

Constraint analysis of the farmers on climate variability in castor (*Ricinus communis* L.)

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ABSTRACT

Castor (*Ricinus communis* L.) is cultivated extensively in Mahaboobnagar district of Andhra Pradesh because of the commercial importance of its oil. The area and production of castor in Mahaboobnagar is gradually decreasing for which one of the most important reasons is the high incidence of *botrytis* greyrot disease due to conducive climate variations. Apart from this, the frequent droughts in the region also influence in reduction of area. Keeping this in view the present study was carried out to understand the problems and suggestions as perceived by farmers on adaptation to climate variability in castor. The results indicated that high incidence of *botrytis* disease in rainy season, lack of training on climate variability coping mechanisms were some of the problems. Development of cultivars resistant to *botrytis* disease with short stature and profuse branching, providing training to farmers and extension officials on techniques of crop production and adaptation options to face the climate variability in castor were some of the perceived suggestions. Based on the results a strategy was developed to enhance the adaptability of castor farmers towards climate variability.

Key words: *Botrytis*, Castor, Climate variability

Castor (*Ricinus communis* L.) is an important non-edible oilseed crop in the Mahaboobnagar district of Andhra Pradesh state. The area under castor cultivation in Mahaboobnagar is 90.25 mt and the productivity is 733 kg/ha (India stat.com 2010-2011). The area under castor in Mahaboobnagar district is decreasing due to frequent droughts, high incidence of *botrytis* and competitive crops like Bt Cotton and Maize. The humid and cloudy weather during cyclonic showers during September-November, when the rainy season sown castor is in flowering and at capsule formation stage often affects the spikes with fungal disease (*botrytis*). The major limitation of crop is *botrytis* grey rot which is threatening crop's continuance in the district. High temperature above 41°C at flowering time even for a short period result in occurrence of male flowers lead to poor seed set. Thus, current focus is oriented towards mitigation of the problems like *botrytis* and drought tolerance. Keeping this in view, the present study was conducted to understand the problems and suggestions of castor farmers on adaptation to climate variability in castor.

Mahaboobnagar district of Telangana region of Andhra Pradesh state was selected and an ex-post facto research design was followed in the present investigation. Four manadals and three villages from each mandal making a total of 12 villages were selected at random. The selected villages were Shettipally, Akuthotapally and Jangireddypalli from Amanagal manadal; Nagaram, Dokur and Marrikal from Deverakadra manadal; Gangaram, Boyapally and

Mahadenpet from Bejenepally mandal; while Chitlankunta, Macharam and Padara were selected from Amrabad manadal. From each selected village, 10 castor farmers were chosen by random sampling method, making a total sample size of 120. Data were collected from the respondents on the problems in adaptation to climate variability in castor and suggestions to overcome the same. Suitable standard statistical tools are used for analysis of data

The results indicated that the problems perceived by farmers related to research were high incidence of *botrytis* disease in rainy season (95% of the respondents). This was probably due to humid and cloudy weather during cyclonic showers in September-November when the rainy season sown castor is in flowering and capsule formation stage. The farmers' suggestion was to develop cultivars resistant to *botrytis* disease with short stature and profuse branching. Varieties like Jwala and Kiran show moderate tolerance to the disease. The second constraint expressed by 83 % of the respondent was lack of drought mitigation strategies in castor crop. The suggestion given by the farmers was to work out suitable strategy/contingency plan by the researchers to minimise the effect of drought in castor. The last constraint expressed by 67% of the respondent was less relevance of weather forecasting data to cope-up the climate variation (Gwimbi, 2009). Hence, the location specific weather information has to be provided (Table 1).

The extension related problems were lack of awareness on *botrytis* tolerant varieties as perceived by 86 % of the respondents. This may be due to poor exposure of extension, which led to less awareness on *botrytis* management. The

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CONSTRAINT ANALYSIS OF THE FARMERS ON CLIMATE VARIABILITY IN CASTOR

suggestion offered was to create awareness among the farming community on availability of varieties such as Jwala and Kiran, which can tolerate *botrytis* disease. More demonstrations may be conducted to show the value and worth of these varieties along with other management practices in order to compare with the traditional varieties which are highly susceptible to *botrytis*. The second constraint as expressed by 85% of the respondent was non availability of seeds of *botrytis* tolerant varieties on time, even though they want to purchase seeds of such varieties to adopt as a strategy for adaptation to climate variability. The

suggestion given by farmers was to produce seeds of the varieties, which are tolerant to *botrytis* disease and made available to farmers on time. This was followed by lack of effective advisory system on variability in climate (83%). The suggestion offered was to develop an integrated mechanism with the coordination of Agriculture University, Department of Agriculture, NGOs (Non Government Organizations) and private organizations to provide an effective advisory system and to counsel the farmers on various issues pertaining to the climate variability and measures to overcome the same. (Table 2).

Table 1 Research problems perceived by the castor farmers in adaptation to climate variability in castor

Problem	Frequency and %	Rank
High incidence of <i>botrytis</i> disease in rainy season	114 (95%)	I
Lack of drought mitigation strategies in castor crop	100 (83%)	II
Absence of suitable rain water harvesting structures	84 (70%)	III
Less relevance of weather forecasting data to cope up the climate variability	81 (67%)	IV

Table 2 Extension problems perceived by the castor farmers in adaptation to climate variability in castor

Problem	Frequency and %	Rank
Lack of awareness on <i>botrytis</i> tolerant varieties	103 (86%)	I
Lack of group action to follow the biological control measures on castor pests	91 (75%)	V
Lack of information pertaining to adaptation options to cope up the climate variability	92 (76%)	IV
Lack of availability of seeds of <i>botrytis</i> tolerant varieties	102 (85%)	II
Lack of sufficient technical guidance on micro irrigation	79 (65%)	VI
Lack of effective advisory system on changes in climate	100 (83%)	III

In institutional related problems, lack of training on climate variability coping mechanisms was the most important problem as mentioned by 89% of the respondent; this was probably due to lack of awareness about the training programmes conducted by various agencies among the farmers. The suggestion offered was to give training to farmers and extension officials on techniques of crop production and adaptation options to face the climate variability in castor crop. These trainings may be offered at local, national and international level to address various issues on climate variability. This was followed by lack of guidance on insuring the crop against the climate variability (82%). Crop insurance is one of the important inputs for adaptation to climate variability for the farmers in the state where adverse impact of climate variability reduced the production and also sometimes resulted in total loss of the crops (Pynbianglang Kharumnuid, 2011). Farmers suggested that an institutional arrangement may be established by the government with the banks to insure the castor crop against the weather extremes. The third constraint expressed by 81% of the respondent was frequent interruptions in power supply

(Nagabushana, 2007). Farmers suggested that government has to provide seven hours of continuous uninterrupted power supply to irrigate the crop for better crop production (Table 3).

The natural related problems, declining ground water was the most important problem as mentioned by 74% of the respondents. They offered to adopt corrective measures at farm level to store the rain water as well as *in situ* moisture conservation for sustenance of moisture content in the soil. The establishment of rain water harvesting structure at individual farms may recharge the water table in the ground. This was followed by poor soils of the region (72%) for which farmers believed that sensitization on application of organic material in the form of manures, cakes, powders, compost, bio fertilizers would be needed. These will improve the soil fertility by enriching the nutrient content in the soil (Table 4).

A strategy was developed based on the results/ responses of castor farmers for better adaptability towards climate variability in castor. The strategy includes the interventions to be taken up by the research, extension system, at

government level, at community level and at individual level.

- Evolving strategic and integrated control measures of *botrytis* disease in rainy season castor as well as in winter season castor also.
- Organizing frequent training programmes for farmers on importing knowledge and skills related affects and coping mechanisms to climate variability.

- Farmers should be encouraged to take crop insurance against climate variability in castor to face any eventuality.
- The designed contingency plans may be translated in to meaningful actions which are to be followed by the farmers in true spirit to escape the affects of climate variability

Table 3 Institutional problems perceived by the castor farmers in adaptation to climate variability in castor

Problem	Frequency and %	Rank
Frequent interruptions in power supply	98 (81%)	III
No sufficient training on climate variability coping mechanisms	107 (89%)	I
Lack of guidance on insuring the crop against the climate variability	99 (82%)	11
Lack of proper storage facility for the castor produce	70 (58%)	IV

Table 4 Natural problems perceived by the castor farmers in adaptation to climate variability in castor

Problem	Frequency and %	Rank
Declining ground water	89 (74%)	I
Repetitive occurrence of extreme weather conditions	83 (69%)	III
Poor soils of the region	87 (72%)	II

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