



APRLP-ICRISAT: Unlocking the potential of rainfed agriculture



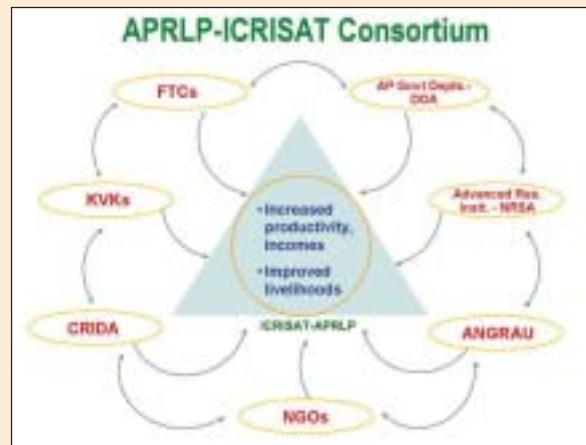
Water gives impoverished farmers the potential to increase food output. For millions, however, water is a scarce resource and the lack of it is a major constraint.

Nearly 70% of the population depends on agriculture in India. With 66% of the cropped area being rainfed without any protective irrigation, watershed management is increasingly being recognized as the ideal approach towards integrated natural resources management in rainfed areas. A new farmer-centered participatory consortium model for the efficient management of natural resources has emerged from International Crops Research Institute for the Semi-Arid Tropics (ICRISAT's) long-term research with national partners.

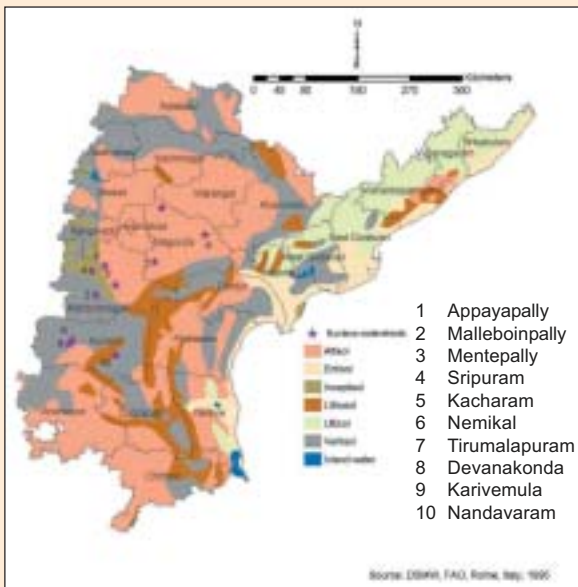
APRLP-ICRISAT Consortium Project

Under the Andhra Pradesh Rural Livelihood Programme (APRLP), watersheds are used as entry points for enhancing the productivity and incomes of rural poor in Kurnool, Anantapur, Mahbubnagar,

Nalgonda and Prakasam districts of Andhra Pradesh, India. The watershed consortium consists of ICRISAT, APRLP, the Central Research Institute for Dryland Agriculture (CRIDA), Acharya NG Ranga Agricultural



University (ANGRAU), the National Remote Sensing Agency (NRSA), and the District Water Management Agency (DWMA), Government of Andhra Pradesh. ICRISAT and APRLP provide technical backstopping to watershed committees and farmers in the districts.



Soil types and watersheds in Andhra Pradesh, India.

Objective

The overall objective of the project is to increase the impact of the program in rural Andhra Pradesh in order to alleviate poverty through increased agricultural productivity and improved livelihood opportunities.



K Raju, Commissioner for Rural Development (center), Government of AP, during a project meeting at ICRISAT.

Strategy and approach

- Working with a consortium of scientists, development workers, policymakers and farmers
- First pilot for scaling-up the consortium model in a development project
- Empowerment path for sustainability
- Holistic Integrated Genetic and Natural Resource Management (IGNRM)
- Watershed as an entry point
- Use of new science tools and ICT for knowledge dissemination and empowerment.

Knowledge-based entry point

- Partners devised an innovative entry point through sharing knowledge on natural resources and collecting and analyzing soil samples from 2000 farmers' fields
- 2500 farmers from 40 villages participated in meetings held in 10 villages; soil analysis results were discussed and program interventions designed.



Discussing soil quality results with farmers.

Baseline characterization

Baseline characterization was carried out in all the 10 APRLP nucleus watersheds in 3 districts:

- Participatory Rural Appraisals and stratified household surveys for socioeconomic characterization
- Agroclimatic and biophysical characterization.

Achievements

- Crop Growing Season (CGS) computed based on weekly water balances in watersheds

- Droughts occur at various stages of crop growth. Late-season severe droughts appear to decrease.

Monitoring runoff and soil loss

- Hydrological gauging stations for runoff and sediment monitoring were installed at 10 nucleus watersheds
- Seasonal runoff was 4-17% of rainfall
- Highest runoff of 94 mm was recorded at Appayapally
- Peak runoff rate was $83 \text{ m}^3 \text{ h}^{-1} \text{ ha}^{-1}$ in Nemikkal watershed.



Runoff recorder and (inset) sediment sampler.

Improved crop varieties and system diversification

Crops requiring high water such as rice are replaced with legumes and high-value medicinal and aromatic plants.

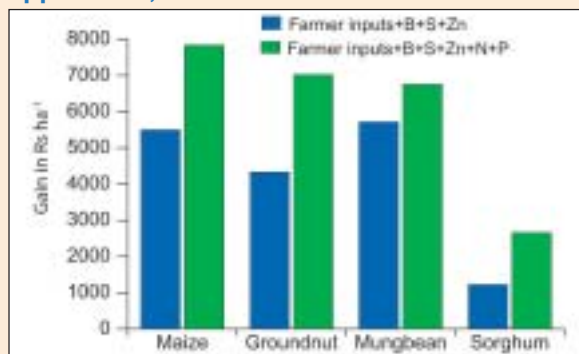
Farmer participatory selection of groundnut varieties ICGS 11 and ICGS 76 yielded 52-64% increased yield in the Karivemula watershed, rainy season 2003.

Integrated Nutrient Management (INM)

- N was deficient in all the farms. Available P was deficient in 37-40% of the farms
- 80-90% of the fields were deficient in Sulfur(S), Boron (B) and Zinc(Zn)
- Balanced nutrient application through bio-fertilizers, Farmyard manure (FYM), green manures through *Gliricidia* on bunds and chemical fertilizers
- Yields increased by 50-120% due to amendment of micronutrients (S, B and Zn)

- An investment of Rs 1750 ha⁻¹ towards micronutrients has enhanced net profits substantially.

Economic gains from micronutrient application, 2003.



Grain yield responses to micronutrient application, 2003.

Crops	Grain Yield (kg ha ⁻¹)		
	Check	Treated 1	Treated 2
Maize	2790	4200 (50)	4890 (75)
Castor	690	1090 (57)	1190 (72)
Sorghum	900	1460 (62)	1970 (119)
Groundnut	830	1230 (48)	1490 (78)
Mungbean	900	1390 (54)	1540 (70)
Pigeonpea	720	1230 (66)	1395 (89)

Check: Farmer inputs; Treated1: Check+S+ B+Zn; Treated 2: Treated 1+N+P and () = % increase over check.

IPM and IDM for enhancing incomes

- Farmers are trained in Integrated Pest Management (IPM) and Integrated Disease Management (IDM) technologies
- Seed treatment resulted in 8-10% increased productivity of groundnut
- One IPM village was identified in each district.

Benefits from micro-enterprises

- Vermicomposting
- Value addition: *Dhal* mills set up



Women preparing vermicompost and at the Dhal mill.

- Village-based seed banks
- Nursery raising by Self-help Groups.

Scaling-up to satellite watersheds

- Village-level meetings were held with men and women farmers
- 450 farmers from nucleus watersheds visited ICRISAT and Kothapally, and 50 farmers visited Madhya Pradesh and Rajasthan watersheds
- Strategy and derived work plans are discussed with consortium partners and Project Implementing Agencies.

Farmers Days for APRLP

- Exposure visits-cum-farmers days conducted in watersheds in 3 districts
- Farmers shared their experiences and lauded the technological support provided at their doorsteps.



Kurnool District Water Management Agency Project Director M Rama Rao addressing farmers.

Improved machinery

The multipurpose, flexible, economical and efficient bullock-drawn tropicultor for all agricultural operations was evaluated by farmers. It ensures faster operations and optimizes returns from cultivation.



The tropicultor: saving labor cost by 40%.



President APJ Abdul Kalam (center), ICRISAT Director General William D Dar and former Andhra Pradesh Governor C Rangarajan at the inaugural of ICRISAT's distance learning program.

ICT—Empowering the community

- VSAT station at Addakal inaugurated on 7 August 2002
- Virtual Academy for the Semi-Arid Tropics (VASAT) launched on 6 June 2003
- Modules developed in Telugu and English to provide drought-related information.

The road ahead

- Consolidate the benefits and refine the strategy in 50 watersheds for sustainable production and increased incomes
- Establish productivity-enhancing models in Anantapur and Prakasam districts
- Upscaling to 150 watersheds (50 + 100 new)

- Capacity building for all stakeholders
- Strengthen ICT for integrated watershed management and improving livelihoods.

Conclusions

- This ICRISAT-led consortium has demonstrated that the use of simple and cost-effective technologies in the three districts has enhanced productivity and incomes substantially (by up to 100%)
- By innovations, convergence and scaling-up the consortium model, APRLP could improve livelihoods of the rural poor. It serves as a model for other development projects aiming to reduce poverty.



About ICRISAT



The International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) is a non-profit, non-political, international organization for science-based agricultural development. ICRISAT conducts research on sorghum, pearl millet, chickpea, pigeonpea and groundnut – crops that support the livelihoods of the poorest of the poor in the semi-arid tropics encompassing 48 countries. ICRISAT also shares information and knowledge through capacity building, publications and ICTs. Established in 1972, it is one of 15 Centers supported by the Consultative Group on International Agricultural Research (CGIAR).

Contact information:

**ICRISAT-Patancheru
(Headquarters)**
Patancheru 502 324
Andhra Pradesh, India
Tel +91 40 23296161
Fax +91 40 23241239
icrisat@cgiar.org

**ICRISAT-Nairobi
(Regional hub ESA)**
PO Box 39063, Nairobi, Kenya
Tel +254 20 524555
Fax +254 20 524001
icrisat-nairobi@cgiar.org

**ICRISAT-Niamey
(Regional hub WCA)**
BP 12404
Niamey, Niger (Via Paris)
Tel +227 722529, 722725
Fax +227 734329
icrisat@cgiar.org

ICRISAT-Bamako
BP 320
Bamako, Mali
Tel +223 2223375
Fax +223 2228683
icrisat-w-mali@cgiar.org

ICRISAT-Bulawayo
Matopos Research Station
PO Box 776,
Bulawayo, Zimbabwe
Tel +263 83 8311-15
Fax +263 83 8253/8307
icrisatzw@cgiar.org

ICRISAT-Lilongwe
Chitedze Agricultural Research Station
PO Box 1096
Lilongwe, Malawi
Tel +265-1-707297/071/067/057
Fax +265-1-707298
icrisat-malawi@cgiar.org

ICRISAT-Maputo
c/o INIA, Av. das FPLM No 2698
Caixa Postal 1906
Maputo, Mozambique
Tel +258-1-461657
Fax +258-1-461581
icrisatmoz@panintra.com

Visit us at www.icrisat.org