

Qualitative Analysis of Factors Responsible For Role of Agriculture in Economic Development of India

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Abstract

Agriculture is most important sector of Indian economy. In economic development agriculture accounts 18 percent gross domestic product (GDP). About employment agriculture sector provides more workforce. So that India recognized as agriculture based country. Agriculture plays important role in contribution of national income source of live hood source of food supply, industrial development commercial important, source of government revenue and economic planning. Agriculture also produces employment, capital formation and investment.

An activity of human for covering the primary aims of life like food, fodder, food, fibre and fuel by optimum use of terrestrial resource is called as agriculture it is modern definition of agriculture.

Beyond the back days in history man depends upon hunting of animal for their food but when knowledge of moderation increases he interested in farming and settles one place. Histological record shows in 2300 B.C. farming concept occurred. In India sixteenth century A.D. Portuguese develop crop system in agriculture. They planted potato, tomato, capsicum, groundnut, tobacco, pineapple and guava like vegetable and fruits crops. In twenty century Lord Karzan lead agriculture development policy. In India 1905-07 six agriculture college started by British government at Sabir, Pune, Kanpur, Nagpur, Coimbiture and laylpur (it comes today in Pakistan). In 21 June 1929 they also established Imperial Council of agricultural research today it known as Indian Council of Agricultural Research. After independence of India in 1950 Imperial Agricultural Research Institute established by Indian government in Pusa (Bihar). All these activities concerned with agriculture development of India are very important. In India 65 to 70 percent population depend upon agriculture for their all necessities.

After independence of India 1950 to 1968 period known as pre-green revolution era and 1968 to 1988 is known as Green revolution era. In these era India become a world ranker in food grain production. 1988 to 1999 period is known as post green revolution era. These all periods shows agriculture progress of India. National bureau of plant genetic resource, national bureau of soil survey and land use planning and national bureau of agricultural imported microorganism also worked to develop the agriculture sector. Five years planning also focused on agriculture sector. National farmer commission, national seed policy 2002, national agricultural insurance scheme 2000 also helpful to farmers development.

So that today agriculture occupied a very important place in the economic life of country. It also known as backbone of economy agricultural technology developed a broad spectrum of option for food, feed and fibre production. Today science and technology develop the agriculture sector botany, zoology, soil science; agricultural science, horticulture science, biotechnology, microbiology and genetic engineering like subjects are given important contribution to the agriculture sector. So population increase of country also increase the agriculture production and it helps to economic development of India.

Key Words - GDP, Agriculture, ICAR, Green revolution etc.

I. INTRODUCTION

Agriculture is most important sector of Indian economy. In economic development it account eighteen percent gross domestic product (GDP). It is very old skill of human being histological record shows farming concept occur in 2300 BC. In India sixteenth century Portuguese develop crop system in agriculture. India is agriculture based country near about fifty percent people depend on it. Agriculture contribute in national economy source of livelihood, source of food supply also plays important role in industrial development, commercial important and source of government revenue. In different ways agriculture sector plays important role in Indian economy.

Agriculture also oldest and largest industry of world and dynamic rapidly changing industry that has existing future. In 8700 BC human domesticated animal like sheep in middle east. 5500 BC Sumerian started organised agriculture in the history. Agriculture has been driven and defined by greatly different climate, culture and technology. Agriculture also plays keep role in development of human civilization. In Indian subcontinent histological record shows wheat barley crops domesticated. Archaeological evidence shows that rice grain is

part of our diet. Indus valley civilization occur around 4500 BC. It shows well irrigation development in agriculture. Mostly twenty crops species of plants produced ninety percent world's food, in which three are grasses species. India having 0.6 million villages estimate 840 million rural populations. It also is having 157.35 agricultural lands with twenty different agriculture regions. Indian land consist 45 to 60 types of different soil types. It is natural wealth our nations so that different types of crops occur in India. So that India recognized as store of different agriculture production. It gives foreign currency and increase nations economy.

Objective-

- To make a compertive analysis of agriculture sector
- To evulate the agricultural growth in India
- To access the level of agricultural development in India
- To focus contribution of farmers towards Indian economy
- To discuss government agriculture policies, scheme and issues

Hypothesis-

- Indian agriculture is game of environment gambler
- Indian farmers believe their ruting agriculture system

Analysis-

Today 570 million estimated family manage world's agricultural land and produced most of world's food. In witch one hector land owners having 72 percent people control eight percent of total land, two hector land owners is 12 percent control four percent total land. Two to five hector land owners is ten percent people control 0.7 percent total land, about 50 hector land owners is 0.1 percent people but control 65 percent of total land. In Asia region 71 percent agriculture land in witch China cover 35 percent and India 24 percent, four percent other countries , South Asian countries cover nine percent, east Asia and Pacific cover six percent. Africa cover seven percent, Europe and central Aisa four percent and latin America and Caribbean region cover four percent total land. These type agriculture land distributed all over world.

Histological background of agriculture-

Agriculture history is date black 10,000 BC people harvested food from natural resources and domesticated animal and plants. After few years passing people select the plants material for propagation and animal for breeding. After thousands years passing farmer select traits in crops and improved plants for agricultural purpose. In witch plant having large seeds and fruits, nutrition content, short life span better adaption in ecological condition. Maize cultivated in Mexico recorded in 4400BC, potato cultivation in 3500 BC at America. Agriculture development occur 2900 BC the plough investigated for cultrate in middle east region. Kalyani dam constructed on Kaveri river in first AD it shows oldest irrigation development of India. Thus day by day agriculture progress occur in different civilization. Indus valley also having good agriculture progress. Human activity of agriculture sector cover food, fodder, feed, fiber and fuel it is its primary aims. In sixteenth century Portuguese develop potato, tomato, capsicum, papaya, tobacco and groundnut like many crops system in agriculture. In British rule in 1903 irrigation commission established, Lord Cerzen also focused on agriculture sector. In vedic period (1500-1000 BC) Rig-Veda given reference about agriculture mentioned with people food and crops system. In Buddha period agriculture is main business of people. In megdh period (544-493 BC) people cultivated food grains, fruits, flowers and seeds for quality crop cultivation. Samrat Ashoka declared first forest policy In his rule. In muslim Kings period garden and agriculture are well planed.

Agriculture development after independence-

After independence of India government focused on agriculture sector because population of India rapidly increase but not increase food grains production, India aslo faced many famine in British rule. So that government keep target in every five years planning commission with other development give first preferred to agriculture. It shows in following data.

Table1. Five year plans and agriculture expenditure

Year	Plans	Total plans expenditure	Agriculture and allied sector	Percent of agriculture and allied sector
1951-1956	I	0001960	0000600	31.00
1956-1961	II	0004670	0000950	20.00
1961-1966	III	0008580	0001750	21.00
1969-1974	IV	0015800	0003670	24.00
1974-1979	V	0039430	008940	22.00
1980-1985	VI	0109300	0026100	24.00
1985-1990	VII	0218730	0047100	23.00

1992-1997	VIII	0475480	0101590	21.00
1997-2002	XI	0859200	0176217	20.05
2002-2007	X	1525639	0365055	20.06
2007-2012	XI	3676936	0723465	19.07
2012- 2017	XII	7669807	1323119	17.03

(Source planning commission document)

Because of government investment and provided basic need to agriculture. It increase the production of agriculture sector. In 1950-51 share of agriculture in national income is 56.5 percentages. In 1970-71 it become 43.9 percent, in 1990-91 it is 34.6 percent. In agriculture sector 1952 to 1958 periods considered as first green revolution era. 1968 to 1988 is green revolution era and 1988 to 1996 post green revolution era. It also increase gross domestic product (GDP) also it seen in below data.

Table 2-Gross domestic products GDP of agricultural sector

Year	GDP	GDP Agricultural and allied sector	Percentage of food grains production
1992-1993	5.1	5.8	06.6
1993-1994	5.9	4.1	02.7
1994-1995	7.3	5.0	03.7
1995-1996	7.3	-0.9	-05.8
1996-1997	7.8	9.6	10.5
1997-1998	4.8	-2.4	-03.6
1999-1999	6.5	6.2	05.0
1999-2000	6.1	0.3	-03.0
2000-2001	4.4	0.0	-06.6
2001-2002	5.8	6.2	08.2
2002-2003	3.8	-7.2	-18.2
2003-2004	8.5	10	22.4
2004-2005	7.5	0.0	-07.1
2005-2006	9.5	5.9	05.2
2006-2007	9.6	3.8	03.6
2007-2008	7.3	4.7	06.0
2008-2009	6.7	1.6	01.3
2009-2010	7.2	-0.2	---

(Source economic survey)

With this in agriculture vegetable and fruits production also increase. It shows by following table.

Table3: Production of vegetable and fruits by agriculture in million tone

Year	Fruits	Vegetable	Total
2001-2002	43	089	132
2007-2008	66	126	174
2008-2009	68	129	197
2009-2010	71	134	205
2010-2011	75	147	222
2011-2012	76	156	232

India produced fourteen percent (146.55 million tone's) of world's vegetable in fifteen percent (8.5 million hector) area under its cultivation. Productivity of this vegetable is 17.3 tone / hector and world's average productivity is 18.8 tone/ hector. India is second largest producer of vegetable in the world. Total area under horticulture crops is 21.83 million hector and production of its in India is 240.53 million tone's in which vegetable and fruits produced. It considered 92 percent total horticulture production of country. In 2012-13 India having 6982 hector area under fruits production gets 81285 metric tone's production. It's average is 11.6 percent and vegetable is 9205 hector area given 162187 metric tone's production, it's average productivity is 17.6 percent. We consume 375 gms of cereals and only 30 gms vegetable daily as against 328 gms cereals, 316 gms of vegetable and 362 gms fruits in advanced countries. Dietitian recommended consumption of leafy vegetable at least 200 gms and 150 gms root vegetable for well balanced diet of human being. Due to construction of new irrigation project and lifting irrigation scheme area under irrigation increased. These increased area also helped to increase agriculture production. The Indian Agricultural scenario rapidly changing in last two decades, Increase in irrigation area, use of fertilizers, and insecticide and hybrid seeds production of crops increase. Multiple cropping system, different scientific technology allow to country active productivity target. Following table data shows the increase of production some food grains.

Table- 4 Production of food grains in million tone's

Year>Crop	1950-1951	1960-1961	1970-1971	1980-1981	1990-1991	2000-2001	2010-2011	2011-2012	2012-2013	Rise %
Rice	20.5	34.5	42.2	53.6	74.2	84.9	95.4	105.3	104.4	507.2
Wheat	06.4	11.0	22.8	36.3	55.1	69.6	86.8	094.8	092.4	1431.
Maize	1.73	4.08	7.49	6.96	8.96	12.0	21.73	021.76	022.23	1285.0

Increased production increase governments export quantity. Export of different agricultural product given foreign currency exchange. Cotton, jute, tobacco, species, tea and coffee gives foreign currency exchange for 2011-12 and 2012-13 exporting year to nation.

Table5: Agricultural crops export in foreign currency exchange (core)

Crops	2011-2012	2012-2013
Raw cotton	21624.20	198172.85
Jute	00945.83	003814.98
Un-manufactured tobacco	02993.46	015318.92
Spices	13220.23	004677.08
Tea	04078.53	004712.51
Coffee	04534.62	_____

India produced wheat, rice, groundnut, tea, fruits and vegetables production second rank after China in the world. Jute and pulses production of India is first rank in the world. These production increases by different revolution in India. Green revolution is related to crops while white revolution is related to milk production. Blue revolution is related to fish production while golden revolution is related to oil seed production all these revolution achieved productivity target.

Role of science and technology in agriculture-

In agriculture development role of science and technology is very important.1930 to 1950 period considered as mechanical era in agriculture development. 1950 to 1970 considered as chemical era and 1970 to past considered as biotechnology and information technology era. In agriculture sector agronomy is branch arise in 1900 agro's means field and nomos means manage it defined as branch of agriculture concerned with the principle and practice of crops production and field management. Alphonsede Can dole and Vavilo published book on center of origin of cultivated plants in 1926 it gives directions to researchers about crop plant history.

In eighteen century oxygen and horses used for power crude wooden plows, all sowing by hand cultivating by hoe and gram with sickle and threshing with flail. Cradle and Scythe introduced invitation of cotton gine in 1793. After it Eli Whitney invents the cotton gine which contribute to success of cotton as southern cash crop. In 1801 Charles New bold patent the first east iron plow with interchangeable parts. For storing the long time fruits and vegetables Thomas Moore of Maryland invents the ice box refrigerator. These type day by day agricultural investigation progressed. Plow with steel blades Laws Lare invest, John Dere and Leonard also manufactured steel plow and practical threshing machine. In 1843 Laws founded the commercial fertilizers industry by developing process for making superphosphate, but mixed fertilizers sold commercially in 1849. Instead of animal use firstly steam tractor in 1868 it become revolutionary movement in agriculture sector. In seed production first hybrid cron seed produced in 1881. In 1892 gaslin tractor build by John Folish but in 1904 first business oriented tractor comes in market but it modified in 1920 by introducing gear tractor.

George Washington Cover firstly given commercial use of peanut, sweet potato and soybean it is revolutionary movement in southern agriculture. Thus science and technology develop the agriculture sector. In 1997 first weed and insects resistance commercial seed of soybean and cotton by biotechnological investigation. All these necessary for high yield of crops because world population increase rapidly but not increase cultivated land. So that land owners decrease area of their land. In India land holders data is as follows.

Table 6 - Land holders of India

Category	Number of land holders (million)		Total area		Average size holders (hector's)	
	2000-01	2010-11	2000-01	2010-11	2000-01	2010-11
In hectare						
Marginal (<= than 01)	75.41	92.36	29.81	35.41	0.40	0.38
	62.3	67.00	18.07	12.02		

Small (01- 02)	22.69 19.00	24.71 17.09	32.14 20.02	35.14 22.01	1.42	1.42
Semi medium (02-04)	14.02 11.08	13.84 10.01	38.19 24.00	37.55 25.06	2.72	2.77
Medium (04-10)	06.58 05.05	05.86 14.03	38.22 24.00	33.71 21.02	5.81	5.76
Large (≥10)	01.23 01.07	01.00 00.07	21.07 13.02	17.38 10.09	17.1	17.5
	119	137.76	159.44	154.18	1.33	1.16

In these cultivated area many labour worked in 1881 it is 7.5 million it increase in 1921 become 21 million. In 1951 it is 31.5 million , in 1971 it is 47.5 million. But in 1981 it is 55.4 million it decrease in 1991 become 22.4 million. In 2007 to 2010 male labours percent is 46 and female labours percent is 65 percent. Over centuries agriculture technology developed a broad spectrum of option for food feed and fiber production in many ways, technology reduce amount of time and labours workforce. Agricultural shows tremendous changes today. Population involved in farming is reduced only few members of family or society involved in farming. Technology development reduced the need for basic farm labour, more than 2500 plants varieties developed as crops by radiation mutagen, induced mutagen breeding widely used in United States but today used all over world. Tissue culture system also developed high productive crops. It gives entire genetic information of donor plants, embryo secure system also related to plant species are hybridised or crossed. Protoplast fusion technology used protoplast to introduce new gene into plants cell. Advanced concept genetic engineering comes in light in 1980.

In India agriculture sector used many chemical fertilizers and insecticide for increase of production. First fertiliser industry developed in 1906 at Ranipat in Tamil Nadu state. Domestic production of nitrogen and phosphate is 29,000 and 10,000 tone's in 1951-52 it increase in 1972-73 and become 1.05 and 0.325 million tone's respectively. In 1999-2000 average consumption of fertilizers all over country is 89.8 kg/ hectore but in West Bengal used 122 kg, Haryana 167 kg, Punjab 184 kg Uttarakhand and Utter pardesh 127 kg Andhra pradesh 138 kg and Tamilnadu 112 kg it is over average fertilizers used states in India. IFCO born in India 03 March 1967. The data of fertilizers production and consumption is as follows.

Table 7- Production of fertilizers in India

Year	N -production	N -consumption	P- production	P- consumption
1999-00	087310	159310	34483	7184
2000-01	044316	092011	07343	2154
2001-02	069010	031010	08373	3824
2002-03	069010	047411	09043	0194
2003-04	135205	000076	00617	0124

There is also chemical insecticide over used in India to control the pest and disease of crops. It increase crops production and also famine threaten in country and world gives right answer by increasing crops production. In world 842 people is chronically hungry. Use of chemical insecticide in India data is as follows.

Table 8 - Consumption of chemical insecticide in India

Year	Consumption (in metric tone's)
1994-1995	61357
1995-1996	61260
1996-1997	56114
1997-1998	52239
1998-1999	419157
1999-2000	46175
2000-2001	3584
2001-2002	47020
2002-2003	48350
2003-2004	41026
2004-2005	46672
2005-2006	38373

Role of agricultural education in agriculture development-

Education also important factor to develop the agriculture production and agricultural techniques. General education given insufficient knowledge of agriculture sector so that special agriculture education start in world.

In 1818 first eastern state developed horticulture society in New York. For animals protection and study first veterinary school established in Cambridge university. In 1924 institute of agriculture engineering

established by Oxford University, the school of agricultural botany established in 1908 at Cambridge University. First agricultural journal published by agriculture and horticultural society in 1824. In India department of agriculture was established in 1863 by William Dension at Madras. In 1868 first agricultural school starts in Saidapet in Madras area. In Maharashtra 1879 Poona college agriculture department introduce three years agricultural diploma course. In veterinary subject Lahore College start first journal Veterinary Science and animal management. In 1888 college of Nagpur has started two year agriculture diploma. In 1893 government agriculture college Kanpur started B.sc. agriculture science in 1921. In 1931 first private agriculture college under Punjab University is in Khalsa College Amritsar for B. Sc agriculture degree. In 1951 IARI started first post graduate degree. In 1960 first agricultural university started in India Rudrapur (Nainital). Today in India under ICAR five deemed university, 60 ICAR institutions six national bureau, fifteen project directorates. Under ICAR also sixteenth national research center, 138 substations, eight zonal project directorates worked. In India 57 state agricultural university, two central agriculture universities, four agriculture facilitate Agriculture University in working. 633 Krushi vighyan kendra 61 ACRP (All India coordinated project) in working.

Education commission (1966) recommend that vigour's efforts to made established specialized institute for agricultural and allied field for pre and post matriculation level to it named as agricultural polytechnic. 1966 to 1972 ICAR, ministry of education and planning commission given idea of krushi vighyan kendra. First KVR (krushi vighyan kendra) established in 1974 in Pondicherry under Tamilnadu agriculture university. Its main aims is to transfer technology developed by agriculture student to farmers in first and effective manners using web mobile technology. In India agriculture department created by government on 27 April 1871. In 1905 Imperial agriculture institute established at Poosa it is first agricultural research center of India. It shifts later in 1936 in Delhi. Indian agriculture research institute in 1946 changed its name as Indian Council of Agricultural Research. For potato crops center research institute established in Simla 1946. Indian research institute of vegetable established in Varanshi First Govind Ballabh Pant university of agricultural and technology established at Pantnager(UP) in 1960. All these educational programs started in agricultural education in India. It is very important to spread agricultural knowledge among farmers to develop new technologies in agriculture.

Present agricultural scenario-

Agriculture development of India become back bone of its economy. Today agriculture sector given more source of income to the government. Present agricultural scenario of 2015-16 show rise in agriculture production. Total production of country is estimated to around 286 million tone's. Production of fruits estimated to be 90 million tone's and vegetables estimated around 169 million tone's. Production of spices estimated around seven million tone's , onion production estimated around 209 lakh tone. Other vegetable like potato estimated around 434 lakh tone and tomato 187 lakh tone. Cereal production also estimated in witch rice production around 109.15 million tone's, wheat production around 92.29 million tone's. Others cash crops like cotton estimated around 32.58 million bales, suger cane 306.03 million tone's. These production increase export and it gives foreign currency exchange more. Data of agriculture export 1990 to 2011 is as follows.

Table 9-Agriculture export of India-

Year	Agricultural Export	Total export	Percentage
1990-1991	006013	0032527	18.05
1996-1997	024161	0118817	20.03
2000-2001	028637	0201356	14.02
2005-2006	061194	0456418	10.08
2006-2007	062411	0571779	10.92
2007-2008	079040	0655864	12.05
2008-2009	085952	0840855	10.59
2010-2011	180279	1463359	12.3

Importance of study

It is very important subjects it shows contribution of farmers towards national economy. Farmers are backbone of our nations economy. It also contribute more share in gross domestic product (GDP) but today farmers future become dark their life not safe because of their economic condition. Environmental factor, climate change, political Issues and government policies are related it's economic condition. Due to economic problem many farmer done suicide in India. These study also shows government policies and implementation process and also its result. It also given information about agricultural progress and role of science and technology in agriculture development. It is world's second largest populated country but these study also focused on our countries place in world about different agriculture production. Study also give information on export and import data of agriculture production. These study also focused present sceniorio of agriculture sector development.

II. Conclusion

These study also shows histological status of agriculture . Farmers do their agriculture it's own way but day by day government policies and scheme helps to change the ruting agriculture pattern. Also science and technology develop different agriculture instrument and process with hybrid seeds and chemical fertilizer and insecticide. Government seen towards agriculture as industry so that different types of investment done by government in agriculture sector. It's result we seen today our country takes first and second rank in world. Many branches of agriculture rise like oleculture, floriculture, horticulture like different branches. Agriculture development keeps balance in population risen and production. Population increase day by day but not increase cultivated land, other hand cultivated land decrease day by day so that agriculture sector one of most important sector of economic development. For increase of more share of agriculture in Indian economy new technologies and policies necessary with life of farmers.

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