

Module 1 – (L1-L3) Introduction and Basic Concepts
Concept of watershed, introduction to watershed management,
different stakeholders and their relative importance, watershed
management policies and decision making.

WATERSHED MANAGEMENT

Prof. T. I. Eldho

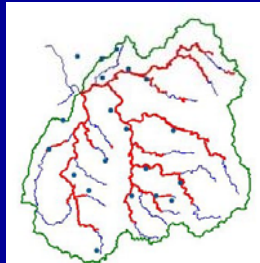
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Lecture No- 2

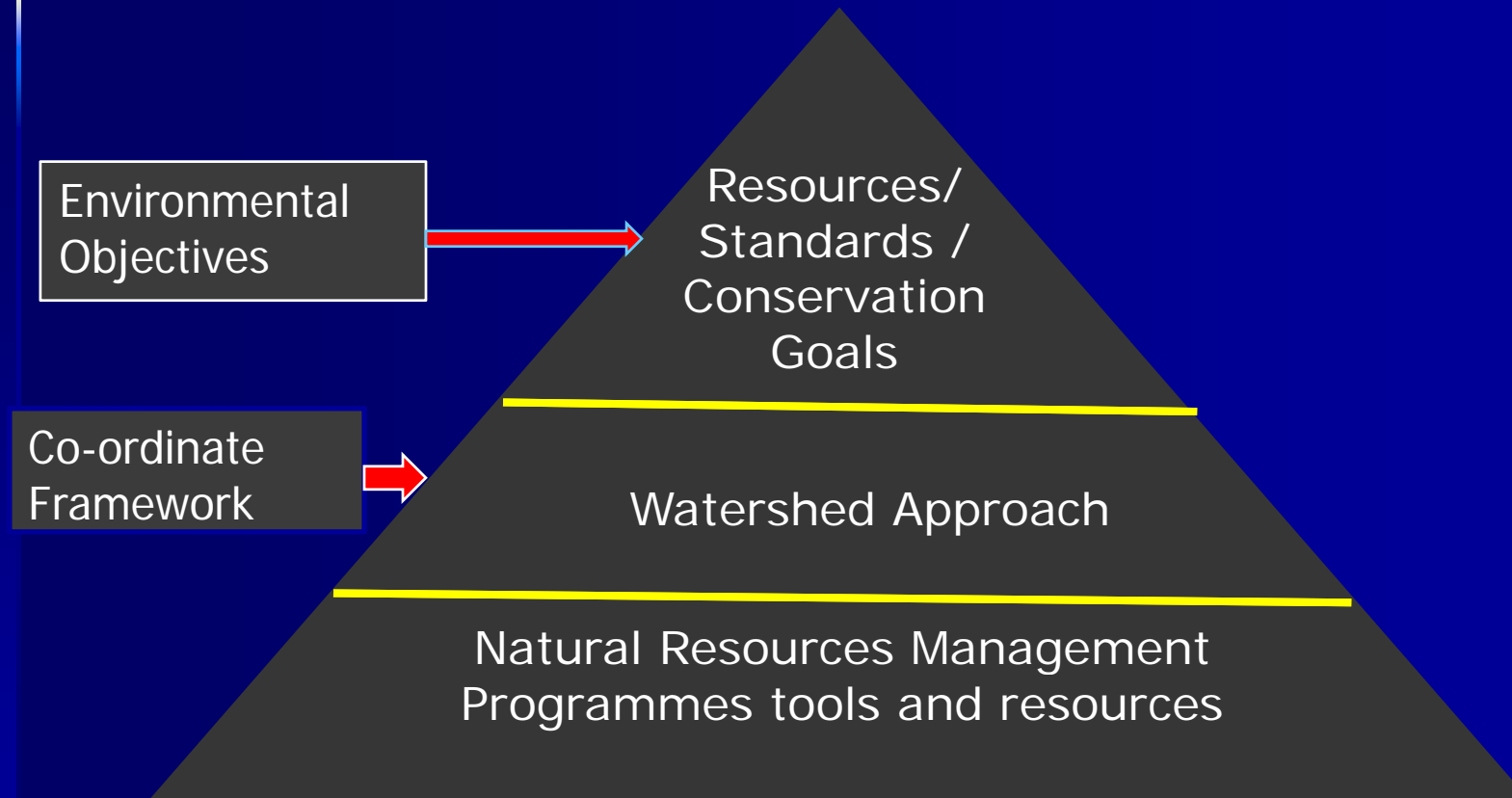
**Watershed Management &
Stakeholder Analysis**

L2–Watershed Management & Stakeholder Analysis

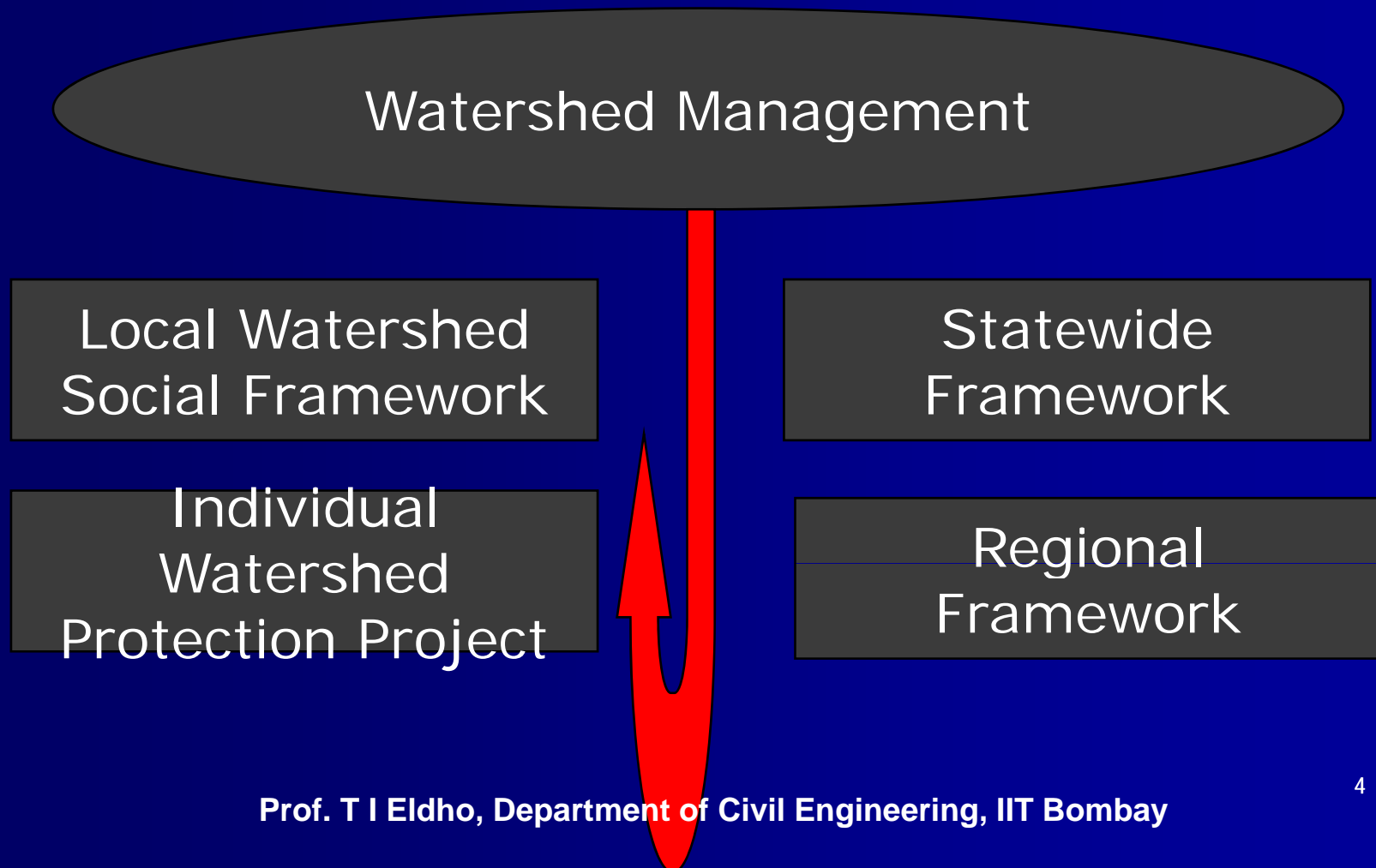
- **Topics Covered**
- Watershed system; Watershed Management (WM) - Objectives, Components & Benefits; WM- Multiple use, Multi disciplinary approach, Stakeholder analysis, Role of stakeholders in WM development plans; People's participation; Case Study.
- **Keywords:** Watershed management objectives, Development plans, Multi disciplinary approach, Stakeholder analysis, People participation.



Goals: Watershed System Integrity



Watershed Management at Different Levels



Objectives of Watershed Management

- Wise use of soil, water & vegetation- optimum production- mini. hazard to natural resources
- Industrial utilization & development of lands: Conserve water, more income, reduce drought
- Prevention and retardation of floods through construction of reservoirs
- Provision of adequate water for agricultural, industrial and domestic purpose
- Abatement of soil, water and air pollution
- Creation of recreational facilities e.g. lakes
- Utilize natural resources- improving agriculture

Components of Watershed Management

1. Foundation Practices:

- Engineering & biological measures for soil and water conservation
- Contour farming, diversion bunds, grades of vegetative bunds, terraces, check dams etc.
- Water storage structures : Nullah bunds, gully plugs, bunds, percolation tanks
- Alternate land uses in the non-arable lands: Afforestation and plantation of fodder and fuel trees



Contd....

2. Improved Production practices

- In-situ water conservation
- Agricultural water management
- Improved crop and cropping systems
- Foundation practices depend upon financial assistance provided by the government
- Production practices depend upon the people participation

Benefits of Watershed Management

- Control flood, drought
- Reduce erosion and sediment production
- Maximize productivity per unit area, time & water
- Increase crop intensity
- Utilization of marginal or waste lands through alternate land use systems
- Ensure ecological balance
- Maximize combined income
- Stabilize income in unfavorable conditions
- Social upliftment

Watershed Management Strategies

- **Preventive strategies** — preserve existing sustainable land use strategies.
 - Prevent problems in a watershed
- **Restorative strategies** — designed to overcome identified problems – to restore conditions in a watershed to desirable level .
 - To restore conditions once problems occurred.
- In most cases – WM between two extremes: Routine preventive strategies & some Restorative strategies.
- **Preventive strategies** – key to WM

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Watershed Management – multiple use

Resources	Products
Water	Irrigation, Municipal industrial and Recreation
Timber	Pulp, Wood, Fuel, Recreation
Forage	Livestock, Wild life, Recreation
Wildlife	Consumption, Recreation
Minerals	Depends on type of mineral

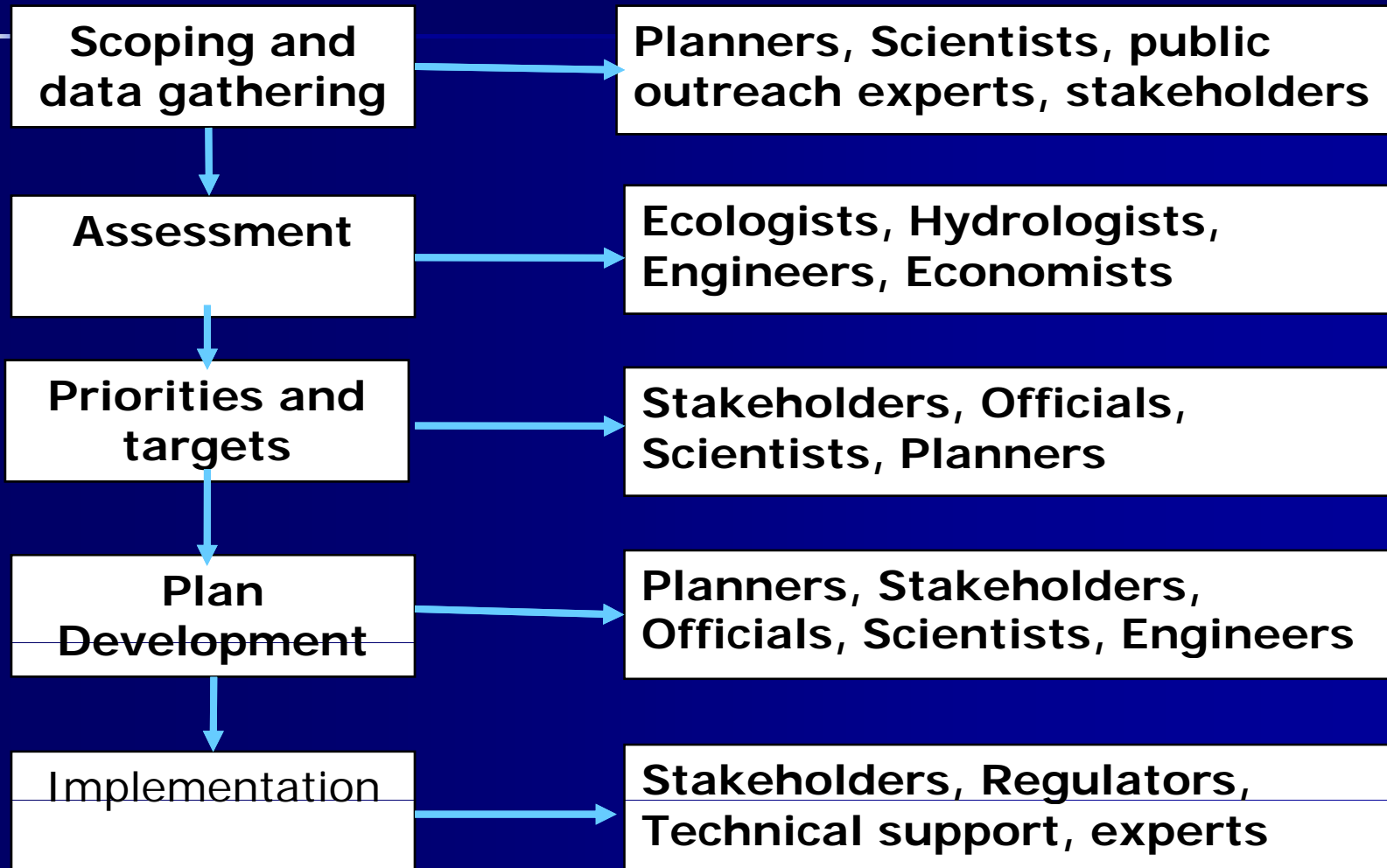
Aim of multiple use: To manage natural resources - most beneficial combination for present & future uses

Resource Oriented: production capabilities of natural resources

Area Oriented: Based on dynamics of local, regional and national demands

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Multi-Disciplinary Approach in WM



Concept of Stakeholders

“Stakeholder” - Any group of people, organized or unorganized, who share a common interest or stake in a particular issue or system.



Photo, A.K. Singh, 2002

Importance of stakeholders

- Stakeholders involvement - key aspects in the success to implement development activities
- Involvement of stakeholders helps - dovetailing of funds, supply of goods and human resources required for project implementation
- Involvement of stakeholders - leads to a confidence building process for community based projects



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Stakeholder Analysis (SA)

- Stakeholder analysis - generate knowledge about relevant actors - to understand their behavior , intentions, inter-relations, agendas, interest and influence and resources they bring to bear on decision making process
- Stakeholder analysis - tool for policy formulation and implementation
- Developed - to challenge of multiple objectives and interests



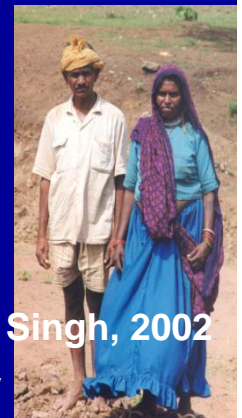
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Steps for Stakeholder Analysis (SA)

- Stakeholder Identification
- Development of relevant issues and their characterization
- Discussion with regional and local subject matter expert (formal as well as non-formal interview)
- Focused group discussion
- Semi-structured interviews
- Development of Influence-interest matrix



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Stakeholders Identification

Level	Examples of Stakeholders	Environmental Issues
International	<ul style="list-style-type: none">-International Agencies-Foreign Governments	<ul style="list-style-type: none">-Climatic regulations-Biodiversity Conservation
National	<ul style="list-style-type: none">-National Governments-NGOs	<ul style="list-style-type: none">-Timber extraction-Tourism development
Regional	<ul style="list-style-type: none">-Forest Departments-Regional Authorities	<ul style="list-style-type: none">-Forest Productivity-Soil loss and degradation
Local	<ul style="list-style-type: none">-Downstream communities-Women fuel collectors	<ul style="list-style-type: none">-Protected water supply-Cultural sites

Developmental Issues & Methods

- Cross cutting system & stakeholder interests
- Multiple uses and users of the Resources
- Subtractability and temporal trade-offs
- Poverty and under-representation
- **Methods**
- Focus group discussion – People's opinion – Interactive – gives data & insight. Eg. Women group
- Semi-structured interviews: about natural resources, problems & solutions.
- Interest –Influence Matrix: to understand the relative interests and influence of the stakeholders



Photo, A.K. Singh, 2002

USEPA Approaches

- Stakeholder involvement is essential to the development – eg. Water pollution management
- USEPA – Two approaches
 - Traditional simulation and decision making approach – based on command & control - Stakeholders involvement – after most decisions made
 - Decision support system for stakeholder involvement - Involves stakeholders to make management decisions - Guides stakeholders through the decision making process – Fits the needs – Multiple options accessible.
 - WARMF - Watershed Analysis Risk Management Framework - Data Module, Engineering Module, Knowledge Module - DSS

Stakeholder Analysis- road map

Module for stakeholders to

- ❖ Organize themselves
- ❖ Develop a work plan
- ❖ Identify water quality issues
- ❖ Learn about river basin
- ❖ Formulate alternatives
- ❖ Perform analysis
- ❖ Research Consensus

The screenshot displays a software interface with a light blue header and a white main area. The interface is organized into seven numbered steps, each with associated buttons or text boxes. Step 1, 'Stakeholders', has 'List' and 'Organization' buttons. Step 2, 'Work Plan', has 'Mission' and 'Tasks & Schedule' buttons. Step 3, 'Water Quality Issues', has 'Designated Use' and 'Criteria' buttons. Step 4, 'Learning Process', has a prominent blue 'Simulate' button, along with 'Loading' and 'Water Quality' buttons. Step 5, 'Management Alternatives', includes a 'Scenario' dropdown menu set to 'Base060402', a 'Describe' button, and an 'Edit...' button next to a 'Point Sources' dropdown. Step 6, 'Analysis', has 'Cost/Benefit' and 'Cost Sharing' buttons. Step 7, 'Resolution', has an 'Eros & Cons' button and a large blue button that says 'Consensus achieved?.'

Carl and Joel (2004)

SA in WM - People Participation

- Sustainability of WM programme is not possible if the people are bypassed in planning and decision making processes
- Role of project implementation agencies
- Community organizations and/or NGOs
- They should make efforts to ensure that people have control over entire process
- Entire process- planning and implementation, including financial and technical monitoring and evaluation

SA in WM - People Participation..

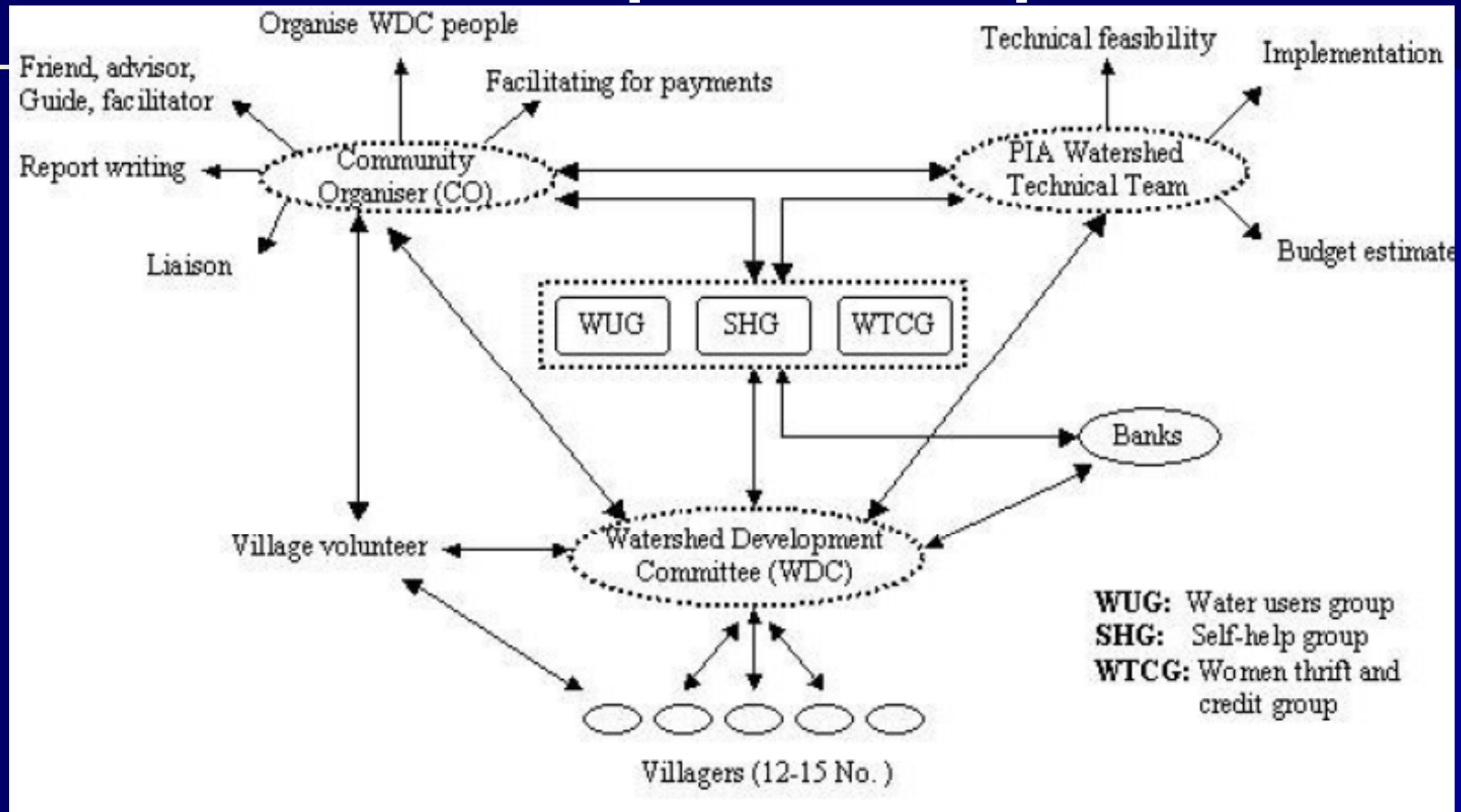
- Promotion of sustainable economic development
 - ❖ Optimum utilization of land, water and vegetation to mitigate the adverse effects of drought
 - ❖ Provide employment and local capacity building to generate income
- Restore ecological balance through community participation
- Improving living conditions of the poorer through more equitable resources distribution



Photo, A.K. Singh, 2002

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SA in WM - People Participation..



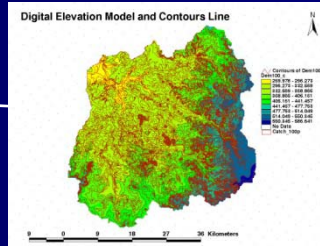
Ref: A. K. Singh, **Eldho T. I.**, D. Prinz, (2002), 'Integrated watershed approach for combating drought in semi-arid region of India: A case of Jhabua watershed', *Journal of Water Science and Technology*, Vol. 46(6-7), 2002, pp. 85-92.

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SA in WM - People Participation..

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Natural Resources Mapping



Social Mapping



Village Volunteers



Participatory Appraisal



Prioritising Options



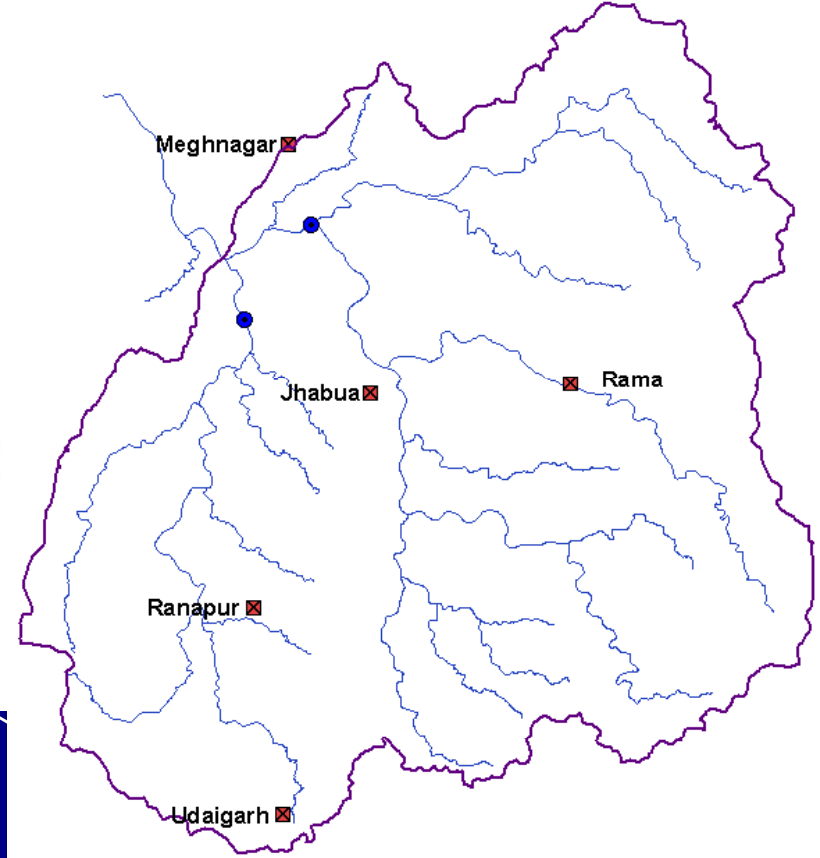
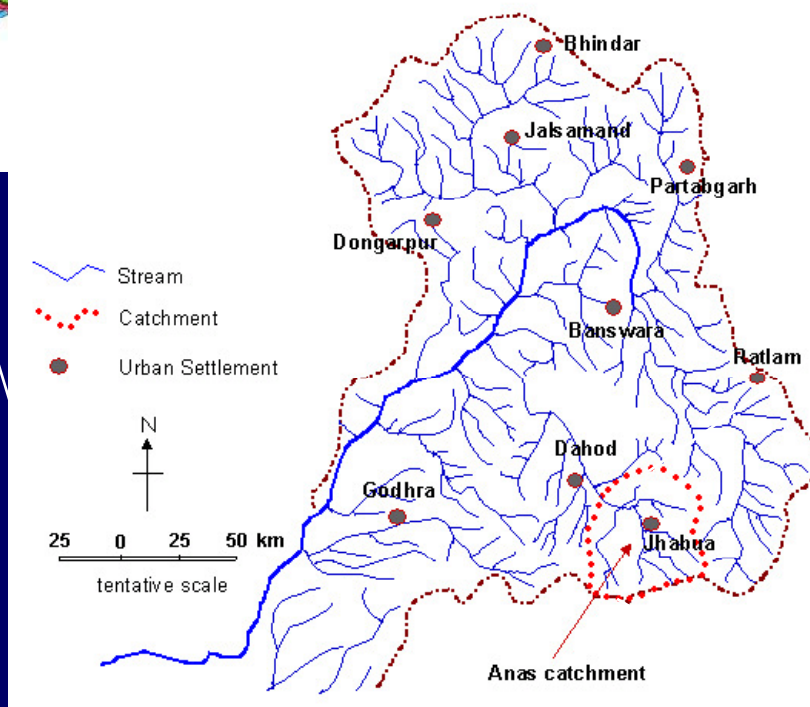
Implementation



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Case Study: Jhabua watershed

Catchment Area-1800 km² Avg. rainfall ~750mm/ annum.



- ~ 57% arable land
- ~ 16% notified as forest land.

Watershed Related Problems

- Economically among most backward regions in India
- Forest cover - sparsely distributed on sloping lands
- Watershed has poor soil depth - 0.30-0.40 m in hilly areas and 1- 2m in valleys
- Classified as drought prone based on agro-ecological classification
- Socio-economic characteristics - users of natural resources categorized below poverty line
- Seasonal migration (50%) to nearby urban centers in search of jobs



Photo, A.K. Singh, 2002

Major crops:
Maize, Cotton, Peanuts, Soyabeans;
Gram, Black beans, Oil seeds.

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Developmental Interventions

Developmental interventions taken place at Jhabua Watershed – NGOs (1990s & 2000s)

- Water harvesting for supplementary irrigation
- Soil and water conservation
- Joint Forest Management
- Community participation and local capacity building
- Women empowerment
- Water regulation

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Community participation and local capacity building

- People in Jhabua watershed - involved in developmental activities - conception, planning, financing and maintenance
- Eg. Social mapping & resources mapping was undertaken together with village community, & community organizers (CO).
- Efficient utilization of funds
- 10-15% is spent on administration
- 85-90% are used for actual project implementation activities



Photo, A.K. Singh, 2002



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Photo, A.K. Singh, 2002

Water Regulation & Forest Management

- Self-regulation: community based watershed monitoring system
- Local people -developed system of water management
- Accounting uncertainties of rainfall and retaining the runoff from the watershed
- Sharing of water - family size & location of fields close to source
- Water use priorities had given to
 - Life supporting system than needs- during drought
- Joint Forest Management – Forest committees -
concept of “Social Fencing”

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Impact Assessment

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- Forest development – in 10 years (1991-2000) – from 16% to 25-30% forest cover.
- Water availability improved considerably - About 2-4m water level increase is observed in selected wells.
- Improved agricultural output : 30- 100% increase
- Drought proofing
- No migration
- Children goes to school
- Women empowerment
- Overall social & economical improvement



WM Case Study– Lessons Learned

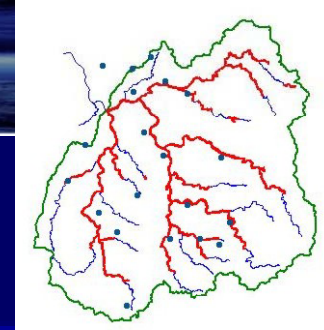
- Integration- appropriate technical & managerial measures
- Successful technical aspects:
 - Systematic watershed development work,
 - Prioritization of water conservation measures
 - Harvested water for supplementary irrigation
- Stakeholder analysis in WM
- People's participation from inception to implementation
- Restoration of ecological balance through community participation & sustainable development of natural resources
- Encouragement of available low cost affordable technologies for easy acceptance

References

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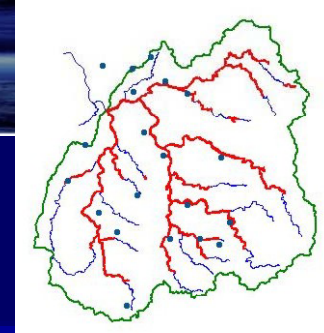
- <http://www.fao.org/docrep/x5307e/x5307e00.htm#Contents>
 - “ The community's toolbox: the idea, methods and tools for participatory assessment, monitoring and evaluation in the community forestry”

- <http://www.sas2.net/tools/social-analysis-techniques>
 - SAS2 Social Analysis Techniques



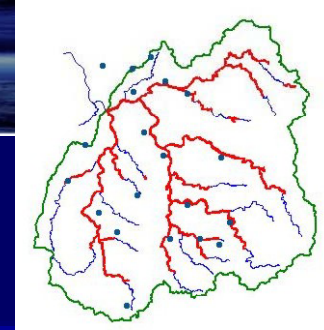
Tutorials - Questions!..?.

- A) Discuss the watershed management issues at different levels.
- B) Illustrate watershed management as a multi disciplinary approach.
- C) Discuss the USEPA approaches of Stakeholder analysis.



Self Evaluation - Questions!

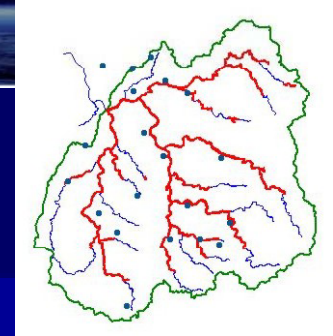
- A) What are the important components of watershed management practices?
- B) What are the important benefits of watershed management?
- C) In stakeholder analysis, discuss the developmental issues with examples.
- D) Illustrate Stakeholder analysis within the perspective of "People participation"?



Assignment- Questions?.

- A) What are the important objectives of watershed management?.
- B) Discuss watershed management within the perspectives of “multiple uses” of resources.
- C) Describe the watershed management strategies with examples?.
- D) With the help of a case study, show the importance of Stakeholder Analysis in Watershed Management?.

Unsolved Problem!



- Consider a hypothetical situation of canal water supply for a village in India, where water is drawn and regulated from medium size irrigation tank to both u/s and d/s command areas. Draw various stakeholders formal and informal involved for it , their individual interests and interest-influence matrix for them.
- Hint: Formal stakeholders
 - A. Governmental agency; B. Village Electoral Representative
 - C. Formal Associations; D. Association of industries
 - A. Research organization / team
- Informal stakeholders
 - 1. Farmer's group; 2. Village level community group

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THANK YOU

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