Economic Impact of Forest Management Institutions of Collective Action on Groundwater Recharge in Karnataka, India

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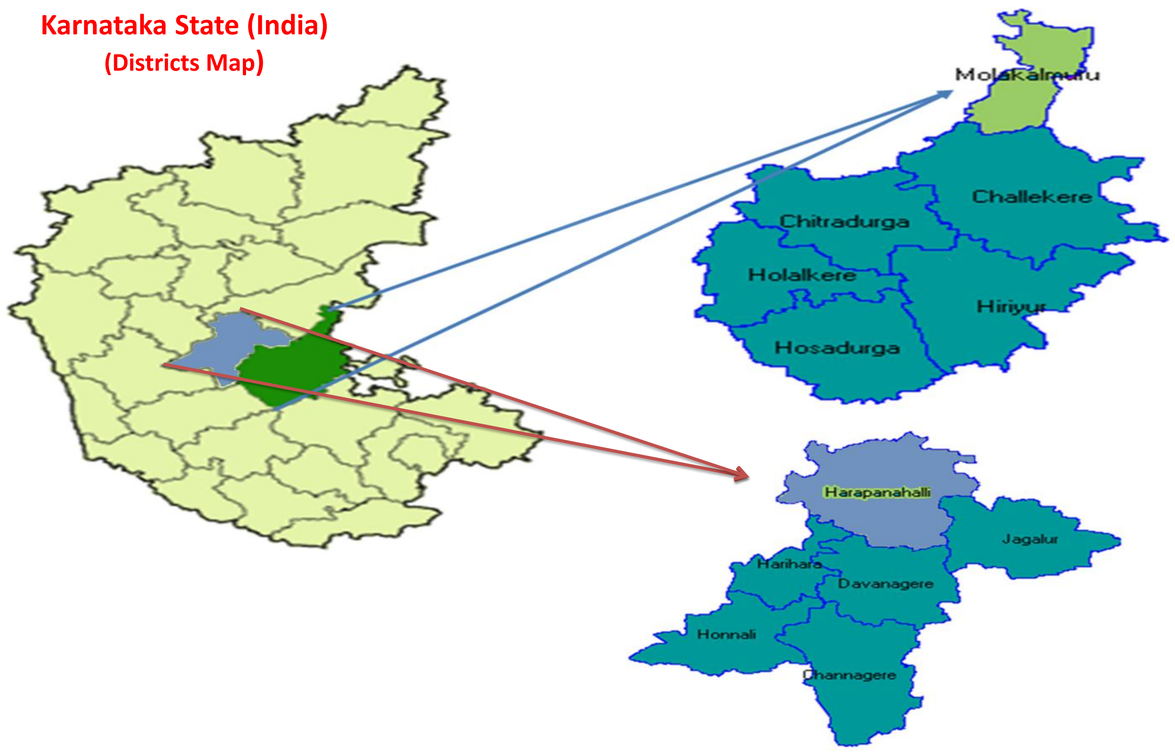
Introduction

- Groundwater has become the major water resource for agriculture, livestock and other purposes in the country.
- Groundwater depletion and deforestation are creating many socio-economic and environmental problems.
- Development of innovative forest management institutions is a *sine quo non* for the development of forest and groundwater resources.
- Government of Karnataka introduced the decentralized system to involve people in forest management.
- Joint Forest Planning and Management (JFPM) is an institutional innovation focusing on decentralization in planning process.
- In addition to usufruct benefits of the forest, JFPM enabled groundwater recharge at local level through collective action institutions of Karnataka Forest Department.

Research Objectives

- To analyze the economic impact of JFPM on groundwater recharge.
- To Analyze the incremental net returns of the farmers due to JFPM over non-JFPM area.
- To analyze the equity in income distribution among different categories of the farmers in JFPM area.

Study Area



Sampling Framework

Population of farmers possessing irrigation wells
- JFPM + Watershed village (23 farmers).
- JFPM village (42 farmers).
- Watershed village (24 farmers).
- Control village (15 farmers).

Analytical Tools

- Tabular Analysis
- Descriptive Statics
- ANOVA

Results and Discussion

Table 1: Estimated contribution due to JFPM development program, 2007-08

Sl. No.	Particulars	Rs. Per acre
1	**Contribution of JFPM program:** A. net returns in only JFPM minus net returns in control area	= 20044 – 6702 =13342
	B. Net returns in JFPM + watershed minus net returns in watershed	=13068 -13045 = 23
2	**Contribution of JFPM + Watershed:** Net returns in (JFPM + watershed) minus Net returns in control area	=13068- 6702 =6366
3	**Contribution of Watershed:** A. Net returns in watershed minus Net returns in control area	= 13045- 6702 = 6343
	B. Net returns in JFPM + watershed minus net returns in only JFPM	=13068 – 20044 = -6976

Table 2: Incremental net returns, per acre 2007 -08

Type of farm	JFPM over Non-JFPM area = Rs. 16355.09 – Rs. 10605.25 = Rs. 5749.84	
	For sample farmers in JFPM + watershed over watershed (Chitradurga)	For sample farmers in JFPM over control area (Davanagere)
Small and marginal farmers	1996	23959
Medium farmers	2118	8944
Large farmers	-548	2243
Overall	23	13342

Note: Incremental net return in JFPM over Non- JFPM = net return per acre from all sources in JFPM minus that in non-JFPM area

Fig 1. Dugwell Yield Rejuvenated in JFPM Area

Fig 2. Dugwell-Totally Failed in Non-JFPM Area

Table 3: Gini coefficient for income distribution for different classes of farmers in all the four study areas, 2007-08

Type of farm	JFPM+ watershed	Only watershed	Only JFPM	Control area
Small and marginal farmers	0.72	0.65	0.64	0.66
Medium farmers	0.66	0.67	0.63	0.66
Large farmers	0.73	0.88	0.73	0.77
Overall	0.72	0.69	0.63	0.76

Table 4: ANOVA for net returns per acre from all the sources across different categories of sample farmers in Chitradurga and Davanagere districts, 2007-08

Sl. No	Particulars	Mean	F statistic
1	a. only JFPM	88764	40.608**
	b. JFPM + watershed	32149	
2	a. only JFPM	88764	46.904**
	b. only watershed area	30059	
3	a. only JFPM	88764	52.766**
	b. Control area	11798	
4	a. JFPM + watershed	32149	0.232
	b. only watershed area	30059	
5	a. JFPM + watershed	32149	21.248**
	b. Control area	11798	
6	a. only watershed area	30059	26.576**
	b. Control area	11798	

*Note: ***, ** and * indicate significance at 1, 5 and 10% respectively*

Fig 3. Lorenz curve showing the income distribution of the farmers in JFPM area

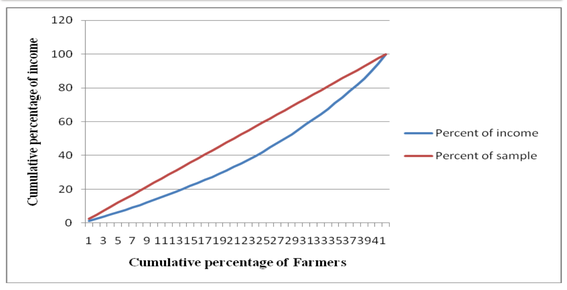
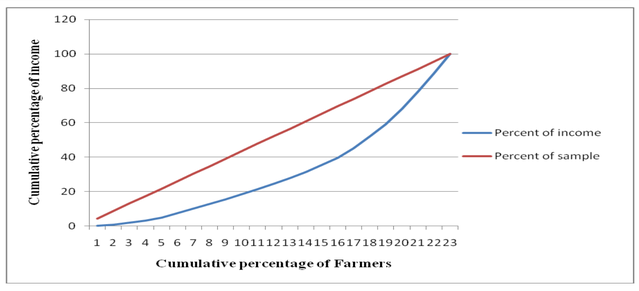


Fig 4. Lorenz curve showing the income distribution of the farmers in JFPM + watershed area



Conclusion

- Net returns realized by the farmers in JFPM areas is higher compare to non-JFPM area
- The collective action of the farmers in the JFPM and watershed programs is largely responsible for statistically and economically significant net returns as well as in their equitable distribution of benefits.
- The collective action paves the way for improved, equitable and efficient access to groundwater and natural resources for small and marginal farmers in Karnataka through JFPM and watershed developmental programs.
- The JFPM program still needs the effective governance system with greater transparency and credible coomitment to enforce the institutions.
- The ongoing JFPM activities in other parts of Karnataka villages need to be promoted with commitment and support by the government.

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