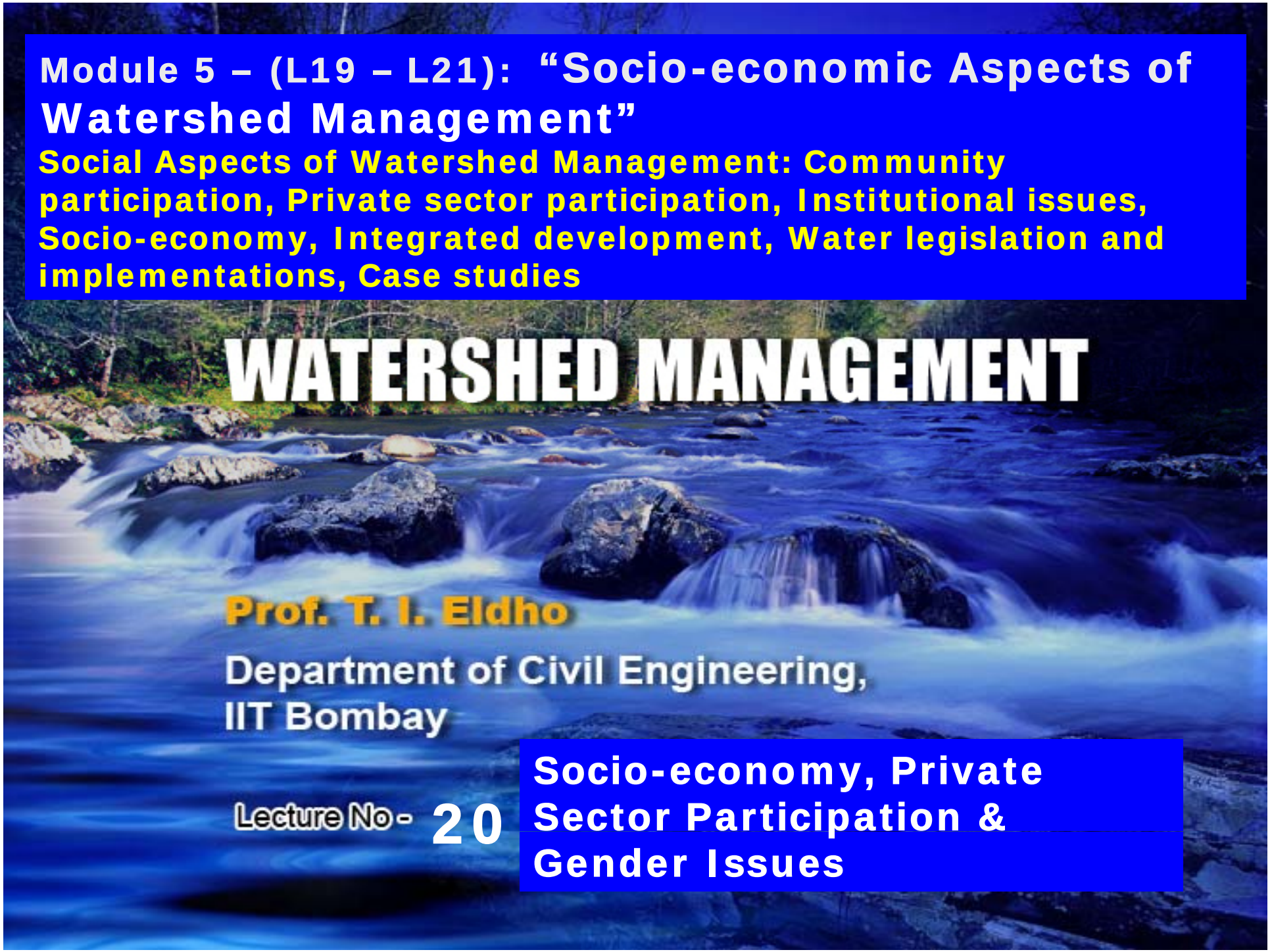
Module 5 – (L19 – L21): "Socio-economic Aspects of Watershed Management"

Social Aspects of Watershed Management: Community participation, Private sector participation, Institutional issues, Socio-economy, Integrated development, Water legislation and implementations, Case studies



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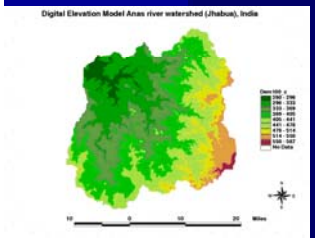
Lecture No - **20**

Socio-economy, Private Sector Participation & Gender Issues

WATERSHED MANAGEMENT

L20–Socio-economy, Private Sector Participation & Gender Issues

- **Topics Covered**
- Socio-economy, Economic assessment of watershed project, Private sector participation, Role of NGOs, Gender issues.
- Keywords: Socio-economy, economic assessment NGO, Gender issues.



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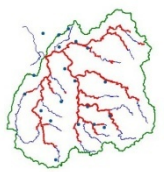


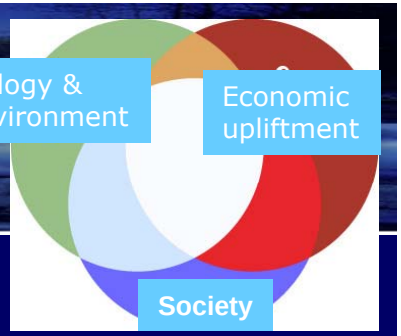
Socio-economic Aspects

- **Watershed management** is not just about the physical environment but also the human environment.
- **Socio cultural and economic aspects** influences the type finally adopted by the land users as well as the rate of adoption & success of adopted technologies.
- **Major socio-cultural & economic factors** include: Land tenure; Capital; Labour; Perception & beliefs; Gender.
- Land tenure & watershed management: Land tenure is the terms and conditions on which land & other natural resources (e.g. trees and water) are held & used.

Photo, A.K. Singh, 2002

Resources Management: manner in which they are owned, accessed, controlled, and used.

Four Resource Management Regimes: Private regime ; State property regime; Open access (non property regime); Common property regime.



Socio-economic Aspects

- **Capital & watershed management**
  Watershed management is a capital demanding exercise. Unless land users have sufficient resources, they cannot engage in successful watershed management. For example labour is required for the construction of water harvesting structures
- Labour is costly and beyond the reach of majority of land user; Therefore resource-disadvantaged land users will most likely not engage in meaningful watershed management.
- **Poverty** is usually defined as ones inability to meet their basic economic needs for clean air, water, food, shelter, and health care.

Photo, A.K. Singh, 2002

Socio-economic Aspects

- **Major Watershed problem:** Low Productivity; Low Income; Low Savings; Low Investment
- **The Environment-Poverty Nexus:** Poverty stricken people are critically environment-dependent. They often depend on environment for their livelihoods (fish, timber, fruits, charcoal, food, medicine).
- **Labour and watershed management**
  Labour is another vital component in watershed management. It is actually the most limiting constraint of smallholder land users in the adoption and sustenance of watershed management techniques.
- Labour is required for: Establishing tree nurseries and planting the trees; Constructing terraces; Manuring farms; Constructing dams

Photo, A.K. Singh, 2002

Economic & Social Issues - Review

- Methodologies for effective watershed management, with special reference to economic and social considerations.
- **Watershed management policy and legal environment** - "What are the fundamental policy and legislative weaknesses associated with the contemporary watershed management programmes, with special focus on economic and social considerations?"
- Policy lacks focus in terms of classifying projects with regard to site-specificities and that it pays insufficient attention to monitoring and evaluation mechanisms.
- Legislation is often absent or inadequate with respect to interdepartmental collaboration, funding allocation, sharing of resources and decentralization of authority.

Economic & Social Issues?...

- **Review existing legislation & formulate** new legislation to address policy issues such as interagency collaboration, decentralization of authority and sustainability of resources.
- **Watershed management planning**
- What are the major issues associated with contemporary watershed planning methods, with special focus on economic and social consideration at the national, watershed and local levels?",
- **Investment** should be made in information collection, national database infrastructure and easy data access
- **Cost-effective technologies** should be emphasized, and proper attention paid to indigenous knowledge.

Economical Assessment of watershed Project

Aims

- Are economic benefits greater than cost?
    - Budget impact
    - Will project increase economic stability?
    - Project attractive to private entities?.
    - Long term work of inter-generation benefits
    - Multiple use and multi products
    - Externalities- indirect
    - Spatial distribution of costs and benefits
    - Difficulties in qualification and valuation

Necessity of Economical Assessment

- Economic analysis focuses on net benefit to the society
- Its purpose is to determine whether investment is justified on economic efficiency basis
- Economic analysis is needed to verify that the project yields net benefit to the society as a whole
- Economic appraisal considers market traded goods and services but also attempts to value them in terms of society's true willingness to pay
- Economic analysis also adds in benefits costs of goods and services that are not traded in the market place.

Economic Appraisal

- Economic appraisal should include following basic steps
  - What is the project trying to achieve towards what objectives is it aimed?
  - What problems is it trying to overcome?
  - Main alternatives for achieving the objectives
- Alternatives for achieving the objectives
  - Definition and quantification of the physical inputs and outputs involved
  - Developments of tables which show inputs & outputs over time
  - Determination of unit values (both market and economic) for inputs and outputs over time
  - Development of value flow tables, showing total values of benefits & costs estimated to occur over life of the project

Factors and limits of Economic Assessment

- Project worth
  - Project feasibility and attractions
  - Risk factors
  - Project design and various alternatives
- **Limitations**
  - All benefits cannot be quantified
  - Depends on data
  - **Major Techniques**
    - With and without project approach
    - Discount – future value
    - Cost and benefit analysis

Economic Assessment

- Net present value or net present worth (NPW) – to determine present value of net benefits of a project
- NPW = Present value of all benefits - present value of costs
- Project acceptable if NPW is zero or positive (B – C) ≥ 0

  where, Bt – Benefit; Ct – cost in year t; r – discount rate; n – No. of years.
- To compare several alternatives, analysis results be ranked.

$$NPW = \sum_{t=1}^{n} \left[\frac{(B_t - C_t)}{(1+r)^t} \right]$$

Economic Assessment

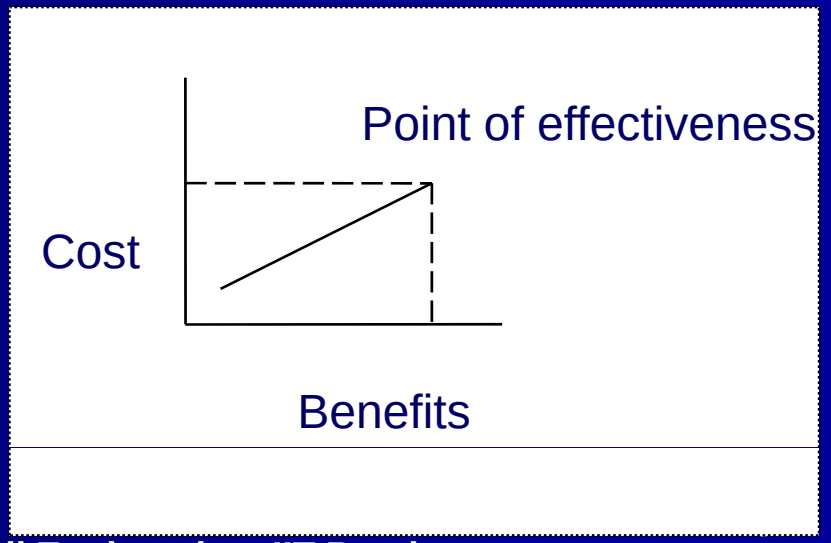
- **Benefit Cost Ratio:** Ratio of present value of benefits to present value of costs.

where, Bt – Benefit; Ct – cost in year t; r – discount rate; n – No. of years.

$$B/C = \frac{\sum_{t=1}^{n}\left[\frac{B_t}{(1+r)^t}\right]}{\sum_{t=1}^{n}\left[\frac{C_t}{(1+r)^t}\right]}$$

- Economically feasible if

$$B/C \geq 1$$



Economic Assessment...

- **Economic rate of return (ERR)** Discount rate that sets present value of all benefits equal to the present value of total costs.
- Otherwise, ERR is discount rate r such that
- Computed ERR is compared with some reference discount rate, to know whether project is economically feasible
- If computed ERR ≥ project fund cost, project economically attractive.

$$\sum_{t=1}^{n}\left[\frac{B_t - C_t}{(1+r)^t}\right] = 0$$

Economic Assessment...

- Sensitivity analysis
- Financial analysis

Economic Assessment Procedure

  - Developing technical relationships and quantifying physical inputs and outputs
  - Find monetary values and developing value flow tables eg. Labour, equipment & materials
  - Measuring project worth
  - Sensitivity test - for discount rate, benefit value estimates, cost assumptions etc.

- Assistance for economic assessment: i) for establishing technical relationships; ii) identifying costs; iii) identifying benefits.

Private sector Participation

- **People's participation**
  - Pre-project stage
  - Planning stage
  - Implementation stage
  - Maintenance
  - Evaluation
- Private sectors or NGOs
  - Motivate people to participate in all the stages
  - Make them understand the knowledge inputs required by people
  - Organize education programs prior to program initiation

Private sector Participation..

- To use various types of organizations such as
  - small informal groups,
  - traditional community associations,
  - cooperatives and trade unions and to reach all sectors of the rural population concerned.
- To encourage governments to adopt methods to help the organizations to become self-sufficient.
- To change administrative & budgetary procedures to facilitate hand-over to the local level of powers & tasks involved in decision-making, tax collecting & expenditure
- To set up local planning consultation bodies, which will comprise representatives of the people's organizations, NGOs & authorities to help in decentralizing decision-making.

Role of NGOs in Watershed Development

Success of watershed development depends on

- Working out collective protocols of equitable and sustainable use of surface water and groundwater
- Bringing together scientists and farmers
- Involvement of community and private sectors

- **Role of NGOs in watershed development**
- Creation of awareness
- Social mobilization
- Capacity building and training

Role of NGOs in WM

- To improve the effectiveness of project delivery.
- To empower village communities to take control of the project (processes and outcomes).
- To improve the levels of transparency and participation of communities.
- To facilitate the learning process of different partners at different levels based on objective assessment of field experience.
- Joining of national governments and international agencies with NGO's
- Major agencies providing funds for activities in watershed management are: UNEP, FAO, IFAD, World Bank, USAID, CARE, OXFAM, SIDA, ICRISAT etc.

Role of NGOs in WM

From 1980s, the role of NGOs became increasingly important in the development sector in India

- NGOs have ability to bridge gap between people's needs and available resources and services
- Several projects implemented by NGOs have demonstrated their ability for new approaches and techniques for mobilizing local economies
- As a partner in the commonly shared vision, NGOs have adopted a new role in operationalizing the implementation of regional watershed management policies at the local level.
- Essential local coordination and education are areas where the services of NGOs have been effective
- This makes NGOs the 'nuclei' for a successful watershed management.

Gender issues

Gender-sensitive approach to watershed management:

- Watershed management initiatives that exclude women as stakeholders ignore half the population, decreasing the efficiency and effectiveness of the actions promoted.
- Use of a gender approach in dealing with the socio-environmental dynamics of watersheds can open avenues & opportunities for achieving equity between women & men by considering their unique interests, demands & expectations.
- A gender-sensitive approach to watershed management - emphasizes affirmative actions to address women's disadvantageous position and condition in many societies.

Gender Issues- Women's Role

- Women constitute more than 50% of the world population.
- Women play a pivotal role in agriculture development and the management of natural resources
- Their involvement is indispensable for the effective implementation and equitable distribution of the benefits of watershed management.
- Managers of community natural resources, and have learned to protect these resources in order to preserve them for future generations (managers of sustainability).
- They have extensive knowledge, experience and common sense on use & management of natural resources.

Community Participation- Women's Role

- Women often oversee water, food, fuel and fodder requirements of family and cattle.
- Women also use natural resources for economic activities, building and repair work, crops and food processing.
- It is clear that poverty alleviation can be ensured through a watershed development programme only when women have a stake in decision-making, so that their basic needs are met.
- Most of the watersheds project successful – when women have participated considerably – various roles.

Photo, A.K. Singh, 2002

Case Study: Equity in Community-Based Sustainable Development: A Case Study in Western India

- Hivre Bazar - in Nagar Taluka in Ahmednagar Dist. In Maharashtra– 9.77 sq.km area; Main occupation - Agriculture
- 795.23 hectares is cultivable. The average annual rainfall in the district is 579 mm, though this is both erratic and uneven
- The principal form of irrigation in the village is well irrigation (open wells).
- The population of Hivre Bazar in 2001 was 1,150.
- 27 per cent are marginal landholders, 39% medium/ small land holdings, 34% landless.

Ref: Sangameswaran, Priya (2005): Equity in Community-Based Sustainable Development: A Case Study in Western India, Economic & Political Weekly, May 27, 2006.

Case study: Problems

- Water Problem: In the 1970s. Hivre Bazar was a typical semi-arid village.
- Water for irrigation was scarce, and women had to walk long-distances to fetch drinking water.
- This resulted in low agricultural productivity and mostly one kharif crop (typically bajra) could be managed and sometimes jowar in the rabi season.
- Out-migration became common due to limited employment opportunities.
- The villagers were under the influence of alcohol addiction and gambling, which resulted in frequent fights, and the village became notorious in the region.

Case study: Interventions

- In 1980s – Group of youngsters under leadership Popatrao Pawar
- NGO called Yashwant Agricultural, Rural
- and Watershed Development Agency was set up by Popatrao Pawar in 1993 and the scheme began to be implemented from 1994.
- Watershed development was derived from the community initiative in watershed development, Ralegan Siddhi.
- Five principles: restrictions on free grazing, ban on tree felling, ban on alcohol, adoption of family planning and voluntary labour
- Village was divided into three micro-watersheds, the first with an area of 612.14 ha, second with an area of 123.4 has & third with an area of 241.3 ha.

Case study: Interventions & Impacts

- The principal watershed works constructed include continuous contour trenching and tree plantation (on forest, private and panchayat land), contour bunding, nala bunding -5, two percolation tanks and five storage bandharas.
- In a span of four years, most of the work was completed.
- **Impacts**: most immediate impact of watershed development has been an increase in groundwater & biomass.
- This in turn has led to socio-economic changes in the village, especially in agriculture and animal husbandry.
- Increased water and fodder potential has meant that more animals, especially milch animals, can be reared. Hence milk production has increased more than tenfold, and the village now has its own dairy cooperative.

Case study:

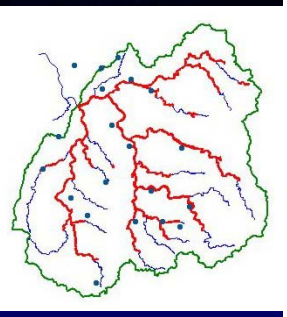
- Increase in the level of water in wells has led to more land becoming irrigated, with the result that both intensity and pattern of cropping have improved resulting in higher incomes.
- Increased demand for labour, & wage - labourers no longer have to go out in search of work – reverse migration.
- Both the quality of the technical watershed works and the resulting positive socio-economic changes have now been widely acknowledged

Case study: Lessons Learnt

- Hivre Bazar experience stands out, not only in terms of its equity outcome, but also in terms of improvement in livelihoods and the impact on sustainability.
- The measures to attenuate the negative impact of the ban on grazing, the rules about use of water and the careful targeting of watershed-plus measures have been particularly critical.
- Some of the inequities considered 'inherent' to watershed development projects can be partially remedied by local-level initiative – as demonstrated in this area.

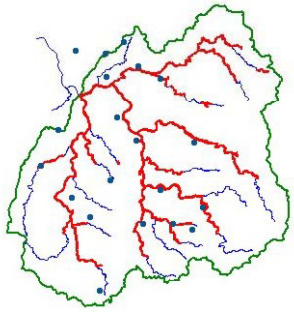
References

- J.V.S Murthy (1991), Watershed Management, New Age international Publications
- Economic and Political Weekly September 16, 2000, 3435- 3444, Sustainable Watershed Management Institutional Approach. V Ratna Reddy.
- Joshi PK, Vasudha Pangare, Shiferaw B, Wani SP, Bouma J and Scott C. 2004. Socioeconomic and policy research on watershed management in India: Synthesis of past experiences and needs for future research. Global Theme on Agroecosystems Report no. 7. Patancheru 502 324, Andhra Pradesh, India: International Crops Research Institute for the Semi-Arid Tropics. 88 pp.
- Shah, A. 2001. *Who benefits from participatory watershed development? Lessons from Gujarat.* IIED Gatekeeper Series No. 97. London, International Institute for Environment and Development
- Sangameswaran, Priya (2005): Equity in Community-Based Sustainable Development: A Case Study in Western India, Economic & Political Weekly, May 27, 2006.



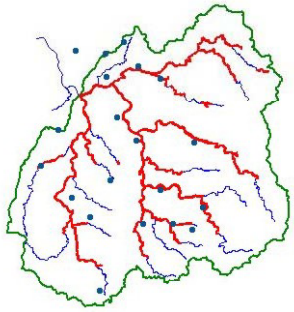
Tutorials - Question!.?.

- Why we need economic assessment of watershed projects?
- Explain major techniques of economic assessment ?.
- How we can effectively assess the economical impacts of watershed projects?.
- From the literature, critically study the economical impacts of watershed development projects.



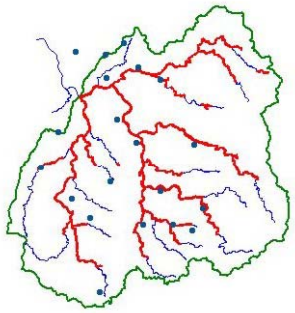
Self Evaluation - Questions!.

- What is the importance of socio-economic analysis of watershed management projects?.
- How to do socio economic assessment for watershed projects?.
- Discuss the role of private sector in watershed development projects.
- Why 'gender issues' important in watershed management projects?.



Assignment- Questions?.

- What are the important socio economic components of watershed development projects?.
- What are the important techniques used for economic assessment of watershed projects?.
- Describe the role of NGOs in watershed management projects.
- Discuss woman role in watershed development projects.



Unsolved Problem!.

- For your watershed area, critically study the various implemented and proposed watershed development management plans.
- Using benefit cost ratio method, carry out an economical assessment of the implemented and proposed watershed management plans.
- Critically evaluate various watershed management plans (eg. Water harvesting measures/ irrigation projects/ Well irrigation/ canal irrigation etc.) and economically compare each schemes in terms B/C ratio.

THANK YOU

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