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Commerce

DIGITAL AGRICULTURE IN INDIA- A WAY FOR DOUBLING FARMER'S INCOME.

KEY WORDS: Digital agriculture, farmer's income, productivity, strategy, schemes.

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ABSTRACT

Digital agriculture is the framework for doubling farmer's income-an issue in Indian economy. The programme of doubling Farmer's income was announced by the finance minister Mr. Arun Jaitly during his budget speech on February'29-2016.The targeted year that has been set by the Govt. for doubling the farmer's income is 2022 i:e from 2015-16 to 2021-22.With to objective to double the real income of farmers, not output or value added or GDP of to agriculture sector. Targeted income includes income from agriculture as well as allied activities. The level of farmer's income go declare year after year due to agravian distress.This article examine to source of agricultural growth and suggest. Technological institual policy options, various scheme & program are implemented to enhance production and Productive - of agriculture to archive the target of doubling farmer's income.

INTRODUCTION:

Agriculture is the principal source of livelihood for about 60 percent of the population of the country .If caters to the food security of the nation. The agriculture sector of India has contribution 17.32% in gross domestic product (GDP) in 2016-17. According to economic survey 2018 .50%of total employment in India is occupied in agricultural sector. The annual average growth of agro based domestic product (GDP) is 3.1%where as to overall GDP is 7.1% during 2008-09 to 2014-2015.in India, farmers are at abysmal condition to 22.5% of them are lying below poverty line. The average income of the farmer was Rs.6426 per month as against their consumption of Rs.6223. The Index of suicide .Indian agriculture sector has been undergoing a structural charge with respect to its farm size, cropping pattern, and share in national economy.

In this context, increase of income of farmers is a social necessity keeping in mind the welfare of the society. Government of India (GOI) in recent time is with the opinion of doubling farmer's income (DFI) and has announced that GOI has its target to double the farmer's income by 2022.

In order to active doubling farmer's income by 2022. Governments introduce a project 'Digital India' on 1st July 2015.The project aim was empowering citizen with e-access to government service and level hood related service among others. Digital agriculture is the way for doubling farmer's income –an issue in Indian economy scenario. Agriculture is the world first solar power industry. It organises human effort to capture the life hidden in seed and sun-light, to process the element in the soil, air and water into produce. Agriculture converts have natural elements into useful material for use of mankind. Agriculture in itself is not digital but a very material physical process.

Like in all other parts of one's life, there is increasing use of electronic devices, tools and a fusion of digitised system to manage agricultural process. The term digital agriculture refers to the use of technologies in managing the business of agriculture.

Present status of Indian Agriculture

At present we are first & highly developed economy in the world. After registering GDP growth of over 7% for the third year in succession in 2016-17, the Indian economy is headed for somewhat slower growth estimated to be 6.5% in 2017-18. (First advance released by CSO) Even with this slower growth for 2017-18 GDP growth has averaged 7.3% for the period from 2014-15 to 2017-18. Net cultivated Area 160 million Hectare and total production from that is 3006 MT at present.

Table-1 Growth and Contribution of Agriculture and Allied Sectors in Indian Economy. (Rs. crore)

Sector	2011-12	2012-13	2013-14	2014-15	2015-16	CAGR (2011-16)
Agriculture & Allied sectors	1501816	1524398	1609061	1604259	1616461	2.00
Total GDP	8106656	8548229	9079250	9709347	10469720	6.60
Agriculture & Allied sectors contribution	18.5	17.8	17.7	16.5	15.4	-
Annual Growth						
Agriculture & Allied	-	1.5	5.6	-0.3	0.8	-
Total GDP	-	5.4	6.2	6.9	7.8	-

(Source: central statistics Organisation)

Role of Science & Technology in Agriculture

For the perspective of doubling farmer's income, there is a **Risks-It mitigate** the need to prioritise efforts in science & technology. The target area in agriculture for Science & Technology as.

1. Extension services:

This includes targeted information sharing system, expending out reach of extension services, building capacity –and skin, agricultural practices, providing knowledge to take up secondary agricultural activities etc.

2. Risks in agriculture:

It mitigali to inherent risks in agriculture. These include a range of systems such as weather forecasting, Insurance coverage, Market forecasting, animal & plant health, post-mitigation etc.

3. Post production:

It safe guards the product and enables efficient marketing. These include modern warehousing and inventory management system, value assessing technologies, transparency in price discover and exchange process, packing & transpiration system etc.

4. Resource use:

It optimises the use of natural resources at each level of the agricultural eco- system. These include converging initiatives taken for soil health, water health quality of planting material, feed and similar inputs.

5. Energy use:

It brings energy use efficiency in agricultural activities. These include those that bring efficiencies in use of fuel and

elements, out motion that minimises indiscriminate energy use, system that enhance the output form labour etc.

6. New developments:
That generally new technology and associated knowledge such as development of new verities, breads, climate resilience etc. went to west before reaching consumers.

7.Agriculture governance:
That identifies and builds database of farmers, links identifies farmers to their specific requirements, ensures that delivery system are transparent and effective, monitor cropping and yields, facilities access to a unified national market, performance dashboards etc.

At the national label, the priority areas to target doubling of farmer's income through science and technology could be.

a. Farmer's data base:
To build a dynamic data base and ensure targeted and effects delivery of support to farmer and to assist specialised extension services.

b. Credit availability:
To proved greater coverage under Kissan Credit Cards including crops, fishers and live stock farmer and universal access to post – harvest pledge loans.

c. Market efficiency:
To provide market intelligent through demand and price fore casting.

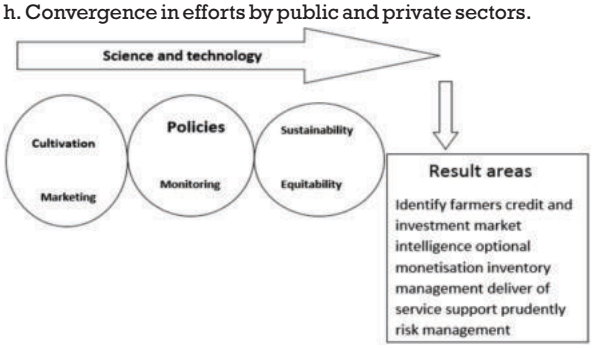
d. Extension system:
to standardise the information integration of effort among stake holders and to maximise coverage to reach all farmers.

e. Recourse use efficiency:
To improve soil and water management.

f. Sustainability and productivity gains:
To improves yields and broad base the production while suiting regional ecological strengths.

g. Risk management:
Information and insurance system that improve farmer capacity to handle the vagaries of weathers, post, disaster and markets.

h. Convergence in efforts by public and private sectors.



Objectives of the study:
(I) To study the role of digitisation in Indian agriculture.
(ii) To study why farmers income could be doubled.
(iii) To study various scheme on agriculture production and productivity.
(iv) To find out the bottleneck in doubling the farmer's income.

Methodology:
The present study was based on policy farmed by Govt. of India and different programs which are going to be implemented for enhancing the farmer's income. Therefore the study was exclusively based on secondary source. The data have been collected from various published annual reporters, journal, magazine, web site etc. The data was analysed for deriving meaningful conclusions regarding digitization in agriculture. A way for farmers doubling income.

Why farmer's income to be doubled?
- Past strategy for development of the agriculture sector in India has focused primarily on raising agricultural output and improving food security.
- The strategy did not explicitly recognize the need to increase farmer's income resulting in low income of farmer's.
- Farmer's income Continuous low in relation to income of those working in the non farm sector.
- Indian farmer's suicide increase due to losses from farming, post attack, shock in farm income and low farm income.
- The low farm income is forcing more and more cultivators, particularly younger age group, to level farming.
- There is an adverse effect on the future of agriculture in the country, leading to food insecurity.

There is need to double farmer's income to promote farmers welfare, reduce agrarian distress and bring parity between income of farmers and those in non-agricultural profession.

Enhancing farmer's income

Enhance Gross Income			Reduce Cost		Stabilise Income
Production growth	Higher prices	Diversify farm/Non-farm	Reduce purchase Input	Exploit Complementarities	Coping Mechanisms

Obstacles for the vision:
There are many obstacles the huddles to achieve the vision.
- Inadequate credit facility.
- Proper un- utilization of resources.
- Inadequate knowledge of modern techniques.
- Monsoon Independency.

Strategy for enhancing farmer's income
1. Improvement in agricultural output viz: productivity-Area-Agricultural output has to be increased through access to irrigation and technological advancement.
2. Resource use efficiency or saving in cost of production.
3. Increase in cropping intensity i:e, the ratio of net area sown to the total cropped area by raising short duration after the main karif and after the main Rabi season so that agricultural land does not remain on used half of the productive period.
4. Diversification of agricultural production towards commercial crops like fruits, vegetables, fibre, condiments & spices and sugarcane.
5. Diversification towards other allied enterprises live forestry, daring, rather than depending primarily on crop cultivation.
6. Shifting cultivators from farm to Non-farm occupation because of productive employment than agriculture sector in rural area.
7. Improvement in terms of trade for farmers or real prices received by farmers use of consumer price index for agricultural labour (CPIAL) as a deflator to change nominal farm income to real farm income.

Source of growth in farmer's income:
Doubling real income of farmers requires annual growth of 10.41% in farmer's income. This implies that the on-going and previously archived rate of growth in farm income has to be sharply accelerated. Therefore it in necessary to harness all possible source of growth in farmer's income within as well as outside agriculture sector.

Source of growth operating within agriculture sector are:
- Improvement in productive in productively

- Resources use effectively or saving in cost of production
- Increasing in cropping intensity
- Diversification toward high value crop

Source outside agriculture:

- Shifting cultivators from farm to non- farm occupations.
- Improvement in terms of trade for farmer's or real prices received by farmers.

Table-2 Data's representing the way forwarding in different sectors

S.No	Crop	Value (Rs Cr.)	Area (MHA)	Productivity (Rs/ha)	Adjusted Productivity (Rs/ha)	Share (%)	
						In total output	In total area
1	Pulses	62135	23.23	26748	26748	4.14	11.95
2	Oilseed	112181	98.28	44707	44707	7.74	14.68
3	Cereals	439383	28.53	40722	40722	29.26	50.56
4	Staple crops	617699	150.04	41169	41169	41.14	77.18
5	Fibre crops	95993	12.54	76549	76549	6.39	6.45
6	Sugarcane	76295	5.01	152285	109558	5.08	2.58
7	Condiments & spices	54163	3.24	167376	120415	3.61	1.66
8	Fruits	155547	7.19	216458	155725	10.36	3.70
9	Vegetables	234219	9.57	244820	244820	15.60	4.92
B	High value crops	616217	37.54	164154	142777	41.04	19.31
C	All crops	1501464	194.4	77236	61503	100	100

Source: Central Statistical Organisation

This table shows that the ongoing rate of growth in farm sector has to be sharply accelerated the annual growth rate of 10.41% required in farmers income, for the farmers income till 2022 from the base year 2015-16.

Source of growth in farms income, achievement and required growth for doubling farmer's income
Table-3

Sources	Period	Growth rate /change	Required growth rate for DFI
Crop productivity 70% segment	2001-2013	3.1	4.1
Live stock value added 30% segment	2005-2014	4.5	6.0
Improvement in resource use efficiency	2001-2012	1.0	1.3
Crop diversification towards fruits and vegetable 70% segment	2003-2014	3.89	5.17
Better price realization: crop	Karnataka experience . Reforms	13% Total	17
Shift to non- farm occupation	2005-2012	1.81	2.4

It is important to know for archive overall growth 18%, crop productivity is require to increase by 4.1% and life stock added by 6%, improvement in resource use efficiency by 3% and form shift to nonfarm occupation by 2.4%.

Income trends of farmers:

Farm income in real terms expressed as real income. Real income is income of individual or rations after adjusting for exflation. It in calculated by substracting ixflahon from nominal income.

Table-4:Trends in farmer's income

Year	Total farm income of all farmers (Rs.crore)		Farm income for cultivators (Rs)	
	Market price	Real price	Current price	Real price
1993-94	177954	303814	12365	21110
1999-00	335631	372923	24168	26875
2004-05	434160	434160	26146	26146
2011-12	1157128	632514	79137	43258
2012-13	1312730	596095	91416	41553
2013-14	1477159	602922	104763	42760
2014-15	1558223	597020	112507	43106
2015-16	1634625	598764	120193	44027

Source: Doubling farmer's income: NITI Aayog

This table reveals that there is acceleration in total and or farmers include and up to the period 2011-12. Total income of all farmers increased by 5.52% per year from 2004-05 to 2011-12 from the period 2004-05 to 2011-12 shows that number of cultivation in per farmer income as compared to the growth rate in income of all farmers. The rate of growth was 7.46% a year, which is a great step towards achieving goal doubling farm income.

The purchasers power of the farmers depends upon his average monthly income of the farmers is average from the situation assessment survey of farmers. Conducted NSS 70th round, 2013. S.chardva sekhar and Niruparm mehrotra in the article "Doubling of farmers income by 2022- what would it take. Shows the ratio of the charges in the real average income of the farmers in different state/ group of UTs.

Ratio of average monthly income per agricultural house hold for different states / UTs during 2013.

Table-5
Source: NSS No.576; income expenditure productive assets and indebtedness of agricultural households in India.
Various scheme an agricultural production and productively.

States/ Group UTs	Income from wages	Net income from cultivation	Net income from farming of animals	Net income from nonfarm business	Total income
Andhra Pradesh	2482	2022	1075	400	5979
Arunachal Pradesh	2076	6647	1310	836	10869
Asam	1430	4211	799	255	6695
Bihar	1323	1715	279	240	3558
Chhattisgarh	1848	3347	-19	1	5177
Gujarat	2683	2933	1930	380	7926
Haryana	3491	7867	2645	431	14434
Himachal Pradesh	4030	2876	1047	824	8777
Jammu & Kashmir	7336	3063	801	1483	12683
Jharkhand	1839	1451	1193	238	4721
Karnataka	2677	4930	600	625	8832
Kerala	5254	3531	575	2529	11888

Madhya Pradesh	1332	4016	732	129	6210
Maharashtra	2156	3856	539	834	7386
Manipur	3815	2924	1563	540	8842
Meghalaya	3776	6472	657	887	11792
Mizoram	3655	4561	864	19	9099
Nagaland	5393	3212	1384	59	10048
Odisha	1716	1407	1314	539	4976
Punjab	4779	10862	1658	760	18059
Rajasthan	2534	3138	967	710	7350
Sikim	3113	1696	980	1009	6798
Tamilnadu	2902	1917	1100	1061	6980
Telengana	1450	4227	374	260	6311
Tripura	2185	2772	311	162	5429
Uttarakhand	1069	2531	848	253	4701
Uttar Pradesh	1150	2855	543	376	4923
West Bengal	2126	979	225	650	3980
Group of UTs	5179	1864	213	1312	8568
All India	2071	3081	763	512	6426

The various schemes which are launched which are launched by the Government to developed agriculture.

(a)Pradhan Mantri Fasal Yojana (PMFBY)
This scheme was implemented from kharif season 2016 along with Pilot United Package Insurance Scheme (UPIS) and Restructured Weather Based Crop Insurance Scheme (RWBCIS). Under This scheme a uniform maximum premium of only 2% will be paid by farmer for all kharif crops and 1.5% for all Rabi crops. During Kharif 2016, 366.64 Lakh farmers have been covered out of which 264.04 Lakh farmers are lonee and 102.60 Lakh farmers are non loanes. PMFBY has been implemented 21 states during kharif 2016.

(b)Interest subsidy for short- term credit to farmers:
Under this scheme, the crop loans up to 3 lakh pa to about 7.5 crore farmers at 7% annual interest and at 4% on timely re payment of crop loan is given. The objective of this scheme to increase annual growth in food gain productivity by 2%.

(C) market intervention scheme and price support scheme :
The objective of market intervention scheme (MIS) and price support scheme (PSS) is to provide remunerative prices to the farmers in case of glut in production and fall in prices. In case market prices fall below the MSP/MIP, central/state agencies start the purchase operation by paying the MSP/MIP, to the farmers.

(d)Rastriya Krishi bikash Yojana (RKVY):
It was launched in 2007-08 for enhancing growth in agriculture and allied sector. The approved outlay of the scheme for the 12th plan was rupees 63246 crore was against the 25000 crores during the 11th plan.

(e) Krishi Unnati scheme:
(1) Mission for integrated development of horticulture (MIDH).
(2) Integrated Scheme on Agriculture Census and statistics (ISACE&S).
(3) Integrated scheme on agricultural marketing (ISAM)
(4) National mission for Sustainable Agriculture (NMSA)
(5) National Mission on Agriculture Extension and Technology (NMAET).
(6) Pradhan mantri Krishi Sanchay Yojana (PMKSY).

(F) Soil Health Card Scheme:
This scheme carry crop wise recommendation of nutrients and fertilizers required for individual farms to help farmers to improve productivity through judiciary use of inputs. About 6.04 crore soil health cards distributed till 2017 and 2.78 crore soil surplus has been collected till 15.4.2017.

(g) National Agriculture Market (e-NAM)
The main objective of this scheme that farmers will be able to get better price of their crops through e-NAM. Under this scheme, 250 mandis of 13 states have been integrated with e-NAM portal.

(h) Neem Coated Urea (NCU)
Prime minister of India has made available 100 percent neem coated area into country. In this scheme farmers are getting urea in adequate quantity. The cost of production is being reduced 10-15% with the use of Neem Coated Urea. Productively will be increase with the use of this scheme.

(i)Farmer First:
The farmer's first aims at enriching farmers- scientist interface technology assemblage, application and feedback, partnership and institutional building and content mobilization. it will provide a platform to farmers and scientists for creating linkages, capacity, building, technology adoption and application, on site input management feedback and institutional building.

(j) Paramparagata Krishi Vikash Yojana (PKVY)
The objective of the scheme is to promote commercial organic production through certified organic farming. It will raise farmer's income and create potential market for traders. It will motivate the farmers for natural resource mobilization for input production.

The action needed in sours of growth in farm income can be divided in to three category (a) development initiatives (b) technology generation and dissemination (c) policies and reforms.

Table-6 base level and target for development initiatives to double farmer's income.

source	year	Base level	Target 2022
Quality seed(MT)	2014-2015	3.03	7.97
Fertilization(MT)	2014-2015	25.58	36.24
Irrigation(MH)	2012-2013	92.58	307.39
Area under than one crop (%)	2012-2013	40	53
Area under fruits and vegetables(MH)	2013-2014	16.75	26.38
Area under High yielding varieties (%)	2014-2015	69.3	90.0

MH- million hectors MT- million ton

B-Improved technology:
India has large network of ICARI institute and state agricultural universities are continuously working for dissemination of technology and developing improved varieties, products, breeds and formulation for sustainable growth of agriculture sector. The system has also been equipped with network of krishi bigyan Kendra in every rural district for extension of technology.

C- Reforms and policies
1. Institutional reforms:
a. Private Mandi
b. Direct marketing
c. Contract farming
d. e- trading
e. Single point levy
f. Direct sell to consumer by farmer
g. Single trader license

2. Special treatment to fruits and vegetables denitrify form APMC

Participation in E- NAM

CONCLUSION:

To secure future of agriculture and to improve lively hood of Indias population, adequate need to big event to improve the welfare of farmers and rais agricultural income. Doubling the farmers income by 2022 is a challenging issue but it is a needed for economic growth of country. Indian farmers should choose digital technology, high value crops for agricultural production and productivity archiving the goal of doubling farmer's income by 2022, three strategy should be focused on development initiatives, technology and policy reforms.

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