

HM663 - Systems, Policies and Implications

Food Grain Analysis Report

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★ **Season wise Area, Production and Productivity of total food grains india. From 1950-51 to 2017-18 - 1st Advance Estimates.**

➤ I have taken the data from 2001 to 2010 which is given below.

1Year	Area	Log Area	Production	Log Production	Productivity	log of Productivity	% of covered Irrigation	Area under
2001	122780	5.089127629	212851	5.328075695	1734	3.239049093	43.9	
2002	113860	5.056371179	174771	5.242469371	1535	3.18610838	43.4	
2003	123447	5.09148054	213189	5.328764792	1727	3.237292338	43	
2004	120078	5.079463446	198363	5.297460668	1652	3.218010043	42.8	
2005	121600	5.084933575	208602	5.319318468	1715	3.234264124	42.2	
2006	123708	5.092397786	217282	5.33702375	1756	3.244524512	44.2	
2007	124068	5.093659781	230775	5.36318876	1860	3.269512944	45.5	
2008	122834	5.089318595	234466	5.370079874	1909	3.280805928	46.3	
2009	121334	5.083982515	218107	5.338669604	1798	3.254789687	46.8	
2010	126671	5.102677199	244482	5.38824689	1930	3.285557309	48.3	

❖ **Regression analysis of Area :-**

1	SUMMARY OUTPUT											
2												
3	Regression Statistics											
4	Multiple R	0.658935										
5	R Square	0.434196										
6	Adjusted R Square	0.36347										
7	Standard Error	2698.403										
8	Observations	10										
9												
10	ANOVA											
11		df	SS	MS	F	Significance F						
12	Regression	1	44701645	44701645	6.139171	0.038246						
13	Residual	8	58251049	7281381								
14	Total	9	1.03E+08									
15												
16		Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%			
17	Intercept	43672.42	31639.42	1.380317	0.204829	-29288.2	116633	-29288.2	116633			
18	X Variable	1.084195	0.437575	2.477735	0.038246	0.075145	2.093244	0.075145	2.093244			
19												
20												
21												
22												
23												

◀ ▶ ... data

Area

Production

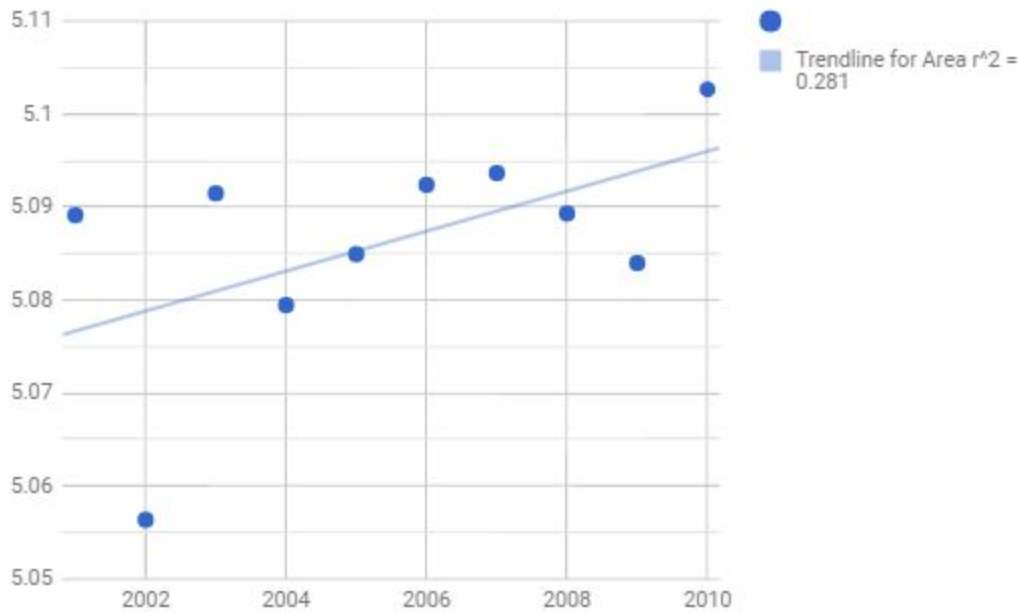
Productivity

Irrigation

⊕

- Here R square value is 0.43 which is below 0.5, So there is less trend.
- Here coefficient is 1.08, which is positive. So total area has increased During years.
- T stat is also 2.47 which is greater than 2.

❖ **Graphical Representation of Area during 10 years :-**



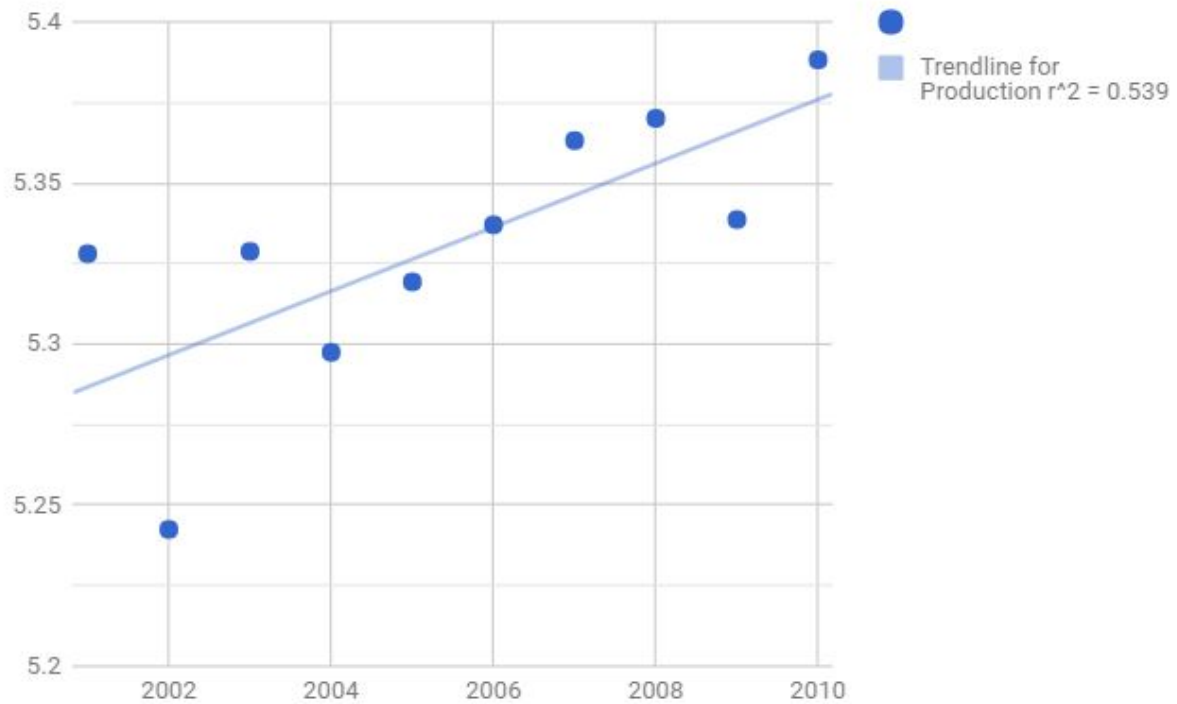
- Here you can see the decline at 2002, 2004 and 2009. In 2002 and 2009, the reason behind that was drought.
- In 2004 farm income insurance scheme was withdrawn, that is why there is a decrease.

❖ **Regression analysis of Production:-**

1	SUMMARY OUTPUT								
2									
3	Regression Statistics								
4	Multiple R	0.749532							
5	R Square	0.561798							
6	Adjusted R Square	0.507023							
7	Standard Error	13756.73							
8	Observations	10							
9									
10	ANOVA								
11		df	SS	MS	F	Significance F			
12	Regression	1	1.94E+09	1.94E+09	10.25642	0.012564			
13	Residual	8	1.51E+09	1.89E+08					
14	Total	9	3.45E+09						
15									
16		Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
17	Intercept	-9512383	3037466	-3.13168	0.01398	-1.7E+07	-2507973	-1.7E+07	-2507973
18	X Variable	4850.497	1514.566	3.202565	0.012564	1357.9	8343.093	1357.9	8343.093
19									
20									
21									
22									
23									

- Here R square value is $0.56 > 0.5$, So there is a trend.
- Here coefficient is 4850, which denotes high growth rates. So total production has increased.
- T stat is also 3.2 which is greater than 2.

❖ **Graphical Representation of Production during 10 years :-**



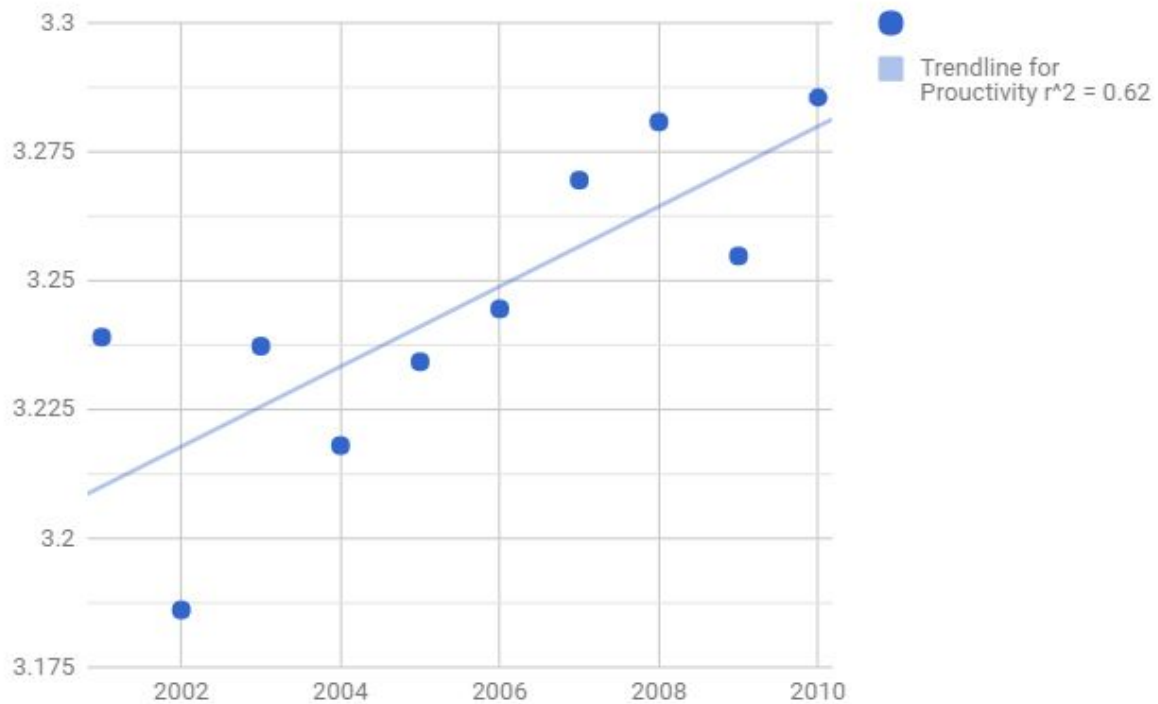
- As area under cultivation was decreased in 2002, 2004 and 2009 that's why Production decreased.

❖ **Regression analysis of Productivity :-**

1	SUMMARY OUTPUT								
2									
3	Regression Statistics								
4	Multiple R	0.795111							
5	R Square	0.632202							
6	Adjusted R Square	0.586227							
7	Standard Error	76.89611							
8	Observations	10							
9									
10	ANOVA								
11		df	SS	MS	F	Significance F			
12	Regression	1	81310.3	81310.3	13.75108	0.005971			
13	Residual	8	47304.1	5913.012					
14	Total	9	128614.4						
15									
16		Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
17	Intercept	-61198.9	16978.55	-3.60449	0.006937	-100352	-22046.3	-100352	-22046.3
18	X Variable	31.39394	8.465983	3.708245	0.005971	11.87135	50.91653	11.87135	50.91653
19									
20									
21									
22									
23									

- Here R square value is $0.63 > 0.5$, So there is a trend.
- Here coefficient is 31.39, which denotes good growth rates. So total productivity has increased.
- T stat is also 3.7 which is greater than 2.

❖ **Graphical Representation of Productivity during 10 years :-**



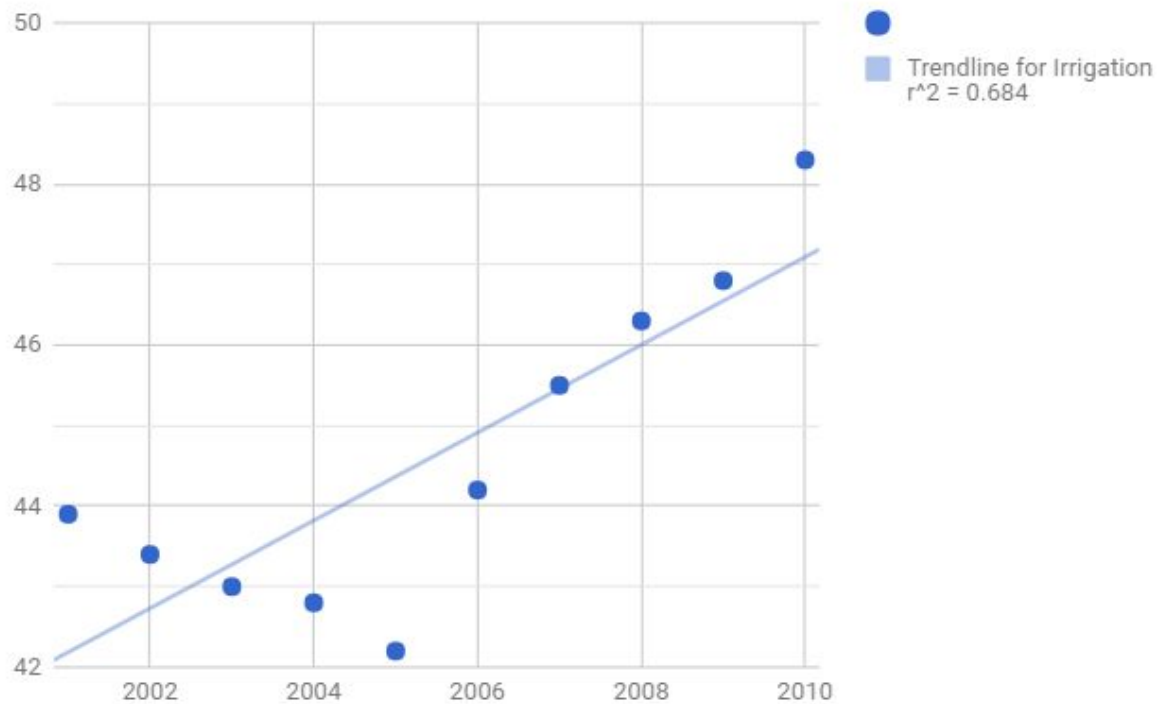
- As area under cultivation and production were decreased in 2002, 2004 and 2009 that's why Productivity decreased.

❖ Regression analysis of Area covered under Irrigation :-

	A	B	C	D	E	F	G	H	I	J
1	SUMMARY OUTPUT									
2										
3	Regression Statistics									
4	Multiple R	0.827287								
5	R Square	0.684404								
6	Adjusted R Square	0.644954								
7	Standard Error	1.189461								
8	Observations	10								
9										
10	ANOVA									
11		df	SS	MS	F	Significance F				
12	Regression	1	24.54545	24.54545	17.34884	0.003143				
13	Residual	8	11.31855	1.414818						
14	Total	9	35.864							
15										
16		Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%	
17	Intercept	-1049.27	262.6313	-3.99522	0.003976	-1654.9	-443.64	-1654.9	-443.64	
18	X Variable	0.545455	0.130955	4.165194	0.003143	0.243471	0.847438	0.243471	0.847438	
19										
20										
21										
22										
23										

- Here R square value is $0.68 > 0.5$, So there is a trend.
- Here coefficient is 0.5454, which denotes slight growth rates.
- T stat is also 4.16 which is greater than 2.

❖ **Graphical Representation of Irrigation during 10 years :-**



- In irrigation, during 2001 to 2005 there was slight decrease because indian government could not provided the facility of irrigation effectively due to various reason. After that it has increased.

1. Correlation between Area and production :-

	Area	Production
Area	1	
Production	0.927722	1

- Here, correlation is 0.92 which is very high, which shows that as area increase production increase.

2. Correlation between production and productivity :-

	Production	Productivity
Production	1	
Productivity	0.988	1

- Here, correlation is 0.98 which is very high, which shows that as production increase productivity increase.

3. Correlation between area and productivity :-

	area	Productivity
area	1	
Productivity	0.859	1

- Here, correlation is 0.859 which is very high, which shows that as area increase productivity increase.

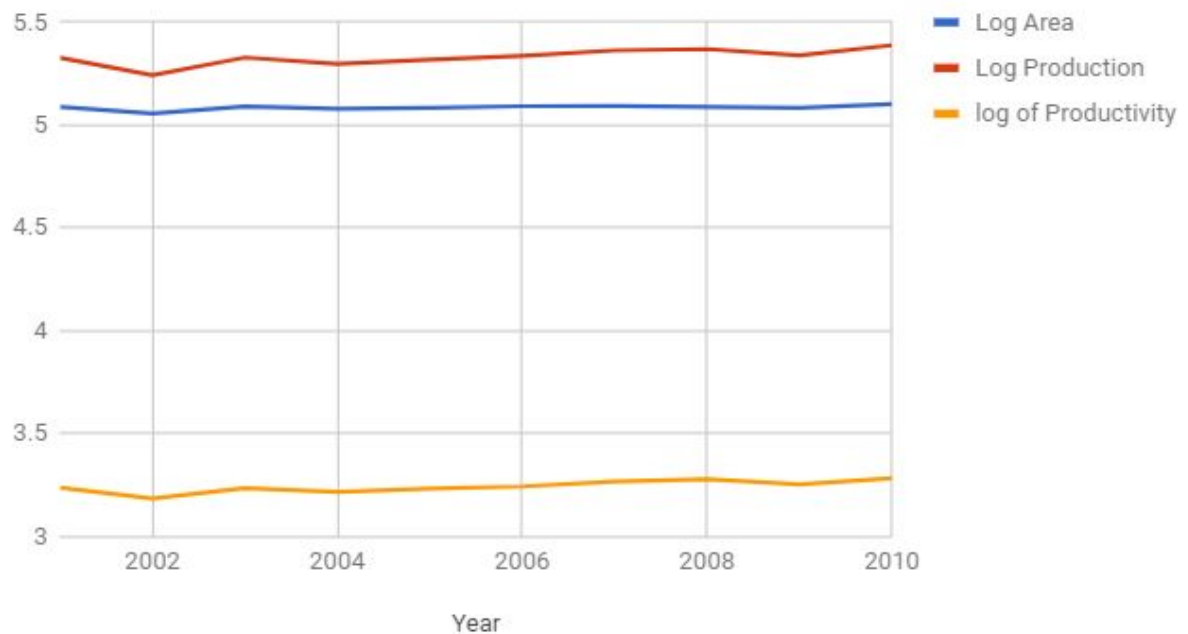
4. Correlation between productivity and Irrigation :-

	Productivity	Irrigation
Productivity	1	
Irrigation	0.481	1

- Here, correlation is 0.481 which is good enough, which shows that as Irrigation increase productivity increase.

★ Area, Production and Productivity Comparison :-

Log Area, Log Production, log of Productivity and Irrigation



- We can see here that pattern of Area, Production, Productivity are almost same. It means that all these factors are proportional to each other.