ARTICLES

Determinants of Agriculture Production: A Statistical Examination of MSP, AUC and Productivity of Selected Crops in India

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Main aim of this article was to examine the relationship between MSP/SMP, area under cultivation, productivity and overall production of selected crops in India. It also examined impact of MSP/SMP, area under cultivation, productivity on overall production of *Rice*, *Wheat*, *Pulses*, *Cotton and Sugarcane*. In this study required data were collected form 1990-91 to 2019-20, and analyzed according to the objectives of the present study. The results indicate that area under cultivation and productivity were most significant predictor and MSP/SMP were not significant predictor of production in case of Rice, Pulses, Cotton and Sugarcane. However, MSP, area under cultivation and productivity were only found significant in wheat production in India.

Keywords: MSP, SMP, Area under Cultivation, Productivity, Agricultural Production.

Introduction

AGRICULTURE sector is contributing significant role in Indian economy; about 56 per cent of population are depends upon agriculture and most of rural peoples getting employment from agriculture and allied sector. Therefore, the Government of India and state government providing support to agriculture sector through Minimum Support Price (MSP) for selected crops, Statutory Minimum Prices (SMP) for sugarcane, agricultural finance, subsidized inputs, technology, irrigation facilities, marketing and storage facilities, electricity, etc. However, research literature shows that MSP/SMP, area under cultivation (AUC), productivity are major determinates of agricultural production. Therefore, the present study was conducted to examine that, how they affects on overall agricultural production in India.

Objectives

The specific objectives of the present study are as under:

1. To examine impact and importance of MSP/SMP in determination of overall production of rice, wheat, pulses, cotton and sugarcane in India.
2. To recognize the impact of area under cultivation (AUC) and productivity of rice, wheat, pulses, cotton and sugarcane on overall production of these crops.

Literature Review

The government have attempting continually for development through veracious packages and policy of market intervention via MSP and SMP of selected crops. At present the Government of India has implementing MSP policy as tool for intervene in agriculture produce markets and regulate agro-market in India. The minimum support prices (MSP) covers 23 commodities i.e. 7 cereals, 4 pulses, 8 oilseeds, copra, raw cotton, raw jute and tobacco; Statutory Minimum Prices (SMP) for sugarcane. However, the first attempt based on New Economic Policy (NEP) was initiated in 1990 with the Draft Agricultural Policy Resolution (1990) focusing on increased output, efficiency in resource management and technologies, etc. While till MSP and SMP is important issue in

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agriculture in India. Acharya, (2001); Ranade (1980) and Kamat and Kamat (2007), mentioned that, MSP is now viewed as a form of market intervention on the part of the State and also as one of the supportive measures to the agricultural producers. In India there is very positive impact on wheat and paddy production detected. However, Sinha (2000) mentioned that mismatch of agriculture education, research and resource management in agriculture have adversely affected on agricultural production in India. According to Reddy (2004), the lack of an assured market price is one factor in the poor performance of pulses than foodgrains in India. Market price is always greater than the MSP announced by the government for pulses. Iqbal and Merwe (2010) mentioned that, production of wheat and rice were increased due to rise in MSP by the Government. All available literature clears that, there were positive relationship between MSP and production of related crops up to some extent.

However, some researchers posited that agriculture inputs are important factors in the determination of overall agriculture production than MSP or SMP (Sarma, 1975). Patil and Sirohi, (1987) posited that the facilities of tube-well irrigation and mechanical power helped the farmers in raising the cropping intensity of their farms. Singh (2001) concluded that cropping intensity was mainly dependent on annual water availability in the specific region and availability of the farm power. Verma (2006) concluded that farm mechanization enhances the production and productivity of different crops due to timeliness of operations, better quality of operations and precision in the application of the inputs. Kamlakar (2006) concluded that the productivity growth and shift in cropping pattern were major factors that accounted for the growth of crop output in the Maharashtra State. Sahu & Rajasekhar (2002) mentioned that credit facilities plays important role in agricultural production. Different studies also indicated that MSP is not only determinates of cropping pattern and production of agriculture commodities. Some of the studies focused that, productivity, irrigation, power availably, mechanization are important detriments of agricultural production.

Hypothesis

The present study was conducted to test followings hypothesis:

H^1: MSP is good determinant of overall production of rice, wheat, pulses, cotton and sugarcane in India.

H^2: Area under cultivation is good determinant of overall production of rice, wheat, pulses, cotton and sugarcane in India.

H^3: Productivity of is good determinant of overall production of rice, wheat, pulses, cotton and sugarcane in India.

Methodology and Scope

All required data were collected through secondary data sources and collected data analyzed using SPSS 19.0 versions. According to the need of this study regression test were performed to examination of correlation and predictive ability of the dependent variables used in this study. For the hypothesis testing results of regression test were used. In this study, author has covered only selected five crops (i.e. rice, wheat, pulses, cotton and sugarcane) and all results were depends up on time series data of the selected crops from 1990-91 to 2019-20.

Results of Regression Analysis

Table 1 indicates that R values (simple correlation) with dependent variables were ranging from .990 to .999; it shows good

TABLE 1

MODEL SUMMARY

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
Rice	.999[a]	.999	.999	.49315
Wheat	.999[a]	.999	.998	.52372
Pulses	.990[a]	.980	.978	.17966
Cotton	.998[a]	.995	.995	.39111
Sugarcane	.999[a]	.998	.998	2.31824
a. Predictors: (Constant), Productivity, AUC, MSP.				

relationship between predictors and dependent variables. R Square indicates the prediction power of independent variables for dependent variable. Close value of R Square to 1 indicates strong predictive ability of the independent variables. Table 1 indicates that R Square values of the selected crops reneging from .980 to .999 it indicates that productivity, area under cultivation and MSP can predict the overall production of selected crops almost 98 to 99 per cent correctly.

ANOVA Results

ANOVA indicates that the predicting variables are significant or not significant for predicting dependent variable. Table 2 shows that all results of the ANOVA test were found significant because it indicates that F values relating to Rice, Wheat, Pulses, Cotton and Sugarcane were significant at .000 levels.

Predictors of Agriculture Production

In the regression analysis, lower value of significance (<.050) indicates greater and strong predictive power of the predictors. To understand best predictors of overall production, author has used coefficients of the predictors of respected crops. Table 3 indicates that:

1. MSP was not significant (t = 1.843, P = 0.77) in the determination of production of rice, however, AUC and productivity are good predictors of rice production in India.
2. In case of wheat production MSP, AUC and productivity are significant factors and good determinants of wheat production in India.
3. MSP was not significant (t = 0.165, P = 0.870) in the determination of production of pulses, however, AUC and productivity are good predictors of pulses production in India.
4. MSP was not significant (t = 1.044, P = 0.307 in the determination of production of cotton, however, AUC and productivity are good predictors of cotton production in India.
5. MSP was not significant (t = -.393, P = 0.698) in the

TABLE 2

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
Rice	Regression	5922.574	3	1974.191	8117.579	.000[a]
	Residual	6.323	26	.243		
	Total	5928.897	29			
Wheat	Regression	5213.361	3	1737.787	6335.737	.000[a]
	Residual	7.131	26	.274		
	Total	5220.493	29			
Pulses	Regression	38.129	3	12.710	393.749	.000[a]
	Residual	.775	24	.032		
	Total	38.903	27			
Cotton	Regression	763.659	3	254.553	1483.167	.000[a]
	Residual	3.947	23	.172		
	Total	767.606	26			
Sugarcane	Regression	82687.395	3	27562.465	5128.608	.000[a]
	Residual	139.731	26	5.374		
	Total	82827.126	29			

Predictors: (Constant), Productivity, MSP, Area Under Cultivation. b. Dependent Variable: Production.

determination of production of cotton, however, AUC and productivity are good predictors of cotton production in India.

Policy Implications

According to the assumption of the present study the government's efforts should concentrate on followings:

Policy for Rice, Pulses, Cotton and Sugarcane Production in India: Empirical evidences (Table 3) shows that SMP were not positively affects on production of rice, pulses, cotton and sugarcane (t value of rice t = 1.843 sig. .077; pulses t = .165 sig. .870, cotton t = -1.044 sig. .307 and sugarcane t = -.393 sig. .698). Therefore, the government should not concentrate on MSP/SMP of these crops. However, the government should concentrate their efforts for how to increase area under cultivation and productivity of these crops in India. Here, MSP of the crops and its relation with production may be debatable issue however, we can't disrespect the facts. Therefore, the government should concentrate their efforts on irrigation, agriculture finance, marketing facilities, agro processing, HYPVs, technology and other inputs.

Policy for wheat production in India: Empirical evidences shows that MSP, AUC and productivity

TABLE 3

COEFFICIENTS[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Results about Hypothesis
		B	Std. Error	Beta			
Rice	**(Constant)**	**-74.269**	**3.020**		**-24.594**	**.000**	
	MSP	*.002*	*.001*	*.025*	*1.843*	*.077*	*Not Supported*
	AUC	1.835	.093	.226	19.792	.000	Supported
	Productivity	.040	.001	.786	43.137	.000	Supported
Pulses*	**(Constant)**	**-12.463**	**.853**		**-14.606**	**.000**	
	MSP	*1.654*	*.000*	*.007*	*.165*	*.870*	*Not Supported*
	AUC	.569	.037	.485	15.353	.000	Supported
	Productivity	.022	.001	.801	18.831	.000	Supported
Cotton**	(Constant)	-12.946	1.006		-12.87	.000	
	MSP	*.000*	*.000*	*-.029*	*-1.044*	*.307*	*Not Supported*
	AUC	1.496	.151	.259	9.937	.000	Supported
	Productivity	.053	.001	.838	40.027	.000	Supported
Sugarcane	**(Constant)**	**-230.316**	**6.665**		**-34.556**	**.000**	
	SMP	*-.011*	*.028*	*-.006*	*-.393*	*.698*	*Not Supported*
	AUC	65.654	1.454	.759	45.149	.000	Supported
	Productivity	.004	.000	.311	27.094	.000	Supported
Wheat	**(Constant)**	**-53.663**	**2.776**		**-19.333**	**.000**	
	MSP	*.003*	*.001*	*.065*	*3.723*	*.001*	*Supported*
	AUC	2.316	.140	.320	16.568	.000	Supported
	Productivity	.023	.001	.645	38.409	.000	Supported

a. Dependent Variable: Production.

of wheat were significant factor (t = 3.723 sig. .001; t = 16.568 sig. .000 and t = 38.409 sig. .000) in case of overall wheat production in India. Therefore, the government should focus their policy for increase AUC and productivity of wheat including its MSP in India.

Limitations

The present study covered only three variables of the agriculture production function i.e. MSP/SMP, area under cultivation (AUC) and productivity because the main intension of this study was to examine the importance of MSP/SMP, AUC and productivity in the determination of overall production of crops under study. However, it is note that there are some other important factors also exits which have significantly affects on productivity and production of crops i.e. type of seeds, irrigation facilities, finance, fertilizers, pesticides, rainfall, technology, etc.

Conclusion

The present study reveals that MSP and SMP were not only one of the significant determinants of agriculture production in India. However, area under cultivation and productivity of the crops were more important factors in India. Therefore, the government should focus their policy on how to increase area under crops and productivity of those crops which indented to increase overall production.

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