Integrated and Community-driven approach to Ground Water Management

Experiences from SuGWM project
(Supported by EU & BfdW)

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www.cwsy.org/sugwm

CWS in ground water management

- started with science-based social regulations in 2003 and demonstrated participatory approach to GW management
- Refined our approach based on field learnings:
    - top down regulations lead to more illegal drilling and proliferation
    - recognized institutional gaps at grass-roots (PRI and functional committees are not effective)
    - studied and responded to energy issues in agriculture
    - recognised the potential of traditional water sharing practices
    - integrated approach – water supply, sanitation and irrigation

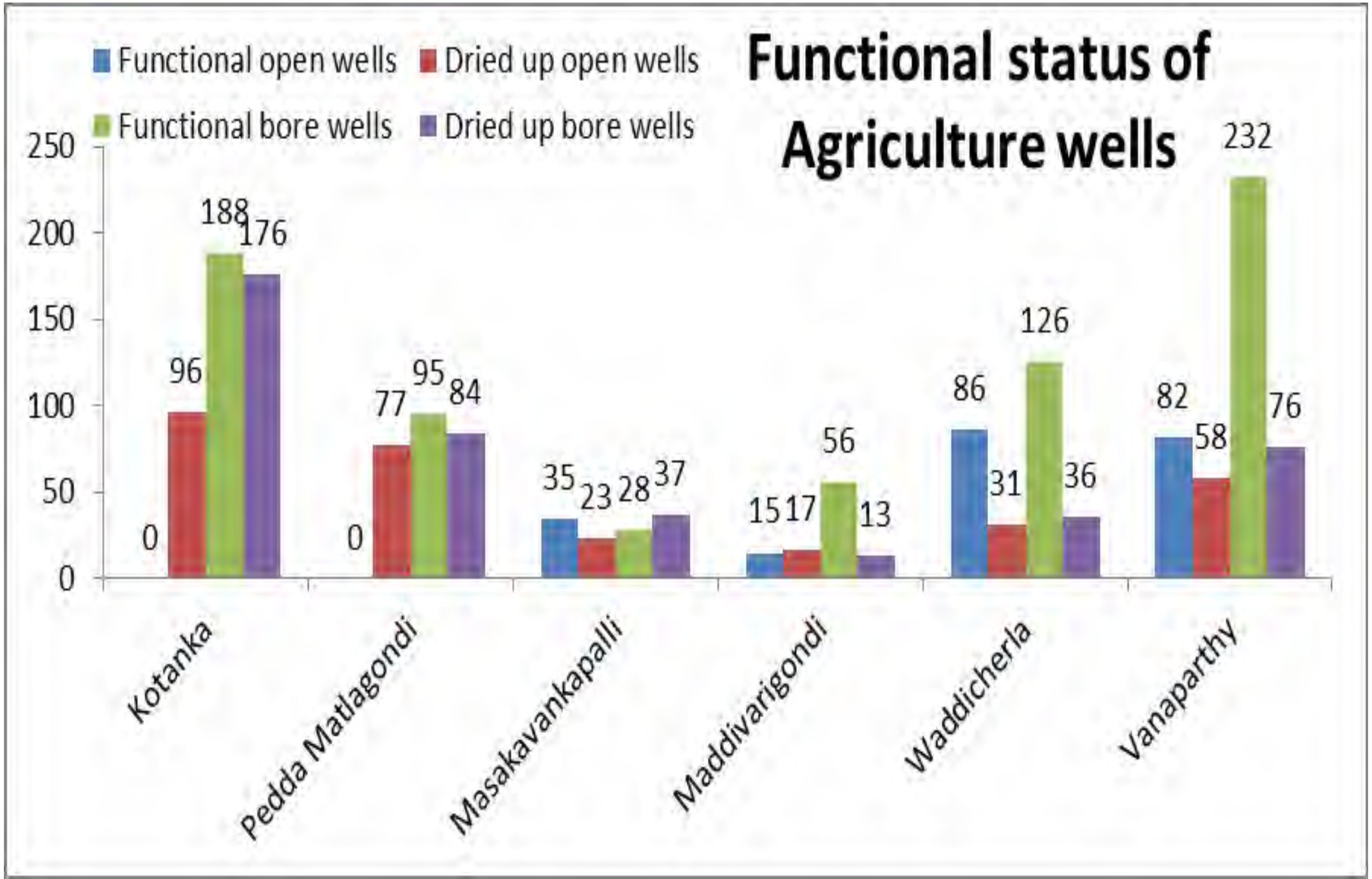
Ground water is the major source for drinking and irrigation

40-80% of wells dry up post December every year

Over-use in agriculture leading to failure of drinking water sources

Electricity supply to agriculture is poor in quality but free

37% of bores and 58% of open wells dried up in project GPs (Nov-Dec 2011)



Integrated approach to GW mgt.

- Sustainable Water supply
- Sanitation - services and infrastructure
- Irrigation – equity and efficiency
- Aquifer recharge
- PHM and social regulations
- Local water governance

Sustaining water supply systems

- most of the schemes are GW based and decentralized, with abundant physical infrastructure
- lack of local institutions to manage and effective O & M
- tail-end deprivation aggravated by lower yields from source bore wells

<u>3 novel elements:</u>

1. correcting inequalities through system renovation / augmentation
2. O & M by GPs, conditional and mandatory water cess
3. Ensuring 'source sustainability' through DAR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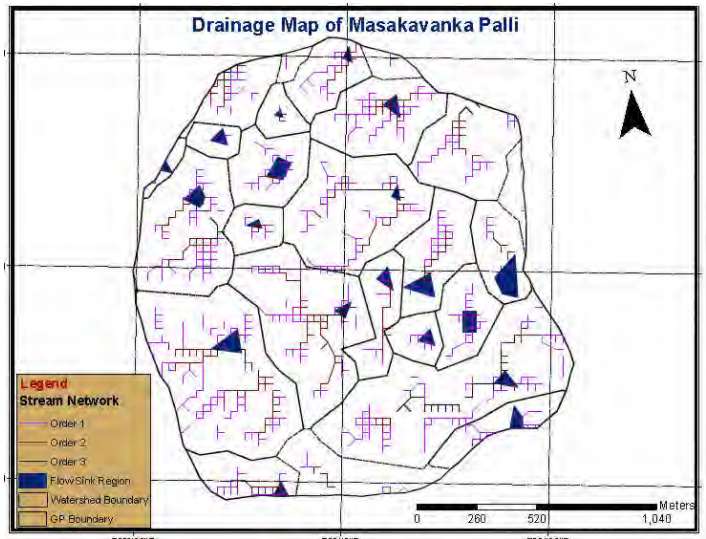
Direct Aquifer Recharge

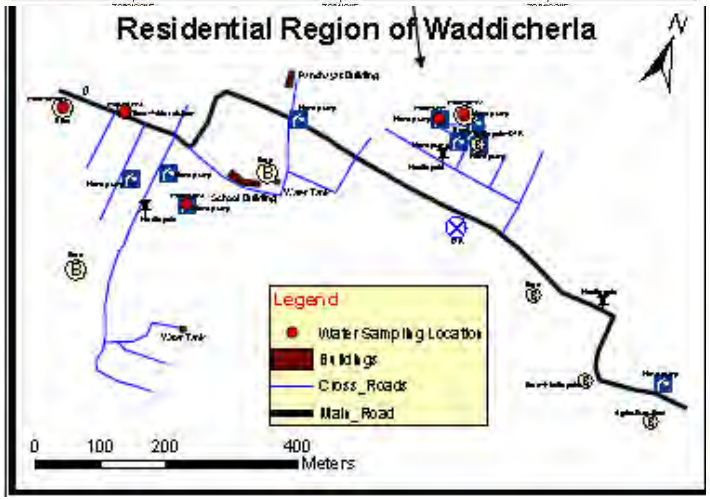
- Conventional approaches focus on infiltration through top soil and could recharge 10-12% to GW
- Limits of storage on surface already reached
- climate change - increased rainfall intensities with longer dry spells
- DAR has the potential of augmeting GW recharge by 40-50% of run-off
- Slug test simplified and technical manual developed

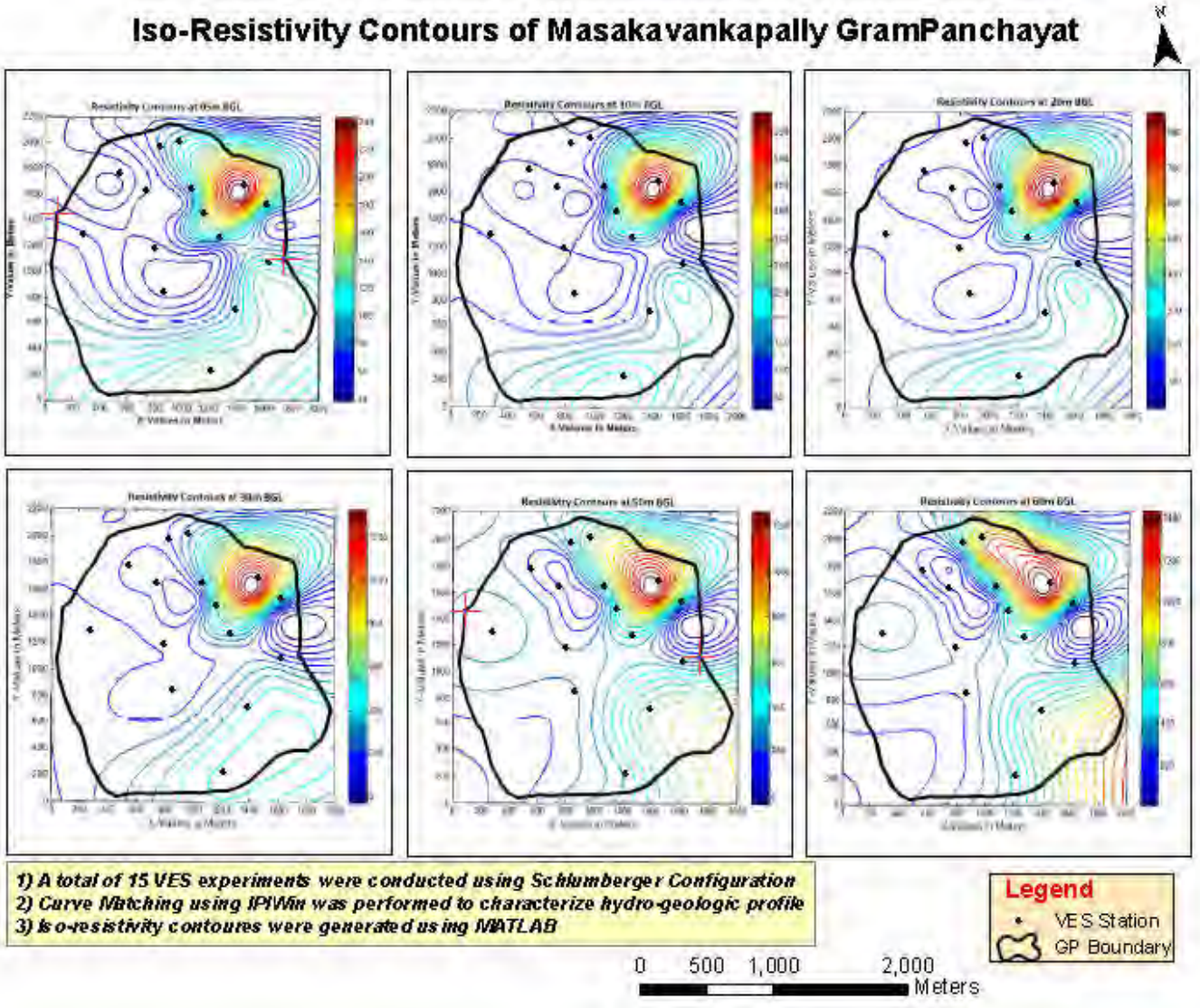
Dry well rejuvenation

- 302 open wells (58%) and 422 bore wells (37%) dried up in 2011
- Most of the open wells are join wells having 5-12 farmers sharing water
- 185 wells deepened or converting as recharge wells
- 348 wells (132 OWs and 216 Bws) got rejuvenated

Open well recharge


Drainage Map of Masakavanka Palli
N
Legend
Stream Network
Order 1
Order 2
Order 3
Flow Sink Region
Watershed Boundary
GP Boundary
0
260
520
1,040
Meters

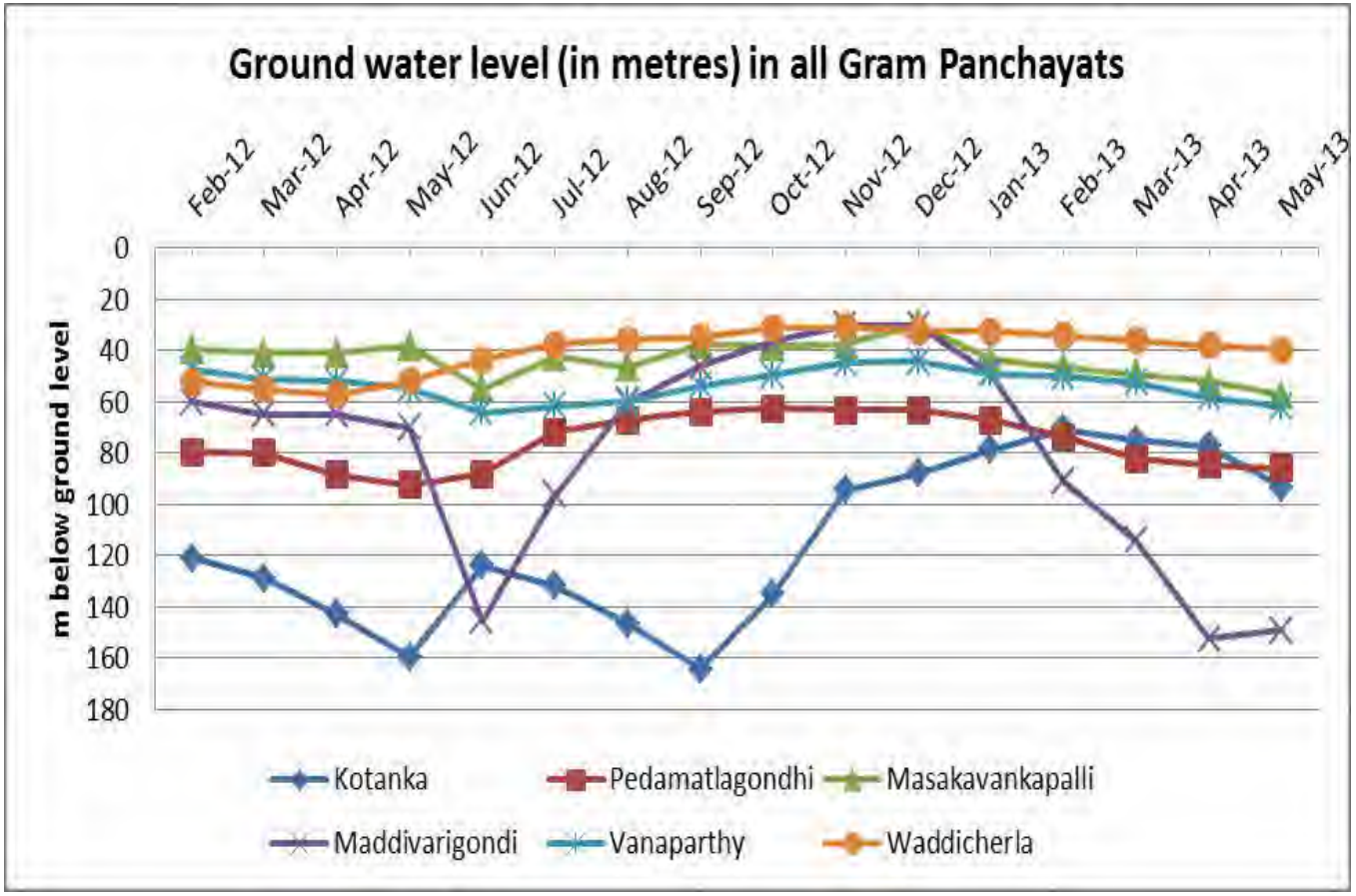

Residential Region of Waddicherla
N
Legend
Water Sampling Location
Buildings
Cross_Roads
Main_Road
0
100
200
400
Meters


Iso-Resistivity Contours of Masakavankapally GramPanchayat
N
1) A total of 15 VES experiments were conducted using Schlumberger Configuration
2) Curve Matching using IPIWin was performed to characterize hydro-geologic profile
3) Iso-resistivity contours were generated using MATLAB
Legend
VES Station
GP Boundary
0
500
1,000
2,000
Meters

Participatory Hydrological Monitoring

Rain gauges and water level indicators deployed

Directed to measure the impact of 'source sustainability measures' and educating farmers on crop planning

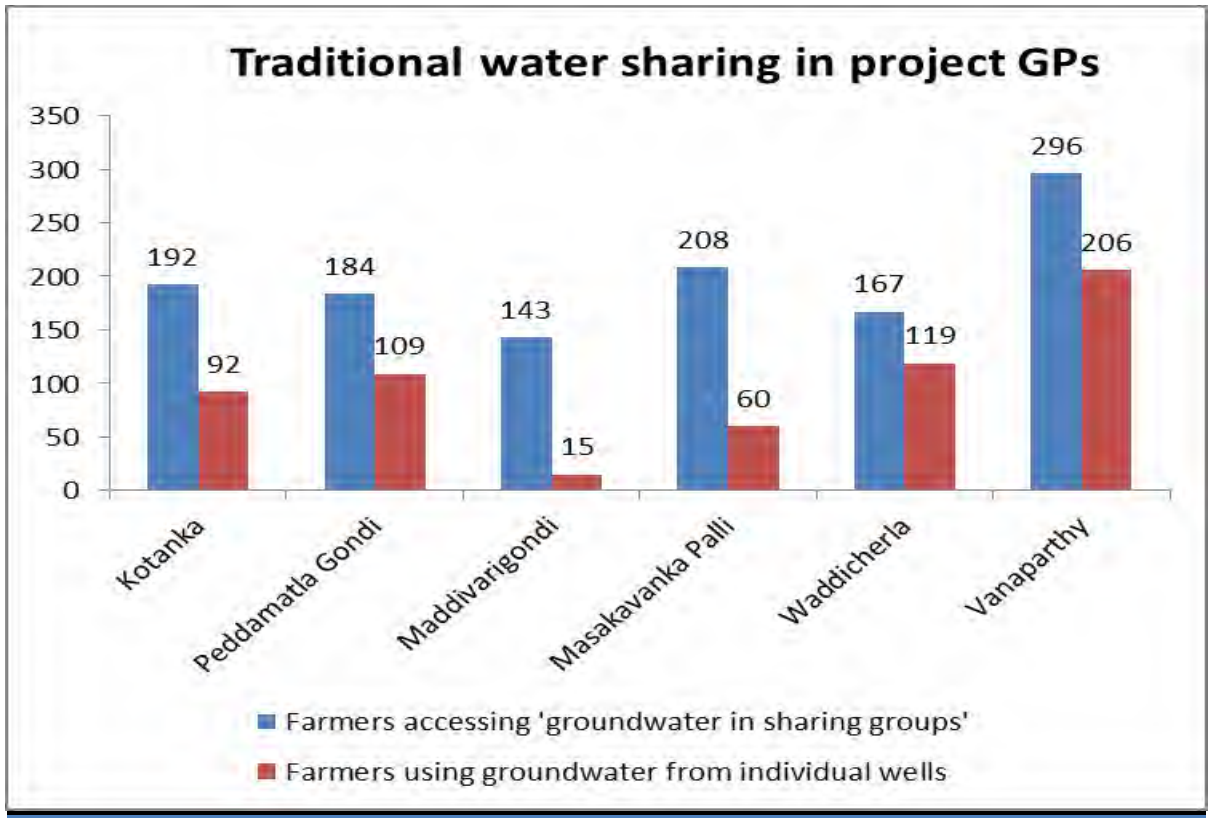


Traditional Joint Wells – Water sharing

-The project promotes groundwater sharing to achieve equity without drilling new wells

-Enumeration of 520 joint wells by GW Committees

-MI Census reveals decline of traditional sharing groups to 44,722 in AP (2006-07)



Study Findings:

**Total farmers surveyed: 2884*
**water-sharing farmers: 1190 (41%)*
** farmers having individual wells: 601 (21%)*
**Total farmers practising only rain-fed cultivation: 1093*

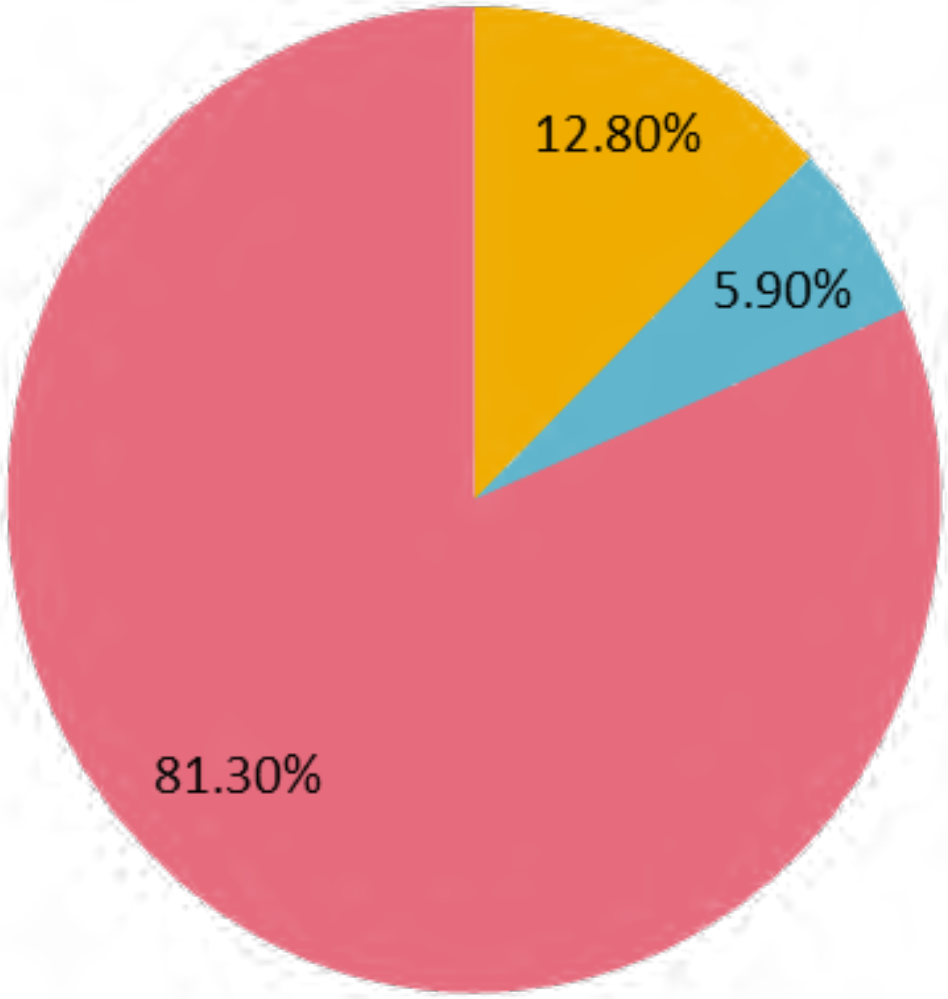
Group wells in Andhra Pradesh

Type of well*	1993 - 94	2000 - 01	2006 - 07
Dug well	120078	91369	32830
Shallow tube wells	15644	22554	6770
Deep tube wells	2197	4818	5122
Total	137919	118741	44722

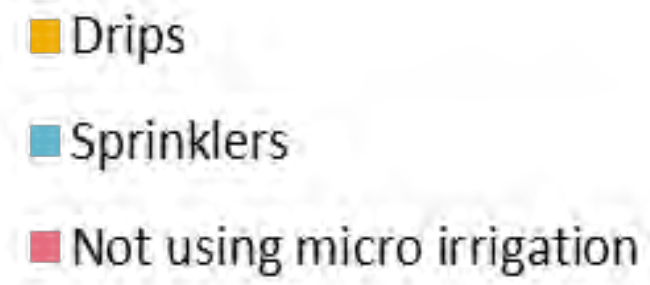
Shared open well with individual motors for

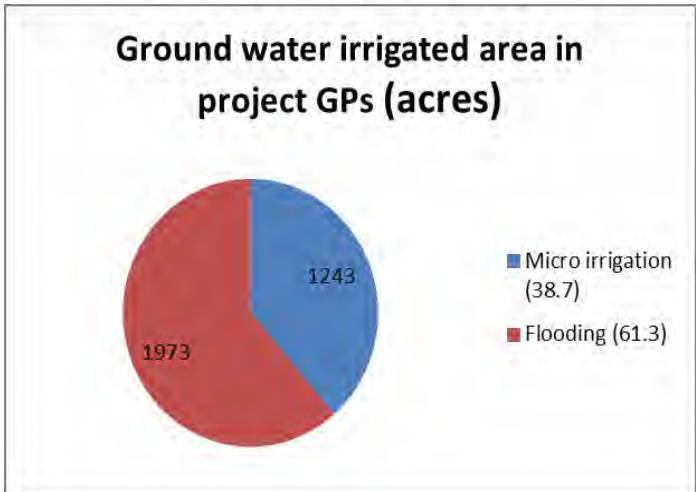
pumping

Micro irrigation usage among 1190 sharing farmers in project GPs



% of individual well owners using MI: 35
% of water sharing farmers using MI: 18.7





Energy issues in agriculture

-Low supply quality and frequent failures

-Frequent motor dry-runs and burnouts

-Electricity accidents and deaths

-Over-loaded DTRs due to unauthorized Tapping

-Discoms and farmers lack motivation for energy efficiency

- Implemented measures of improving PF, dry-run prevention and DTR upgradation

Sanitation

- Augmented water supply removed hurdles

- 70% of 3117 HHs already have defunct toilets

- People renovated 500+ units and 2500+ HHs stopped open defecation

- Invented methods of reusing old on-line drip lateral pipes

- costs Rs.7,000 to 10,000 against a new drip system at Rs. 50,000 per acre

Conclusion

Recharging deeper aquifers coupled with efficient use of water revived GW based agriculture. More research needed on efficient and low-cost methods for different formations.

Local institutions function effectively when technical backup available. Institutional innovations for basin-wide approach to GW management (EX: Erft Verband).

Energy as a key regulatory tool for GW management not fully realized. 'Free electricity units' instead of 'free hours of supply' integrates energy and water use efficiency.