Soil Moisture Management & Critical Irrigation for Rainfed Agriculture

As a Relevant Framework for PMKSY in Rainfed Areas



Revitalising Rainfed Agriculture The RRA Network

Ravindra A,

raviwn1@gmail.com 9440621861



The Problematique

marivand ta Mandal,

Gand 8 0

en

Gandlapenta: Anantapur, rainfall profile



Risks of Rainfall Failures in Rainfed Agriculture



RAINFED AREAS - CHARACTERIZATION

LARGE PARTS OF INDIA ARE RAINFED



Rainfed areas- Areas having less than 40% of the land under assured irrigation lex- a composite index of percentage of households in the district المالي landlines, banking services, potable tap water, electricity as main source of lighting, concrete roof, LPG cylinder for cooking, water closet latrine facility and closed drainage wastewater outlet.

THE MAJORITY AREAS OF RURAL POVERTY IN INDIA OVERLAP WITH RAINFED AREAS

RAINFED AREAS - CHARACTERIZATION

Areas with less than 40% of land under assured irrigation

Land is subject to the variability, distribution, non-uniformity of the rains

Characterized by:

A mix of topographies, fragmented

Varied agro-climatic conditions

Marginal soils

Remote locations with poor access to institutions

COMPARISON of RAINFED AND IRRIGATED DISTRICTS



Percent Area Above 500m Elevation Percent Scheduled Tribes Rural Population

Percent Area with Tree Cover





She now can irrigate her 1.5 ac dry land in kharif without digging any new borewell!

Kummarivandlapalli, Gandlapenta Mandal, Anantapur Dist, AP

> Costs : About 9500 Rs. Per acre

12 borewells out of 42 in the village

113 acres

- 83 rainfed
- 24 irrigated

21 Borewell owning farmers

23 rainfed farmers

>> Impacts:

Average kharif
yield increased
from 2.5 qt per
acre to 4.12 qt/ac.

- Annual Net income increased by 10,000 Rs/ ac

© 2015 Google

Image © 2015 CNES / Astrium

Securing Crops through GW Collectivisation

- A contiguous area chosen 50 to 100 ac (1:3 ratio of borewell owning to non-owning farmers)
- Water literacy and analysis with farmers; PGWM mapping.
- Agreement on pooling of borewells for kharif protective irrigation & reducing paddy crop
- Commitment on **NO NEW** borewells for 10 years (with revenue office).
- All farmers contribute 2500 Rs. Per ac.
- A pipe line grid is made (maintenance is collective)
- Sprinklers are provided in common.
- Right of all to have protective irrigation in kharif and the borewell owners can decide on provision of irrigation during rabi to others.



Gorantlavandlapalli: **Anantapur District**

19 of the 34 borewells brought into the pool covering 68% of the households in the village including 50 non-borewell



Changes in Area (ac)under Well Irrigation by Well Status: Gorantlavandlapalli

	Area under Owned Wells	Under Water Sharing	ALL
Before	77	18	59
Present	92	64	83
% Change	19%	255%	41%

Changes in %Area under Well Irrigation by Farm Size

	Marginal Farmers	Small Farmers	Large and Medium
Before	8	66	80
Present	69	85	90
% Change	763%	29%	13%

Source: Srinivas Reddy and Ratna Reddy (2012)

RRA (Revitalising Rainfed Agriculture Program) in Anantapur District Supported by the Department of Agriculture, AP. (3 yrs old)

No. of Borewells	128
Farmers	411
Borewell owning Farmers	156
Non-BW farmers	255
Total Area (ac)	1111.41
Dry land (ac)	(77%) 857.07
Irrigated (ac)	(23%) 293.76
Total investment from the Dept of Agriculture	Rs.1.03 crores
Farmers' Contribution (Rs.)	518,783
Direct investment Per acre (Rs./ac)	9269
Through Convergence – seeds, soil organic	
matter etc. (rs./ac)	6000
Pay-back period (returns on investment)	4 years

Department of Agriculture has now expanded the program to 1000 ha (Rs.10 cr investment). And efforts are being made to expand the program to other districts in AP.

Much cheaper compared to 2.5 lakh rs/ ac investment in medium and large irrigation projects.

Participatory Drought-Risk Mapping





JAURA village, Chatterpur Block, Palamau District, Jharkhand

- Initial investment from the project
- Agreement on 20% contribution
- Return of the rest of the costs over four years by sharing half of the additional value of productivity gains.



A combination of

- large farm-ponds for fish rearing & protective irrigation;
- Additional support from a grid lifting water from stream flows (supply of protective irrigation & filling of ponds).

- Initial investment from the project
- Agreement on 20% contribution
- Return of the rest of the costs in four years by sharing half of the additional value of productivity gains.

Irrigation for Rainfed Areas under PMKSY : A framework



2008, Source-IWMI Part 4 Ch8-Unlocking the potential of Rainfed agriculture

Critical / Supportive Irrigation :

Source: IWMI

Diverse options for agricultural water management along the spectrum



Propositions for Revitalizing Rainfed Agriculture

- 1. Enhancing **Soil Productivity** : regular **addition of organic matter** in every ha of rainfed agriculture areas
- 2. Expanding Protective Irrigation to secure rainfed crops (from ground and surface water sources : equity, productivity, efficiency and security aspects of water management) – protection of at least 2 acres of rainfed crops for every family
- 3. Seed systems : timely, quality, contingency, diversity
- 4. Agronomic innovations : LEISA, SRI, NPM, SSNM and others and enhancing farmers' knowledge and management skills
- 5. Appropriate farm mechanization for enhancing labor productivity
- 6. Developing and strengthening **producers organisations** (resources management, credit access, securing inputs, value addition and market linkages, infrastructure)
- 7. Strengthening support systems for **Extensive Livestock Systems** (health care, breeding, drinking water, fodder in commons, etc.)
- 8. Promote fisheries in numerous rainfed water bodies through institutional approach
- 9. Integrated **value chain support systems** to realise growth potential in pulses, millets, meat and fish production systems; including infrastructure and processing facilities.
- 10. Risk minimization and resilience building and enhancing private investments

