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Neemrana Ground Water Management Initiative:

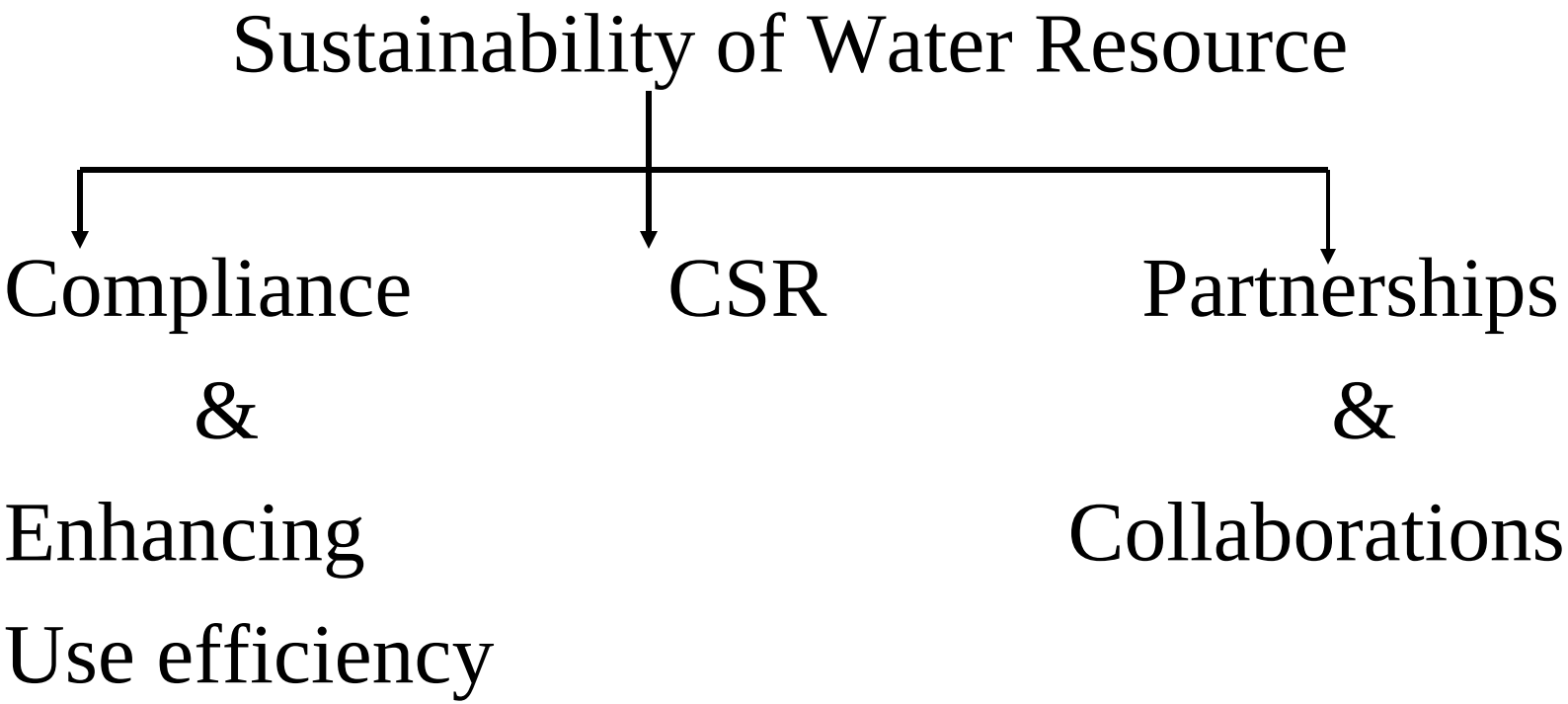
A Model for collective governance

by

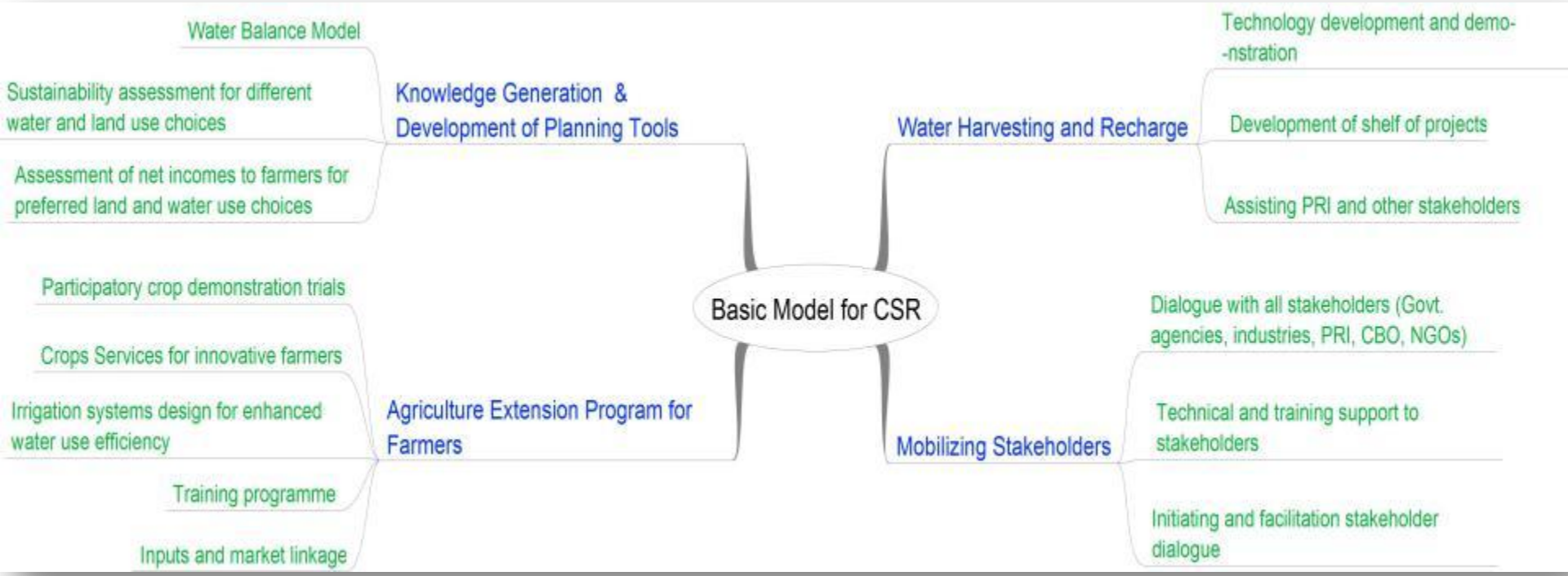
Meenakshi Sharma - SABMiller India

Vinayak Damle - Confederation of Indian Industry

Sustainability of Water Resource



Basic Model of Corporate Initiative



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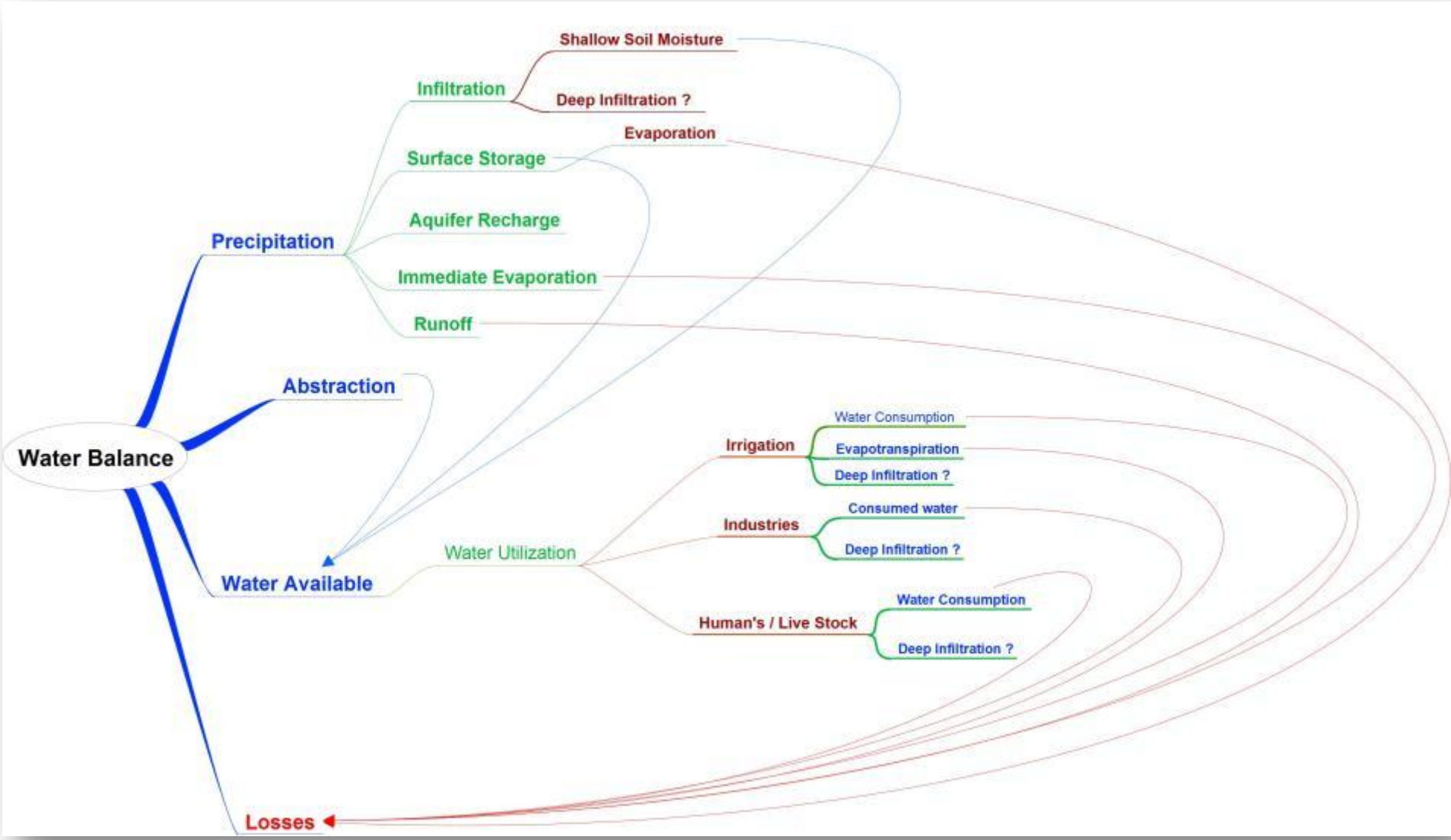
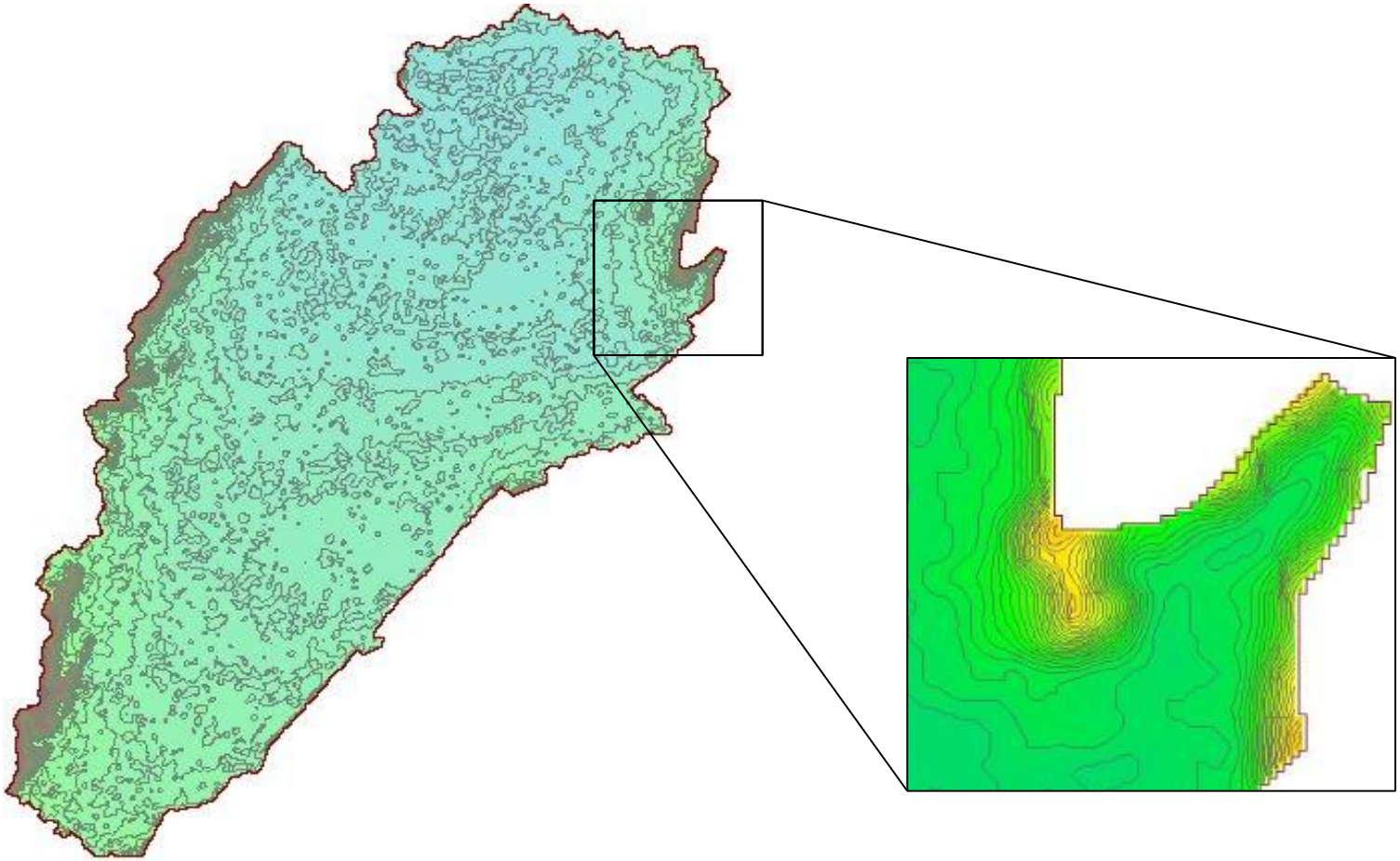
Framework – Water Balance



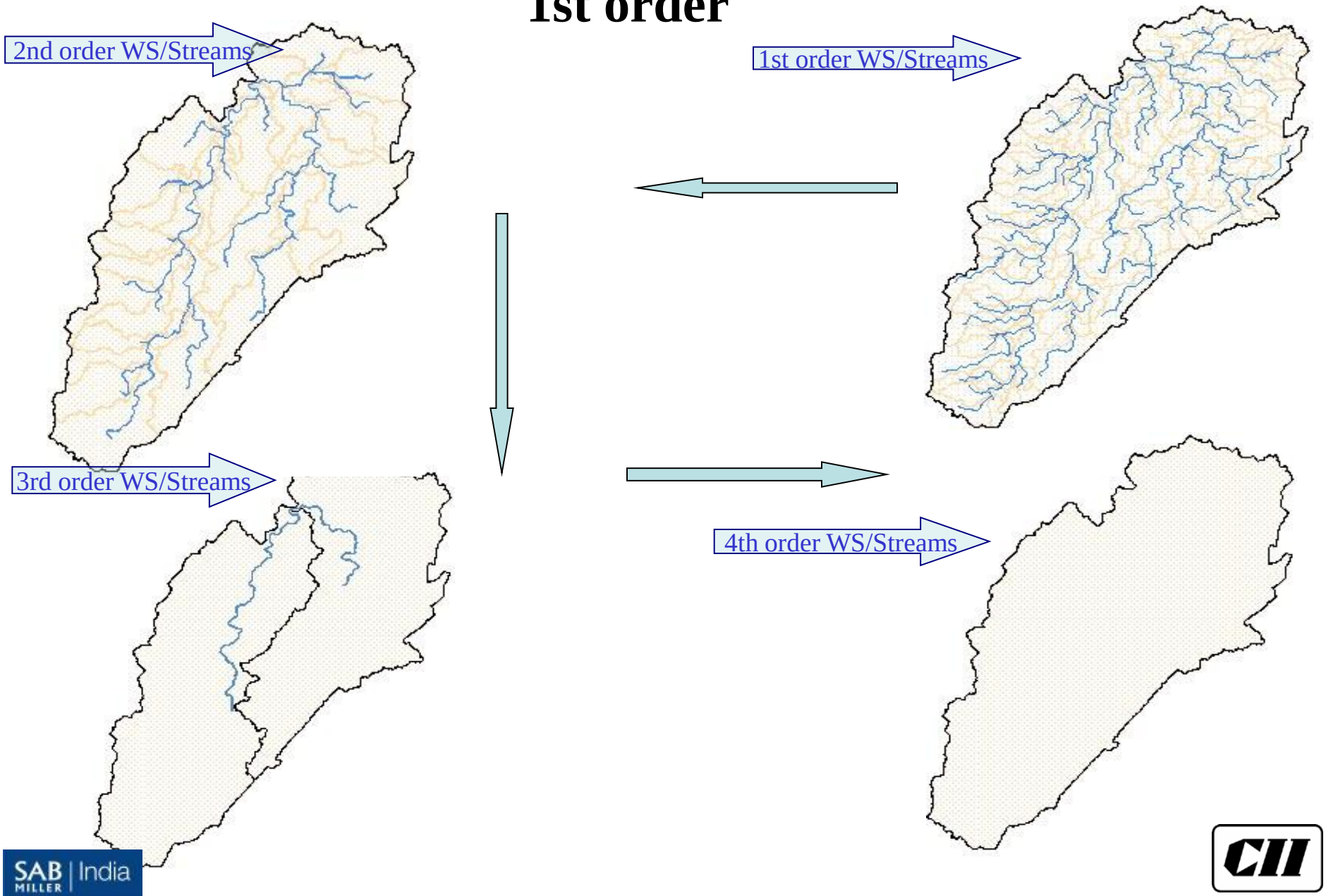
1st Step in Project Planning: mapping

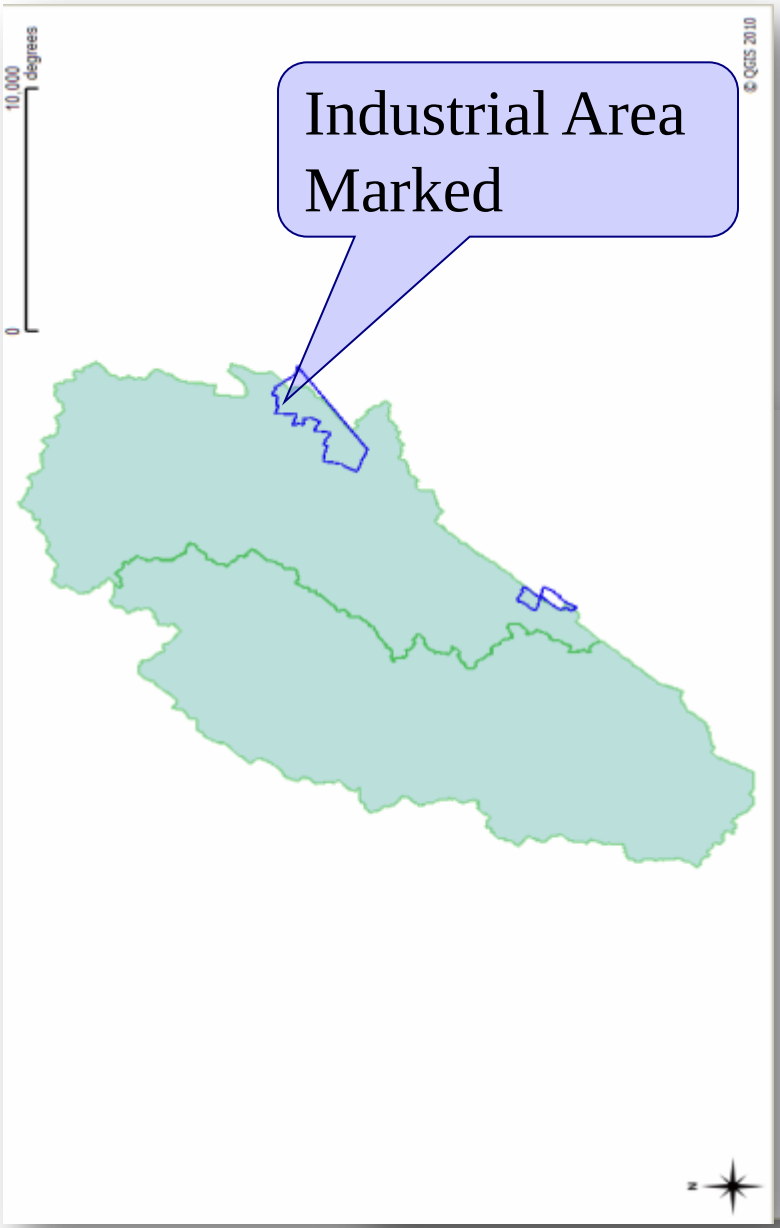
Area Demarcation of > Watershed basin on the basis of ridgeline

Contours Derivation 5m from DEM



Process of Water Balance: cascading starting from 1st order




Industrial Area Marked
0
10,000
degrees
© QGIS 2010
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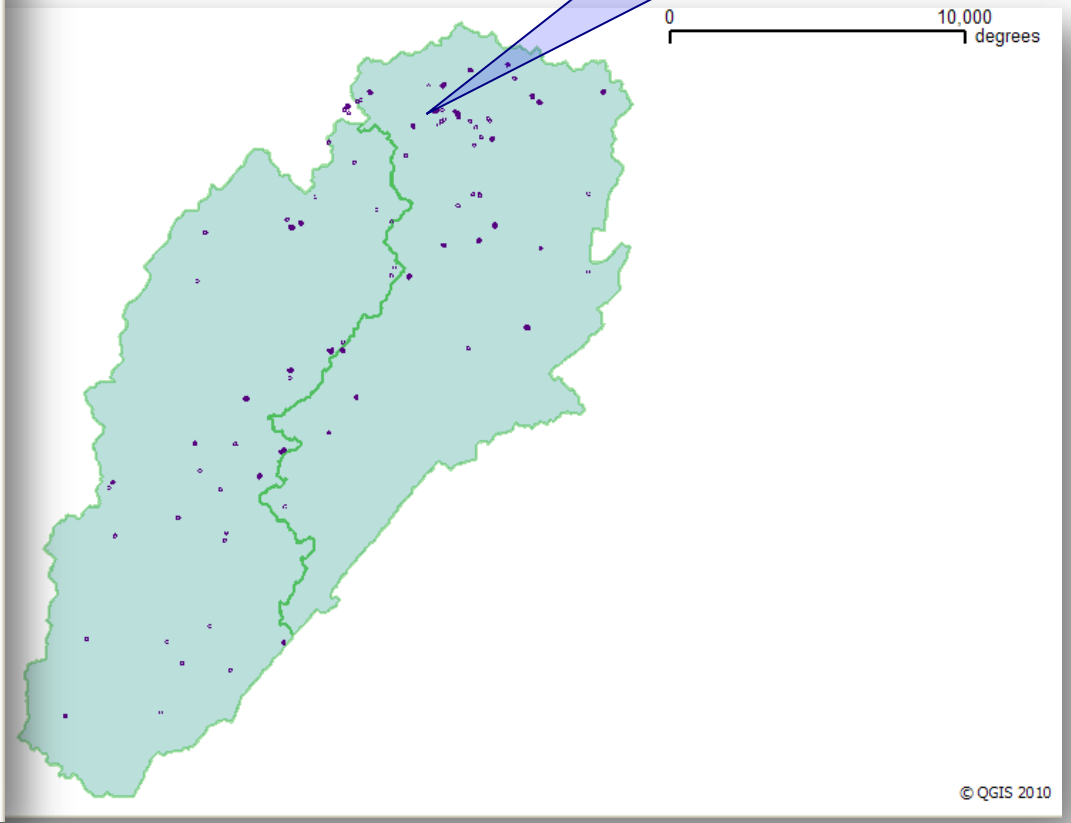
Existing Water Bodies Marked
0
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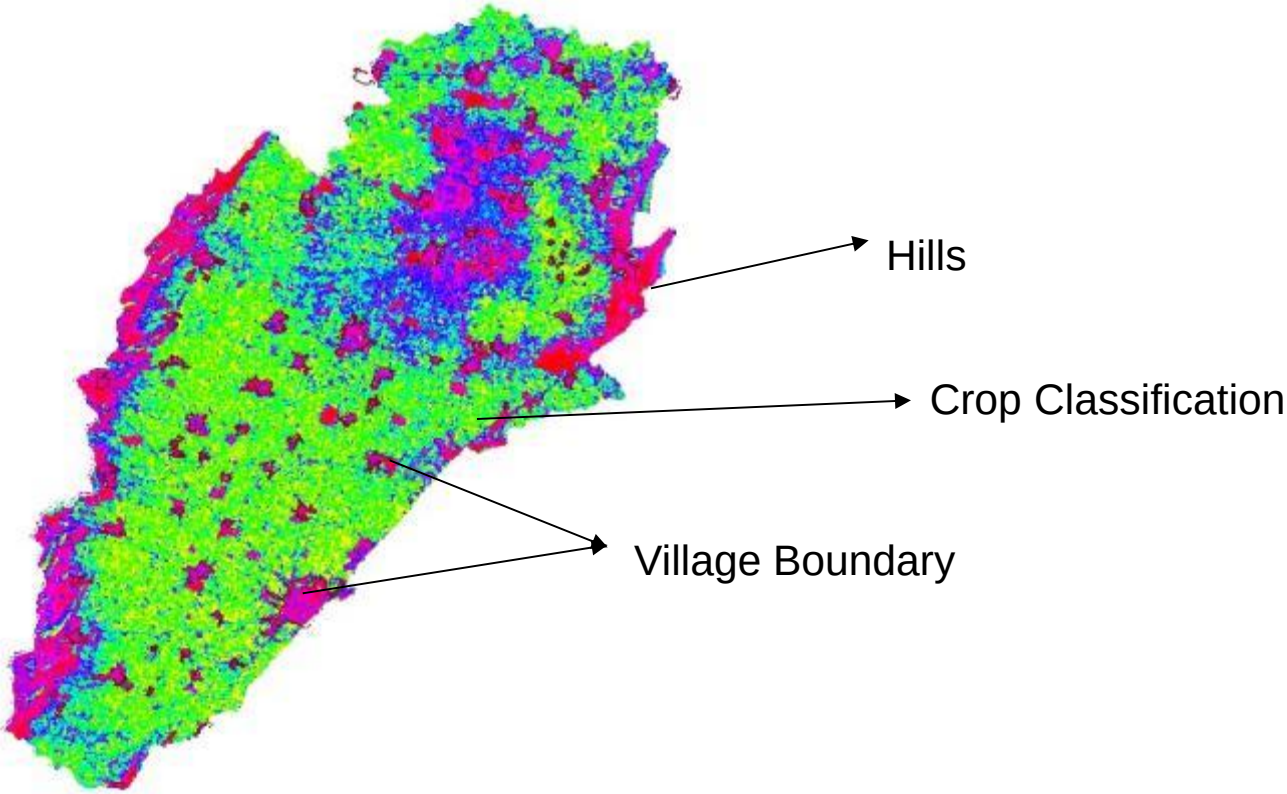
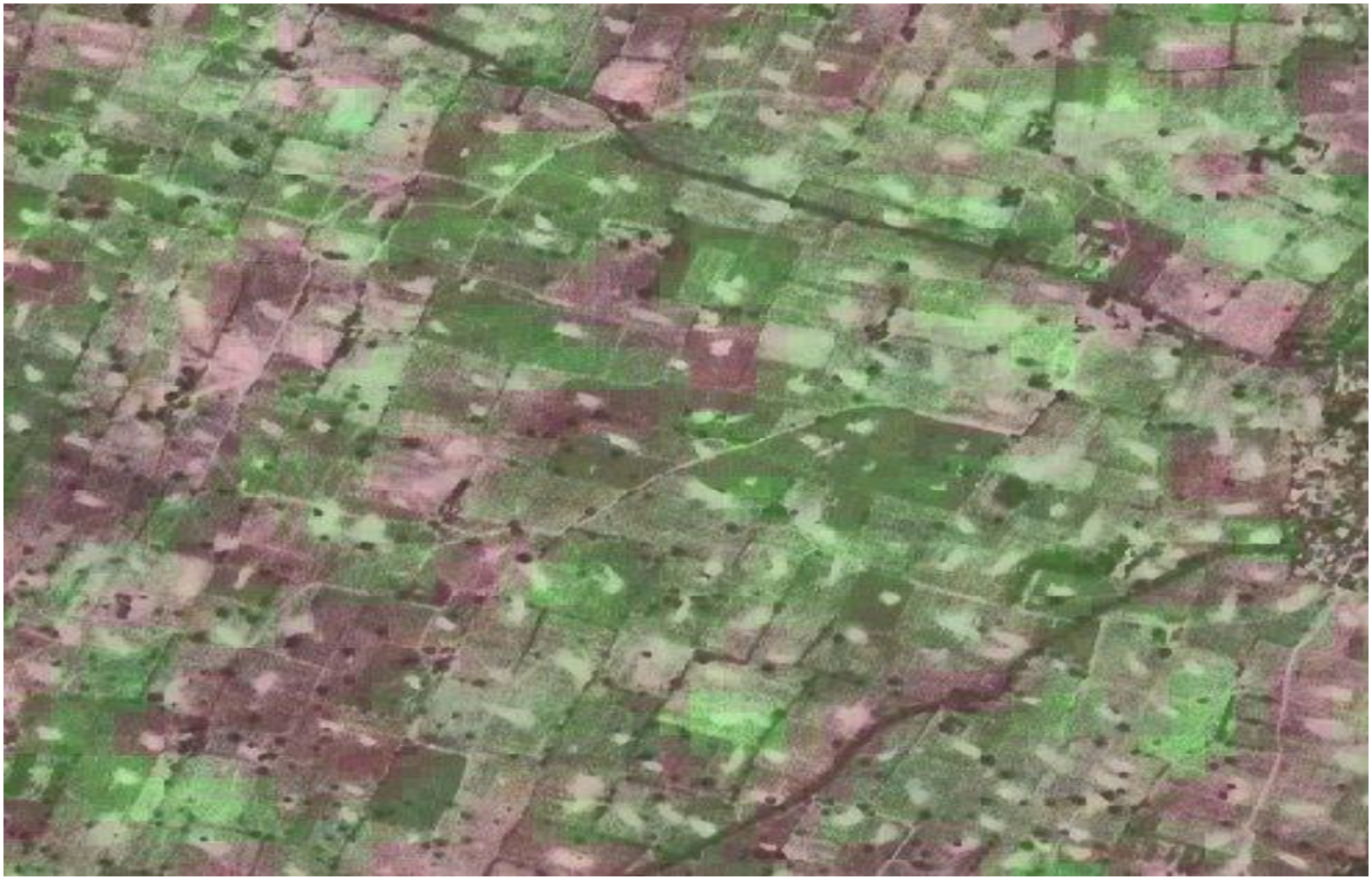
degrees
© QGIS 2010

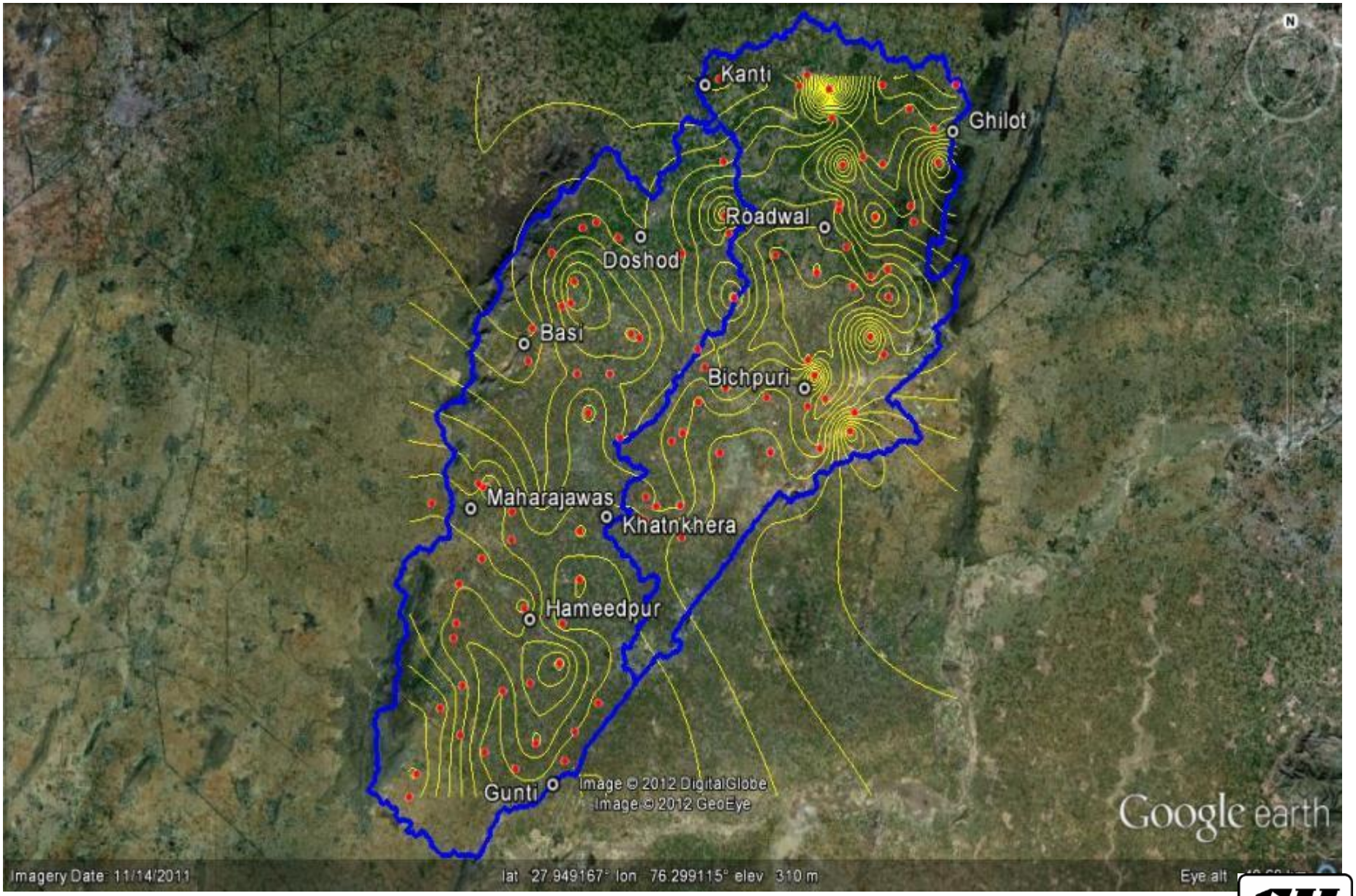
LISSIII 07 Feb 2006



Overlay of LISS Classification on Cartosat-I



Water level contours for the entire target area



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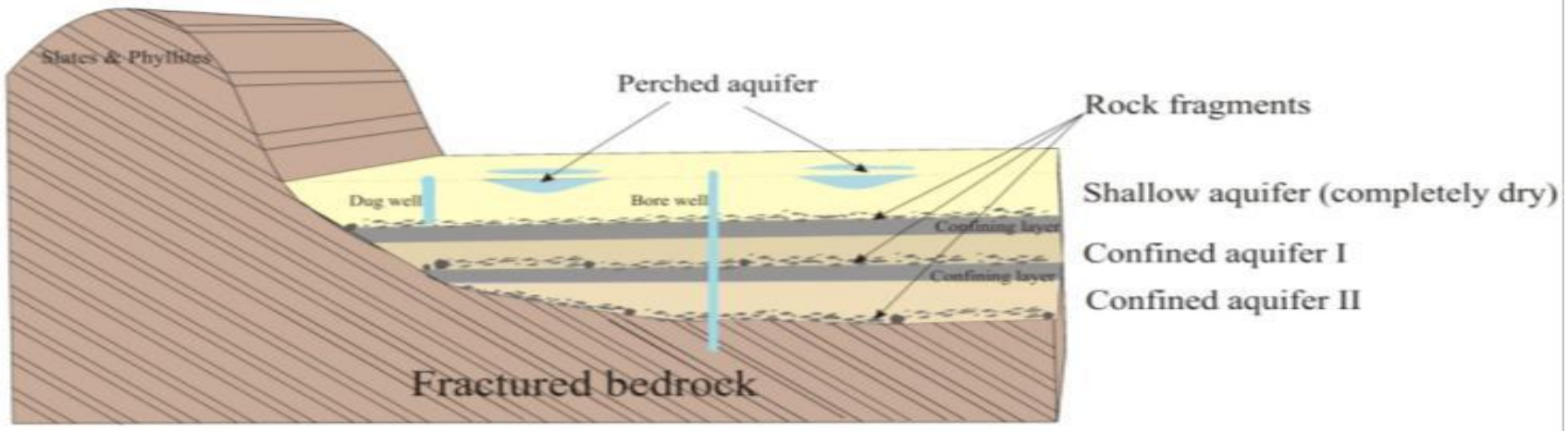


FIGURE NOT TO SCALE

Field data collection to carry out water balance of the area

Strategies for Recharge

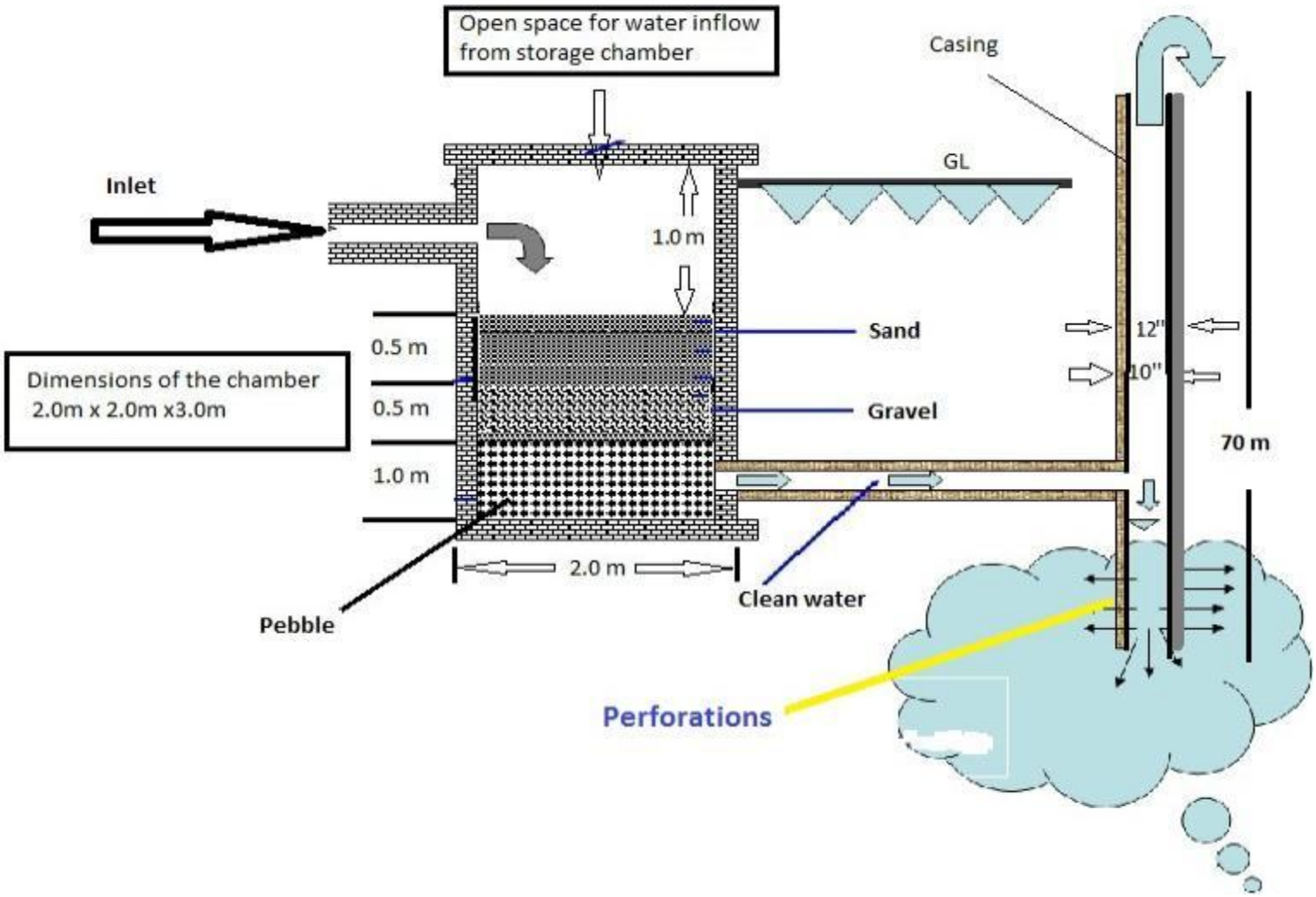
Run-off estimates

- By Rational method (Rainfall intensity basis)
- By Curve number method (Antecedent moisture content basis)

Technology for ridge areas

Runoff water directly penetrates to deep aquifer through opening in rocks.

Conceptual Model of Recharge Shaft



Technology for plain areas where drainage exists

- Construction of stone masonry or improved gabion structure across the drainage channel.
- Introduction of artificial recharge shaft in the ponding area.

Masonry check dam with artificial recharge system

Improved Gabion structure

Gabion structure

Technology for plain areas with totally obliterated drainage system

- Dug out pits in low lying areas, a few being constructed presently.

Improved water use efficiency through improved irrigation techniques

Particulars	Sprinkler Technology	
Crop	Bajara,	Bhindi
Variety	MP-7792, Paineer - 86M52, Shona-16	Mhyco-10
No. of Villages Covered	30	10

Irrigation Number	Time duration, min	Water Applied, m3
1	300	77.94
2	300	77.94
3	270	70.15
4	300	77.94
5	240	62.35
6	210	54.56
7	360	93.53
8	300	77.94
9	360	93.53
10	120	31.17
total	2760	717.05

This is for participatory crop demonstration trials on 0.2 ha plots. The conventional practice is minimum 960 m^3 water through 8 irrigations. That is a minimum saving of 25% for practices that can be promoted in a short duration – not high end practices that require longer duration for adoption.

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Wheat Crop trails

Cluster bean Crop trails

Results of Participatory Crop Demonstration Trials

	Cost Details	Bajara	Okra
Under conventional crop & irrigation management practice on 0.2 ha area	Cost of Seed, Rs	250	900
	Cost of Major Nutrients, Rs	445	610
	Cost of Micro Nutrients (Zn, Br, S, etc)	0	0
	Total Inputs Cost, Rs	695	1510
	Total Production, qt	6	12
	Gross Income, Rs	4,800	18,000
	Net Income, Rs	4,105	16,490
Under INM (Integrated Nutrient Management) Participatory Crop Demonstration Trial	Cost of Seeds, Rs	290	3600
	Cost of Major Nutrients, Rs	300	388
	Cost of Micro Nutrients (Zn, Br, S, etc)	200	235
	Total Inputs Cost, Rs	790	4223
	Total Production, qt	12	30
	Gross Income, Rs	9600	45000
	Net Income, Rs	8810	40777
	Increase in Net Income	4,705 (+114%)	24,287 (+147%)

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Water Resource Sustainability Scenario

Gap in Ground water Abstraction and Recharge

- Total estimated abstraction = 65.35 Mm3 (238 mm)
- Total estimated deep recharge = 6.27 Mm3 (22.86 mm)
- Estimated gap between recharge and abstraction = 59.08 Mm3 (215.14 mm)
- Therefore estimated annual decline of groundwater level = 0.71 m
- The actual observed average annual decline of groundwater level = 0.9 m

Enhancement of natural recharge

- Estimated deep ground water recharge from ppt through natural process: 6.27 Mm3 (22.86 mm, 3.5% of ppt)
- Deep infiltration from ppt:119.31 Mm3 (434.7 mm, 66.51% of ppt)

Potential for artificial recharge

- Estimated run-off = 53.81 Mm3 (196 mm)
- Total required artificial recharge = 42 Mm3 (153 mm) i.e. 78.05% of the total runoff.

Potential for water saving in agriculture

- Potential for water saving in groundwater irrigation in agriculture = 30% or 17.08 Mm3 (62.14 mm)

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Institutionalising sharing of knowledge

- Development of a resource center for putting all knowledge and information in public domain
- Providing online assistance to farmers and other stakeholders

Challenges

- Corporate capacities
- Limitations of Government schemes and programmes
- Managing convergence

	Corporate/ SABMiller	Apex body/ CII	R&D/ Resource Organisations/ ACWADAM	Grassroot NGOs/ HUMNANA	Govt./ CGWB/ RIICO	Donors – Innovative Programs
Knowledge generation	✓	✓	✓		✓	✓
Augmentation (Ground water recharge)	✓ ✓				✓ ✓ ✓	✓
Water use efficiency in Agriculture	✓	✓		✓ ✓	✓	✓
Stakeholder dialogue	✓	✓ ✓		✓		
Convergence of govt. programmes				✓	✓	
Resource Centers – activities, information, web sites	✓ ✓	✓	✓		✓	

✓ : Activities being conducted by primary partners – SABMiller, CII, ACWADAM, Humana

✓ : Activities being conducted by other collaborating stakeholders in a small way – other industries, Rajasthan Industrial and Investment Corporation (RIICO)

✓ : Upscaling – Government, Donor Agencies – needs to happen in a big way

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Thanks