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Production constraints in different crops and recommendations for improved productivity in Kurnool division of Andhra Pradesh

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Abstract
A study was undertaken to assess the identification of constraints and suggest fertilizer recommendations and nutrient management options for improved productivity in different crops grown in the study area of Kurnool revenue division in Kurnool district of Andhra Pradesh. The main soil constraints faced by farmers were low soil fertility followed by inadequate organic matter in the soil. The main production constraints noticed were lack of knowledge on soil testing and soil test based fertilizer application followed by inadequate knowledge on basal application of phosphorous fertilizers, split application of nitrogen fertilizers, poor availability of improved variety and lack of adoption of optimum seed rate. The socio-economic related constraints faced by farmers were high cost on labour and inputs. The other constraints noticed surfaced during the survey were lack of training facilities, knowledge about latest production technologies, lack of club/group/union etc.

Keywords: Constrains, production, productivity

Introduction
The major constraint faced by most of the farmers was inadequate knowledge on recommended packages of practices and lack of awareness about latest production technologies for raising crops successfully under rainfed agriculture. The appropriate timely recommendations against the identified production constraints would lead to self sufficiency and sustainability in agriculture (Kumar *et al.*, 2018) [4].

Materials and Methods
For the purpose of documentation of production constraints, a survey was conducted in rainfed ecosystem. In five mandals of Kurnool agricultural division, 10 respondents each from the small, medium and big farmer category were selected to constitute a total sample size of thirty farmers in each mandal. Keeping in view the objective of the study, a comprehensive structured interview schedule was prepared. The items included in the interview schedules were structured questions which were relevant to the investigation. The data collection was done by personal interview method using the schedule.

Preparation of report
The data thus collected from the sample respondents through interview schedules were coded, tabulated, analyzed and presented in the form of tables in order to make the findings meaningful and easily understandable. The findings emerged from the analysis of data were suitably interpreted and necessary conclusions and inferences were drawn. The frequencies and percentages were calculated and production constraints were documented. The percentage analysis was done to make simple comparisons wherever necessary.

Results and Discussion
From the Table 1, it can be observed that with respect to farm size, marginal, small and big farmers which accounted an equal percentage of 33.3 per cent for equal number of respondents were selected purposively from each category. With regard to the occupation, 85.3 per cent (128 respondents) represented agriculture as primary and 14.7 per cent (22 respondents) represented agriculture as secondary occupation.

As far as the social participation is concerned, 37.3 per cent of the respondents belonged to low level followed by 30.0 per cent in the medium level and 32.7 per cent to high level. When economic motivation is concerned, 56.7 per cent of the respondents belonged to low level, 20.7 per cent belong to medium level and 22.6 per cent belonged to high level of economic motivation.

It was observed that 100 per cent of the respondents (150 no's) were following single cropping pattern. In case of input availability, 56.0 per cent of the respondents belonged to low level category followed by 22.7 per cent in the medium level and 21.3 per cent belong to high level of input availability. As far as the information seeking behavior is concerned, 57.3 per cent of the respondents belong to low level followed by 25.3 per cent in the medium level and 17.4 per cent in high level category of information seeking behavior.

When the labour availability is taken into account, majority of the respondents (65.3 per cent) had opined that low availability of labour, followed by medium level (18.7 per cent) of labour availability and 16.0 per cent belonged to high level of labour availability.

The major soil related constraints faced by farmers were inadequate organic matter, low soil fertility, problematic soils viz., acidic, saline and alkaline and micronutrient deficiency in soils. In the survey, it was clear that majority of the farmers (82.0 per cent) responded (rank I) to low fertility of soil, followed by inadequate organic matter (61.3 per cent), micro nutrient application (56.0 per cent) in soil and 30.7 per cent of farmers responded to problem soils (Table.2).

Balasubramanian *et al.* (1999) [1] had stated that majority of the farmers had not adopted fertilizers based on soil test and did not follow IPM and micro nutrient application due to lack of technical knowledge, complexity of the practices and non-realization of importance of these practices.

In addition to the above problems, the farmers also faced the crop management related constraints such as lack of knowledge on soil testing and soil test based fertilizer application (Rank I) followed by inadequate knowledge on basal application of phosphorous fertilizers (Rank II), split application of nitrogen fertilizers (IV), poor availability of improved variety (VI), lack of adoption of optimum seed rate (V) and pest and disease incidence (III). Keeping this in view, there is a strong need to create awareness among farmers about soil testing and soil test based fertilizer application. Kumar *et al.*, (2018) [4] observed that the major constraints in production of pulses were lack of knowledge about recommended dose of fertilizers and recommended practices and lack of improved variety.

The data from Table 2, indicate that high cost of labour was ranked- I and most important constraint (88.0%) followed by high cost of inputs (81.3%). However, the constraints such as high rate of credit (72.7%) and non-availability of credit (59.3%) ranked III and IV respectively. Fifth major constraints faced by the farmers were non availability of farm implements (50.7%).

The farmers also faced the other constraints such as lack of training facilities (79.3%), lack of knowledge about latest production technologies (63.3%) and lack of club/group/union (52.0%) were some of the other minor problems reported by the farmers of rainfed ecosystem.

Table 1: Production constraints faced by the farmers in rainfed agriculture and recommendation suggested to overcome the problems

S. No	Constraints	Recommendation/Suggestion
I	**Soil related constraints**	
1	Inadequate organic matter in soil	Addition of organic manures regularly in higher proportion through use of compost materials, animal manures, by bringing awareness among farmers through training programmes. Maintenance of crop cover over soil and incorporation of crop residue into the soil.
2	Low fertility of soil	Soil fertility improvement through Integrated Nutrient Management, application of tank silt, growing of legumes, practice of soil conservation measures and apply the fertilizers based on soil test and crop response. Application of bulky organic manures regularly and avoidance of growing exhaustive crops.
3	Acidic, Saline and alkaline problem soil	Reclamation of problematic soils with respective reclamation material with proper soil and water management and growing of tolerant crop species. Acid- Lime, saline and alkaline- Gypsum- Green manuring in situ. Use of good quality water for reclamation.
4	Micro nutrient application in soil	Application of fertilizers on soil test based fertilizer recommendation, including micro nutrients. Bringing awareness regarding fertilizer application as per soil health cards. Addition of bulky organic manures along with the application of $ZnSo_4$ @ 20kg/acre once in 2 years and foliar nutrition with deficient micronutrient.
II	**Crop management related constraints**	
1	Availability of improved variety	Improved variety seeds should be made available well in advance in large scale through government agencies. Improved varieties should also be included in supply chain through Agriculture department.
2	Adopting optimum seed rate	Sowing of seed based on recommendations for optimum plant population and sowing at optimum moisture level have better establishment and reduce the wastage of seeds of high value crops.
3	Awareness on soil testing & STBF	Awareness on soil testing & STBF through training to farmers and demonstrations should be conducted for yield improvement through soil testing & STBF application.
4	Awareness on basal application of "P" fertilizers	Create awareness among farmers on basal application of "P" fertilizers through field demonstrations and trainings.
5	Awareness on split application of "N" fertilizers	Promotion of awareness among the farmers for basal application through straight/complex fertilizers and top dressing of N through straight fertilizers and Moisture is must for fertilizer application.
6	Higher pest & disease incidence	Integrated pest management and integrated disease management should be popularized through demonstrations and trainings. Less application of synthetic pyrethroids. Promotion of crop rotation, intercropping etc.
III	**Socio-economic related constraints**	
1	High cost of inputs	Adoption of recommended package of practices. Reduce the usage of complex fertilizers through top dressing. Use of herbicides to lessen the cost on weed management. Practice IPM
2	High cost of Labour	Mechanization for major operations needs to be popularized through demonstrations.

		Farm equipment should be made available through custom hiring centres at affordable rent.
3	Non-availability of credit	Availability of credit through banks should be liberalized. Publicity should be given to tenancy act. Credit facility through agriculture market yards should be made available.
4	High rate of credit	RBI has to reduce the rate of interest on credit. Enhancing the subsidy amount to the farmers
5	Non-availability of farming implements	As the farm animal populations were reduced in rural areas, most of them depend on tractor drawn implements. Supply of tractor drawn implements including small tractors to farmers. Farm implements should be supplied on subsidy or made available through custom hiring centres.
IV	**Other Constraints**	
1	Lack of awareness of latest technologies.	Publicity of latest technologies through press, media, demonstrations, leaflets and publications. Inputs for fulfilling latest technologies should be made available at affordable rate.
2	Lack of training facilities	Regular trainings should be given to farmers at field level. Training programmes should be focused on both onfarm and off farm difficulties. Farmers training centres should be established at region level.
3	Lack of club/group/union	Farmers Produce Organizations needs to be organized and trained. Registration of societies/club/group should be must. Publicity should be given for importance of farmers organization and registration under societies act.

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Table 1: Profile characteristics of respondents

S. No.	Variable	Rainfed ecosystem (n=150)	
		No. of respondents	Percentage
1	**Occupation**		
	Agriculture as primary	128	85.3
	Agriculture as secondary	22	14.7
2	**Farm size**		
	Marginal (< 1 ha)	50	33.3
	Small (1-2.5 ha)	50	33.3
	Big (>2.5 ha)	50	33.3
3	**Social participation**		
	Low	56	37.3
	Medium	45	30.0
	High	49	32.7
4	**Economic motivation**		
	Low	85	56.7
	Medium	31	20.7
	High	34	22.6
5	**Cropping pattern**		
	Single crop	150	100.0
	Double crop	0	0.0
6	**Input availability**		
	Low	84	56.0
	Medium	34	22.7
	High	32	21.3
7	**Information seeking behavior**		
	Low	86	57.3
	Medium	38	25.3
	High	26	17.4
8	**Labour availability**		
	Low	98	65.3
	Medium	28	18.7
	High	24	16.0

Table 2: Constraints faced by farmers of rainfed ecosystem in the Kurnool division of A.P.

S. No	Constraints	Rainfed ecosystem		
		Frequency	Percentage	Rank
1 Soil related constraints				
	Inadequate organic matter	92	61.3	II
	Low fertility of soil	123	82.0	I
	Acidic, Saline and alkaline problem soil	46	30.7	IV
	Micro nutrient application in soil	84	56.0	III
2 Crop management related constraints				
	Availability of improved variety	79	52.7	VI
	Adopting optimum seed rate	92	61.3	V
	Awareness on soil testing& STBF	129	86.0	I
	Awareness on basal application of “P” fertilizers	123	82.0	II
	Awareness on split application of “N” fertilizers	98	65.3	IV
	Higher pest & disease incidence	116	77.3	III
3 Socio-economic related constraints				
	High cost of inputs	122	81.3	II
	High cost of Labour	132	88.0	I
	Non-availability of credit	89	59.3	IV
	High rate of credit	109	72.7	III
	Non-availability of farming implements	76	50.7	V
4 Other Constraints				
	Lack of awareness on the latest technologies	95	63.3	II
	Lack of training facilities	119	79.3	I
	Lack of club/group/union	78	52.0	III

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