CHAPTER–I

INTRODUCTION

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1.0 INTRODUCTION:

This first introductory chapter is designed to understand the notion of 'watershed development', the concept of 'sustainable development' and to suggest that encouraging watershed development by eliciting community participation with initiative and involvement of NGOs can be one way to move towards achievement of goals of sustainable development. Let us first understand the concept of watershed development.

1.1 THE WATERSHED DEVELOPMENT:

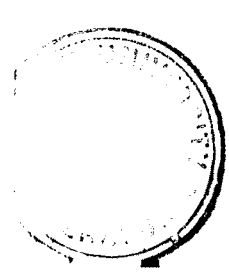
G. Krishna Murthy notes that, "all the primary natural resources like water and soil need to be managed judiciously. The water on the earth is a fixed amount. ------ scarcity of water has become a serious problem in many parts of the country, water logging is also a problem in some areas. Over exploitation and mismanagement of land and water resources adversely affects the present and future of mankind. In 1994, the FAO (UN) theme was 'Water for Life', to focus world attention on the need for watershed management to sustain food production and quality of life. Water covers more than two thirds of world surface. Of

all the water, 94% are in the oceans and around 6% in underground locations and only 0.02% in glaciers, lake, rivers, soil and atmospheric vapour. Human life is critically dependent on this inland and underground water [G. Krishna Murthy, 1998:38]. Further, regarding watershed he observes, "the conservation of water at a common point is called watershed. It is a geo-hydrological unit or a piece of land that drains at a common point. This natural unit is evolved through the interaction of rainwater with landmass and typically comprises of arable lands (cultivable lands), non-arable lands (non-cultivable lands) and natural drainage lines in rainfed areas. Sustainable production depends on health, vitality and purity of production, of which land and water are important constituents. Therefore, for scientific utilization of the natural resource base of land and water, the ideal geographical unit (from what was earlier geo-hydrological unit) would be the product of the interaction of rain with land i.e., watershed" [Ibid: 1998:38].

About 'watershed management' Ansari notes that the "watershed management involves a combination of practices, which cover agricultural, irrigation, forestry and engineering measures to achieve certain objectives of land and water management, on a sub-regional (watershed) basis. The objective could be prevention of flood/sedimentation/land slide/water logging or conservation of water. Construction of percolation tanks and check dams to conserve water and

other flood routing structure such as dams, dykes or weirs are some of the structural measures. Prevention of water logging and effective waste disposal measures are necessary to avoid deterioration of land and water quality. Needless detailed to say, comprehensive watershed management requires information of land use and hydrology of the area" [A.A. Ansari, 1998:116].

About the philosophy of watershed management Ratna Reddy has noted that, "the watershed development is associated more with technology, watershed management is more of a philosophy. While the success of watershed development as a technology is well established, the philosophy of watershed management is proving to be the main bottleneck for the widespread success of programme. Watersheds have been studied from various perspectives such as economic efficiency of water use and investments, food, run-off, soil erosion, sedimentation, ground-water recharge, socio-political dimensions. Understanding the interactions between land, water and people is equally important in studying watersheds. Therefore, watershed management is more than just the cost-benefit analysis of investments. The main distinction between watershed development and former is essentially a community-based one. Given the nature of the technology, watershed development requires large areas cutting across households and even entire villages for its adoption. Hence, it's adoption and success critically hinge upon



inter as well as intra village cooperation. In other words, collective participation and action is a critical ingredient of watershed management. This throws up a wide range of issues, such as social organization and property rights that need a careful scrutiny in order to sustain the programme. The problem of property rights arises when dealing with the treatment of common lands. Another distinctive feature of watershed technology is its relatively long gestation period. Farmers have to wait for 5-7 years to reap the benefits. This aspect further makes watershed management difficult" [Ratna Reddy, 2000:3436].

The author further notes, "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. Hitherto the 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 that "peoples participation is a must to sustainable watershed development/management" few have attempted to analyse and understand the process of collective action, either theoretically or empirically. As a result, peoples participation in watershed management' has remained cursory even in policy formulations and the consequent low adoption (success) rates" [Ibid: 3436].

WATERSHED METHODS:

G. Krishna Murthy says following things about watershed development methods: "-------- water is the most critical input for increasing the biomass yield of trees, like in agriculture. With adequate irrigation, the biomass yield can increase by 300-400%. Therefore, maximum efforts should be made of making optimum use of the available water resources. Most of the wastelands, except marshy, saline and 'user' lands, suffer from water scarcity. In these areas, the first priority should be given to harvesting of maximum quantity of rainwater through watershed development, plugging of gullies and rivulets to check the run-off water. The concept of watershed development involves contour binding, contour cultivation, training the waterways to reduce the flow of water and to prevent soil erosion. G. Krishna Murthy has explained these concepts as under:

i) Contour Survey:

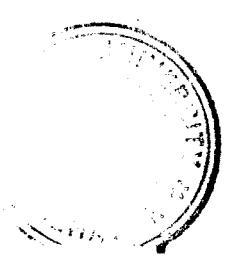
Most of the watersheds are undulated. It is necessary to map the land topography by conducting a survey and preparing a contour map. A contour map indicates the direction of the run-off water flow in the field. This also helps in locating the site for building percolation tanks, preparing contour bunds and dividing the field into small plots.

ii) Contour Bunding:

These are the bunds running along the same elevation, across the slope. These bunds can be long or short, depending on the slope of the field. If the bunds are short, they can be called staggered bunds.

In case the field has a gentle slope in only one direction, continuous, long contour bunds can be constructed. In hilly terrains with sharp gullies, there is limited slope for long contour bunds. In such areas, staggered trench-cum-bunds can be developed on wastelands where interspace is not suitable for cultivation. Staggered bunds are of 20-30 cm will be dug along the same contour, leaving a gap of 2-25 m between two trenches. The soil dug out from each trench will be used to form a bund, parallel to the trench, at the lower side, keeping a distance of 10-15 cm from the trench. While digging the trenches in the next contour, the position of the trenches will be adjusted in such a way that each trench will be located exactly below the gap of the previous contour line.

Under the system, the rainwater flowing from a higher elevation will be accumulated in the trench. With water, silt eroding from the top will also be deposited in the trenches. Once the trenches are filled, the surplus water will flow from both sides of the staggered trench-cum-bund without causing any damage. This water is then collected in the next trench, located alternatively below the top row of trenches. In case



of long continuous bunds, surplus water has to flow over the bund, which often causes soil erosion. The damage to contour bond may increase further, when proper level is not maintained all along the bund while constructing it. Contour bunding will help in retaining maximum rainwater with the field. In addition to these bunds, percolation tanks and farm ponds can also be created to store the rainwater.

iii) Gully Plugging:

The ideal method of water resource development is to build check bunds on nalhas and gullies to store run-off water within the field. Normally, only about 20-30% of the rainwater percolates into the soil and the remaining water runs off, eroding fertile soils as well.

By developing contour bunds and opening furrows across the slope, the rate of rainwater percolation can be doubled easily. The drained water can be restored at the lower portion of the fields by bulding tanks or digging farm ponds. It is difficult to store water for a long time through such gully plugging, but it helps in recharging the ground water and supporting farm ponds or percolating tanks dug at lower elevations.

iv) Percolation Tanks:

Percolation tanks are generally built by erecting a bund across a nallah or a main gully where water storage capacity is high, and water is retained for a longer period. In low rainfall areas, earthen bunds can be

built and the earthen surface of this bund can be pitched with grasses and stones. A spillway should be provided adjacent to the bund to let out surplus water from the tank. The level of the spillway should be sufficiently lower (about 1m) than the height of the earthen bund to prevent the flow of surplus water over the bund, and to avoid breaching. Development of percolation tanks should be an important activity under the government sponsored "Employment Guarantee Scheme" or "Jawahar Rojagar Yojana" to make best use of the rainwater for increasing the biomass production and to improve the ground water level of the area. The common practice is to dig open wells in the downstream of percolation tanks, instead of directly pumping from the tank.

In heavy rainfall areas, the nalhas flood quite frequently during monsoon. For such nalhas, masonry construction with floodgates is ideal, through expensive. Another cheap method is to construct temporary bunds across the rivulets every year, after the mid-monsoon season by laying gunny bags filled with sand. In such tanks, water can be retained almost till the end of summer. Before these bunds wash away during the rainy season, the sandbags can be removed for clearing the waterway of the nalhas and the soil can be used for nursery or other purposes" [Krishna Murthy G, 1998:41].

While commenting on the watershed development programmes in India, Rao (2000) notes that, "as an official programme, watershed

development is over three decades old in India. It has undergone periodic reviews by expert committees with a view to improving upon its strategy and components. One such committee had the benefit of studying and learning from the already existing cases of outstanding success in watershed development such as Sukhomajiri, Ralegaon Sidhi, Adgaon, certain tribal areas of Panchmahal, Mittemari and Jhabua, to mention only a few. Learning from these and other success stories, the Technical Committee recommended planning on watershed basis through the participation of the people at all stages, active involvement of voluntary organizations and co-ordinated effort resulting in convergence of treatment by the concerned government department " [C. H. Hanumantha Rao, 2000:3943]. "In 1986, National Watershed Development programme was launched for rainfed areas in 16 states" [Ratna V. Reddy, 2000: 3435].

About strategy of watershed development Hunumantha Rao, notes that, " the present strategy of watershed development is prompted by the need to protect the inhabitants of the fragile eco-systems from acute distress caused by recurring droughts. In this sense, it is a strategy for survival, even though in quite a few cases the successful implementation of the watershed development programme has led to a substantial increase in income and employment for the people. Even the in many cases of outstanding success pioneered by the eminent NGOs reveal that such

efforts were originally driven by acute distress caused by recurring droughts. Indeed, the overwhelming response from the people to the initiatives taken by the NGOs is explained by the misery to which they were subjected" [C. H. Hanumantha Rao, 2000:3943].

C. T. Pawar writes about the concept of watershed development: "watershed development refers to the conservation, regeneration and the judicious use of natural resources including land, water, plants and animals within a watershed. Watershed is a basin or catchment area of a stream or river. It is the area from where the water to a river or stream comes from. The main goal of watershed approach is to keep the water where it falls, instead of letting it run unused at the same time carrying away fertile soil. It also offers an eco-friendly way that is both cheap and effective in arresting and indeed reversing the degradation of our natural resources. Fresh water is a major resource that sustains life on the earth. Any subsistence based economy functions on the basis of the availability and accessibility of usable water resources in the region. These twin conditions determine the resource use pattern and its consequential impact on the inhabitants. In fact water is a social treasure that must be protected at all levels by the Government and community as well" [Pawar, C.T: 2003:85].

About the community participation Kolvalli and Kerr have noted that, it "is gaining acceptance among policy-makers in India as an

essential aspect of managing natural resources. This belated recognition is reflected in the government of India's (GOI) somewhat half hearted initiatives to facilitate community management of forests, and consider a larger role for users in the management of irrigation systems. Participatory approaches are recommended even for agricultural research, hitherto considered the exclusive domain of scientists. Fundamental changes, more drastic than in other sectors, are being attempted to increase community participation in watershed development. The common guidelines for implementing the projects supported by the ministry of rural development (MORD), the major source of funds for watershed development in the country, require community participation. The district administrations, which receive the funds from the ministry, are encouraged to use non-government organizations (NGOs) to implement the projects. The guidelines give the communities substantial freedom to decide how to use the money. Most significantly, the funds are placed under the control of watershed organizations. This is a major departure from the way the government usually works. Recently the ministry of agriculture (MOA) agreed to join the MORD in using the common guidelines for watershed development" [Kolavalli and kerr, 2002:225].

1.2 THE CONCEPT OF SUSTAINABLE DEVELOPMENT:

About the sustainable development S.A Salunkhe (2003) notes that, " in the last four decades, there is a growing awareness and activism relating to worsening environmental situation at the local, national and global level. The emerging environmental concerns have once again led to the reconsideration of our conception, goals and strategies of 'development'. As a result of this, our conception of development has experienced a paradigm-shift and this has its expression in the concept of "sustainable development", which emerged in the 1980s and continues to dominate the development-discourse at various levels.

In the year 1981, the concept of 'sustainable development' appeared for the first time. It was enshrined in the title of a key document of the 1980s – World Conservation Strategy: Living Resource Conservation for Sustainable Development, published by the International Union for Conservation of Nature and Natural Resources (IUCN), the World Wildlife Fund (WWF) and UN Environment Programme (UNEP) (Starke, 1990:8-9). According to the Strategy's definition, 'for development to be sustainable it must take account of social and ecological factors, as well as economic ones; of the living and non-living resource base; and of the long term as well as the short term advantages and disadvantages of alternative actions'.

In 1983, the United Nations set up the World Commission on Environment and Development (WCED) headed by Gro Harlem Brundtland, Prime Minister of Norway, as an independent body. Its objective was to re-examine the critical environment and development problems on the planet and to formulate realistic proposals to solve them, and to ensure that human progress will be sustained through development without bankrupting the resources of the future generations. The WCED published its report titled, Our Common Future in the year 1987.This report presented the first official definition of the concept of 'sustainable development' which still continues to dominate the discourse on environment and development at the national and international levels.

The definition of the concept of Sustainable Development put forward in the report titled Our Common Future (1987) is: "Sustainable development is development that meets the needs of the present without compromising the

ability of future generations to meet their own needs. It contains within it two key concepts:

- the concept of "needs", in particular the essential needs of the world's poor, to which overriding priority should be given; and

- the idea of limitations imposed by the state of technology and social organization on the environment's ability to meet present and future needs"[Science Age, 1987:30].

In the words of the report, 'development involves a progressive transformation of the economy and society. A development path that is sustainable in a physical sense could theoretically be pursued even in a rigid social and political setting. But physical sustainability cannot be secured unless development policies pay attention to such considerations as changes in access to resources and in the distribution of costs and benefits. Even the narrow notion of physical sustainability implies a concern for social equity between generations, a concern that must logically be extended to equity within each generation"[Ibid: 30].

For a better understanding of the concept, some of the important requirements of sustainable development, noted in the report, can be highlighted: 'Sustainable development requires meeting the basic needs of all and extending to all the opportunity to satisfy their aspirations for a better life.....the promotion of values that encourage consumption standards that are within the bounds of the ecologically possible and to which all can reasonably aspire.....that societies meet human needs both by increasing productive potential and by ensuring equitable opportunities for all..... demographic developments are in harmony with the changing productive potential of the ecosystem.....at a

minimum, ...development must not endanger the natural systems that support life on Earth: the atmosphere, the waters, the soils, and the living beings.....the world must ensure equitable access to the constrained resource and reorient technological efforts to relieve the pressure.....that the rate of depletion of non-renewable resources should foreclose as few future options as possible.....the conservation of plant and animal species..... that the adverse impacts on the quality of air, water, and other natural elements are minimized so as to sustain the ecosystem's overall integrity" [Ibid :30-31].

Further, it is also added that, 'in essence, sustainable development is a process of change in which the exploitation of resources, the direction of investments, the orientation of technological development, and institutional change are all in harmony and enhance both current and future potential to meet human needs and aspirations" [Ibid: 31].

To move on to the path of sustainable development all the nations are required to bring about certain policy changes. It has been noted that, the 'critical objectives for environment and development policies that follow from the concept of sustainable development include:

- reviving growth;
- changing the quality of growth;
- meeting essential needs for jobs, food, energy, water, and sanitation;
- ensuring a sustainable level of population;

- conserving and enhancing the resource base;
- reorienting technology and managing the risk; and
- merging environment and economics in decision making" [Ibid: 32].

Regarding suitable strategy, the report notes, 'in its broadest sense, the strategy for sustainable development aims to promote harmony among human beings and between humanity and nature. In the specific context of the development and environment. ...the pursuit of sustainable development requires:

- a political system that secures effective citizen participation in decision making,
- an economic system that is able to generate surpluses and technical knowledge on a self-reliant and sustained basis,
- a social system that provides for solutions of the tensions arising from disharmonious development,
- a production system that respects the obligation to preserve the ecological base for development,
- a technological system that can search continuously for new solutions,
- an international system that fosters sustainable patterns of trade and finance, and

- an administrative system that is flexible and has the capacity for self-correction.

These requirements are more in the nature of goals that should underlie national and international action on development" [Ibid: 38].

1.3 TOWARDS SUSTAINABLE DEVELOPMENT: WATERSHED DEVELOPMENT WITH INITIATIVE AND INVOLVEMENT OF NGOs.

About the watershed development and management K.C Ramotra notes that, "the 'watershed development and management' is a holistic approach aimed to maintain geo-ecological balance and increasing productivity from dry land farming and harmonising ecology, economy and equity. The main objectives of the watershed management are the utility of land in accordance with its suitability, increasing and covering land with vegetation, harvesting and conservation of rainwater, minimisation of soil erosion by constructing check dams, terrace bunding and contour bunding at suitable intervals, recharging ground water by constructing percolation tanks, optimisation of land productivity, increasing cropping intensity, safe and productive use of marginal lands, afforestation and ensuring sustainability of geo-ecosystem benefiting society, flora and fauna and water complex in the watershed.

About the sustainable development and watershed development he further says that, "the drought-prone/dry land areas can benefit from sustainable agricultural approaches because conservation of soil and water constitute the basis of sustainable farming without degrading the environment. For this, mixed farming, use of organic manure, appropriate land, land preparation methods, inter and multi-cropping, rotation, composing, mulching, agro-forestry and many more other techniques that are suitable to improve the soils and enhance the security production should be considered. The rural development should be the objective to achieve but through sustainable agriculture. The sustainable development is that, which meets the needs of the present generation without sacrificing the welfare of the future. The sustainable agriculture should be ecologically sound, economically viable, socially just, humane and adaptable" [Ibid:]

About the role of NGOs in watershed development Lakshmikanthamma says, "in recent years, Non-Government Organisations' (NGOs) involvement in economic development, especially in rural development, is being emphasized by development experts and academicians. The NGOs intervention in development process started gaining importance in India, when there is a general dissatisfaction with state intervention in developmental activities. NGOs role in agricultural development as promoters of peoples' organization

started gaining importance since 1970's and national and international funding for voluntary agencies started increasing substantially in 1980's. [Lakshmikanthamma: 2000:234].

Kishore Saint notes that, "the promotion of micro-watershed planning and management and support to local communities for this purpose is one specific aspect of this effort. This too is a well-known approach, which has been tried at various places under various schemes of government, e.g., Drought Prone Area Programme. However, these have not made much headway because they have been unable to mobilise people's participation and self-management. The only exceptions are those where a special taskforce and /or a locally based voluntary organisation has become involved as a support agency, e.g., SPWD in Sukhomajiri, AFPRO in Devpimplegaon and Gokul Prakalp Pratishthan in Vilye, Ratnagiri. It is this specific role of voluntary organizations in micro-watershed management that holds the potential for making this work a people's movement for protection and regeneration of their primary productive assets, viz., land, water and vegetation" [Kishore Saint, 1989:20].

About the management of small-scale watersheds J.Soussan, and V. Ratna note that "the management of small-scale watersheds in India has a long history, with many traditional village-based systems that were integral to the livelihoods of rural communities. These traditional

systems have often broken down and tended not to be recognized until recently, with the 'modern' era of watersheds development emerging in the last 40 years to be the main approach to improving land and water management particularly by, several semi-arid parts of the country "[J.Soussan, V.Ratna Reddy: 2003:25].

They have further noted that "this approach has had many successes; the severe degradation of land and water resources has been halted and even reversed in many semi-arid areas and clear gains seen in terms of agricultural production, labour demand, migration and income in rural communities where watershed development has been implemented" [Ibid: 25].

About the impact of watershed development programme Kanchan Chopra says, "increasing production in rainfed areas through conventional watershed management and watershed management with institutional change. This is undoubtedly a slow process. However, adoption of the 1994 Guidelines for watershed development gave the process some headway in an evaluation, comments, the overall impact of the programme has been positive and significant when compared to period before the implementation of the guidelines. Further, the National Water Policy of 2002 adopts the conservation of water within catchments as one of its guiding principles" [Kanchan Chopra, 2003:3365].

T. Shah, C. Scott, Buechler have noted that, "the new water policy adopted by the government of India in 2002 has received a mixed response. The NGO community has been critical about several aspects; they would like water rights to be vested in communities instead of some abstract notion of the Indian 'state', they would also like the emphasis to shift from mega projects to small-scale systems, from management of 'blue water' to rain-water harvesting and soil-moisture management, and from government control to community control" [T, Shah, C, Scott, Buechler, 2004:361].

The point, which we would like to emphasize here, is that, watershed development itself is a programme, which can significantly contribute to the sustainable development of rural areas. However, for implementation of watershed development programmes, efforts of only governmental agencies will not be sufficient. Such programmes require effective people's participation. People's participation can not be taken for granted. Some non-governmental organizations are required organize people, to convince people about such programmes and to motivate them to participate in these programmes. Therefore, the role of NGOs may be considered as necessary for sustainable development especially in rural areas.

In this chapter we have seen various facets of concept of watershed development and watershed management. We have also seen

the concept of sustainable development. Finally, we have noted the significance of watershed development in the context of sustainable agricultural development and the importance of involvement of NGOs in this process. Against this background, the next chapter attempts to present a review of relevant literature based on the empirical studies and elaborates the methodological procedures adopted for the present study.

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