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Assessing the Interdependence of Agriculture Growth and Rural Development in India (for 2012 – 2022)

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Abstract

As per all the available data and statistics in India it has been observed that productivity, growth, and modernization in the agriculture sector has far reaching beneficial impacts on rural developments in terms of better resource utilizations, structural transformation (workers skills, employability, small scale entrepreneurship), food security and nutrition, food prices, rural poverty, rural healthcare, technological methods in farming and many more. Most significantly the fact that agriculture driven growth tends to be more pro-rural compared with other economic sectors in the country, this has a direct connect to a better living standard for rural population by improving their earning potentials. Use of technology has also played a key role in helping the rural regions to acquire instant information and new skills learning and are able to understand market needs or demands. The focus has largely shifted from just producing crops to creating a well-planned farming activity, improving product quality, and building a more robust food value chain and creating new ancillary services. This paper studied various factors in the agriculture sector for last decade and defined a dependency of some of these factors such as Agriculture productivity data, Gross value addition and credit flow to the sector tend to show a bigger contribution and impact towards Rural development.

Keywords: Agriculture, Development, Industry 4.0 (4FIR), Rural Development, Per Capita Income, Sustainable Development, Inflation, Human Development Index, Gross Value Addition, Productivity.

1. Introduction:

Agriculture sector growth is one of the most important tools for economic growth and ensuring food security for the projected billion people growth by the year 2050. In most large economies of the world Agriculture has and will be considered the most significant sector as large percentage of population is engaged in this economic activity and as such this sector in most parts of the world is closely associated with overall socio, economic and political stability in a region. Through this paper we hope to clearly assess and analyze a close dependency or link between Agricultural sector growth with rural development (development in agriculture growth and productivity has a positive impact on the overall improvements in rural sector). The aim to look at rural development in terms of financial, environmental, social and improvements in quality of life and its dependence of agriculture sector growth. The Study was undertaken with a purpose to help readers, peers, policy makers understand the large quantity of existing and data forecasts on various factors leading to agriculture sector growth which in turn has a significant impact on rural development.

At the end of the third industrial revolution in 2000 a significant number of changes and modernization were brought about in all economic sectors including agriculture. Productivity and Machineries played a key role in the growth numbers. With the FIR (Fourth Industrial Revolution) or Industry 4.0 this trend has continued and we are seeing technology being used for automation, saving time and improving productivity to create solid sector and related business growth. Study in this paper intends to highlight the significant innovations and changes brought about by Industry 4.0 which also contributes to rural development. This technological disruption in the Agri-sector has had exceptional influence on the outputs in the sector directly impacting the equations on food security, nutritional benefits, rural sector incomes and social developments. These technologies have also created a new pathway to answering some of the Agri-sector challenges related

2. Background and Objectives:

In theory it is a well-established fact that there is a high degree of inter-dependencies between Agriculture sector and Rural development in general, every time it is read and hear that if a sector is growing fast every year it must create ground level development and such is the case with agriculture sector, so there is just a general assumption that if agriculture sector is growing and if large number of schemes are being implemented then it must lead to over benefits for rural areas; but most of the existing agriculture sector research data till date have mostly focused on exploring the agriculture yield growth, new technological and machinery in the sector, fiscal policies and aids to farmers and so on. There is a lack of research within the rural development niche in terms of 360-degree evaluation of changes at the ground level and a concrete measurement of these changes. This research data gap is being addressed via this paper. Efforts have been made by number of research experts to highlight the need of rural development in the context of improving overall rural economies but the suggestions have been largely generic and not specific.

There is a definite shortage of data related to the quality of life in rural areas in the country in terms of access to basic needs, nourishments, shelter, healthcare, education, access to skilling and training, access to economic data and information, ease of transportation especially for the farming work force in the country. Most existing studies have been limited to small geography and regions at the state level. Moreover, there is no definite linkages to actionable Agri-sector areas that could help alleviate some of the basic rural problems.

The researcher feels that such data must be available for policy makers, other scientists and academicians

to understand that common level of base parameters that need to be addressed at the minimum to bring about significant improvements in the rural regions with a focus on agriculture sector as this sector employs a high number of rural populations.

Main objectives are

- To observe the link between Agricultural productivity growth and rural development of India.
- To analyze the Barriers in Agri productivity growth contributing to rural development of India.

Main Questions answered are

1. What factors show a link between Agri-growth and Rural Development of India? (Is there a Data based evidence for this link?)
2. What are the barriers for Agriculture growth impacting rural developments of India ?

"This study explores the impact of Apiculture growth on rural development of India in terms of poverty alleviation, food security, economic stability and other improvement parameters among rural communities"

"The research will focus on overall Agri-sector growth and examine correlations between rural development patterns of India with measurable advancements in the sector"

3. Rural Development or Growth:

When we talk about economical and sustainable rural development, it involves measure of human welfare in a society. There are various parameters such as levels of poverty, inequality, progress, access to food and proper nourishment, purchasing power that can be an indication of levels of development in a region. Besides these there are other factors that define development such as measure of freedoms, self-esteem, crime levels, stress levels that shows the general quality of life, but these are more non-financial and non-measurable indicators.

Objectives of development is always to improve these economic indicators by producing more necessary life supporting goods and expanding the access reach in the society slowing moving towards improving living standards and expanding economic activities and choice availability thereby creating a robust sustainable rural economic activity.

Agricultures can contribute to development by raising food productivity, creating new employment opportunities, creating new related services or industry in support of the farming activity, by expanding access to markets and market linkage facilities, creating innovative methods and technological advancement in the sector. This can further be helped with new improved policies and government schemes for access to credits and capital, ease of transportation, new incentives to crop producers.

Rural Development is defined as improving the overall standard of living for those residing in the small towns and villages by enhancing the socio-economic infrastructure like setting up schools, hospitals, industries (based on agriculture processing, minerals, textiles), banks, postal services, electricity, roads building, access to food and water and sanitation.

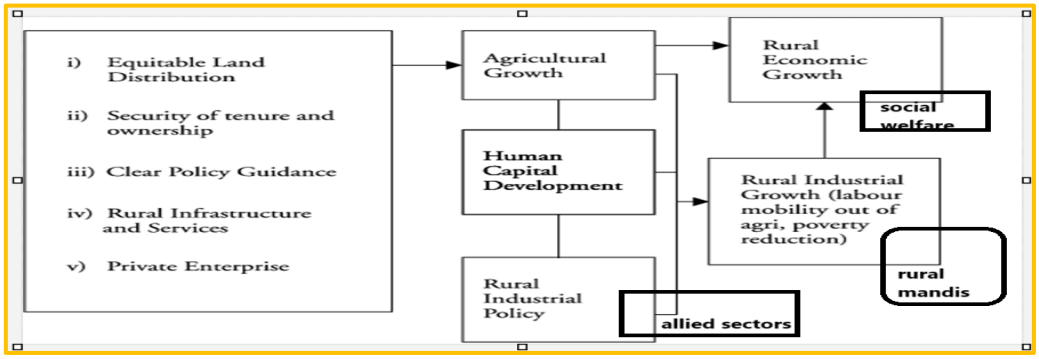
Agriculture and Rural Development plays a key role in rural economy in several domains such as

- **Food Security and Food production**: Agricultural produce ensures access to substantial food source not just for the local region but in the market. Every small-scale farmer contributes to this food storage there-by keeping the supply side of the economy.
- **Income Security:** This sector provides livelihood to large number of rural working age population. Supports farmers, laborers, agri-businesses, transport industry and many more.

- **Environmental conservation**: Regular food production helps regular soil quality check, water conservation, protects biodiversity and contribute to preserving natural resources.
- **Agro Tourism:** Recently upcoming mode of earning in the Agri-sector is to facilitate Agro-tourism for a unique farming life experiences and farm activity participation.
- **Small scale loans:** Micro finance schemes via Cooperative banks and government agencies active in rural regions have facilitated access to capital for small farmers and farming communities. Timely access to capital has helped farmers in improving their yields and solutions for pest controls and post-harvest care of crops.
- **Social harmony:** Rural development helps reduce inequalities in local region and provides a base for equal access to basic life services such as health, education, clean water, nutrition, this also creates a stable environment for a long-term economic growth.

Most talked about development indicators show a positive trend in overall economic development for India in the coming years. Some factors that are vital to Rural development are shown below, 5 elements crucial to driving rural economy are listed in the Figure 3.1

Figure 3.1



Source: Newspaper article on Rural Development (modified by author)

Following graphs highlight last decade sector GDP, GVA and yearly growth has shown a positive trend between 5 to 9 percent annually, this is an indication of a growing economic and good growth in almost all segments including agriculture. The pie chart shows that agriculture sector is the 3rd largest contributor in the overall economic activities after industry and services sector.

Figure 3.2 Annual GDP Growth and Sector wise contribution

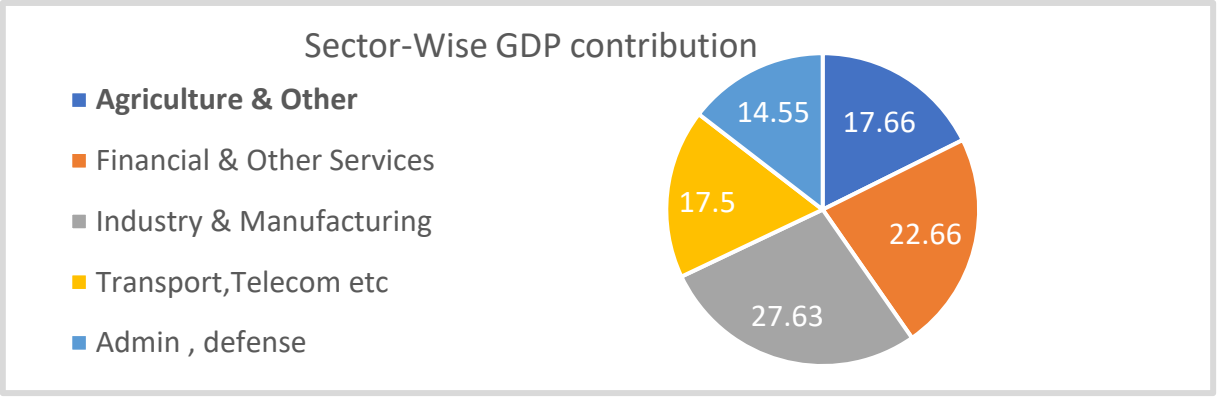
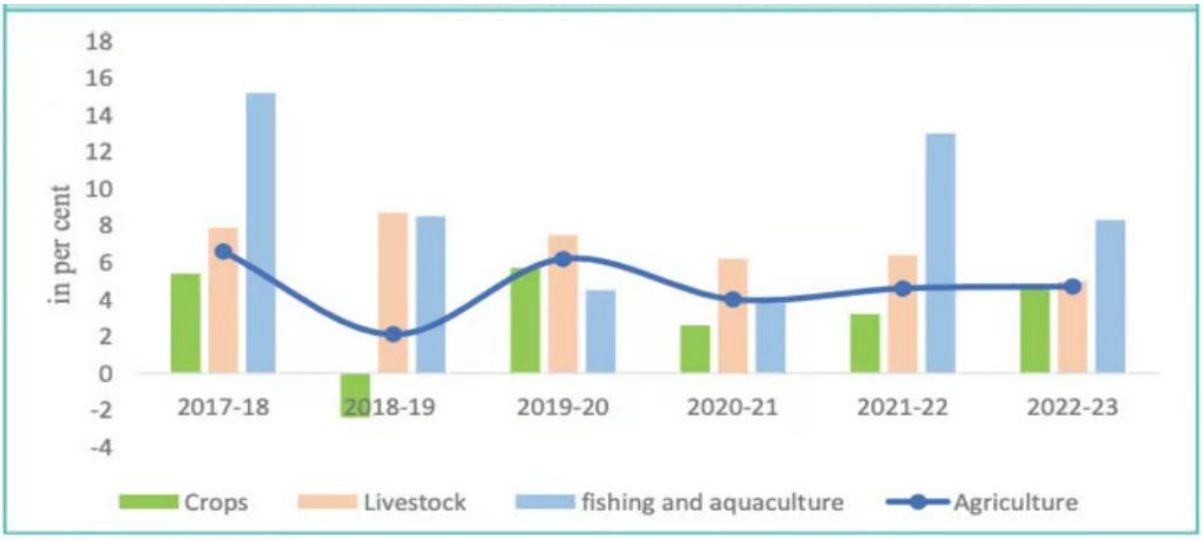


Figure 3.3 Agriculture Sector Growth over the last decade



Source: National Statistical Office (NSO) M/o Statistics & PI

As per the above graph the five-year annual average growth rate of the agriculture sector was 4.18 per cent, we can see a steady growth over the decade apart from 2018-2019 with the period's lowest recorded growth number in the decade.

4. Methodology:

Under this study we target time limit of last 10 years (a decade i. e. from 2012 to 2022) using a mixed-methods approach including statistical data, research material, existing surveys, newspaper articles, books, and various journals. This exercise is a serious Assessment **on the basis of secondary data from 2012-2022 i.e. for 10 years** from various sources that are quoted in this papers reference section. While the study acknowledges the broader context of rural development, it will explore a geography or a set of population of India. This methodology uses structured data collection instruments such as existing surveys, experiments, or existing datasets.

Large part of analytical data has been collected from various Indian government department and ministries such as department of statistics, Agriculture Ministry, local agriculture market reports. For certain points such as climate change data impact, new technology in the sector the author had to refer to international research data available publicly online.

Main points

- Units used are either SI or CGS (metric system) as primary units.
- The Methodology used would be to conduct critical and in-depth review of existing available literature, information from various other sources like articles, magazines, newspapers etc. in order to provide a different perspective on the data related to the set objectives.
- The study does involve some use of statistical models on the collected data
- The study is not a specific region study, it would take examples from across different regions of India.

5. Data Collection and Observations:

After reading multitude journals article, reference books and newspapers articles on the topic of Agriculture sector growth and its impact on Rural Development; the basic factors that must be worked on are Building farmers capacity for high productivity and higher standard of life And creating an integrated governing body policy framework such that it creates a system of maximizing the resource utilization at

the ground level. Introducing planned agricultural activities with the help of upcoming technologies and practices in addition to providing reasonably high-quality farming inputs such as seeds, fertilizers, crop insurances, access to credits etc. other areas such as good storage facilities, transportation, latest post-harvest techniques and new research data and access to training for farmers should also evolve and be implemented diligently.

This study collected secondary data available from government agencies, previous research, journals, reference books and economic articles. Where ever there were gaps in the data, interpolation and extrapolation method were used to fill such gaps in the data to improve its wholeness and quality.

Interpolation Methods Used:

Interpolation is an estimation of a value within two known values in a sequence of values. **Newton's divided difference interpolation formula** is an interpolation technique used when the interval difference is not same for all sequence of values. **Then the first divided difference is given by f[x1,x0] = (f(x1)-f(x0))/x1-x0 and second difference by f[x0,x1,x2] = (f(x1,x2)-f(x0,x1))/x2-x0 and so on… thus we create a newton divided table as**

xi	fi	F(xi,xj)	F(xi,xj,xk)
x1	f1		
		$f[x1,x2]=\frac{f2-f1}{x2-x1}$	
x2	f2		$f[x1,x2,x3]=\frac{f[x3,x2]-f[x2-x1]}{x3-x1}$
		$f[x2,x3]=\frac{f3-f2}{x3-x2}$	
x3	f3		

Table 1

Source: https://www.geeksforgeeks.org/newtons-divided-difference-interpolation-formula/

This method was used as the data available is for a short period of time and calculation takes little time. Below example shows the detail working of this method.

Example:

1. Find Solution by using Newton's Divided Difference Interpolation formula

Table 2

x	2014	2016	2019	2021
y	6427	8059	10218	12698

Table 3

Newton's divided difference table is				
x	y	1st order , f(2014)	2nd order , f(2014,2016)	3rd order, f(2014,2016,2019)
2014	6427			
		8059-6427		
		2016-2014		
		816		
2016	8059			
			719.66666667-816	
			2019-2014	
			-19.26666667	
		10218-8059		104.06666667--19.26666667
		2019-2016		2021-2014
		719.6666667		17.61904762
2019	10218		1240-719.66666667	
			2021-2016	
			104.0666667	
		12698-10218		
		2021-2019		
		1240		
2021	12698			

The value of x at you want to find the f(x):x=2015
Newton's divided difference interpolation formula is
f(x)=y0+(x-x0) f[x0, x1]+(x-x0)(x-x1)f[x0,x1,x2]+(x-x0)(x-x1)(x-x2)f[x0,x1,x2,x3]

y (2015) =6427+(2015-2014) ×816+(2015-2014) (2015-2016) ×-19.26666667+(2015-2014) (2015-2016) (2015-2019) ×17.61904762

y (2015) =6427+(1) ×816+(1) (-1) ×-19.26666667+(1) (-1) (-4) ×17.61904762

y (2015) =6427+816+19.26666667+70.47619048

y(2015)=7332.74285715
Extrapolation Methd Used:
Growth Excel formula = The GROWTH (known's, known's, new x's, constant) function is used to perform a regression analysis where an exponential curve is fitted. A least squares criterion is used, and GROWTH tries to find the best fit under that criterion. (used when Data changes at an un-even rate), also used formula for forecast and trend.

6. Discussion

The study is based on statistics and quantitative information of the last decade Indian Agriculture sector data. This study wants to discuss and analyze in details about Rural Development link theory that can be in future applied/used in some academic field. We have made an effort to define a sufficient degree of dependencies between some sector growth data and the effect on rural development. Data was collected and studied to display what exactly are the factors that may directly or indirectly explain the two paramet-

ers or segments of Rural Development. These parameters are

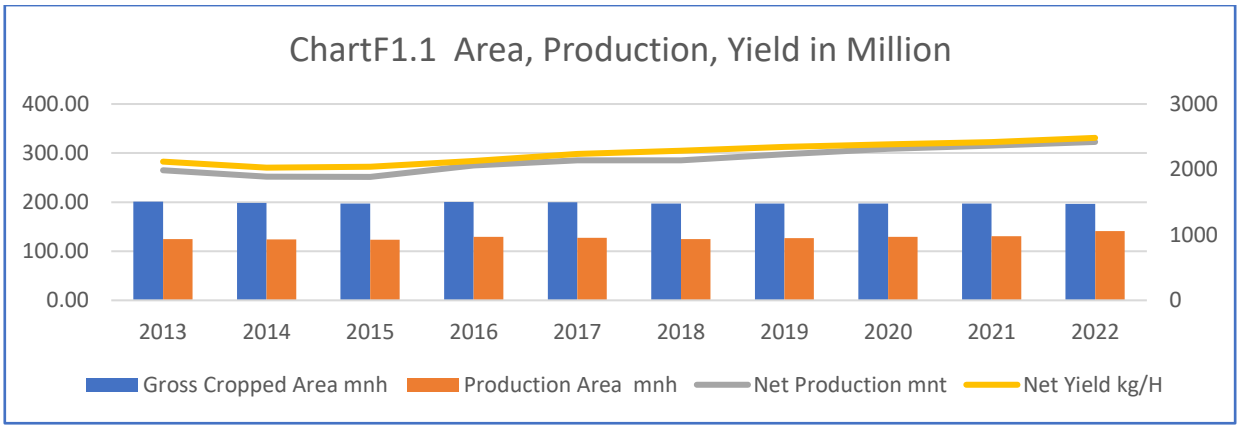
a. Contribution to Farmer Income Growth over the decade [S1]
b. Contribution to Rural Employment growth over the decade [S2]

Aim of the study is to show what factors when improved either by using new process, new technology or even a new policy framework will act as contributor towards significant changes in the performance improvement of some segment of rural development whether it be improved purchasing power, access to healthcare, access to education or training or simple living standard improvement for the rural population. In the next section. The researcher have summarized tables and graphs showing the well-organized tabular information about Agriculture sector factors (called them factor sets F1, F2) that the researcher has identified as the most significant contributor towards one of the segments of improvement in Rural Development.

Factor F1 includes several sets of data combined namely data on production, yield, inflation, exports over the last few years.

1. Data on Agriculture Area Covered, Production and Yield: Last decade is showing a growing trend on all the production numbers confirming the fact that the agriculture sector is growing yearly even if the rate of growth is slower compared to other industrial sectors.

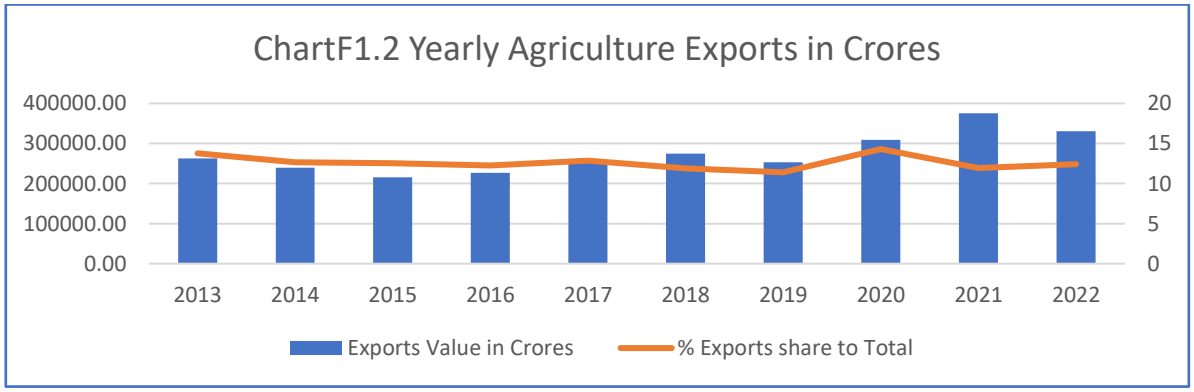
Chart 1.1



Source: GOI Ministry of Agriculture & Farmers Welfare, Economics & Statistics Division – 2022

2. Data in chart 2 for yearly Agricultural commodities exports in monetary values shows a growing number supporting the fact that the exports are growing in line with the production numbers.

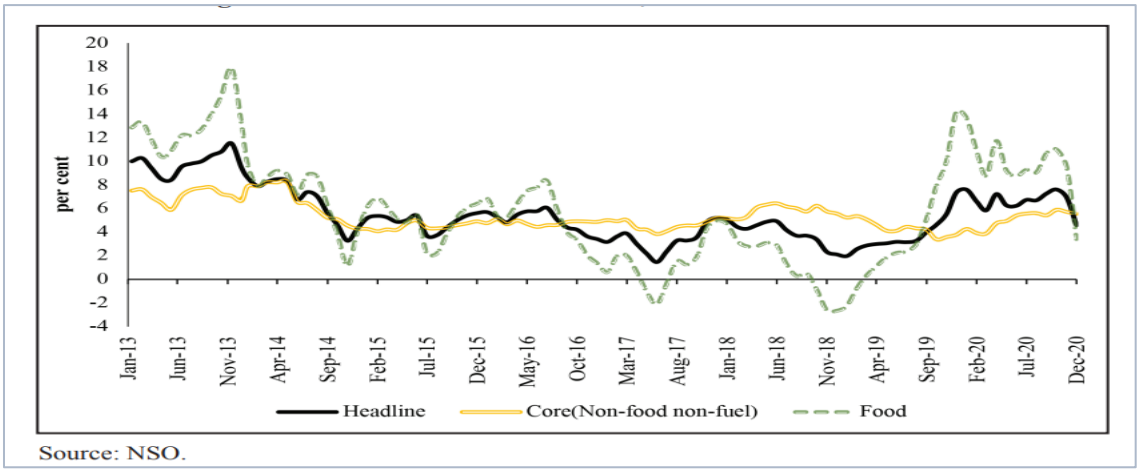
Chart 1.2



Source: Directorate General of Commercial Intelligence & Statistics, Department of Commerce

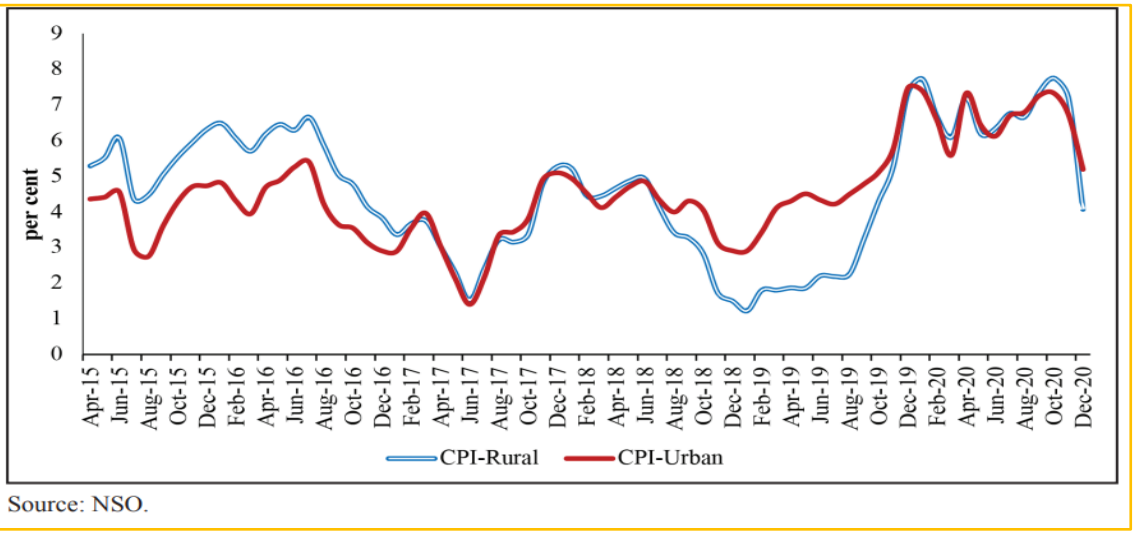
3. Data for food inflation in chart 3, Over the years from 2013 to 2022, India dealt with some moderate inflation rates, usually hanging around 4% to 6%. This inflation was influenced by a mix of things like economic activities, how the monsoon affected farming, and the decisions made by policymakers. The Reserve Bank of India did their part to control inflation by making changes to monetary policies. Looking back over the last decade leading up to 2022, India's consumer price inflation averaged 5.5%, which was higher than the 2.1% average for the Asia-Pacific region over last few years. By 2022, India's inflation was at 6.7%, showing that efforts to steady the economy were still in progress.

Chart F1.3 WPI, CPI, rural, urban inflation data



Source: NSO.

Chart F1.3 A WPI, CPI, rural, urban inflation data



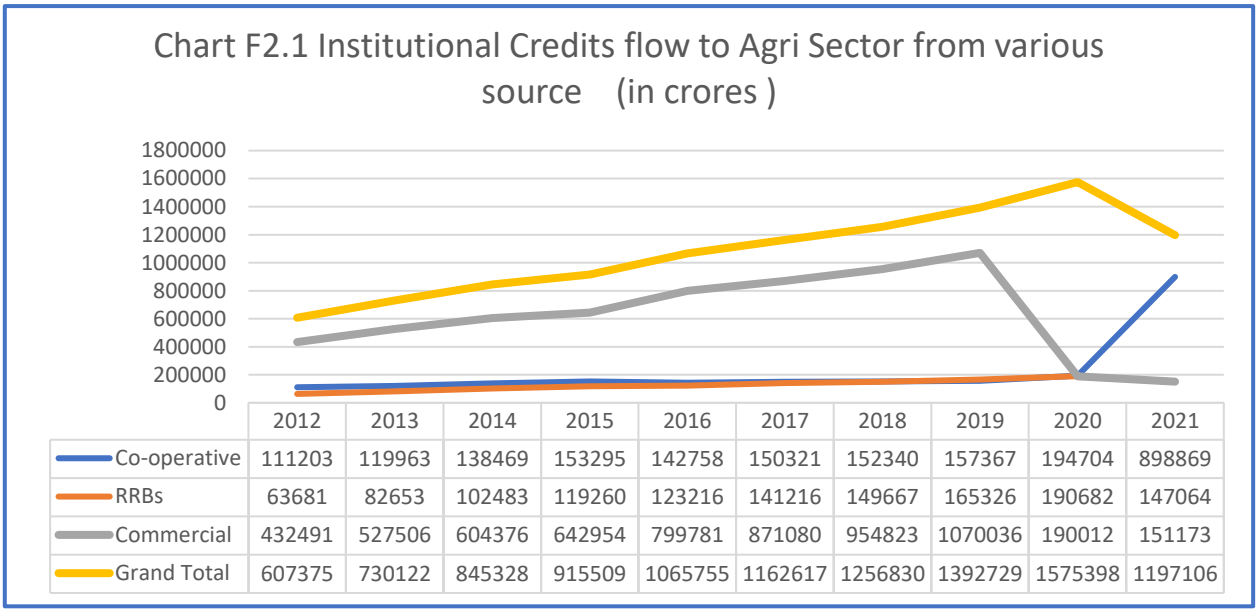
Source: NSO.

Factor F2 includes several sets of data combined together namely data on credits flow in the sector, agriculture department budget allocations, major fiscal schemes launched to help farmers with access to capital, food subsidy issued to help farmers acquire good quality of seeds, fertilizers and machinery.

1.Data for credit flow to Agriculture sector via various institutional and private agencies during the last few years shows commercial banks are most active in terms of credit disbursement in the rural areas compared to regional rural or co-operative ones. The credit number shows a steady increase yearly, apart from covid-19 impact year where the number shows a large dip in the chart. Economic Survey 2023-24:

Agricultural credit saw 1.5 times jump in FY24 compared to earlier years.

Chart 2. 1



	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Co-operative	111203	119963	138469	153295	142758	150321	152340	157367	194704	898869
RRBs	63681	82653	102483	119260	123216	141216	149667	165326	190682	147064
Commercial	432491	527506	604376	642954	799781	871080	954823	1070036	190012	151173
Grand Total	607375	730122	845328	915509	1065755	1162617	1256830	1392729	1575398	1197106

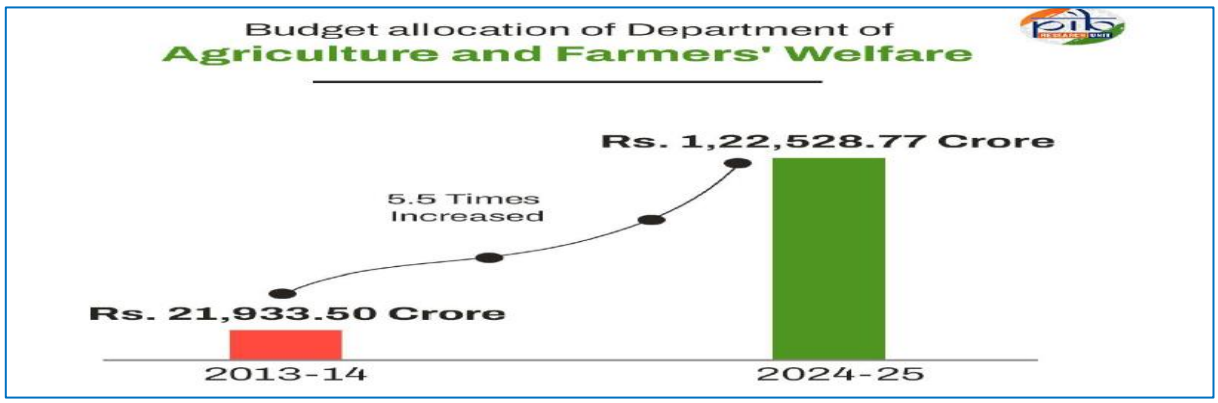
Source: NABARD portal

2. According to RBI Deputy Governor Swaminathan J. (Source: Ministry of Agriculture & Farmers Welfare 2024). As per latest Economic Survey 2023-24: Agricultural credit saw 1.5 times jump in FY24 for the entire country. For short term capital requirements farmers can avail the kisan card facility as per latest data Approximately 7.4 crore active Kisan Credit Cards have emerged as vital tools for providing timely and flexible credit, especially for short-term needs.

Picture 1

Data showing budget allocation number for the sector over the last decade. Numbers shows a 6-fold increase in the allocation ensuring continued growth and development.

Chart 2.2



Source: ministry of agriculture and farmers welfares

3. Data showing food subsidy distribution, The Food Corporation of India (FCI), in collaboration with state governments, receives subsidies for procurement of food grains from farmers at prices notified by government. These grains are subsequently sold at reduced subsidized prices in accordance with National Food Security Act (NFSA) of 2013. The NFSA mandates that up to 75 percent of population in rural areas and 50 percent in urban areas be covered under scheme, thereby ensuring greater access to essential food commodities for significant segments of population.

Picture 2

Year	Food Subsidy (in ₹ thousand crore)
(1)	(2)
2009-10	58.2
2010-11	62.9
2011-12	72.4
2012-13	84.6
2013-14	89.7
2014-15	113.2
2015-16	134.9
2016-17	105.7
2017-18	100
2018-19	101.13
2019-20	119.94
2020-21	529.8
2021-22	288.72
2022-23@	134.96

Source : DFPD

Notes:
1. In addition to net subsidy released to FCI, NSSF loan of Rs 25,000 crires in FY 2016-17, Rs 40,000 crores in FY2017-18, Rs. 70,000 crores in FY 2018-19 and Rs 44,164.02 crores in FY 2019-20 was availed by FCI

Data on Agricultural Inputs consumed over a decade:

Table 4

Inputs	Unit	2012	2013	2014	2015	2016	2017	2018	2019	2020
Seeds										
Seed Prod.	'000 Qtls	126.37	99.72	101.97	105.32	132.80	124.62	122.26	104.32	115.28
Seed Dist.	Lakh Qtls	313.44	301.29	303.12	304.04	348.58	352.01	320.41	383.72	421.09
Fertilizers										
Nitrogen	'000 tons	16821	16750	16946	17372	16735	16958	17628	19100	20404
Phosphatic	'000 tons	6653	5633	6098	6979	6705	6854	6968	7662	8978

Potassic	'000 tons	2062	2099	2532	2402	2508	2779	2779	2607	3154
Total	'000 tons	25536	24482	25576	26753	25949	26591	27375	29369	32536
Pesticides Use	'000 tons	45.62	60.28	56.27	56.72	58.63	63.41	59.67	61.70	61.70
Source: Department of Agriculture and Farmers Welfare										

Post data collection for all factors F1 and F2 this data was analyzed for correlation and regression with the data for different segments S1 and S2 independent variables for its impact and link analysis. The data link was analyzed between F1 and S1, F2 and S2 to observe the closeness or farness of the impact of change in F (factor) and its resulting impact on segment (S). The complete result set is shown and described in the Results paragraph of this paper.

Our (F) Factors VS Impacted (S) Segments table formed is as below:

Table 5

Symbols	Independent Factor	Dependent Segment
F1 <> S1	Agriculture Production, CFPI	Vs Rural Income
F2 <> S2	Rural credit flow, GVA	Vs Agriculture output/yield

7. Findings or Results

Following section shows the statistical test results for factors (F) and segment (S) independent variables. The researcher has used Pearson Correlation Coefficient method to show the links between parameters studied. This is showing strength of a linear relationship between two variables. Its values can range from -1 to 1, -1 indicating a perfect negative (inverse) correlation, 0 indicating no linear relationship, and 1 indicating a perfect positive (direct) correlation. The formula for correlation is $r=(n\times\sum(X2)-\sum(X)2)\times(n\times\sum(Y2)-\sum(Y)2)n\times(\sum(X,Y)-(\sum(X)\times\sum(Y)))$

where:*r*=Correlation coefficient*n*=Number of observations

To show what proportion of the variation in the dependent variable is attributable to the independent variable we use the coefficient of determination, also known as "R-squared,"

Let us look at the statistical calculation on our data below.

For Segment S1- Impact on Rural Income, Our Correlation and Regression data shows the results as below, Both the correlation equation and R square (highlighted in yellow) shows a very-close link between the agriculture sector production growth and increase in the rural income. The graph confirms the close linear relation between Production and Rural Income. In ANOVA (Analysis of Variance) table the Significance-F less than 0.05 indicates statistical model is a better fit for the data. Finally, a smaller p-value indicates one variable as having greater dependency on the other.

Table 6

F1 <> S1	**Agri Production, CFPI VS Rural Income**		
Year	**Net Production mnt**	**CFPI Index in %**	**Avg Monthly Rural Income in Rs**
2013	265.05	13.73	6223.00

2014	252.03	7.89	6427.00
2015	251.54	6.14	7332.74
2016	275.11	6.85	8059.00
2017	285.01	2.01	8711.49
2018	285.21	4.70	9395.91
2019	297.50	2.65	10218.00
2020	308.65	13.63	11283.45
2021	315.00	4.94	10498.00
2022	322.79	5.85	12483.22

	Net Production mnt	The Consumer Food Price Index in %	Avg Monthly Rural Income in Rs
Net Production mnt	1		
The CFPI in %	-0.14835054	1	
Avg Monthly Rural Income in Rs	0.949292323	-0.212183511	1

SUMMARY OUTPUT Regression	
Regression Statistics	
Multiple R	0.952030512
R Square	0.906362096
Adjusted R Square	0.879608409
Standard Error	724.7988978
Observations	10

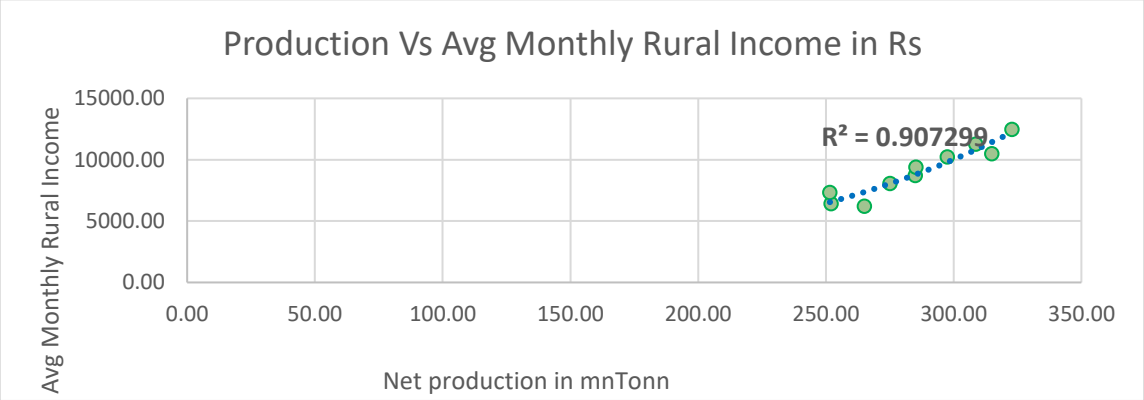
ANOVA

	df	*SS*	*MS*	*Significance F*
Regression	2	35594520.02	17797260.01	0.000251235
Residual	7	3677334.096	525333.4423	
Total	9	39271854.12		

	Coefficients	*Standard Error*	*t Stat*	*P-value*
Intercept	-12862.6943	2865.4091	-4.4890	0.0028
Net Production mnt	77.6286	9.6741	8.0244	0.0001
CFPI index in %	-37.9415	60.8179	-0.6239	0.5525

Result1 : A POSITIVE CORRELATION :

Chart 7.1



For Segment S2 Impact on Agriculture Yield/Output, calculated results show the closeness of data on both sides. Both the correlation equation and R square (highlighted in yellow) shows a close link between the agriculture sector production growth and increase in the rural income linearly. The graph plotted confirms the close linear relation between credit flow, Agriculture GVA and Rural Agriculture Output data observed in the last decade in India. In our ANOVA (Analysis of Variance) table the Significance-F less than 0.05 indicates the statistical model is a good fit for the data. Finally, a smaller p-value indicates one variable as having greater dependency on the other.

Table 7: Data on Rural credit flow Vs Agriculture Output, Yields last decade

F2 <> S2	**Rural credit flow, Agriculture GVA vs Agriculture output/yield**		
Year	**Agency Credit Flow in Crores Rs**	**Net Yield kg/H**	**Gross Value Addition in '000 Cr.**
2013	607375	2120	1926
2014	730122	2028	2094
2015	845328	2041	2228
2016	1065755	2129	2519
2017	1162617	2235	2830
2018	1256830	2286	3030
2019	1392729	2343	3368
2020	1575398	2386	3706
2021	1330000	2419	4099
2022	1589400	2483	4484

	Agency Credit Flow in Crores Rs	Net Yield kg/H	Gross Value Addition in '000 Crores
Institutional Credit Flow in Crores Rs	1		
Net Yield kg/H	0.914700026	1	
Gross Value Addition in '000 Crores	0.923990043	0.963572421	1

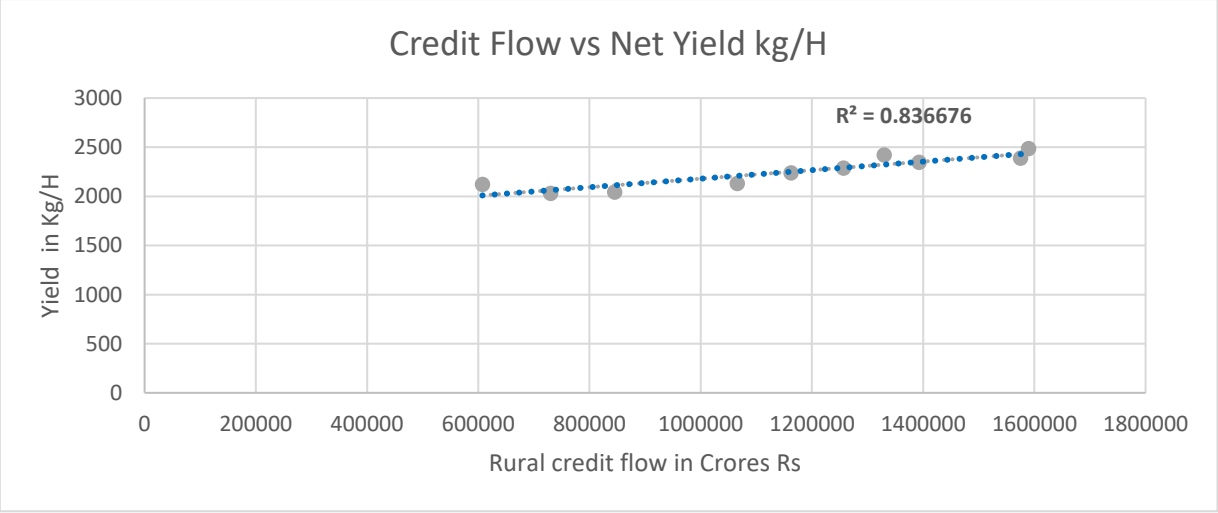
SUMMARY OUTPUT - Regression	
Regression Statistics	
Multiple R	0.969323793
R Square	0.939588616
Adjusted R Square	0.922328221
Standard Error	243.4465626
Observations	10

Table 8

ANOVA	*df*	*SS*	*MS*	*Significance F*
Regression	2	6452444.798	3226222.399	0.00005
Residual	7	414863.6019	59266.22884	
Total	9	6867308.4		
	Coefficients	*Standard Error*	*t Stat*	*P-value*
Intercept	-6532.398269	2183.4363	-2.991797044	0.020174956
Agency Credit Flow in Crores Rs	0.000668078	0.000588637	1.13495764	0.293756689
Net Yield kg/H	3.911359185	1.240269153	3.153637399	0.01607029

Result2: A POSITIVE CORRELATION:

Chart 7.2



Rural development can be attained by making sure access to irrigation facilities, creating employment opportunities, enhancing farm incomes, and improving the socio-economic conditions of rural communities. Of all these the most important is availability of water through irrigation and availability of good quality inputs such as seeds, fertilizers, post-harvest treatment methods, it allows farmers to diversify their crops and cultivate high-value cash crops, contributing to income generation and agricultural growth. Final Observations on dependencies:

Table 9

Symbols	Independent Factor	Dependent Segment	Observation
F1 <> S1	Agriculture Production, CFPI	Vs Rural Income	Very Close Link
F2 <> S2	Rural credit flow, GVA	Vs Agriculture output/yield	Close Link

According to the Economic Survey, India is the world's largest producer of milk and the second-largest producer of fruits, vegetables, and sugar. The food processing industry is one of the largest employers in India's organized manufacturing sector, accounting for 12.02% of total employment in the organized sector. During the 2022-23 fiscal year, the value of agri-food exports, including processed food exports, reached $46.44 billion, representing approximately 11.7% of India's total exports. Furthermore, the share of processed food exports has increased from 14.9% in 2017-18 to 23.4% in 2022-23.

Investing in rural economic development, such as food, dairy, meat, and animal feed processing, food production, waste management, and breed improvement, can be facilitated through collaborations with individual entrepreneurs, private companies, farmer producer organizations (FPOs), Section 8 businesses, and government agencies. This multifaceted approach will help strengthen the economies of rural communities.

8. Barriers

To analyze the Barriers in Agri productivity growth contributing to rural development are

- Education
- Production credit
- Effective farm organizations or associations
- Improving or expanding the land base
- Effective agricultural planning

9. Common Assumptions

Data looked at in the agriculture sector did not include the sub industries such as floriculture, fisheries, horticulture, livestock, and forestry.

10. Conclusion:

From the above study it is find that the agriculture is a backbone for Indian Economy and human being also. As in India, the maximum population is still depended on agriculture sector thus rural development is directly connected with this sector. Increase in Agriculture income directly affect the income of rural people, but agriculture depend on number of factors and basically it required implementation of government schemes systematically and sincerely along with the development ininfrastructure.

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