



Cover Page



IMPLEMENTATION OF RURAL DEVELOPMENT PROGRAMMES – A STUDY ON WATER SHED MANAGEMENT IN MAHABUBNAGAR DISTRICT

Mahender Reddy Seri

Faculty

Department of Economics, Government Degree College

Tandur, Vikarabad District, Telangana, India

Abstract

Watershed Management programme was initially taken up has river valley projects. The watershed management programme is as old as the concept of crops grown under the irrigated conditions and this concept led to construction of tanks for increasing production to meet the demands of ever growing population since ages. Only government departments were involved in these projects initially and macro level approach was adopted in initial days. Because of severe drought and depletion of natural resources rural agricultural production was reduced from then onwards micro level concept of watershed programme was introduced. For the first time in Andhra Pradesh the micro level concept of watershed programme was introduced with World Bank funding with the involvement of Project Implementation Agency, Watershed Association, Watershed Development Team, multi-Disciplinary Team, Self Help Group etc., at gross root level. This research article to be discussed Implement of Watershed Management Programmes in Mahabubnagar District.

Keywords: Rural Development, Water Protection Policy, Rural Economy, Water Shed Development, Water Shed Management, Social Consciousness.

Introduction

“No Water, No life, No Blue, No green”

Sylvia Earlie

A familiar American Philosopher and Writer

Rural Development strategy can be defined as a set of goals, operation processes, terminal objectives and structural arrangements designed to bring about change and development in the lives of the rural people. A typical rural development strategy is defined as one "that achieves desired increase in farm output at minimum costs, makes possible widespread improvements in the welfare of the rural population, contributes to the transformation of a predominant agrarian economy, and facilitates a broader process of social modernization". Rural development strategies, therefore, outline the processes that lead to rise in the capacity of the rural people to control their lives and environment, accompanied by wider distribution of benefits resulting from such control. Rural development strategies are also viewed as 'strategic intervention': in the rural economy through change in production and pricing, fiscal, monetary and credit policies; in the rural institutions directed toward the creation of favourable changes in the rural infrastructure; in the social structure by bringing about change in property relationships, distribution of rights and privileges by different rural classes; in the power and authority structure at various levels; and in the cultural matters, in ideas and beliefs about nature, man and society.

In a typical Third World country, rural development strategies result from a complex decision-making process having various external and internal constraints. Effectiveness of rural development strategy is, therefore, determined by the extent to which it integrates a variety of activities in the field in which it operates, aiming at creating or maintaining a certain set of conditions for the future. Thus, in understanding a rural development strategy, one has to determine to what extent it is well articulated, free from internal and external inconsistency, and autonomous of immediate circumstances, and to what extent it lacks these characteristics.

In his updated and enlarged edition of his classic study, Maheshwari first discusses the conceptual, historical, and constitutional background of rural development, placing it within a holistic framework. He then evaluates the major rural development programs implemented since Independence and examines their strategies and the impact they have had. In addition, major issues such as rural credit, land reform, rural unrest, and rural technology are comprehensively discussed. In conclusion, this well-documented work critically examines policy assumptions and suggests viable policy options for the future.

Rural development as part of social change is defined here as a process of expanding the decision-making horizon and extending the time frame for appraising investment and consumption choices by rural disadvantaged people collectively, and not necessarily at the village level but at even higher levels of aggregation. Sustainable processes will require correspondence between



Cover Page



people's access to resources, ability to convert access into investments (that is, skills for using resources), and assurance of future returns from present investment (vertical assurance) and about others' behaviour vis-a-vis one's own (horizontal assurance or collective rationality). The changes in the network of access, ability, and assurance for the people have to be achieved simultaneously.

These new guidelines have increased investment levels and promote programmes to benefit landless people; but they do not guarantee that the new programme-based top-down approaches will be successful. People's participation is largely stuck in the "you will participate in the programme" mode, and project sustainability is questionable even after two decades of experience in watershed management. The resulting lack of community ownership has meant that the investments in rural development and natural resource regeneration have mostly only realized Proceedings of the Asian Regional Workshop on Watershed Management short-term benefits. India's large investments in rural development have not produced a matching transformation on the ground. Investment thrusts in recent watershed development programmes are trying to reverse the inefficient use of resources in many integrated rural development programmes.

Public Policy and Water Shed Management

Watershed management needs to take a multipurpose approach to improving land and increasing water availability for crop growing, livestock and human use through soil and moisture conservation measures. An effective watershed project should aim to drought-proof areas by capturing every falling raindrop. This is technically possible. An assessment by the Centre for Science and Environment estimates that if half of India's average annual rainfall of 1170 mm were captured over 1.12 ha of land in each of the country's 587 226 villages, then the 6.57 million litres of rainwater thus collected would meet the annual cooking and drinking needs for an average village of 1200 people. Doing this would help both to sustain surface water supplies and to recharge aquifers.

However, the National Sample Survey reported that despite the extensive programmes carried out to provide drinking-water to rural areas, 140 975 villages (24 percent of India's total) still had a drinking-water problem. Even the watershed development programmes set up to complement the drinking-water programmes in villages did not improve the situation. As a result, much of the 420-billion-hectare metres (mham) of average annual available precipitation flowed uninterrupted to the sea without fulfilling its ecological functions of enhancing surface water supplies and recharging groundwater to any appreciable extent. The experiences of watershed development projects have been quite varied. The few successful projects are outnumbered by the many unsuccessful ones. There are situations where some successful watershed projects have not even provided for the minimum amounts of drinking-water and fodder. Many watershed projects, designed to conserve rainwater to improve irrigation, have tended to ignore communities' primary need of access to drinking water.

On similar lines, some projects have neglected to develop pastureland and propagate soil-moisture conservation practices. Between 1994 and 1999, about 10000 watershed projects went ahead in India. This large number reflects the coverage and the amount of resources being pumped in to watershed development. Although watershed programmes are one of the largest types of investment in integrated rural development, there is no central coordination unit to provide information on the actual number of watershed projects in India at any given time.

Concept of Water Shed Development

The two main problems of watershed development programmes have been the lack of any consistent criteria for selecting villages and the process of implementation. This raises several management-related questions. The poor performance of many watershed projects has not reduced the number of new projects. Andhra Pradesh has taken up an additional 2090 projects to treat 1 million ha since the November 2000 revised guidelines were issued. Typically, each watershed project is restricted to an area of 500 ha. Bilateral- and multilateral-funded projects usually cover many such subprojects.

For instance, the World Bank's Kandi Watershed Area Development Project in Haryana covers 619 separate watershed projects. One of the most intractable problems in watershed development has been the lack of project sustainability. Many projects have failed to build in strategies to maintain their assets once project support ends. Feedback from several projects indicates that many farmers only benefit from watershed projects by getting short-term paid labouring work. Because communities see few long-term benefits emanating from these projects, they have little interest in operating and maintaining project assets. This issue is being confronted by some donors in their projects.

Many watershed projects have failed in their primary objective of arresting land degradation. One study indicates that the rate of land degradation in rainfed areas in the 1990s is likely to have been more than twice the rate in the 1980s, largely because of increased soil erosion. At the other extreme, many projects have failed because the guidelines provided a pattern of uniform treatments



Cover Page



across diverse agro-ecological conditions, leading to a less than desired impact. The continued lack of drinking- and irrigation water in several Indian states shows that drought proofing interventions have failed to stop land degradation in rural areas and have failed to improve rainfed agriculture and the availability of drinking water.

Approaches of Water Shed Management

The concept of watershed approach in soil and water conservation measures attained importance in the recent past in view of its positive impact. The approach is based on people's participation and accruing benefits to wider number of stakeholders. In fact, the watershed approach, after series of public policy changes, has the following important components:

- i. participatory planning
- ii. participatory implementation
- iii. participation of local self-governance institutions
- iv. Participation of community-based institutions.

Effective operation of these components is quite essential to ensure success of a watershed project taken up. However, as pointed out by many a research study conducted, many of these watershed projects are not yielding appropriate results. Especially, the post phase of watershed project is quite important in sustaining the results, wherein people's participation is an important factor. This in context, the public policy under vogue in reference to watershed projects, the quality of people's participation etc. play vital role in ensuring success of the same. Another important aspect that governs the people's participation is the equity aspect i.e., access to benefits by all the stakeholders. Unless these things are not ensured the success of a watershed project is bound to failure. On the other hand, the issues of participatory planning, participatory implementation, and involvement of grassroot institutions always involve wide range of social and economic issues. In other words, the process of watershed development projects involves wide range of issues that evolve around the social and economic conditions prevailing in the project area concerned. The intricacy of these issues determines either success or failure of the project concerned.

As such the public policy required to take into consideration all these issues while designing the policy concerned. This in background, the study of watershed development projects is always assumed importance as they provide various insights on the policy and implementation linkages. Study of the watershed development projects also provides an opportunity to understand the implications of the policy under vogue. Further, the study of watershed development projects provides new insights that may be essential to take care of while shaping the new public policy. Thus, the study of watershed development projects in reference to public policy in vogue and its repercussions etc. is quite an important not only to understand the relation between the public policy and the implementation process but also the remedial measures which need to be taken care of while ensuing success of the watershed development projects.

Profile of Mahabubnagar District

The profile of the district is presented in two sub-sections. Sub-section A deals with general profile of the district and the sub-section B deals with statistical profile on important aspects like irrigation, agriculture, public finances, industries etc. Mahabubnagar was a southern district of Hyderabad state under Nizam rule. Today, it is an important district of Andhra Pradesh bordered with River Krishna in the south and surrounded by the Nalgonda, Ranga Reddy, Kurnool, Guntur Districts of Andhra Pradesh, Raichur and Gulbarga districts of Karnataka. It is the largest district in Telangana Region and the second largest in Andhra Pradesh State. Mahabubnagar town is located at a distance of 96-km from Hyderabad.

Mahabubnagar formed the core of the Satavahana Dynasty (221 BC-218 AD), and a part of Chalukya Dynasty in South India (between 5th and 11th century AD), and in the recent history, it formed the core of the Golconda State and Hyderabad State, ruled by Qutub Shahi Dynasty (1520-1687) and Nizam Dynasty (Asaf Parti Dynasty) (1724-1948). This region became independent and joined in the democratic India on 18th September 1948. This place was formerly known as "Rukmammampeta" and "Palamooru". The name was changed to Mahabubnagar on 4th December 1890, in honour of Mir Mahbub Ali Khan Asaf Jah VI, the Nizam of Hyderabad (1869- 1911 AD). It has been the headquarters of the district since 1883 AD. The Mahabubnagar region was once known as Cholarwadi or the land of the Cholas'. It is said that the famous Golconda diamonds including famous "KOHINOOR" diamond came from Mahabubnagar district. The district witnessed many invasions and ruins of temples still dot the district.

For the purpose of administrative convenience, the district is divided into five administrative divisions viz., Narayanpet, Mahabubnagar, Gadwal, Nagarkurnool and Wanaparthy. The other administrative particulars of the district are provided below.



Cover Page



1. **No. of mandals: 64**
2. **No. of villages: 1475 inhabited and 69 uninhabited**
3. **No. of towns and municipalities: 7 towns, 4 municipalities**

Agriculture

The major crops grown in Mahabubnagar district are oilseeds, millets, paddy, pulses, castor, cotton and chillies. Kharif is the main crop. The gross cropped area during 2007-08 was 8.25 lakh ha. The cropping pattern in the district shows a distinct trend in increase in area under millets and cash crops such as groundnut, sunflower, cotton and chillies. There has been a decline in area under paddy despite good rainfall. Castor crop has also seen a sharp decline in area.

Paddy is mainly grown in Atmakur, Pangal, Pebbair, Gadwal, Ghattu, Ileeja, Kothakota, Narva, Midjil, Amangal, Weepanagadda, Balanagar, Farooqnagar, Kosgi, Chinna Chinta Kunta. Millets are grown in Doulatabad, Damarigadda, Maddur, Kodangal, Utkoor, Maganoor, Makhtal, Dharioor, Madgul, Vangoor. Pulses are grown in Uppumuthala, Nagarkurnool, Tador, Telkapalli, Balanagar and Groundnut is grown in Uppumuthala, Kodair, Pangal, Ghattu, Itikyala, Kollapur, Manapada, Kolikandla. Castor is an important crop grown in Devarkadra, Veldonda, Kalwakurthy, Vangoor, Nidjil, Thalakondapally, Amangal, Kolikandla, Gadwal, Dharioor, Ileeja, Narva, Chinna Chinta Kunta, while cotton is grown in Farooqnagar, Thimmajipet, Kalwakurthy, Peddalakothapalli, Addakal, Utkoor, Peddamadandi, Bijnepalli, Kothakota, Balmoor, Amrabad.

The major horticulture crops grown in the district are mango, sweet orange, pomegranate, papaya, grapes, guava, citrus, sapota, custard apple, fig, banana etc. Mango, sweet orange and lime are grown in all the mandals of the district.

Economy of the district

Agriculture is the mainstay of the economy. Frequent spells of drought have rendered many small farmers unable to carry on their agricultural activity, leading to migration to nearby cities. Paddy, Jowar, Castor, and pulses are the important crops grown in the district. The major industries in the district are cotton textiles, ceramics, power generation etc.

Soils

The district has about 70% of its area covered with Red Chalka soils, 20% of the area with black soils, the rest of the area covered by the mixed soils. The red & mixed soils are highly prone to erosion. Since these form over 80% of the soils in the district this constitutes a big constraint to raising levels of crop yields.

The intensity of soil erosion depends on land form, slope, soil type, vegetative cover, run off, land management practices and conservation measures. Soils in these areas needed to be stabilized through graded terracing, contour bunding and application of high dose of organic manures regularly.

Rivers

The rivers in the district are Krishna, Tungabhadra. Catchment area of these rivers is about 15000 sq. km. It is now widely admitted that a watershed forms an ideal unit for planning for the up gradation of land and water resources.

Forests

Forests extend over an area of 3,027.53 sq. kms, constituting 16.4% of the area of the district as against 23.2% of the state. The per capita forest area of the district is as low as 0.10 hectares. Most of the forest area is concentrated in the south eastern part of the district, covering mainly Achampet and Kolhapur Mandals along the river Krishna. Many isolated forest blocks lie amidst dry cultivation, scattered over the district. These blocks consist of degraded and scrub cover. The forest type is dry deciduous.

In this section, an attempt was made to understand the performance of various important sectors like agriculture, irrigation, forests, industries etc. in the district along with certain of demographical features.

Public Finances

As per the statistics available the major revenue from the district is through Sales Tax under the taxes collected under state revenue. Same is the case with taxes collected under central government taxes. However, most of the tax collections were fallen short of actual demand.



Cover Page



DOI: <http://ijmer.in.doi./2021/10.12.117>

Agriculture

Paddy is the most common agriculture crop in the district and then followed by Groundnut, Cotton, Chillies etc. Maize is another crop which has registered a steady growth in the district. Given the cropping profile, it is quite evident that the district is dominated by dry-land cropping pattern. Onion, which is not grown earlier, has started gaining its presence in the district from the 2000-01 agriculture season.

Irrigation

Given the agriculture crop profile, it is expected that the irrigation facilities in the district is quite meagre. As per the statistical information available 440,532 acres of land was covered under gross irrigated land in the district. In fact, there was a considerable decline of gross irrigated land when compared to previous years. This was predominantly due to severe drought occurred at that period. Tube wells and filter points were the major source of irrigation in the district. As much as 247,131 acres were irrigated under this source. Canals are the next major irrigation source in the district.

Wells and tanks were the other sources of irrigation in the district. In all these sources of irrigation, there has been considerable decline due to severe drought witnessed by the district. Thus, Mahaboobnagar district is severely tested under dry spells in the recent past.

Further, in order to understand the irrigation profile of the district, an attempt was also made to depict the sources of irrigation in the district. The district has two each of major irrigation as well as medium irrigation sources. Priya Darshini Jurala Project and Rajoli Banda Diversion Scheme are the two major sources for irrigation. Sarala Sagar Project and Koil Sagar Project are the two medium irrigation sources in the district. A total of 203,385 acres were registered ayacut under these sources. However, the two major irrigation sources itself account for 189,500 acres as registered ayacut. The remaining 15,000 odd ayacut is registered under medium irrigation sources.

MAJOR AND MINOR IRRIGATION

Acres

Sl. No.	Major / medium	Name of the Project	Registered Ayacut	Actual area irrigated			
				2010-2011		2012-2013	
				Net	Gross	Net	Gross
1	Major	Priya Darshini Jurala Project	102000	45000	60322	45000	80000
		Rajoli Banda Diversion Scheme	87500	21335	21335	11935	11935
2	Medium	Sarala Sagar Project	4185	0	0	0	0
3	Medium	Koil Sagar Project	11700	3500	3500	0	0
	TOTAL		103385	69835	85157	56935	91935

Source

1. S.E., P.J.P., Circle, Gadwal.
2. E.E., I & CAD, Mahabubnagar, Wanaparthy & RDS,

Most of the respondents selected for the study on random sampling basis were belonging to backward castes and communities belonging to Scheduled Castes and Tribes. The social profile of the sampling reflects the existing social profile of the Maddur mandal as well as the Mahaboobnagar district. Most of the respondents were in the middle age group and the level of education is mostly confined to primary and high school level. Most of the respondents were associated with agriculture and allied operations. Though agriculture labor constitutes major chunk but most of them were marginal and small farmers. Most of the respondents were having quite low annual income and in fact most of them considered to be poor given the yardsticks of Below Poverty Line. Only half of the respondents expressed that they are aware of concept of watershed approach. However, respondents from cluster 3 villages retained better knowledge on watershed approach due to on-going nature of the projects concerned. At local



Cover Page



level, only half of the respondents do have knowledge on Project Implementing Agency. In other words, there is substantial gap between PIA and the targeted stakeholders. However, the respondents have shown tremendous appreciation for soil, moisture and water conservation measures undertaken as part of watershed development projects.

Though respondents do have much appreciation for Project Implementing Agency yet they do have comprehensive knowledge on User Committees and other committees formed under watershed development projects. Among the utilities of watershed development projects, the respondents have shown larger preference to conservation of water. Structures like check-dams etc. which preserve water had more popularity among the respondents than the soil and moisture conservation structures.

The respondents selected for the study have in fact developed knowledge on water conservation structures like farm ponds, check dams, percolation tanks etc. when compared to measures related to soil and moisture conservation. Though the respondents do not have much of the technical knowledge on most of the watershed structures yet they have larger appreciation for the utilities of the structures erected in the project area. Irrespective of the landholding pattern there has been larger appreciation for impact of watershed development aspects. Respondents do have appreciation for the direct and indirect benefits derived from the watershed development projects.

What need to be done?

Substantial number of respondents from the study area have participated in implementation aspects of watershed development interventions. Only a few of the respondents did not participate in the watershed interventions and these were mostly from the landless category as well as frequent migrates. Most of the respondents acknowledged that the watershed development interventions resulted in better economic activities in the study area. Raise in ground water table, growth in vegetation, better crop yields, change in cropping pattern due to availability of water etc. were considered as direct outcomes of watershed interventions in the study area. Most of the respondents acknowledged that watershed interventions resulted in spurt in agriculture related activities.

As a sequel to the benefits drawn from watershed interventions, most of the respondents expressed that it has resulted in growing water intensive crops. In other words, their observations reflect the success of watershed interventions to a large extent in conserving the water in the study area, which is a water scarce area. Another important observation emanated from the study is, watershed development interventions resulted in popularizing participatory approaches as most of the respondents acknowledged the advantages of participatory action. The respondents also reflected that collective action is the new culture developed after the watershed interventions. Migration has considerably reduced in the study area and was directly attributed to more agriculture operations and availability of wage employment. Since more agriculture operations are due to watershed interventions, it may be considered that watershed interventions reduced migration to some extent. Given the overall impression on watershed interventions among the respondents, water conservation is considered as the best effect in their respective villages. In areas where the watershed development interventions are currently in vogue, the impact of the water and soil conservations measures were well understood by the respondents.

Summing up

In areas where the watershed development interventions were long back completed, the retention of knowledge among the respondents was quite lagging when compared to respondents from villages where the projects were recently completed or on-going. The Rural Development functionaries who were also comprise the distinct sample of the study, expressed that there is need for more capacity-building activities to understand the rural development policies and carry out the same in their respective jurisdictions. Rural Development functionaries, including the elected representatives, have larger appreciation for rural development policies. Irrespective of the cadre of rural development functionaries believe that participatory approaches do have larger role to play in the coming future. In this regard, they appreciate the role of capacity building activities. Most of the rural development functionaries believe that collective action is the best method to overcome several of rural development problems. In view of the present research study findings and the experienced gained by the researcher in the study area, it was the study leads to the following suggestions. These are along with the watershed development interventions, the rural development functionaries functioning at cutting-edge need to be focused more to sustain the results obtained from watershed interventions. Follow-up by the implementing agencies to the watershed areas after the completion of the activities is vital since it would help in the institutionalization of the system.



Cover Page



References

1. Archana Mishra, **Watershed Management**, Author's Press, New Delhi, 2001.
2. Bhatt, S, Environmental Laws and Water Resources Management, Radiant, Delhi, 1986.
3. Chaturvedi, H.R. and Sabrata Mitra, K. Citizen Participation in Rural Development, Oxford and IBH, New Delhi, 1982.
4. Chiranjeevulu, P. Tank Irrigation and Agricultural Development, Kanishka Publishing House, New Delhi, 1992.
5. Chopra, Kanchan., Kadekodi, G.K. and Nurthy, N.N. Participation, Development, People and Common Property Resources, Sage Publications, New Delhi, 1989.
6. Dantwala, M.L., Harsh Sethi and Pravin Visaria (Ed.), Social Change through Voluntary Action, Sage Publications, New Delhi, 1998.
7. Das Guptha and Kalyan Kumar, Problems of Management of Tank Irrigation: A Case Study of Tumkur District, Himalaya Publishing House, New Delhi, 1978.
8. Depey, K.R. and Joay, K.J. A Holistic Approach to Soil and Water Conservation, Technology Publication, London, 1994.
9. Djavvam, B.D. Irrigation in India's Agricultural Development, Sage Publications, New Delhi, 1980.
10. Indra Dev Sharma, Water Management in Drought Prone Areas, Orient Publication, New Delhi, 1985.
11. Isobal, W. Hathoeote., Isabel, I.W. Integrated Watershed Management Principles and Practice, John Wiley and Sons Publishing House, 1998.
12. Jaiswal, N.K. and Lorty, N.V. **Development of Drought Prone Areas, NIRD, Rajendranagar, Hyderabad, 1981.**
13. Joshi, P.K., Tewari, L.Jha, A.K. Impact of Watershed Programme and People's Participation, Centre of Agricultural Economics and Policy Research, New Delhi, 2003.
14. Kerr, I., Pangare, G. Watershed Development Projects in India: An Evaluation, International Food Policy Research Institute, Washington D.C., 2002.
15. Maheswari, S.R., Rural Development in India: A Public Policy Approach, Sage Publications, New Delhi, 1995.
16. Maitra, M.K. Watershed Management: Project Planning, Development and Implementation, Omega Scientific, New Delhi, 2001.
17. Ploney, N.D., Watershed Management, Principles, Parameters and Programmes, Dominant Publications, New Delhi, 2005.
18. Palaniswamy, K., Suresh Kumar, D., Impact and Assessment of Watershed Development: Issues, Methods and Experiences, Associated Publishers, New Delhi, 2006.
19. Parthasarathy, G. Technical Committee Report on Watershed Development in India, Ministry of Rural Development, Government of India, 2006.
20. Rajesh Rajora, Integrated Watershed Management: Field Manual for Equitable Productive and Sustainable Development, Rawat Publications, Jaipur, 2002.
21. Rajeev Sing, Watershed Planning and Management, Yash Publications, Bikaner, 2003.
22. Ranga Reddy, A. Watershed Management for Sustainable Development: With reference to Drought Prone Area, Mittal Publications, New Delhi, 2005.
23. Rangachary and Mukherjee, S.D., People's Participation in Watershed Development Schemes in Karnataka, National Workshop for Watershed Approaches to Wasteland Development, New Delhi, 2003.
24. Reddy, Y.V.R, Reddy, B.M.K. Ramakrishna, Y.S. Watershed Management, Agrotech Publishing Academy, Udaipur, 2008.
25. Sahoo, N.K. Varma, H.N., Watershed Management of Waterlogged Areas, Centre for Water Technology of Eastern Regions, Bhubaneswar, 2002.
26. Seshagiri Rao, K.V., Watersheds: Comprehensive Development, B.S. Publication, Hyderabad, 2000.
27. Sundaram, I.S., Voluntary Agencies and Rural Development, B.R.Publishing Corporation, New Delhi, 1986.
28. Suresh Lal, Watershed Development Management Technology, Mangal Deep Publications, Jaipur, 2004.
29. Tideman, E.M. Watershed Management - Guidelines for Indian Conditions, Omega Scientific Publishers, New Delhi, 1996.
30. Turton, C. Watershed Development in India, A Report prepared for Government of India, New Delhi, 1998.

Related Websites and Internet Sources

<https://portal.ct.gov>
<https://dep.wv.gov>wwe>
<https://www.jstor.org>
<https://www.watershed.org>