Small is Beautiful

A study to explore the role of small pumps in enhancing incomes of small and marginal farmers in the eastern states

Introduction

- With the exception of some districts of West Bengal and North Bihar, the entire eastern region has less than 40 percent of net sown area irrigated
- In western states the total percentage of area irrigated area from ground water is more than 60 percent in the eastern states it is less than 40

Irrigated Area





Net Irrigated Area as a Percentage of Net Sown Area



Methodology

- Interviewed 176 farmers in 5 districts and 14 blocks of Assam, Odisha and Jharkhand
- Types of farmers interviewed were No pump users, Small Pump users and Large Pump Users
- Assam predominantly has a presence of small electric pumps, Jharkhand that of small diesel pumps and Odisha of nano solar pumps











Odisha Irrigation by Source



Pump Sizes in Odisha



Source: Minor Irrigation Census 2006-07

Nano Solar Pump





Source of Water







Subsidies on Electric and Diesel Pumps



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Types of Small Pumps

Type of Pump	Manufacturers	HP Range	Preferred Irrigation Method	Crops Grown
Electric	Kirloskar,Crompton,Usha,V guard,Mahindra,Hindustan, Varun	0.5HP-3HP	Furrow	Rabi,Summer
Diesel	Usha,Field Marshall,Honda,Bajaj, Greeves Cotton,Vijay,Kirloskar	1 HP-3HP	Flood	Rabi, Paddy
Solar	Vikaram Solar, Jain, Tata Solar	0.1 HP-3 HP	Drip/Sprinkler	Rabi, Annual

Kharif			Rabi			Summer			
	Crops	Average Area (Acres)	Irrigation Intensity per acre	Crops	Average Area (Acres)	Irrigation Intensity per acre	Crops	Average Area (Acres)	Irrigation Intensity per acre
	Paddy	2	15						
Only Small Pump Users	Black Gram, Millets, Green Gram, Horse Gram, Cowpea, Pigeon Pea, Mustard, Groundnut	0.2	0						
	Tomato, Brinjal, Ridge Gourd Pointed Gourd, Cauliflower, Cabbage, Bitter Gourd, Beans, Pumpkin, Leafy Vegetables	0.1	260	Pointed Gourd, brinjal, Tomato, Spinach, Radish, Bitter Gourd, Cauliflower, Gourd, French Beans	0.1	1000	Tomato, Brinjal, Ladyfinger	0.15	718
	Paddy	2.5	23						
Only Large Pump Users	Cowpea, Millets, Green Gram, Horse Gram, Pigeon Pea, Sesame	0.43							
	Brinjal, Tomato, Cabbage, Cauliflower, Ladyfinger, Beans	0.1	87	Onion, Tomatoes, Pointed Gourd, Ridge Gourd, Cauliflower, Green Vegetables	0.11	200	Bitter Gourd, Brinjal, Tomato, Cucumber	0.1	270

Land Holding										
State	Categories of Pump Users	Average Operational Land Holding	Fragmentation Index	Avg Number of Parcels per holding	HP/NSA	Net Irrigated Land (%)	Net Cultivated land (%)	Income /Ha	Income/M ember	% Income from Agriculture
Assam	Only Small Pump Users	2.08	0.419	3.095	0.84	34	81.5	61606	23897	56
	Only Large Pump Users	3	0.513	2	2.11	26	75	52000	23500	66
	Both Small and Large Pump Users	4.3	0.42	3.15	3.9	33	83	58549	23139	55
	No Pump Users	3.1	0.38	3.33	0	11	60	45000	14000	59
Jharkhand	Only Small Pump Users	3.48	0.323	4.66	1.01	63	87	53258	13036	86
	Only Large Pump Users	4.9	0.31	3	3	32	65	25808	8000	60
	Both Small and Large Pump Users	3.75	0.37	4.8	4.3	63	81	63416	19393	80
	No Pump Users	7	0.318	5.3	0	16	72	49251	9196	96
Odisha	Only Small Pump Users	2.45	0.69	2	0.5	57.5	85	37310	10785	87
	Only Large Pump Users	4.06	0.48	2.76	1.15	43	86	33705	9818	86
	No Pump Users	5.25	0.47	3.5	0	13	72	21322	5382	26

Conclusions- I

- Surface water sources are most abundant in Assam, which makes for a strong case for usage of small pumps.
- In Jharkhand, the surface sources tend to dry up by the months of Feb-Mar and therefore shallow groundwater sources are used for irrigation using small pumps.
- Small electric pumps are capable of extracting from a depth of 15-20 ft and diesel pumps from a depth of 20-30 ft, which is the average water table level in all the three states.

Conclusion -II

- Small diesel and solar pumps prove more effective for small farmers as compared to marginal farmers, due to higher land fragmentation
- The pumps are available in the urban markets, in Assam and Jharkhand primarily for domestic usage. Their spill over into agriculture is relatively new in Assam as compared to Jharkhand.
- In Rayagada, it is difficult to spot a retailer/distributor for these pumps even in the busy railway heads such as Muniguda and Bissamcuttack.

Conclusion-III

- Irrigation intensities of small pumps are almost double that of large pump users in all the three states.
- In Odisha, the free power and low discharge of the nano pumps attributes to such high figures.
- A comparison of costs shows that for a small diesel pump user the total cost of irrigation would be 20,300 per acre, for a large pump user it would be Rs 24,460.
- For large electric pump users in Odisha, the monthly expenditure is not fixed and varies to the tune of Rs 300-400 per month during Kharif.

Conclusions -IV

- Despite higher HP available per Net sown area, farmers using large pumps have lesser net area under irrigation as compared to small pump users
- Income per hectare of small pump users are the highest in Assam, followed by Jharkhand and are the least in Odisha.