Productivity potential and profitability of castor (*Ricinus communis* L.) with sprinkler irrigation

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ABSTRACT

In Andhra Pradesh, Amrabad Mandal in Mahabubnagar district was inhabited predominantly by Chenchus. They depend on forest produce for their livelihood. The area under castor gradually came down in these villages due to erratic rains and inadequate irrigation. Farmers felt the need for an efficient water management system for castor. Castor crop was re-introduced in to these villages with sprinkler irrigation with Tribal Sub Plan. The productivity potential and profitability of castor increased with sprinkler system as compared to flood irrigation. The factors for ready adoption of sprinklers were delineated such as limited availability of water, controlling of irrigation depth increased crop yield and converting rainfed area to irrigated area. Adoption of sprinkler irrigation have changed the economic dependence on money lenders, improved the input use in castor and increased the gross monetary returns to the Chenchu farmers.

Keywords: Castor, Chenchus, Irrigation, Reconnaissance, Sprinklers

Nallamala forest ranges spread across five districts *viz.*, Mahabubnagar and Nalgonda in Telangana region, Kurnool in Rayalaseema region and Prakasham and Guntur in Andhra region of Andhra Pradesh. In Mahabubnagar district, Nallamala forest area covers two assembly segments namely Achampet and Kollapur. Achampet consists of five Mandals *viz.*, Amrabad, Balmoor, Lingala, Achampet and Uppununthala. Among them, Amrabad is fully surrounded by the Nallamala ranges and consists of 18 Gram panchayats and 34 villages including Pentas, Gudem and Thandas. The people of this Mandal belongs to various caste groups *viz.*, forward caste, other backward caste, scheduled caste and three types of scheduled tribes namely Chenchu, Lambada and Yerukala. Majority of Chenchu farmers are dependent upon the forest products like gum, honey, fruits, seed, leaves, tubers etc. for their livelihood, while Lambada and Yerukala tribes reside in Thandas villages and depend mainly on agriculture and other ancillary activities.

Lands were provided to tribal people (including Chenchus) by the Integrated Tribal Development Agency (ITDA), Sunnipenta-Srisailam (Kurnool) and supported agricultural development. But, the rainfed agriculture has become burdensome to many of the Chenchu farmers and they reverted back to depend upon forest products. However, most of the forest areas in Nallamala are prone to de-forestation and thus the dependency of Chenchus on the forest products for their livelihood has become unsustainable. With this background, the present study was conducted with the objectives to identify the problems related to castor production in the selected villages, to assess the felt needs as perceived by the Chenchu farmers to know the reasons for preferring the sprinkler irrigation and to study the impact of sprinkler irrigation on castor productivity and profitability

The study was conducted in the three villages *viz.*, Jangamreddypalle, Petranchenu and Macharam, Amrabad mandal, Mahabubnagar district in Telangana. A baseline survey was conducted in the villages to assess the felt needs of farmers through focus group discussions (FGD). Reconnaissance survey was conducted to assess the problems encountered by the Chenchus in castor production. It was found that frequent droughts hinder castor productivity. In order to provide assured irrigation to castor crop, Directorate of Oilseeds Research, Rajendranagar, Hyderabad has provided technical and logistical support for establishing micro-irrigation facility (sprinklers) under Tribal Sub Plan (TSP) during 2011-12 for farmers with tube wells. Fifty six farmers were selected random from three villages, the data on effect of sprinklers on castor yields were collected through structured interview schedules and FGD. The data were tabulated and analyzed using descriptive statistics.

The results of reconnaissance survey on problems in castor production are shown as a problem tree in Fig.1. It is clear from the Fig.1, that uneven distribution of rains, inadequate irrigation sources, low nutrient status and water holding capacity of soil led to gradual reduction in castor yield. In order to combat the problem of water scarcity, there is a need for a new method of efficient water management in agriculture (Karamani *et al.*, 2006). Low exposure to extension agency and lack of castor cultivation trainings led to low knowledge on castor production and reduced yields. Farmers perceived low profits due to high cost of inputs, non-availability and high cost of labour and low market price for castor seeds.

Establishment of sprinkler irrigation and bore wells were the most important needs of the Chenchu farmers, followed by tractor and tractor-drawn implements. Accessibility to

agricultural inputs and support for diversified agriculture to allied activities were the subsequently ranked needs of the farmers. Among all, Nalligorru (Local weeds collecting bullock drawn implement) which was the least preferred felt needs of the Chenchu farmers of the selected villages.

Limited water resources and there by less area under irrigation were identified as the major factors associated with adoption of sprinkler irrigation. Similar reasons were reported by Caswell and Zilberman (1985). Other factors perceived by them in that order were increasing yields with sprinklers, controlling of irrigation depth to cover more area and reduction of production cost, avoiding water loss in sandy loam soils, minimum chance of crop failure, easy to manage, can be used even on undulated topography, reduction of sucking pests and change of micro-climate. Meena and Dheertaj Singh (2013) reported that water security was the major factor for adoption of drip system in Rajasthan.

Information given in Table 1 pertains to the impact of sprinkler irrigation on castor productivity and profitability. The additional net returns realized by the farmers was ₹2854 and ₹4200/ha as a result of adoption of sprinkler irrigation in castor at Jangamreddy Palli and Macharam, respectively. The seed yield increased by 16 and 18 per cent in Jangamreddy Palli and Macharam villages, respectively. The mean increase in seed yield and additional net returns as a result of sprinkler was 17 per cent and ₹ 3473/ha, respectively. The BC ratio with sprinkler was 2.56 as against farmers' practice of flood irrigation (2.39).

The dependency on money lenders was reduced because of income generated from the castor crop; most of the money generated was utilized for household purpose, agriculture (purchase of seed, fertilizers and pesticides), re-payment of hand loans, children education and performing festivals. The water scarcity, sandy loam soil and poor irrigation management led to the need for alternate irrigation systems. The sprinkler irrigation introduced in castor in the study area proved its worth as there was significant enhancement in castor productivity and profitability.

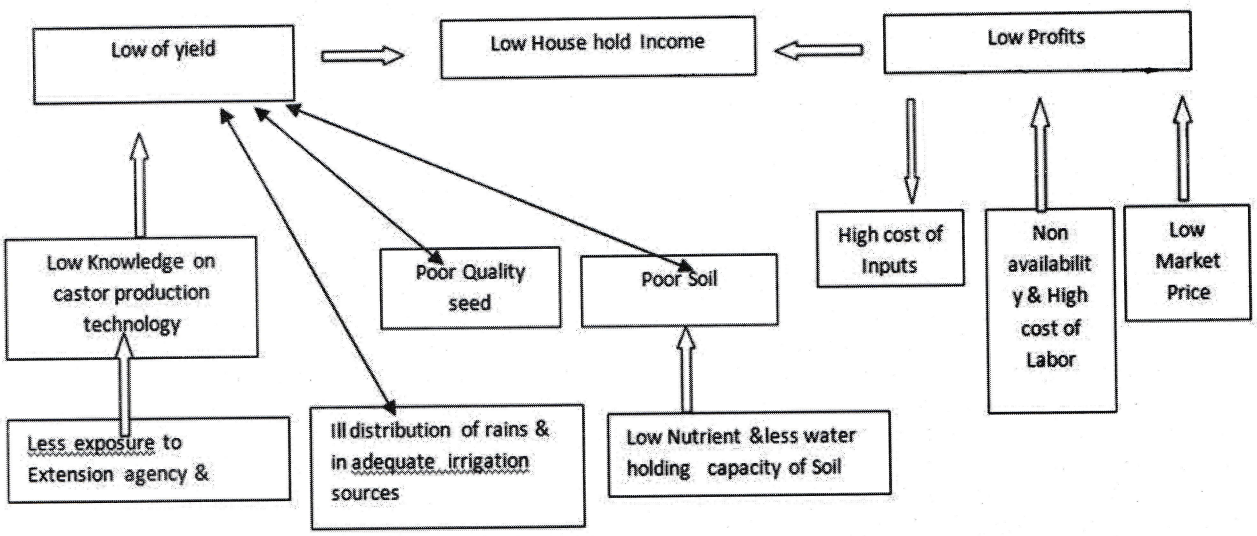

Fig. 1. Problem tree of low castor production in tribal villages

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Table 1 Effect of sprinkler irrigation on castor productivity and profitability during *rabi* 2012-13*

Village	No. of Demons.	Mean seed yield (kg/ha)		% increase	Cost of cultivation (₹/ha)		Gross returns (₹/ha)		Addl. Net returns (₹/ha)	BCR	
		IT	FP		IT*	FP	IT	FP		IT	FP
Jangamreddy Palli	19	871	754	16	11917*	11361	26130	22620	2854	2.19	1.99
Macharam	15	1250	1060	18	12500	11000	37500	31800	4200	3.00	2.89
Mean	34	1038	889	17	12174	11177	31140	26670	3473	2.56	2.39

IT=Improved Technology (sprinklers; castor hybrid DCH), FP=Farmers' practice (flood irrigation), BCR=Benefit Cost Ratio
*Acute drought year (rainfall was less than normal (District mean-605mm) depleted the ground water levels in *rabi*.

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