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Constraints of production and marketing of maize in north Karnataka: An economic analysis

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Abstract
The production pattern as well as its consumption pattern has dramatically changed in India in the recent past. However, the average crop yield of 2.5 t/ha is still very low as compared to the other Asian countries like Bangladesh (6.8 t/ha), China (5.7 t/ha), Indonesia (4.6 t/ha) and Pakistan (3.8 t/ha) in 2012 (FAOSTAT, 2013) [5]. This paper has examined the growth in area, production and productivity of maize in Haveri district of Karnataka. An attempt has also been made to study the constraints faced by farmers in production and marketing of maize in the study area. In all, 60 farmers were selected from Hirekerur and Shiggaov taluks of Haveri district in Northern Karnataka. The data related to the agricultural year 2017-18 was taken for the present study and primary data was collected from personal interview method with the help of pre-tested schedule. Compound Annual Growth Rate Analysis and Garrett's ranking technique were used to analyze for the data analysis. The results showed that maize area and production were positive growth rate of 6.49 and 5.19, percent respectively. In the case of production of maize, it was observed that frequent occurrence of drought ranked I, which recorded a Garrett mean score of 73.38 while in the case of marketing of maize, location of markets at for off places ranked I, which recorded a Garrett mean score of 72.23.

Keywords: Maize, growth, production, marketing and constraints

Introduction
India is the seventh largest producer of maize in the world contributing two per cent of the global maize production. It is grown in an area of 8.69 million hectares with an annual production of 21.81 million tonnes (2015-16). Among the major maize producing states, Karnataka tops the list with the contribution of 13.57 per cent of area and 14.99 per cent of production. Other maize producing states are Madhya Pradesh (11.83%), Bihar (10.99%) and Tamil Nadu (10.93%).

The phenomenal growth in the production and its spread across the regions proved maize a golden grain in India. Its diversified usage as food, feed and other multifarious industrial derivatives make the crop special and apart from any other cereals (Ranjit Kumar et al., 2014) [11]. The poultry sector is growing by 9 per cent per annum and expected to continue in the future. Growing demand from poultry and feed sector in India is expected to significantly hike maize consumption to go over 30 Mt by 2020 (Rattanani, 2006; Falcon, 2008; ASSOCHAM, 2009; Chennakrishnan and Raja, 2012) [12, 4, 2]. A small number of oilseed farmers also mentioned some marketing problems in the study areas. The major problem of oilseed marketing was opined to be the lack of transports facilities. Due to this problem, they sometimes are compelled to sell their produces at farm gate and at the local market at a low price. Sometimes, they could not take advantage of the higher prices prevailing at the distant markets due to lack of transportation and the higher cost of transports. The other problems were higher marketing charges demanded by lease holders, lower price of the produces, and inadequate marketing facility (Monayem et al., 2014) [10]. According to existing literatures, the utilization pattern of maize at present includes 51 per cent as poultry feed, 20-25 per cent as human food, 10-12 per cent as cattle feed, about 10-12 per cent going towards industrial processing like starch and brewery and 1 per cent as seed (DMR, 2012 and USDA, 2013) [3, 13]. On the other hand, it should also be kept in consideration that the spatio-temporal variations in projected changes in temperature and rainfall are likely to lead to differential impacts on maize yield in the different regions in India (Kattarkandi et al., 2010) [9]. The study found that major biotic production constraints were Echinocloa, Cynodon dactylon, rats, and termites, which reduced maize production levels by more than 50%. Other important abiotic and biotic stresses listed in descending order of importance were: caterpillars, water stress, stem borers, weevils, zinc deficiency, rust, seed/seedling blight, cutworm, and leaf blight. Non-availability of improved seeds, inadequate input markets, ineffective technology dissemination, and lack of

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collective action were the principal socio-economic constraints (Joshi *et al*., 2005) [8]. A number of studies (Hasan, 2008; Islam and Haque, 1995) [6, 7] were conducted on constraints of maize production as a whole.

Material and Methods
For evaluating the specific objectives of the study, both primary and secondary data were utilized. Primary data was collected from sample farmers by personal interview method with the help of pre-tested schedule. It includes, opinions regarding various constraints faced by the farmers in production and marketing of maize in the study area. The total sample size was 60 maize growers and the data related to the agricultural year 2017-18 was taken for the present study.
Secondary data for the study was collected from taluk headquarters, Haveri District at a glance, Karnataka State Agriculture Profile (2015-16) and Agriculture Produce Market Committees (APMC's) of respective taluks. Compound growth rate analysis and Garrett's ranking technique were employed for assessing quantitatively the objectives outlined for the purpose of the present study.

Compound annual growth rate analysis
In order to analyze the growth in area of maize and also growth in arrivals and prices of maize over the years, compound growth rates were computed using the following model.
$Y_t = ab^t e^u$
Where, Y_t = dependent variable (area/arrivals/prices)
a = intercept term, b = (1+r) and 'r' is the compound growth rate
t = time, u = error term
The above model was expressed in Logarithmic form as, Log Y= log a + t log b+ log u
Log a and Log b values were obtained using the Ordinary Least Squares (OLS) procedure and the R^2 was computed for testing the goodness of fit. Antilog of (Log (b -1))* 100 provide the per cent growth rate. Significance of the growth rate was tested using 't' test.

Garrett's ranking technique: This technique was used to evaluate the constraints encountered in maize cultivation and marketing. In this method, the farmers were asked to rank the given constraints according to the magnitude of the problem. The orders of merit given by respondents were converted into ranks by using the following formula.

$$\text{Percentage Position} = \frac{100 (R_{ij} - 0.5)}{N_j} \quad (1)$$

Where,
R_{ij}= Rank given for i^{th} item by j^{th} individual
N_j= Number of items ranked by j^{th} individual
The percentage position of each rank thus obtained was converted into scores by referring to the table given by Garrett. Then for each factor the scores of individual respondents were added together and divided by total number of respondents for whom the scores were added. These mean scores of all the factors were arranged in the order of their ranks and inferences were drawn.

Result and Discussion
Growth in area, production and productivity of maize in Haveri district (1998-99 to 2012-13)
The overall growth in area, production and productivity of maize in Haveri district is presented in Table 1. It indicated that if we consider the area and production there is a positive growth rate of 6.49 and 5.19, percent respectively but in case of productivity there is a negative growth rate of -1.21 percent.
The problems associated with farmers in production and marketing of maize in the study area have been depicted in Table 2 and Table 3 under the sub-headings of production constraints and marketing constraints.

Production constraints
The major constraints faced by sample respondents in production of maize were given in Table 2. In the case of production of maize, it was observed that frequent occurrence of drought ranked I, which recorded a Garrett mean score of 73.38 followed by non-availability of labour (II), non-availability of high yielding varieties(III), high cost of fertilizer(IV), Lack of extension service facility towards updating new technology (V), Lack of information about maize hybrids/varieties (VI), High cost of organic manure/PPC (VII), Poor quality PPCs' (VIII) with mean Garrett scores of 70.61, 60.35, 52.13, 49.00, 39.51, 28.93 and 24.33, respectively.

Marketing constraints
Constraints faced by sample respondents in marketing of maize were presented in Table 3. In the case of marketing of maize it was observed that location of markets at for off places ranked I, which recorded a Garrett mean score of 72.23 followed by high price -fluctuations (II), high cost of transportation (III) and delay in payment (IV), high commission charges (V), improper weighment (VI), absence of price support programmes (VII), distress sale after harvesting (VIII) with mean scores of 71.38, 59.7, 56.15, 45.43, 42.1, 28.38 and 24.4, respectively.

Table 1: Growth in area, production and productivity of maize in Haveri district (1998-99 to 2012-13)

Particulars	Period I (1998-99 to 2002-03)		Period II (2003-04 to 2007-08)		Period III (2008-09 to 2012-13)		Overall (1998-99 to 2012-13)	
	Average	CGR (%)	Average	CGR (%)	Average	CGR (%)	Average	CGR (%)
Area(ha)	78377	16.3	133867	4.74	139750	7.94	113320	6.49
Production (t)	225899	2.69	294080	24.66	360973	1.47	295684	5.19
Productivity(kg/ha)	3113	-11.7	2266.2	19.01	2770	-5.99	2795	-1.21

Table 2: Constraints faced by sample respondents in production of maize

Sl. No.	Constraint	Mean Score	Garret's Rank
1	Frequent occurrence of drought	73.38	I
2	Non availability of labour	70.61	II
3	Non availability of High Yielding Varieties	60.35	III
4	High cost of fertilizer	52.13	IV
5	Lack of extension service facility towards new technology	49.00	V
6	Lack of information about maize Hybrids/varieties	39.51	VI
7	High cost of organic manure/PPC	28.93	VII
8	Availability of poor quality PPC	24.33	VIII

Table 3: Constraints faced by sample respondents in marketing of maize

Sl. No.	Constraint	Mean Score	Garret's Rank
1	Location of market at far off place	72.23	I
2	High Price fluctuations	71.38	II
3	High cost of transportation	59.70	III
4	Delay in payments	56.15	IV
5	High commission charges	45.43	V
6	Improper weighment	42.10	VI
7	Absence of price support programmes	28.38	VII
8	Distress sale after harvesting	24.40	VIII

Conclusion

The constraints faced by farmers in maize production was frequently drought occurrence which Garret's rank stands first followed by non-availability of labour. The constraints faced by farmers in maize marketing, location of markets at for off place for which Garret's rank stands first and followed by followed by high price fluctuation. Hence, there is a need to develop mechanisms for strengthening the production and marketing-system of maize in the northern part of Karnataka and traditional maize growing areas, so that the poverty ridden maize producers can also benefit.

Acknowledgments

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