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Market response to declining water table in the state of Jharkhand a sample survey

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Abstract

With the continuous decline in water table in the state of Bihar, centrifugal pumps are being replaced by submersible pumps because it is uneconomical and unsafe to continue with the former to lift ground water to meet the irrigation needs of crops. In order to know this shift, a market survey on the sale of six popular brands of both types of pumps was undertaken together with the sale of four major makes of smaller and larger diameter PVC pipes so as to correlate the two since larger dia. pipes are normally used for making filter in the submersible pumps. It was revealed that during the last four years, the average annual sales of centrifugal pumps has decreased by about 27 % while that of submersible pumps increased by about 78 %. And that the share of larger dia PVC pipes of major brands has increased from 60 % to 80 % over the same period. The unprecedented jump in the sale of submersible pumps was recorded in the year 2012-13 as it was linked with the steep decline in water table when area under water table depth greater than 10 m in South Bihar increased from 53 to 80 %.

Keywords: Sale of Centrifugal pumps, Submersible pumps, PVC pipes, Market survey

Introduction

There has been an over exploitation of ground water in Jharkhand comprising the districts of Garhwa, Daltengang, latehar, Chatra, Lohardaga Bokaro, Ranchi, in the last two decades or so primarily due to the paddy- wheat rotation. Because of this, the water table has been declining at about 40 cm per annum. The continuous decline in water level has compelled the farmers to shift from centrifugal pump sets (monoblocks) to submersible pump sets in order to sustain the paddy- wheat rotation normally followed by the Jharkhand farmers ^[1]. Along with the shift from centrifugal pumps to submersible pumps, there has been a phenomenal increase in the sale of 6-8" diameter PVC pipes also since the former normally requires 4" filter while the later, a 6-8" PVC filter. Thus the market (sale of submersible pumps and larger dia. PVC pipes) has also responded sharply to the declining water level. In order to correlate this shift from centrifugal pumps to submersible pumps with the lowering of water table, a sample survey of the market in terms of sale of pumps and pipes was conducted by the Department of Soil and Water Engineering of the RPCAU. This will help the scientists and planners to recommend to the government and the farmers to go for diversification of crops ^[2].

Methodology

To have an overview of the linkage between the market and the decline in sub surface water level, the present survey was restricted to a selected few brands of centrifugal and submersible pump sets and PVC pipes. The information was collected for 4 years i.e. for the period 2012-13 to 2015 - 16 since prior to this; the dealers expressed their inability to trace the records. The distributors/manufacturers of 6 popular brands of pumps* were contacted either personally or on phone or by e-mail. Other less popular brands though are also marketed in Bihar, but were not included in the study since their authentic sale figures were not made available. Likewise, for PVC pipes, four reputed brands were included in the survey though other brands are also sold in the market but because of relatively less known and unauthentic sales data, these did not form the part of the study.

Results and Discussion

Sale of pumps

The sale figures of centrifugal and submersible pumpsets in Bihar state for the period 2012-13 to 2015-16 of the selected makes are given in Table-1 and Fig 1. The data show that sale of Make-I of centrifugal pumps have been progressively decreasing over the years. From a sale of 8,450 pumps in 2012-13, it came down to 7,390 in 2013-14 registering an annual decrease of 12.5%. Similarly, for the next year i.e.2014-15 to 2015-16,

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the sale fell to 5,824 units showing a further decrease of 21% over the preceding year. And during the last financial year i.e. 2015-16, it stood at 2,464 units, showing a fall of 71 %. And during the same period, number of Make-I submersible pump sets sold went up from a mere 1,553 to 7,844 registering a massive 405 % increase in the sale of Make-I submersible pumps. This clearly points towards the farmers' compulsion – to shift from centrifugal pumpsets to submersible pumpsets since the centrifugal (monoblock) pumps installed even in deep pits (35-40') failed to lift the water from 50-60' depth where water level had touched in recent years in most parts of the state.

The production of Make-II centrifugal pumps (Table-1) has also successively dipped from 8,754 units in 2012-13 to 3,877 units in 2014-15 registering a decrease of nearly 55 % in the preceding 3 years with an average annual decrease of 24, 30 and 22 % in the last three years respectively. The continuous fall for three years in the sale of centrifugal pumps prompted the manufacturer to upgrade its infra structure and start production of submersible pumps in the year 2015-16 in order to remain in the market. And within two years of starting production, the sale of this submersible pump jumped from 923 pieces in 2014-15 to 2,451 in 2015-16 - an increase of nearly 165 % over the last year.

Table 1: Sale of Centrifugal & Submersible Pumps in Punjab State for the period 2012-13 to 2015-16.

Make	Centrifugal pump				Submersible pump (above 2 hp)*			
	2012-13	2013-14	2014-15	2015-16	2012-13	2013-14	2014-15	2015-16
Make-I	8,450	6,390	4,874	1,764	1,553	1,666	2,026	3,144
	Started business in 2014-15		50	50	Started business in 2014-15		450	700
	-	600	500	350	-	3,000	3,500	3,200
	-	400	400	300	-	1,000	1,200	800
Sub total	8,450	7,390	5,824	2,464	1553	6,116	7,276	7,844
Make-II	8,754	6,518	4,942	3,877	Not manufactured	Not manufactured	923*	2,451
Make-III	-	-	-	-	2,319	3,353	3,003	2,965
Make-IV	500	550	500	400	3,000	4,500	7,000	8,000
Make-V	-	-	No sale	No sale	2,500	3,000	3,000	3,268
Make-VI	-	-	-	-	-	9,000	9,800	19,000
Total	17,704	14,458	11,266	6,741	9,372	25,969	31,002	43,528

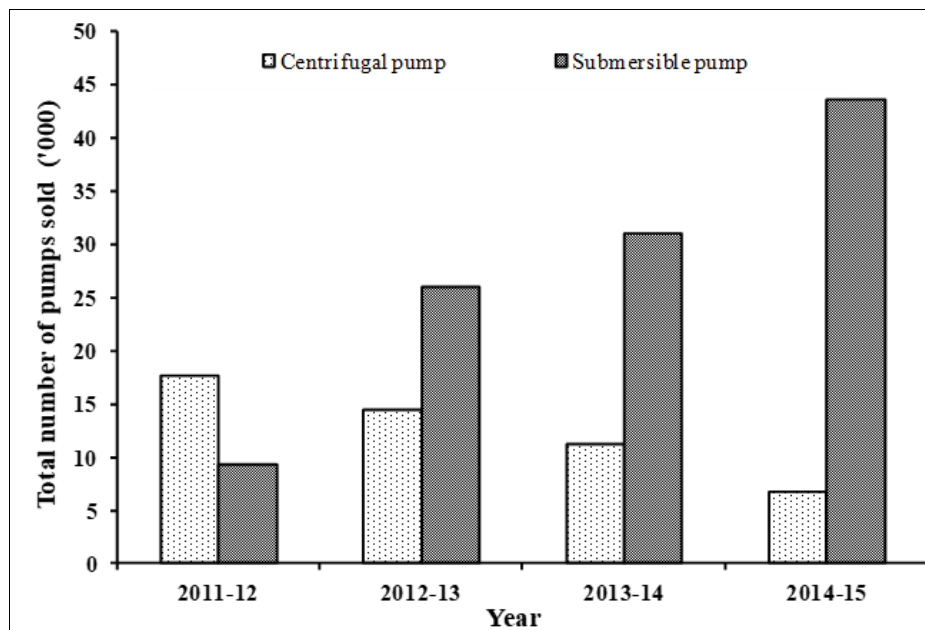


Fig 1: Sale figures of centrifugal and submersible pump sets during the years 2012-13 to 2015-16.

Make-III also witnessed an upsurge in the sale of submersible pumps. The sale figures for the last 4 years were 2,319; 3,533; 3,003 and 2,965 units respectively.

Similarly, the sales of Make-IV submersible pumps showed an average annual increase of 40 % during these four years with an annual increase of 50, 55 and 14 % respectively during the last 3 years. Simultaneously, the sale of centrifugal pumps showed a decrease of about 20 % during the period 2013-14. Similar is the story of Make-V pump manufacturer who sold 2,500; 3,000; 3,000 and 3,268 units of submersible pump sets in the preceding 4 years showing an ever increasing trend in the sale of such pumps.

Another saleable brand in pumps was Make-VI who have been marketing only submersible pumps in Punjab and it

recorded a sale of 9,000; 9,800 and 19,000 units in the years 2013-14, 2014-15 and 2015-16 respectively, registering an average yearly increase of 52 % and it showed a phenomenal increase of 94 % during the last year itself.

Cumulatively, the sale of six selected brands of centrifugal pumps decreased from 17,704 units in the year 2012-13 to 14,458 in 2013-14 (a fall of 19 %) and then to 11,266 units in the year 2014-15 (a fall of 22.37 %) and the sale further dipped to 6,741 units during the year 2015-16 indicating a further fall of 40 % in the last financial year itself. On the other hand, the sale of submersible pumps of these six makes increased from 9,372 units in 2012-13 to 43,528 units in the year 2015-16 showing an astounding average annual growth rate of 79 %. And over a period of 3 years, the unprecedented

jump of 177 % in the sale of submersible pumps occurred during the year 2013-14 and truly so if we link it with the fall in water table which showed that area under water table depth greater than 10 m in most parts of the state increased from 53 % in 2011 to about 80 % in the year 2015.

Sale of PVC Pipes

The data with regard to the sale of PVC pipes in the state of Bihar for the four selected brands are given in Table-2. These figures if viewed in the context of small size (upto 4" dia.) and large size (greater than 4" dia. pipe size) like the pump figures, are equally revealing. All the major players in the manufacture of PVC pipes expressed the view that share of large size pipes out of the total manufactured or sold has substantially increased over the past 3-4 years, which is corroborated by the figures given in Table-2. For example, pipe Make-I witnessed percentage increase in sale (of large size pipes) from 55 in 2012-13 to about 70 % during the current financial year, while Make-II's share of large size pipes remained almost static-at around 70-75 %; Make-III's 92-95 % and Make-IV's around 90 %. Taken together, the total annual turnover of the four makes of PVC pipes increased from 7,643 m tons in 2013-14 to 11,414 m tons in

the year 2015-16 registering an increase of nearly 50 %. Although break-up figures for sales of small size and large size pipes from various manufacturers in the state were not available, yet the share of large size out of total sales was nowhere less than 60 % as opined by most of the manufacturers / distributors indicating clearly that a strong linkage existed between the sale of large size pipes and the sale of submersible pump sets since it was only for the submersible pumps that filter size larger than 4" (5-9") was used which is made from PVC pipe of size larger than 4". It was also disclosed by the traders that some local brands of PVC pipes were also being sold and their total sales were rather more than the combined sales of above-mentioned brands. Since their sale figures were not available with them, therefore these were not included in the study. Similarly, although the sale figures do not show the break-up of pipe sizes used for domestic, industrial and agricultural sectors, yet it will not affect the final results since their share towards total sales was not too much. Thus it was fairly reasonable to conclude that the increased sale of larger size PVC pipes over the last 3-4 years has been the result of increased sale of submersible pumps.

Table 2: Sale of PVC pipes in Punjab state for the period 2012-13 to 2015-16

Make	Quantity Sold In Metric-Tons*			
	2012-13	2013-14	2014-15	2015-016
Make-I	-	1930 (45:55)**	2200 (40:60)	2238 (30:70)
Make-II	-	500 (5:95)	1200 (8:92)	1500 (5:95)
Make-III				
upto 125 mm	415	587	602	482
>125 mm	567	1626	1392	1394
(larger size)	(42:58)	(27:73)	(30:70)	(25:75)
Make-IV	-	3000	4000 (10:90)	5800 (10:90)
Total		7643	9394	11414

* Total sale of all sizes

** Figures in parenthesis indicate ratio of small size (upto 125 mm) to larger size (> 125 mm)

Conclusions

The market trend as borne out by the sale figures of centrifugal and submersible pump sets and PVC pipes given in Table-1, 2 and Fig.1 and the analysis given above leaves no room for doubt that in the Bihar state, submersible pump sets have taken over the centrifugal pumps for irrigation in a big way because of the drastic decline in water table in most parts of the state and if the trend was not checked, the day was not far off when the underground aquifers will become devoid of any water. Then what to say of rising crops and industry, even drinking water may not be available for the burgeoning population and future generations.

Abbreviation and symbol

dia. Diameter

' Feet

" Inch

mm millimeter

% Per cent

PVC Poly Vinyle Chloride

RPCA Dr. Rajendra Prasad Central Agricultural University

Application of Research: The main factors for declining of groundwater table in districts of Garhwa, Daltengang, latehar, Chatra, Lohardaga Bokaro, Ranchi Jharkhand are variation in water table depth, effective rainfall, cropping pattern and area irrigated by electricity operated tubewells.

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