Drought vulnerability assessment and institution building for effective watershed management in arid and semi-arid regions of Andhra Pradesh, India

Dr Suvarna Chandrappagari,

Indian Forest Service

suvarnac@yahoo.com

Presentation Structure

Basic details of water related aspects in Andhra Pradesh

Watershed programmes taken up so far

Research issues and evaluation

Perspective plan of Integrated watershed management Programme (IWMP)

Implementation processes and institution building

Project components, activities and convergence

State Land and Water Profile

Total Geographical area	27.5 mi.ha
Waste Land and degraded land	11.5 mi.ha
Normal annual average Rainfall	896 mm
Total Volume of water recd. per annum	8631 tmc
Evaporation & Evapo-transpiration	3538 tmc
Surface Runoff	3452 tmc
Soil Moisture	863 tmc
Ground water recharge	777 tmc

- 40 drainage basins, 81 sub basins of major and minor rivers, 1229 ground water assessment units of 100 to 300 sq.km size
- 94 GW assessment units and 2123 villages fall under over exploited category

Various Watershed Schemes implemented through Rural Development Dept

- Drought Prone Areas Programme (DPAP) 1973 (Watershed Approach from 1987), regular projects from 1994-1995
- Desert Development Programme (DDP)..1994-95
- Integrated Wasteland Development Project (IWDP) - watershed approach from 1989
- Andhra Pradesh Rural Livelihoods Project
- Integrated Watershed Management Programme (IWMP)

Evolution of Watershed Guidelines

- Prof. C.H. Hanumanth Rao Committee Guidelines 1995 Participatory & Integrated approach (1995-96 to 2001-02).
- Hariyali Guidelines 2003 Implementation through local government.
- Common Guidelines 2008 of Department of Land Resources (Cluster Approach, Revised Cost Norms and area limit)

Important Research issues

- Issue of scale in terms of planning and managing WSD in hydrological (Basins to Hydrological units) and social terms
- Strong institution building for addressing equity and sustainability issues
- Need for an integrated approach for evaluation of WSD where comprehensive analysis of social aspects (livelihoods, farm typology etc) are interpreted in terms of the hydrological realities
- Need for tools to evaluate how WSD programme can be assessed in relation and conjunction to other policies

ACIAR (Australian Centre for International Agricultural Research) projects on WSD in AP

1. *Impact of meso-scale WSD in AP and implications for designing and implementing improved WSD policies and programmes*

- Integrated livelihoods based model
- Surface & groundwater modelling for improving access to groundwater-Baynesian network modeling keeping in view the land use Patterns, rain fall patterns and intensity
- Assessing the cost effectiveness and water related resilience and equity outcomes of stakeholder defined possible future scenarios
- Developing integrated approach

ACIAR (Australian Centre for International Agricultural Research) projects on WSD in AP

2. Enhancing institutional performance in WSM in AP

- **Analyzing decentralized natural resource governance**
- **Structural equation modeling**
- **Different rationalities (technical, financial and organizational) within institutional settings**
- **Performance of WSD ..linkages to institutions (local government body, watershed institutions, women's groups, NGOs..)**
- **Equity issues (landed vs landless, gender etc)**

ACIAR (Australian Centre for International Agricultural Research) projects on WSD in AP

3. *Impacts of climate change and WSD on whole-of-Basin agricultural water security in the Krishna and Murray-Darling Basins*

- **Assessing combined impacts of WSD and climate change on stream flows in the sub-basin**
- **Collation of additional data on watershed structures and development**
- **Remote sensing of land surface for integrated hydrological modeling**
- **Assessing down stream trade-offs, requirement for more water storage structures and weather forecasts**

ACIAR (Australian Centre for International Agricultural Research) projects on WSD in AP

4. *Developing multi-scale adaptation strategies for farming communities*

- **Assessing adaptive capacity and determine farming systems typologies at local and state levels amenable to cropping and water management based adaptation strategies**
- **Developing cropping systems model (agricultural production systems simulator)**

Evaluations

- **Third party evaluations tried to bring out impact of programmes.. positive as well as negative**

State Perspective Plan of IWMP

Item	Details	
	No.	Area (mi ha)
Total no. of micro-watersheds in the State	46,035	27.50
Total no. of untreatable micro-watersheds (Reserve Forest, Barren Rocky, flow irrigation)	18,454	9.22
Total no. of treatable micro-watersheds in the State	27,581	18.27
No. of micro-watersheds covered under different schemes (including projects sanctioned during 2009-10 under IWMP)	10,465	5.26
Balance no. of micro-watersheds not covered till date	17,116	13.01
Proposed Area for treatment under IWMP up to 14th Plan	11,474	8.72

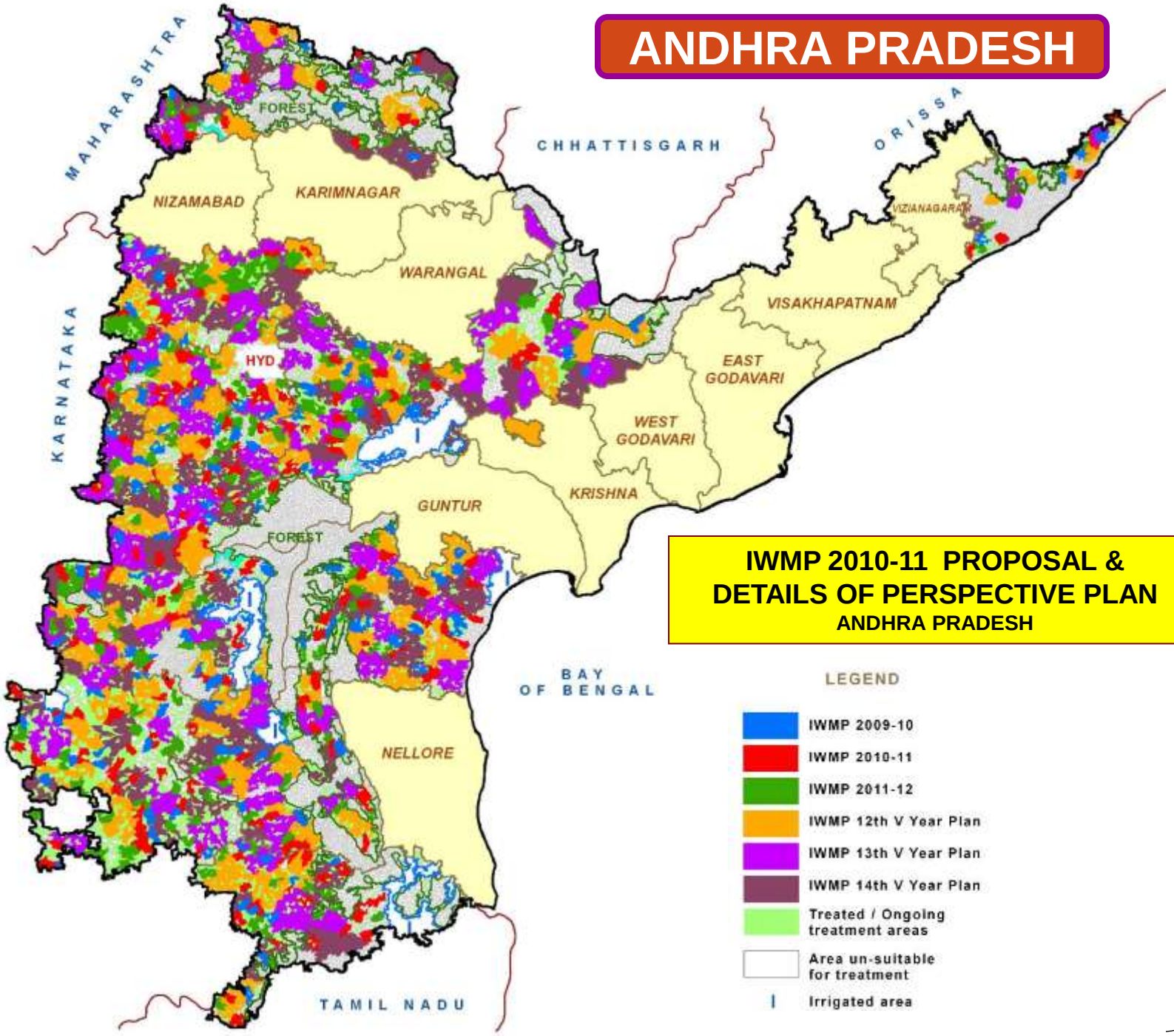
Selection criteria followed by the State for proposing New Projects

S. No.	Criteria
i	Poverty index (% of poor to population)
ii	% of SC/ ST population
iii	Actual wages
iv	% of small and marginal farmers
v	Ground water status
vi	Moisture index/ DPAP/ DDP Block
vii	Area under rain-fed agriculture
viii	Drinking water
ix	Degraded land
x	Productivity potential of the land
xi	Contiguity to another watershed that has already been developed / treated
xii	Cluster approach in the plains (more than three contiguous micro-watersheds in the project)

Programme coverage

- 552 IWMP projects covering 2.4 mi. ha with financial outlay of approx. $ 550 mi
- Convergence with line agencies and relevant schemes in all the villages and capacity building activities
- Extensive use of remote sensing data and GIS
- Natural resource management activities, production systems enhancement and livelihoods for the assetless as key components
- Placing social audit systems, transaction based software and electronic fund management for transparency and accountability
- NGO involvement as partners in implementation, training & capacity building

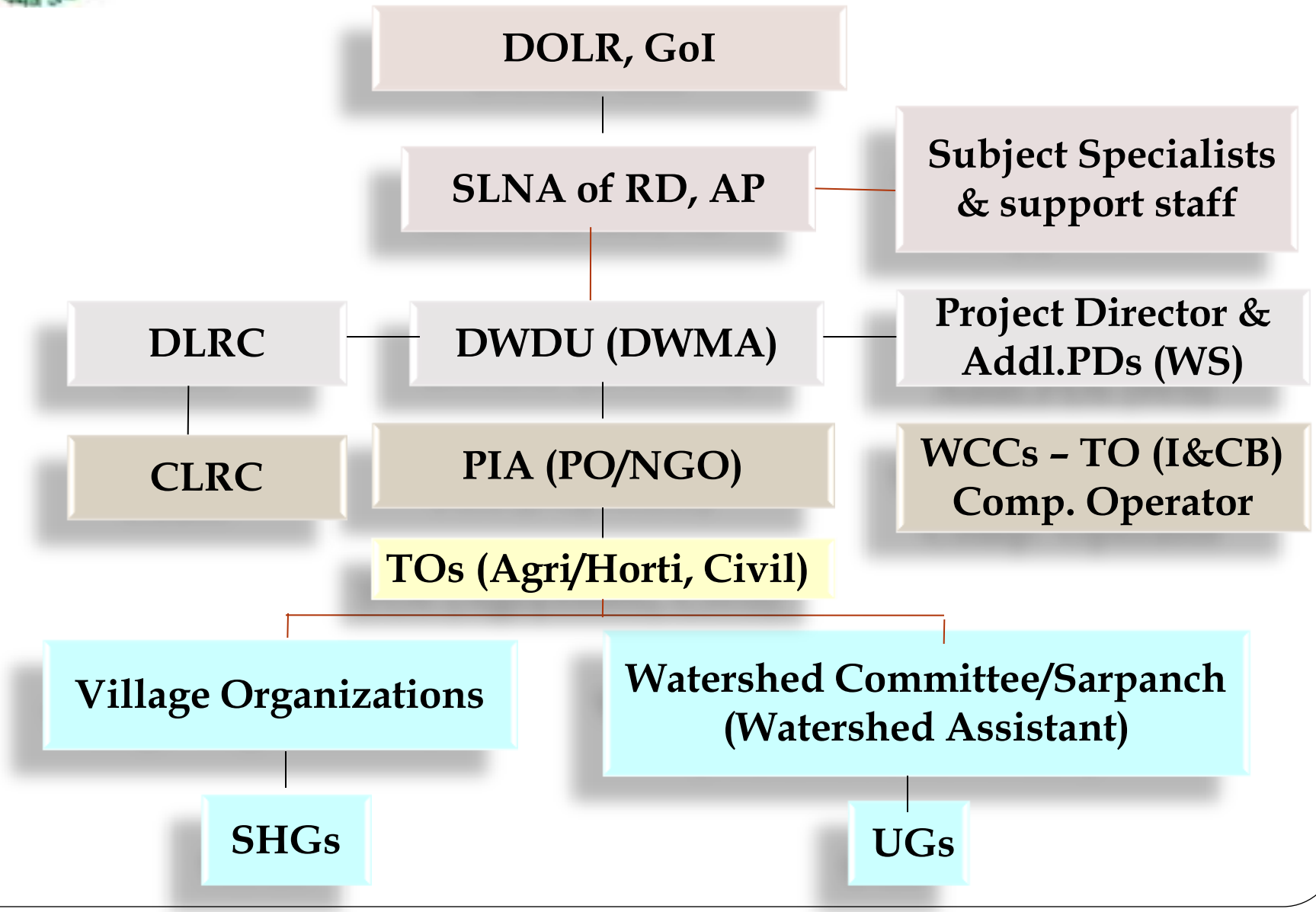
ANDHRA PRADESH



IWMP 2010-11 PROPOSAL & DETAILS OF PERSPECTIVE PLAN

ANDHRA PRADESH

Institutional Arrangements



Project Implementing Agency

Establishment of Watershed Office

Office space

Staff

Computer peripherals

Internet Connectivity

IWMP Software

Opening of Bank A/C

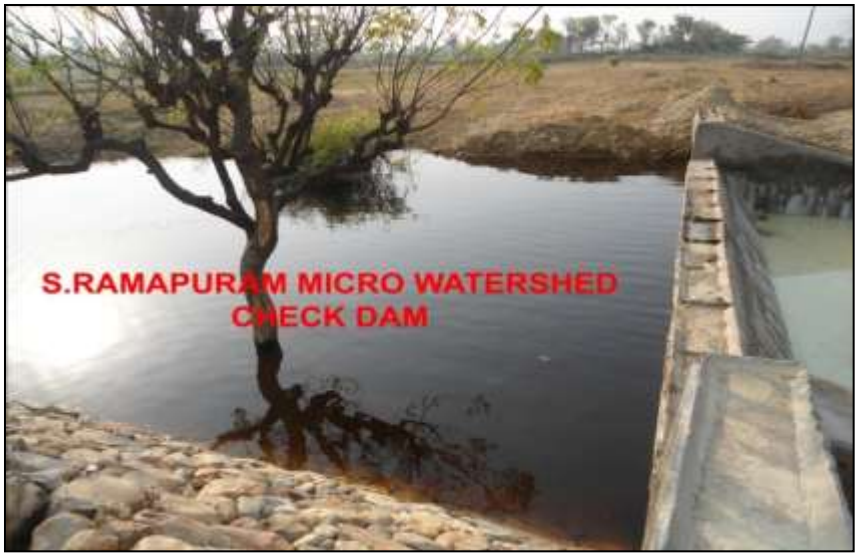
Digital Key

Institution Building Strategy - Watershed Development Fund Management

- Promotion of area based user groups (UGs) with land holding households and linking with SHGs
- Watershed committee as sub committee of local government
- Village Organizations (VOs) as implementing channels for productivity enhancement & livelihood interventions.
- Drought adaptation initiatives; land development, water use, appropriate agronomic practices and livelihoods plans along with proper monitoring mechanisms

Kalajata Programme Ulvanuru GP Palvancha(md)

Natural Resource Management works



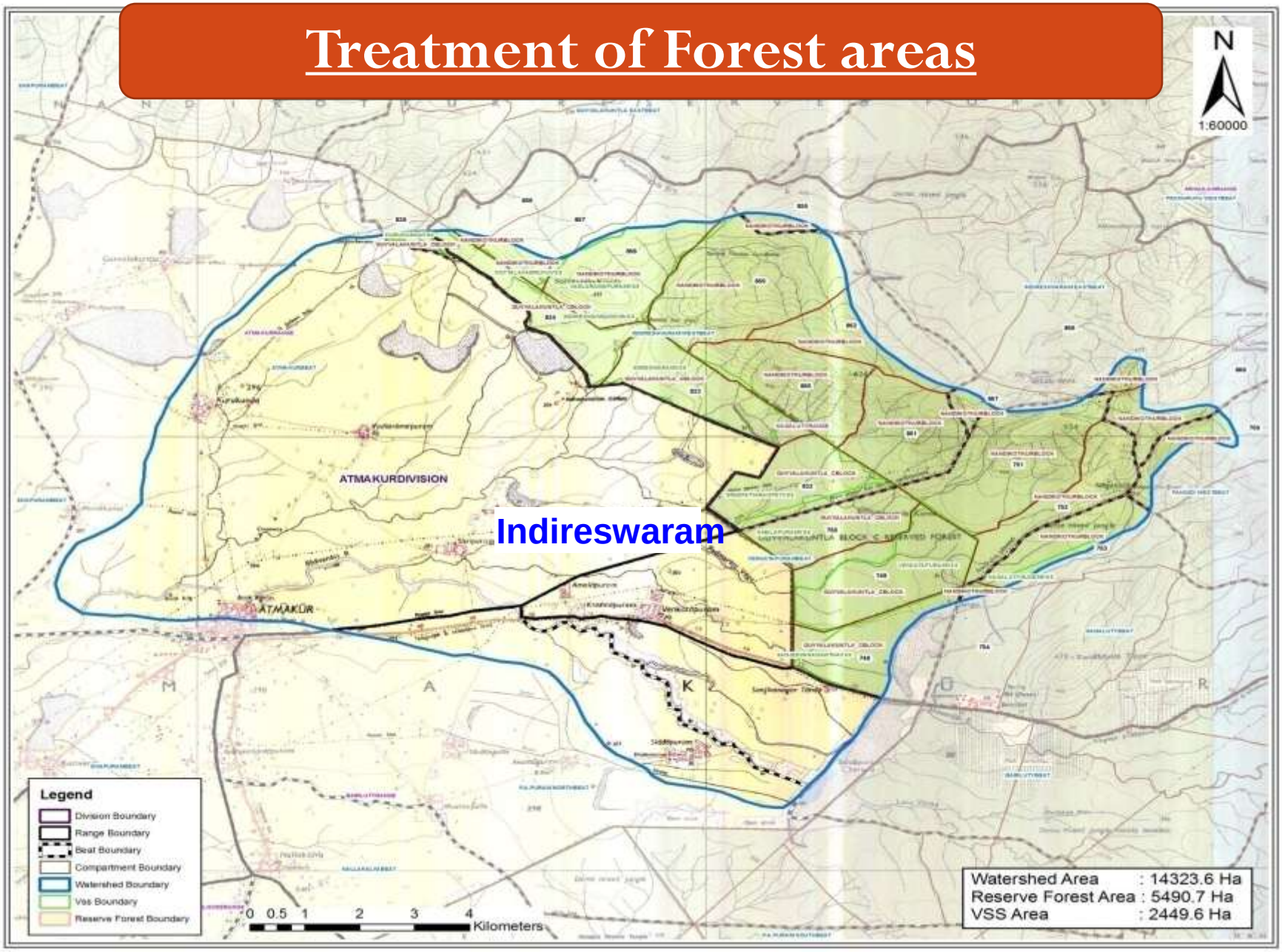
Check Dams

Percolation Tanks

Dry Land Horticulture works

Fodder development

Treatment of Forest areas



Production Systems improvement

Compost pits

Conservation Furrows

Non Pesticide Management shops

Animal Husbandry activities

Community based Interventions	Individual Based Interventions (on 50% contribution)
❖Animal & sheep Health Camps, ❖ Infertility Camps, ❖Supply of Trevices, ❖Electronic Milk Testing ❖Machines and Castrators	➢Supply of feed to Milch animals ➢Mineral Mixture to Milch animals ➢Breeding Rams ➢Supply Backyard Poultry Units of 10 birds

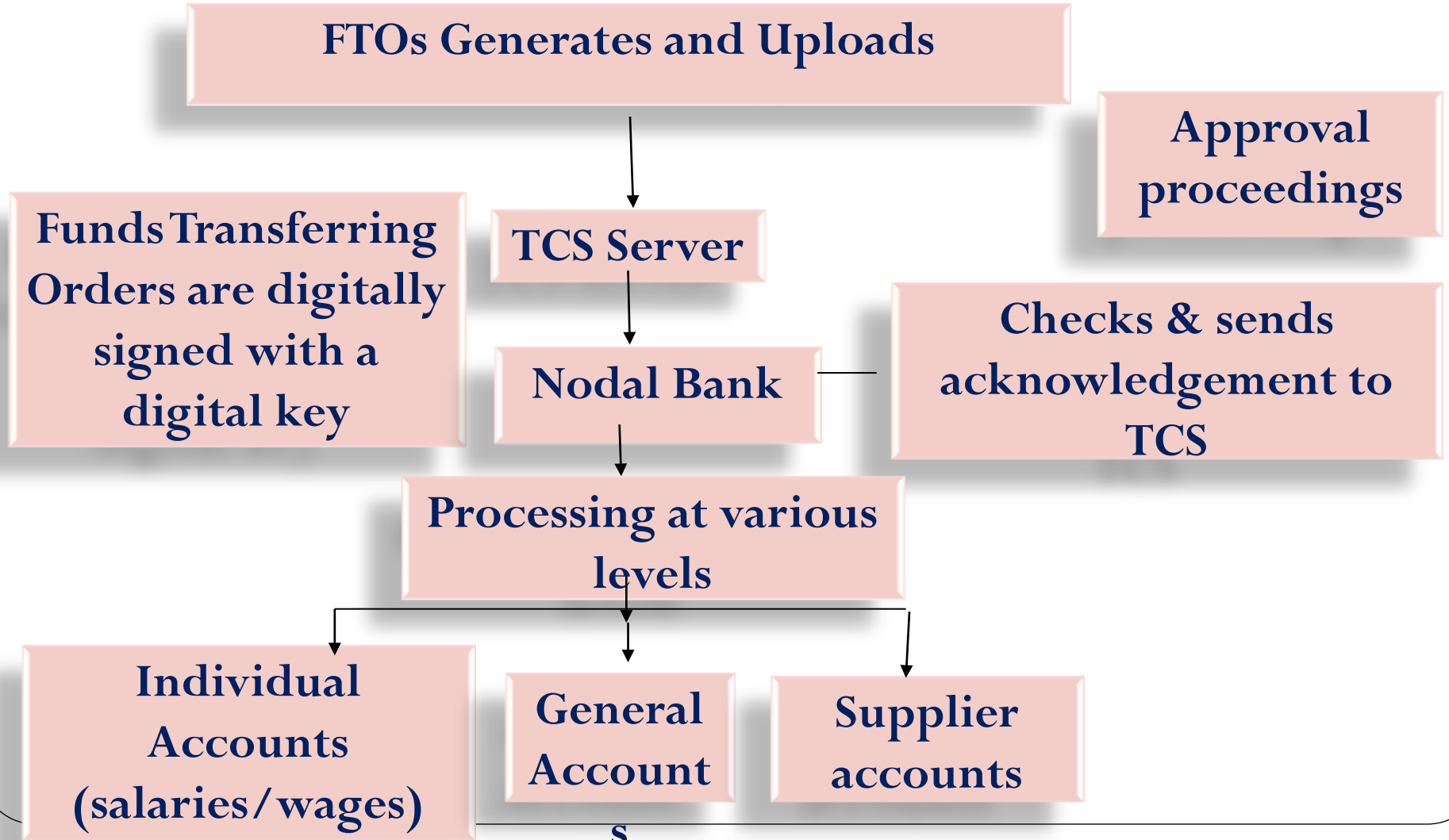
Livestock Production Systems improvement

Breeding Rams

Mineral mixture & dewormers distribution

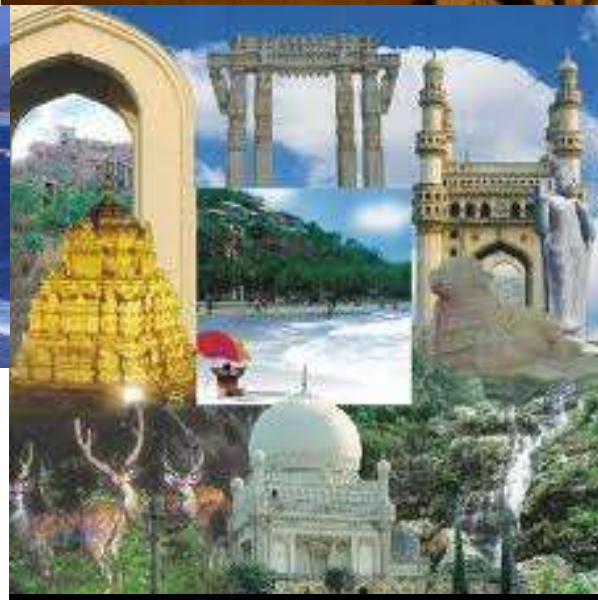
Silo pits

Electronic Fund Management System (EFMS) in IWMP







Thank You!