Integrating Traditional Knowledge With Modern Technology to Manage Drought in Local Communities using e-PRA (Participatory Rural Appraisal) and Google Earth Imagery

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(Watershed Support Services and Activities Network)

A resource organisation working on the issues of **rainfed landscapes** in India.

It works with a focus on **natural resources management, regenerative agriculture** and **strengthening local circular economies**.

WASSAN works across India with communities, networks and Government.

www.wassan.org

Research & Network

- Central Research Institute for Dryland Agriculture
- Central Institute for Agriculture
 Engineering
- National Bureau of Plant Genetics Research (NBPGR)
- National Bureau of Animal Genetics Research (NBPGR)
- Indian Institute of Rice Research
- MANAGE
- National Rainfed Areas Authority (Knowledge Partner)
- University of Agriculture Sciences, Bengaluru
- Odisha University of Agriculture and Technology
- CSIRO, Australia
- University of Cambridge, UK
- University of Greenwich, UK

Government

- Ministry of Agriculture, Department of Agriculture and Farmer Welfare
- Department of Agriculture / RYSS-Andhra Pradesh
- Department of Tribal Welfare and Development – AP
- Department of Women & Development, Telangana
- Department of Agriculture, Odisha
- Department of Tribal Welfare and development, Odisha
- Department of Rural Development, Jharkhand
- NRAA, Ministry of Agri, Govt of India
- National Bank for Agriculture and Rural Development, NABARD
- National Disaster Management Authority (NDMA)

WASSAN anchors :

- Network Hub of Revitalising Rainfed Agriculture Network (RRA Network)
- Secretariat of the National Coalition for Natural Farming (NCNF)

WASSAN works with over 100 grassroots organisations across the country – supporting them in building their implementation capacities, innovations, networking and policy development through networking and coalitions.



Rainfed Areas of India

- Rainfed areas accounts for 52 % of net cultivated area, about half the total population of the country and two-thirds of livestock strength.
- Rainfed areas are the most susceptible and vulnerable to the negative impacts of Drought and Dry Spell
- Contributes to 40% of total food grain production (40% - Rice, 89% millets, 69% - oilseeds, 88% -Pulses)

Context of the Case Study

- A national level JIVA-Agroecology program
- WASSAN is developing the approach & participatory methods for landscape based agroecology transformation
- The methodology evolved **blending** indigenous knowledge of the community with GIS tools



Participatory appraisal by the community to arrive at crop choices and agro-ecological methods to address drought and other climate vulnerabilities

Land Use Classifications :

Indigenous knowledge vs USDA classifications

| USDA Classification | Indigenous/ community classification |
|---|--|
| Purpose for which it is being used I to VIII classes based on parameters like: Slope, Soil attributes, Topography, Drainage, Climate | Includes slopes (and if it is terraced), soils, soil depth, moisture levels across seasons Suitability of crops (and crop varieties) w.r.t. each land type & risks (evolved over years) |
| | |

The challenge before us is to build upon the community's **rich understanding** of their landscapes, their indigenous classifications, and **to evolve crop systems** suited to managing drought and other risks in the present context

Part A E-PRA (Participatory Rural Appraisal)



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e-PRA

A Tool for Spatial visualization with indigenous Knowledge of community

Used in Participatory planning process

Step 1: List the different land types and their use (land use) on cards, along with their names and characteristics used commonly in the village.

Step 2:

- Map the drainage lines, forests and other landscape features
- Enable community to demarcate each of the land types on the Google Earth map

Step 3: Digitize the features marked gives the ground-truth high resolution digital map of the landscape with a repository of indigenous landscape knowledge.

These maps can be easily related to the standard scientific classification of LULC or USDA classification – as all the parameters are captured in the indigenous classification.

E-PRA Field Exercise

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Mapping the Lanscape Features on Google Earth Integration of spatial visualization with traditional Knowledge of community

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Community Resource Person Explaining the Map Generated Through E-PRA Activity



Mallaigudem Watershed Land types - Local Classification: IsukaNela: Sandy Palachowdu: saline soils Gelusu: Saline+murram+ tiny pebble soils Digitization Malkinudem of Locally Identified **PusanGuncu** Land Types TatinagulaGumpu

Ramannagudem

Habitations
 WaterBodies
 Drainagelines

Legend

LandTypes

Gelusu

Grazing land Forest

IsukaNela

WatershedBoundar

PalaChowdu

KundaThogu

Dibbagudem Pancivalgudem

Land Use Based on Irrigation Practices



Water Resource Map & its Characteristics



Current Land Use Map – Crop Details



Current Land Use Map - Horticulture



Part B – Fasal Chakra; Crop Cycle

Exploring Crop systems, varietal diversity, crop Calanders and climate risks in each Land Types



Fasal Chakra

Participatory method to explore crop systems in each land types, their trends & vulnerabilities at the landscape level.

- Concentric circles divided into months.
- Inner circle captures the local understanding of rainfall pattern
- Each circle represents an identified land type.
- **Crops** cultivated in each of the land types, their operations, **sequence** .. are captured in each concentric circle; including the **varietal diversity**
- Trends and climate risks (nature and intensity) are marked across months.
- Crop rotations and periods when the soil is not covered are also marked.
- The interaction and notes provide deeper insights on the **interconnectedness** of crop systems with land types, soil characteristics, risks and climate uncertainties.



- ★ Cropping Pattern
- ★ Land Use details based on land type
- ★ Rainfall Details
- ★ Crop Details (Crop verities and its special traits
- \star Seasonal Fallow
- ★ Risk Analysis







Exploring Action Areas

- Risk Analysis
- Regenerating fallows
- Increasing the soil cover duration
- Food Systems Analysis
- Exploring Trends

Participants

It is important to select a cross section of farmers – who cultivates various types of land i.e. upland, mid-land, low land etc., in different parts of the landscape. A mix of people – old and young, women and men, small and marginal and large farmers etc., adds value to the exercise.

Planning on Selection of Cropping Systems

- **Diversified** and multi-crop systems
- While the main-crop continues to focus on income, crop diversification should additionally provide for:
 - Nutritious food for farm household
 - Fodder for livestock
 - Biomass for soil
 - Income from supplementary produce
- Cover the soil with live-roots for longer duration (as far as possible)

Conclusion

Blending Fasal Chakra & e-PRA \rightarrow Arriving at Participatory Action Plans

• Fasal Chakra : provides a deeper participatory analysis of the landscape – pegged on the land types in the indigenous nomenclature

• e-PRA :

- provides a spatial visualisation to the land types and landscape features (including ownership of land).
- Extent and location of the crop systems, the issues marked spatially.

Evolving Action Areas:

With the **spatial visualisation** of the crop systems, land types, water resources etc., on the map – **interaction with the community on eliciting options for mitigating drought and climate risks** will provide a rich harvest of action areas.

Thankyo

Indigenous knowledge is not just a reflection of the past but a guide for the future, rooted in the lived experiences of communities and their deep understanding of the land and environment