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Geoinformatics in water resource management at Micro watershed level; Dangra a Case, West Bengal

Presented by Kartic Bera

In Collaboration with:
Dr. Jatisankar Bandyopadhyay

Department of Remote Sensing & GIS
Vidyasagar University, Midnapore, West Bengal :: India
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Introduction

Water are the greatest gift of nature. This resources must be conserved and maintained carefully for environmental protection and ecological balance. Land degradation reduces the world’s fresh water reserves, river flow rates and lower ground water levels which lead to the silting up of estuaries, reservoirs, salt water intrusion, interfere with the operation of reservoirs and irrigation channels, increase coastal erosion and pollution of water by suspended particles and stalinization, thus affecting human and animal health. Solution to all these problems is watershed management.

Water resources development needs very careful analysis of the upper catchments to the lower stretch of a watershed otherwise scattered local level surface/ground water management in the upstream is likely to affect negatively the recharge in the downstream of a river.

Multi dataset is required for micro watershed wise water resources management. Simulate of water scarcity zones, drainage character, surface runoff and sediment transport during rainfall events and evaluate the land capabilities and suitability’s of it for multi criteria evaluation based final action plan tacking. It is essential to identify areas most susceptible to demographic stretcher for best management practices on these areas and assessment of BMP implementation effectiveness on water amiability improvement through monitoring strategies.
Location of Study area
<table>
<thead>
<tr>
<th>Sub watershed</th>
<th>Mini watershed</th>
<th>Micro watershed Code</th>
<th>Number</th>
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<tbody>
<tr>
<td>Dangra (2A2C8C)</td>
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Aim & Objectives


Objectives:

- To prepare drainage network map.
- To delineate and coded micro-watershed boundary.
- To prepare various thematic map.
- Different physiographic parameter based prioritization.
- Societal perspective based prioritization.
- Micro watershed wise action plan taking for sustainable development.
INTEGRATED WATERSHED DEVELOPMENT

OBJECTIVES

Economic Growth, Basic Needs, Ecological Balance

INFORMATION NEED

Natural Physical Resources
- SOIL
- GEOLOGY
- GEOMORPHOLOGY
- GROUNDWATER
- LANDUSE / LANDCOVER
- RAINFALL AND CLIMATE
- DRAINAGE & WATERSHED
- SLOPE, ASPECT & ALTITUDE
- TRANSPORT NETWORK AND SETTLEMENT

Contemporary technology
- AGRICULTURE
- WATER MANAGEMENT
- GROUNDWATER EXPLORATION
- ANIMAL HUSBANDARY
- FISHERY
- MINERAL EXPLORATION
- HOUSING AND CONSTRUCTION
- ENERGY & POWER ENGINEERING
- HEALTH & SANITATION
- WATER HARVESTING

Socio-Economic & Demographic data

SPATIAL ANALYSIS OF SOCIO ECONOMIC DATA
- SOCIAL PROFILE
- DEMOGRAPHIC PROFILE
- CULTURAL PROFILE
- ECONOMIC STATUS

THEMATIC MAP INFORMATION

INTEGRATION OF MULTI-THEMATIC INFORMATION
(Composite Land Development Unit)

NATURAL/PHYSICAL RESOURCE BASED DEVELOPMENT POSSIBILITY RESOURCES REGIONS

PEOPLES NEED & PROGRAMMES REGION IDENTIFICATION
* Socially backward Areas/People
* Economically backward Areas/People
* Areas lacking basic amenities

RESOURCES MANAGEMENT DECISIONS-SPECIFIC PLANS/PROJECTS

DEMONSTRATION OF TECHNOLOGY IMPLEMENTATION TRAINING/RETRAINING OF USERS

EVALUATION AND FEED BACK

Source: Krishna Murthy Y. V. N. (2013)
## Materials used for Study

<table>
<thead>
<tr>
<th>TYPE OF DATA</th>
<th>YEAR OF PUBLISHED</th>
<th>SOURCE</th>
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<tbody>
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<td>IRS-P6, LISS-III</td>
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<td>NRSC- Hyderabad</td>
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<td>Spatial Resolution = 23.5 Meter.</td>
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<td>Swath = 114 KM.</td>
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<td>2011 (Kharif &amp; Rabi Session)</td>
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<td>ASTER &amp; SRTM DEM (30 &amp; 90 Meter)</td>
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<td>GLCF Website</td>
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<td>Landform</td>
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<td>NATMO (Bankura), Kolkata</td>
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<td>Toposheets</td>
<td>1972 (First Edition) (73I/11,14, 15 &amp; 16)</td>
<td>Survey of India (Kolkata)</td>
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<td>Sub-Surface / Ground water</td>
<td>3rd &amp; 4th EMI Report</td>
<td>SWID, Kolkata</td>
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<td>Meteorological Data</td>
<td>1993 to 2011</td>
<td>Indian Meteorological Department, Kolkata</td>
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<td>Soil Data</td>
<td>1991</td>
<td>NBSS &amp; LUP, Kolkata</td>
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<tr>
<td>Socio economic data and Soil Sample</td>
<td>2010 to 2013</td>
<td>Repetitive field survey.</td>
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</table>
Methodology of Study

Micro-Watershed Management (Water Resources)

- Water Scarcity
- Drainage Morphometric
- Run-off
- Sediment Yield Index
- Societal parameters

Multi-Criteria Evaluation (AHP)

Micro Watershed wise Action Plan (Alternatives 1, 2 & 3)

Water Resources Management

Flow chart of the work
Conclusion

- Special Information technology has emerged as a powerful technique for cost effective data acquisition within a short time at periodic intervals.

- Evaluation of watersheds after the treatments is necessary to find the effect of conservation practices and further planning to control runoff and sediment yield.

- Most of the villages are in serious condition in dry seasons as do not they have the minimum quantity of water. So assigned high priority for taking immediate action.
Due to low availability of water they cannot cultivate therefore economically backward.

The sole factor in the success of any water harvesting system is the proper selection of the site, type of structures as per the physiography of the area and the methods to be used.

Nano-watershed wise future study is necessary for local level implementation if micro watershed not covered.
References


THANK YOU
FOR YOUR
KIND ATTENTION

SUGGESTION FOR DEVELOP
MY STUDY

4kbrsgis@gmail.com