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An Evolution Of Agriculture Development In Rajasthan

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ABSTRACT : Food security is a major concern all over the world. Rajasthan is the largest state of India where food security is extremely essential since about 61 area of the state is desert so agriculture production is also affected by it. The paper is tried to examine consequence of many factors on agriculture during the year 1985-86 to 2015-16 for the grounds that agriculture production is positively related with food security. This paper deals with agriculture efficiency in Rajasthan which function many exogenous factors like rainfall, use of fertilizers, irrigation facilities, area of operational size holding, cropping intensity etc. This study based on secondary data of agriculture statistics of Rajasthan .The result of study based on multiple regression models that reveal that annual rainfall, fertilizer, irrigation, HYV seeds, area of operational size holding are positively correlated with the production. There is significance role of fertilizers, irrigated area, copping intensity & HYV seeds for enhance productivity. This paper deals with agriculture production of last thirty year in Rajasthan .Rajasthan climate is different from the nation because there is 61 per cent desert and it is the biggest state of the nation. Time series based this study shows different variables which can affect the agriculture production .The growth rate of gross cropped area, annual seasonal rainfall, cropping intensity, gross irrigated area, consumption of fertiliser, agriculture production are respectively 0.8, 0.5, 0.5, 2.9, 6.5 and 3.0 percent per year. . Linear regression and log linear regression model shows that GCA and FC is significant for agriculture production but ASRF is non significant.

Key words: Total Agriculture Production, Gross Cropped Area, Annual Seasonal Rainfall, Cropping intensity, Gross Irrigated Area, Consumption of fertilizer, C.D.P.F.

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Introduction : Indian economy continues to be an agrarian economy since time immemorial. Rural India continues to sustain the nation, as nearly 75 per cent of Indian economy is still agriculture based. Around 73 per cent of nation's population is rural based and is engaged in agricultural and allied activities. This holds true for Rajasthan economy also, with about 70 per cent of the total population depending on agriculture and allied activities and around 30 per cent of the total state's income generated by it. In spite of the limited resources with the state government, over the five year plan periods, there is a continues increase in investment and outlays. The investment was Rs. 2.62 crores in the first five year plan which increased to Rs. 1013 crores in the 10th five year plan.

Profile of the state

Rajasthan, with a geographical area of 3.42 lakh sq.km, is the largest state of the country, covering 10.4 per cent land mass and 10.6 percent of arable area of the country. It is situated in the north-western part of the country which is surrounded by the states of Punjab, Haryana and Uttar Pradesh in the north-east, Madhya Pradesh in the south east and Gujarat in the south-west. The state has long International border with Pakistan.

The topography of state is dominated by the Arravali range of hills, one of the oldest mountain systems in the world. The Arravali hills range runs from south-west to northeast through heart of the state. The region to the west and the north west of these hills comprising twelve districts and spread in 61.11 per cent of the total area of the state is either desert or semi desert and known as the Great Indian Desert, "Thar". Administratively, the state has been divided into 6 divisions and 32 districts which are further sub divided into 241 tehsils and 237 development block.

Climatic Zones1 Agro

Rajasthan is spread over four of the agro-climatic zones delineated by the Planning Commission.

(1) Upper Gangtic plans: Ganganagar and Hanumangarh districts.

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(2) Central plateau and Hill region: Ajmer, Alwar, Banswara, Baran, Bharatpur, Bhilwara, Bundi, Chittorgarh, Dungarpur, Dausa, Jaipur, Kota, Pali, Rajsamand, Sawai Madhopur, Karauli, Tonk. Sirohi and Udaipur.

(3) Western Plateau and Hill Region – Jhalawar

(4) Western Dry Region: Barmer, Bikaner, Churu, Jaisalmer, Jalore, Juhnjhunu, Jodhpur, Nagaur and Sikar.

Agro- Economic Zones of Rajasthan

The Planning Commission has divided the country into four agro- economic zones on the basis of certain agro-economic characteristics like level of land productivity, incidence of rural poverty etc, these are as below.

Zone I: Area with relatively high level of productivity with either high levels of irrigations or high assured rainfall and low incidence of poverty – No district of Rajasthan falls under this zone.

Zone II: Area with relatively low productivity, high rainfall, low level of irrigation and high incidence of poverty – Chittorgarh and Jhalawar.

Zone III: Area with low productivity, low rainfall and high incidence of poverty – Ajmer, Alwar, Banswara, Bharatpur, Bhilwara, Bundi, Dholpur, Dungarpur, Sri Ganganagar, Jaipur, Jhalawar, Kota, Pali, Sawai Madhopur, Sirohi, Tonk and Udaipur.

Zone IV: Ecological fragile areas of the north Himalayan belt, north-eastern region and desert area of Rajasthan and Gujarat. This zone has lot of intra-zonal variation in the levels of productivity, poverty, and irrigation etc. The desert districts of Rajasthan, i.e., Barmer, Bikaner, Churu, Sikar, Jaisalmer, Jalore, Jodhpur, Nagaur, and Juhnjhunu are covered in this zone.

Agriculture and Public Finance

Agriculture in the state till today, to a great extent, depends upon the vagaries of monsoon. Even then certain major breakthroughs have taken place over the plan period. The plan outlay and

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expenditure for agriculture and allied activities of Rajasthan from first plan to eleventh plan is given in appendix 1.1.

In spite of the limited resource with the state Government, table 1.1 clearly shows that over the Five Year Plan periods, there is a continued increase in investment and outlays. The investment was Rs. 54.14 crores in the 1st Five Year Plan which increased to 33735 crores by 10th Five Year Plan as against a total plan outlay of Rs. 64.50 crores and Rs. 31832 corers in the 1st and 10th plan periods respectively.

The state budgetary allocation for agriculture and allied activities has increased in absolute term but in percentage terms, the share of agriculture and allied activities to total outlay fluctuated between 3.16 (11th Plan) and 10.15 (8th Plan) per cent. As such no definite trend is noticeable when all the plan periods are taken into account.

However, when one analyse the state's plan allocation in agriculture and allied activities vis-à-vis actual expenditure, it is observed that since the First Five Year Plan and right up to Tenth Five Year Plan, [except Annual Plan 1979-80 and 6th and 7th Plan] actual expenditure is always less than the amount sanctioned.

Agriculture in Rajasthan: Some important features:-

• Though the contribution of agriculture in the State GDP is declining (it has come down from about 30% in the beginning of this century to about 20% currently), a large percentage (about two thirds) of the total population is still dependent on agriculture,

• With just one percent share in country's surface water resources Rajasthan's agriculture dependent on rains. As only 35-38% of total agriculture is irrigated and irrigation – largely well based (well is source for about 70% irrigated land)

• Unequal land distribution –small percentage of land holders own large amount of land, while majority of the farmers are marginal and small farmers

• Women's ownership in all sections hovers around 3.5 %

• Declining expenditure in agriculture and allied services and irrigation

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(Irrigation and Flood Control) by the state government in terms of its share in total state government expenditure as well as total expenditure by the government on Economic Services. Though the share of spending on irrigation and flood control is showing some increase year 2008-9 onwards, the major expenditure in irrigation is being made on major irrigation; medium and small irrigation getting less than one third of total expenditure on irrigation.

• Decreasing per capita availability of water in Rajasthan, which is anyway below

the national average

Methodology

The secondary data is collected from Directorate of Economics & Statistics, Rajasthan since 1985 to 2015. Semi log econometrics model has been used here to estimate the growth rate of gross cropped area, annual seasonal rainfall, cropping intensity, gross irrigated area, consumption of fertiliser, agriculture production in Rajasthan in last thirty year.

Semi-Log: The exponential equation is given by

$LnYi = \alpha + \beta t + Ui$ this is fitted using OLS method

Here Yi = Dependent variables ith year (i= 1, 2, 3…N)

α = Intercept, β = Regression coefficient, Ui = Residual term

The parameters α and β are estimated by the least square method. The significance of the regression coefficients of the model has been tested by usual

Student‟s t-test. The coefficient of determination has also been calculated for the model.

Multiple Regression Model.

There is three model is estimated for check the effect of GCA, ASRF and FC on Agriculture production.

Agriculture production = f (Gross cropped area, Annual Seasonal Rainfall, Fertilizer Consumption) + Ui

Total Agriculture Production = Food grain + Oilseeds +Fibres + Sugar Cane + Fruits +

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Vegetables + Drug & Narcotics + Fodder + Others

I. Multiple Linear Model

$Yi = \beta1 + \beta2X1 + \beta3X2 + \beta4X3 + Ui$

Here Yi = Total Production

X1 = Gross Cropped area,

X2 = Annual Rainfall,

X3 = Use of Fertilizers,

Ui = Disturbance term

II. Multiple Semi-log Model $LnYi = \beta1 + \beta2X1 + \beta3X2 + \beta4X3 + + Ui$

III. Multiple log Linear Model

$LnYi = ln\beta1 + \beta2\ lnX1 + \beta3\ lnX2 + \beta4\ lnX3 + Ui$

These models are trying to investigate which model is most fitted .So r2 has an important role for fitting the model. This model is tested by the f-test and parameters are tested by the student t- test at 5 per cent of level of significance.

Analysis

Growth Coefficients of Different Agriculture Variables:-

Variables	Intercept	Growth rate(s.e)	Student-t value	R^2	Sig
Gross Cropped Area	9.749	0.008(0.003)	2.969	0.246	0.006
Annual Seasonal Rain Fall	6.221	0.005(0.005)	0.879	0.028	0.0387
Cropping Intensity	4.728	0.005(0.001)	8.289	0.718	0.000
Gross Irrigated Area	8.175	0.029(0.002)	14.784	0.890	0.000
Consumption of Fertiliser	2.198	0.065(0.004)	16.874	0.913	0.000
Total Agriculture	9.146	0.030(0.005)	6.581	0.616	0.000

Estimated Growth rate of gross cropped area, annual seasonal rainfall, cropping

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intensity, gross irrigated area, consumption of fertilizer and total agriculture production in Rajasthan during 1980 to 2009.

Result of Agriculture production with Gross Cropped Area, Annual Seasonal Rainfall and Consumption of Fertiliser during 1980-81 to 2008-09 in Rajasthan:-

Model	Dependent		Independent	OLS Estimators	Sig	R^2
	Variable		Variables	Intercept Regression		
				Coefficient		
Linear	Total	Agri.		-	0.000	
Regression	Production			12949.09		
			1.GCA	1.000	0.001	0.889
			2.ASRF	7.366	0.141	

Semi log	Log	Total	7.669		0.000
	Agri.				
	Production		1.GCA	6.347E-5	0.001
					0.918
			2.ASRF	0.001	0.023
			3.FC	0.012	0.000
C.D.P.F	Log	Total	-4.230		0.093
	Agri.				
	Production		1.LnGCA	1.122	0.003
					0.906
			2.LnASRF	0.294	0.102

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			3.LnFC	0.288	0.000

Author's Calculation ()

Authors calculation (Significant at P = 0.05)

Result & Discussion

Growth rate of Agriculture production in Rajasthan is very much affected by a large number of factors. There are some factors which affect Agriculture growth rate.

1. The growth rate of gross cropped area during last thirty year. 0.8 per cent per year and it is statistically significant. But coefficient of determinant is very low that is 0.246.
2. The annual seasonal rainfall growth rate is 0.5 per cent per year .This also statistically significant but coefficient of determination is very low that is 0.0387.
3. Cropping intensity growth rate in Rajasthan is 0.5 percent and it statistically significant and coefficient of determination is good for making model.
4. The growth rate of gross irrigated area is 2.9 percent per year and it is statistically significant and coefficient of determination is good that is 0.89.
5. The growth rate of fertiliser consumption in Rajasthan is 6.5 percent per year which is statistically significant and coefficient of determination is 0.913 which show goodness of fit.
6. The growth rate of total production of agriculture is about 3 percent per year and it statistically significant and coefficient of determination is 0.616.

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