

The Indian Agriculture System: The Current Scenario

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Abstract— Over 2500 years ago, Indian farmers had discovered and begun farming many spices and sugarcane. It was in India, between the sixth and four BC, that the Persians, followed by the Greeks, discovered the famous "reeds that produce honey without bees" being grown. Modern agronomy, plant breeding, agrochemicals such as pesticides and fertilizers, and technological developments have in many cases sharply increased yields from cultivation, but at the same time have caused widespread ecological damage and negative human health effects. Irrigation in India includes a network of major and minor canals from Indian rivers, groundwater well based systems, tanks, and other rainwater harvesting projects for agricultural activities. Of these groundwater system is the largest. "With a population of just over 1.2 billion, India is the world's largest democracy. In the past decade, the country has witnessed accelerated economic growth, emerged as a global player with the world's fourth largest economy in purchasing power parity terms, and made progress towards achieving most of the Millennium Development Goals. The required level of investment for the development of marketing, storage and cold storage infrastructure is estimated to be huge. The government has not been able to implement schemes to raise investment in marketing infrastructure. Among these schemes are 'Construction of Rural Godowns', 'Market Research and Information Network', and 'Development / Strengthening of Agricultural Marketing Infrastructure, Grading and Standardisation. Research as the means to the development and application of effective technological and intellectual resources. Forms of data as evidence; types (quantitative and qualitative) and methods of handling for description and analysis. Methodological approaches to obtaining data; the role of observation, experimentation and deduction in both natural and social sciences. Development of hypotheses, testing; acceptance, rejection and reformulation. The role of statistics; applications and limitations. India agriculture system is very oldest .Vedic literature provides some of the earliest written record of agriculture in India. Rigveda hymns, for example, describes plowing, fallowing, irrigation, fruit and vegetable cultivation. Other historical evidence suggests rice and cotton were cultivated in the Indus Valley. The middle ages saw irrigation channels reach a new level of sophistication, and Indian crops affected the economies of other regions of the world under Islamic patronage.

Key words: Agriculture, irrigation. Major Corps, Organic, Production, Year, Economic, Farmers, History

I. INTRODUCTION

Agriculture is the cultivation and breeding of animals, plants and fungi for food, fiber, biofuel, medicinal plants and other products used to sustain and enhance human life. Agriculture was the key development in the rise of sedentary human civilization, whereby farming of domesticated species created food surpluses that nurtured the development of civilization. The study of agriculture is known as agricultural science. The

history of agriculture dates back thousands of years, and its development has been driven and defined by greatly different climates, cultures, and technologies. Industrial agriculture based on large-scale monoculture farming has become the dominant agricultural method.

Modern agronomy, plant breeding, agrochemicals such as pesticides and fertilizers, and technological developments have in many cases sharply increased yields from cultivation, but at the same time have caused widespread ecological damage and negative human health effects. Selective breeding and modern practices in animal husbandry have similarly increased the output of meat, but have raised concerns about animal welfare, environmental damage (such as massive drainage of resources such as water and feed fed to the animals, global warming, rainforest destruction, leftover waste products that are littered), and the health effects of the antibiotics, growth hormones, artificial additives and other chemicals commonly used in industrial meat production. Genetically modified organisms are an increasing component of agriculture, although they are banned in several countries. Agricultural food production and water management are increasingly becoming global issues that are fostering debate on a number of fronts. Significant degradation of land and water resources, including the depletion of aquifers, has been observed in recent decades, and the effects of global warming on agriculture and of agriculture on global warming are still not fully understood. However, entomology would solve most of the former problems, and may start to gain popularity among society in the West.

II. HISTORY OF AGRICULTURE IN INDIA

A. Indian Agriculture before Independence

Vedic literature provides some of the earliest written record of agriculture in India. Rigveda hymns, for example, describes plowing, fallowing, irrigation, fruit and vegetable cultivation. Other historical evidence suggests rice and cotton were cultivated in the Indus Valley, and plowing patterns from the Bronze Age have been excavated at Kalibangan in Rajasthan. Bhumivargaha, an Indian Sanskrit text, suggested to be 2500 years old, classifies agricultural land into 12 categories: urvara (fertile), ushara (barren), maru (desert), aprahata (fallow), shadvala (grassy), pankikala (muddy), jalaprayah (watery), kachchaha (contiguous to water), sharkara (full of pebbles and pieces of limestone), sharkaravati (sandy), nadimatruka (watered from a river), and devamatruka (rainfed). Some archaeologists believe that rice was a domesticated crop along the banks of the river Ganges in the sixth millennium BC. So were species of winter cereals (barley, oats, and wheat) and legumes (lentil and chickpea) grown in northwest India before the sixth millennium BC.[citation needed] Other crops cultivated in India 3000 to 6000 years ago, include sesame, linseed, safflower, mustards, castor, mung bean, black gram, horse gram, pigeonpea, field pea, grass pea (khesari), fenugreek, cotton, jujube, grapes,

dates, jackfruit, mango, mulberry, and black plum[citation needed]. Indian peasants had also domesticated cattle, buffaloes, sheep, goats, pigs and horses thousands of years ago.

B. Indian Agriculture after Interdependence

In the years since its independence, India has made immense progress towards food security. Indian population has tripled, and food-grain production more than quadrupled. There has been a substantial increase in available food-grain per capita. India's agricultural economy is undergoing structural changes. Between 1970 and 2011, the GDP share of agriculture has fallen from 43% to 16%. This isn't because of reduced importance of agriculture or a consequence of agricultural policy. This is largely because of the rapid economic growth in services, industrial output, and non-agricultural sectors in India between 2000 and 2010.

III. AGRICULTURE AND COLONIALISM

Over 2500 years ago, Indian farmers had discovered and begun farming many spices and sugarcane. It was in India, between the sixth and four BC, that the Persians, followed by the Greeks, discovered the famous "reeds that produce honey without bees" being grown. These were locally called साखर, (Sākhara). On their return journey, the Macedonian soldiers carried the "honey bearing reeds," thus spreading substantially sugar and sugarcane agriculture. People in India had invented, by about 500 BC, the process to produce sugar crystals. In the local language, these crystals were called khandā (खण्ड), which is the source of the word candy.

Before the 18th century, cultivation of sugarcane was largely confined to India. A few merchants began to trade in sugar — a luxury and an expensive spice in Europe until the 18th century. Sugar became widely popular in 18th-century Europe, then graduated to become a human necessity in the 19th century all over the world. This evolution of taste and demand for sugar as an essential food ingredient unleashed major economic and social changes. Sugarcane does not grow in cold, frost-prone climate; therefore, tropical and semitropical colonies were sought. Sugarcane plantations, just like cotton farms, became a major driver of large and forced human migrations in 19th century and early 20th century — of people from Africa and from India, both in millions — influencing the ethnic mix, political conflicts and cultural evolution of Caribbean, South American, Indian Ocean and Pacific Island nations.

The history and past accomplishments of Indian agriculture thus influenced, in part, colonialism, slavery and slavery-like indentured labor practices in the new world, Caribbean wars and world history in 18th and 19th centuries.

IV. IRRIGATION AND IRRIGATED AREA

Irrigation in India includes a network of major and minor canals from Indian rivers, groundwater well based systems, tanks, and other rainwater harvesting projects for agricultural activities. Of these groundwater system is the largest. In 2010, only about 35% of total agricultural land in India was reliably irrigated. About 2/3rd cultivated land in India is dependent on monsoons. Irrigation in India helps improve food security, reduce dependence on monsoons, improve

agricultural productivity and create rural job opportunities. Dams used for irrigation projects help produce electricity and transport facilities, as well as provide drinking water supplies to a growing population, control floods and prevent droughts.

V. IRRIGATION

Year	Govt canal	Pvt. canal	Total	Tanks	Tubewells	Other wells	other sources	Net irrigated Area
1	2	3	4	5	6	7	8	9
2001-02	14993	209	15202	2196	23245	11952	4342	56936
2002-03	13867	206	14073	1811	25627	8727	3658	53897
2003-04	14251	206	14458	1916	26691	9693	4299	57057
2004-05	14553	214	14766	1734	25235	9956	7538	59229
2005-06	16490	227	16718	2083	26026	10044	5966	60837
2006-07	16802	224	17027	2078	26942	10698	5999	62374
2007-08	16531	217	16748	1973	28497	9864	6107	63189
2008-09(p)	16686	195	16881	1981	28377	10389	6020	63638
2009-10(p)	14789	188	14978	1587	28371	9992	7008	61936
2010-11(p)	15472	171	15643	1980	28543	10629	6864	63659
2011-12(p)	15883	172	16005	1919	29943	10595	7236	65697
2012-13(p)	15506	165	15672	1753	30543	10763	7536	66266
2013-14(p)	16115	163	16278	1842	31126	11312	7542	68100

Table 1: Net Area (000, Hectares) Under Irrigation By sources

P- Provisional

Sources: Directorate of Economic and statistics, Ministry of Agriculture and Farmers Welfare.



Fig. 1: An irrigation canal in Gujarat. Irrigation contributes significantly to agriculture in India.

VI. ORGANIC AGRICULTURE

Organic agriculture has fed India for centuries and it is again a growing sector in India. Organic production offers clean and green production methods without the use of synthetic fertilisers and pesticides and it achieves a premium price in the market place. India has 6,50,000 organic producers, which is more than any other country. India also has 4 million hectares of land certified as organic wild culture, which is third in the world (after Finland and Zambia).

A. The key characteristics of organic farming are:

- 1) Protecting the long term fertility of soils by maintaining organic matter levels, encouraging soil biological activity, and careful mechanical intervention
- 2) Providing crop nutrients indirectly using relatively insoluble nutrient sources which are made available to the plant by the action of soil micro-organisms
- 3) Nitrogen self-sufficiency through the use of legumes and biological nitrogen fixation, as well as effective recycling of organic materials including crop residues and livestock manures.
- 4) Weed, disease and pest control relying primarily on crop rotations, natural predators, diversity, organic manuring, resistant varieties and limited (preferably minimal) thermal, biological and chemical intervention
- 5) The extensive management of livestock, paying full regard to their evolutionary adaptations, behavioural needs and animal welfare issues with respect to nutrition, housing, health, breeding and rearing.

VII. MAJOR CROPS AND YIELDS

The following table presents the 20 most important agricultural products in India. The table suggests India has large potential for further accomplishments from productivity increases, in increased crops area.

crops(000,hectares)	2011-12	2012-13	2013-14	2014-15
RICE	44006	42754	44136	43855
WHEAT	29865	30003	30476	30969
JOWAR	6245	6214	5773	5299
BAJRA	8777	6214	7811	7118
MAIZE	8782	8673	9066	9258
TUR	4007	3893	3905	3708
GRAM	8299	8522	9927	8191
MUSTARD	5894	6363	6646	5791
SUGARCANE	5038	4999	4993	5144

COTTON	12178	11977	11960	13083
JUTE	809	777	756	749
TOTAL	133900	130772	135466	1337657

Table 2: Major and Yields

Source: Directorate of Economic and statistics, Ministry of Agriculture and Farmers Welfare.

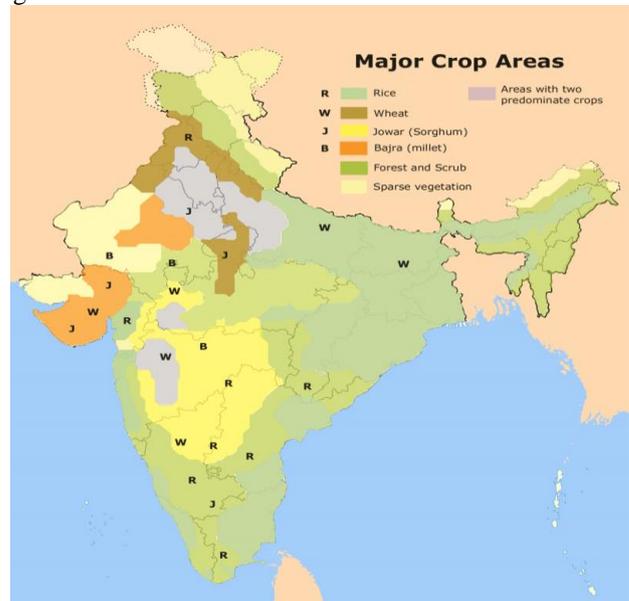


Fig. 2: Major crops by regions of India

VIII. ALL INDIA PRODUCTION AND YIELDS OF MAJOR CROPS

Crops	Production (Million tonnes) (2010-2011)	Production (Million tonnes) (2011-2012)	Yield (kg hectare) (2010-2011)	Yield(kg hectare) (2011-2012)
Rice	95.98	105.31	2239	2393
Wheat	86.87	94.88	2989	3177
Pulse	18.24	17.09	691	699
Food grains	244.49	259.32	1930	2079
Oilseeds	32.48	29.80	1193	1133
Sugarcane	342.38	361.04	70091	71668
cotton	33.00	35.20	499	491

Table 3: Source: Department of Agriculture and cooperation

IX. PROBLEMS IN AGRICULTURE IN INDIA

"With a population of just over 1.2 billion, India is the world's largest democracy. In the past decade, the country has witnessed accelerated economic growth, emerged as a global player with the world's fourth largest economy in purchasing power parity terms, and made progress towards achieving most of the Millennium Development Goals. India's integration into the global economy has been accompanied by impressive economic growth that has brought significant economic and social benefits to the country. Nevertheless, disparities in income and human development are on the rise. Preliminary estimates suggest that in 2009-10 the combined all India poverty rate was 32% compared to 37% in 2004-05. Going forward, it will be essential for India to build a productive, competitive, and diversified agricultural sector and facilitate rural, non-farm entrepreneurship and employment. Encouraging policies that promote competition

in agricultural marketing will ensure that farmers receive better prices.

A. Following Major Problems in India

- 1) The Indian farmer receives just 10% to 23% of the price the Indian consumer pays for exactly the same produce, the difference going to losses, inefficiencies and middlemen. Farmers in developed economies of Europe and the United States receive 64% to 81%.
- 2) The Indian food distribution system is highly inefficient. Movement of agricultural produce is heavily regulated, with inter-state and even inter-district restrictions on marketing and movement of agricultural goods.
- 3) The average size of land holdings is very small (less than 2 hectares) and is subject to fragmentation due to land ceiling acts, and in some cases, family disputes. Such small holdings are often over-manned, resulting in disguised unemployment and low productivity of labour. Some reports claim smallholder farming may not be because of poor productivity.
- 4) Adoption of modern agricultural practices and use of technology is inadequate, hampered by ignorance of such practices, high costs and impracticality in the case of small land holdings.
- 5) Indian branch's Priorities for Agriculture and Rural Development, India's large agricultural subsidies are hampering productivity-enhancing investment. Overregulation of agriculture has increased costs, price risks and uncertainty. Government intervenes in labour, land, and credit markets. India has inadequate infrastructure and services
- 6) The allocation of water is inefficient, unsustainable and inequitable. The irrigation infrastructure is deteriorating.[85] The overuse of water is being covered by over-pumping aquifers but, as these are falling by one foot of groundwater each year, this is a limited resource.
- 7) Illiteracy, general socio-economic backwardness, slow progress in implementing land reforms and inadequate or inefficient finance and marketing services for farm produce.
- 8) Inconsistent government policy. Agricultural subsidies and taxes are often changed without notice for short term political ends.

X. GOVERNMENT STEPS TO SOLVE FARMERS PROBLEMS

The required level of investment for the development of marketing, storage and cold storage infrastructure is estimated to be huge. The government has not been able to implement schemes to raise investment in marketing infrastructure. Among these schemes are 'Construction of Rural Godowns', 'Market Research and Information Network', and 'Development / Strengthening of Agricultural Marketing Infrastructure, Grading and Standardisation.

- 1) The required level of investment for the development of marketing, storage and cold storage infrastructure is estimated to be huge. The government has not been able to implement schemes to raise investment in marketing infrastructure. Among these schemes are 'Construction of Rural Godowns', 'Market Research and Information Network', and 'Development / Strengthening of

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- 2) The Indian Agricultural Statistics Research Institute develops new techniques for the design of agricultural experiments, analyses data in agriculture, and specialises in statistical techniques for animal and plant breeding.
- 3) Recently the government of India has set up the Farmers Commission to completely evaluate the agriculture programme.[103] Its recommendations have had a mixed reception.
- 4) In November 2011, India announced major reforms in organised retail. These reforms would include logistics and retail of agricultural produce. The announcement led to major political controversy. The reforms were placed on hold by the government in December 2011.
- 5) In the summer of 2012, the subsidised electricity for pumping, which has caused an alarming drop in aquifer levels, put additional strain on the country's electrical grid due to a 19% drop in monsoon rains and may have contributed to a blackout across much of the country. In response the state of Bihar offered farmers over \$100 million in subsidised diesel to operate their pumps.
- 6) Start-ups with niche technology and new business models are working to solve problems in Indian agriculture and its marketing. Kandawale is one of such e-commerce website which sells Indian Red Onions to bulk users direct from farmers, reducing unnecessary cost escalations.

XI. ACHIEVEMENT OF INDIAN AGRICULTURE

- 1) India is the largest producer of wheat in the world.
- 2) India is the largest producer of Rice in the world.
- 3) India is among the largest vegetable oil economic in the world.
- 4) India is the largest producer of tea in the world.
- 5) India is the second largest producer of fruits in the world.
- 6) India is the largest producer of milk in the world.
- 7) India is the largest producer of coffee in the world.
- 8) India is the largest producer of cotton in the world.

XII. RESEARCH METHODOLOGY

Research as the means to the development and application of effective technological and intellectual resources. Forms of data as evidence; types (quantitative and qualitative) and methods of handling for description and analysis. Methodological approaches to obtaining data; the role of observation, experimentation and deduction in both natural and social sciences. Development of hypotheses, testing; acceptance, rejection and reformulation. The role of statistics; applications and limitations. Descriptive statistics and data presentation. Inferential statistics and decision-making. Case studies, surveys and questionnaires. Computer based application of statistics to agricultural research.

CONCLUSION

India agriculture system is very oldest .Vedic literature provides some of the earliest written record of agriculture in India. Rigveda hymns, for example, describes plowing, fallowing, irrigation, fruit and vegetable cultivation. Other

historical evidence suggests rice and cotton were cultivated in the Indus Valley. The middle ages saw irrigation channels reach a new level of sophistication, and Indian crops affected the economies of other regions of the world under Islamic patronage. Land and water management systems were developed with an aim of providing uniform growth. Before the 18th century, cultivation of sugarcane was largely confined to India. A few merchants began to trade in sugar — a luxury and an expensive spice in Europe until the 18th century. Sugar became widely popular in 18th-century Europe, then graduated to become a human necessity in the 19th century all over the world. India's population is growing faster than its ability to produce rice and wheat. Other recent studies claim India can easily feed its growing population, plus produce wheat and rice for global exports. Now India exporting his agriculture products. Our economy is self-dependending in food grains. the lasting benefits of improved seeds and improved farming technologies now largely depends on whether India develops infrastructure such as irrigation network, flood control systems, reliable electricity production capacity, all-season rural and urban highways, cold storage to prevent spoilage, modern retail, and competitive buyers of produce from Indian farmers. This is increasingly the focus of Indian agriculture policy.

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