COMMUNITY PARTICIPATION & EFFICACY OF WATERSHED DEVELOPMENT PROGRAMME: A CASE STUDY OF KANDI REGION IN HARYANA

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DECLARATION

I, Animesh Kumar, hereby declare that the dissertation entitled *'Community Participation & Efficacy of Watershed Development Programme: A Case Study of Kandi Region in Haryana'* for partial fulfilment of the requirements for the award of the Degree of Master of Philosophy is my bonafide work and may be placed before the examiners for evaluation.

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"Words, like nature, half reveal
and half conceal the truth within"

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Animesh Kumar

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Abbreviations Used:

CPR: Common Property Resources

CRIDA: Central Research Institute for Dryland Agriculture

CSWCRTI: Central Soil and Water Conservation Research and Training Institute

DDP: Desert Development Programme

DEM: Digital Elevation Model

DPAP: Drought Prone Areas Programme

FAO: Food & Agricultural Organisation

FDS: Farmer Drainage Society

FYP: Five Year Plan

GAS: Gross Area Sown

GIS: Geographic Information System

GPS: Global Positioning System

HRMS: Hill Resource Management Society

IAEPS: Integrated Afforestation and Eco-development Projects Scheme

IFAD: International Fund for Agricultural Development

IWDP: Integrated Watershed Development Programme

KMU: Knowledge Management Unit

MADP: Medicinal, Aromatic and Dye Plants

M & E: Monitoring & Evaluation

MDA: Mewat Development Agency

MDB: Mewat Development Board

MMM: Macro Management Mode

NAS: Net Area Sown

NDVI: Normalized Difference of Vegetation Index

PIA: Programme Implementing Agency

PPI: People's Participation Index

PRA: Participatory Rural Appraisal

PRI: Panchayati Raj Institution

PWD: Public Works Department

RVP: River Valley Project

RWP: Rural Works Programme

SDD: Silt Detention Dam

SSD: Sub-Surface Drainage

VDC: Village Development Committee

VDP: Village Development Plan

WARSA: Watershed Areas for Rainfed Agricultural Systems Approach

WDG: Watershed Development Guidelines

WDP: Watershed Development Programme

WUA: Water Users Association

Conversion Scales used:

1 Bigha = 0.17 Hectare

1 Bigha = 20 Biswa

1 Kila = 5 Bigha

1 Kila = 8 Kanal

1 Kanal = 20 Gaththa

Local terms used for various structures and crops:

Cheri – fodder

Gatha – onion

Gochar – village commons (CPR)

Gohar – bridal path

Jhiri – paddy

Johar – pond

Kanak – wheat

Kuhl – canal

Nakka – check dam

CHAPTER I

INTRODUCTION

'Let not even a small quantity of water obtained by rain go to the sea without benefiting man'.

Parakrama Bahu,
12th Century King of Sri Lanka

1.1 Contextualising the Study

Development implies change, and this has been one of the ways in which the term development is used (Thirlwall, 1994). The period immediately following the Second World War was the era of economic growth, wherein enhancing the national income was the sole motive of nations. However, the futility of such a 'growth sans distribution' was soon realised. If the 1980s have been the decade of *human face of development*, the 90s can certainly be designated as the sustainable phase of development (Michael Redclift ed., 2005).

Although a number of attempts have been made to define sustainability, the one given by FAO deserves special mention. The FAO of the United Nations describes sustainability as "management and conservation of the natural resource base and the orientation of technological and institutional changes in such a manner as to ensure the attainment and continued satisfaction of human needs for present and future generations. Such sustainable development (in the agricultural sector) conserves land, water, plant and animal genetic resources, is environmentally non-degrading, technically appropriate, economically viable and socially acceptable" (FAO, 1989)[1].

Among the various facets of sustainability, ecological sustainability is considered the most significant one, as on it depends the very existence of mankind. A society is ecologically sustainable when it conserves ecological life-support system and biodiversity, ensures that uses of renewable resources are sustainable and minimises the depletion of non-renewable resources and keeps within the carrying capacity of supporting ecosystems (IUCN, UNEP & WWF, 2005). In the highly industrialised and developed countries, the environmental economics is largely pollution based, whereas

[1] Quoted in K. K. Raina. (2004). 'Sustainable Mountain Agriculture and Rural Livelihoods through Community based Watershed Development-lessons from Doon Valley (Uttaranchal)'. *Man & Development*. Vol. 26, No.1, March, p. 94

the developing countries are more dependent upon natural resources (Kaiser & Roumasset, 2002).

It is this sustained dependence on the natural resources that the pressure on the existing resources has been mounting over the years. The natural resource dependency has also resulted in diversities as some regions are better in terms of endowments as compared to most others. This diversity, which also gave birth to widespread regional disparities, was tried to be solved with the help of area development programmes. Thus, the dry regions of the country received the maximum attention. However, the rainfed and dry farming areas remained largely neglected[2].

Substantial areas of our country periodically experience droughts leading to considerable loss of agricultural production and livestock wealth, besides causing misery to people inhabiting such areas. Large sums have been spent by the Government for providing relief after the occurrence of droughts. But, such expenditures have not helped to solve the basic problem of increasing the productivity of these areas by conserving soil and moisture and thereby reducing the impact of the severity of the droughts to the human and cattle population. Further, ecological degradation on account of denudation of forests and excessive grazing has resulted in soil erosion and decline in the productivity of the land (Govt. of India, 1994).

A large part of the rainfed region in the country, belong to semi-arid tropics. The semi-arid unirrigated regions are characterised by a few problems – heavy and intense rainfall in a few days result in high surface runoff in the monsoons resulting in soil erosion upstream and siltation and pollution downstream. Also, the rainfall variability is extremely high, and due to lack of supplementary sources of water, leave the farmers exposed to frequent crop failures. Thirdly, the overall low availability of water supply leads to acute scarcity of water, both for human beings as well as crops, the latter leading to low productivity and widespread poverty (Joshi et al, 2004). The major difficulty being faced by the rainfed agriculture is thus not only enhancing yield levels, but also to achieve spatial and temporal stability of yield levels, i.e. across farms and over time. Past experiences have shown that the technological intervention in terms of new varieties of seeds and fertilizers without taking care of the natural resource and environment has led to increase in instability in agricultural growth (Nadkarni, 1993;

[2] The rainfed areas in the arid and semi-arid tropics of India receiving 1125 mm or less of annual rainfall are called as drylands or dry farming areas (Katar Singh, 1991 b, p. 121)

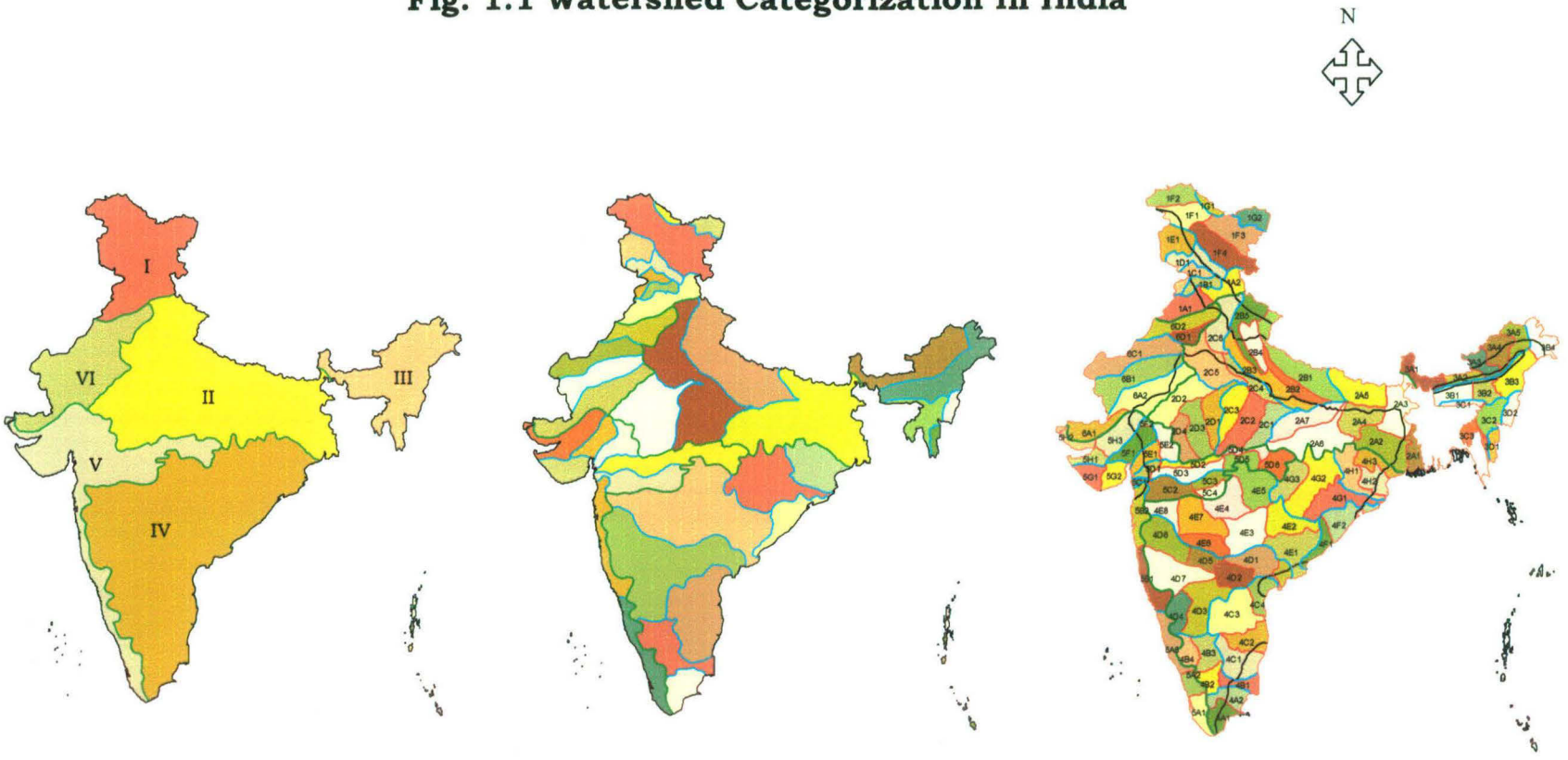
Sarkar et al, 2005). Therefore, if farming has to be made sustainable it is essential that the technological inputs are in tune with land and water resource bases (Shah, 1997).

The watershed development programmes are potential means for tackling the problems of the rainfed regions. A watershed is 'an area of land that captures water in any form, such as rain, snow or dew and drains it to a common water body, i.e., stream, river or lake' (DeBarry, 2004). More specifically 'a catchment or watershed is a natural integrator of all the hydrologic phenomena pertaining to its boundaries and, as such, it is a logical unit for planning optimum development of soil and water resources' (James, 1995). The entire country has been divided into six regions, 35 basins, 500 sub-catchments and more than 3200 watersheds (Fig. 1.1). The size of an average watershed works out to be about 1 lakh hectares. However, working scale operational unit of a micro-watershed has been taken as 500 hectares (Shankar, 1999).

The concept of watershed management is as old as the history of crops grown under irrigated conditions. Sir Arthor Cotton submitted two reports during 1844 and 1845 to the British Government after having surveyed the entire area from Papi Hills to Sagaram in Godavari. This led to the construction of a dam at Dhavaleswaram in Godavari district for utilising rain/run-off water for agricultural development. He also planned for the utilisation of the run-off water to construct dams to Kalirune river water in Tanjavur district of Tamil Nadu and to Tungbhadra river near Bellary (Reddy et al, 2002).

The watershed approach in its present form can be traced back to the 1970s, when the approach was used in a new form in three village level projects that subsequently became very famous – Sukhomajri, Pani Panchayat and Ralegaon Siddhi (Kerr, 2002). These three projects became landmarks in the history of Indian watershed development as they focused on the complementarity between soil conservation and water harvesting, greening the barren villages in the process. Further, these projects, the first two in particular, were also remarkable for their innovative institutional arrangement wherein sharing of costs and benefits were mandatory for productivity gains (Kerr, *op cit*).

Fig. 1.1 Watershed Categorization in India



I. Indus Drainage
II. Ganga Region
III. Brahmaputra Region
IV. Flowing into Bay of Bengal
V. Flowing into Arabian Sea
VI. Ephemeral Drainage

Basins - 35

Catchments - 112

350 0 350 700 1050
Kilometers

Source: Nagaraja (2004)

1.2 Statement of the Problem

The significance of participation of beneficiary population in any developmental programme, particularly watershed development programmes (WDPs) can hardly be overestimated. However, the replication of any participation model has hitherto failed. This shows that the success of participation and in turn watershed programme depends heavily on the characteristics of the area concerned. Thus, the determinants of participation also tend to be location-specific. Among such determinants, the level of development of the village and heterogeneity (of caste and class) in composition of the village population are important ones. The available literature is not clear whether heterogeneity facilitates or impedes participation.

The undertaken research makes an attempt to analyse the spatial variations in the levels of participation, and the determinants thereof, over the sample villages through a set of indicators. This is followed by an impact evaluation of the watershed programme in the same set of villages in physical and socio-economic terms. Finally, the two analyses have been linked up together with a view to assessing the implications of participatory management on the impact of watershed programmes. Based on the assessment of the research, an analytical framework may be developed which may be utilised for assessing the determinants and implications of participation in other areas with similar characteristics.

1.3 Review of Literature

Most people living in the semi-arid tropics depend on agriculture and natural resource management for their livelihood. So, the planners were eager to implement productive, environmentally sustainable land and water management systems. It was with this view that the watershed development programmes were launched in the dry areas, which increasingly became popular, with a current annual budget from all sources exceeding 500 million US dollars per year directed towards the development of micro-watersheds (Farrington et al, 1999).

The watershed development has attracted considerable attention because it is central to any strategy to develop rainfed agriculture or improve natural resource management. The development of rainfed agriculture is being emphasised as growth in its productivity has lagged behind that of irrigated agriculture (Kolavalli & Kerr, 2002).

Soil and moisture conservation, the core element of watershed development, has always been considered to be fundamental to improving rainfed agriculture (Seth, 1999).

The huge volume of literature on watershed development and management can be categorised into four broad sections. The institutional and participatory issues are the prime focus of the undertaken research and hence form the first section. The second one pertains to the impact-based studies, some of which looked into the ecological gains, while others concentrated on socio-economic advantages. The subsequent section looks into the gender related issues in watershed. The last section forays into the domain of information technology and evaluates the scope of application of remote sensing and GIS in watershed studies. Finally, the critiques of watershed development have been dealt with followed by a discussion on the issues emerging from the available literature.

1.3a Institutional Aspects & Participation in Watershed Management

The initial watershed programmes could not bring in desired benefits as the beneficiaries were not aware of the significance, method and utility of the activities being carried out and hence could not relate to it. There have been loads of evaluation-based studies, most of which have been systematically catalogued (Chadha et al, 2004; Reddy, 2000), and most of which have also felt the need of people's participation, but it has been given merely cursory glances or residual significance. The majority of studies emphasised technology rather than managerial aspects.

While these studies helped in establishing watershed as a viable technology, its sustenance in the longer run remained a bottleneck. In a number of areas, the watershed programmes have been highly successful and have even accomplished their targets in a hurried manner. However, in the process, the required institution-building framework and grass root leadership building have been overlooked. This poses grave threat to the sustainability of such programmes (Yugandhar et al, 1999). It has been estimated that in the Indian context, where a great deal of emphasis has been placed on watershed development, 99 percent of watershed development projects are still based on conventional approaches emphasising physical planning without attention to local economic, social, or ecological conditions (Farrington and Lobo, 1997).

Hence, the significance of participatory watershed development was realised, which also had its repercussions on the literature. It was also realised that human resource development should precede external technical watershed management activities (Datta & Virgo, 1998). Community participation was accepted widely as being necessary for sustainable watershed development (Raina 2004; Mukhopadhyay, 2003; Kolavalli & Kerr, 2002; Reddy, 2000; Rao, 2000; Arya & Samra, 1994; Rao, 1992; Singh, 1991a & b, etc.). It has been rightly pointed out that 'the single most important factor accounting for the positive impact of watershed development under the government sponsored programme in different parts of the country.....is community participation and decentralisation of programme administration made possible under the new guidelines'(Rao, 2000).

Various individual choices in aggregation have collective consequences on the management of natural resources. Other things remaining the same, inadequate participation leads to insufficient watershed management of an agricultural parcel and to land degradation; at the same time adequate participation generally results in joint benefits like reduction in soil erosion and increase in productivity (White & Runge, 1994). Further, the achievement of specific objectives for improving their resource position through collective efforts imparts greater confidence in the people (Wignaraja, 2000).

The 1994 guidelines for watershed development issued by the Ministry of Rural Development (MoRD) made it very clear that people would contribute directly to watershed management and then derive benefit from it. In this sense watershed programme is essentially an *in situ* development programme where optimum harnessing of indigenous technology becomes a critical input (GoI, 1994).

The complex nature of watershed development and management calls for a comprehensive understanding of the situations under which watershed technology becomes economically viable, socially acceptable and ecologically sustainable in the long run (Reddy, 2000). The available literature on watershed management has concentrated more on the techno-economic aspects of the programme. Though almost all the studies make a cursory statement at the end regarding people's participation, only a few have attempted to analyse and understand the process of collective action, either theoretically or empirically. Consequently, people's participation in watershed

management has remained cursory even in policy formulations and the consequent low adoption or success rates, at least till half a decade before.

Participation in its literal sense, implies 'a dynamic group process in which all members of a group contribute, share, or are influenced by the interchange of ideas and activities towards problem-solving or decision-making' (Banki,1981). People's participation in watershed management is defined as employing a method where the associated communities are motivated to function and contribute as a group to perform a pre-determined task (Pal, 2001). It implies 'communities' being involved in the analysis of the soil and water conservation problems and 'jointly' arriving at strategies to alleviate them. It has been argued that the aspects critical for such processes are the ability of members to participate 'as community' or to have 'collective' voice (Kerr, 2002). Participatory management or collective action being a critical factor in watershed management, it would be imperative to review the literature on the theoretical aspects of collective action.

Collective Action is a situation in which everyone (in a given group) has a choice between two alternatives and where, if everyone involved acts rationally (in the economic sense), the outcome will be worse for everyone involved, in their own estimation, than it would be if they were all to choose the other alternative (i.e., than it would be if they were all to act "irrationally" – in the economic sense). Thus, the theory of collective action attempts to explain the likelihood of success by a given set of individuals in undertaking activities, including the establishment of rules, which may benefit them collectively. The 'flip' side of the theory is, of course, a theory of why and how collective action failures come about. Such failures stem generally from the 'free-rider problem' which is derived from the public goods aspect of group action (Nabli & Nugent, 1989).

The theory of collective action originated with Olson (1965) and was extended by G. Hardin (1968) and others, and deals primarily with the pure public goods (e.g. national defence, contagious disease eradication, general tax reduction, tariffs with competition, farm subsidies, etc.) as well as the common property resources (e.g. open range grasing land, large river or canal transport, city streets, cartel pricing, etc.). Since these goods, whether congestible or not, share the characteristics of being jointly consumable and non-excludable, they also share the property that their existence gives rise to incentives for group members to 'free-ride'.

The incentive to free-ride arises with jointly consumable and non-excludable goods as, because of non-excludability, the benefits of collective action accrue even without participation in the costs of production of the good. This situation gives rise to a typical situation, popularly called as 'prisoner's dilemma'. This is a situation in which it pays each of several economic agents individually to behave in a particular way, even though it would pay them as a group to behave in a particular way. The prisoner's dilemma is a classic and fundamental concept in game theory.

By convention, in any Collective Action Problem, the economically rational alternative is referred to as "Defection" ("D"); and the economically irrational alternative is referred to as "Cooperation" ("C"). The theoretical underpinning of the literature on collective action has been provided by the standard one-shot *prisoner's dilemma game* in which 'defection or non-cooperation is the dominant strategy of each player, no matter what the other players do.

But as Taylor (1987) and others have pointed out, the constellation of costs and benefits of collective action on common pool resources such as water is often of a kind which is much more favourable to the possibility of co-operation than the prisoner's dilemma game.

If we take the case of the 'Chicken game' (as pointed by Taylor), or the Hawk and Dove game (as pointed by some evolutionary biologists), the ultimate result is not defection but co-operation. Suppose two neighbouring farmers are pondering the issue of who will carry out the essential maintenance work on the irrigation ditches which both use. Either farmer can do it by himself, but each of course, prefers to free ride on the other's work. The literature usually jumps to the extreme case prisoner's dilemma immediately on mentioning of the free-rider's problem.

But in the case of many vital common-pool resources such as water the consequence of 'defection' on the part of both agents may be so bad that either of them would rather do the work himself if the other did not. There are, of course, cases in which an individual farmer cannot by himself do the whole job, and the extra benefits from the part of the work done by him do not fully cover his costs. Under such a circumstance each farmer co-operates when the other does, but defects when the other defects. This is an assurance game, which captures a widely observed phenomenon in the field studies: no body wants to be 'suckered' but one tends to be co-operative when the

others (at least a critical mass of others, in a multiperson game) are cooperating – something that the prisoner's dilemma game fails to capture (Bardhan, 1993).

Coming back to participation, it would be imperative to look into the theoretical underpinnings to this term as well. The term has several interpretations attached to it. With the increasing literature that has built up on the subject in the last two decades, the scope of the term has steadily widened. It has become an umbrella term to refer to a host of theoretical orientations, practices and beliefs concerned with the people's role in the development process (Sharma, 1999). The participatory approach to development owes its burgeoning popularity to a widespread concern with the shortcomings of the past development strategies which in many cases made little or no difference to the lives of large segments of population, especially the poor, the women, the tribal and the vulnerable groups.

Participation involves voluntary contribution by people in programmes and projects to bring about the needed changes either among the people or in the environment. There are several ways in which participation has been conceived – as involvement in people's development of themselves, their lives and their environment; or, as a way of achieving certain specific targets in which the local people participate in outsider's project (Muthayya, 1995).

The watershed approach follows the second version of participation to achieve its objectives. That participation is a key ingredient of successful watershed development in India, is widely shared among policy makers, donors, researchers and others (Sinha, 1994; Deshpande & Rajasekaran, 1995). The main approach followed under the Integrated Watershed Development Programme (IWDP-Hills) is that it is a truly people's programme and the role of the government is limited to providing only infrastructural and technological support (Jha, 1999).

In any watershed project, productivity and conservation aspects are highly complementary. This is because conservation of soil, water and natural vegetation leads to higher productivity of crops and livestock. However, the interrelationships among these two factors and poverty alleviation are quite ambiguous as the wealthier landowners tend to get benefited from the watershed projects and that too at the cost of the landless poor. This leads to conflict between the rich and the poor, wherein the latter tend to become hostile towards the new programme. Thus, there is an observed

difference in behaviour between the small and large farmers (Sastry et al, 2003; Kerr, 2002; Deshpande & Reddy, 1994). It has also been observed that in most cases the participation of local people in watershed programmes does not go beyond the landowners, while among the landless, institutional building remains limited to the formation of a few SHGs (Sastry et al, 2003). Political domination of the watershed institutional mechanism has been common in a few areas (Adhikari et al, 2003).

The past watershed programmes often failed to reach the poorest households and disproportionately benefited the better off sections of the community. This is reflected above all in the pattern of expenditure on different activities in watershed programmes, with an estimated 70 per cent of funds used for land and water management interventions that predominantly benefit larger farmers and only 7.5 per cent being used to support the livelihoods of poor and landless families (GoI, 2001d).

Several approaches have been put forward to resolve the equity issue in watershed management. One such approach is 'ridge to valley' treatment of the watershed basin that gives preference to small and marginal farmers who are located on the degraded slopes of the higher reaches of the watershed. Another approach is to treat the entire land in the village rather than restricting to 500 hectares of the micro-watershed. This approach facilitates the coverage of all the sections of the landed households and ensures better participation and cooperation (Soussan & Reddy, 2003). Yet another approach is the need to ensure better access to the benefits of watershed development for landless and land poor people by 'de-linking' access to water from land ownership, i.e. to treat water as a public good to which all sections of the community have equal rights and entitlements (Reddy, 2002).

After the 73rd Amendment Act, watershed development was included in the schedule of subjects to be handled by the Panchayats. This provided opportunity for combining development of grassroots democracy and natural resources in a symbiotic manner (Pal, 2001). In fact the revised 2001 guidelines for watershed development says that the chief executive officers shall be a member of the district watershed development committee and further that the "PRIs shall have the right to monitor and review the implementation of the programme" (GoI, 2001 a). Thus, there seems to be an overlap of jurisdiction between PRIs, WUAs and watershed committees. It needs to be realised that PRIs exist, have strong historical tradition in independent India and have recently

acquired constitutional status. Thus, there is a need to look for spaces within the PRIs for their role in water resources management (Upadhyay, 2002).

The participation of local people in watershed projects has been a perpetual problem for the Programme Implementing Agencies (PIAs). People's participation in most areas has been found to be poor except in the cases of wage earners and subsidy beneficiaries. People prefer to attend to their individual direct benefits rather than long term benefits (Reddy et al, 2002). Wherever watershed programme has been unable to generate sufficient employment it has failed miserably (Meher, 2002).

It has been seen that active beneficiary participation brings in better impact of the watershed programme when compared with the passive beneficiary participation (Deshpande & Reddy, 1994). Further, the poor show unwillingness to pay for the programme. The problem becomes more acute in the case of Common Property Resources (CPR) as it is easy for the PIA to encourage people to pay in circumstances where private gains are assured, but it is immensely difficult in terms of societal good as a whole (Shah, 2005). People's contribution is found to be almost nil in the case of CPRs and 10 – 15 percent in the case of private land (Kolavalli & Kerr 2002). In this regard the experience of MYRADA (in Kadiri – AP and Kollegal - Karnataka), Karnataka Watershed Development Project (KAWAD) and Chaitanya (Hindupur – AP) are worth noticeable. It has been demonstrated here that if farmers are convinced of the economic returns they can be made to share as much as 50 – 60 percent of the cost and even borrow money to pay for such costs (Iyenger et al, 2002[3]; Kolavalli & Kerr, 2002).

Determinants of Participation: Though it has been reiterated for umpteen instances and established that for any successful watershed programme, participation is vital, the essential prerequisites for participation is still being debated. Further, though almost all projects claim to adopt a participatory approach, the very meaning of 'participation' changes from one project to the other and from one agency to the other (Kerr et al, 2002).

Educational status and income level have been deemed to have a positive influence on people's participation. It has been argued that educated people possess greater awareness and hence easily get motivated to participate in the programme activities

[3] S. Iyenger, et al (2002), 'Report of the Mid-Term Evaluation of KAWAD', submitted to DFID, Gujarat Institute of Development Research; quoted in Amita Shah (2005)

(Chand et al, 2001; Pal, 2001). Evolution of a participatory process is dependent on a variety of factors, viz. size of the group, internal coherence, intra-group communications, balance of individual vis-à-vis group interests, extent and severely of the problem, social pressure and other relevant characteristics of the social group (Deshpande & Reddy, 1994). The significance of a good leadership remains unquestioned. It has been largely realised, particularly after the Ralegaon Siddhi success story, that for a successful watershed programme, an efficient leadership is mandatory (Chand et al, 2003; Reddy et al, 2001; Singh, 1991 a).

A considerable amount of theoretical and empirical research has focussed on the heterogeneity of population composition and its relation with the level of collective action of the concerned population. Two schools of thought emerge if the various arguments put forward by scholars are analysed. The first school, that can be designated as 'homogeneous' argues that for an efficient participation the relevant group should be uniform, economically or socially. They presume that the individuals prefer to interact with others who are similar to themselves in terms of income or ethnicity. (Silva & Pai, 2003; Alesina & Ferrara, 2000; Joshi & Bantilan, 1997; Deshpande & Nikumbh, 1993; Suresh, 1990). They believe that social capital turns out to be lower in more unequal and heterogeneous communities.

On the other hand the 'heterogeneous' school believes in diversified groups so that participation emerges from inter-dependency of needs (Kurian, et al 2005; Kurian et al, 2003; Chakravarty, 1999). It has also been argued that collective action become more feasible when one or several members own a higher proportion of assets (Olson, 1965). A sub-stream of the same school believes that heterogeneity in the entire group does not directly affect participation, but it is actually heterogeneity in the elite and political group of the village that has a greater influence on participation (Vedeld, 2000).

However, both the schools, in general, believe that a small group is always better for an efficient participation. The literature also cites instances wherein heterogeneity ensures participation, however, as the degree of heterogeneity increases, the level of participation declines, thus leading to a U-shaped curve of participation on the scale of heterogeneity (Baker, 1998; Dayton-Johnson & Bardhan, 1998; Molinas, 1998). There are also instances where it has been asserted that heterogeneity in user population has *no* determinant effect on collective action (Varughese and Ostrom, 2001; Vedeld, 2000).

Further, participation generally is ensured if the farmers get direct benefits (Joshi & Bantilan, 1997; Arya & Samra, 1994; Singh, 1991a). Else where too it has been found that wealth redistribution that gives more assets to a positive contributor to a public good induce a higher level of contribution from that individual (Bergstrom et al, 1986). What makes participatory process more complex is that it is a continuous process of learning and adjusting to new situations (Chopra et al, 1989).

Watershed management through people's participation is highly dependent upon a variety of factors – viz. micro-situation, ownership of resources, composition of inhabitants, politico- religion considerations and traditional customs. It is therefore very difficult to give specific indicators but nevertheless there are some ways to analyse the level of participation (Samra, 1999). A few attempts have been made to measure the level of participation. A significant contribution towards quantification of participation has been the preparation of a People's Participation Index (Singh, 1994; Chand et al, 2003; Chand et al, 2001). The PPI involves a number of variables that encompass various facets to capture participation, viz. participation of women, formation and functioning of SHGs, expenditure on common lands and so on.

The sustainability of any watershed programme depends upon capacity building by providing adequate training to the village level committees and involving the people at the time of planning, thus improving their skills and institutional capabilities. Sustainable development can be achieved only if the village level committees are made independent, without any external dependence, after handling over the project (Meher, 2002; Datta & Virgo 1998; Joshi & Bantilan, 1997). The planners should also consider providing employment opportunities to the landless, which should not only be remunerative but also be extensive so that the benefits reach everyone (Bhatnagar, 1996).

The revised guidelines for watershed development 2001 in fact lays down that one of the objectives of watershed development projects will be encouraging village community for: (a) Sustained community action for the operation and maintenance of assets created and further development of the potential of the natural resources in the watershed. (b) Simple, easy and affordable technological solutions and institutional arrangements that make use of, and build upon, local technical knowledge and available materials (GoI, 2001a).

1.3b Evaluation Related Studies

The impact analysis of watershed programmes is subject to a number of limitations. This is because:

1. A large part of the benefits generated through watershed programmes are in the form of environmental regeneration and hence difficult to assess in monetary terms.
2. The impact of watershed programme is situation specific and has a long gestation period.
3. The benefits generally accrue at societal levels and hence are difficult to be isolated at household levels (Shah, 2005).

A recent study of project implementation under MoRAE suggested that lack of implementation capacity is the major reason for poor performance of the project. And that training alone will not be adequate as the incentives to participate in training itself may be weak (Farrington et al, 1999). What is concerning is that such limitations arise even in the cases where the project implementation has been fairly participatory. The need therefore is to understand the dynamics of the three inter-related aspects which eventually determine the impact (or outcome) of watershed projects. These are:

(i) technology, physical treatments and economic returns;

(ii) institutions that ensure efficiency in resource-use; and

(iii) market linkages essential for enabling the project to sustain beyond the initial funding, and for spreading out to larger number of beneficiaries as well as areas.

A number of attempts have been made to analyse the impact of watershed development. In fact the evaluation related studies dominate the available literature on watershed development. Most of the studies have limited their analysis to a particular sub-watershed or micro-watershed and have tried to measure the impact of watershed development in a variety of terms.

All the impact analysis studies have adopted either or both of two approaches. A number of studies have adopted the 'before-after' approach (See Table 1.1). At the same time, others have resorted to the 'with-without' approach for impact analysis (See Table 1.2). Both the approaches have there respective advantages and

disadvantages. The former approach is easy to follow if the data is available, while the latter one is generally followed under the conditions of paucity of information regarding pre-project phase. However, the temporal approach has often been criticised because it fails to capture the concurrent developmental programmes apart from the watershed programmes. Thus, the scenario at the time of survey cannot be wholly attributed to watershed programmes. At the same time, the spatial approach comes under criticism as the extremely high location-specificity of watersheds makes it difficult to select a non-programme area with similar physical and socio-economic characteristics.

Table 1.1: Impact Analysis Using Before-After Approach

Author(s)	Watershed(s)	Area	Major Findings
Mahnot, Singh & Sharma (1992)	Thakarda	Dungarpur (Rajasthan)	The watershed programme has resulted in enhanced economic opportunities and development of dairy sector.
Dhyani et al (1993)	Bhaintan	Tehri Garhwal (Uttaranchal)	Out-migration and risk to the fragile ecology in hilly regions can be efficiently arrested by adopting soil and moisture conservation technologies on watershed basis.
Deshpande & Reddy (1994)	Ase & Poshera Micro-Watersheds (Adgaon Watershed)	Maharashtra	Positive impact on crop production, increase in cropping intensity and shift towards high value crops observed.
Dhyani et al (1995)	Bhaintan	Tehri Garhwal (Uttaranchal)	Watershed development is the most efficient way of meeting the food, fodder and fuel requrement of its inhabitants, particularly in hilly areas.
Hazra (1998)	Tejpura	Jhansi (Uttar Pradesh)	Watershed development has had drastic positive impact on cropped area, cropping intensity and irrigated area leading to high agricultural productivity.
Topal, Mishra & Kothyari (1999)	Bheta Gad & Garur Ganga	Kumaun Valley (Uttaranchal)	Push factors are much more dominant as compared to the pull factors in effecting out-migration.
Shah (2001)	-	Gujarat	Watershed induced irrigation tends to arrest distress out-migration.

Reddy, Sastry & Singh (2001)	Ralegan Siddhi	Ahmednagar (Maharashtra)	Economic upliftment and an efficient selfless leadership (Sri Anna Hazare) is the key to a successful watershed programme
D. V. Ramana (2002)	269 Watersheds	5 States	Adoption of local technology is essential for a successful watershed programme
Chand et al (2003)	15 Watersheds	Coimbatore & Tirunelveli (Tamil Nadu)	Watershed programmmes have resulted in an increase in land value and infrastructural development.
Adhikari & Sau (2003)	4 Micro-Watersheds	Midnapore (West Bengal)	Change in cropping pattern in favor of high yielding and commercial crops. Watershed committees marked by single party domination.
Raina (2004)	Various	Doon Valley (Uttaranchal)	Food and livelihood issues should be given priority in any watershed programme.

Table 1.2: Impact Analysis Using Before-After & With-Without Approach

Author(s)	Watershed(s)	Area	Major Findings
Saraswat, Nadda & Sikka (1990)	Kalol	Bilaspur (Himachal Pradesh)	Marginal impact of the programme was observed on agricultural productivity.
Deshpande & Reddy (1991)	3 Micro-Watersheds	Solapur, Aurangabad & Akola (Maharashtra)	Location-specificity is extremely important in watershed planning. Level of income inequality lower in the watershed areas than the untreated hinterlands.
Mahnot, Singh & Sharma (1992)	Thakarda	Dungarpur (Rajasthan)	Watershed development has resulted in drought-proofing in the watershed areas.
Amita Shah (1997)	Vatrak & Narmada Micro-Watersheds	Gujarat	Negligible differences between adopters & non-adopters of soil conservation measures observed. Farmers stick to the traditional measures and still associate their gains to rainfall and fertilisers. They stress on making the best when the weather conditions are favorable and not on stabilising the yields when the rainfall is erratic or low

Deshpande & Rajasekaran (1997)	Bugewadi & Nune Goudi	Ahmednagar (Maharashtra)	Watershed development has helped in the minimisation of entropy in the production process.
Kumari et al (1999)	Gorantlapalle	Chittoor (Andhra Pradesh)	Income ineqaualities in terms of net farm returns in watershed areas have been much lower.
Anil Shah (2000)	Watersheds in 8 districts	Gujarat	The watershed projects have led to significant level of drought proofing. Expenditure on drought proofing could now be redirected towards watershed development.
Shiyani et al (2002)	4 Watersheds	Southern Saurashtra (Gujarat)	Increase in cropping intensity, productivity and employment generation observed. Reduction in income disparities among the beneficiaries.
Narayanamoorthy & Kshirsagar (2002)	Gaosud	Osmanabad (Maharashtra)	Watershed programme can be taken up not only for economic development but also as a permanent remedy for the drinking water problem.
Reddy, Prakash, Sastry & Singh (2002)	37 Watersheds	Different Agro-eco Zones	Selection of villages for watershed development pertained to advanced villages, political factors and officials' contacts with the local leaders and not on scientific lines and grid or benchmark survey.
Rathore (2003)	Bilriya & Tambesara Nandali & Samliya Pandiya	Banswara Dungarpur (Rajasthan)	Watershed development has resulted increase in gross cropped area, supplementary irrigation as well as productivity levels.

As already mentioned, the location specificity of watershed programmes makes any generalisation of their impact quite difficult. However, the literature on watershed management suffers from a major lacuna. Majority of them undertake impact evaluation studies with parameters that are mostly pre-determined. Wide variability in bio-physical and socio-economic conditions implies that the parameters have to be locally adapted for an efficient evaluation (Amita Shah, 2000).

Further, apart from irrigation-induced improvement in productivity and net-returns, there is limited impact in terms of environmental regeneration and sustainable livelihood among the poor. As a result, watershed projects as of now, are characterised by certain critical missing links such as: regeneration of CPRs and degraded forest in a large number of watershed projects (Shah, 1999). What is more concerning is that in most cases the environmental impact is captured only through indirect measures (Chopra, 1999).

Most of the studies assess the impact in terms of either physical or socio-economic criteria. Among these, impact on cropping pattern, land use, crop productivity, income inequality, etc. have been commonly analysed. Attempts have also been made to assess the impact of watershed implementation on drought proofing wherein in most cases it was observed that the effect of droughts has substantially reduced (Raina, 2004; Anil Shah, 2000; Mahnot et al, 1992).

A new development in the domain of evaluation related studies has been the increased use of SWOT Analysis (Raina, 2004; Sastry et al, 2003; Chakravarty, 1999; Das & Kumar, forthcoming). The SWOT studies came into prominence only after 1994. A SWOT (Strength, Weakness, Opportunity and Threat) analysis helps to identify prospects and problems of the scheme clearly. Strength is the basic factor of the programme that would provide competitive advantage for development. Weakness is considered as the liability of the programme that would create disadvantage for its development. Opportunity is the chance and ability of the programme which would enable it to achieve the desired goals. Threat is an externality which creates or blocks the abilities / chances of the scheme to achieve its objectives due to inherent drawbacks in the society (Sastry et al, 2003). SWOT analyses are more of an iterative process rather than a linear one, and has become an established method for assisting the formulation of strategy (Dyson, 2004).

1.3c Gender Related Studies

It has been rightly emphasised that when deprived and marginalised groups are the focus for development activities it gives them a direction and purpose and hence a better chance of success of the developmental programmes. Over the last few decades eco-feminism has emerged as a pluralistic, bottoms-up movement in different parts of

the world; harmonising women's economic and social needs with the environment that sustains them (Gate, 2001).

The fundamental obstacle for the women has been their minimal ownership of resources, lack of access to the use of both private and common land and negligible access to resources for investments to develop the wastelands (Banerjee, 1995). A few studies have depicted the poor plight of women and dominance of men in watershed activities (Adhikari, 2003; Singhal, 1999). However, despite the stiff resistance they face the women, in a number of cases, have turned out to be the prime movers of watershed activities (Raina, 2004; Gate, 2001; Banerjee, 1995). Further, they have also been found to be more receptive and capable of forming cohesive groups to manage natural resources if given proper guidance (Chakravarty, 1999; Datta & Virgo, 1998). Involvement in watershed programmes offers unique opportunities to rural women to improve their economic status and hence enhance their status in the society (D'Souza, 1997). Success of watershed programmes in a number of programmes like Sukhomajri and Banga (Haryana), Anola and Tejpur (UP), Chavela (AP) and Mittemari (Karnataka), has been attributed to community action and women's participation (Mukhopadhyay, 2003).

The role of women is often invisible but in fact they are the real traditional decision-making power group in the rural areas. The aim should be for the women to be self-reliant and solve their problems with minimum external intervention (Mukhopadhyay, 2003; Mascarenhas, 1999). The women should be made part of the PRA exercises done before the planning and implementation of watershed projects so that they may themselves point their problems (Rao, 1998[4]). However, there is also a flip side to it. Though the participation of women in decision making process increases the effectiveness of programmes, their representation has often been taken for granted (Paudel, 2002). It has been cautioned that the involvement of women in watershed activities should not be done at the cost of their quality of life, meaning thereby that they should not be burdened more than they already are, with additional jobs and responsibilities even if these are of an income generating nature (Shiyani et al, 2002; Mascarenhas, 1999). Further, they should also be given technical and social support

[4] V. Rukmini Rao (1998), 'Gender and Participation in Watershed Management', in Farrington et al ed 'Participatory Watershed Development: Challenges for the 21st Century', OUP, ND

like assistance in child care so that they may play a full role in watershed development (Pangare & Farrington, 1999[5])

1.3d Application of Remote Sensing & GIS

Watershed development involves the incorporation of a number of developmental factors in an integrated manner. An efficient planning for such a development network involves massive data intake, voluminous processing and detailed analytical works. Further, watershed planning requires a proper amalgamation of people's requirements at the grass root level and suggestions for solutions with the technical information about the area to be treated and technically viable solutions. Data based on remote sensing enables one to get a coverage that would otherwise not be possible with the technique of primary surveys, particularly so far as the natural resource status is concerned.

The use of GIS proves out to be handy right from the level of data illustration to manoeuvring mapped data, processing to generating final maps as per the requirements. GIS proves out to be a boon for performing several map merging exercises which are extremely difficult manually and at the same time the automation has sufficient capacity for human control and intervention (Saraf, 1999). The use of GIS is quite effective in planning the integrated development of a watershed as the remotely sensed data can be matched or integrated with the conventional database (Navalgund & Tamilarasan, 1998).

The application of remote sensing and GIS as instruments in watershed development has proved to be quite helpful. This is particularly true for boundary delineation studies using digital elevation model (DEM) and classification of groundwater potential zones (Gowd et al 1998; Kumar et al 2000). Land degradation can be precisely and accurately analysed with the help of satellite imageries (Saxena, 2000). Further application can be seen in land cover and land use studies, which are essential for impact analysis (Overmars et al 2005; Gowd 2004; Kannan et al 2002; Saxena et al 2000).

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[5] Vasudha Lokur-Pangare & John Farrington (1999) 'Strengthening the Participation of Women in Watershed Management' in Farrington et al ed (1999), *op cit*

The satellite imageries have become a handy tool for natural resource conservation due to their repetitive (temporal), multi-spectral scanning and synoptic coverage leading to generation of sequential images. Further, their greatest advantage can be assessed in terms of their role in impact evaluation. They can easily assess the increase in cropped area and biomass with the help of Normalised Difference of Vegetation Index (NDVI) (Jain, 1999).

An important contribution of GIS is the formulation of a Spatial Decision Support Systems (SDSS) which can be effectively used to calculate the effectiveness of existing resource management strategies (Kaur et al, 2004; Palanisami, 2002). Attempts have also been made to construct a Watershed Planning Support System using GIS and GPS (Rajakesavan, 2002). Although the capability of remote sensing and GIS in watershed management has been proved beyond doubt, its operationalisation in wider terms is yet to be achieved (Rao et al, 2003).

1.3e Critiques of Watershed Programmes

Of late the watershed programmes have been seen to be more of a welfare scheme than a land-productivity enhancement programme. This was as a result of the guidelines of the government that makes participation necessary for programme implementation (GoI, 2003). To involve the local people in the project, employment generation was deemed necessary. Further, by then the futility of employment generation programmes had also been recognised (Bhatnagar, 1996). Thus, the watershed programme was launched to assimilate the twin objectives of regeneration of land-productivity and generation of employment.

However, the inability and unwillingness on the part of the villagers compelled the government to provide huge subsidies. Thus, subsidies are offered for enhancing the resource use rather than the efficiency thereof (Shah, 2005). People feel that the WDP is a subsidy oriented programme rather than a natural resource development and employment generation programme. Thus, even the self-reliant farmers develop a dependent attitude over the watershed programme rather than getting actively involved in it (Sastry et al, 2003).

One of the basic problems, left largely ignored for long, has been the prioritisation of watershed programmes. It is universally known that the neglected areas of the country

are mostly in the hilly and dry areas. However, when it comes to allocation of resources, state being the unit of resource allocation, physical area of each state becomes the sole criterion for funds disbursement rather than the requirement of the specific regions. It has been argued that the level of ecological and socio-economic vulnerability of a specific area should be the criterion for prioritisation of resource allocation (Sen & Banerjee, 2004).

The mode of implementation of watershed projects has also often been questioned. As most projects are centrally designed, the project design and processes are treated as given, thus leaving a lot of potential benefits untapped. There is a need for location specific adaptation of technologies that can enhance productivity as well as ensure sustainability, which is particularly true for the less favorable rainfed areas (Kerr et al, 2002; Amita Shah, 2000).

Another constraint of watershed programmes in the country has been the multiplicity of agencies. Resultantly, there are overlaps, at the same time some areas remain unserved. Therefore, integration of the watershed works by various ministries, particularly between rural development and agriculture is called for. Integration of watershed work with Joint Forest Management (JFM) is also essential and hence there should also be active involvement of the Ministry of Environment and Forest (Rao, 2000). Integrated watershed development has been advocated to mitigate this problem (Rajagopalan, 1991).

Problems with the project implementing agencies have also been cited. The governmental agencies have been criticised for their bureaucratic attitude, particularly in terms of generation of participation (Kerr et al, 2002). The NGOs have been the most hailed agencies for watershed implementation. However, it has been seen that many NGOs do not have the requisite experience nor will to handle such a huge programme and function merely for self-aggrandisement (Shah, 1999; Sastry et al, 2003).

1.3f Issues Emerging from Existing Literature

1. Participation depends on a variety of factors; the determinants of participation need to be comprehensively documented and generalised.
2. A number of studies have made mention of homogeneity or heterogeneity of beneficiaries as a condition for success of participation. Both the schools of

thought have given their own views and arguments on the necessity of either factor for generation of participation. Further, the debate on the issue needs to be raised in participatory watershed management.

3. There seems to be a lack of clarity as to whether it is the characteristics of a given community of beneficiaries that influence participation, or whether, given these characteristics, they have devised some institutional mechanisms to ensure participation.

4. A number of studies have been undertaken in a project context; this makes it difficult to distinguish between collective action in various activities and institutional building and mere participation in project activities.

5. The impact evaluation studies have been mostly executed with more or less set parameters, which might not be applicable due to high location-specificity of the watershed areas.

1.4 Objectives of the Study

The present study aims at analysing the differentials in participation over space – physical, social and economic – and makes an attempt to relate participation and efficacy of watershed programmes. The specific objectives of the study are:

1. To identify the spatial pattern of agricultural problems in Haryana and relate the progress of land development programmes implemented with particular reference to watershed development programmes.

2. To analyse the nature of peoples' participation in the watershed programme with respect to levels of development and economic and social composition of village community.

3. To make an impact analysis of the watershed programme in the selected villages and to see whether levels of participation have implications on the impact of watershed programme.

1.5 Hypotheses

1. Level of participation is directly proportional to the level of development.
2. Level of participation is directly proportional to economic and social homogeneity of inhabitants.
3. Level of participation influences the outcome of the watershed programme. Impact of watershed programme would be higher at a place where participation has been higher.

1.6 Database

The analysis in this study has primarily been undertaken at the village level and most of the data used in the study have been collected through a primary survey. Some unpublished sources of information like the Village Development Plans (VDPs) and record books of the watershed office have been used. Besides, secondary sources of information like District Census Handbooks of Census of India (2001) and Annual Administrative Reports of Government of Haryana have been used. For district level information, data from Statistical Abstracts of Haryana have been utilised (Table 1.3).

Table 1.3 Variables Considered & Sources of Data

Issue	*Variable / Indicator*	*Source*	*Level of Information*
Level of Agricultural Development in Haryana	Share of NSA	Statistical Abstract of Haryana	District
	Agricultural Productivity		
	Cropping Intensity		
	Irrigation Extent		
	Irrigation Intensity		
	No. of Tractors		
	Rural Literacy		
Identification of Problem Areas	Share of NSA	District Census Handbooks	Block
	Irrigation Extent		
	Literacy Rate		
	Female Literacy		
	Share of Marginal Workers		
Project Information (IWDP-Hills)	-	Annual Administrative Reports	Sub-watersheds
		World Bank Reports	

Impact Evaluation	Share of Culturable Wasteland	District Census Handbooks, 1991 and 2001	Village
	Share of net area sown to the total cultivable area		
	Share of Irrigated Area		
	Cropping Pattern & Yield	Primary Survey	Household
	Irrigation Source		
	Fodder Procurement		
	Other Benefits		
Level of Development	Agricultural Land	District Census Handbooks	Village
	Irrigated Land		
	Proportion of Landless	Primary Survey	
	General Perception		
Level of Heterogeneity	Caste Heterogeneity	Primary Survey	Village
	Class Heterogeneity		
Level of Participation	Level of Awareness	Primary Survey, FGDs	Household, Appropriate Groups
	Involvement in VDC and Gram Sabha		
	Cost Shared		
	Willingness to contribute for repair / maintenance		

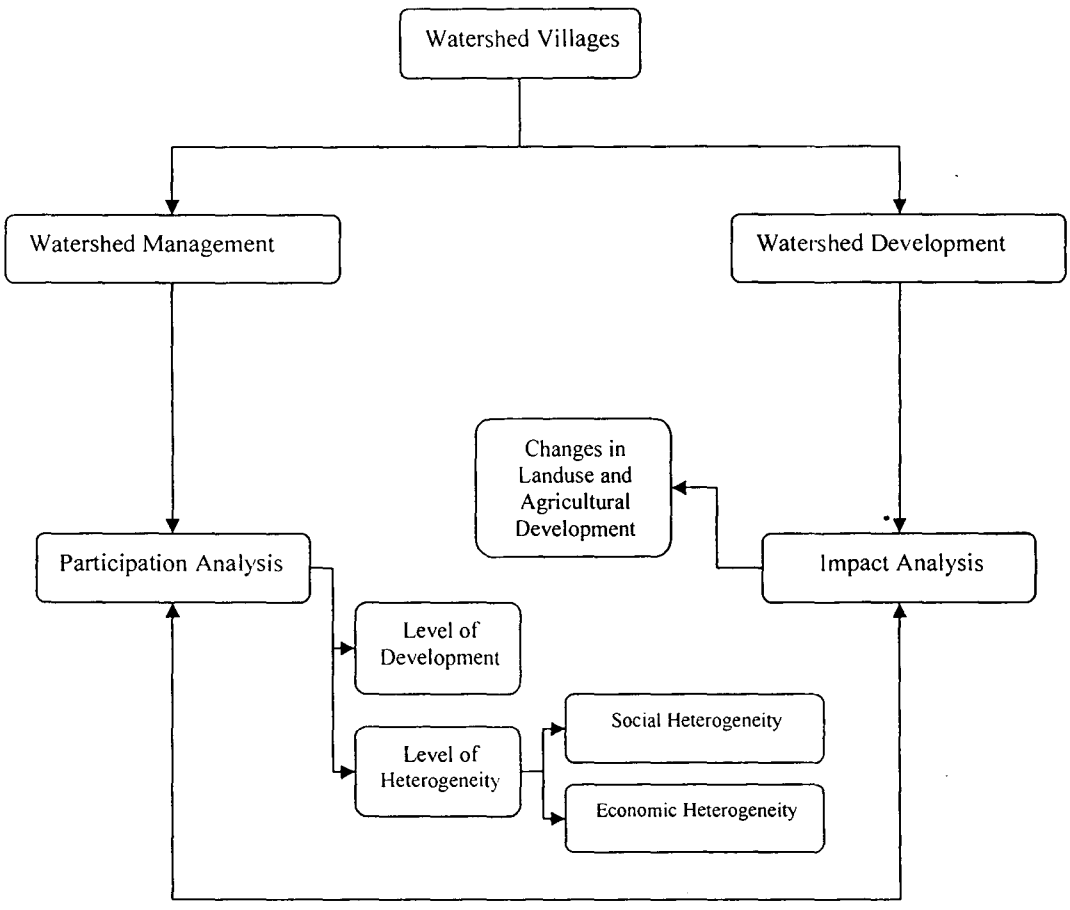
1.7 Framework of Analysis

As mentioned above, the present study attempts to analyse whether development levels and social and economic heterogeneity affect the degree of participation. It also endeavours to look into the relationship between quality of participation and impact of watershed activities (Fig 1.2). The existing literature largely points towards a positive relation between the level of development and that of participation. However, the available literature has remained inconclusive regarding the role of heterogeneity in generation of participation. Hence the undertaken study would make an endeavour to first categorising the sample villages into developed and underdeveloped (based on population characteristics and assets) and homogeneous and heterogeneous (based on caste and class) and then analyse the variations in participation over them.

An attempt has also been made to see whether the indicators chosen for impact evaluation differ between the villages where watershed programme had been implemented and where it had not been implemented, and within those villages where

watershed programme had been implemented, whether the observed impact is more in those villages where participation is higher.

Fig 1.2 Framework of Analysis



1.8 Methodology

This research has been undertaken with a view to assessing the variations in participation and impact over space. The methodology adopted for the purpose can be discussed under the following heads:

1.8a: Impact Assessment:

The impact assessment was done at the village level from two data sources. From the Census, an analysis of general land-use change between 1991 and 2001, which corresponded somewhat to the before and after programme implementation periods,

was carried out[6]. The advantage of the analysis from the Census is in terms of the spatial coverage- i.e. all the villages in the sub-watershed covered under the programme have been taken into consideration. However, this analysis can be carried out only for a few variables, which only partially covers the possible watershed impacts. Thus, in addition to the analysis done on the basis of available secondary information, an exploratory field survey was carried out in 10 villages for a total of 74 households with a view to encompassing a more comprehensive set of variables to analyse impact. The primary survey also enables exploration of participation dynamics, which cannot be addressed otherwise.

1. Methodology of Impact Analysis based on Secondary Information

The assessment of impact of watershed development in the region has been limited to the available information, i.e., the changes in land-use viz. share of culturable wasteland, share of cultivated area and share of irrigated area. The villages in which the watershed programme was implemented in the first phase of IWDP-Hills have been selected for comparison with the non-watershed villages. The impact assessment has been done at two levels:

i) The changes in all the villages in Kandi where watershed programme was implemented have been compared with the changes in all the villages where the programme was not implemented. This gives a generalised scenario of the impact of WDP in the region.

ii) In the second stage a sub-watershed wise comparison has been made wherein the villages in the sub-watersheds where the WDP was implemented have been compared with the corresponding non-watershed villages[7].

[6] As the first phase of IWDP-HILLS was started in 1990 and continued till end of the decade, the two Censuses of 1991 and 2001 have been used to compare the two sets of villages.

[7] After carefully examining the watershed and district maps, an attempt has been made to juxtapose the former with the latter, at the C. D. Blocks level. The sub-watersheds and blocks were merged together as and when required. Of course, a complete juxtaposition was virtually impossible due to huge dissimilarities between natural and political boundaries, attempt has been to make it as close as possible.

Table 1.4: Segregation of Watershed & Non-Watershed Villages

	Watershed Villages	*Non – Watershed Villages*
	Villages of Sub – Watershed/s	Remaining villages of C. D. Block/s
1	Sirsa	Pinjore
2	Begna & Dangri	Morni, Barwala, Raipur Rani & Narayangarh
3	Nakti	Sadhaura
4	Boly–Yamuna, Pathrala & Sukhrao	Chachrauli

Source of Information: District Census Handbooks, Ambala & Yamunanagar, 1991

2. Methodology of Impact Analysis based on Primary Information

Having compared the watershed and non-watershed villages, the results of the primary survey have been used, wherein additional information regarding cropping pattern, agricultural yield, irrigation extent and sources, fodder procurement, etc. have been analysed before and after the project.

1.8 b: Determination of Study Area:

Haryana is agriculturally one of the most developed states of the country. Agriculture forms the backbone of its economy. However, the state is also marked by a stark contrast in terms of regional development, wherein there are pockets of underdevelopment within the developed parts of the state. One such highly backward sub-region of the state is Kandi, which is a natural region and stretches over parts of the states of Punjab, Haryana, Himachal Pradesh and Uttar Pradesh. The present study limits itself to Haryana only. The Kandi region is characterised by large scale land degradation and utter paucity of agricultural land. However, within the Kandi region there are again variations in terms of development as well as heterogeneity in population composition. Therefore, the Kandi region has been selected to assess the variations in levels pf participation which in turn has a bearing on the impact of watershed programme launched in the region.

1.8 c: Determination of Sample Villages:

Both purposive as well as multistage sampling techniques have been followed to decide the villages to be included in the sample. Multistage sampling involves selection of samples in a series of steps with the sampling portions constituting the sample (units or increments) at each step being selected from the larger or greater number of portions of the previous step, or from a primary or composite sample (McNaught & Wilkinson 1997). The purposive sampling is followed when the sample is not

chosen at random but is done so with some set predefined criteria in mind. Thus, the sample is chosen because of certain desired characteristics (Patton, 1990).

The sample was decided based on the following criteria:

a) Early implementation of watershed programme: The watershed activities in the study area have been efficiently prioritised according to the requirements of the villages (Sen & Banerjee, 2004). Hence by selecting the villages where watershed work had been taken on priority basis would phase out those villages where the requirements were not that acute.

b) Employment in primary activities: Rural livelihoods depend to a greater extent on agriculture and animal husbandry. Hence, to assess the impact of watershed primarily agricultural villages need to be selected.

c) Work requiring participation done: In order to trigger participation in any area, the basic requirement would be to have such activities which actually require participation of the local people. Such works include drainage line treatment (DLT) or activities on CPRs. Thus, this step phases out such villages where limited amount work, viz. treatment of private lands has been done.

Based on above criteria ten villages in the Kandi region were selected survey (Table 1.5).

Table 1.5: Sample Villages & Households by Block, District and Watersheds

Village	Block	District	Watershed
Ponta	Morni	Panchkula	Dangri
Katli	Morni	Panchkula	Dangri
Narwar	Morni	Panchkula	Dangri
Plasara	Morni	Panchkula	Dangri
Bholiwala	Sadhaura	Yamunanagar	Nakti
Mirzapur	Sadhaura	Yamunanagar	Nakti
Gobindpur	Raipur Rani	Panchkula	Dangri
Mandapa	Raipur Rani	Panchkula	Dangri
Ferozepur	Raipur Rani	Panchkula	Dangri
Todarpur	Sadhaura	Yamunanagar	Nakti

In order to assess the level of participation in the villages surveyed, four indicators have been selected:

1. Level of Awareness
2. Involvement in VDC and Gram Sabha
3. Cost Shared
    a. Private Lands
    b. CPR
4. Willingness to contribute for repair / maintenance of the structures

Further, two major classifications of the sample villages were done based on their levels of development and heterogeneity of population composition.

a. Level of Development:

In order to analyse the differences of participation over developed and underdeveloped villages, the sample villages were chosen on the basis of proportion of landless in the village population. Level of agricultural development was given prime importance and hence factors like mechanisation in agriculture, cropping pattern, sources of irrigation, agricultural and livestock productivity were taken into consideration for deciding the level of development of a village. In general, emphasis was more on perception of the Research Scholar. Required information was also taken from the CSCD report in which some village level information was given (Buggi, 2002). Background information regarding the village was taken from the IWDP-Hills officials and some reports.

b. Level of Heterogeneity:

One of the three hypotheses of the study was to assess whether heterogeneity in population composition has any effect on participation. Hence, the level of heterogeneity was determined for the sample villages by using the Weaver's Method (Weaver, 1954) (Table 1.6 & 1.7). The Weaver's method (originally used for calculating crop combination) gives the combination of variable under study (in this case caste and land ownership), that has a significant share in the total. Thus, the villages having only one *dominant* caste have been designated as socially homogeneous while those with more than one dominant caste as socially

heterogeneous. Similarly, villages with a single dominant landowner class have been taken as economically homogeneous, while those with no dominant class

Table 1.6: Social Heterogeneity in the Sample Villages (Based on Numerical Strength of Communities)

	Total No. of Castes	Hierarchy of Caste Dominance		
Ponta	1	Rajput	-	-
Katli	1	Brahmin	-	-
Narwar	1	Rajput	-	-
Plasara	2	Rajput	S.C.	-
Bholiwala	2	Gujar	-	-
Mirzapur	Mixed	-	-	-
Gobindpur	1	Gujar	-	-
Mandapa	1	Gujar	-	-
Ferozepur	3	Gujar	Saini	S.C.
Todarpur	3	Gujar	Jat	Brahmin

(See Appendices for details) (Source: Primary Survey)

Table 1.7: Economic Heterogeneity in the Sample Villages (Based on Land Ownership)

	Landless	Less than 1 ha	1 – 2 ha	2 – 3 ha	More than 3 Ha	Total HH
Ponta	0	0	2	8	2	12
Katli	0	0	7	4	0	11
Narwar	0	11	5	0	0	16
Plasara	21	30	6	4	3	64
Bholiwala	4	15	10	6	5	40
Mirzapur	50	10	20	40	12	132
Gobindpur	0	11	8	4	3	26
Mandapa*	0	0	2	16	4	22
Ferozepur	25	18	25	42	45	155
Todarpur	6	34	20	21	9	90

(Source: Same as Table 1.6)

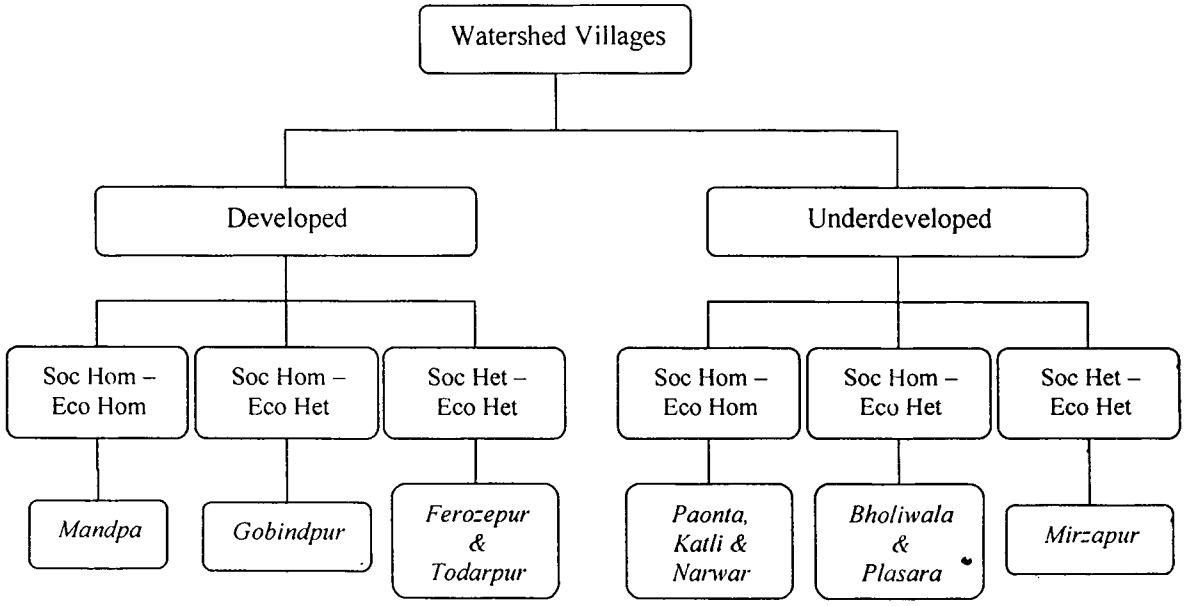
as economically heterogeneous. In the analysis, these villages have been clubbed together to form three categories of villages[8]:

i. Socially & Economically Homogeneous (Hm – Hm)

ii. Socially Homogeneous & Economically Heterogeneous

iii. Socially Heterogeneous & Economically Heterogeneous

Fig. 1.3: Selection of Sample Villages



Soc – Social: Eco – Economic; Hom – Homogeneity; Het - Heterogeneity

The Kandi region in Haryana forms a narrow strip in the northern stretch of the state (Fig. 1.4). The region consists of more than a dozen sub-watersheds (elaborated in the next chapter). A total of ten villages, where the IWDP-Hills had been implemented in the second phase were chosen for primary survey, while one village was chosen from the first phase. The ten villages form part of the Dangri and Markanda watersheds (Fig. 1.5). Most of the villages in the Dangri watershed have hilly terrain while those in the MArkanda watershed are either located in the footHills or plains (for a detail analysis of the sample villages, see field notes in Appendix - I).

[8] A fourth category of village – socially heterogeneous but economically homogeneous – was not possible as the caste lines closely follow the class demarcations, particularly for the SCs, in the study area.

1.8 d: Focus Group Discussions:

Having decided the sample villages, differences in the level of participation in them have been analysed through a field visit to each of these villages and conducting Focus Group Discussions (FGDs) with the villagers. The FGD draws upon respondents' attitudes, feelings, beliefs, experiences and reactions in a way in which would not be feasible using other methods, for example observation, one-to-one interviewing, or questionnaire surveys. These attitudes, feelings and beliefs may be partially independent of a group or its social setting, but are more likely to be revealed via the social gathering and the interaction which being in a focus group entails (Gibbs, 1997). The deliberations in a FGD can be utilised further to develop questions or concepts for questionnaires and interview guides (Hoppe et al, 1995).

A focus group generally consists of less than 10 people, fairly homogeneous in background. The FGD revolves around specific issues and hence the role of the moderator is quite significant. The notes made during the discussions and the recordings done can then be analysed to draw inferences.

Recordings done during the FGDs were utilized to draw inferences

In the undertaken research, at least one FGD was conducted in set of village. In the heterogeneous villages, two FGDs were conducted in which one was exclusively for

the Scheduled Castes. The average number of participants in the discussions was. The issues discussed in the FGDs have been given in the Appendix – III D.

In total 11 FGDs were conducted in the sample villages in which a total of 82 villagers participated (Table 1.8 A). The individual groups were mostly homogeneous in terms of sex, caste and land ownership. As the participation of women in household surveys was minimal, more emphasis was laid on having women groups for FGDs. In total eight groups had only woman participants while only there were only three groups for men. The average age of the participants in the discussions was 35 years. The landowners had an average landownership of 5.8 hectares while three groups were exclusively meant for landless. The details of individual groups have been given in the Appendix – I.

Table 1.8 A: Number and Size of Focus Groups

Village	Social Heterogeneity	Economic Heterogeneity	No. of FGDs	No. of Participants
Ponta	Homogeneous	Homogeneous	1	8
Katli	Homogeneous	Homogeneous	-	-
Narwar	Homogeneous	Homogeneous	-	-
Plasara	Homogeneous	Heterogeneous	1	9
Bholiwala	Homogeneous	Heterogeneous	1	7
Mirzapur	Heterogeneous	Heterogeneous	2	8 + 7
Gobindpur	Homogeneous	Heterogeneous	1	7
Mandapa	Homogeneous	Homogeneous	1	7
Ferozepur	Heterogeneous	Heterogeneous	2	7 + 7
Todarpur	Heterogeneous	Heterogeneous	2	7 + 8
Total	-	-	11	82

1.8 e: Household Surveys:

In addition to the FGDs, some in-depth interviews were conducted at the household level in each of the ten villages surveyed. In the homogeneous villages, the sample

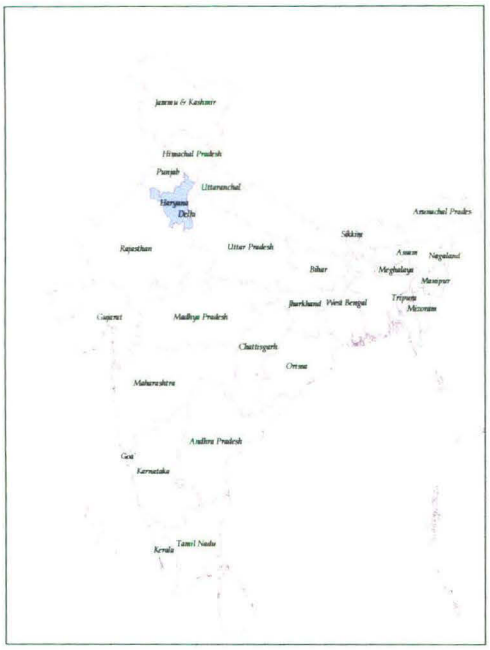
households were decided by taking 10 percent of the total households of the village, subject to a minimum of five sample households (Table 1.8 B). In the heterogeneous villages, 10 percent of the number of households in each of the communities was selected. The respondents were asked questions regarding their perception of the WDP, change in their status in terms of agriculture or other benefits, and some questions on participatory issues. The questionnaires have been attached in the Appendix III B.

Table 1.8 B: Sample Size for Household Survey

Village	Total HH	Sample HH
Ponta	12	4
Katli	11	3
Narwar	16	5
Plasara	64	7
Bholiwala	40	5
Mirzapur	132	14
Gobindpur	26	6
Mandapa	22	5
Ferozepur	155	15
Todarpur	90	10
Total	568	74

Fig. 1.4 LOCATION OF STUDY AREA

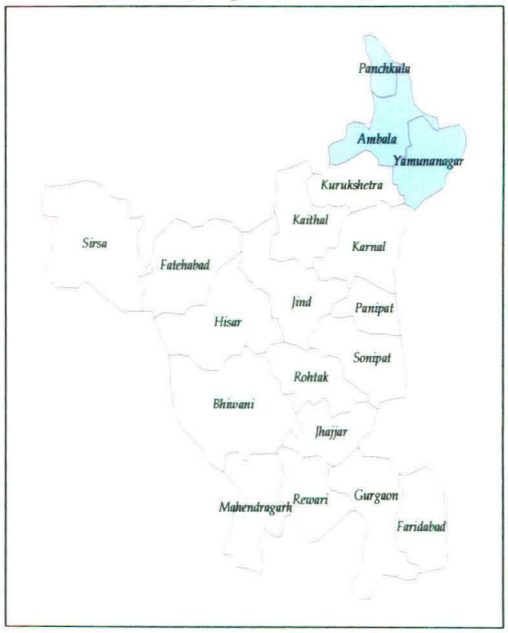
Location of Haryana in India



350 0 350 700 1050 Kilometers

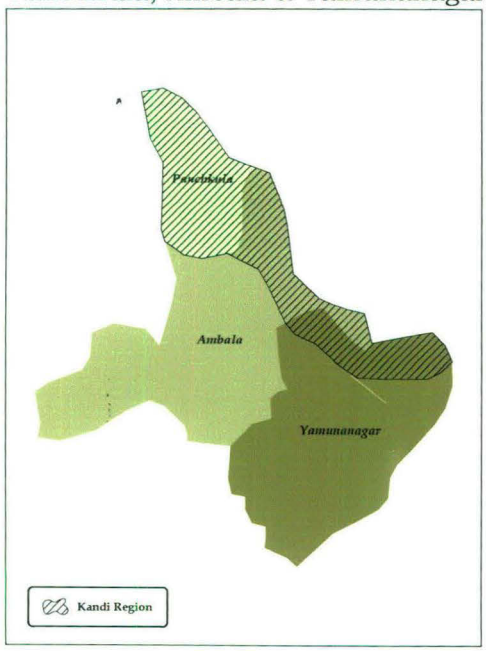
N

Location of Panchkula, Ambala & Yamunanagar in Haryana



50 0 50 100 150 Kilometers

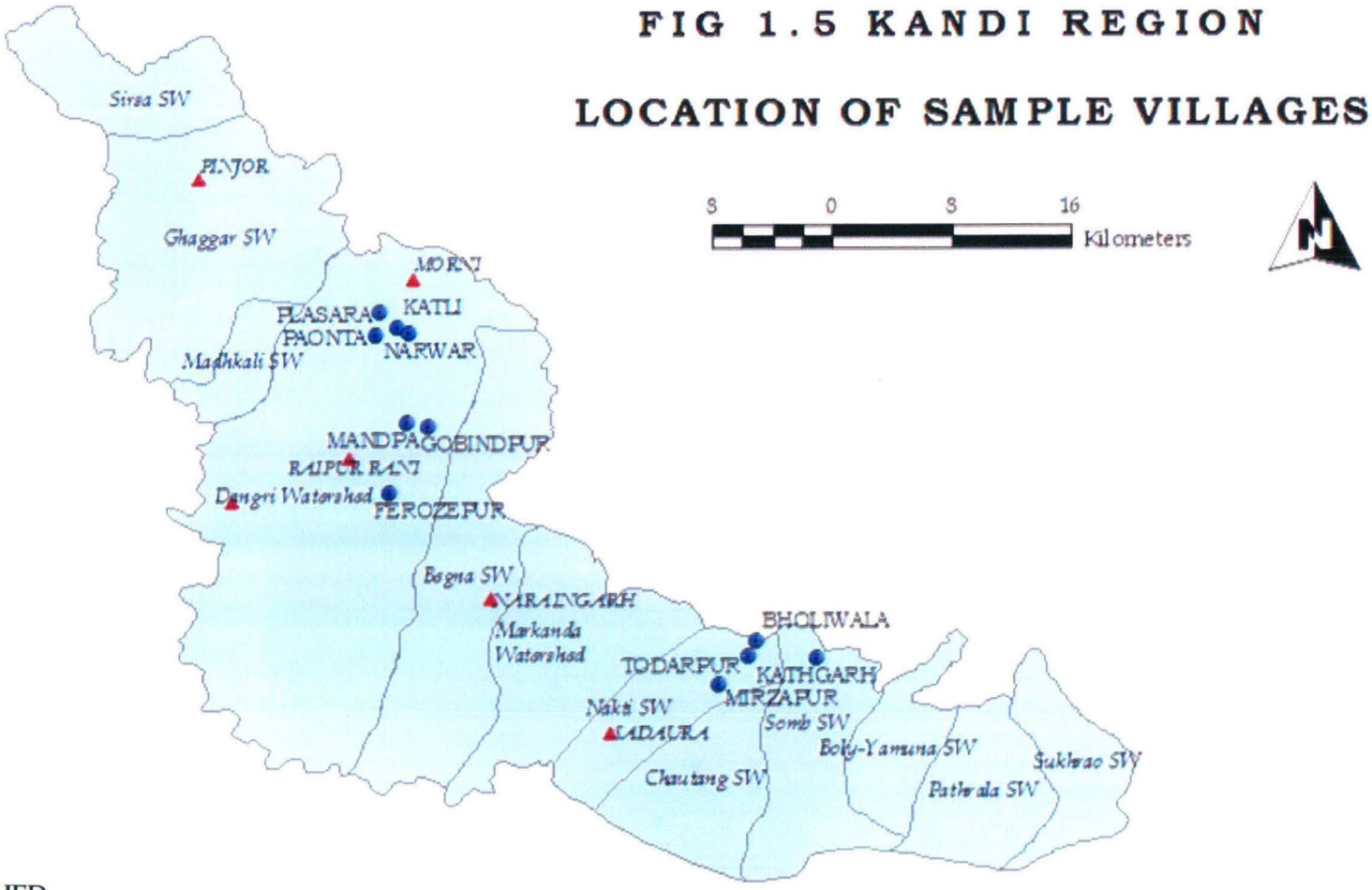
Location of Kandi Region in Panchkula, Ambala & Yamunanagar



30 0 30 60 90 Kilometers

FIG 1.5 KANDI REGION

LOCATION OF SAMPLE VILLAGES



1.8 f: VDC Member Surveys:

A separate questionnaire was prepared for the VDC members in the village. This was done in order to assess their socio-economic status vis a vis the households of the village. In the homogeneous villages, only the VDC President was interviewed, while in the heterogeneous villages, one member from each of the community was interviewed. The questionnaire has been given in the appendices.

1.8 g: Study Instruments:

Four different study instruments (proforma) were used to collect the data required for the research. The first proforma entailed collection of village level information. The information about the village was collected from at least three people from each of the village. This information helped in deciding homogeneous groups for FGDs and sample households for in depth interviews. The second proforma contains the issues on which the FGDs were to be directed. It also contains information on the age, sex, caste, landownership and educational level of the participants.

The third proforma contains the issues for household level in-depth interviews. The fourth and last proforma contains a similar questionnaire but only for the members of the VDC. This gives the relative position of the villagers vis a vis the elite group of the village. At the same time, the differences and heterogeneity within the village leadership also gets captured.

1.8 h: Field Work:

The entire field work was done in the beginning of May, 2006. A total of ten villages were surveyed, all covered during the second phase of IWDP-Hills, while one village from the first phase was also surveyed. Such a timing of the survey was selected as by this time most of the villages had completed around one agricultural year of the completion of the project activities (the IWDP-Hills was finally wrapped up in September 2005). This was not only necessary for impact assessment of the watershed activities undertaken in these villages, but also for assessing institutional strength of the villages.

1.9 Limitations of the Study

A with-without approach is always considered better than a before-after approach, which is primarily based on the recall surveys and hence tend to be faulty. In the undertaken research, although the former approach has been followed at the secondary level, the same could not be followed at the primary level. This is because the study aims at analysing the level of participation in the sample villages and then the influence of the same on the impact of watershed programme. Thus, only those villages could be selected where the WDP had been implemented. Consequently, the impact analyses may give in some erroneous results inasmuch as it would be difficult to segregate the impact of watershed programme and other concurrent developmental programmes.

Secondly, as the survey was conducted when not even a full year had passed since the completion of the watershed project in the study area, the impact analyses would give the results in the short run. Thus, the sustainability aspect of the programme, one of the rationales for inculcating community participation, cannot be captured at this moment.

1.10 Characteristics of the Sample Population:

The ensuing section deals with some of the characteristics of the sample population (respondents).

It would be seen that no perceptible difference exists between developed and underdeveloped villages in terms of family size (Table 1.9). Both set of villages have few small and large families and a large number of medium sized families.

Table 1.9: Family Size of the Sample Households

	Developed		Underdeveloped	
	Frequency	Percent	Frequency	Percent
Less than 4	2	5.6	4	10.5
4 – 8	24	66.7	22	57.9
8 – 12	8	22.2	9	23.7
More than 12	2	5.6	3	7.9
Total	36	100.0	38	100.0

(Source: Same as Table 1.6)

In terms of caste composition of the sample population, it would be noticed that the Gujars dominate the developed regions (Table 1.10). In fact, the entire Kandi region is

largely dominated by the Gujars. The dominance can be exemplified both in terms of numerical dominance as well as that of ownership of resources. Almost all the Rajputs in the underdeveloped villages belong to Bhoj Paonta. It would also be seen that caste heterogeneity is more in the underdeveloped villages; however, that is again due to a single village – Mirzapur.

Table 1.10: Caste Structure of the Sample Households

	Developed		Underdeveloped	
	Frequency	Percent	Frequency	Percent
Badhai	-	-	1	2.6
Balmiki	-	-	3	7.9
Brahmin	2	5.6	3	7.9
Harijan	2	5.6	3	7.9
Hindu Gujar	23	63.9	4	10.5
Jat	4	11.1		
Jhiwar	-	-	1	2.6
Kumhar	-	-	1	2.6
Muslim	-	-	4	10.5
Rajput	-	-	14	36.8
Ramdasi Sardar	-	-	1	2.6
Saini	5	13.9	-	-
Sikh	-	-	3	7.9
Total	36	100	38	100

(Source: Same as Table 1.6)

The level of education of the respondents was higher in the developed villages (Table 1.11). Almost 40 percent of the respondents were educated till secondary level or higher while this proportion was 30 percent in the underdeveloped villages. Even the share of illiterates was slightly higher in the latter. However, the number of respondents educated till higher secondary was found to be higher in the underdeveloped villages, all of them belonged to either Bhoj Paonta or Plasara.

Table 1.11: Level of Education of the Respondents

	Developed		Underdeveloped	
	Frequency	Percent	Frequency	Percent
Illiterate	11	30.6	13	34.2
Primary	4	11.1	7	18.4
Middle	7	19.4	6	15.8
Secondary	13	36.1	7	18.4
Higher Secondary	1	2.8	5	13.2
Total	36	100.0	38	100.0

(Source: Same as Table 1.6)

Ownership of land is an important indicator of the economic status in the rural setup. It was found that most of the respondents in the developed villages owned at least some amount of land and only one landless respondent was found. While in the underdeveloped villages, more than 20 percent of the respondents were found to be landless (Table 1.12). Similarly, 20 percent of the respondents in the developed villages were found to own more than 5 hectares of land, the maximum being 25 hectares, whereas only 10 percent of the respondents in the underdeveloped villages owned more than 5 hectares. Thus, it can be inferred that in terms of landownership, the respondents in the developed villages were found to be at a much better status as compared to those in the underdeveloped villages.

Table 1.12: Landownership in the Sample Households

Land owned (in ha)	Developed		Underdeveloped	
	Frequency	Percent	Frequency	Percent
Landless	1	2.8	8	21.1
Less than 1	3	8.3	10	26.3
1 – 2	9	25.0	7	18.4
2 – 3	11	30.6	7	18.4
3 – 5	5	13.9	2	5.3
Above 5	7	19.4	4	10.5
Total	36	100.0	38	100.0

(Source: Same as Table 1.6)

A good number of respondents in the underdeveloped villages were found to be unemployed, which they cited as the perennial problem in these areas, temporarily solved by the IWDP-Hills during the project phase. Importantly not even a single respondent in the developed villages was found jobless at the time of survey (Table 1.13).

Cultivation was the most dominant occupation in all the villages surveyed. Very few respondents were found to be employed in non-agricultural activities. More than two-third of those employed in the underdeveloped villages were either farmers or agricultural labourers, while in the developed villages less than 10 percent of the respondents worked as agricultural labourers.

Table 1.13: Occupational Structure of the Respondents

	Primary Occupation				Secondary Occupation			
	Developed		Underdeveloped		Developed		Underdeveloped	
	Frequency	%	Frequency	%	Frequency	%	Frequency	%
Nil	0	0	0	0	23	63.9	22	57.9
Cultivation	28	77.8	26	68.4	5	13.9	5	13.2
Agricultural Labourer	3	8.3	12	31.6	4	11.1	10	26.3
Livestock	-	-	-	-	3	8.3	-	-
Construction	1	2.8	-	-	-	-	-	-
Transport					1	2.8		
Trade	2	5.6						
Service	2	5.6					1	2.6
Total	36	100	38	100	36	100	38	100

(Source: Same as Table 1.6)

Almost every household in the sample villages had livestock ownership. Significantly, there was a drastic decline in the number of goats in the surveyed area, which is a healthy sign. People have opted for more productive bovines. Buffalo was found to be the most popular bovine and every household in the developed villages had at least one buffalo (Table 1.14 A). Further, more than 55 percent of the respondents in the developed villages were found to own more than 4 buffalos. The respective share in the underdeveloped villages was less than 25 percent.

Table 1.14: Livestock Ownership in Sample Households

A. Buffalo

	Developed		Underdeveloped	
	Frequency	Percent	Frequency	Percent
Nil	0	0	3	7.9
1 – 3	16	44.4	26	68.4
4 – 6	15	41.7	8	21.1
7 & Above	5	13.9	1	2.6
Total	36	100.0	38	100.0

(Source: Same as Table 1.6)

Cow and ox are not that popular in the region. Only half of the respondents in both set of villages were found to possess either of the two (Table 1.16 B). However, some of the respondents in the developed villages (Gobindpur to be particular) had a good number of cows, the maximum being more than 30.

1.14 B. Cow & Ox

	Cow				Ox			
	Developed		Underdeveloped		Developed		Underdeveloped	
	Frequency	Percent	Frequency	Percent	Frequency	Percent	Frequency	Percent
Nil	18	50.0	20	52.6	23	63.9	23	60.5
1 – 2	14	38.9	15	39.5	13	36.1	14	36.8
3 – 4	2	5.6	2	7.2	-	-	1	2.6
5 – 10	0	0	1	2.6	-	-	-	-
11 & Above	2	5.6	-	-	-	-	-	-
Total	36	100	38	100	36	100	38	100

(Source: Same as Table 1.6)

The above analyses of the study area indicate that the two set of villages – developed and underdeveloped – have stark differences in their economic condition. In the ensuing chapters after making a secondary level impact analyses of the IWDP-Hills in the Kandi region, an attempt has been made to examine the variations in the level of participation in these villages and then link it up with the variations in the impact of the programme.

CHAPTER II

WATERSHED PROGRAMMES IN HARYANA

"Water is probably the only natural resource to touch all aspects of human civilization – from agricultural and industrial development to cultural and religious values embedded in society."

Koichiro Matsuura,
Director General, UNESCO

The chapter makes an attempt to regionalise the agricultural related problems in the state of Haryana. This is followed by a description of the efforts to mitigate the problems. Under such programmes, a special emphasis has been laid on the Integrated Watershed Development Project (IWDP - Hills) launched in the Kandi region of the state. After a short description of the project, an analysis of the prioritisation followed in the programme and the changes occurring thereof has been done.

The state of Haryana covers an area of about 44 thousand sq. kilometres. It became a separate state in 1966 and is one of the smallest states in Indian Union, accounting for 2.06 percent of the national population and 1.35 percent of area. The state is bounded by the Shivalik Hills in the north, and the river Yamuna in the east. The south-western boundary is provided by the Aravalli Hills while towards the west lies the river Ghaggar. The state is devoid of any major river as it lies in the watershed between the rivers Indus and Ganges. The state is divided into three drainage basins (Table 2.1).

Table 2.1 Drainage Basins in Haryana

Drainage Basin	Area (km2)	No. of Drains	Principal Drains	Outlet into
Yamuna	16,330	336	Main Drain 2. Diversion Drain 8 (Main Drain 8). Drain No. 8 (Najafgarh Drain) & Gaunchi Drain	Yamuna River
	About 600 cumecs of water is contributed to Yamuna River by these drains between Tajewala barrage and Wazirabad water supply system upstream of Delhi and 200 cumecs downstream of Delhi			
Ghaggar	10,675	30	-	Ghaggar
Inlands	17,207	-	-	No outlet
	This basin is flat and does not have a drainage outfall into the rivers. The rainwater in the inland drainage basin either infiltrates or gathers in pools and village ponds. Some critical areas have been provided with surface drains which outfall into irrigation canals through lift pumps.			

Source: Govt. of Haryana (2006), p. 3

The general slope of the state is from north-east to south-east and also towards the west, with the exception of Bhiwani, Mahendragarh, Rewari, Gurgaon and Jhajjar districts where the slope is towards the north.

At the time of its creation, Haryana was deficit in foodgrains production. However, it has grown at an accelerated rate, offering its citizens the third highest per capita income[9]. Agriculture is the mainstay of the state economy and a substantial proportion of the working population is engaged in primary activities, particularly cultivation and dairying. The state lies next only to the neighbouring Punjab in terms of agricultural development.

2.1 Levels of Agricultural Development in Haryana

The high incidence of overall prosperity in the state has overshadowed the regional disparities existing within it. The state of Haryana presents a typical scenario where some parts of the state are highly developed while others are quite backward, particularly in terms of natural resource endowment. The current chapter attempts to examine the disparities in the state in terms of agricultural development and then outlines the programmes initiated by the government and other multilateral funding agencies to mitigate the problems faced by the backward regions. For agricultural regionalisation, the triennium averages of 1989-90, 1990-91 and 1991-92 have been taken, the reason being that it was largely in this period that most of the land development schemes were initiated in the state (except Mewat Development Agency). Further, all analyses of problem regions in the state have been done with reference to the year 1991.

In order to measure agricultural development, a set of physical, technological and socio-economic indicators have been taken:

1. Net area sown as percentage of total cultivable area
2. Agricultural productivity (Rs. per hectare for all crops in an agricultural year)
3. Cropping Intensity (gross area sown as percentage of net area sown)
4. Irrigation Extent (gross irrigated area as percentage of gross area sown)
5. Irrigation Intensity (gross irrigated area as percentage of net irrigated area)

[9] Source of information: National Accounts Statistics

6. Number of tractors per 1000 hectares of net area sown

7. Rural literacy

The individual indicators have been standardised by division by mean method (DM method)[10]. The means of the values of the respective indicator have been calculated and the individual values have been divided by their respective means. Finally a composite index has been taken out by summing up the standardised indices (UNDP, 2004).

The following regions can be identified at various levels of agricultural development (Fig. 2.1; also Appendix – II):

1. Region at high level of agricultural development (Index exceeding 7.5):

The region comprises of a consecutive stretch of land consisting of the districts of Sonipat, Kaithal, Panipat, Kurukshetra and Karnal. The region has been marked by a dominance of rice-wheat cropping pattern, with the combination occupying more than 2/3rd of the cropped area.

2. Region at moderate level of agricultural development (Index of 6.5 – 7.5):

This region comprises of two discontinuous stretches and consists of the two northern-most districts of Ambala and Yamunanagar, and the western districts of Hisar, Sirsa and Jind. The two stretches have been marked by different cropping patterns. While the former has had rice and wheat as major crops, the latter has wheat and cotton. However, the latter has also been marked by other important crops like pulses and paddy.

3. Region at low level of agricultural development (Index below 6.5):

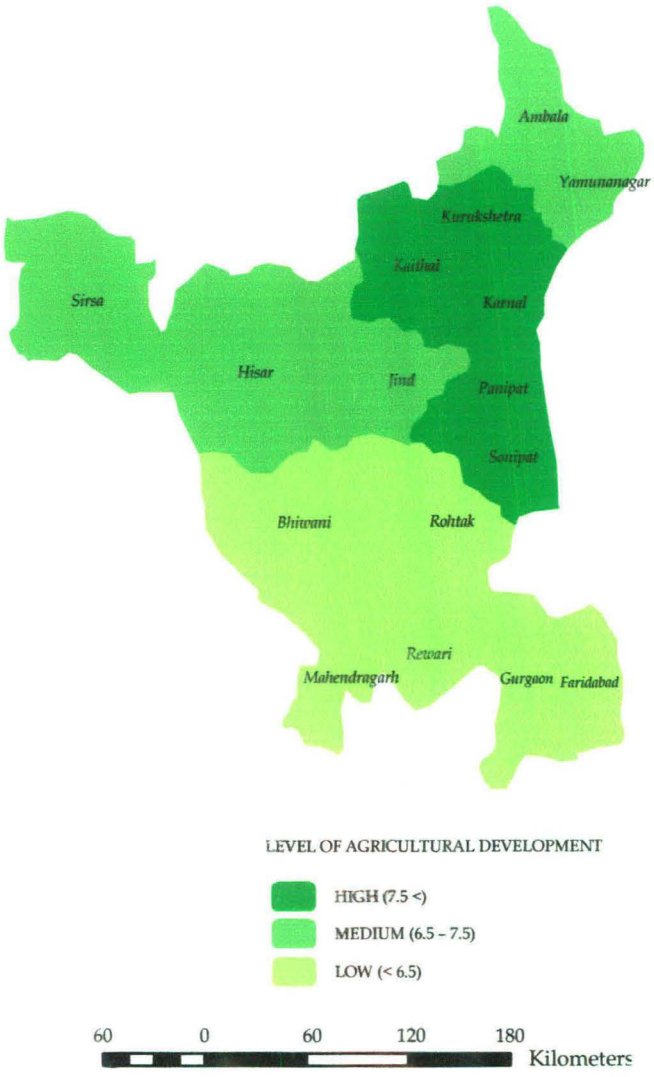
This zone has again been a continuous stretch in southern Haryana and comprises of the districts bordering Rajasthan - Mahendragarh, Bhiwani, Gurgaon, Faridabad and Rewari and Rohtak. In all these districts, rice and wheat does not figure prominently in the cropping pattern of the districts. The dominant crops have been oil seeds, followed by cotton and wheat. The region is also marked by very poor irrigation extent.

[10] The DM method transforms the coefficient of variation of the original indicators into the standard deviations of the scale free indicators, which are then carried into the composite indices. Thus the variation within the indicators is maintained even after making them scale free (UNDP, 2004). To carry out this method, the means values of the respective indicators have been calculated and the individual values have been divided by their respective means.

Fig 2.1 **HARYANA**

LEVELS OF AGRICULTURAL DEVELOPMENT

1990



2.2 Identification of Problem Regions

The above regionalisation of levels of agricultural development in the state gives a much generalised picture, inasmuch as, even in agriculturally developed region, there are pockets which are relatively ecologically fragile and/or agriculturally deprived. This section summarises the problems faced by such regions and the actions taken to remedy the lacunae under various watershed projects. These watershed projects do not include other developmental programmes like DPAP, RWP, etc. running in various parts of the state, that also have watershed components. Three regions have been dealt with, out of which the Kandi area has been dealt in detail. These three regions form

three of the most underdeveloped parts of the state (Source of Information: Various Project Documents).

2.2 A. South-Eastern Haryana: Mewat Region

The Mewat Region covers a portion of the Indo-Gangetic plain to the West of Yamuna river and South-West of Delhi, in the Southern part of Haryana and North Eastern part of Rajasthan, having an extent of 26° - 30° N and 76° - 78° E. It comprises of six blocks - five blocks of Gurgaon - Nuh, Taoru, Nagina, Ferozpur Jhirka, Punahana and one block in Faridabad – Hathin (Fig. 2.2). The area has an uneven topography of plain and undulated patches of land dotted with Hills and hillocks of the Aravali Mountain ranges.

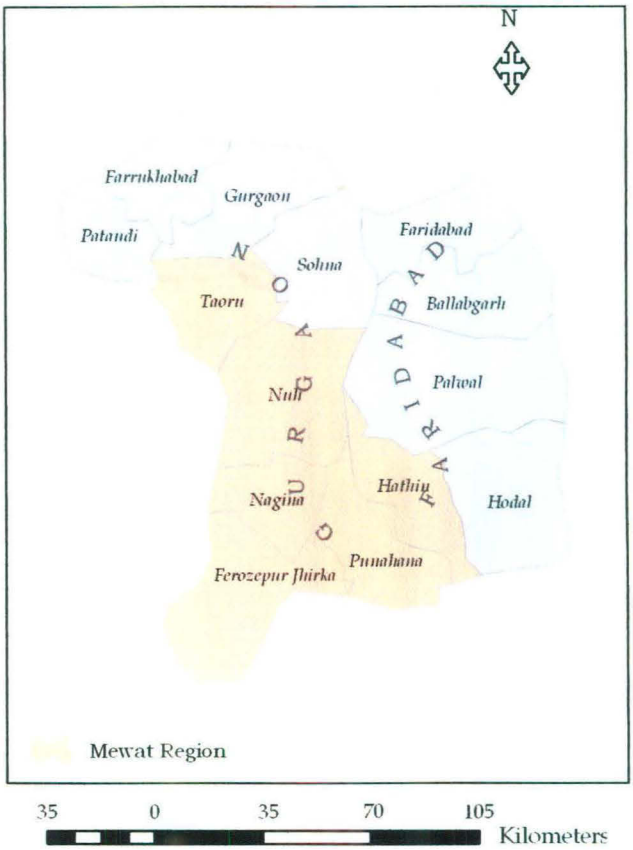
Both the districts suffer from the problem of land degradation. The wastelands form almost 400 sq. km. of the total geographical area in each of the districts (Table 2.2). The uplands, an extension of Aravali, form the most dominant portion of the wastelands and constitute 42 percent and 67 percent of the total wastelands in Faridabad and Gurgaon respectively. Faridabad also suffers from the problem of sandy soil, degraded forests and waterlogged land.

Table 2.3: Relative Situation of Mewat Region and other Blocks of the Region (1991)

District	Block	Share of Cultivable Area to Total Area	Irrigation Extent	Literacy Rate	Female Literacy	Share of Marginal Workers to Total Workers
			Faridabad			
	Hathin	***86.62***	***63.39***	***31.55***	***10.13***	***3.95***
	Faridabad	63.21	75.53	52.56	31.06	0.22
	Ballabhgarh	84.84	85.01	54.86	32.01	1.42
	Palwal	85.13	87.93	49.32	25.04	4.12
	Hodal	83.02	83.73	43.69	18.55	3.97
District		82.12	80.30	46.12	22.79	3.03
			Gurgaon			
	Taoru	***71.46***	***75.71***	***41.83***	***20.22***	***8.04***
	Nuh	***78.55***	***30.75***	***33.61***	***12.43***	***12.88***
	Nagina	***79.89***	***12.24***	***29.39***	***8.31***	***8.98***
	Punahana	***85.72***	***55.72***	***25.68***	***5.14***	***4.78***
	Ferozpur Jhirka	***72.04***	***25.56***	***26.39***	***7.89***	***5.17***
	Pataudi	94.05	91.27	62.37	42.26	1.89
	Farukhnagar	87.13	85.74	62.89	44.29	2.01
	Gurgaon	72.23	73.04	66.16	48.46	1.62
	Sohna	66.25	60.63	58.25	37.90	2.30
District		78.11	55.58	46.00	26.12	5.34

All figures in percentages. Blocks in italics fall in the Mewat Region. Source: DCH, Faridabad & Gurgaon, 1991

Fig. 2.2: Location of Mewat Region in Gurgaon & Faridabad



Even a cursory glance towards the Table 2.3 showing relative position of Mewat areas vis a vis other parts of the two districts would exemplify the critical situation that have existed in Mewat. For instance, while Hathin block in Faridabad has the maximum percentage of cultivable area to total geographical area, it has the least area under irrigation. Similarly, in Gurgaon the five blocks have only meagre area under irrigation, although the cultivable area is fairly high.

The Mewat region is also quite underdeveloped in terms of socio-economic conditions. 'It is a region where only poverty and ignorance thrive. The factors for backwardness of the region may be poor soil conditions, natural calamities, inadequate irrigation facilities and relatively low rates of literacy.'[11] The literacy rates in all the blocks in the Mewat are quite low. However, significantly and abysmally, the female literacy rates are too low, in most cases, around 10 percent. The region also has a fairly high share of workers in the marginal category.

[11] 'District Census Handbook, Gurgaon, Census of India 1991'

Table 2.2: Share of Wastelands in Total Geographical Area

	Gullied and/or Ravinous Land	Upland with or without Scrub	Waterlogged and Marshy Land	Land Affected by Salinity/ Alkalinity	Under utilized/ Degraded notified Forest Land	Degraded Pastures/ Grazing Land	Degraded Land under Plantation crop	Sandy	Mining/ Industrial Wastelands	Barren Rocky/ Stony Waste/ Sheet Rock Area	Total Wastelands
Ambala (Panchkula)	-	4.16	0.03	-	16.90	0.44	0.32	0.02	-	-	21.87
Bhiwani	-	2.96	0.03	0.01	-	0.66	-	4.60	-	0.93	9.19
Faridabad	-	7.55	2.37	0.57	2.53	0.78	0.42	3.35	0.65	-	18.24
Gurgaon	1.79	8.73	-	0.10	0.95	1.44	-	0.02	-	-	13.05
Hisar (Fatehabad)	-	-	-	0.13	0.09	3.41	0.32	1.10	-	-	5.05
Jind	-	-	0.07	0.60	0.15	4.57	0.04	0.03	-	-	5.45
Karnal (Panipat)	-	-	0.09	3.08	0.10	2.01	0.08	-	-	-	5.36
Kurukshatra (Kaithal)	-	0.26	0.13	-	0.34	-	0.10	-	-	-	0.82
Mahendragarh	-	7.96	-	-	0.51	1.77	1.83	2.33	-	2.08	16.49
Rewari	-	2.48	0.08	-	-	0.82	1.55	0.04	-	1.41	6.39
Rohtak (Jhajjar)	-	1.14	0.91	0.53	3.46	2.83	0.90	0.73	-	-	10.51
Sirsa	-	-	0.39	-	-	1.35	0.07	0.49	-	-	2.31
Sonepat	-	3.31	4.91	4.94	0.04	0.09	-	-	-	-	13.29
Yamunanagar	-	2.21	0.81	0.02	5.15	0.26	-	0.05	-	-	8.50
Total	**0.11**	**2.24**	**0.54**	**0.65**	**1.66**	**1.63**	**0.30**	**1.05**	**0.03**	**0.24**	**8.45**

(Districts in parentheses indicate the new carved out district from the original district) *(Figures in percentage)*

Source: Wastelands Atlas of India, Ministry of Rural Development, Department of Land Resources & National Remote Sensing Agency, 2000[1]

[1] The Wastelands Atlas of 2000 was prepared for three reference periods and different states were covered in each phase. As per the administrative divisions of Haryana as used in the Atlas, the reference period for the state has been 1987 – 88.

2.2 B. Central and South-western Haryana: Waterlogged & Saline Areas

Waterlogging and soil salinity have emerged as twin problems that have been threatening the sustainability of agricultural production in large parts of Punjab, Haryana and Rajasthan. In Haryana alone, an area of 473,400 ha had been affected till 1996 making the ground water mostly unfit for irrigation in the Central and South-Western parts (Drainage Master Plan, December 1998)[12]. With a view to meeting irrigation requirements, farmers of these areas make use of canal irrigation to irrigate their fields. Deep percolation losses from the field and application of irrigation water coupled with seepage from the canal system have been distorting the groundwater regime (Govt. of Haryana, 2004).

The alarming rise in the groundwater table has caused a grave threat to highly productive agricultural land. This is compounded by the fact that groundwater in most of these areas is brackish. As a result of less withdrawal over a period of time, water has come up on the surface along with salts which has adversely affected the crop production. It has been estimated that in 1989 almost 300,000 hectares of land in Haryana belonging to this region were affected by waterlogging and salinity[13]

In addition to the adverse effects on agriculture, waterlogging and salinity also leads to vector borne diseases, water supply and sanitation. It also damages buildings, roads and other structures thereby increasing their maintenance costs.[14]

The problem has been particularly severe in Bhiwani, the largest district of the state in terms of area (Fig. 2.3). Located in the vicinity of Rajasthan, the district has had the largest share of sandy land in the state covering almost 250 sq km, forming 5 percent of the total area of the district. This is compounded by a fairly large share of uplands which are unfit for agricultural purposes; as a result Bhiwani has traditionally been one of the most backward districts of the state in terms of agricultural development.

In the south-east and central portions of the state (Sonepat, Rohtak and Jind districts), severe problems of waterlogging and soil salinity are seen along the main and branch irrigation canals. These may be attributed to canal seepage and poor surface drainage.

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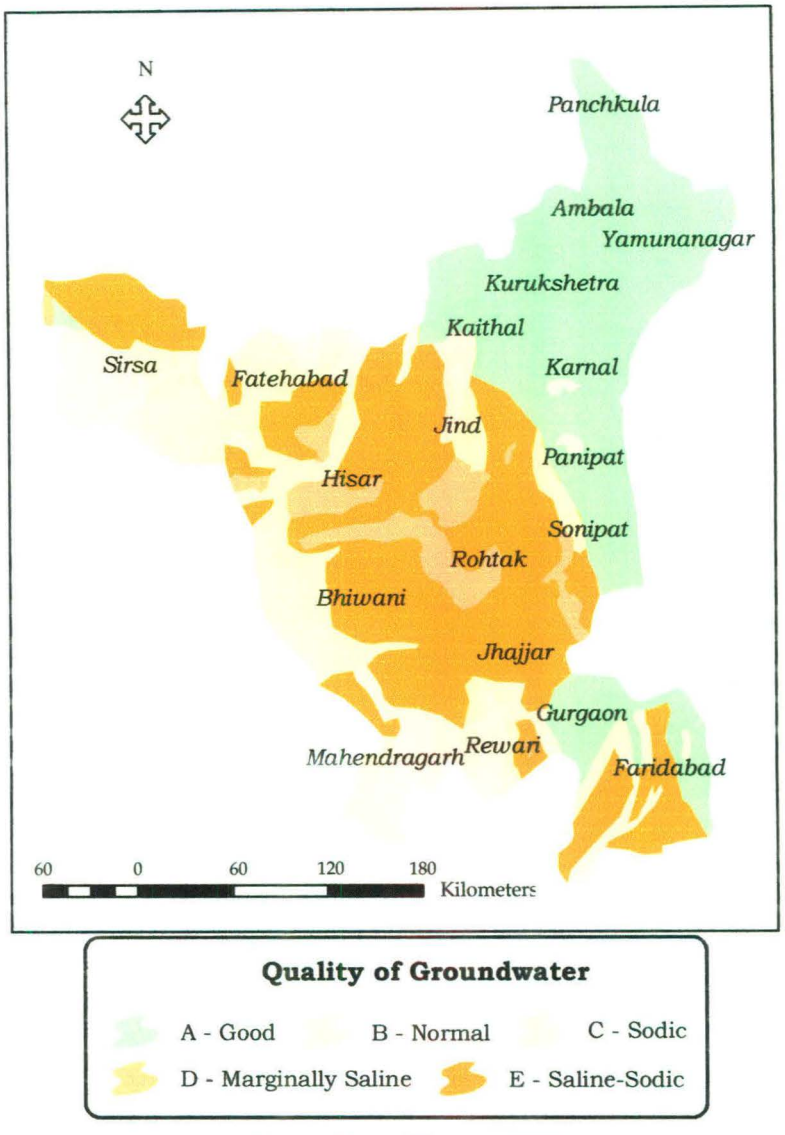
[12] Govt. of Haryana (2006)
[13] Govt. of Haryana (2001)
[14] Govt. of Haryana (2006), p. 5

Fig 2.3: Groundwater Salinity in Haryana



Source: Govt. of Haryana (2006)

Two pilot areas where the problem was particularly severe had been selected for analysis and assessment. Of these Gohana lies in the Sonepat district while Kalayat

Table 2.4: Relative Share of Kalayat Block and other Blocks of Kaithal (1991)

District	Blocks	Share of Cultivable Area to Total Area	Irrigation Extent	Literacy Rate	Female Literacy
Kaithal		88.26	95.77	38.71	23.68
	Guhla	84.37	99.38	37.87	27.20
	Kaithal	90.20	95.96	37.05	20.96
	Pundri	89.42	99.63	45.04	29.87
	Rajound	91.43	94.77	38.06	21.36
	Pehowa (Part)	91.28	100.00	38.50	24.71
	Kalayat	**87.62**	**86.30**	**34.81**	**17.31**

Source: District Census Handbook, Kaithal, 1991

forms part of Jind / Kaithal. Both these areas have flat lands and suffer from canal induced waterlogging and salinity problems. Further, these are the areas which are also backward in terms of socio-economic development (Table 2.4).

To maintain sustainable production, there is no alternative except reclamation of saline and water logged soils in such areas. According to a rough estimate, about 70,000 hectares are under critical condition where salts have surfaced and no crops can be grown.

2.2 C. Northern Haryana: The Kandi Region

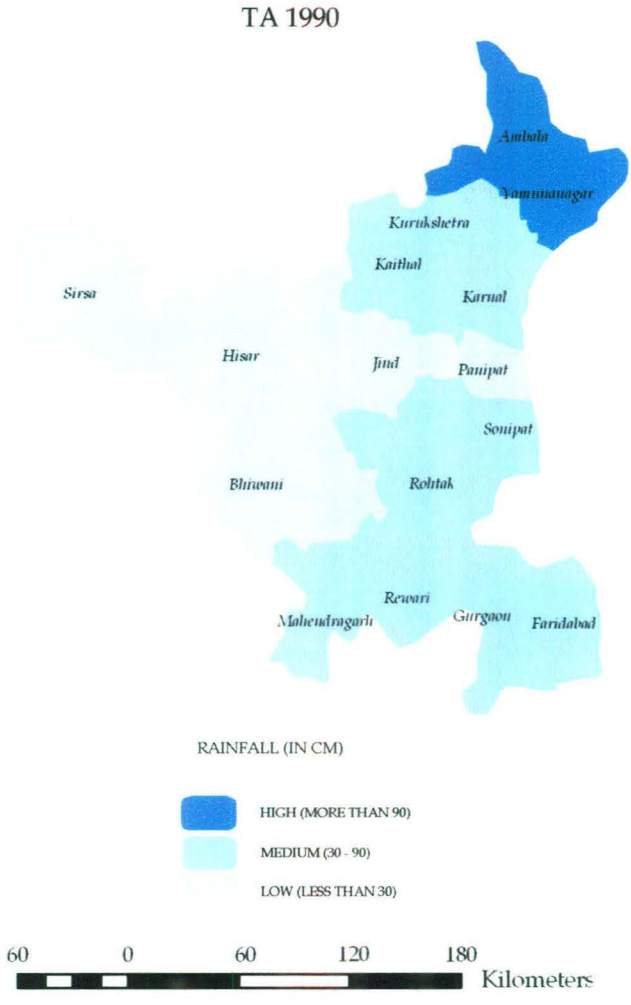
The Kandi area of Haryana comprises of the Shivaliks, consisting of northern strip of land in the three northern districts of Ambala, Panchkula (carved from Ambala in 1995) and Yamunanagar. The region is bound by Solan and Sirmaur (Nahan) districts of Himachal Pradesh in the north and plains of Ambala and Yamunanagar districts in the south. In the east lies the Saharanpur district of UP while Patiala of Punjab marks its western limit. Kandi is a small strip of undulating land between the Himalayas and the Indo-Gangetic Plains, experiencing high rainfall, high erosion, deep water tables, inhabited by poor people, badly dissected by a number of streams and choes, facing drought or drought-like condition most time of the year.

The Kandi region is quite different from the rest of the state in a number of aspects. Some of these can be studied under the following sub-heads:

a) Seasonal rainfall:

The northern districts consisting of the Kandi area experience more than double the rainfall than that in all other districts of the state (Fig. 2.4). However, most of the rainfall remain concentrated in a few months and were largely left untapped. The main causes are shallow soil depth, low retention capacity of the soil profile, steep slopes and high density rains. This also leads to the emergence of a number of seasonal streams which become active denudational agents – cause heavy erosion in the upper reaches and deposition in the lower reaches. Thus, removing valuable soil from the uplands and depositing silt in the lowlands. They also cause massive damage to life and property through flash floods. Scarcity of water for drinking purposes was another grave problem for the villages in the uplands.

Fig. 2.4 AVERAGE ANNUAL RAINFALL IN HARYANA



b) Forest and Land Degradation:

The twin districts of Ambala and Yamunanagar account for more than 40 percent of the total forests in the state. However, they also accounted for more than 67 percent of the total degraded forests of the state (as per Wasteland Atlas, 2000) (Table 2.2). The gravity of the situation comes to the fore when it is realised that these degraded forests covered 22 percent of the total geographical area of the two districts. Most of these areas are found in the hilly tracts of Ambala (now in Panchkula). Apart from the erosional activities of the seasonal streams, large scale open grazing has been a serious cause of forest degradation. The size of livestock that were dependent on the land and were provided fodder by lopping trees and bushes often exceeded the production capacity of the present system and resulted in the degradation of forests (World Bank, 1999b).

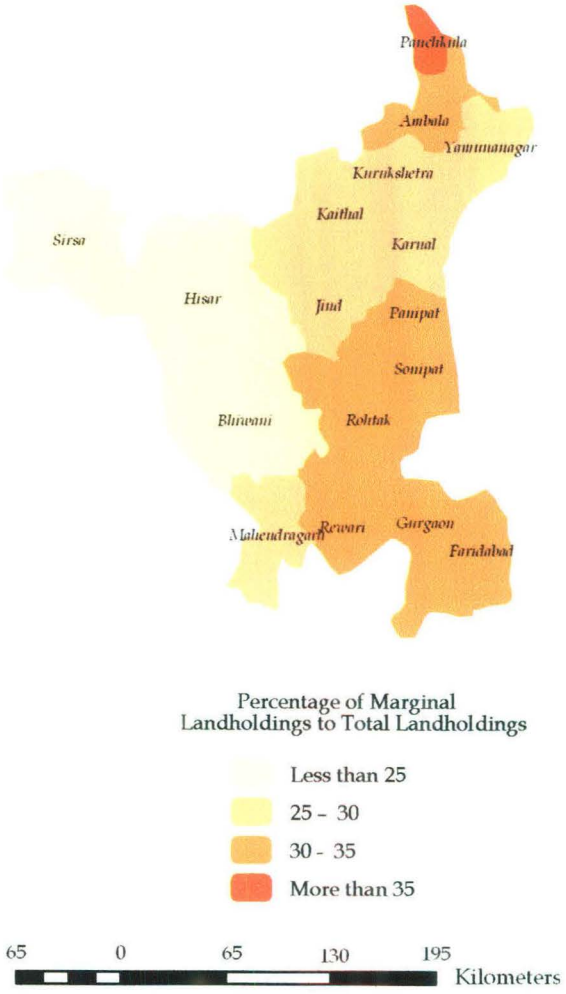
Erosional activities have also lead to a large scale degradation of available land. The problem is particularly acute in the Kandi region of Panchkula, Ambala and Yamunanagar districts, as depicted by an analysis of the satellite imageries (Fig. 2.6).

c) Small landholdings:

The hill-foothill regions are generally marked by small landholdings due to the uneven terrain. Due to its location in the Hills and footHills of Shivaliks, the Kandi area is marked by a huge number of small and uneconomic holdings (see Table in Appendix – II). The problem is particularly severe in the Panchkula district where half of the total landholdings are of sizes less than 0.5 hectare which together cover almost 10 percent of the total agricultural land (Fig. 2.5). The fast declining per capita land availability resulted in brining marginal lands too under plough.

Fig. 2.5 MARGINAL AGRICULTURAL LANDHOLDINGS IN HARYANA

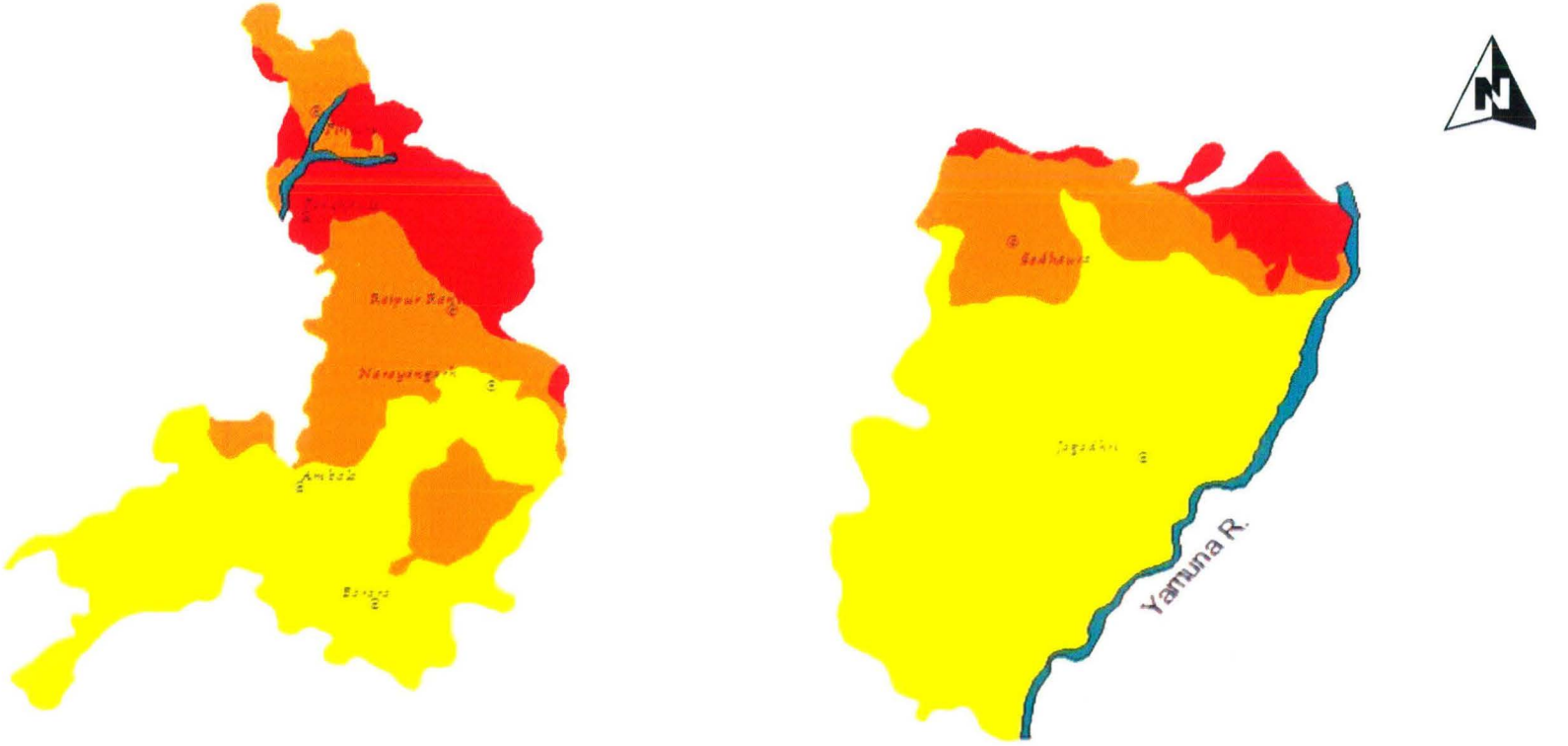
1995 - 1996



(Landholdings smaller than 0.5 ha have been taken as marginal landholdings)

Fig. 2.6

LEVEL OF LAND DEGRADATION IN AMBALA & YAMUNANAGAR



** The district of Ambala also includes Panchkula*

As per an earlier analysis in this chapter, the districts of Ambala and Yamunagar fall in moderate category of agricultural development. However, within these districts, the Kandi region has a relatively fragile ecological base, and consequently has a lower level of performance in terms of agricultural development. The northern stretch of mountainous land presents a typical case of diversities, which have led to widespread disparities not only in natural resource endowments but also in social and economic terms (World Bank, 1999a).

d) Seasonal Migration:

The Kandi region is home to a significant Gujar population – the traditional cattle herders. Cattle offered them the only security against the vagaries of nature that had reduced the once fertile tracts in the Shivaliks into dusty rolling topography. Shrinking biomass cover under increased moisture stressed conditions had left little option for the poor but to utilise cattle as the sole tool for livelihood (Sharma, 2003b).

The large scale migration of both human as well as cattle population has had its impact on the social and economic lives of the inhabitants. The migrants used to leave their respective villages and move towards the Gangetic Plain towards the end of Kharif season and were back the next year with the onset of monsoons. The migration had negative economic as well has social consequences. The low level of female literacy (particularly for that of girl children) is a case in point.

e) Connectivity:

The hilly villages of Shivalik footHills suffered from lack of connectivity facilities. There were no metalled roads and in several villages there were no roads at all. The problem was severely acute in the uplands of Morni Block (Table 2.5). Lack of connectivity to the urban centres has hindered the development process of the villages. Though most of the villages in the Morni block are not more than 40 km from the state capital, reaching the most planned city of the country generally took more than 8 hours. The situation got worse during rainy days. Most of such villages found it difficult to reach the nearest metalled road as the there were no proper pathways linking them to the roads (Sharma, 2003a).

e) Socio-economic Backwardness:

Lack of awareness and employment opportunities have forced the inhabitants to fall back on the fragile natural resources. The Kandi region stands apart in terms of socio-economic development from other parts of the state and even the districts where it is located. Lack of connectivity and male-specific seasonal migration has led to low literacy levels (Table 2.5). Communication facilities are also at a very low level.

Table 2.5: Socio-Economic Level of Development by Blocks in Kandi (1991)

District	Blocks	Share of Cultivable Area to Total Area	Irrigation Extent	Literacy Rate	Female Literacy	P & T (% of villages)	Communi-cation (% of villages)
			Ambala				
	Pinjore	*49.17*	*22.24*	*58.60*	*47.00*	*18.85*	*62.30*
	Morni	*77.99*	*10.36*	*44.23*	*24.72*	*40.00*	*46.67*
	Barwala	*60.92*	*43.42*	*55.41*	*42.34*	*23.53*	*72.55*
	Raipur Rani	*71.12*	*38.71*	*54.68*	*42.11*	*20.73*	*73.17*
	Naraingarh	*75.47*	*68.75*	*57.71*	*44.94*	*23.81*	*71.43*
	Ambala	82.23	73.60	58.87	46.52	33.71	79.43
	Barara	83.30	67.67	60.54	48.33	41.61	74.45
	Sadhaura (Part)	87.08	75.23	58.96	46.19	33.33	66.67
District		74.81	60.14	68.79	45.52	28.83	72.15
			Yamunanagar				
	Chachhrauli	*66.35*	*72.32*	*45.08*	*35.78*	*21.08*	*68.67*
	Bilaspur	*75.45*	*59.40*	*50.38*	*45.36*	*19.57*	*45.65*
	Sadhaura	*68.24*	*47.57*	*48.65*	*40.41*	*12.07*	*27.59*
	Radaur	87.15	99.42	57.50	45.47	31.73	50.00
	Jagadhri	83.07	96.34	58.19	33.14	36.65	52.80
District		76.39	79.92	52.73	38.17	25.68	52.63

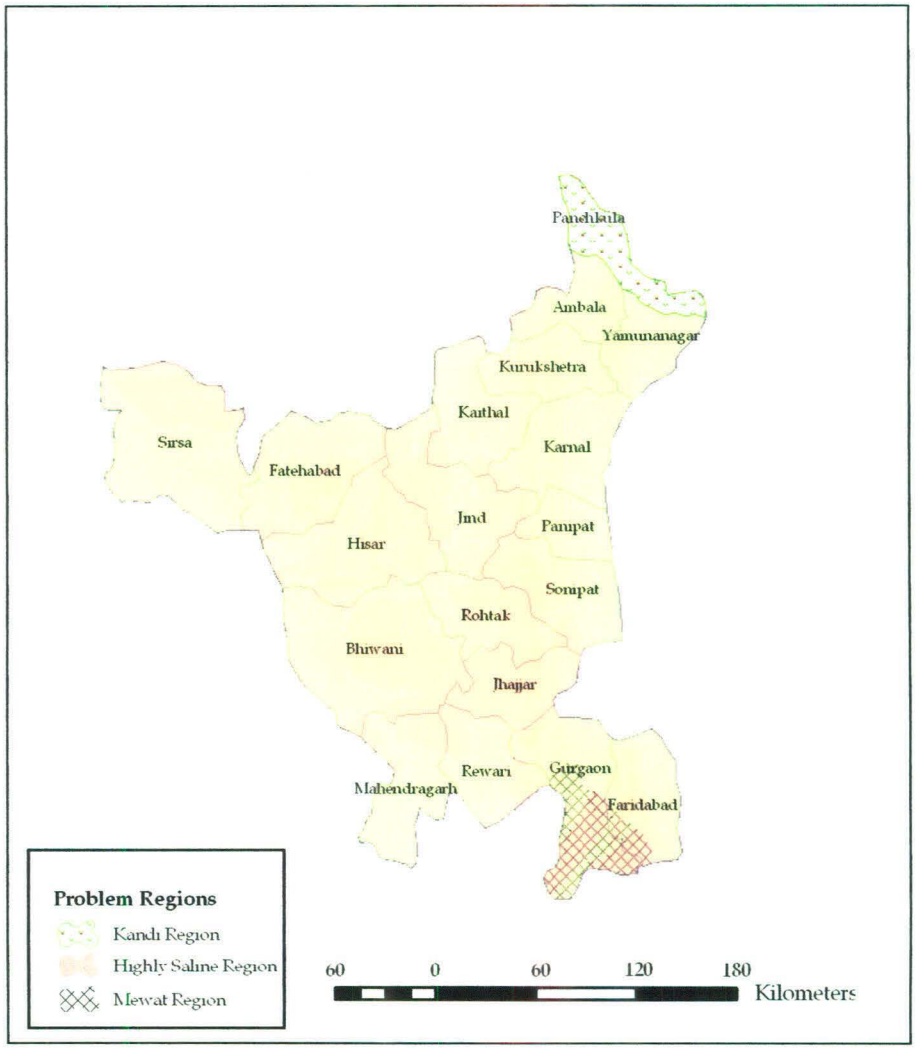
(The blocks shown in italics constitute the Kandi Region)

Source: District Census Handbook, Yamunanagar and Ambala, 1991

It would thus be seen that there are pockets of underdevelopment even in an economically developed state like Haryana. A comparison of these problem regions (Fig. 2.7) with the agriculturally developed regions of the state (Fig. 2.1) would indicate a close *inverse* relation between the two. Further, as it has come out from the foregoing analyses, these underdeveloped pockets are also backward on socio-economic parameters. More importantly, these regions suffer from one or the other

land related problem. It may thus be inferred that the land degradation problems have led to agricultural backwardness and which in turn has translated into socio-economic backwardness.

Fig 2.7: Identification of Problem Regions in Haryana



It has been largely found that watershed programmes are an apt answer to the plight of such regions. The watershed development programmes, in its new avatar giving prime emphasis to institutional development, not only arrest land degradation but also lead to community development. It is heartening to note that the government in collaboration with other agencies have launched a number of watershed programmes in such regions as a response to the long due problem of land degradation in the regions in various

forms. The ensuing section deals with such programmes launched to mitigate the problems identified in these problem regions of the state.

2.3 Programmes Targeted at the Problem Regions

2.3 A. Mewat Development Agency

For the overall social and economic development of the region, the state government constituted the Mewat Development Board (MDB) under the chairmanship of the Chief Minister. The executive wing of MDB has been designated as Mewat Development Agency (MDA) and is headquartered at Nuh (Gurgaon)[15].

The main stress of MDB is to improve the agricultural situation by better management of watershed area, reclamation of saline soil through sub-surface drainage system. Empowerment of the villagers is also given emphasis and is done through organisation of training camps for the farmers, literacy campaigns and upgrading the skills of the rural artisans[16].

In order to ensure adequate development of this region infrastructure was created and basic amenities were provided to the masses in the previous plan periods in the fields of education, water supply, agriculture, animal husbandry, fisheries, health, industries, dairy, establishment of industrial training institutes, industrial estates and housing colonies etc. Efforts had also been envisaged to be made towards sustainability of existing SHGs by increasing their awareness level through frequent interactions with them. The aim has been to empower women with a view to improving their economic condition and social status, in turn, bringing the overall growth and progress in the society.

Rural water supply, canal irrigation and soil and water conservation formed the most important heads under which the expenditures were made (Table 2.6). The depleted soil sources of Mewat and the pronounced shortage of water underline the importance of soil and water conservation measures. The soil and water conservation measures aim at increasing rainfed cultivation over 16,000 hectares with better watershed management practices. Most of the streams, converging from Aravali Hills have been bunded to enhance the ground water level.

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[15] All information pertaining to MDA have been taken from its official website and newspaper clippings featuring MDA.

[16] District Census Handbook. *op cit*

Capacity building has been one of the prime concerns of MDB. The Board has allocated 17 percent of the total outlay for community development. Under the Integrated Wasteland Development Project (IWDP) 14 Watershed Committees have been constituted and offices of these committees have been established in each project village. A number of SHGs have also been formed in the villages, with a view to impart training for vocational activities (particularly candle making and dairying). Special emphasis has been laid on the women and efforts have been made to empower them to take-up social action programmes.

Table 2.6: Component-wise Physical & Financial Achievements of MDA

	Project Component	Total Outlay in Rs. Cr. (Share of Total Outlay)	Expenditure Up to 31.10.03 (Share of Allocation)	Activities Undertaken
1	Soil and Water Conservation	12.62 (17.98)	11.88 (94.13)	Field Bunding (1071 Ha), Construction of Check Dams (939), Gully Plugs (350), Percolation Ponds (871), Soil Reclamation (772 Ha)
2	Canal Irrigation	11.03 (15.71)	11.53 (104.53)	Banarsi Distributory rehabilitation (17 Km) Umra, Gangwani,Shadipur, Dabalu, Hinganpur Minors (51 Km)
3	Arable Crop Development	2.17 (3.09)	1.51 (69.58)	Demonstration Plots on different crops (17200 Ha), Control of Pests & diseases (4120 Ha), Green manuring (1295 Ha) Farmers Training and Excursion (3700)
4	Livestock Development	5.43 (7.74)	4.63 (85.26)	Construction of Livestock Complexes (8), Mini Livestock Complexes (9), Mass deworming of animals (112058), Mass Mineralisation of Animals (97893), Formation of Dairy Market Cooperatives (225), Vaccination against FMD diseases (9000), Training to youth for Milk Production (3355)
5	Off-Farm Enterprises	8.46 (12.05)	2.41 (28.49)	Technical training to youth (10222), Potential Studies (2)
6	Development Support Communication	1.22 (1.74)	0.57 (46.72)	Training to NGO staff (141), Refresher course for NGO (262), MDA's News Letter (31), Awareness through non-conventional media (392 villages)
7	Community Development	11.79 (16.80)	5.5 (46.65)	Training to Midwives / Nurses (586), Training to

				Panchayat Raj Members (996), Training to Sahelis / Animators / Bookwriters (3036), Gender Sensitisation (5257), SHG Training (53343), Federation Members Training (13186)
8	Formal Education	3.16 (4.50)	4.9 (155.06)	Construction of school rooms (59), Const. of Girls Hostel (1), CDP Centres (329), Mobile Health (185 Villages), Health Camps (24)
9	Rural Water Supply	9.2 (13.11)	27.61 (300.11)	Construction of Booting stations (55 Nos.) , Installation of Tubewells (313 Nos.), Pipeline (650 Kms.),Generating Sets to Panchayats (26 Nos.)
10	Mewat Dev. Agency	3.2 (4.56)	4.42 (138.12)	--
11	Project Evaluation	0.14 (0.20)	0.24 (171.42)	Base line survey, Midterm review, Evaluation Studies & Water Resource Study etc. (5 Nos.)
	Total	**70.19**	**77.78**	

Source: Mewat Development Agency, 2004

An analysis of the financial records of MDA shows that all funds allocated under various heads have been duly spent, which is one of the primary requirements of a project. However, it would be seen that in terms of expenditure on creation of physical infrastructure the expenditure has always exceeded the allocated money, however, for institutional development like community development and development support communication – necessary for the sustenance of any watershed related programme – the actual expenditure has always formed only a fraction of the fund allocated. Thus, it would be seen that institutional strengthening is yet an ignored area which requires urgent attention of the planners.

2.3 B. Haryana Operational Pilot Project

To arrest the problem of salinity and water logging, a project namely Haryana Operational Pilot Project (HOPP) was started in the state in 1987 with support from the Netherlands Government[17]. In 1991, the Department of Agriculture was designated as the nodal agency for the HOPP with the Soil Conservation Office as implementing agency. The implementation of the Project started in 1994 with a total outlay of Rs. 230 million, the contribution of the state government being Rs. 22 million.

[17] Source of information - Govt. of Haryana (2001)

The first phase of HOPP (1994 – 99) aimed at *'the preservation of the production capacity of agricultural land in the saline groundwater belt of Haryana. Farm land, in danger of becoming unproductive as a result of water logging and soil salinity, will be preserved and land that has already become unproductive because of these processes will be reclaimed'.*[18]

During initial stage, of Phase-I, an area of 1253 ha has been developed at a cost of Rs. 7.31 crore under this system in Gohana (Rohtak, earlier in Sonipat) covering 4 villages. Additionally, 746 hectares have been developed in Kalayat (Kaithal) at a cost of Rs.4.39 crore in 13 villages. All the said works have been undertaken with the financial assistance of Netherlands Government.

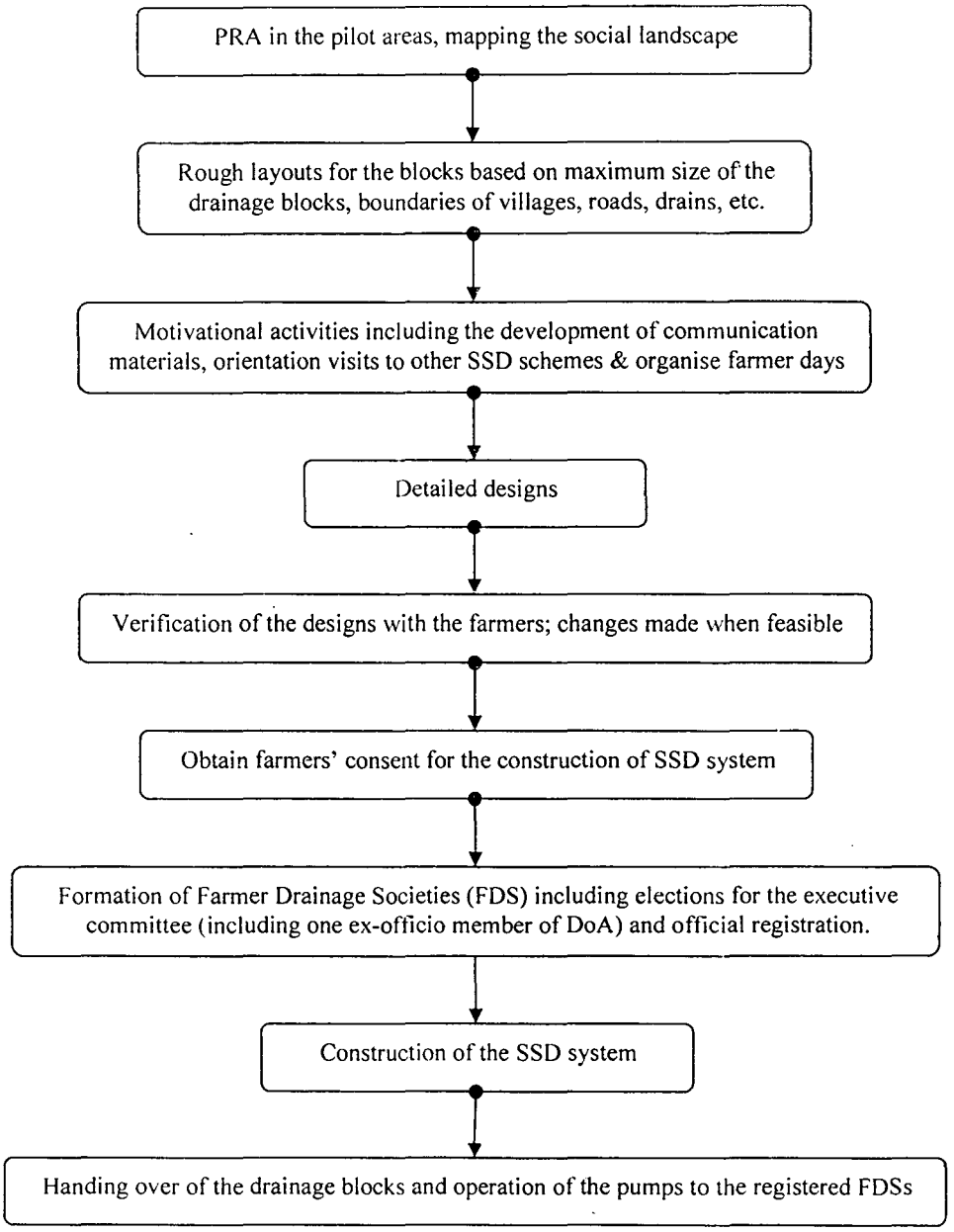
The first phase of HOPP was followed by the second one (1999 – 2002), wherein the project was extended to institutionalise the gained experience. The redefined long term objective of the project was *'to build and strengthen the capacity of the DoA, Govt. of Haryana to implement the SSD technology in the state and to create/act as a resource/knowledge base for the future interventions of the SSD technology in the waterlogged and salt affected areas of Haryana (and later north-west India) including playing active facilitating role for the development of a drainage policy in the State and possibly in neighbouring state'.*[19]

The project has been restructured around the pivot of a gender-sensitive bottom-up decentralised approach of partnership. Farmers' involvement has been sought right from the planning and design stage and is continued till the completed project is handed over to the representative institution (Fig. 2.5).

Based on a process approach, a Knowledge Management Unit (KMU) was established in Chandigarh during the second phase of the project. Besides assuming additional M & E responsibilities, the KMU has been designated to guide the implementing department (the SSD cell in Karnal) to developed capacity building packages, co-ordinate training on data collection, work processing and planning, gender sensitisation and farmer participation.

[18] Govt. of Haryana (2006), p. 9
[19] Govt. of Haryana (2006), p. 12

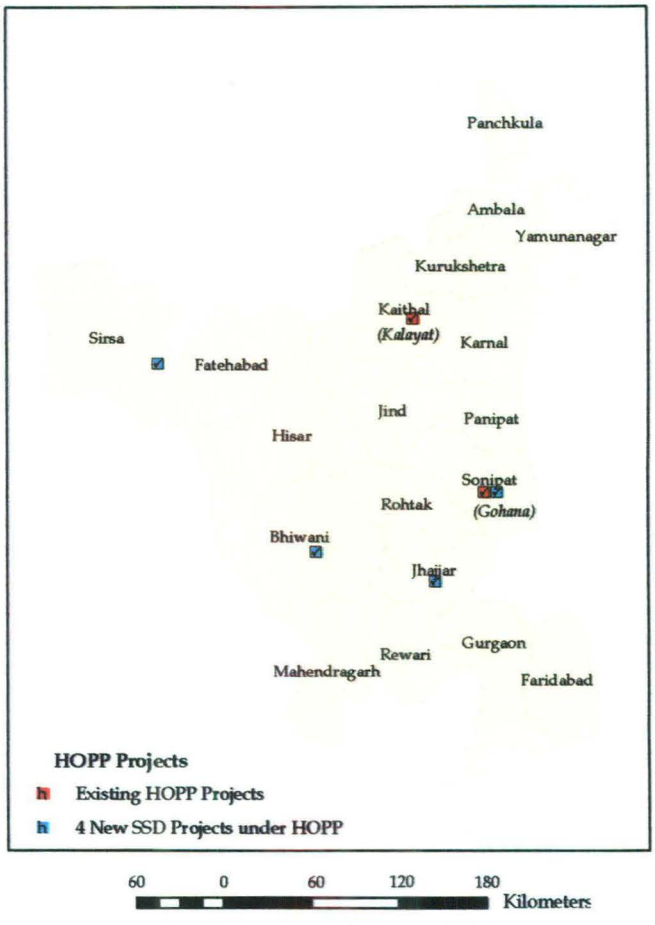
Fig. 2.8 Sequence of Activities in HOPP



Source: Govt. of Haryana, 2004

Impressed upon the success of HOPP implemented by the DoA, the Ministry of Rural Development has sanctioned four projects for reclamation saline and waterlogged soils in Jhajjar, Bhiwani, Sonepat and Sirsa districts at a total cost of Rs.

Fig 2.9: Location of Sites of Haryana Operational Pilot Project



Source: Govt. of Haryana (2006)

1906 lakh (Fig. 2.8). The Government of India would contribute 60% of the total project cost and the balance 40 % (including 10% beneficiaries share) shall come from the state government. It is contemplated to develop a total area of 4600 hectares under the project by laying sub-surface drainage system (Table 2.7).

Table 2.7: Land Reclamation under HOPP

District	Area (in ha) to be reclaimed (% to the total)
Jhajjar	800 (17.4)
Bhiwani	800 (17.4)
Sirsa	1500 (32.6)
Sonipat	1500 (32.6)
TOTAL	**4600 (100)**

Source: Govt. of Haryana (2006)

The HOPP has ceased to function from March, 2003 leaving 9 villages of Kalayat project having an extent of over 538 hectares (gross area) yet to be covered. This balance area of Kalayat-II has been developed under Macro Management Mode (MMM) scheme funded by the Indian Government.

2.3 C. The Integrated Watershed Development Project (Hills)

The Kandi tract is marked by fragile ecosystem consequent upon grazing and illicit exploitation of forests. The fertile lands had been destroyed to a great extent due to erosional activities in the upper reaches and deposition of silt in the lower reaches. The World Bank took note of the degrading natural resources in Kandi and other parts of the country and funded the Integrated Watershed Development Project (IWDP-Hills) for development of seven selected States in 1990-91. The objectives of these projects were minimising ecological degradation and stabilising watersheds through a number of programmes. The project was conceived for integrated development of plain areas on selected watershed basis in Gujarat, Rajasthan and Orissa under IWDP (Plains) and similar development of hilly areas, especially of Shiwalik ranges in Jammu and Kashmir, Himachal Pradesh, Punjab and Haryana through IWDP (Hills) (GoI, 2000).

The Kandi tract consists of four watersheds[20] – Ghaggar, Dangri, Markanda and Yamuna and 16 sub-watersheds covering an area of 1.92 lakh hectares and 621 villages (Fig. 2.10). The altitude of the region ranges from 300 to 1500 metres. The first phase

Table 2.8: Area Covered under IWDP (Hills – Phase I) in Haryana

	Watershed	Sub-Watershed	Estimated Area in ha *(Share of Total Area)*	No. of Villages
Initial Phase (1990 – 94)				
Ambala (now Panchkula)		Sirsa	8964 *(14.02)*	29
Yamunanagar		Boli-Yamuna	6406 *(10.02)*	25
		Total	**15370 (24.04)**	**54**
Expansion Phase (1994 – 99)				
Ambala	Ghaggar	Madhkali	4036 *(6.31)*	8
Ambala	Markanda	Begna	17345 *(27.12)*	119
Yamunanagar	Yamuna	Somb	15890 *(24.85)*	60
Yamunanagar	Yamuna	Pathrala	11297 *(17.67)*	43
		Total	**48568 *(75.96)***	**230**
		Grand Total	**63938 *(100)***	**284**

Source: Annual Administrative Reports, Govt. of Haryana

[20] Some project documents have mentioned Sirsa as a watershed. However, the watershed maps of the region show only four watersheds while Sirsa has been shown as a sub-watershed.

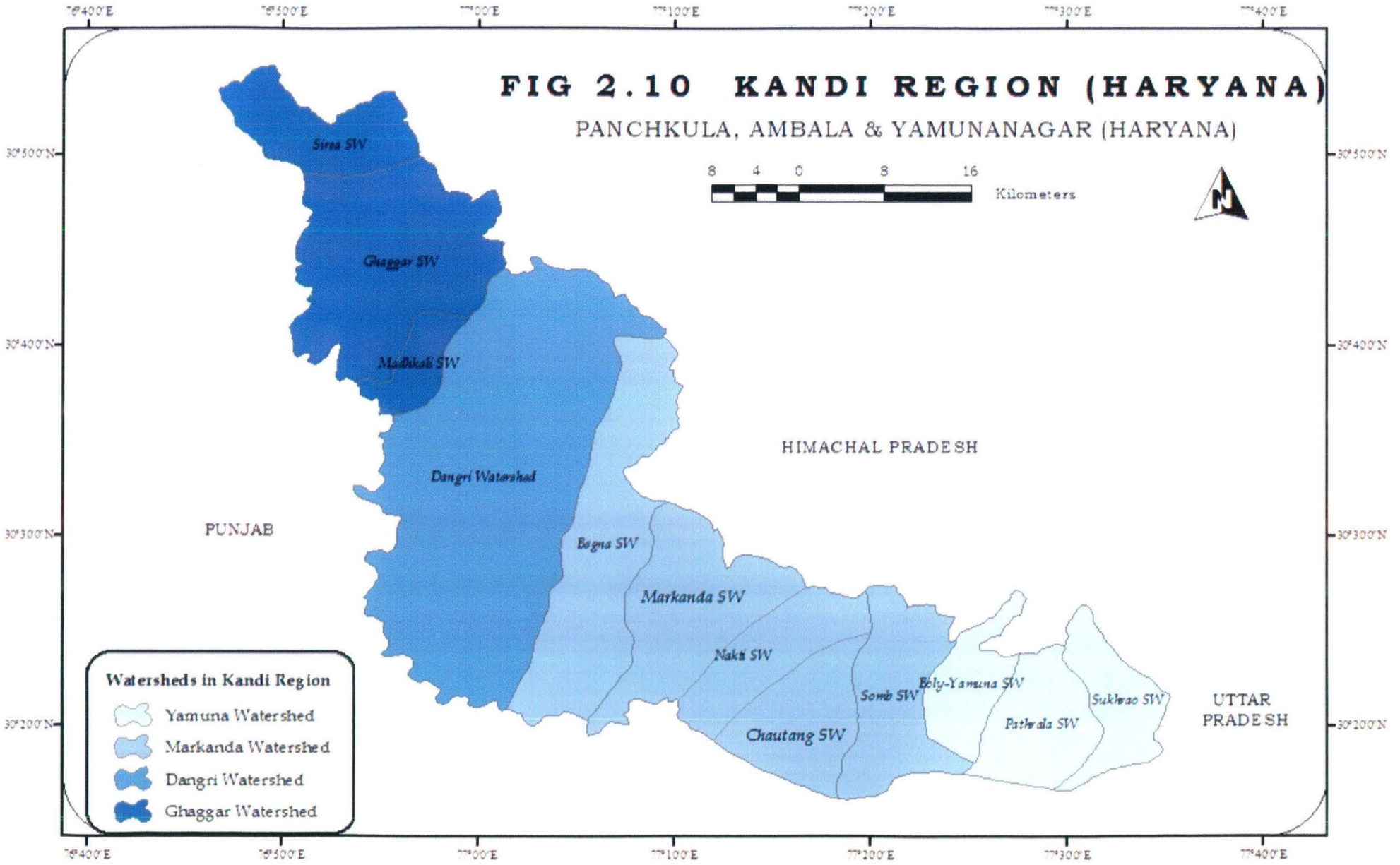


FIG 2.10 KANDI REGION (HARYANA)
PANCHKULA, AMBALA & YAMUNANAGAR (HARYANA)
8 4 0 8 16
Kilometers
N
76°400'E
76°500'E
77°00'E
77°100'E
77°200'E
77°300'E
77°400'E
30°500'N
30°400'N
30°300'N
30°200'N
Sirsa SW
Ghaggar SW
Madhkali SW
Dangri Watershed
Begna SW
Markanda SW
Naki SW
Somb SW
Chautang SW
Bely-Yamuna SW
Pathrala SW
Sukhrao SW
HIMACHAL PRADESH
PUNJAB
UTTAR PRADESH
Watersheds in Kandi Region
Yamuna Watershed
Markanda Watershed
Dangri Watershed
Ghaggar Watershed

of the IWDP (Hills - I) was started in 1990 for a period of seven years, was given an extension of two years and finally ended in 1999. A total expenditure of Rs. 61.68 crores was made in this phase. In this phase six sub-watersheds were covered, viz. Sirsa, Boli-Yamuna, Madhkali, Begna, Somb and Pathrala. Most of these sub-watersheds covered small areas, except Begna and Somb (Table 2.8). A total of 284 villages were taken up for development in the first phase.

Encouraged with the success of the first phase, the second phase of the IWDP-Hills was launched in 1999 (Hills – II). In Haryana, 70472 hectare area of 219 villages in five sub-watersheds, viz. Dangri, Markanda, Nakti, Chautang – Saraswati, and Sukhrao were earmarked for development (Table 2.9). Among these, Dangri watershed is the largest one, covering more than 35 percent of the total area treated in the second phase. Dangri watershed is typified by the existence of hilly terrain due to its location in the Hills and footHills of Morni. Sukhhrao, one of the smallest sub-watersheds in the Kandi region, is entirely formed of Hills. Both these watersheds together cover almost 90 percent of the total hilly terrain in the region.

Table 2.9: Area Covered under IWDP (Hills Phase – II) in Haryana

District	Sub-Watershed	Watershed Catchment	Estimated Area *(Share of Total)*	Area Under Hills *(Share of Total)*	Area Under Plains *(Share of Total)*	No. Of Villages	No. Of Micro Watersheds
Panchkula / Ambala	Dangri	Dangri Nadi	24858 *(35.27)*	11723 *(58.79)*	13135 *(25.99)*	82	22
Ambaba / Yamunanagar	Markanda	Yamuna River	18205 *(25.83)*	1016 *(5.10)*	17189 *(34.01)*	56	18
Yamunanagar	Chautang-Saraswati	Yamuna River	12021 *(17.06)*	0 *(0)*	12021 *(23.79)*	34	15
Yamunanagar	Nakti	Markanda River	9458 *(13.42)*	1270 *(6.37)*	8188 *(16.20)*	44	7
Yamunanagar	Sukhrao	Markanda River	5930 *(8.41)*	5930 *(29.74)*	0 *(0)*	3	2
		Total	**70472** *(100)*	**19939** *(100)*	**50533** *(100)*	219	64

Source: World Bank (1999b), Report No. E-261 (Absolute area figures in hectare)

In total an aggregate expenditure of 193 million USD was made (for all the five states) (Table 2.10). The expenditures were first incurred by the state government which was later reimbursed through the Govt. of India. In the first phase the overall rate of re-

imbursement was about 80% while in the second phase it was about 70%. It would be seen that in the first phase the prime emphasis was on land conservation and infrastructural development while institutional development was conspicuous by its absence. This anomaly was more than rectified in the second phase most of the expenditures were incurred on capacity generation activities.

Table 2.10: Component-wise Expenditure for all states under IWDP - Hills

	Million USD	%
Project Component I (1990-99)	**139.2**	72.12
Sub-Watershed Treatment	94.3	48.86
Fodder & Livestock Development	18.0	9.33
Rural Infrastructure Development	26.9	13.94
Project Component II (1999-2005)	**53.8**	27.88
Community Capacity Building	6.2	3.21
Policy Reforms & HRD	4.4	2.28
Income Generating Activities For Women	1.6	0.83
Information Management, M & E	5.8	3.01
Project Coordination & Management	35.8	18.55
Grand Total	**193.0**	100

Source: World Bank (1999a) Report No. 19274-IN

Phase I and II Compared:

The World Bank projects support three sets of goals: Millennium Development Goals (MDG), Corporate Advocacy Priorities (CAP) and Global Public Goods Priorities (GPG). The IWDP-Hills was designed to address, over a seven year period (later extended to nine years), one of India's most serious environmental problems - watershed degradation. This was to be done by aiding for remedial programs in some of the country's most important agro - economic zones. The main project objective was to slow and reverse degradation of the natural environment through soil and moisture conservation technology, with a view to improving production and income from grain crops, horticulture, fodder, fiber, fuel-wood and livestock.

The objectives of IWDP (Hills – I) can be thus put into the broader framework of the three set of goals promulgated by the World Bank:

Table 2.11 Goals and Missions of the World Bank

Objective	Goal	WB's Mission
Participation and civic engagement	Empowerment, security & social inclusion	CAP
Environmental policies and institutions	Environmental commons	GPG
	Ensure environmental sustainability	MDG
Land administration and management	Environmental commons	GPG
	Ensure environmental sustainability	MDG

Source of Information: Project Information Document, IWDP, Project ID: P009882

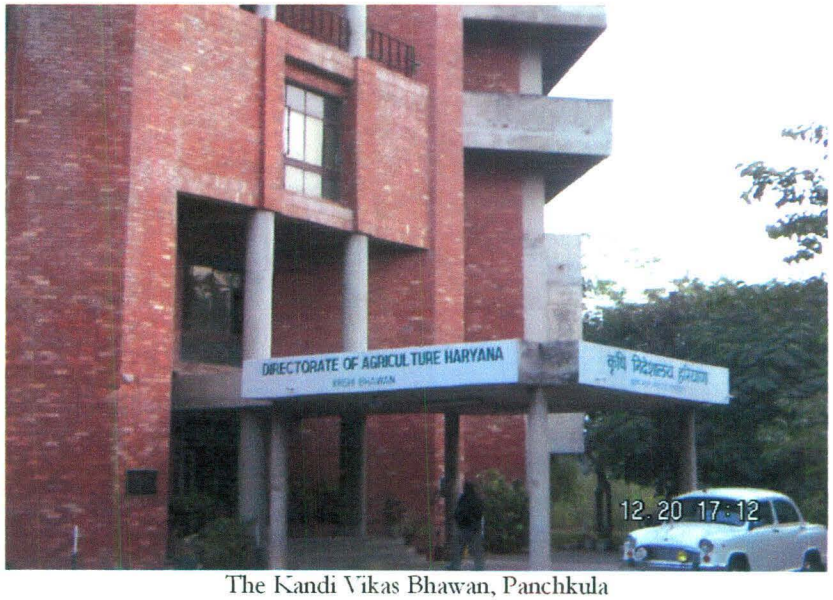
The first phase of IWDP-Hills was started on 6th March 1990 and ended on 31st March 1999. Towards the end of the project a number of constraints were realised. One of the foremost lacunae in the first phase was a clear lack of emphasis on community participation. The project also had poor linkages with the line departments and had a departmental execution which has its own set of obvious problems that have plagued most developmental programmes in the country (World Bank, 1999b).

In the light of these limitations of the first phase, the second phase of IWDP (Hills – II) was launched 1999 onwards, soon after the completion of the first phase. By now it had been realised that the participatory approach requires a great deal of flexibility in approach and methodology. It was observed that even the participatory process had followed a top-down approach rather than a bottom-up one. Hence, in the second phase, a 'need-based' approach was followed, wherein the concerned villagers were involved at the very stage of planning. This was done through the formation of Village Development Committees (VDCs) in each of the 219 villages where the programme was implemented in the second phase. These VDCs were duly registered as a society. Each of the VDC framed its own Village Development Plan (VDP) under the

supervision of government officials, in accordance to its requirements. Thus, it has been a classic example of participatory planning which provides the villagers with a sense of belonging towards the project which in turn ensured their active involvement in its execution

Another unique feature of the project, which deserves special mention, has been an attempt to address the connectivity issue in the region. Given the nature of ravine-like conditions in most of the villages in the hilly tracts of Shivaliks, the benefits of soil and moisture conservation works could only be suitably and gainfully harvested if the communities would have easy access to the world outside. Easy access to the market, particularly for horticultural goods, and comfortable movement of the people contribute to better living conditions in the remote villages. A small share of the total allocation of Rs. 72 crores for civil works (3.5 %) were spent on building culverts and in laying pathways in the villages (Sharma, 2003a – Project Documents).

Multiplicity of agencies implementing watershed projects has often been cited as one of the major lacunae in literature. A major fallout of such an approach has been either overlap in implementation or left-out areas. This intriguing issue was answered here by a significant integration of various ministries. The Department of Agriculture was



The Kandi Vikas Bhawan, Panchkula

identified as the nodal agency, followed by the Department of Forest, Animal Husbandry and Horticulture. As the project involved addressing of connectivity problem, the PWD was also involved.

It would be thus seen that the IWDP – Hills in the Kandi region has been a unique experiment in the realm of watershed development and management. The success of this experiment has been much emphasised and well documented. In the ensuing sections, a secondary level assessment of the watershed programme in the Kandi region has been done, wherein initially the prioritisation followed in taking up the sub-watersheds for development has been dealt with, which has been followed by an analysis of the landuse changes that have occurred at the village level (based on the Census information).

2.4 Prioritisation of Sub-Watersheds in IWDP – Hills

The Kandi region consists of 16 sub-watersheds. The IWDP-Hills has covered eleven sub-watersheds under the programme over a fifteen-year period in two phases. The first phase (1990 – 99) can be further divided into the Initial Phase (1990 – 94) and Expansion Phase (1994 – 99). Table 2.12 shows the status of culturable wasteland, net area sown and irrigated area at the time of initiation of the project. An analysis of various sub-watersheds at this stage would demonstrate whether their requirements were taken into consideration before making a prioritisation of sub-watersheds for development. The prioritisation followed will be discussed subsequently in context of the following indicators:

a) Share of Culturable Wasteland:

One of the prime motives of any watershed programme is to arrest land degradation. Therefore, extent of wasteland in a watershed is a potent determinant of initiation of watershed programme in a region. In the Kandi region, Boly – Yamuna sub-watershed has the maximum share of culturable wasteland (12 percent) as compared to all other sub-watersheds (Table 2.12). The two sub-watersheds chosen for watershed development in the Initial Phase have almost 6 percent of their total area under this category, while those taken up in the Expansion phase have 7 percent and those in the second phase have 5 percent of their total area under wastelands. Thus, it can be inferred that the sub-watersheds were aptly prioritised in terms of them being taken up for development as far as the existence of wastelands is concerned.

Table 2.12 Culturable Wasteland and Agricultural Land in Kandi Region (1991)

	Villages**	Share of Culturable waste in total area	Share of NAS in Cultivable Area	Share of Irrigated Area in NAS
		Phase I (Initial) 1990 – 1994		
All Watershed Villages	***52***	***5.86***	***92.87***	***30.61***
Sirsa	34	2.80	95.72	18.29
Boly-Yamuna	18	11.65	87.49	53.90
*Non-Watershed**	*740*	*4.79*	*88.25*	*52.65*
		Phase I (Expansion) 1994 – 1999		
All Watershed Villages	***184***	***6.95***	***90.70***	***45.10***
Madkali	9	8.98	87.15	26.82
Begna	54	6.61	89.97	47.76
Somb	76	8.69	89.29	54.62
Nakti***	33	4.16	94.40	27.13
Sukhrao***	2	0.66	97.95	43.46
Dangri***	10	3.54	95.69	34.30
Non-Watershed*	556	4.14	87.73	55.22
		Phase II (Extension Phase) 1999 – 2005		
All Watershed Villages	***148***	***4.75***	***93.44***	***52.32***
Chautang-Saraswati	25	3.50	96.07	45.37
Dangri	67	5.33	91.64	40.33
Markanda	56	4.60	94.42	69.77
Non-Watershed*	408	3.92	86.33	55.34

** Includes only those villages which lie in the Kandi Region ** No. of villages for which census figures were available *** Work in these sub-watersheds/ villages started in 1997*

Source: District Census Handbooks, Ambala & Yamunanagar, 1991

b) Share of net area sown to the total cultivable area:

Agriculture being the dominant occupation in the region, the significance of area under plough need not be exemplified. It would be seen that Kandi region has a fair share of net area sown (NAS) in the total cultivable area (NAS and culturable wasteland combined), averaging almost 90 percent in the region. However, the extent of agricultural land in itself does not throw any light on land productivity. In the absence of information on gross area sown (GAS), the cropping intensity[21] cannot be calculated which could have been a better indicator of land productivity.

c) Share of Irrigated Area:

As discussed in the previous chapter, the Kandi region receives very high rainfall as compared to all other parts of the state. However, most of it could not be utilised for agriculture as due to high slopes and uneven terrain surface runoff was quite high.

[21] Cropping Intensity = (GAS / NAS) × 100

Under such a scenario, the significance of irrigation can hardly be overestimated. The table gives a very clear picture of the level of irrigation in the sub-watersheds. The average irrigated percentage of NAS is seen to be the least in the villages where watershed programme has been implemented in the Initial Phase (30 percent) followed by those in the Expansion Phase (45 percent) and second phase (52 percent). As against that the non-watershed villages for each phase (where the programme was not implemented till that phase), have constantly higher share of irrigated area. Further, Sirsa sub-watershed which has a very high share of NAS (more than 95 percent) has the least share of irrigated area (less than 20 percent). More importantly, there are only three sub-watersheds (Boly-Yamuna, Somb and Markanda) where at least half of the NAS is irrigated.

It can thus be concluded that the prioritisation followed in the IWDP-Hills in Kandi largely conforms to the requirement of the sub-regions which is the first step in an efficient watershed programme. In the light of this inference, it would be incumbent upon one to assess the impact of the watershed project in the region.

2.5 Changes in Selected Natural Resource Indicators – A pre and post Programme Analysis of Kandi Region as a Whole

It has been observed that fragile ecology in hilly regions can be efficiently managed by adopting soil and moisture conservation technologies on watershed basis (B. L. Dhyani et al, 1993). It has already been seen in the previous section that prioritisation has been followed in adopting sub-watersheds for development in the Kandi region. Therefore, it would be pertinent to assess the impact of the programme on the ecology and economy of the region.

The general approach followed in impact evaluation of watershed projects is that of 'before – after', wherein the scenario after the implementation of WDP is compared to that before the initiation of the programme. This is an easily followed approach in circumstances where sufficient information for both the periods is available. However, such temporal comparisons fail to capture the effects of developmental effort other than that of watershed programmes. In other words, with the before-after approach, it may be difficult to 'sieve' out the effect of watershed programme. The 'with – without' approach is preferred in cases that suffer from the paucity of information in the pre-

project phase.[22] Such a spatial approach comes under criticism as the extremely high location-specificity of watersheds makes it difficult to select a non-programme area with similar physical and socio-economic characteristics.

The approach followed in this section on impact evaluation makes an amalgamation of both these approaches. The sub-watersheds taken up for development in the first phase of IWDP-Hills (1990 – 1999) have been taken into consideration. This is because the period of implementation of the first phase, i.e. one decade, almost coincides with the two censuses (1991 and 2001). Therefore, the developments over the decade can be assessed by making an inter-temporal comparison between the two censuses. At the same time the villages where the watershed programme was not implemented have also been taken into consideration and an assessment of the developments in these non-implementation villages over the decade has also been done. Thus, the impact of watershed programme in the Kandi region has been analysed.

The impact analysis attempted here has had some limitations inasmuch it is difficult to capture the impact of WDP generally followed in a 'ridge to valley' format through village-level segregations. Consequent upon the same, the watershed and non-watershed categorisations are also not that effective. However, these limitations should not completely offset the effect of watershed development at the village level and hence this approach has been followed here.

The Census provides information on the culturable wasteland, net area sown and irrigated area. These three indicators have been chosen to evaluate the influence of the watershed programme. Initially, all the villages where watershed programme has been implemented have been compared with those in the region where the programme was not implemented. Thereafter, a sub-watershed-wise analysis has been attempted.

The first phase of IWDP (Hills – I) covered a total of 284 villages in seven sub-watersheds[23]. These average figures of the selected indicators for these villages (for which Census information were available) have been shown in Table 2.13. These group of villages have been compared with those villages where watershed programme was not implemented in the first phase, shown as 'non-watershed' in the table[24]. The

[22] An indicative list of available literature on impact evaluation studies using both the approaches has been given in the literature review.
[23] Source of information – Annual Administrative Reports, Government of Haryana
[24] The 'non-watershed' villages include a number of villages where WDP was implemented in Phase II.

total number of such villages is around 500 and includes only those villages that lie in the Kandi region.

Table 2.13 Change in Proportion of Culturable Waste & Agricultural Land in Kandi Region

	Watershed	Non-Watershed	Difference of Means (t)	Watershed	Non-Watershed	Difference of Means (t)
	1991			2001		
Share of NAS in Cultivable Area (in %)	92.30	89.63	2.67 (1.837)***	94.80	89.48	5.32 (3.508)*
Share of Irrigated Area in NAS (in %)	43.65	57.24	-13.58 (-5.158)*	59.42	69.11	-9.68 (-3.891)*
Share of Culturable Waste in Total Area (in %)	6.06	4.16	1.90 (3.112)*	3.45	3.83	-0.38 (-0.644)

*, **, *** Significant at 1, 5 & 10 percent level respectively

Source: Calculated from DCH, 1991 & 2001

It would be seen that the decline in culturable wasteland in the watershed villages is higher as compared to that in the non-watershed villages. While there is a marginal decline in the latter, the decline in the former is almost 3 percent points which is significant. Similarly, in terms of change in share of NAS, although the increase is not that high, it is still higher in the watershed villages. In fact the proportion of NAS has remain virtually stagnant in the non-watershed villages while that in the watershed villages has increased thereby significantly broadening the difference between the two set of villages. Even in terms of proportion of irrigated area, the increase is quite high for the watershed villages (more than 15 percent points) while that in non-watershed villages is less than 14 percent points.

Table 2.14 depicts the change in absolute figures of the chosen variables. It would be seen that although the increase in NAS in the watershed villages has been slightly lower as compared to that in the non-watershed villages, the increase in the irrigated area has been significantly higher in the former. Again, the decline in culturable wasteland in the former is much higher as compared to the latter.

Table 2.14 Growth of Culturable Wasteland & Agricultural Land in Kandi Region

(All units in hectares)		Average Culturable Wasteland	Average NAS	Average Irrigated Area
Watershed Villages	1991	18.71	181.37	78.00
	2001	10.11	187.08	114.57
	Growth (in %)	*-45.98*	*3.15*	*46.89*
Non-Watershed Villages	1991	9.84	158.35	97.26
	2001	6.98	164.77	133.01
	Growth (in %)	*-29.10*	*4.05*	*36.76*

Source: Calculated from DCH, 1991 & 2001

In order to narrow down the differences in changes in the selected indicators, two sub-watersheds have been selected – Somb and Markanda (Table 2.15). Both the sub-watersheds are similar in terms of average area of the villages, number of villages, besides aerial extent and topography; the only difference being that the former was taken up for development in the first phase while the latter one was taken up in the second phase and in fact was one of the last sub-watersheds that were taken up for development.

Table 2.15 Change in Proportion of Culturable Waste & Agricultural Land in Somb & Markanda Sub-watersheds

	Somb (Phase I - Initial)		Markanda (Phase II – Last)	
	1991	2001	1991	2001
Share of Culturable Waste in Total Area	11.55	3.93	4.60	2.37
Share of NAS in Cultivable Area	86.12	93.22	94.42	97.13
Share of Irrigated Area in NAS	54.86	65.92	69.77	85.26

Source: Calculated from DCH, 1991 & 2001

The higher increase in irrigation could have been due to differential investments in irrigation outside the watershed project, an aspect, which is outside the scope of this study. However, both in terms of decline in the share of culturable wasteland as well as

increase in the net sown area, aspects that are less likely to be tackled through other sources of investment, Somb has performed better than Markanda.

Till now, only the average figures of the selected indicators have been taken into consideration. It would be pertinent to assess the trend in changes in each of the villages, both watershed and non-watershed, in the selected indicators. This has been done through scatter diagrams wherein the figures for both the years for each village have been plotted on the two axes. Thus, the trend in change in the selected indicators can be examined by analysing the inclination of the trend-line.

In terms of the NAS and irrigation extent, not much difference can be observed between the watershed and non-watershed villages (Fig. 2.11 & 2.12). In both the cases the inclination of trend-line is quite similar and the values of coefficient of determination almost the same. However, a good dissimilarity between the two set of villages is found in the case of the change in the extent of culturable wasteland. The decline in the watershed villages is much more pronounced as compared to that in the non-watershed villages (Fig. 2.13).

2.6 Changes in Selected Natural Resource Indicators: A Sub-watershed Analysis of pre and post Programme

In the previous section, the impact of watershed programme in the region was assessed in aggregate in all the villages. This section makes an attempt to disaggregate the selected indicators at sub-watershed level. The Kandi region consists of 16 sub-watersheds. Out of these, work was started in two sub-watersheds – Sirsa and Boly-Yamuna in 1990. In 1994, Madhkali, Begna, Somb and Pathrala sub-watersheds and in 1997 Dangri, Nakti and Sukhrao sub-watersheds were selected for development. Thus, the first phase starting from 1990 to 1999 spread over a total area of 104184 hectares covering nine sub-watersheds and 410 villages.

This section makes a comparison of villages where WDP has been implemented *(watershed villages)* with those where WDP has not been implemented *(non-watershed villages)*, both set of villages falling within a particular watershed. The detailed schema followed to segregate the watershed villages with the non-watershed villages and the tools employed to assess the differences therein has been given in the methodology section.

Fig. 2.11 Change in Share of NSA in Cultivable Area (1991 & 2001)

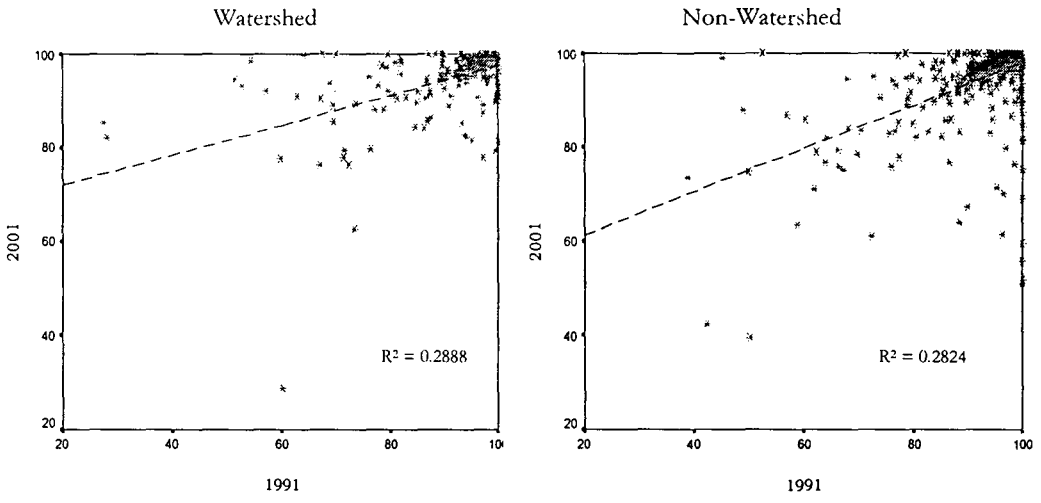


Fig. 2.12 Change in Irrigation Extent (1991 & 2001)

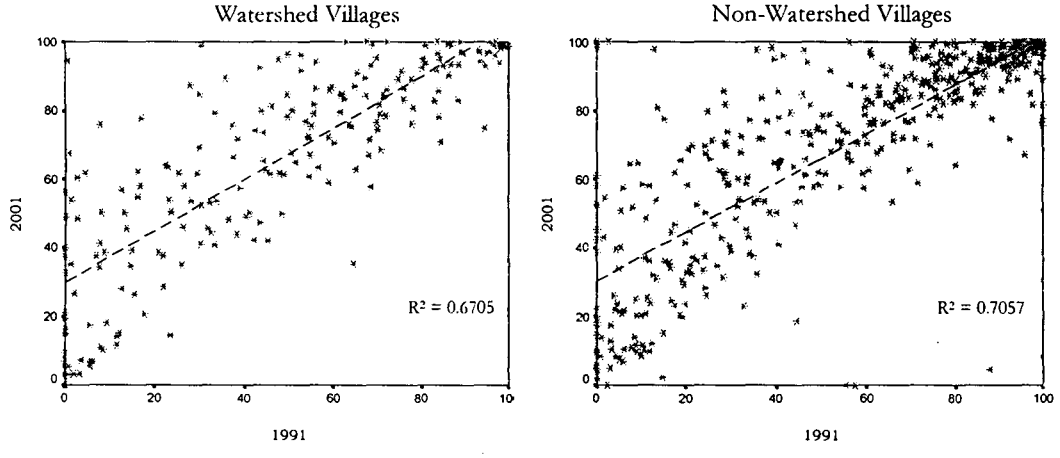
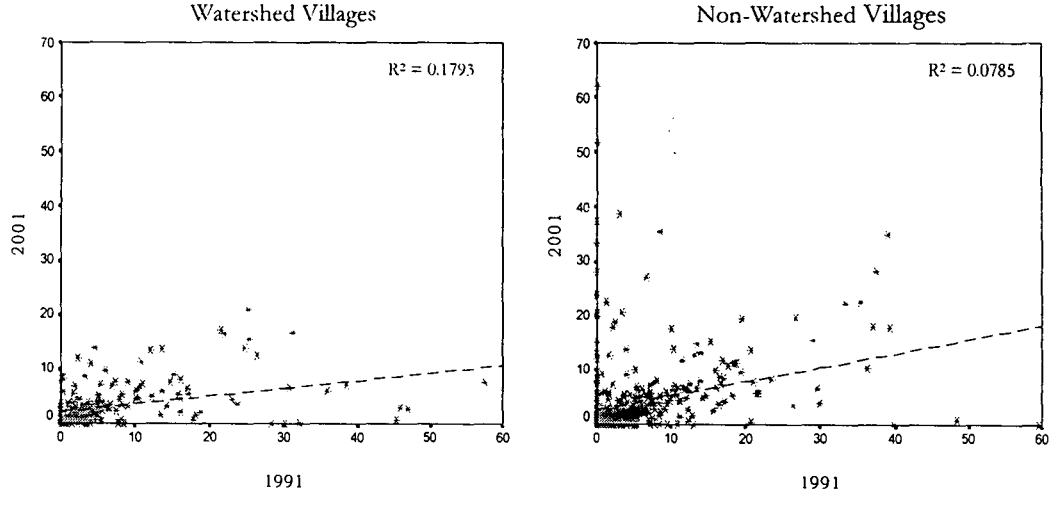


Fig. 2.13 Change in Share of Culturable Wasteland (1991 & 2001)



Source: DCH, 1991 & 2001

In order to assess the differences between watershed and non-watershed villages in each of the watersheds, the average figures for the selected indicators have been compared over time. In terms of change in area under plough, no perceptible change due to watershed activities is observed (Table 2.16).

In Sirsa and Somb sub-watersheds, significant differences are observed between the watershed and non-watershed villages, but these differences exist for both periods. In case of Sirsa, net area sown is significantly higher for watershed villages compared to the non-watershed ones, but in both periods. It needs to be noted however, that for both categories of villages, the share of net sown area to the total cultivable area has declined, notwithstanding the watershed activities undertaken in one category of villages. This can probably be explained by a diversification towards non-agricultural activities, as a result of activities outsides the scope of the watershed programme.

Somb sub-watershed presents a different scenario altogether. To begin with, there was a significant difference in extent of net area sown in the two sets of villages, with the watershed villages having a lower level of area under plough. Though this set of villages did not catch up with the villages without watershed activities in 2001 in terms

Table 2.16: Change in Proportion of Net Area Sown in Cultivable Area

		1991	Difference of Means (t)	2001	Difference of Means (t)
1	Begna & Dangri	92.28	-1.38	95.74	-0.887
	Non_Watershed	93.66	(-1.354)	96.63	(-1.170)
2	Boly-Yamuna & Pathrala	96.61	4.071	96.98	3.671
	Non_Watershed	92.54	(1.248)	93.31	(1.164)
3	Nakti	94.40	1.91	93.00	0.622
	Non_Watershed	92.49	(0.627)	92.38	(0.162)
4	Sirsa	95.72	20.802	93.54	26.82
	Non_Watershed	74.92	(3.357)*	66.72	(4.119)*
5	Somb	85.28	-11.00	92.98	-4.707
	Non-Watershed	96.29	(-4.305)*	97.69	(-3.109)*

* Significant at 1 percent level

Source: Calculated from DCH, 1991 & 2001

of statistical significance, the gap between the two sets of villages has narrowed down considerably and there has hardly been any increase over that. However, the watershed

villages have shown a remarkable increase in the cultivated area. Given the fact that, there has also been a simultaneous decline in the share of culturable wasteland in the watershed villages of Somb, one can certainly infer that that the culturable wasteland has been turned into cultivated area (see Box 2.1).

Irrigated cultivation is an important indicator of the level of agricultural development in any region. Almost all the watershed villages, that were taken up for development had poor irrigational infrastructure consequent upon poor water availability, if not in quantity then in duration. However, the WDP in these villages has brought in benefits and has reduced the hiatus between the watershed and non-watershed villages to a considerable extent (Table 2.17). The gap, ironically, has increased in Somb sub-watershed but this can, as mentioned before, be explained by developmental activities other than the watershed programme. It is difficult to isolate the effect of watershed works on increase in enhancement and utilisation of water resources within the watershed villages in such cases (which have also increased their proportion of irrigation by more than 10 percent points).

Table 2.17: Change in Proportion of Irrigated Area in Cultivated Area

		1991	Difference of Means (t)	2001	Difference of Means (t)
1	Begna & Dangri	45.84	-13.86 (-3.754)*	66.65	-9.40 (-3.203)*
	Non_Watershed	59.69		76.05	
2	Boly-Yamuna & Pathrala	56.45	-21.36 (-3.634)*	69.95	-11.44 (-1.946)***
	Non_Watershed	77.82		81.40	
3	Nakti	27.13	-22.87 (-2.821)*	39.54	-22.72 (-2.72)*
	Non_Watershed	50.00		62.26	
4	Sirsa	18.29	-3.52 (-0.621)	30.23	-3.08 (-0.473)
	Non_Watershed	21.80		33.31	
5	Somb	56.78	-10.971 (-2.075)**	67.45	-14.85 (-3.394)*
	Non-Watershed	67.75		82.30	

*, **, *** Significant at 1, 5 & 10 percent level respectively

Source: Calculated from DCH, 1991 & 2001

Reduction of culturable wasteland has been one of the primary motives with which the WDP was launched. It would be seen that the watershed programme has been successful in reducing the extent of wasteland in all the sub-watersheds. The reduction

Box 2.1

Kathgarh, a big village in Somb sub-watershed, was randomly surveyed for impact assessment. The village was taken up for development in the first phase of IWDP (Hills). Kathgarh is located in the footHills with gentle to steep slopes. A number of seasonal hilly rivulets (khali) dissected the village land, causing massive soil erosion with huge volumes of valuable water getting away untapped. The construction of scores of check dams and SDDs not only arrested the pace of water but also helped in field-levelling through checking high erosive activities. Besides, more than 200 ha of wastelands were treated through vegetative barriers. Plantations were done on commons, private lands and forests. Gradually, the undulating wastelands became cultivable and the khalis are now being productively utilized for irrigation. The structures built under the project were found to be intact. In fact, many check dams had got filled up by silt which had necessitated raising their heights. The villagers informed that the project had changed their lives by dint of making agriculture a remunerative activity.

Similar observations were true for other villages as well, particularly Bholiwala, another village infested by more than a dozen khalis. The khalis are now being productively utilized for irrigation and their damming has helped reclamation of wastelands for cultivation.

The height of check dams is being raised due to heavy siltation in Kathgarh

has been particularly in Somb sub-watershed, where the extent of wasteland had assumed alarming proportions (Table 2.18). In most of the sub-watersheds, the decline in wastelands in watershed villages has been more pronounced as compared to that in non-watershed villages. In fact, in Nakti sub-watershed, the share of culturable waste

has marginally increased, however, that in the non-watershed villages has nearly doubled. A similar scenario is found in Sirsa sub-watershed.

Table 2.18: Change in Proportion of Culturable Wasteland in Total Area

		1991	Difference of Means (t)	2001	Difference of Means (t)
1	Begna & Dangri	6.12	0.988	3.11	0.42
	Non_Watershed	5.13	(1.190)	2.69	(0.795)
2	Boly-Yamuna & Pathrala	2.39	-0.34	1.96	-.197
	Non_Watershed	2.73	(-0.310)	2.16	(-0.274)
3	Nakti	4.16	0.459	4.88	-2.12
	Non_Watershed	3.70	(0.462)	7.00	(-0.624)
4	Sirsa	2.80	-3.62	4.56	-4.46
	Non_Watershed	6.42	(-1.808)***	9.02	(-1.751)***
5	Somb	12.25	9.94	3.70	1.55
	Non-Watershed	2.30	(5.456)*	2.15	(1.646)***

*, *** Significant at 1 & 10 percent level respectively

Source: Calculated from DCH, 1991 & 2001

2.7 Summing up:

One important aspect that has come to the fore through this chapter is the requirement to look at a more micro scale with a view to assessing the problems at the ground level. For instance, Haryana as a state is considered to be highly developed but some of the districts are languishing far behind as compared to most others. Further down, the developed districts also have blocks of underdevelopment. Thus, it would be pertinent to take note of the requirement of micro-level planning in a region.

The large scale land degradation and waterlogging-salinity problems have brought out the requirement of watershed programmes to address such concerns. What makes the state of Haryana unique in this regard is the vast irrigation coverage in most parts, which is very much unlike other semi-arid parts of the country.

Further, in the analysis of the IWDP-Hills in Kandi region, it has been seen that a good level of prioritisation has been followed in taking up various sub-watersheds for development. This speaks of an efficient planning by the project planners and implementers. In terms of changes in the land uses in the study area, it has been found

that there has been a perceptible decline in the share of culturable wasteland in the villages where WDP was implemented as compared to those villages where it was not implemented. However, a positive change in the NAS and irrigated area has not been noticed and wherever it has occurred the difference between the watershed and non-watershed villages is not that significant.

Project implementation through community participation was one of the prime approaches of the second phase of the IWDP – Hills. This was done to ensure the long term sustainability of the programme in the selected villages. In the following chapter an attempt has been made to analyse the level and determinants of participation in the sample villages. This would be followed by an impact analysis of the programme in the same villages with a view to assessing whether participation has had any impact on the outcome of the programme.

CHAPTER III

PARTICIPATORY ISSUES IN INTEGRATED WATERSHED DEVELOPMENT PROJECT IN KANDI

"Through participation, we lost 'control' of the project and in doing so gained ownership and sustainability, precious things in our business."

World Bank Task Manager[25]

The initial watershed programmes could not bring in desired benefits as the beneficiaries were not aware of the significance, method and utility of the activities being carried out and hence could not relate to it. Hence, participation was widely recognised as an essential component to make watershed development sustainable. That participation is an integral and essential aspect of natural resource management, is widely accepted by the policy makers as well as administrators. It has been largely accepted that active beneficiary participation brings in better impact of the watershed programme when compared with the passive beneficiary participation, i.e. a top-down approach (Mukhopadhyay, 2003).

3.1 Participation Defined:

However, participation connotes and entails different meanings and significances to different people. In common parlance, it means an 'act or fact of partaking' or 'sharing in' (Singh, 1991). People's participation in watershed management can be defined as 'a process through which stakeholders influence and share control over development initiatives and the decisions and resources which affect them' (Participation Learning Group Final Report[26]). In this context, participation can be identified in terms of beneficiaries' level or mode of adoption of recommended soil and water conservation measures practices on a sustained basis and their involvement in meetings, contribution of money, labour or both to WDP (Pal, 2001).

Participation in any watershed programme, at the very basic level, requires that the PIA does not follow a 'blue print' for development, but attempt to involve the communities in identifying soil and water conservation problems and identify strategies to alleviate them (Hinchcliffe et al, 1999). One of the major implications of

[25] World Bank (1996), 'The World Bank Participation Sourcebook', The International Bank for Reconstruction and Development / The World Bank, Washington D.C., p.xi
[26] World Bank, *op cit*, p. 3

participatory development is that *in achieving these relatively limited tasks, the people would acquire greater technical expertise, building on their own knowledge an associated scientific awareness of their economic, political and physical environment. At the same time, the achievement of specific objectives for improving their resource position through collective efforts would impart greater confidence* (Wignaraja, 2000, p.114).

Although most of the initial projects tried to emulate the three successful models of Sukhomajri, Pani Panchayat and Ralegaon Siddhi, none of them gave due significance to the institutional arrangements followed by Pani Panchayat or Sukhomajri. For such projects, poverty alleviation meant launching the projects in backward areas, while economic emancipation of the poor implied employing them in the project. In the process a very important factor was overlooked, that being the uneven distribution of costs and benefits amongst communities. Community participation in solving the problems was seldom resorted to, and never meant more than the participation of a few key people (e.g. sarpanch) from the village (Kerr, 2002).

The IWDP (Hills) in its second phase had given prime significance to beneficiaries' participation in the watershed activities. Increased community/beneficiary participation through Village Development Committees (VDCs) was cited as one of the eight key performance indicators for the project by the World Bank (World Bank, 1999). The project design itself addressed the issue of promoting effective community involvement in planning project activities, managing their execution, and maintaining these assets in the longer-term. Based on beneficiaries' feedback from the first phase, and other projects, some concrete steps had been taken to streamline and operationalise the participatory process. These included developing a participatory Village Development Plan (VDP) for each village / VDC (or groups of villages in micro-watersheds), an agreed and signed Memorandum of Understanding (MoU) and an Operational Manual (OM) between the communities and the implementing agencies. The MoU and OM articulated the rights, obligations and responsibilities of the various parties during implementation.

3.2 Limitations of Institutional analysis of Watershed Management

1. The institutional analyses fail to clarify the links between collective action at the level of community and inter-sectoral and natural resource management policies pursued by the government.
2. Most studies are undertaken in a project context; this makes it difficult to distinguish between collective action in existing decentralised settings and mere participation in project activities.
3. Most of the studies, except a few, have remained limited to analysis of isolated experiments carried out in a single village or sub-watershed (Kurian et al, 2003).

Taking view of these limitations, a sample of ten villages was selected in the Kandi region (the detailed analysis of the sample selection has been given in the methodology section). These villages have been put into separate categories as per their social and economic conditions and then the level of their participation has been analysed.

3.3 Level of Participation in the Sample Villages

In order to assess the level of participation in the villages surveyed four indicators have been selected:

1. Awareness Level (about problems in the village and project activities)
2. Involvement in VDC and Gram Sabha
3. Cost Shared
    a. Private Lands
    b. CPR
4. Willingness to contribute for repair / maintenance of the structures

On the basis of these four indicators firstly, the level of participation in the sample villages have been assessed, and then the various characteristics of the villages that might affect participation have been analysed. Both the aspects have been worked out separately in two sections for the sample villages:

A. Developed and Underdeveloped Villages
B. Homogeneous & Heterogeneous Villages

Box 3.1

A study was undertaken by Center for Studies in Community Development (CSCD), Bangalore in the year 2002, aimed at comprehending the socio-economic set-up of the rural people in the Kandi region and analyze whether they were capable and willing to share the cost of the activities undertaken in their village under the IWDP (Hills). The study was based on household surveys and Focus Group Discussions and covered a sample of 21 villages where WDP had been undertaken under the second phase of IWDP-HILLS. Based on the structural conditions, power equations and inter-group relations, the sample villages were classified as open, semi – open and closed, wherein the open villages had favourable conditions for the implementation of the programme.

The study concluded that the villagers were highly aware of their problems as well as the objectives of the WDP. More importantly, the report revealed that there was no lack of willingness on the part of the villagers to share the costs involved, though many expressed their reservations on the intentions of the government to introduce the concept of cost sharing. The report also mentioned that the willingness of the beneficiaries for cost sharing was not only a function of their economic status but also their necessities, trust on government and implementing officials and community characteristics.

However, the study limited itself to assessment of the willingness of the beneficiaries for cost sharing and largely ignored other important facets of participation. Moreover, although the report gave a detailed account of the social and economic characteristics of the sample villages, it made little attempt to assess the determinants of cost sharing in terms of these characteristics. Further, there was no direct reference to the ***spatial differences*** *in cost sharing over the study area. Another major lacuna in the report was that although 21 sample villages were surveyed, the report mentioned its results on cost sharing only for nine villages out of these.*

Nevertheless, the report proved out to be quite helpful not only in terms of gaining a background information with respect to some of the sample villages but also deciding on the final samples for this research.

3.3 A Developed and Underdeveloped Villages

It had been hypothesised that the level of participation in a village would be directly proportional to the level of development in that village, hence more developed a

village is, one would expect more participation. In order to test this hypothesis, the level of participation has been assessed for the developed and underdeveloped villages.

a. Awareness Level:

The awareness level in the rural set-up is an essential condition for the success of any project. Most of the respondents and participants in the discussions were quite aware of the general problems in the village. However, as far as awareness about the watershed programme in the village was concerned some discrepancies were readily visible. A two-way relationship between level of awareness and participation can be visualised. It has been argued that level of awareness is an indispensable factor for the generation of participation in a village (Chand et al, 2001). Conversely, it can also be maintained that in the post-project phase, level of awareness would be higher where participation was found to be higher.

In the sample villages, it was found that almost 90 percent of the respondents were either fully or partially aware regarding the functioning of such a project in their village. However, a comparison of developed and underdeveloped villages reveals that awareness regarding the project is higher in the latter set of villages. Almost one-third of the respondents in the developed villages expressed their complete ignorance about the project; on the other hand all the respondents in the underdeveloped villages had at least some information regarding the project (Table 3.1).

A better measure of the level of awareness of the villagers would be the knowledge regarding the existence and structure of VDC in the village. The VDC was formed in a village after calling a general meeting of all the households in the village and then after due consultations, an Executive Committee and a General Body of the VDC was formed. The VDC was constituted to decide and take care of the watershed programme in the village, and if the villagers did not have any information about it, it would only reveal their lack of involvement in the programme, which in turn could also point towards the weak entry point activities.

In the villages surveyed, it was found that only 20 percent of the respondents in the underdeveloped villages did not have any information regarding the existence of the VDC, while this proportion was more than double in the case of the developed villages (Table 3.2). Half of the respondents in the underdeveloped villages had precise information regarding the number of VDC members, while this share was less than 10

percent for the other set of villages. Thus, in all, almost 80 percent of the respondents in the underdeveloped villages had some knowledge regarding the VDC, whereas only 55 percent of respondents in developed villages had such information.

Table 3.1: Level of Awareness about WDP in the Sample Villages

		Developed		Underdeveloped	
		Frequency	Percent	Frequency	Percent
1	Fully Aware	17	47.2	27	71.1
2	Partially Aware	9	25.0	11	28.9
3	Not aware	10	27.8	0	0
	Total	36	100	38	100

Chi Square Test*

No. of Observations	Value	Significance
64	0.231	0.631

* Conducted for 1 & 2

Source: Same as Table 1.6

Table 3.2: Level of Awareness about VDC

		Developed		Underdeveloped	
		Frequency	Percent	Frequency	Percent
1	Not Aware	16	44.4	8	21.1
2	Exact No. Known	3	8.3	19	50.0
3	Aware but Exact No. not known	17	47.2	11	28.9
	Total	36	100	38	100

Chi Square Test*

No. of Observations	Value	Significance
74	2.624	0.105

* 2 & 3 merged

Source: Same as Table 1.6

b. Involvement in VDC and Gram Sabha

The participation of villagers in the village bodies like Gram Sabha and VDC is an important indicator of the level of participation in the village, inasmuch as it not only depicts the interest of the villagers in community gatherings but also captures their urge to convey their problems and listen to those of others.

There was a stark contrast between the developed and underdeveloped villages in these terms, which was found to be statistically significant (Table 3.3). While almost half of the respondents in the underdeveloped villages reported regular visits to the VDC meetings, the share was less than 10 percent in the Developed villages. Only one–third of the respondents never attended any of the meetings of VDC in the former whereas two-third of the same was reported in the latter. Even in terms of payment of VDC

membership fee for the General Body, only 40 percent of the respondents in the Developed villages had made any payment while the figures in underdeveloped villages was more than 60 percent.

Table 3.3: Respondents' Regularity of Participation in VDC

		Developed		Underdeveloped	
		Frequency	Percent	Frequency	Percent
1	Regularly	3	8.3	18	47.4
2	Occasionally	2	5.6	3	7.9
3	Seldom	7	19.4	3	7.9
4	Never	24	66.7	14	36.8
	Total	36	100	38	100

Chi Square Test*

No. of Observations	Value	Significance
74	13.860	0.001

* 2 & 3 merged

Source: Same as Table 1.6

Since WDP was a relatively new phenomenon, it was important to assess the participation of villagers in the older institutions like Gram Sabha to see whether the village has any history in participation. A similar story got repeated here as well. The share of regular visitors to Gram Sabha meetings was as high as two-third in the underdeveloped villages while in the developed villages it was a dismal low at 20 percent. Most of the respondents in the developed villages (almost 60 percent) were irregular visitors to the Gram Sabha (Table 3.4). Again, the difference between the developed and underdeveloped villages in was found to be highly significant.

Table 3.4: Respondents' Regularity of Participation in Gram Sabha

		Developed		Underdeveloped	
		Frequency	Percent	Frequency	Percent
1	Regularly	7	19.4	25	65.8
2	Occasionally	14	38.9	3	7.9
3	Seldom	7	19.4	4	10.5
4	Never	8	22.2	6	15.8
	Total	36	100	38	100

Chi Square Test*

No. of Observations	Value	Significance
74	17.369	0.00

* 2 & 3 merged

Source: Same as Table 1.6

c. Cost Shared

Sharing of costs for the activities undertaken in a village was a concept introduced in the later stage of the second phase of IWDP-Hills. This was done to inculcate a sense of ownership among the beneficiaries about the project. It is believed that sustainability of the watershed acivities is closely related to the stakeholdership of the beneficiaries, particularly, after the completion of the project. It is generally expected that people would contribute about 5 – 10 percent of the cost for treatment on CPRs and about 20 – 25 percent cost for treatments on private lands (Shah, 2005).

Box 3.2

Ferozepur was one of the most developed villages in the region, with a prominent rice-wheat cropping pattern and tubewell irrigation. One of the major problems that the village was facing was undulating cultivable land and low groundwater table, due to which the tubewells went dry during summers. However, none of the villagers shared any cost of the structures like check dams constructed even in their own fields – neither in terms of money / material nor in terms of labour. A miniscule number of respondents asserted that they had given their tractor for some time. The villagers acknowledged that the project had brought in lots of benefits to them. However, they merely perceived the programme as another government supported one.

A similar story was observed at another developed village – Todarpur. The village was suffering from lack of irrigation resources and high incidences of soil erosion. Apart from constructing a dam on a khali, plantations were also done on the private culturable wastelands. Valuable trees like sesame and safeda were planted on these lands on the condition that they would be taken care by the project for initial three years and then would be handed over to the owner. Thus, the owners got valuable and remunerative trees on a land that would have otherwise remained fallow. Still, they did not agree to pay anything for the plantations, or for that matter check dams built in their own fields.

One would expect that the beneficiaries' willingness to pay would be a function directly proportionate to their overall economic status. However, it was found that not much difference exist between the developed and underdeveloped villages in terms of cost sharing (Table 3.5 A & B). The willingness to pay in the Developed villages was definitely higher as compared to the Underdeveloped villages; however the level of cost

sharing was identical in the two set of villages. A similar tale was found in terms of CPRs as well. In fact, no where it was found that the villagers had contributed in terms of money and material for activities undertaken in CPRs.

Table 3.5 A: Contribution of Sample Households in Private Lands (Money & Material)

	Contribution (in %)	Developed		Underdeveloped	
		Frequency	Percent	Frequency	Percent
1	Nil	30	83.3	31	81.6
2	10	2	5.6	3	7.9
3	15	2	5.6	1	2.6
4	20	1	2.8	1	2.6
5	25	1	2.8	2	5.3
	Total	36	100	38	100

Chi Square Test*

No. of Observations	Value	Significance
74	0.039	0.843

* Test for 'contributed' & 'not contributed' Source: Same as Table 1.6

Table 3.5 B: Contribution of Sample Households in CPR (Money & Material)

Contribution (in %)	Developed		Underdeveloped	
	Frequency	Percent	Frequency	Percent
Nil	35	97.2	38	100
5	1	2.8	0	0
Total	36	100	38	100

Source: Same as Table 1.6

However, in terms of a typical rural set-up, one would hardly expect monetary contribution from the poor villagers for any government work. So, to compare the willingness to pay between the developed villages and underdeveloped villages, one needs to bring them at a level field as their capacities to pay are different. It had been observed that the beneficiaries had been making contribution in the form of labour. However, this was not sometimes acknowledged even by the contributor himself / herself. One needs to understand that if somebody works at concessionary or without wages, one is actually contributing to the programme through foregone opportunity cost, and that should be regarded as a contribution.

It was found that the percentage of wage foregone for labour in watershed activities was arrived by consensus in the meetings of VDCs. Thus, the cost agreed to be shared in the form of wages can be regarded as a good indicator of the level of participation of the village as a whole (and not only of the respondents alone). Further, to judge the perception of the respondents, they were asked the wages they generally get and the wages they agreed to take in the project.

It was found that two-third of the respondents in the underdeveloped villages had made at least some contribution to the project through concessionary wages, while this share was as low as 22 percent in the developed villages, the difference between the two set pf villages was found to be highly significant (Table 3.6 A) . Further, more than 40 percent of the respondents in the former had made a contribution of 20 percent or more whereas there was only one respondent in the latter who claimed to have made such a contribution.

Table 3.6 A: Contribution of Sample Households in Private Lands (Labour)

Contribution (in %)	Developed		Underdeveloped	
	Frequency	Percent	Frequency	Percent
Nil	28	77.8	13	34.2
10	1	2.8	2	5.3
15	6	16.7	7	18.4
20	1	2.8	8	21.1
25	0	0	8	21.1
Total	36	100	38	100

Chi Square Test*

No. of Observations	Value	Significance
74	14.202	0.00

* Test for 'contributed' & 'not contributed Source: Same as Table 1.6

However, the real test of the level of willingness to pay was the contribution of the villagers for CPRs. There were hardly any respondents in the developed villages who had made any contribution through labour in the works done on village commons (Table 3.6 B) even though a good amount of work had been undertaken in the CPRs in both sets of villages. In stark contrast to that, almost 60 percent of the respondents in the underdeveloped villages had made some contribution (most of them 20 percent or more) in the CPRs. On an average, the respondents in the underdeveloped villages had made a contribution of 14 percent for private land while 11 percent for commons, in terms of labour. The respective figures for Developed villages were 3 percent for private and less than 1 percent for CPRs. Thus, it would be largely seen that the participation of villagers in the watershed activities was more in the underdeveloped villages as compared to the developed villages.

Table 3.6 B: Contribution of Sample Households in CPR (Labour)

Contribution (in %)	Developed		Underdeveloped	
	Frequency	Percent	Frequency	Percent
Nil	33	91.7	16	42.1
5	1	2.8	-	-
10	2	5.6	-	-
15	-	-	3	7.9
20	-	-	18	47.4
25	-	-	1	2.6
Total	36	100	38	100

Source: Same as Table 1.6

d. Willingness to contribute for repair / maintenance of the structures

The very purpose with which the entire process of VDC formation and cost sharing were undertaken was to inculcate a feeling of belongingness to the project. This was done, as mentioned earlier, with a view to ensuring the sustainability of the watershed programme. The respondents in the underdeveloped villages gave an overwhelming response to the interjection of repair and maintenance works, and almost 80 percent of them were ready to contribute in one way or the other for the purpose (Table 3.7). Out of these, more than 45 percent were ready to provide free labour if required. This was also validated during the FGDs. However, in the developed villages, 75 percent of the respondents were not ready to contribute anything for the repair and maintenance works. The difference between the two set of villages was found to be highly significant.

Thus, despite the fact that both the sets of villages had been benefited by the WDP, it was only the underdeveloped ones who were mostly ready to contribute. One of the reasons for low willingness for cost-sharing in developed villages could be that these villages have earlier benefited from Government investment in the past without having to make any financial and labour contribution. Thus, the participatory mode of development work may carry less appeal to the population of such villages. Also, the value of the additional benefits of the watershed programmes would be lower in these villages compared that of the underdeveloped villages.

Table 3.7: Willingness of the Respondents to Contribute for Repair / Maintenance

		Developed		Underdeveloped	
		Frequency	Percent	Frequency	Percent
1	Would not repair	27	75.0	8	21.1
2	Would contribute money / material	5	13.9	8	21.1
3	Would work on concessionary wages	3	8.3	8	21.1
4	Would work as labourer for free	1	2.8	14	36.8
	Total	36	100	38	100

Chi Square Test*

No. of Observations	Value	Significance
74	19.486	0.00

* 2, 3, & 4 Combined Source: Same as Table 1.6

It would be largely seen, as per these analyses that participation is largely found to be higher where the level of development is low. Having examined this hypothesis, it would be imperative to move on towards the next hypothesis – that participation is inversely proportion to the heterogeneity in the population.

3.3 B Homogeneous & Heterogeneous Villages

The role of heterogeneity in participation has been often contested in the available literature (For an analysis, see the section on determinants of participation in literature review). It has been generally believed that social and economic homogeneity within local population creates conducive conditions for effective participation. This hypothesis is based on the argument that people prefer to interact with members of their community and do so more effectively (Alberto & Ferrara, 2000). Also, homogenous social and economic conditions usually go hand in hand with similar problems faced by the beneficiaries. However, the relationship between participation and social and economic heterogeneity have been debated in existing literature and there is no clear consensus about it (Vedeld, 2000). Finally, factors like homogeneity among the elite class of the village and leadership homogeneity have also been cited as important for ensuring participation.

To check this hypothesis, therefore, the sample villages have been divided into three sets according to the following characteristics:

a. Caste Homogeneity & Class Homogeneity (Hm – Hm)

b. Caste Homogeneity & Class Heterogeneity (Hm – Ht)

c. Caste Heterogeneity & Class Heterogeneity (Ht – Ht)

Both the developed and underdeveloped villages now have been combined and are now classified on the basis of heterogeneity (for a detailed method applied to calculate the level of heterogeneity see the methodology section). The analyses would be definitely having some limitations in so far as possible effect of developmental factors could influence the results. Therefore, towards the end, a cross-tabulation of both the factors – development as well as heterogeneity – has been done. Further, due to lack of adequate sample households in each of the category in this section Chi-square tests for most of the indicators could not be done.

The three sets of villages would be compared on the previously selected four indicators to assess the level of participation in these villages.

a. Awareness Level

It would be seen that the awareness level regarding the activities undertaken in the WDP was higher in the villages where caste homogeneity was found. While all the respondents were either fully or partially aware regarding WDP, more than 20 percent of the respondents in the heterogeneous villages (Ht – Ht) had no information regarding any programme as such that had been undertaken in the village (Table 3.8).

Table 3.8: Level of Awareness about WDP in the Sample Villages

	Hm – Hm		Hm – Ht		Ht – Ht	
	Frequency	Percent	Frequency	Percent	Frequency	Percent
Fully Aware	14	77.8	14	82.4	17	43.6
Partially Aware	4	22.2	3	17.6	14	35.9
Not Aware	-	-	-	-	8	20.5
Total	18	100.0	17	100.0	39	100.0

Source: Same as Table 1.6

In terms of information about the existence of a village level organisation (VDC) designed to look after the watershed programme in the village and take care of the problems of the villagers, the level of awareness was found to be inversely proportional to heterogeneity. More than 70 percent of the respondents in the Hm – Hm villages were fully aware of the VDC and had knowledge about the exact number of members in the Executive Committee; the percentage of such respondents in the Hm – Ht villages was 40 percent while that in the Ht – Ht villages was less than 10 percent (Table 3.9). Conversely, almost half of the respondents had no information regarding the very existence of such an organisation in their village in Ht – Ht villages; the

number was slightly better at 23 percent in Hm – Ht villages and still better at 6 percent in Hm – Hm villages. Given the above two scenarios one can safely conclude that the level of awareness was better in those villages where heterogeneity was less.

Table 3.9: Level of Awareness about VDC

	Hm – Hm		Hm – Ht		Ht – Ht	
	Frequency	Percent	Frequency	Percent	Frequency	Percent
Not Aware	1	5.6	4	23.5	19	48.7
Exact no. known	13	72.2	7	41.2	3	7.7
Aware but exact No. not known	4	22.2	6	35.3	17	43.6
Total	18	100.0	17	100.0	39	100.0

Source: Same as Table 1.6

b. Involvement in VDC and Gram Sabha

The VDC and Gram Sabha are two parallel village level organisations, with separation of functions. The involvement of villagers in such bodies is an important indicator for assessing the level of participation in the village. Beginning with VDC, more than 75 percent of the respondents had never attended any VDC meetings in the Ht – Ht villages. While this share was lower at 23 percent in Hm – Ht villages, none of such respondents was found in the Hm – Hm villages (Table 3.10). On the other hand, the number of regular visitors in the VDC was identical at 50 percent in the homogeneous villages (Hm – Hm & Hm – Ht) while the figure was low at less than 10 percent in the Ht – Ht villages.

Table 3.10: Respondents' Regularity of Participation in VDC

	Hm – Hm		Hm – Ht		Ht – Ht	
	Frequency	Percent	Frequency	Percent	Frequency	Percent
Regularly	9	50.0	9	52.9	3	7.7
Occasionally	5	27.8	-	-	-	-
Seldom	4	22.2	4	23.5	6	15.4
Never	-	-	4	23.5	30	76.9
Total	18	100.0	17	100.0	39	100.0

Source: Same as Table 1.6

Not only the participation of villagers was low in the heterogeneous villages in the VDC, it was also low in the existing institutions like Gram Sabha. For instance, more than 75 percent of the respondents in the Hm – Hm villages were regular visitors to Gram Sabha, while this share was lower at 65 percent in Hm – Ht villages and 15 percent in the Ht – Ht villages (Table 3.11).

Table 3.11: Respondents' Regularity of Participation in Gram Sabha

	Hm – Hm		Hm – Ht		Ht – Ht	
	Frequency	Percent	Frequency	Percent	Frequency	Percent
Regularly	14	77.8	11	64.7	6	15.4
Occasionally	3	16.7	2	11.8	12	30.8
Seldom	1	5.6	3	17.6	8	20.5
Never	-	-	1	5.9	13	33.3
Total	18	100.0	17	100.0	39	100.0

Source: Same as Table 1.6

As far as payment of membership fee for VDC is concerned. All the respondents in the homogeneous villages (Hm – Hm) had been regularly paying the same without fail. This was also verified through the records of the VDC. On the other hand, the proportion of such respondents in the Hm – Ht villages was 75 percent while it was a dismal 25 percent in the Ht – Ht villages. Further, in most of the Ht – Ht villages the Executive Committee meetings had almost stalled and as per the VDC records no as such a meeting had been organised in the last one year. While, in the homogeneous villages, the meetings were still being held, although their regularity had not been maintained. Thus, it can be inferred that the villagers in the heterogeneous communities do not prefer to socialise as much as those in the homogeneous villages. Due to paucity of a desire to mix up with members of other communities, participation has been found to be at a much lower level here.

c. Cost Shared

Sharing of costs has been considered to be the most important indicator of participation in IWDP-Hills. In terms of private land, one – third of the respondents reported to have contributed in money and material in the Hm – Hm villages (Table 3.12 A). None of the respondents had made any contribution in this form in Hm – Ht villages while less than 20 percent of the respondents had done so in the Ht – Ht villages. For CPRs, as already assessed, the monetary contribution was virtually nil. However, during the FGDs it was observed that contribution in the homogeneous villages for CPRs was much higher as compared to the heterogeneous ones.

Table 3.12 A: Contribution of Sample Households in Private Lands (Money & Material)

(in %)	Hm – Hm		Hm – Ht		Ht – Ht	
	Frequency	Percent	Frequency	Percent	Frequency	Percent
0	12	66.7	17	100.0	32	82.1
10	-	-	-	-	5	12.8
15	2	11.1	-	-	1	2.6
20	2	11.1	-	-	-	-
25	2	11.1	-	-	1	2.6
Total	18	100.0	17	100.0	39	100.0

Source: Same as Table 1.6

Table 3.12 B: Contribution of Sample Households in CPR (Money & Material)

(In %)	Hm – Hm		Hm – Ht		Ht – Ht	
	Frequenc y	Percent	Frequenc y	Percent	Frequenc y	Percent
0	17	94.4	17	100.0	39	100.0
5	1	5.6	-	-	-	-
Total	18	100.0	17	100.0	39	100.0

Source: Same as Table 1.6

Contribution in the form of labour is a better indicator for assessing the level of participation in rural areas. For private lands, it was found that almost all the households had worked on concessionary wages for the work on their own lands in the Hm – Hm villages (Table 3.13 A). The proportion of such respondents in the Hm – Ht villages was 60 percent, while in the Ht – Ht villages only 15 percent of the sample households had agreed to work on concessionary wages.

In the case of works undertaken in the village commons, there was hardly any household that had agreed to contribute through labour in Ht – Ht villages (Table 3.13 B). Even the two respondents, who had agreed to work on concessionary wages, had contributed only 10 percent of their wages. On the other hand, in the Hm – Hm villages more than 70 percent of the respondents had contributed in the form of labour, while 65 percent of the respondents had made such contribution in the Hm – Ht villages.

Table 3.13 A: Contribution of Sample Households in Private Lands (Labour)

(In %)	Hm – Hm		Hm – Ht		Ht – Ht	
	Frequency	Percent	Frequency	Percent	Frequency	Percent
0	1	5.6	7	41.2	33	84.6
10	-	-	1	5.9	2	5.1
15	9	50.0	1	5.9	3	7.7
20	5	27.8	3	17.6	1	2.6
25	3	16.7	5	29.4	-	-
Total	18	100.0	17	100.0	39	100.0

Source: Same as Table 1.6

Amongst these most of the respondents had made a contribution of 20 percent or more. The differences in contribution in the form of labour amongst the three set of villages was found to be statistically highly significant.

Table 3.13 B: Contribution of Sample Households in CPR (Labour)

(In %)	Hm – Hm		Hm – Ht		Ht – Ht	
	Frequency	Percent	Frequency	Percent	Frequency	Percent
0	5	27.8	6	35.3	37	94.9
10	-	-	-	-	2	5.1
15	2	5.6	3	17.6	-	-
20	10	55.6	8	47.1	-	-
25	1	5.6	-	-	-	-
Total	18	100.0	17	100.0	39	100.0

Chi Square Test*

No. of Observations	D_1 Value	D_1 Significance	D_2 Value	D_2 Significance
74	13.108	0.00	11.075	0.001

* Test for 'Contributed' & 'Not Contributed'

Source: Same as Table 1.6

Thus, in terms of cost sharing, it would be seen that the contribution from homogeneous villages – both developed and underdeveloped – have excelled as compared to that from the heterogeneous villages.

d. Willingness to contribute for repair / maintenance of the structures

After the withdrawal of the project, the only way through which the level of participation in the village can be adjudged, apart from involvement in the VDC, is through the willingness of the villagers to pay or contribute in any form for the repair and maintenance works. In this case as well, it was found that more than 80 percent of

Table 3.14: Willingness of the Respondents to Contribute for Repair / Maintenance

	Hm – Hm		Hm – Ht		Ht – Ht	
	Frequency	Percent	Frequency	Percent	Frequency	Percent
Would not repair	3	16.7	4	23.5	29	74.4
Would contribute money / materials	6	33.3	4	23.5	3	7.7
Would work on concessional wages	5	27.8	2	11.8	4	10.3
Would work as laborer for free	4	22.2	7	41.2	3	7.7
Total	18	100.0	17	100.0	39	100.0

Source: Same as Table 1.6

the respondents in the Hm – Hm villages were ready to contribute in one way or the other, whereas this proportion was slightly lower at 75 percent in the Hm – Ht villages and a measly 25 percent in the Ht – Ht villages (Table 3.14).

3.4 Determinants of Participation in the Sample Villages

Having analysed the two hypotheses, it would be pertinent to summarise the findings of the study in terms of what are the factors that were observed to have some influence on the level of participation in a village.

1. Level of Development:

It has been substantiated in the aforementioned analyses that the level of participation is generally higher in the underdeveloped villages. Despite the fact that capacity to pay in the developed villages is higher than that in the underdeveloped villages, the willingness to pay has been found to be higher in the latter as compared to the former. One might question the method followed to assess the level of participation inasmuch as most of the respondents in the underdeveloped villages had contributed in the form of labour on concessionary wages. So, one might argue that it is not actually participation but simply economics – they participated because they got employment (which is itself a big problem in these areas), whereas in the developed villages they have alternate sources of employment, hence they need not participate.

However, even if this argument might be true to some extent, one needs to assess their willingness to forego a part of their wages. The villagers in the underdeveloped villages readily agreed to contribute a part of their wages, and during discussions and interviews showed pride as they could say that they also had made their contribution. Not even a single respondent accused the IWDP-Hills officials of coaxing them to contribute but were thankful to them as they had made the villagers aware of the benefits of participation.

On the other hand, the villagers in the developed villages were very suspicious of the demands of the officials to contribute and there were cases where beneficiaries actually refused to do so. The response of the beneficiaries of the developed village in this respect was that it was the duty of the government to do so.

Such a difference in level of participation between the prosperous and poor villages has not been adequately explained in the available literature. In the western countries it has been largely found that the blacks have a higher propensity to participate in group activities than the whites (Alesina & Ferrara, 2000; Verba & Nie, 1987). The reason forwarded in such instances is that blacks are more conscious of being a minority and have an extra incentive to engage in political action to preserve their identity and foster their civil and political rights.

To some extent the clamour of the poor to assert themselves in the socio-economic-political space of the rural set-up must have taken the form of a high level of participation in the village level collective action, particularly in homogeneous villages.

2. *Level of Heterogeneity:*

The impact of heterogeneity in population composition on participation is highly debated in the literature. A number of case studies have attempted to prove that homogeneity assists participation while an equal number of studies have tried otherwise. It has been argued that in heterogeneous groups, the interests of the poor are ignored while those of the higher class are paid more attention (Joshi & Bantilan, 1997). Conversely, it has also been argued that the presence of diverse individuals facilitates participation as there is a likelihood of the emergence of a 'critical mass' of highly motivated contributors with diverse functions (Olson, 1965).

However, it generally appears that in the Indian scenario homogeneity helps in building up collective action, where heterogeneous rural population is also characterised by clashes of interest. So was also found in the present study wherein collective action was found to be at a higher level in the villages where both caste and class homogeneity was found, slightly less where caste homogeneity but class heterogeneity was found while the least was observed where villagers from different castes and class resided. This also shows that class homogeneity is more important than caste homogeneity as heterogeneity in the former brings down the level of participation.

3. Group Size:

It has been generally recognised that the size of the target population definitely has an impact on the level of participation - the smaller the size of the population, the better the chances of keeping things under control and hence lesser the chance of conflicts. Even in the case of the undertaken research, one would find that the level of participation was lower in the larger villages and vice versa. For instance, three of the villages – Mirzapur, Todarpur and Ferozepur had large population and low participation. Similarly, Paonta, Katli and Narwar had very low population but very high participation.

Bringing in the issue of group heterogeneity here, it is often assumed that a small group is effective largely because it is more homogeneous than larger groups (Vedeld, 2000). However, this may not be always so; the two issues of heterogeneity and group size needs to be kept separate.

In the case of the present study, one can definitely say that participation was more in the smaller villages, but *among* the smaller villages it was found to be more in those villages which were homogeneous. Thus, it seems that although group size does matter, it is actually the homogeneity of population that is more important.

4. Awareness Level:

It was found that wherever the villagers were aware and vocal of their problems participation was found to be at a higher level. Awareness was adjudged not only in terms of assessment of their own problems but also in a holistic manner. For instance, in a number of villages the villagers were aware about the works undertaken in their village, but replied in negative when asked about their knowledge of the 'Kandi Project'. It was only after naming the structures built up in the village that they could exclaim that they did not know that 'Kandi' had come to their village as well. Further, no where it was found that the villagers had paid anything for the work undertaken in their adjacent fields. This should be deemed to be necessary, as theoretically and practically, the works undertaken in a field would definitely benefit the adjacent fields as well. Although this was duly recognized by the respondents and participants in the FGDs and they agreed that they should have contributed something, none of them did so. However, in the underdeveloped villages it was largely found that the awareness

level, both among the women and men, was at a much higher level as compared to the developed ones (see Box 4.3).

5. Ensuring Private Benefit:

One of the most important conditions for ensuring participation that has been largely ignored by the policy executors is to ensure private benefits for the people they expect to participate. Of course, there is a trade off between the level of awareness and expectation of benefits, one cannot but ignore the fact that any participant joins an

Box 3.3

Sharing of water, both inter-village as well as intra-village has been touted as one of the most potent reasons for conflicts among the villagers. One of the facts that had come out during the FGDs was that the construction of dams in the upper reaches in the hilly regions was a major handicap for those in the lower reaches as they could utilize only the residual supply. However, no conflicts had been reported till date in any of the underdeveloped villages. The villagers at Paonta, Katli, Narwar and Bholiwala recognized that the construction of dams in the upper reaches is a problem that did not matter to them as it was all nature's will. They were happy with what they got. Even where more than one village shared the same water source, like Khetri and Narwar, the conflicts were resolved amicably by selling off water rights.

In terms of intra-village distribution of water, most of the underdeveloped villages practised auctioning of water. In some of the underdeveloped villages, water was equally distributed among the households; somebody who had surplus water could sell off his share of water. Alternatively, the water distribution rights were auctioned and the VDC members could get water at subsidized rates. However, both these systems had failed in the developed villages. Even where the distribution rights were auctioned to a contractor, for instance in Gobindpur and Todarpur, the rates were too high for the marginal farmers to afford.

activity with some expectation. Through FGDs, it was largely found that villagers were ready to contribute when they found that they would be benefited by the project. Even in the Sukhomajri case, initially the farmers were reluctant to make investments in

their fields on various soil conservation measures. They started cooperating only when they received water for supplemental irrigation (see Fig 3.1) (Arya & Samra, 1994)

This shows that cooperation and participation of the people cannot be ensured unless they are directly benefited (See Box 3.4). Further, participation of the farmers is generally need based – they would not show any interest unless they require it. Farmers generally show their unwillingness to contribute for long-term or ecological gains. It is highly unlikely that the poor would cease to send their livestock for grazing in commons for the sake of its conservation when their livelihood depends on the livestock. Further the direct benefits to the farmers accruing as a result of their participation must substantially be higher as compared to the direct private costs of participation.

Box 3.4

In one of the developed villages, Mandapa, which was homogeneous both in terms of caste as well as class, very high level of participation was found among the villagers. Some of the villagers even claimed to have contributed thousands of rupees for the construction works in their own fields. However, for the last one year there has been little rain and hence the reservoirs and tanks were all dry. The villagers were back to their previous stage where irrigation was a big problem. There was widespread dissatisfaction among the villagers and now none of them was ready to contribute even a penny for the repair and maintenance works, even after acknowledging that rainfall was not in anybody's hands and the task of watershed programme was simply to channelize the available resources in the most optimum manner.

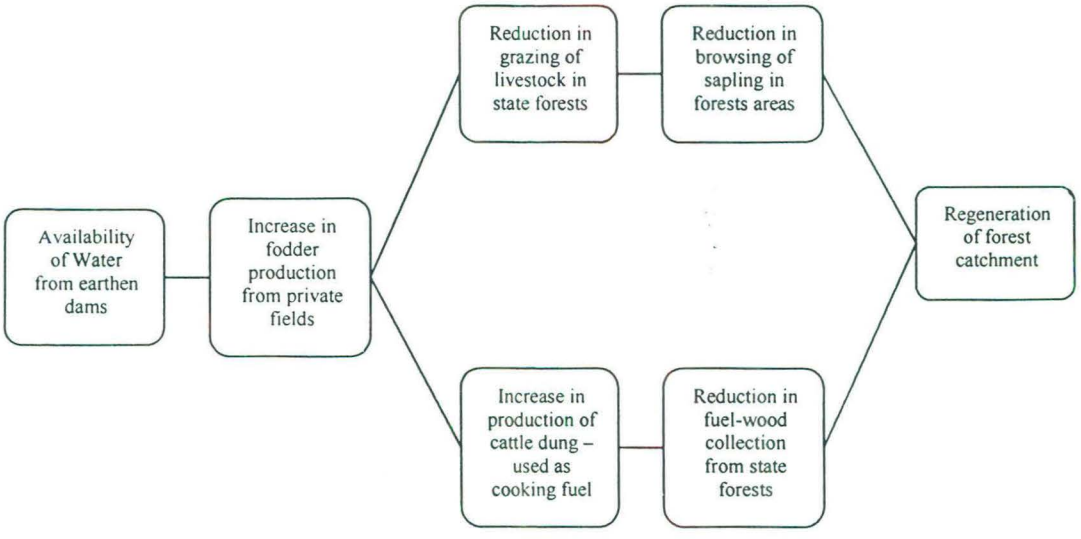


Fig. 3.1 Model followed in Sukhomajri that ensured private as well as ecological benefits (After Kurian et al,2003)

6. Leadership Heterogeneity:

One of the important factors that have remained largely ignored in the literature is the heterogeneity in the elite group of the village as a factor influencing participation. A heterogeneous community is capable of finding solutions to participation dilemmas as long as there is a reasonable degree of homogeneity among the leadership groups.[27] This fact has amply come out during the FGDs and later got validated during the household surveys. The respondents were questioned whether they felt that the VDC Executive Committee members have representative character. They were also questioned if they felt that the village level socio-economic-politico scenario was dominated by a particular person or a group of persons.

More than two-third of the respondents in the Hm – Hm villages believe that the VDC Members were truly representative in character and took care of all their problems; while, this proportion was 40 percent in the Hm – Ht villages and only 20 percent in the Ht – Ht villages (Table 3.15). At the same time, almost half of the respondents in the heterogeneous villages agreed that the village was dominated by a few households; while only 15 percent of the respondents in the Hm – Hm villages said so.

Table 3.15: Perception of Respondents Regarding Representation of VDC Members

	Hm – Hm		Hm – Ht		Ht – Ht	
	Frequency	Percent	Frequency	Percent	Frequency	Percent
Representative	13	72.2	7	41.2	8	20.5
Not Representative	4	22.2	6	35.3	12	30.8
Not Aware	1	5.5	4	23.5	19	48.7
Total	18	100.0	17	100.0	39	100.0

Source: Same as Table 1.6

Finally, the villagers were questioned as to whom they recognised as their leader in the village. Surprisingly, it seemed that the VDC Presidents were quite popular in the homogeneous villages inasmuch as more than one-third of the respondents in Hm – Hm villages regarded them as their leaders, while no body named the sarpanch as their leader (Table 3.16). While, in the heterogeneous villages, none of the respondents considered him as their leader. More interestingly, the percentage of respondents that

[27] Trond Vedeld, (2000), 'Village Politics: Heterogeneity, Leadership and Collective Action', *Journal of Development Studies*, Vol. 36, No. 5, June, p. 125

considered no one as their leader was 95 percent in the Ht – Ht villages, 70 percent in the Hm – Ht villages and 60 percent in the Hm – Hm villages. Therefore, one would see that leadership heterogeneity in the villages has very closely followed the heterogeneity in the village concerned.

The perceptions of the respondents were largely validated during the survey of VDC-Executive Council (EC) members. In few of the villages, it was observed that the

Table 3.16: Perception of the Respondents Regarding Person having Leadership Quality

	Hm – Hm		Hm – Ht		Ht – Ht	
	Frequency	Percent	Frequency	Percent	Frequency	Percent
VDC Pradhan	7	38.9	-	-	-	-
Sarpanch	-	-	3	17.6	2	5.1
No one	11	61.1	12	70.6	37	94.9
Any other	-	-	2	11.8	-	-
Total	18	100.0	17	100.0	39	100.0

Source: Same as Table 1.6

VDC-EC members had worked only for self-aggrandisement. For instance, in one of the developed villages, all the cow-sheds built under the project belonged to the VDC-EC members. Further, in all the heterogeneous villages it was found that the presence of members from the lower castes was only in the documents. Such members had no knowledge regarding the functioning of the body nor ever dared to enquire about the financial matters.

The EC members in the homogeneous villages, particularly in the underdeveloped ones, were found to be more responsible in their duties. However, in all the villages surveyed it was found that the VDC President was also the most influential person in the village.

3.5 Analysis of Level of Participation in the Sample Villages:

Measurement of a phenomenon like participation is a difficult task inasmuch as it is subject to behavioural aspects of the population, deeply embedded in the social and cultural ethos of the village concerned. This section makes an attempt to generalise the level of participation in the sample villages, based on the inferences drawn from the afore analysis on participation with reference to the selected indicators.

The following tables take both the level of development as well as heterogeneity into consideration for arriving at the assessment of the level of participation in the selected villages. In terms of the awareness regarding execution of watershed activities in their villages it would be seen that the awareness level has been higher in the homogeneous villages, irrespective of the level of development (Table 3.17). However, this has more to do with the group size, i.e. population size of the village. In the smaller villages, information dissemination is simpler as compared to the larger villages. Nevertheless, the highly heterogeneous villages (Ht – Ht) would definitely show lower awareness level as it was observed that most of the advantages of watershed activities are generally cornered by the elite class of the village.

Table 3.17: Level of Awareness Regarding Watershed Activities

Village		Good	Moderate	Poor
Developed	Hm - Hm	✓		
	Hm – Ht	✓		
	Ht – Ht			✓
Underdeveloped	Hm - Hm	✓		
	Hm – Ht		✓	
	Ht – Ht			✓

Villagers' involvement in the village level local bodies like Gram Sabha and VDCs was observed to be higher in the underdeveloped villages, particularly with some degree of homogeneity (Table 3.18). This has been largely because, as already told in the earlier sections, for the villagers in the backward villages, problems become a part of their lives. Thus, they make every attempt to get their difficulties addressed, which was found to be particularly true in the small and homogeneous villages. So is not the case in the prosperous villages as they already have an easy life.

Table 3.18: Participation in Village Level Bodies

Village		Good	Moderate	Poor
Developed	Hm - Hm		✓	
	Hm – Ht		✓	
	Ht – Ht			✓
Underdeveloped	Hm - Hm	✓		
	Hm – Ht	✓		
	Ht – Ht			✓

In terms of cost shared for the activities undertaken in their private lands as well as CPRs, the developed villages lag behind the underdeveloped ones (Table 3.19). The contribution of the villagers in the underdeveloped villages, particularly in the form of labour, has been much higher as compared to that in the developed villages. The only exception amongst the developed villages has been one with a complete homogeneous population structure, which had a good level of monetary contribution in the private lands.

Table 3.19: Perception Regarding Cost Shared

Village		Good	Moderate	Poor
Developed	Hm - Hm	✓		
	Hm – Ht			✓
	Ht – Ht			✓
Underdeveloped	Hm - Hm	✓		
	Hm – Ht		✓	
	Ht – Ht			✓

The willingness of the villagers to contribute for repair and maintenance of the watershed structures is one of the most important indicators of the level of participation. In all the villages surveyed, it was observed that a good amount of benefits have been realised by the villagers. Therefore, one would expect that the villagers would show active interest in maintaining the structures for their long term sustenance. However, it was observed that the respondents in the developed villages showed a complete lack of interest in contributing for the maintenance of the structures even after they agreed that they had been benefited by the WDP (Table 3.20). They simply reiterated that they would depend on the government machinery for the repair works. On the other hand, the villagers in the underdeveloped villages showed active interest for making contribution for the said purpose. Importantly, they did confess that making monetary contribution was unaffordable for them, but they were ready to provide concessionary or even free labour, if required. In both the cases, however, the completely heterogeneous villages showed an utter lack of interest for making contributions.

Table 3.20: Willingness to Contribute for Repair and Maintenance

Village		Good	Moderate	Poor
Developed	Hm - Hm		✓	
	Hm – Ht		✓	
	Ht – Ht			✓
Underdeveloped	Hm - Hm	✓		
	Hm – Ht	✓		
	Ht – Ht			✓

Based on these analyses, an aggregation of various indicators has been done to figure out the differences in the level of participation in the sample area. None of the villages in the developed ones has shown a good level of participation (Table 3.21). Amongst the developed villages, the completely or partially homogeneous villages have shown better level of participation as compared to the completely heterogeneous villages.

The completely homogeneous villages amongst the underdeveloped ones have shown the best level of participation among all the sample villages. In fact they are the only ones that figure in the category of 'good level of participation'. Among others, the partially homogeneous villages have moderate level of participation while completely heterogeneous villages rank among the villages that have poor level of participation.

Table 3.21: Aggregate Level of Participation in the Sample Villages

Village		Good	Moderate	Poor
Developed	Hm - Hm		✓	
	Hm – Ht		✓	
	Ht – Ht			✓
Underdeveloped	Hm - Hm	✓		
	Hm – Ht		✓	
	Ht – Ht			✓

3.6 Summing Up:

The spatial analysis of participation in the study area has thrown up some interesting results. Each of the village has its own deeply rooted social, economic and cultural ethos, and participation of the village would largely depend on these variations. These facets are of particular interest to a geographer as variations in participation over space – physical, social and economic – are largely unexplored avenues. A generalisation of variations in participation shows that participation largely is higher in the places where low level of development is found. It is also higher at places where the population composition is largely homogeneous. More importantly, it has been observed that class homogeneity bears more significance as compared to caste homogeneity, inasmuch as between the first two sets of villages (Hm – Hm & Hm – Ht), participation is largely found to be better in the first set of villages.

Amongst the determinants of participation, assurance of private benefits and leadership heterogeneity have come out as important factors determining the level of

participation. In fact, heterogeneity among the elite group of the village is deemed to be more important than heterogeneity in the entire village per se.

That all the watershed projects launched during the last one decade have given prime significance to community participation speaks of the significance of participation as a prime mover of any watershed project. The ensuing chapter analyses the rationale of inculcating participation as a tool for WDP sustenance by assessing the effect of participation on impact of the programme in the sample villages. One would expect that impact should be higher at a place where participation has been on the higher side, as on it depends the very rationale of community participation.

CHAPTER IV

LEVEL OF PARTICIPATION & IMPACT ANALYSIS OF WATERSHED PROGRAMME IN KANDI REGION

As it was observed in the second chapter, fragile natural resource base and its unsustainable use leading to large scale land degradation in various forms has led to a relatively weaker livelihood support system in parts of Haryana, in spite of it having a relatively better agricultural infrastructure compared to most parts of the country. Kandi area or the northern foothill region presents an ideal case of the above process. The present chapter attempts to analyse the effect of a holistic natural resource development programme intended to benefiting the livelihoods of the population of the Kandi region. Other than being aimed at assessing the impact of such a programme in the state, the analysis also is focussed towards linking up the nature of participation with that of the impact of the programme.

Impact evaluation of a watershed programme is subject to a number of limitations. This is consequent upon a number of factors, prominent amongst these are:

1. A large part of the benefits generated through watershed programmes are in the form of environmental regeneration and hence difficult to assess in monetary terms.
2. The impact of watershed programme is situation specific and has a relatively long gestation period (Shah, 2005).

4.1 Livelihoods Benefits of the Watershed Programme: A Household-level Analysis of Sample Villages

In order to ascertain the livelihood benefits disbursed to the villages where watershed programme was implemented, the respondents were generally queried as to what benefit they felt was the most significant one for the village. As no choices were given, the respondents supplied the answer on their own, and the pattern of response to a certain extent, points towards greater efficacy of watershed activities in an underdeveloped region as compared to that in a developed region (Table 4.1). This point is validated from the fact that a far greater percentage of respondents in the developed villages felt that the programme did not hold any benefits for them compared to the underdeveloped villages. Also, respondents of villages on the Hills cited drinking water and connectivity as the most important benefit while those on the plains cited improvement in irrigational facility as the most significant development (Box 4.1).

Box 4.1

The significance of connectivity for the economic development of a village can hardly be overestimated. Most integrated watershed programmes ignore this issue and concentrate on land development. However, agricultural development gets nullified when there is no access to the market. Most of the villages in the hilly tracts, particularly those in the Morni Hills, suffer from this problem. In the absence of paths, the villagers used to follow the route of dried hilly culverts, thus lowering the channel and aiding in erosion. Lack of connectivity through proper pathways also had a series of problems. The problem got acute during crises, like immediate health requirements.

One might maintain that addressing such problems is never a part of a watershed programme. However, in any integrated development plan, the immediate requirement of the subject needs to be taken care of. Thus, the second phase of IWDP-HILLS gave due attention to the connectivity issue and built almost 400 km of pathways and more than a hundred causeways over culverts (Sharma, 2003a). Three of the villages surveyed – Paonta, Katli and Narwar had got immensely benefited due to such constructions.

The approach followed in IWDP – Hills to address the connectivity issue, which seldom forms part of a watershed programme, answered the direct concerns of the subjects. Such an approach not only facilitates generation of interest among the villagers in the project, but also leads to their economic development.

Causeway built over a culvert in Narwar that was earlier used as pathways

Table 4.1: Primary Benefit Realised from the WDP

	Developed		Underdeveloped	
	Frequency	Percent	Frequency	Percent
No Benefit	13	36.1	3	7.9
Irrigation	22	61.1	11	28.9
Drinking Water	-	-	7	18.4
Cultivated Area	1	2.8	9	23.7
Connectivity	-	-	8	21.1
Total	36	100	38	100

Source: Same as Table 1.6

Provision of gainful employment was an important benefit the respondents had observed during the project. Unemployment was a big problem in the underdeveloped villages and the project provided them sustained employment for a fair period as wage labourers. More than two – third of the respondents in the underdeveloped villages informed that they had worked as wage labourers. The respective share in the developed villages was less than 50 percent (Table 4.2).

Table 4.2 Employment found in Watershed Project

	Developed		Underdeveloped	
	Frequenc y	Percent	Frequenc y	Percent
Yes	17	47.2	26	68.4
No	19	52.8	12	31.6
Total	36	100	38	100

Source: Same as Table 1.6

4.1 a. Change in Agricultural Area & Wasteland

As already discussed in the second chapter, there has been a perceptible decline in the share of culturable wastelands in all the sub-watersheds in the Kandi region. The villages surveyed also depict a similar scenario. On an average, the share of culturable wastelands in total area of the sampled villages declined by more than half, from 5.67% to 2.37% (Table 4.3). There has also been a simultaneous increase in the cultivable area, wherein the NAS has increased from 93% to 97% and more importantly, the irrigated area has seen a high increase from 19% to 31%.

Table 4.3: Change in Agricultural area & Culturable Wasteland in the Sample Villages

	Share of NAS in Cultivable Area		Irrigation Extent		Share of Culturable Waste in Total Area	
	1991	2001	1991	2001	1991	2001
Bhoj Paonta[28]	99.93	100.00	3.95	26.18	0.05	0.00
Bhoj Plasra[46]	91.28	94.59	1.01	13.88	8.54	5.20
Bholiwala	79.14	97.18	0.00	5.80	16.11	2.08
Mirzapur	97.07	96.86	23.12	63.56	2.49	2.74
Gobindpur	97.09	98.76	7.67	10.88	2.34	0.96
Mirpur*	90.68	96.58	99.07	99.12	9.09	3.31
Ferozepur	95.85	97.57	11.04	20.90	3.20	1.80
Todarpur	95.90	97.36	10.90	11.84	3.54	2.91
Average	93.36	97.36	19.59	31.52	5.67	2.37

** Mandpa forms part of the Census village Mirpur. Similarly, Gobindpur Census village consists of more than one village.* (All figures in percentages)

Source: District Census Handbooks, 1991 & 2001

In terms of absolute growth over the one decade period from 1991 to 2001, the culturable wastelands have seen a decline of 50% all the villages taken together, while the NAS has increased by 5.7% and the irrigated area by more than 300% (Table 4.4). Amongst the surveyed villages, Bholiwala has seen a massive decline in wastelands with a simultaneous increase in NAS, while the hilly villages of Bhoj Paonta and Bhoj Plasara have experienced an extensive increase in irrigated area.

Table 4.4: Growth in Agricultural area & Culturable Wasteland in the Sample Villages

	NAS	Irrigated Area	Culturable Wasteland
Bhoj Paonta	-7.9	510.0**	-100.0
Bhoj Plasara	1.9	1299.2**	-39.0
Bholiwala*	17.6	-	-87.1
Mirzapur	2.2	181.1	9.9

[28] A 'Bhoj' is a collection of a number of hamlets that together form the Panchayat. The hilly Morni block has a fair number of Bhojs. In Bhoj Paonta, three villages – Paonta, Katli and Narwar were surveyed, while Plasara formed a part of Bhoj Plasara.

Gobindpur	-1.6	39.6	-58.8
Mirpur**	5.6	5.7	-63.6
Ferozepur	-2.0	85.3	-43.8
Todarpur	29.5	40.7	-17.8

* Growth rate cannot be taken as base level data is zero. ** Very high growth rate due to low base

Source: District Census Handbooks, 1991 & 2001

The results of the Census data have been largely substantiated by the information provided by the respondents during the primary survey. At an aggregate level, the average cultivated area per household has increased from 2.34 ha to 2.93 ha, entailing an increase of by more than 25 percent over the base level. Correspondingly, the irrigated area has increased by more than two – thirds from an average of 1.61 ha to 2.76 ha. Thus, the proportion of irrigated cultivated area experienced a significant increase- from 69 percent to almost 95 percent in the sample households.

When the increase is disaggregated over the two set of villages – developed and underdeveloped – it is seen that the underdeveloped villages have experienced a higher increase in both the variables (Table 4.5). While the former has seen an increase of 6 percent in NAS, the same in the latter has been almost 50 percent. Similarly, the increase in the irrigated area has been 82 percent in the former, while in the underdeveloped villages it has been as high as 122 percent. The proportion of irrigated area has increased from 75 percent to almost 100 percent in the developed villages, whereas in the underdeveloped villages the same has increased from 60 percent to 90 percent.

Table 4.5: Change in Cultivated and Irrigated Area in the Sample Villages

(NAS & NIA per sample household)	Net Area Sown (ha)		Net Irrigated Area (ha)	
	Before WDP	After WDP	Before WDP	After WDP
Developed	2.69	2.86	2.02	2.84
Underdeveloped	2.01	3.0	1.21	2.69

Source: Same as Table 1.6

In many of the villages surveyed, the respondents reported to have observed an increase in the availability of irrigation water, even though there was no perceptible increase in irrigated area (Table 4.6). Remarkably, there was not even a single

respondent in the underdeveloped villages who did not observe an increase in irrigation water. On the other hand, more than 15 percent of the farmers in the developed villages did not observe any increase in water availability.

Table 4.6: Increase in Water Availability Observed

	Developed		Underdeveloped	
	Frequency	Percent	Frequency	Percent
NA	3	11.1	7	18.4
Yes	28	75.0	31	81.6
No	5	13.9	-	-
Total	36	100	38	100

Source: Same as Table 1.6

Most of the villages surveyed, except a few developed ones, had rainfed agriculture. More than 30 percent of the respondents had no access to irrigation. However, after the watershed programme, the number of such households declined to less than 5 percent. Similarly, more than 40 percent of the households in the underdeveloped villages reported to be dependent on kuhls from river for irrigation (Table 4.7). This number was highly insignificant in the developed villages. However, none of the respondents

Table 4.7: Change in Source of Irrigation

	Developed				Underdeveloped			
	Before WDP		After WDP		Before WDP		After WDP	
	Frequency	%	Frequency	%	Frequency	%	Frequency	%
NA (Landless)	3	8.3	3	8.3	9	23.7	7	18.4
Rain-fed	14	38.9	3	8.3	10	26.3	-	-
Kuhl (from river)	3	8.3	-	-	16	42.1	-	-
Kuhl (from reservoir/ tank)	-	-	3	8.3	-	-	21	55.3
Tubewell (private)	12	33.3	14	38.9	1	2.6	4	10.5
Tubewell (VDC)	-	-	1	2.8	-	-	1	2.6
Tubewell (Contractor)	1	2.8	10	27.8	-	-	2	5.3
Tubewell (govt)	3	8.3	2	5.6	2	5.3	3	7.9
Total	36	100	36	100	38	100	38	100

Source: Same as Table 1.6

reported to solely remain dependent on the river after the watershed programme was launched. Most of these shifted to the more reliable kuhls drawn from a reservoir or tank.

The most conspicuous shift in irrigation source has been observed in terms of the shift to tubewell irrigation, however, there are widespread spatial differences between the two set of villages. The developed villages, that already had a good share of tubewell-irrigated area, have observed a spurt in the same (see Box 4.2). Another noticeable shift towards tubewell irrigation has been observed in terms of increasing popularity of contractor operated tubewells particularly in the developed villages. The contractor operated tubewells are of two types. In the first case, the contract for operating the tubewell is auctioned by the VDC. In the second case the tubewell is owned as well as operated by the contractor. The former provided subsidised water to the villagers, while the rates of the latter was found to be too high, sometimes double of that of the former. However, most villagers preferred the latter due to surety of water supply as the tubewells managed by the VDC suffered from poor maintenance as no one was ready to take full responsibility of its maintenance.

Box 4.2

Ferozepur, a village in the Dangri watershed, was one of the most developed villages that were surveyed. The village was found to be agriculturally very developed with a pronounced rice – wheat cropping pattern. Most of the farmers had their own tubewells even before the initiation of the project. However, the existing tubewells mostly went dry during summers. The respondents agreed that the activities undertaken under the project had led to an uplift in the groundwater table. The farmers (almost none of the farmers had made contribution of any kind in the works undertaken even in their own fields) responded to the increase in groundwater table through digging new tubewells or lowering the existing ones. Thus they realized substantial benefits for a couple of years. However, due to overexploitation the water table subsided once again and this time even to a lower level as compared to the pre-project phase.

Almost two – third of the total respondents reported to have changed their main source of irrigation in the post- project phase. Most of these belong to the underdeveloped set of villages. Out of these, more than 90 percent of farmers attributed the change to watershed related activities (Table 4.8). This was re-confirmed by questioning them whether they could afford the irrigated water at the given price had the project started

earlier. There was a very small set of respondents who accepted that even if the project had started earlier they couldn't have afforded the irrigation water.

Table 4.8: Reason for Change in Irrigation source

	Developed		Underdeveloped	
	Frequency	Percent	Frequency	Percent
Increase in Income	1	6.67	2	6.67
Activity related to Watershed	14	93.33	28	93.33
Total	15	100	30	100

Source: Same as Table 1.6

4.1 b. Fodder Availability

Animal husbandry and dairying was found to be the second most important economic activity in most of the villages. Most of the villagers practised open grazing in village commons and forests which was considered to be one of the prime sources of the land degradation in the Kandi region. Hence, the old practice of open grazing was discouraged and attempts were made to reduce the number of goats and encourage stall feeding of productive bovines. For this purpose cow sheds were built in the villages and artificial inseminations done under the animal husbandry component of the IWDP-Hills. The attempts have had the desired effect and the number of goats was found to be negligible in all the villages. Villagers had started keeping less number of productive milch bovines than a large number of unproductive ones. The practice of open grazing had declined, if not stopped altogether (Table 4.9).The decline was found to be more pronounced in the developed villages than in the underdeveloped villages

Table 4.9: Sources of Procurement of Fodder

	Developed				Underdeveloped			
	Before WDP		After WDP		Before WDP		After WDP	
	Frequency	%	Frequency	%	Frequency	%	Frequency	%
NA*	1	2.8	1	2.8	2	5.3	2	5.3
CPR/ Forest	11	30.6	3	8.3	25	65.8	15	39.5
Purchase	19	52.8	21	58.3	8	21.1	11	28.9
Cultivate	2	5.6	8	22.2	3	7.9	10	26.3
Crop Residuals	3	8.3	3	8.3	-	-	-	-
Total	36	100.0	36	100.0	38	100.0	38	100.0

* Did not have any livestock

Source: Same as Table 1.6

(see Box 4.2). A sizeable proportion of the households had started growing *cheri* (fodder). This was particularly true in those villages where the wasteland has been reclaimed. As such lands were not highly productive, the villagers could utilise them for growing fodder.

4.1 c. Cropping Pattern

The substantial increase in the cultivated area and irrigation facilities has had a positive impact on the cropping pattern practised by the farmers. In the rainfed farming areas, only dry crops were possible due to acute paucity of water. Hence, maize was the most important kharif crop. Paddy could be cultivated only in those developed villages where tubewell irrigation was dominant. Very few farmers from the underdeveloped villages reported to be cultivating paddy before. However, the watershed programme changed the scenario. Paddy became the most important kharif crop while the number of farmers cultivating maize was reduced by half in both the developed and underdeveloped villages (Table 4.10 A). Increased and assured availability of water for irrigation facilitated the cultivation of paddy. However, one needs to take note of the fact that the Kandi region is mostly semi – arid and not suitable for an intensive rice – wheat cropping pattern. The increase in the cultivation of paddy, though leading to an increase in income, has put pressure on the available water resources (as shown in Box 4.2).

Table 4.10: Change in Cropping Pattern by the Sample Households

A. Kharif Crops

I. Developed Villages

	Before WDP				After WDP			
	Primary Crop[29]		Secondary Crop[49]		Primary Crop		Secondary Crop	
	Frequency	%	Frequency	%	Frequency	%	Frequency	%
Nil/ Landless	4	11.1	23	63.9	4	11.1	17	47.2
Paddy	9	25.0	4	11.1	21	58.3	7	19.4
Maize	23	63.9	6	16.7	11	30.6	10	27.8
Millets	-	-	3	8.3	-	-	2	5.6
Total	36	100	36	100	36	100	36	100

II. Underdeveloped Villages

[29] As information about area under each crop could not be collected (since the analyses were solely dependent on recall surveys), the respondents were queried on the most important crop they grew (primary crop) followed by the next most important crop (secondary crop).

	Before WDP				After WDP			
	Primary Crop		Secondary Crop		Primary Crop		Secondary Crop	
	Frequency	%	Frequency	%	Frequency	%	Frequency	%
Nil / NA	13	34.2	31	81.6	8	21.1	20	52.6
Paddy	2	5.3	4	10.5	11	28.9	4	10.5
Maize	20	52.6	2	5.3	10	26.3	3	7.9
Millets	3	7.9	1	2.6	-	-	-	-
Onion Seeds	-	-	-	-	4	10.5	3	7.9
Chili / Tomato Seeds	-	-	-	-	4	10.5	7	18.4
Potato/ Ginger	-	-	-	-	1	2.6	1	2.6
Total	38	100.0	38	100.0	38	100.0	38	100.0

Source: Same as Table 1.6

However, in the underdeveloped villages, particularly those in the hilly tracts of Morni, new crops have been introduced. Although households cultivating paddy has increased manifold over the base year, the absolute number of farmers presently growing paddy is still relatively less. New crops like onion seeds, chilli seeds and vegetables have become more popular. Though these crops are mostly rabi crops, but can be grown in the hilly tracts even in the kharif season. More than half of the respondents in underdeveloped villages have moved towards crop diversification. This percentage in the developed villages is comparatively lower, about one – third. It can be thus inferred that the while the developed villages have retained their old cropping pattern or introduced paddy in their crop-basket, the underdeveloped ones have diversified their cropping pattern to less water-intensive crops.

Better quantum and quality of water supply is expected to favourably impact yield of crops. The evidences from the field conform to this phenomenon in most of the sample households. 30 percent of the total respondents have experiences an increase in the yield of existing crops after the project was initiated (4.11).The share of such respondents was low in the underdeveloped villages as most of them had shifted to

Table 4.11 Increase observed in Yield of Existing Kharif Crops

	Developed		Underdeveloped	
	Frequency	Percent	Frequency	Percent
NA/Landless	12	33.3	29	76.3
Increase	15	41.7	7	18.4
Decrease	1	2.8	-	-
No Change	8	22.2	2	5.3
Total	36	100.0	38	100.0

Source: Same as Table 1.6

newer crops. That the increase in yield be attributed to WDP can be ascertained from the fact that the respondents cited improvement in water availability and land quality as reasons for increase in yield.

As in most other parts of north – west India, wheat has been traditionally cultivated as the most important rabi crop. The number of respondents growing wheat has mostly remained unaltered even after the project. However, gram as the second most important crop in the region has virtually vanished. The developed villages have shifted to sunflower cultivation while the underdeveloped ones have resorted to the more productive and remunerative onion seeds, tomato seeds, chili seeds, potato, ginger and other vegetables. These new crops and vegetables have become immensely popular in the hilly villages as they have low gestation period and require less water (see Box 4.3).

Table 4.10 B. Rabi Crops

I. Developed Villages

	Before WDP				After WDP			
	Primary Crop		Secondary Crop		Primary Crop		Secondary Crop	
	Frequency	%	Frequency	%	Frequency	%	Frequency	%
Nil / NA	4	11.1	31	86.1	3	8.3	25	69.4
Wheat	27	75.0	1	2.8	31	86.1	1	2.8
Gram	5	13.9	2	5.6	-	-	5	13.9
Sunflower	-	-	1	2.8	-	-	5	13.9
Sugarcane	-	-	1	2.8	-	-	-	-
Onion Seeds	-	-	-	-	2	5.6	-	-
Total	36	100	36	100	36	100	36	100

II. Underdeveloped Villages

	Before WDP				After WDP			
	Primary Crop		Secondary Crop		Primary Crop		Secondary Crop	
	Frequency	%	Frequency	%	Frequency	%	Frequency	%
Nil / NA	10	26.3	33	86.8	7	18.4	32	84.2
Wheat	22	57.9	3	7.9	21	55.3	-	-
Gram	6	15.8	1	2.6	-	-	2	5.3
Onion Seeds	-		-	-	7	18.4	2	5.3
Chili/ Tomato Seeds	-	-	-	-	3	7.9	1	2.6
Vegetables	-	-	1	2.6	-	-	1	2.6
Total	38	100	38	100	38	100	38	100

Source: Same as Table 1.6

A good number of respondents observed an increase in the yield of existing rabi crops, mostly wheat. More than 40 percent of the households surveyed had realised an increase in the yield. The proportion was almost identical in both the set of villages. In many cases, in the underdeveloped villages in particular, the query was not relevant as many of them had completely switched to new crops like onion seeds. Contrary to that,

Table 4.12: Increase observed in Yield of Existing Rabi Crops

	Developed		Underdeveloped	
	Frequency	Percent	Frequency	Percent
NA/Landless	8	22.2	21	55.3
Increase	16	44.4	15	39.5
Decrease	3	8.3	-	-
No Change	9	25.0	2	5.3
Total	36	100	38	100

Source: Same as Table 1.6

Box 4.3

Onion seeds and tomato and its seeds have brought changes to the existing cropping pattern to the hilly villages of Morni block which have subsequently positively affected the economic lives of the beneficiaries. With active cooperation and support from the VDC, the villagers have also learnt the way of marketing their products. They now send the vegetables and seeds, properly packaged, to the markets of Chandigarh, instead of selling it in the local markets. The cost of packaging and transporting is shared by the farmers. Some of the villagers have started processing their products before selling. For instance, ginger is generally not sold as a vegetable, but after processing, is converted into a type of ayurveda medicine. Such value addition makes a significant difference to the prices of the products and hence to the livelihoods of the farmers in these villages.

Onion seeds in full bloom in Katli

in the developed villages, a fair share of the respondents observed either a stagnation or decline in the existing rabi crops. The reason for this anomaly can be found in the fact that WDP has mostly benefited the kharif crops, particularly in the developed villages. The effect of WDP on winter crops was not that pronounced, as found in most developed villages, particularly in Ferozepur and Todarpur.

In order to assure that the shift in cropping pattern in the sample villages was not because of some exogenous factor like price of the crop, the respondents were interjected with regard to the rationale for changing their cropping pattern. Almost 90 percent of the farmers who had made a change in their cropping pattern responded that the change was mainly because of the availability of assured and increased water supply for irrigation (Table 4.13). Very few respondents had changed the cropping pattern because of the availability of HYV seeds and fertilizers and other reasons like pests in the previous crop. Significantly, none of the respondents had changed their cropping pattern because of the price factor. In the hilly villages, people had shifted from maize and gram cultivation to vegetables and seeds. These crops were less water intensive as compared to paddy and assured water supply from reservoirs enabled healthy growth of crops.

Table 4.13: Reason forwarded for Change in Cropping Pattern

	Developed		Underdeveloped	
	Frequency	Percent	Frequency	Percent
NA	14	38.9	12	31.6
Assured Water Supply	17	47.2	26	68.4
Price of Crop	-	-	-	-
HYV Seeds / Fertilizers	3	8.3	-	-
Other Reasons	2	5.6	-	-
Total	36	100.0	38	100

Source: Same as Table 1.6

The aforementioned analyses signify that the WDP in the region has had a positive impact on most of the indicators considered. Of course, one can observe a significant amount of spatial variations in terms of the level of impact concerned; however, in general, the programme has made inroads into the specific lacunae experienced by a specific village and has essayed to find a solution specific to that village or area.

Nevertheless, one may infer from the foregoing discussions that there seems to be a hiatus between what people perceive is good for them and what is good for the

environment concerned, i.e. the debate between ecology and economy comes into the fore. In the ensuing Hobson's choice, the watershed programme seems to loose a grip on its focus (particularly in the developed villages). In many a case, it was found that the WDP has resulted in benefits, the continued execution of which might lead to a situation which may not be very different from that of the pre-watershed phase. One of the most substantial reasons for this irony was lack of awareness and participation among the villagers concerned, which have been dealt in the previous chapter.

4.2 Variations in Impact of IWDP-Hills in the Sample Area

The previous chapter has dealt with the variations in the level of community participation over space in the sample area. Community participation connotes people acting in groups to influence the direction and outcome of development programmes that affect them (Paul, 1987). The key aspects here are, firstly, 'people acting together', i.e. collective action, and secondly, 'influencing the outcome' (Kolavalli & Kerr, 2002). The second aspect bears high significance – the outcome of the programme shouldn't have been the same had participation *not* taken place. If this doesn't happen the very rationale of participation dissipates. Sometimes the project staff may finish off the project work in a shorter time and in a more efficient manner, but for the long term sustainability of a programme like that of watershed, local community participation is vital.

This section makes an attempt to analyse the differences in the impact of WDP in the sample area, with a view to assessing whether the differences in impact have any coherence with the level of participation in that area.

The analysis of change in culturable wasteland has been done at the secondary level (based on Census information). It would be seen that most of the villages surveyed

Table 4.14: Decline in Culturable Wasteland in the Sample Villages

	Village	Good	Moderate	Poor
Developed	Hm - Hm	✓		
	Hm – Ht	✓		
	Ht – Ht		✓	

	Hm - Hm	✓		
Underdeveloped	Hm – Ht	✓		
	Ht – Ht			✓

have experienced a fair decline of wastelands, one of the prime motives of any watershed programme (Table 4.14). However, in the completely heterogeneous villages, the impact of WDP in terms of decline in wastelands could not be observed. In fact in the underdeveloped heterogeneous villages, the wastelands have increased marginally (Table 4.3 & 4.4).

There has been a small increase in NAS in most of the villages surveyed (Table 4.15). In only one of the villages (Bholiwala), the cultivated area has increased tremendously. In highly developed villages, which were also completely heterogeneous, the impact of WDP on NAS was virtually nil as the share of NAS in cultivable area was already very high.

Table 4.15: Increase in Cultivated Area in the Sample Villages

Village		Good	Moderate	Poor
	Hm - Hm		✓	
Developed	Hm – Ht		✓	
	Ht – Ht			✓
	Hm - Hm		✓	
Underdeveloped	Hm – Ht	✓		
	Ht – Ht		✓	

Increase in irrigational facilities bear more significance than that in cultivated area as without irrigation intensive cultivation cannot be executed. In all the underdeveloped villages surveyed, a good increase in the irrigated area has been observed (Table 4.16).

Conversely, in the developed villages the increase in irrigated area has been only marginal. This is because the area under irrigation was already high in these villages. Further, the impact of WDP was felt more on the quantity of water available (due to increased groundwater recharge).

Table 4.16: Increase in Irrigated Area in the Sample Villages

Village		Good	Moderate	Poor
Developed	Hm - Hm		✓	
	Hm – Ht		✓	
	Ht – Ht		✓	
Underdeveloped	Hm - Hm	✓		
	Hm – Ht	✓		
	Ht – Ht	✓		

There has been a noticeable shift in the source of irrigation consequent upon watershed activities (Table 4.17). The most remarkable change has been observed in the underdeveloped homogeneous and partially heterogeneous villages wherein the irrigational structure has changed in entirety from a rain dependent one or kuhls drawn from seasonal rivers to kuhls drawn from reservoirs. This has strengthened the agricultural base of the region. There has not been much change in the developed villages, as most of the respondents already had tubewell irrigation. They normally

Table 4.17: Change in Source of Irrigation

Village		Good	Moderate	Poor
Developed	Hm - Hm		✓	
	Hm – Ht	✓		
	Ht – Ht		✓	
Underdeveloped	Hm - Hm	✓		

	Hm – Ht	✓		
	Ht – Ht			✓

observed an increase in water availability. However, there was a visible difference between the developed and underdeveloped villages in terms of change in irrigation source for those who depended on rain or kuhls from river. While in the underdeveloped villages, the respondents had shifted to kuhls drawn from reservoirs, the respondents in the developed villages had opted for tubewells. In many a case, the latter had also resulted in a stark depletion of the available groundwater resources.

One of the main aims of the IWDP-Hills was to check widespread land degradation, particularly in the village commons and forests. The villagers were thus dissuaded from open grazing. Most of the respondents were found to be complying to the advice. They was a remarkable decline in the number of goats and people had started keeping more productive bovines. In the developed homogeneous village (Mandpa) the villagers generally stall-fed their cattle even before IWDP-Hills had started and hence there has not been any change in the source of fodder. Although in one of the partially heterogeneous underdeveloped villages (as already discussed in Box 4.3) the landless had restarted open grazing once the commons were replenished, in another similar

Table 4.18: Sources of Procurement of Fodder

Village		Good	Moderate	Poor
	Hm - Hm	-	-	-
Developed	Hm – Ht	✓		
	Ht – Ht		✓	
	Hm - Hm		✓	
Underdeveloped	Hm – Ht	✓		
	Ht – Ht			✓

village there had been an overwhelming shift in the source of fodder and hence overall this set of village has shown good results.

With assured and increased water availability, one would expect an increase in the cropping intensity and number of crops grown (Table 4.19). However, in a number of developed villages the number of crops has declined, but it was found that this was because of increased specialisation towards more water intensive crops. For instance, during kharif season earlier rice was grown along with more coarse crops like maize or millets; however with increased water availability, the villagers had started growing only rice. Similarly, in rabi season, wheat was grown along with gram, but now only wheat was grown. On the other hand, in the underdeveloped villages, the villagers earlier used to grow small amounts of wheat and paddy, which entirely depended on rains. With assured water availability, they diversified to crops like onion seeds, chilli seeds and vegetables. Therefore, they started growing more number of crops.

It would thus be inferred that the change in number of crops grown would not be a good indicator for assessing the impact of WDP, but a change in cropping pattern *per se* would be a better indicator.

Table 4.19: Increase in Number of Crops Grown

Village		Good	Moderate	Poor
Developed	Hm - Hm	✓		
	Hm – Ht		✓	
	Ht – Ht			✓
Underdeveloped	Hm - Hm	✓		
	Hm – Ht	✓		
	Ht – Ht			✓

Consequent upon an increase in water availability for irrigation, there has been a remarkable shift in the cropping pattern practised by the villagers. However, there has been a visible difference between the developed and underdeveloped villages in terms of change in the crops grown. While the developed villages have shifted

towards more water intensive crops like wheat and paddy, which many a time were found not be suited to the region concerned, the underdeveloped villages have started growing less water intensive crops like seeds and vegetables. The underdeveloped villages could also have shifted towards more water intensive crops like the developed ones but they did not and shifted to less water intensive, which were of course also remunerative.

Table 4.20: Change in Cropping Pattern

Village		Good	Moderate	Poor
Developed	Hm - Hm		✓	
	Hm – Ht		✓	
	Ht – Ht		✓	
Underdeveloped	Hm - Hm	✓		
	Hm – Ht	✓		
	Ht – Ht		✓	

In terms of increase in yield in existing crops, all the developed villages have shown excellent results with most of the respondents observing a high increase in the yields (Table 4.21). The increase has been largely because of increased water availability and

Table 4.21: Increase in Crop Yield

Village		Good	Moderate	Poor
Developed	Hm - Hm	✓		
	Hm – Ht	✓		
	Ht – Ht	✓		
Underdeveloped	Hm - Hm		✓	
	Hm – Ht		✓	
	Ht – Ht		✓	

hence can be definitely attributed to the watershed programme. On the other hand the underdeveloped villages have generally changed their cropping pattern and hence increase in existing crop yields has been only moderate.

Based on the indicators discussed above, the aggregate impact of the IWDP-Hills in the sample villages has been worked out (Table 4.22). It would be seen that the underdeveloped villages have seen a better impact of watershed programme as compared to the developed ones. Further, the completely heterogeneous villages have again shown a poor impact as compared to the homogeneous ones.

Table 4.22: Aggregate Impact of IWDP-Hills in Sample Villages

Village		Good	Moderate	Poor
Developed	Hm - Hm		✓	
	Hm – Ht	✓		
	Ht – Ht			✓
Underdeveloped	Hm - Hm	✓		
	Hm – Ht	✓		
	Ht – Ht			✓

It would be worth mentionable that the developed villages were already at a higher level of agricultural development; hence the impact of watershed programme would be difficult to ascertain. The contribution of WDP in such villages was limited to the strengthening of existing resources. For instance, creation of check dams resulted in checking soil erosion and recharging ground water that improved NAS marginally and made resources more efficient. Thus, the effect of WDP was small but visible.

Nevertheless, one would appreciate the fact that the impact of WDP has been definitely visible throughout, though there have been spatial variations in the same. With a view to analysing these spatial variations, the participatory factor needs to be brought it.

4.3 Efficacy of Community Participation for Watershed Development

One of the basic tenets of watershed management is that, to the extent possible, all works should be executed by the beneficiaries themselves. The rationale for such an approach is to inculcate a sense of belongingness in the beneficiaries, which in its turn is essential for the long term sustainability of the programme. A number of watershed activities cannot be carried out without the involvement of the local people. Thus, participation has an even relation with the impact of watershed programmes.

The spatial variations in participation in the study area and the reasons thereof have already been analysed in the previous chapter. It would be pertinent now to look for links between the two phenomena and assess whether watershed impact has a causal relationship with community participation.

It would be seen that there exists largely a strong relation between the level of participation and impact in the study area (Table 4.23). In the developed villages, the level of participation has been lower as compared to that in the underdeveloped villages. Similarly, the level of impact in the developed villages has also been lower as compared to that in the latter. Of course, in some of the developed villages a good level of impact has been observed. But with a lower level of participation, such impact would be feasible only in the short run and the very sustenance of watershed programme in such villages would always remain under scanner. This fact has already started showing manifestations in the form of declining water

Table 4.23 Comparison between Level of Participation and Impact of WDP

Level of Development	Level of Heterogencity	Level of Participation	Level of Impact
Developed	Hm - Hm	Moderate	Moderate
	Hm – Ht	Moderate	Good
	Ht – Ht	Poor	Poor
Underdeveloped	Hm - Hm	Good	Good
	Hm – Ht	Moderate	Good
	Ht – Ht	Poor	Poor

tables at an alarming rate in such villages consequent upon high exploitation of rejuvenated groundwater. Shifting to water intensive crops is another such manifestation.

Further, a very important aspect of participation is the maintenance of equity in benefits of the watershed programmes. It was observed that in a few of the villages surveyed, the impact of WDP has been largely because of the benefits realised by a small section of the respondents. This fact was found to be particularly true in the heterogeneous villages – both developed and underdeveloped. It was found that in such villages, most of the works were accomplished with the help of hired labourers (which may or may not be from the village concerned) and hence showed instant results. In such cases it was observed that the large farmers always benefited at the cost of the small and marginal farmers. For instance, several large farmers among respondents were found to have nearly doubled the cultivated area / irrigated area in their possession, while, the small and marginal farmers could not get the benefits in the same scale. Further, in such villages, it was found that the rates of water for irrigation were flat and not proportionate, thus benefiting the large farmers again (see Box 3.3).

On the other hand, sharing of water had never been a problem in the homogeneous underdeveloped villages. The *option of auction* had worked well in such villages, ensuring that everybody got benefited from the watershed programme. Thus, the equity issue was well addressed in such villages.

4.4 Summing Up

This chapter has initially dealt with the impact of WDP in the study area at the household level. It would not be an overstatement that the IWDP-Hills launched in the area has touched all aspects of human and ecological life in the region. Right from the provision of basic amenities like potable water and connectivity to economic aspects like provision of gainful employment and finally to agriculture – the most important economic activity in the region – the programme has benefited all.

Nevertheless, there have been overt spatial differences in the level of benefits realised from the programme. The differences have been observed both at inter-

village level as well as intra-village level. Largely, the underdeveloped villages have seen more progress as compared to the developed villages. There have also been differences in the nature of benefits realised. Thus, the developed villages have shown more exploitation of rejuvenated resources, while the underdeveloped ones have utilised the newly generated resources in a more cautious manner.

Similarly, at the intra-village level, it has been largely found that the benefits have been more equitably distributed in the homogeneous villages as compared to that in the heterogeneous villages where it has been observed that the rich have benefited at the cost of the poor.

In both the cases, it can be seen that the level of participation in the village concerned has a much greater role to play than perceived. Impact of WDP has been generally found to be higher wherever level of participation was higher. Even if the short term impact has been higher in few villages, the signs of resource depletion are already visible, bringing into question the long term sustenance of such developmental programmes. It can thus be safely inferred from the foregoing analyses that the significance of community participation for any watershed programme can hardly be overestimated.

CHAPTER V

CONCLUSION & POLICY IMPLICATIONS

5.1 Conclusion:

The research was undertaken with a view to analysing some of the processes involved in watershed development and management, with a prime emphasis on assessing the participatory issues involved in the latter.

Initially the state as a whole has been dealt with in order to present the macro – issues involved in agricultural development and the pockets of underdevelopment have been identified at the district level. Thereafter these pockets have been narrowed down to the block level in order to get a more micro – view of the issues involved. This has been primarily done with a view to getting a view of the spatial pattern of agriculture-related problems in Haryana. Having assessed the agricultural problems found in these pockets, an account of the land development programmes undertaken or being undertaken in these pockets have been given, with particular reference to watershed development programmes.

The issue that has emerged out of these analyses calls for discarding the older concept of macro-planning and gives more emphasis on the planning at the grass root level. One has to first analyse the spatial aspects of the problem involved in a region so as to get to the root of the problem. It is only then that appropriate plans for that specific area can be implemented.

Among the schemes that have been launched in various regions of the state, a prime significance has been attached to the Integrated Watershed Development Project (IWDP – Hills) that had been undertaken in the Kandi region of the state. The Kandi experiment has been a unique one in its own regard and can be considered a landmark in the history for not only watershed planning but also for any development plan. The IWDP-Hills has not only set an example in terms of a holistic planning for a region, specific to the region, planned at the micro-watershed level, with active collaboration of the beneficiaries involved, but also a holistic implementation. As against the sectoral planning where each of the department has its own schemes and mode of implementation, the IWDP-Hills has had inputs and outputs from all the departments concerned in an amalgamated format.

However, one of the basic principles of watershed planning was overlooked in the planning and implementation process. Although the Kandi region is a natural region,

covering the states of Haryana, Punjab, Himachal Pradesh and Uttar Pradesh, and even the project was popular as Kandi Project, in the implementation process the administrative boundaries were adhered to. Thus, if a watershed falls between two states (which is but natural) the implementation of the project was confined to the specific state. Thus, more than one state was found to be executing the activities under WDP in the same watershed.

The prime focus of the undertaken research was to analyse the dynamics of participation and the variations over the space thereof. By using a set of four indicators, the differences in the level of participation was analysed in the study area and the validity of the first two hypotheses of the research was also checked.

The first hypothesis of the undertaken research pertained to analysing the level of participation vis a vis the level of development of the village. The available literature on determinants of participation considers level of development as positively related to participation. The argument forwarded here is that development (in terms of income and educational level) has a positive effect on the level of awareness and hence the subjects' level of motivation and *ipso facto* to the level of participation (Chand et al, 2001; Pal, 2001).

The level of awareness has been seen to be having a definite positive influence on the participation level; however the determinant of awareness was not seen to be having any positive correlation with the level of development. Inhabitants of highly developed villages were found to be conspicuously unaware of the developments in their own village. Many of them were aware of the works done but had never heard of 'Kandi Project'. Many beneficiaries had taken the project as just another governmental measure to mitigate their problems. In such villages, the beneficiaries simply refused to share any cost for construction as well as repair of the structures, although they confessed to have benefited from the project.

The sheer lack of awareness was noticed in a developed village where cost sharing had been relatively quite high. The beneficiaries realised huge benefits for a couple of years but once it did not rain for a year they accused of being cheated and refused to pay anything for repair and maintenance. Similarly, in another developed village suffering from low water tables, cost sharing was nil, the villagers observed the benefits and in response lowered their tubewells or dug new ones. Consequently, the water table subsided to alarmingly low levels.

On the other hand, the underdeveloped villages showed higher level of awareness. All the respondents, including the women, were found to be not only highly aware of the problems faced by the village but also the measures undertaken under the project to solve them. The SHGs had become immensely popular in these villages. The villagers were also supportive of the VDC and agreed that all the decisions were taken after due consultations with all the members. The VDC meetings were still being held even after the closure of the project, the records were duly being maintained and the members regularly paid their membership fee.

It can thus be inferred that the level of awareness may also be inversely related to the level of development, which is in stark contrast to the views presented in the available literature; and if this be the case, it can be also concluded that the level of participation is inversely related to the level of development. Thus, the first hypothesis of the research – level of participation is directly proportional to the level of development – stands rejected.

The reasons for existence of higher level of participation in underdeveloped regions have both economic as well as behavioural facets. For the village dwellers in the underdeveloped regions, particularly in the hilly terrains, the problems become a part of their lives. It was found during the survey that high level of awareness existed right from the farmers to the women folk and children in these villages and that was for the simple reason that they actually *face* the problems in their daily lives. Thus they could directly relate themselves with the problems and showed instant interest in partaking in the programme. They even readily agreed to contribute to their capacity. So was not the case in prosperous villages as they weren't bothered of any critical problems that could affect their lives. Hence they felt no requirement of contributing to any activity undertaken in the project.

Another major objective of the research was to foray into the debate of homogeneity and heterogeneity of population composition as a determinant of participation. The available literature has given two set of arguments with a view to proving either as vital for participation. The prime argument of the heterogeneous school of thought is based on the interdependency of needs, i.e. the emergence of a 'critical mass' that initiates participation (Olson, 1965; Hardin, 1982; Chakravarty, 1999; Kurian et al, 2003; Kurian, et al 2005).

On the other hand, the homogeneous school of thought suggests that participation tends to be higher in homogeneous communities as people prefer to interact with persons from the same community – socially or economically (Suresh, 1990; Deshpande & Nikumbh, 1993; Joshi & Bantilan, 1997; Alesina & Ferrara, 2000; Silva & Pai, 2003).

In the undertaken research, it was found that homogeneity in all terms facilitates participation in general. Further, it was observed that class homogeneity bears more significance than caste homogeneity for participation. Among the three set of villages selected with the specific criteria, the first set (homogeneous in terms of caste and class) showed a higher level of participation as compared to the other two, while the second set (homogeneous in terms of caste but heterogeneous in class) had lower level of participation than the first set but higher than the third. The last set of villages (heterogeneous in caste as well as class) exhibited the least participation. Thus, a comparison between the first two set of villages in terms of their level of participation reveals that class homogeneity has more significance than caste homogeneity.

An important finding of the research, stemming from the afore analyses, concerns with heterogeneity in the elite group of the village. The undertaken research largely validates the findings of Vedeld (2000) who had enunciated that *the degree of heterogeneity among political elite groups is more important for capacity to perform collectively than heterogeneity among all social groups.* In the undertaken research as well it was found that homogeneity among leadership and elite groups has a positive effect on potential of collective action, i.e. the existence of **multi-power-centric** village political structure has a negative effect on participation.

In villages where the respondents alleged dominance by a few powerful people, participation was at a low level. Similarly, wherever respondents were unanimous in making a choice of their representative, participation was at a higher level. Although size of the village population also has a bearing on the leadership heterogeneity, even within villages of similar size, participation was found at a higher level where leadership homogeneity was found.

These analyses suggest that the second hypothesis - level of participation being directly proportional to economic and social homogeneity of inhabitants – can be accepted.

It has been seen that there is no dearth of watershed related researches that have been undertaken and an ample amount of work has been well documented in the literature. However, most of these works have remained themselves confined themselves to one or a few villages. In the undertaken research, all the villages in the Kandi region in the state have been dealt with at the secondary level. These villages have been categorised into those where WDP had been implemented (*watershed villages*) and those where WDP had not been implemented (*non-watershed villages*). These set of villages were first checked for prioritisation followed for taking up watershed activities in various sub-watersheds in phases. It was largely found that prioritisation was followed in taking up sub-watersheds, inasmuch as severity of problem in each of the sub-watershed had been amply taken care of, at least as far as extent of culturable wasteland is concerned.

Impact evaluation of villages (each largely a micro-watershed as well) at secondary level conceals a good amount of information. This is because it is difficult to segregate the effect of WDP at village level. Further, a large part of the benefits generated through watershed programmes are in the form of environmental regeneration and hence difficult to assess in quantitative terms. Nevertheless, the effect of watershed programme was largely captured given the large number of villages which could be used to assess the effect at an aggregate level.

At this aggregate level, in the Kandi region as a whole, it was found that the WDP definitely has had some negative impact on the proportion of area under culturable wastelands. At the secondary level it was found that the decline in wastelands in the watershed villages was much higher as compared to that in the non-watershed villages. Further, it was found that the gap between watershed and non-watershed villages in terms of culturable waste has lessened after the implementation of WDP in all the sub-watersheds. Significantly, a conspicuous increase in wasteland was noticed in many non-watershed villages. Thus, it may be inferred that the WDP in the region has worked well.

However, impact of the programme could not be noticed on other indicators like proportion of cultivated land in culturable area and proportion of irrigated land in cultivated land. Although a definite increase in these two indicators has been observed in almost all the villages no noticeable difference exists between the watershed and non-watershed villages in terms of these two indicators before and after the project.

Therefore, the changes in cultivated area and irrigated area may or may not be attributed to watershed programme. Nevertheless, given the poor physical conditions in the watershed villages before the implementation of the project, it may not be an aberration if it is said that the changes were to a large extent because of the programme.

This assertion has been substantiated later through the results of the primary survey. It was observed that increase in cultivated and irrigated area was the primary benefit accrued due to the watershed programme. Change in cropping pattern was another major positive development, particularly in the underdeveloped villages, so were mitigation of vital problems like paucity of drinking water and connectivity. With a view to verifying whether the changes were due to WDP and not any external factor, the respondents were interjected on reasons for changing their cropping pattern and for increase in irrigated area and most of them had emphasised that the change was not possible had the watershed programme not been implemented.

One of the major positive developments after WDP in underdeveloped villages has been the introduction of suitable and profitable crops like seeds of onion, chilli and tomato and vegetables. The moisture requirement of these crops is less as compared to traditional crops like rice and wheat and they also have a short gestation period.

There has been a sort of chain reaction out of the developments attributed to WDP. For instance, provision of basic amenities like drinking water and connectivity has saved valuable time of the village folks, particularly women. This was complemented by providing vocational training like stitching. Thus, post-project the women could amply utilise their time. Further, increase in irrigation and NAS encouraged the villagers to employ more time for cultivation, even during summers, which earlier had become synonymous with seasonal migration with cattle to far-off plains. The villagers had also sized down their livestock by phasing out goats totally and preferring less number of productive cattle than large number of unproductive cattle. They were highly benefited by the animal husbandry component of the project in this regard.

It can thus be concluded that although at the secondary level the impact of WDP couldn't be ascertained, at the primary level the impact was definitely recognised. The project also brings out the benefits and significance of micro-level planning. A separate plan – Village Development Plan (VDP) – was formulated in consultation with the villagers concerned. Thus, the problems at the micro-level was given due

significance to, which is the first step in any programme directed towards the mitigation of a problem at the macro-level – that of land degradation. Micro-level planning by the villagers also gives a sense of belongingness to the villagers as it directly answers their concerns. This is also the first step towards the generation of participation among the beneficiaries, which forms the core of the research hypotheses.

The third hypothesis of the research was based on the very rationale of the participatory watershed management. Community participation would not have any significance if it does not affect the impact of WDP positively; thus, participation should *affect* the outcome of the programme. To verify this, the villages surveyed were divided into six sets and the level of participation as well as impact of watershed programme was assessed in each of the sets.

It was largely found that impact tends to be higher in a village where participation has been towards the higher side. In some of the villages, the impact was seen to be higher even when the participation was low. However, such impact was only short lived inasmuch as with an increased and intensive exploitation of resources, the sustenance of the benefits had already started showing danger signals. On the other hand, the villagers' participation was seen to be higher, had adopted steps that would not only ensure their economic gains but also guarantee the long term sustainability of the newly generated resources.

Thus, it can be safely concluded that community participation has a definite positive relation with the benefits of the watershed programme and hence the rationale of adopting participatory measures for programme implementation is justified.

5.2 Issues Emerging from the Research:

The determinants of participation need to be dealt with in a more location-specific manner. It has been observed in the undertaken research that at some places people show unwillingness to participate even when they have been realizing benefits from the programme. On the other hand, some of the villages had seen very high level of participation right from the planning of the project. Thus, a more in-depth analysis of the determinants of participation is required.

The current research has dealt with the implication of level of participation on the impact of watershed programme. Thus, it primarily deals with participation of beneficiaries in watershed activities. However, it would be of interest to deal with the *impact of watershed programmes on participation*, i.e. assessing villagers' level of participation in the decentralized settings – whether they are participating to gain benefits from the watershed programme or it is in their intrinsic nature to show community participation in their daily life.

It would have been of interest to take a few control villages for assessing their level of participation in order to examine the effect of watershed programmes on participation and community development. However, this issue has remained beyond the scope of this work but certainly needs to be answered.

5.3 Policy Implications:

1. Efficacy of Participation:

The research undertaken has largely validated the significance of community participation in watershed developmental programmes. The efficacy of participation lies in the fact that it actually affects the outcome, otherwise there wouldn't be any requirement of participation and the works might have been accomplished in a much lesser time. There are two factors that make the inculcation of local participation a vital aspect of watershed programmes. Firstly, participation takes care of the equity issue, thus, all sections of the village population are equitably benefited, which is particularly necessary in heterogeneous village communities.

Secondly, and more importantly, involvement of the local people in the developmental programmes right from the inception ensures the long term sustenance of the efforts employed to rejuvenate and create resources. It also leads to arresting misuse and overexploitation of natural resources.

Thus, it would be pertinent to reiterate that a watershed programme sans participation might lead to a speedy completion of the programme and also might show impact in the short term, but for the sustainability of the impact, participation is vital.

2. *Generation of Awareness:*

One of the significant findings of the research undertaken is that the lack or paucity of awareness among the beneficiaries may lead to a sheer negation of all the benefits emanating out of a watershed project. This fact was observed in both the developed as well as underdeveloped areas. In one of the underdeveloped villages the beneficiaries had restarted open grazing after the replenishing of pastures; while in a developed village the villagers started high exploitation of groundwater. Both the observations prove that lack of awareness may lead to a condition which may not be very different from the pre-project phase or sometime more critical than the original situation.

Thus it would appear that generation of awareness among the rural people is very important for the real success of any programme. Appropriate time must be allotted before, during and after any project to make the villagers aware of potential negative fallouts of their negligence, even if that leads to slowing down of the project activities.

3. *Approach for Leadership Formation:*

In most heterogeneous communities in the study area a hiatus existed between the rich and poor as well as higher and lower caste. It was also largely found that the interest of the former was being subjugated at the advantage of the latter. Under such circumstances, the significance of the village leadership becomes self-evident. The approach followed in Kandi project for the formation of Village Development Committees (VDCs) was a more direct one, wherein the committee was formed by the project officials after due consultations with the villagers. Although care was taken to see that all the village communities were duly represented in the committee it was observed that it was more of a formality and the arrangement did not help much in the addressing the concerns of the deprived communities.

Therefore, an alternate arrangement can be proposed in the case of heterogeneous village communities wherein small homogeneous sub-committees should be formed for each of the community. Each of such committees may have a chief who would be directly responsible to the project coordinator (Alternatively, an apex committee in the village may be formed and the chiefs of each of the committee may be the members of the apex committee. However, this may again lead to a situation in which the elite group of the village may dominate the apex committee and hence should be avoided).

The only limitation in such an approach is that it is very time consuming. However, such an arrangement makes the institutional development more sustainable at the same time ensuring that the concerns of all the communities are duly answered.

4. *Private Benefit & Watershed Policy:*

Another observation during the research relates to people's participation. It was noticed that participation was found to be high only in those villages where the beneficiaries were directly benefited in one way or the other. This was particularly true in the underdeveloped villages.

On the other hand, in an attempt to ensure private benefit, many a time, the very essence of the objectives of the watershed programme is overlooked. What may be privately beneficial may not be good to the environment and *vice versa*. At many places it was observed that the watershed activities have resulted in benefits to the villagers, however the sustained utilisation of the benefits may result in a situation which may not be very different from the pre-project scenario.

Thus, in the ensuing debate between ecology and economy, some midway has to be found out. The poor villagers would not participate in any activity that doesn't bring them personal gains. At the same time, nothing should precede environmental replenishment. Therefore, every project should inculcate both the components and they should be made interrelated.

The mid-way in this imbroglio can be found by ensuring private benefits in at least entry point activities – activities that are vital to the community and with which the community can directly relate themselves to. Such an approach facilitates initiation of collective action among the villagers for undertaking activities that are both important to them as well as relatively simple to implement. This can be followed by persuading them to work together for activities to which they might not directly relate to.

5. *Role of NGOs:*

In the case of IWDP-Hills there was a complete and conspicuous absence of NGOs, either as PIA or as facilitator. Such an approach was followed so that the beneficiaries may take care of their requirements and institutional building was done in the form of formation of VDCs in each of the village. However, in most of the villages it was found that after the completion of the project the VDCs had virtually stopped functioning. The villagers also had shown paucity of interest in the watershed activities

once the direct involvement of the project staff was over, which was very much evident in the unwillingness on the part of the villagers to contribute anything for the repair and maintenance of structures built under the project. Under such a circumstance, where the project gradually withdrew after functioning for a decade and a half, the institutions do require some sort of support. This could be done by bringing in NGOs into the scene. The role of NGOs should remain limited to that of a facilitator. This should be deemed essential for the long term sustenance of the programme.

Towards the end, it may be reiterated that the task of generalisation of the phenomenon called participation is quite an enormous one and many a time almost impossible, particularly in the context of a country like India, where the twin and sometimes overlapping hierarchies of caste and class are omnipresent. At the same time, one needs to question the very process of generalisation. After all, the level of participation in each of the society is deeply embedded in the socio-cultural-politico-economic milieu of that society and needs to be studied and examined in particular context of that society. And this approach should be followed not only with the purpose of research but also with the purpose of project planning, generation of participation and project implementation; the chronological order to be *maintained.*

APPENDICES

APPENDIX – I

FIELD NOTES

1. PAONTA

Dangri Watershed

Name of the VDC	Hill Resource Management Society
VDC formed in	1997
Total Households	12
VDC Membership	11
Caste/s	Rajput
Land Ownership	1 – 3 ha (9); 3 ha < (2)
VDC Composition	Men – 9 Women – 2
Savings of VDC	Rs. 30,000
Caste of VDC President	Rajput
Landownership of VDC President	5.6 ha

Paonta is a small hamlet in the Bhoj Paonta *panchayat* and is located in the midst of Morni hills on the *Paonta ki nadi*. It consists of a dozen Rajput households only and even in terms of land ownership the composition is quite homogeneous inasmuch as most of the households have agricultural land less than 3 hectares, with no landless in the village.

The VDC President Mr. Hari Singh (also the *nambardar* for Bhoj Paonta Pachayat) was quite cooperative and seemed to be a very popular leader in Paonta as well as nearby villages. Although he had never contested any elections, he enjoyed mass support and the villagers readily agreed that he was their leader. Mr. Singh has also taken initiative to constitute an umbrella body for all VDCs in the Kandi region of the state – 'Kandi Chetna Samudaya'. The records and minutes of VDC meetings were very well arranged and even post- IWDP, meetings were held, although irregularly.

The villagers seemed to be very well aware about the programme and its benefits and could recite the structures built and activities undertaken at one go. The women and children zealously showed their new tank and tapped water supply in the village.

The women clan were quite happy as they had ample time in their hand now due to availability of water. Availability of water for irrigation had given a boost to the agricultural economy of the village. Although they were not happy regarding the fact that water was being dammed on the higher reaches (due to which they could get only residual supply) they accepted that it was but natural and nothing can be done about it.

The village seemed to be like a closely knitted family. None of the respondents talked about domination of any kind. Participation under such circumstances was inevitable.

The inhabitants actively participated in all possible terms. Contribution in private fields was to the tune of 25 percent on average while they worked on concessionary wages for work on CPR. Of course one should take into consideration the prevailing unemployment in the region for their active participation as labourers.

The villagers had very well realized the economic benefits of cooperation. The villagers jointly purchased and sold seeds of tomato, chilli and lady's finger due to which everybody got benefited. The VDC in turn also got benefited and it was surprising to note that such a small hamlet had saved more than Rs. 30,000 over half a decade. The women were also active and were successfully running an SHG directed at generating saving habits among women.

However, one common strain of discussion throughout was the fact that the project was wound up prematurely. They reiterated that by the time they realized the benefits of participation the project got over. Now they did not have any external support in the absence of which it would be difficult to sustain themselves for long. Of course, they expressed their willingness to contribute to maintain and repair the structures, as they had brought huge benefits to the village, but hoped to get some external support.

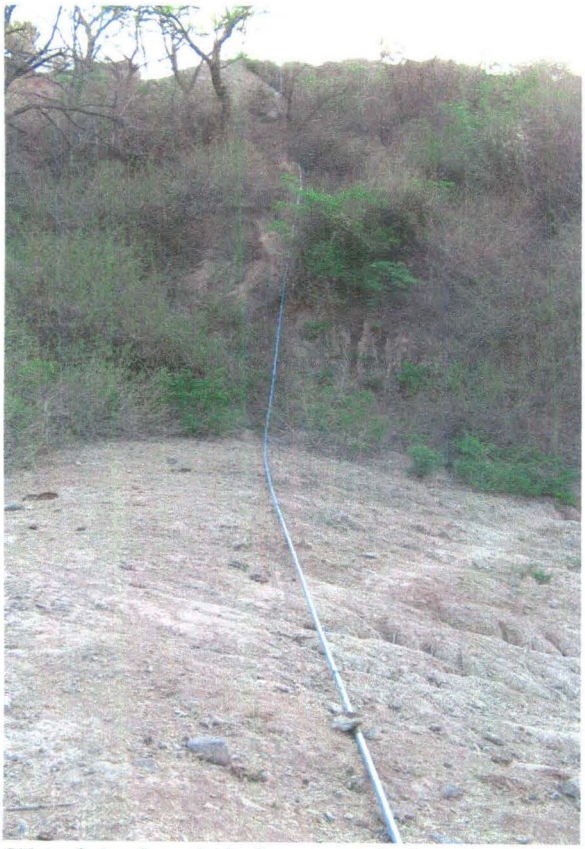
Participants in FGD:

Group – Men Date: May 2 2006 Time: 12:30 PM
No. of Participants: 8
Average Age: 24
Average Land owned: 2.7 ha

2. KATLI

Dangri Watershed

Name of the VDC	Gramin Vikas Sanstha
VDC formed in	2001 (separate in 2004)
Total Households	11
VDC Membership	13
Caste/s	Brahmin
Land Ownership	0.5 – 2.5 ha (11); No landless
VDC Composition	Men – 2 Women – 11
Savings of VDC	Rs. 10,700
Caste of VDC President	Brahmin
Landownership of VDC President	1.2 ha



Water being brought in from reservoir through pipelines

Katli is another small hamlet in Bhoj Paonta panchayat. Earlier VDC for the village was combined with those of Deora and Narwar, however it was separated in 2004. The village was quite underdeveloped but had got immensely benefited due to watershed project. Lack of water for drinking and irrigation was the major problem, both of which were largely solved. Cultivation of onion seeds had become very popular in the village.

The project had also answered the connectivity problems by constructing bridal paths to Bhud, Dhanoda and Plasara and causeways over culverts.

The VDC president Mr. Budh Ram had played a crucial role in getting a separate VDC for his village. He seemed to be politically active and had contested elections for Bhoj Ponta panchayat. His wife was a *panch* now and also chief of a local SHG.

The villagers, particularly women, had shown active participation in all the activities, including the formation of the SHG – directed towards generating savings for unforeseen circumstances or functions (of course it has not been utilized till date and some women expressed their concerns regarding its uselessness). Even in the VDC the women outnumbered the men. The villagers also participated actively in the watershed activities as labourers as it provided them with employment, even though at concessionary wages.

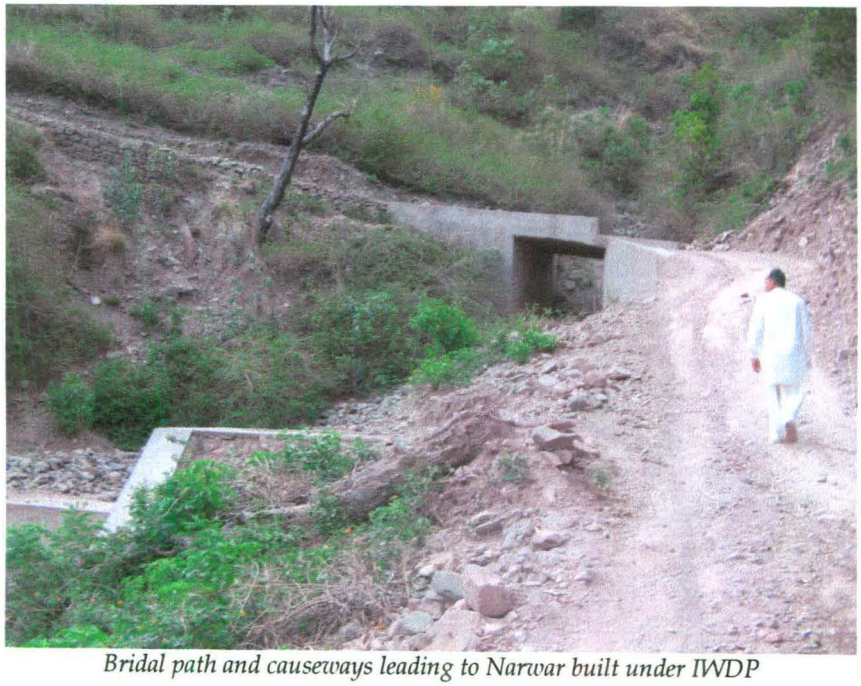
Although the villagers expressed their inability to invest huge amounts for repair works, they were ready to contribute for the purpose to the extent possible. They were even ready to work without wages. However, this was only the last resort and they would do so only if they do not get any support from the government.

3. NARWAR

Dangri Watershed

Name of the VDC	Gram Vikas Sanstha
VDC formed in	2001 (separate in 2004)
Total Households	16
VDC Membership	11
Caste/s	Rajput
Land Ownership	0.5 – 2 ha (16); No landless
VDC Composition	Men – 9 Women – 2
Savings of VDC	Rs. 8000
Caste of VDC President	Rajput
Landownership of VDC President	1.3 ha

Narwar is located on higher slopes of Morni hills and the only way to reach the village was climbing up the slopes through narrow paths, till the project was launched. The construction of bridal paths leading to the village has solved this problem and today one can reach the village on a tractor or jeep.



Bridal path and causeways leading to Narwar built under IWDP

The village has very small patches of agricultural land holdings and mostly terraced farming is practised. Water scarcity was the common problem in these villages. However, the villages pointed unemployment as the biggest problem now; the Kandi

project was a temporary solution. Although the yield level has increased but still it was insufficient to meet their necessities.

The villagers also pointed out lack of prioritization in the project. They stressed that their village was selected in the second phase but its problems were such that it should have been selected almost a decade before. The villagers, as in the other two villages of Bhoj Ponta, were quite vocal in citing their problems and also suggested solutions for their problems.

The VDC president Mr. Om Prakash was quite young and educated. He also seemed to have good knowledge regarding functioning of the project. However, one of the respondents accused him of benefiting his own lands at the cost of others. But rest of the respondents accepted that he was the person who could provide a leadership in the village.

The village had a fair level of participation as almost all the villagers worked in the project as wage labourers and readily contributed 25 percent of their daily earnings, similar to the other two villages surveyed in Bhoj Ponta. An SHG for women was also functioning in the village since 2003 – Monica Swayam Sahayata Samuh – wherein the women of the village deposited a specific amount per month in the bank account and shared the interests.

Name of the VDC	Gram Vikas Sanstha
VDC formed in	2003
Total Households	64
VDC Membership	7
Caste/s	Harijan (24) and Rajput (40)
Land Ownership	Landless (21); < 1 ha (33); 1 – 2.5 ha (10)
VDC Composition	Men – 5 Women – 2; Harijan – 2 Rajput – 5
Savings of VDC	Rs. 7672
Caste of VDC President	Rajput
Landownership of VDC President	2.2 ha

A part of another *bhoj* – Bhoj Plasara, Plasara is a medium sized village with some amount of economic heterogeneity. However, economic heterogeneity is coterminous with caste as almost all the Harijans are landless and work as labourers. They were happy regarding the project as it had provided then with fair amount of regular employment and rued that the winding up of the project had taken away their source of income. They had contributed 25 percent of their wages (or had agreed to take 25 percent less). They agreed that the project had brought in a lot of benefits to the village and even agreed to contribute to maintain the structures through free labour for a few days.

Terraced farming in Plasara

However, one ironical finding was noted during the survey of the landless villagers. The landless were happy that the project had rejuvenated forests and grazing lands *(gochar)*. However, the same had given them an opportunity to enhance open grazing. This portrayed a sheer absence of 'social fencing' in the village.

Caste dominance was definitely visible during the FGDs. There was only one conscious and active Harijan woman – Maya Devi – who has served as sarpanch of Bhoj Plasara. She was bold enough and openly spoke about problems in the village and even dominated the FGD. She denied any caste or economic dominance in the village. However, this was starkly refuted in the other FGDs for Harijan and Rajput women and Harijan household surveys. They agreed that the socio-politico-economic scenario in the village is heavily dominated by the Rajputs, particularly larger farmers.

Although the village had a few functioning SHGs, all of them were caste specific. There was only one SHG for Harijan women, but that again had a Rajput woman as its chief.

The VDC president Mr. Jagdish Singh did not seem to be a very popular leader in the village. Most of the respondents did not consider him as their leader and a few of them named some other person as a better person. The villagers alleged that the VDC members had worked for self-aggrandisement and misappropriation of funds. They also alleged bad prioritization in the selection of villages. They emphasised that those villages where problems were more (like this one) and consequently development cost was also high were neglected initially, while those where development cost was low (like Taparian) due to low level of problems were given preference.

The awareness level regarding the problems, activities under the project and benefits emanating was quite high in the village and through all sections of the society. Further, all the respondents and participants in the FGDs were ready to contribute, to the extent possible, to repair and maintain the structures built under the project.

Participants in FGD:

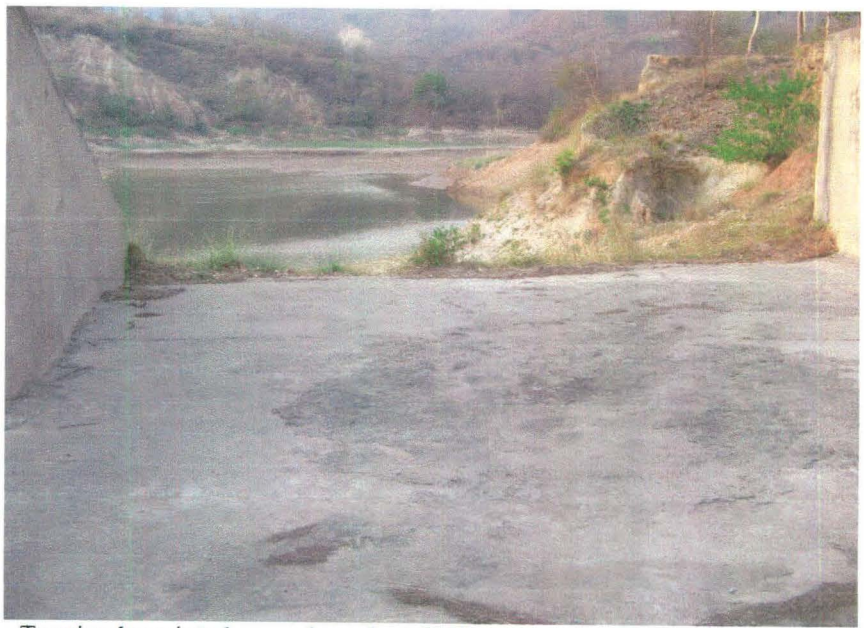
Group – Women Date: May 4 2006 Time: 11:30 AM
No. of Participants: 9
Average Age: 34
Average Land owned: 4.5 ha

5. BHOLIWALA

Nakti Sub-Watershed (Markanda Watershed)

Name of the VDC	Gram Vikas Samiti
VDC formed in	1999
Total Households	40
VDC Membership	11
Caste/s	Gujar (32) and Harijan (8)
Land Ownership	Landless (4); <1 ha (15); 1 – 2 ha (10); 2–3 ha (6); 3< ha (5)
VDC Composition	Men – 7 Women – 4; Gujar– 9 Harijan – 2
Savings of VDC	Rs. 20,000
Caste of VDC President	Gujar
Landownership of VDC President	3.4 ha

Located quite close to the Himachal border, Bholiwala was a sleepy backward village with a series of problems – starting from water scarcity to seasonal cattle and human migration. The 13 seasonal hilly rivulets (*khali*) led to massive soil erosion in the village. However, the Kandi project has metamorphosed the scenario. The highly successful dam built on a major *khali* and plantations on slopes have not only ceased soil ersion but also made regular supply of water. There has been a remarkable increase in the area under plough due to the increased conversion of culturable wasteland. The kharif crop has completely changed from maize to paddy. Seasonal migration (even to far off places like Rurki and Haridwar in Uttaranchal) with cattle has ceased and people have started keeping limited but productive milch bovines rather than herds of bovines.



Turning bane into boon – damming of hilly streams has changed the scenario

On their part, the women folk of the village expressed their happiness they did not have to go to far off places daily to fetch water. They stressed that had the Research Scholar come a few years before he would not have found any man in the village. The men now mostly remained occupied in the field due to increased cropping intensity. There was also an SHG for women; however it was closed recently after functioning successfully for a few years when the women started taking back their shares for household expenditures.

The most remarkable development in the village was found during discussions with the Harijans. Most of them were landless and their condition before the advent of the project was deplorable. However, unlike other villages, where the only benefit the project had brought for the landless was some employment, the landless Harijans of the village had a different reason to celebrate. Due to increase in cultivated area, they could now take culturable land on lease. The sheer joy and pride was evident as till now they were merely identified as labourers.

The last fact mentioned itself is enough to assess the level of participation in the village. Besides, the villagers had also contributed actively and willingly for activities undertaken in private as well as village commons in terms of money, material and labour to the tune of 15 – 25 percent. Thus, participation was obviously at a higher level in the village and the villagers assured of all possible contribution for maintenance and repair works.

Water availability and soil conservation has led to conversion of wastelands into cultivated land

Participants in FGD:

Group – Women Date: May 9 2006 Time: 6:30 PM
No. of Participants: 7
Average Age: 32
Average Land owned: 4.2 ha

6. MIRZAPUR

Nakti Sub-Watershed (Markanda Watershed)

Name of the VDC	Gram Vikas Samiti
VDC formed in	1999
Total Households	132
VDC Membership	13
Caste/s	Balmiki (15); Kumhar (8); .(12); Muslim Gujar (5); Jat Sikh (5); Laban Sikh(15); Ramdasi Sardar (30); Teli Muslim (15); etc.
Land Ownership	Landless (50); <1 ha (10); 1 – 2 ha (20); 2–3 ha (40); 3 ha <(12)
VDC Composition	Men – 11 Women – 2; Balmiki (3); R. Sikh (4); J. Sikh (2); Rest (4)
Savings of VDC	Rs. 10,000
Caste of VDC President	Balmiki (S.C.)
Landownership of VDC President	2.55 ha

Mirzapur is a highly underdeveloped and heterogeneous village having around a dozen castes and equally amorphous land ownership. Land ownership closely follows caste hierarchy with most of the landless belonging to Kumhars, Jhiwars, Balmikis, Ramdasi Sardars, etc. while the Laban Sikh and Jat Sikh are quite prosperous, some of them possessing even 50 hectares of agricultural land. The stark disparity in the economic condition of the villagers was very much evident and caste consciousness was quite high. There also seemed to be a power tussle in the village as the Harijans dominated the VDC while the Sarpanch was a Laban Sikh. The relations between the Laban Sikhs and Balmikis seemed to be particularly sour. The Laban Sikhs alleged that they were never consulted during the project and they were also not happy with the way the VDC was formed.

The villagers allege faults in the construction of check dams in Mirzapur

On the other hand the Harijans and Muslims seemed to be very apprehensive of disclosing any information. Although some of them accepted community domination in the village, the refused to mention who dominated. They also did not mention any particular person as their leader in the village.

Most of the villagers stated that the works carried out in the village was largely in an ad hoc manner. Lack of professionalism was evident in the construction works as they pointed out that most of the structures were poorly built and stopped functioning or got damaged. For instance, no water outlet was provided in the check dams which collapsed due to pressure from water in the rainy season. Further, the pond was not built at the lowest spot, thus it largely remained dry.

Further, the villagers also alleged that the VDC president had worked to benefit only himself. Even a VDC member informed that the VDC kept no records of the money deposited and she was never informed of any meeting.

Nevertheless, one would appreciate the high awareness level in the village. All the villagers – landless and landowners – were quite acquainted with the activities undertaken in the village. However, the contribution of the villagers was minimal and only few rich farmers contributed through some material in their own fields. In fact they claimed that they were also spending to maintain the structures as they had benefited them. Most other respondents refused to contribute anything to maintain or repair the structures.

Participants in FGD:

Group 1 – S.C. (Women) Date: May 11 2006 Time: 11:30 AM	Group 2 (Men) Date: May 11 2006 Time: 5: 00 PM
No. of Participants: 8	No. of Participants: 7
Average Age: 39	Average Age: 45
Average Land owned: Nil	Average Land owned: 16.5 ha

7. FEROZEPUR

Dangri Watershed

Name of the VDC	Village Development Committee
VDC formed in	1999
Total Households	155
VDC Membership	11
Caste/s	Gujar (70); Saini (60); Ramdasi (20); Lohar (3); Jhiwar (2)
Land Ownership	Landless (25); <1 ha (18); 1 – 2 ha (25); 2–3 ha (42); 3 ha <(45)
VDC Composition	Men – 8 Women – 3 Gujar (6); Saini (4); Ramdasi (1)
Savings of VDC	Rs. 526
Caste of VDC President	Gujar
Landownership of VDC President	25.5 ha

Ferozepur appeared to be a very prosperous village, quite close to Raipur Rani, situated only a kilometer from the Raipur Rani – Narayangarh highway. A good number of households possessed tractors and a significant number of bovines. Some households also had cars.

A number of interesting observations can be made regarding the village. The contribution of the villagers in the watershed activities was virtually nil. The villagers simply took the project as just another governmental development scheme and did not participate. All the activities executed in the village had to be fully funded by the project. The village was agriculturally rich and practised rice – wheat cropping pattern. Most of the farmers already had private tubewells. They did face problems during summers as the tubewells went dry and hence, the only benefit they realized was an increase in the water table.

SDDs have arrested soil erosion, enabled field levelling and uplifted groundwater table

Once the benefits were visible, they started exploiting the groundwater through either lowering their existing tubewells or digging new tubewells. This put an enormous pressure on groundwater and after a couple of years the water table subsided – this time to an alarmingly lower level.

Uplift in groundwater table gave a spurt to tubewells due to which water table subsided

There was a noticeable lack of awareness in the village regarding the project. Many respondents simply denied any knowledge regarding the project, however, when informed regarding a few structures constructed in the village they acknowledged that and asserted that they did not know that they were built under the Kandi project.

The Harijan women as well as the poor landless respondents and participants in discussions alleged domination by the higher caste and rich in the village. The Harijans emphasized that they were never consulted before or during the project nor ever they tried to organize themselves. They also denied any attempt by anyone to form an SHG for them. However, when the Research Scholar informed them regarding the benefits and procedure of the formation of SHG, they showed instant interest and even started discussing amongst themselves regarding the matter.

The VDC Pradhan - Mr. Pom Lal – was young, enthusiastic and politically very active. He had successfully contested for the post of sarpanch and his mother was a Zila Parishad member. He had recently taken over the post of VDC pradhan and it seemed that he had found in it an opportunity to remain in public eye.

None of the villagers, as told earlier, had participated in any form in the project related activities and none of them showed any willingness to contribute in the repair works. This anomaly was found despite the fact that most of them had got benefited. That they did not show any interest even after realizing the benefits, exhibited an utter paucity of participation in the village.

Participants in FGD:

Group 1 - S.C. (Women) Date: May 5 2006 5:30 PM	Group 2 (Women) Date: May 5 2006 6:30 PM
No. of Participants: 7	No. of Participants: 7
Average Age: 37	Average Age: 43
Average Land owned: Nil	Average Land owned: 5.5 ha

Name of the VDC	Gram Vikas Samiti
VDC formed in	2000
Total Households	90
VDC Membership	12
Caste/s	Balmiki (5); Brahmin (5) ; Gujar (42); Jat (38)
Land Ownership	Landless(6);<1 ha(34);1–2 ha(20); 2–3 ha(21); 3 ha<(9)
VDC Composition	Men–8 Women–4 Balmiki (1);Brahmin(1); Gujar(4); Jat (6)
Savings of VDC	Rs. 20,000
Caste of VDC President	Jat
Landownership of VDC President	12.5 ha

Todarpur was another developed village, with acute social and economic heterogeneity. The Brahmins and Balmikis were all either landless or marginal farmers and mostly poor. The Jats and Gujars seemed to be at loggerheads against each other in a bid to acquire power, although the former excelled the latter in this regard.

Scarcity of irrigation water and seasonal migration were the two major problems in the village both of which were largely solved now. Moreover, the respondents reported development in NAS by around 70 percent.

The larger farmers belonging to Jat and Gujar castes asserted that the level of participation had been very high in the village and most of the beneficiaries had paid around 15 percent for private land in terms of money / material and 10 percent for CPRs, mostly in terms of labour. They also said that all the decisions were taken after taking all the communities of the village into confidence. The landless were given the charge of the VDC tubewell and were paid Rs. 3 per hour.

However, these claims were bluntly refuted by the marginal farmers, particularly the Balmikis and Brahmins. The latter emphasised that they have always been subjugated by the Jats and Gujars and that they were never ever consulted in the entire process.

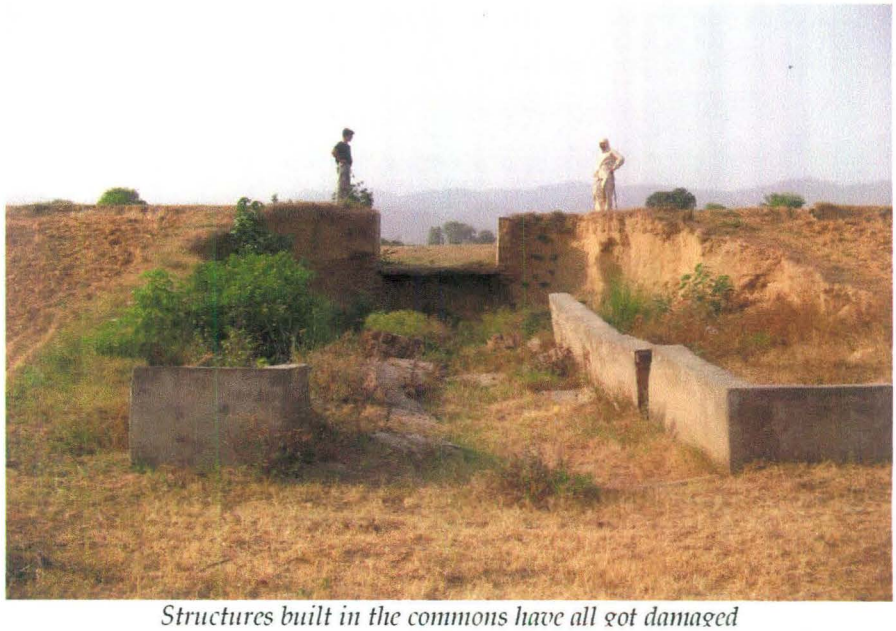
The Balmikis were particularly severe in their assertions. They declined to have benefited in any form by the project as they were not allowed to work as labourers, even at concessionary wages. Even the sole Balmiki member in VDC was inducted merely to complete a formality. The person was never called for meetings nor did he know anything regarding what transpired at the meetings. So was the case with Brahmin member who, the villagers felt, was kept just because he could act as a silent member in the committee.

There was one SHG in the village, however, the Balmikis and the Brahmins alleged that they were never consulted during the process of formation or functioning of the group. They also said that none has ever taken any initiative to form an SHG for them. However, similar to the lines of Ferozepur, when the Research Scholar informed them regarding the mode of formation of an SHG, they showed instant and a lot of interest and kept reiterating that had they been acquainted with the process they would have done it long ago.

Initially, as per the directions of the project officials, irrigation water from the dam was supposed to be distributed equally amongst all the VDC members for 5 hours per day irrespective of the landownership. The smaller farmers could sell off the surplus water to the larger farmers and thus make some earning. Thus the equity issue in terms of benefit distribution could be taken care of. However, the scheme did not work out and a user member had to pay Rs. 15 per hour.

The VDC President Mr. Sarwana was unavailable. Mr. Hari Ram, the Treasurer, was present and had all the documents of VDC. He was quite a dominant person in the village and emphatically stated that he was also the sarpanch of the village. Later the villagers clarified that he had got his daughter – in – law elected as the sarpanch.

Most of the villagers cited the VDC president and treasurer as the most dominant persons in the village. They claimed that the VDC members, sans the Balmikis and Brahmins acted in close connivance and amassed huge fortunes through the project. Most of the beneficiary respondents paid only 10 percent in terms of money, material or labour. Most of such structures were intact and were also bringing in benefits. However, the structures built on common lands had mostly got damaged due to poor construction as well as maintenance.



Structures built in the commons have all got damaged

Even the plantations in the village were done on the culturable wastelands that were private. Productive trees like *sesam, safeda*, etc. had been planted and were taken care of by the project for initial three years and then were transferred to the owner. It was surprising to know that although the owner got productive trees on a land that would have otherwise remained waste he did not pay anything.

All the aforementioned facts portray the village in poor light in terms of participation. There was a tussle of power, subjugation of poor and lower castes and an utter lack of awareness.

All the villagers readily agreed that the project had brought in huge benefits in the village. Still, none of the respondents and participants in discussions agreed to pay anything for its repair and maintenance. Most of them stated that it was the sole duty of the VDC and government to maintain their structures as they had paid their membership fees for the VDC.

Participants in FGD:

Group 1 (S. C.) (Women) Date: May 10 2006 08:30 AM	Group 2 (Women) Date: May 10 2006 4:30 PM
No. of Participants: 7	No. of Participants: 8
Average Age: 32	Average Age: 36
Average Land owned: Nil	Average Land owned: 5.9 ha

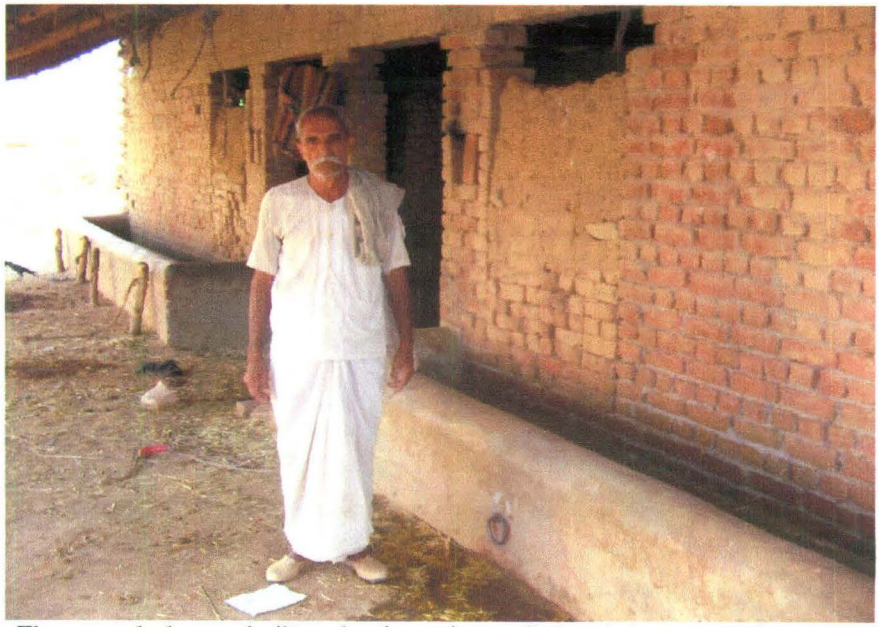
9. GOBINDPUR

Dangri Watershed

Name of the VDC	Village Development Committee
VDC formed in	2001
Total Households	26
VDC Membership	9
Caste/s	Gujar (26)
Land Ownership	Landless(0);<1 ha(11); 1–2 ha (8); 2–3 ha (4); 3 ha <(3)
VDC Composition	Men – 6 Women – 3
Savings of VDC	Rs. 1100
Caste of VDC President	Gujar
Landownership of VDC President	1.6 ha

Located exactly where the first Morni hills start, Gobindpur is a small village with two dozen Gujar households. Soil erosion, water scarcity for irrigation and connectivity were some of the problems that the WDP has solved to a great extent. The village is quite developed, with several households having tractors.

Dairying had been second most important enterprise of the villagers. Some of the households possessed more than 20 cows and buffalos. In order to give a boost to animal husbandry, three cowsheds were built in the village. However, it was amusing to know that all the three cowsheds belonged to three VDC members, out of which one was VDC President. This happened despite the fact that many households possessed more number of bovines than the three. The participants in the FGD expressed their ignorance regarding the fact that the sheds were built under the project.



Three cowsheds were built under the project – all three belong to VDC members (VDC President Mr. Atma Ram seen at his cow shed)

Later several respondents and participants in the discussions revealed that the VDC members had merely worked for their own profit. The VDC President Mr. Atma Ram had been the Sarpanch of Gobindpur panchayat for five years.

There seemed to be power tussle in the village. The current sarpanch's family seemed to have a hostile relationship with Mr. Atma Ram's family. Some of the respondents asserted that some people in the village know only to oppose everything, even when that brings in benefits to the village. This was quite evident even during the village survey. Not only a villager simply refused to talk to the Research Scholar, but also tried to disrupt the ongoing discussions with other villagers.

The larger farmers are always at loggerheads with each other and look for every opportunity to assert their dominance in the village. It was only the marginal farmers in the village who suffered in this imbroglio. All the poor farmers asserted that they were being dominated by the larger farmers.

Another noticeable issue in the village was the water charges for irrigation. The Forest Department had built a dam on *Gobindpur ki Nadi* and they sell water for Rs. 10 per hour. However, there is a huge rush for that and mostly water is not available. Hence, the villagers prefer to rely on the tubewell owned by a contractor who sells water at Rs. 40 per hour. The marginal farmers again suffer here as the input cost becomes too high. They demanded a proportional rate (higher the land ownership higher the rate) to be followed so that the scheme does not benefit only the large farmers.

Paucity of participation was very much visible in the way the project had performed in the village. The contribution of most households was limited to providing labour and that too at full wages. One of the VDC members agreed that the participation was definitely at a lower level in the village and the only reason for the anomaly was groupings and struggle for power and dominance. Whenever somebody in the village took an initiative, the other group smelled self-aggrandisement and stood in protest. This happened even for activities that could benefit the entire village. Very few villagers contributed, and that not more than Rs. 100 – 200.

The villagers agreed that the project had brought immense benefits to the village in terms of arresting soil erosion and increasing connectivity. However, none was ready to contribute anything for repair and maintenance. The marginal farmers stressed on contribution from the contractor and larger farmers as it was they who had retained most of the benefits; the latter passed the buck to the panchayat and VDC.

Participants in FGD:

Group – Men Date: May 7 2006 6:30 PM
No. of Participants: 7
Average Age: 34
Average Land owned: 4 ha

Name of the VDC	Hill Resource Management Society
VDC formed in	1998
Total Households	22
VDC Membership	7
Caste/s	Gujar (22)
Land Ownership	Landless(0);<1 ha(0); 1–2 ha (2); 2–3 ha (16); 3 ha <(4)
VDC Composition	Men – 5 Women – 2
Savings of VDC	Rs. 38, 403
Caste of VDC President	Gujar
Landownership of VDC President	3 ha

Mandpa is a semi-developed village with just over a score of households, homogeneous both in terms of caste as well as landownership. The villagers had shown high awareness from the very initiation of the project. They had realized the benefits of the project and contributed generously for the works executed. Some of the respondents claimed to have spent thousands of rupees for construction of check dams in their own fields as well as for bigger dams.

The remarkable fact regarding the village was that the villagers had realized that the check dams built in somebody's land would benefit the nearby fields as well. Hence, they incurred the expenditure mutually. In a couple of cases, where a particular patch of land was undulating and was aiding erosion in the adjacent fields, the affected farmers levelled the required land jointly. This was quite appreciable as in no other village surveyed such an awareness level as well as cooperation could be found.

Even for selling water for irrigation, the VDC auctioned the operational rights on contract. The contract was given on the conditional charge of Rs. 12 per hour for VDC members, Rs. 25 per hour for non-VDC members and a fine of Rs. 500 for using water without notice.

The VDC records were well kept and it had a unique system of keeping the contribution and expenditure of and on individual members.

Thus the village had set an example in participation. Such a level of participation should ensure the success and sustainability of the watershed project. However, almost all the respondents bluntly refused to contribute anything more for repair and maintenance of the structures. The simple reason for this irony was that the activities carried out in the village did not bring in the desired level of sustained benefits. The

benefits in the village in terms of increase in irrigated water supply were visible only for a couple of years. For the last one year, the reservoirs and ponds were all dry.

Dry reservoirs have infuriated the villagers of Mandpa

The respondents alleged that the project officials had spent a lot of money in the village but did not work efficiently. However, as the Research Scholar found, the reason for failure of the structures was lack of rainfall for the last one year. He had a hard time convincing the villagers that the aim of a watershed project is to utilize the *available resources* in the best possible manner and not *creation* of resources per se.

The VDC president was not available in the village. However, Mr. Ram Pal, the ex-president (2000 – 2004) was available. He was a contractor by profession (also the contractor for tubewell water) and meant business. In fact it seemed that he had left his post in order to acquire the contract of the tubewell. Some of the respondents considered him as the only dominating figure in the village.

Participants in FGD:

Group – Women Date: May 8 2006 08:30 AM
No. of Participants: 7
Average Age: 33
Average Land owned: 3.2 ha

APPENDIX – II

TABLES

Ch. 1 Table: Caste Structure in the Sample Villages

		Gujar	Jat	Muslim	Rajput	Saini	S.C.	Sikh	Others	Total HH
Ponta	0	0	0	0	12	0	0	0	0	12
Katli	11	0	0	0	0	0	0	0	0	11
Narwar	0	0	0	0	16	0	0	0	0	16
Plasara	0	0	0	0	40	0	24	0	0	64
Bholiwala	0	32	0	0	0	0	8	0	0	40
Mirzapur	0	0	0	12	0	0	69	20	31	132
Gobindpur	0	26	0	0	0	0	0	0	0	26
Mandapa	0	22	0	0	0	0	0	0	0	22
Ferozepur	0	70	0	0	0	60	20	0	5	155
Todarpur	5	42	38	0	0	0	5	0	0	90

* Maximum 7 ha

Ch.1 Table: Land Ownership in the Sample Villages

		Less than 1 ha	1 – 2 ha	2 – 3 ha	More than 3 Ha	Total HH
Ponta	0	0	2	8	2	12
Katli	0	0	7	4	0	11
Narwar	0	11	5	0	0	16
Plasara	21	30	6	4	3	64
Bholiwala	4	15	10	6	5	40
Mirzapur	50	10	20	40	12	132
Gobindpur	0	11	8	4	3	26
Mandapa*	0	0	2	16	4	22
Ferozepur	25	18	25	42	45	155
Todarpur	6	34	20	21	9	90

Source: Primary Survey

Ch. 2 Table 1: Values of Selected Indicators for Measuring Levels of Agricultural Development in Haryana (TA 1990)

	Share of NSA in Total Culturable Land (%)	Agricultural Productivity (in Rs. / Ha)	Cropping Intensity (%)	Irrigation Extent (%)	Irrigation Intensity (%)	No. of Tractors/ 1000 Ha Of NSA	Rural Literacy (1991)
Ambala	95.80	17663	160.82	64.99	183.13	39	55.87
Yamunanagar	97.66	21275	150.80	77.31	158.15	54	57.24
Kurukshetra	99.29	22873	183.09	97.05	185.02	62	68.21
Kaithal	100.00	18336	173.02	96.24	168.87	38	77.37
Karnal	99.49	27628	190.31	98.04	188.71	58	62.66
Panipat	98.06	19636	163.78	97.60	165.04	56	63.96
Sonipat	95.80	18814	153.41	93.66	152.83	51	71.82
Rohtak	92.10	11720	132.99	71.02	132.24	44	73.69
Faridabad	99.05	14185	156.23	73.17	195.02	37	38.76
Gurgaon	82.68	11552	156.42	44.69	157.52	30	68.63
Rewari	97.32	13614	151.57	55.34	113.30	26	81.56
Mahendragarh	98.11	11962	162.82	38.31	133.72	11	84.21
Bhiwani	96.53	10101	159.01	38.39	133.28	22	78.01
Jind	91.65	16852	181.19	86.73	169.50	35	74.34
Hisar	91.86	16949	165.09	82.84	172.93	32	68.26
Sirsa	84.32	18053	164.75	81.89	170.54	42	68.79

Source: Census of India & Director of Land Records, Govt. of Haryana

Ch. 2 Table 2: Number and Area covered by Landholdings smaller than 0.5 ha

	No. Less Than 0.5 Ha	Area Below 0.5 Ha
Panchkula	49.94	9.09
Ambala	34.70	4.15
Yamunanagar	28.27	4.65
Sonipat	34.55	7.79
Faridabad	33.88	7.14
Panipat	32.41	5.13
Gurgaon	31.10	5.95
Rohtak	30.52	7.29
Rewari	30.01	4.32
Kaithal	29.45	4.40
Karnal	29.11	3.51
Mahendragarh	28.47	3.61
Kurukshetra	27.27	2.72
Jind	25.94	3.99
Hisar	22.31	2.59
Bhiwani	19.59	2.22
Sirsa	16.69	1.85
HARYANA	27.75	4.06

Figures in percentages. *Source: Agriculture Census, 1995 - 96*

APPENDIX – III

PRIMARY SURVEY SCHEDULES

A. INFORMATION ABOUT VILLAGE

Village _____ Block _____ District _____

Watershed Programme started in _____ Name of VDC _____

1. Total Area of the Village

	Total Area	NAS	Irrigated	Area Sown More than once	Culturable Wasteland	CLPR
Before						
After						

2. Caste / Religion Composition of the Village:

3. Infrastructural facilities

Approach Road	Village Road	Electricity (Agriculture or HH)	Water Supply	Market (Type)

4. Land ownership in the Village:

Landless	< 1 Ha	1- 2 Ha	2-3 Ha	More than 3 ha

4. What is the composition of VDC?

   Sex composition -

   Caste composition –

   Landownership-wise composition –

5. Any other functioning body in the village?

SHGs	Objectives:
User Groups	
Women specific	

Information given by:

4. Agricultural land:

	NAS	Irrigated NAS	Cult Waste	Area sown more than once	Irrigation Source	Fodder
Before						
After						

a) To what extent do you attribute the change to WDP?

_____

b) What has caused the change in irrigation source (if changed)

_____

5. Crops grown

	Kharif	*Yield*	Rabi	*Yield*	Zaid	*Yield*
Before						
After						

Why did you change your cropping pattern?

_____

6. What was the primary benefit observed after the WDP?

_____

_____

7. Did you find any employment due to WDP?

_____

8. How did you contribute to WDP?

CPR : Money _____ Labor _____ Any other _____

Private land: Money _____ Labor _____ Any other _____

9. Would you contribute to the repair work of the structures built? How?

_____

_____

10. Did you ever express your unwillingness? How? Did your opinion get importance in VDC?

_____

_____

11. Which community of the village is stronger in terms of bargaining power?

_____

12. Whom do you feel has the required leadership quality in the village? Why?

_____

_____

13. Do you have trust on the IWDP officials?

_____

13. Does your family participate in any of the following?

	Are you a member?	How many family members participate?	Do female members participate?	How frequently are the meetings organized?	How frequently do you go?	Does your opinion get importance? (Yes–1; No–0; Sometimes–2)
GS	---					
VDC						
Any other						

14. What changes did you expect from the watershed programme before its implementation?

_____

_____

_____

15. How far have these been achieved?

_____

_____

16. Overall, do you feel that the watershed project has been for good? _____

Address of the respondent

Signature

Village:
Block:
District:

C. VDC MEMBER SCHEDULE

1. Name of the VDC _____
2. Name of the VDC Member _____
3. Caste / Religion _____
4. Occupation (Main & Marginal) _____
5. Land ownership:

Land Owned	Land leased in	Land leased out	Land Mort in	Land Mort out

6. Agricultural land:

NAS	Irrigated NAS	Cult Waste	Area sown more than once

7. Crops grown

Kharif	Rabi	Zaid

8. Livestock _____
9. Monthly Income from other sources _____
10. Education Status:
    a. Level of Education (last degree) _____
    b. Place of Education (if educated) _____ Place of last degree _____
11. Information about household members

No. of school going children ____ No. of drop-outs ____ Highest educated member _____

Name	Sex	Age	Educational Status	Main Occupation	Marginal Occupation

12. Whether member in any other body (specify) _____

13. Whether contested elections ever (specify) _____

14. When did you join the VDC? _____ Till when did you serve_____

15. How many meetings were held? VDC _____ GS_____

16. What were the general discussions in VDC meetings?

_____

_____

_____

a) Whether GS influences the functioning of the VDC? _____

b) Whether decisions of VDC required approval of GS? _____

17. a. How many members generally attended the meetings? _____

b. Was attendance limited to a particular community? What was the composition in attendance? _____

18. What were the problems the village faced before the initiation of the programme?

_____

_____

19. What were the main objectives of the programme?

_____

_____

_____

20. How were the objectives decided?

_____

_____

21. Income of VDC (sourcewise)

22. What were the structures / activities taken up under IWDP?

_____

_____

23. Expenditure on private lands. How was it decided?

_____

_____

24. Expenditure on CPRs? How was it decided?

_____

_____

25. What has been the response of the villagers in terms of cost sharing?

_____

_____

26. How was the cost shared for the activities? How was it decided?

Private Land _____

_____

Commons _____

_____

27. Which categories of people are keener in participation?

_____

_____

_____

28. What has been the level of participation in: (Rate on a scale of 10)

CPR	Private Lands	Where cost sharing was high

29. Whether the village has any historical reason for participation? Any other reason?

_____

_____

30. What are the problems you generally face while implementing the programme?

_____

_____

31. How can the level of participation be improved?

_____

_____

_____

Name, Designation, & Address of the Respondent

Signature

Village: Group: Caste:

Cassette No.:
Side:

D. ISSUES FOR FGD

1. Are they aware about the programme?
2. Were they consulted during pre-planning and planning period?
3. Whom do they go to with their problems in the village?
4. How has IWDP benefited the village?
5. How has it benefited you?
6. What is your contribution in the programme?
7. How was the VDC formed? Are you happy with the way it was formed?
8. Are the VDC meetings still conducted? If no, why?
9. Did they feel alienated from the programme?
10. Monitoring/supervision during implementation
11. Did they face any problem during the programme?
12. What was the attitude of other castes? (for socially heterogeneous villages)

13. What was the attitude of villagers from other economic levels? (for economically heterogeneous villages)

14. Do you feel that the benefits were uniformly distributed?

15. How would you undertake repair works for the structures?

16. Suggestions for improvement of programme

Members Present:

S.No.	Name	Age	Caste	Land Ownership	Signature
1					
2					
3					
4					
5					
6					

Date:

Time:

APPENDIX – IV

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