

A COMPARATIVE STUDY OF AGRICULTURE GROWTH IN INDIA AND CHINA

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ABSTRACT

Agriculture sector in India is considered to be the backbone of its economy. Agriculture is source of livelihood for more than 70% of Indians in the rural areas. It contributes around 18% to the total Gross Domestic Product of India. Similarly agriculture sector in India is also the largest employer contributing 49% of the total workforce. Apart from employment, agriculture also plays an important role in food security. According to NSSO an average Indian still spends more than half of the income in food security. However the growth rate of the agriculture sector in India has been fluctuating. The growth rate of the agriculture in India mainly depends on the rainfall as majority of the cultivated area in India depends on rainfall. As per National Sample Survey Organization data, the average size of operational holdings in India fell to 1.2 hectares in 2010-11 from 2.3 hectares in 1970-71. China's average holdings are even smaller. According to the 2000 World Census of Agriculture, the average size of Chinese holdings was 0.6 hectares. Thus, farming in both countries is dominated by small farmers. Despite the similarities, Chinese agriculture has fared better than Indian agriculture on most counts over the past few decades. Both India and China are among the world's top three producers of important crops such as rice, wheat, cotton and maize, but China produces much more from each hectare of land than India does. In the light of above discussion, this paper is an attempt to compare agriculture growth in India and China. The paper is based on secondary source of data like survey reports of national and international agencies, books, journals, newspapers and other periodicals. The paper concludes that China is much better than India in crop productivity.

KEY WORDS: Agriculture, Growth, Productivity, Crop, Landholding.

1 INTRODUCTION

The economies of the world's poorest countries are overwhelmingly agrarian; those of rich countries are dominated by manufacturing and services. Perhaps because of agriculture's initial pre-eminence, a classic literature has argued that agricultural development is either a prerequisite to industrial development, or that it carries important 'forward linkages' to other sectors of the economy (Rosenstein-Rodan, 1943; Schultz, 1953; Lewis, 1954; Rostow, 1960). This view has been influential with policymakers: the World Bank (2007, p. 7) states that "success stories of agriculture as the basis for growth at the beginning of the development process abound" citing England, Japan, India, Vietnam and China as prominent examples of agriculture led growth.

In China, higher agricultural surpluses led to higher savings, capital accumulation and, ultimately, non-agricultural output. In another parallel to China, many of these Asian countries also undertook successful agricultural reforms around time they began to industrialise. Post-war land reforms in Japan, South Korea and Taiwan redistributed land to peasants and are thought to have increased agricultural output (Dore, 1959; Thorbecke, 1979; Jeon and Kim, 2000). More recently, the decommunalisation of agriculture in Vietnam in the mid 1980s dramatically increased agricultural output (Pingali and Xuan, 1992) and raised the curtain for a sustained period of rapid growth that continues to this day. In each of these cases, increases in agricultural output due to the reforms could have increased the supply of capital to the non-agricultural sector—just as it did in China.

Unlike the advanced economies of Western Europe and North America, farm growth in China has been driven by small landowners rather than by industrial farming. As per National Sample Survey Organization data, the average size of operational holdings in India fell to 1.2 hectares in 2010-11 from 2.3 hectares in 1970-71. China's average holdings are even smaller. According to the 2000 World Census of Agriculture, the average size of Chinese holdings was 0.6 hectares. Thus, farming in both countries is dominated by small farmers.

Despite the similarities, Chinese agriculture has fared better than Indian agriculture on most counts over the past few decades. Both India and China are among the world's top three producers of important crops such as rice, wheat, cotton and maize, but China produces much more from each hectare of land than India does. In the early 1960s, farm sector indicators of India and China looked similar, but since then China has left India behind. According to Food and Agriculture Organisation (FAO) data, the ratio of value of agricultural production (in constant 2004-06 international dollars) in China and India was 0.99 in 1960. By 1990, this ratio became 1.66 and 2.23 in 2010.

China's overall economic success cannot be understood without a careful reading of its agricultural sector. The manner in which China put in place incentives for small farmers and supported them through sizeable public investments in agriculture and rural electrification holds important lessons for India.

2 GDP SHARE OF AGRICULTURE IN INDIA AND CHINA

In fifties, both India and China were the agricultural economies. In 1950 nearly 70 percent of India's workforce was engaged in agriculture and its contribution to GDP was 58 percent. At that time China's 68 percent workforce was employed in agriculture with 46 percent share in GDP.

Table-1 Agriculture share in GDP and workforce in Agriculture in India and China

Years	%workforce in Agri. (India)	%share in GDP (India)	%workforce in Agri. (China)	%share in GDP (China)
1950	70	58	68	46
1991	63.5	27.5	58.2	24.2
1995	61.2	24	49.6	19
1999	61	23	45.2	16.2
2003	58.4	19	44.6	13.4
2007	56.6	16.8	31.2	10.10
2011	51.4	16.2	24.3	09.5
2015	46.2	16	19.3	09.2
2018	43.4	15.5	16.2	08.5

3 PRODUCTIVITY COMPARISONS OF INDIA AND CHINA

An India Vs China comparison – both are large countries with similar sized populations and same common food consumption habits – is interesting. For starters, China has less area under cultivation, consumes less fertiliser and yet produces more. Total food grain production of China touched 571 million tonne in 2012 as compared to India's 250 million tonne in 2011-12.

Let's now look at the top five producing countries for two crops – paddy (rice) and wheat.

Table-2 Crop Productivity in Top Five Countries

Crop & Country	Area under cultivation (Million Hectare)	Total Production (Million Tonne)	Productivity (Tonne/Hectare)	% Share in world production
PADDY				
World	158.30	685.24	4.2	100
CHINA	29.88	196.68	6.5	28.7
INDIA	41.85	133.70	3.1	19.5
Indonesia	12.88	64.40	4.9	9.4
Bangladesh	11.35	47.72	4.2	6.9
Vietnam	7.44	38.90	5.2	5.6
WHEAT				
World	225.62	685.61	3.0	100
CHINA	24.29	155.11	4.7	16.7
INDIA	27.75	80.68	2.9	11.7
Russia	26.63	61.74	2.3	9.0
USA	20.18	60.31	2.9	8.8
France	5.14	38.33	7.4	5.5

(Source: <https://www.theglobaleconomy.com>)

Agricultural productivity, to be fair, also depends on a variety of factors like soil quality, availability of water, use of fertilizers and use of high yielding variety of seeds. But productivity also becomes important in India because roughly 50% of the population still derives their livelihood from agriculture. India's irrigation coverage was a poor 48.3% of total cultivated area as late as 2008-09. Which means a bad monsoon can cause havoc.

The first thing to note from the above **Table-2** is that India was the second largest producer of both paddy (rice) and wheat behind China. However, India lagged in productivity levels. India had the worst productivity of 3.1 tonne/hectare in paddy against a world average of 4.2 tonne/hectare. In wheat production, India stood fourth among the top five countries with a productivity of 2.9 tonne/hectare. The only country behind India was Russia.

Table-3 Cereal crop productivity in India and China

Year	2000	2005	2010	2015	2016
India (kg/hect.)	2280	2420	2685	2860	2993
China (kg/hect.)	4750	5210	5524	5912	6029

4 USE OF FERTILIZERS IN INDIA AND CHINA

Now, let's look at some countries and see how much fertiliser they used per hectare in 2008 (This is not an argument for use of fertiliser). We will look at a few Asian countries, especially the ones that had higher productivity than India in rice production.

T-4 Use of Fertilizers in selected Asian Countries

Sr. No.	Country	N+P ₂ O Kg./Hectare
1	CHINA	83.7 Kg./Hectare
2	INDIA	120.2 Kg./Hectare
3	Indonesia	67.6 Kg./Hectare
4	Bangladesh	134.8 Kg./Hectare
5	Vietnam	157.8 Kg./Hectare

Incidentally, fertiliser use has steadily gone up in India since 1950-51 when only 0.6 million tonne (Nitrogen, Phosphorous and Potassium variety) was used. In 2010-11, the fertiliser use stood at 2.8 million tonne.

As **Table 4** shows, the relation between fertiliser use and productivity is not very obvious. China, the most productive country in wheat and rice, used much less fertiliser than India, which was the second largest producer in both crop categories.

Vietnam, which was ranked 2nd in paddy productivity, used the maximum fertiliser among the top 5 countries. Indonesia, which was 3rd in terms of productivity, used the least amount of fertiliser. India used a lot of fertiliser: 138.6 kg/hectare but failed to increase productivity to the levels of China or Vietnam. So what could be the reasons for India lagging China in agricultural productivity?

Here are some general pointers gleaned from reports in public domain. China has many pro-farmer policies. Priorities are given to high-yield bulk crops (grain, cotton, oil and sugar) and grants are provided for grassland ecological conservation. Some other programmes adopted by China for agricultural development include:

Vegetable Basket Programme: Started in 1989, the **VBP** project aims to increase production and utilise natural resources reasonably. In the first five years, 14.05 billion Yuan in investment (roughly Rs 12,290 crore) was used for scientific and technical development.

By 1997, output of almost all products had increased by 10%. Incidentally, this programme concentrates more on non-food grain products. In India, the reliance is more on basic food grains like rice and wheat.

Returning Grazing lands to Grasslands: This was an important programme for China's development. It was started with an accumulated investment worth 9.319 billion Yuan (Rs 8,152 crore) and more than 30 million hectare grazing lands has been turned to grasslands.

China has also started **collective water management**. Under this programme, villages hire a manager who operates directly under local government directive. Water managers collect water-use fees from farmers.

This may or may not be an accurate comparison as the figures may not match but India's agriculture budget (2012-13) is Rs 27,931 crore. In contrast, China spent, as per media reports, \$164 billion on agricultural products, around Rs 913,398 Crore. In general, increasing agricultural productivity in India would depend on better irrigation coverage, more effective use of fertilisers, farmer education and soil management.

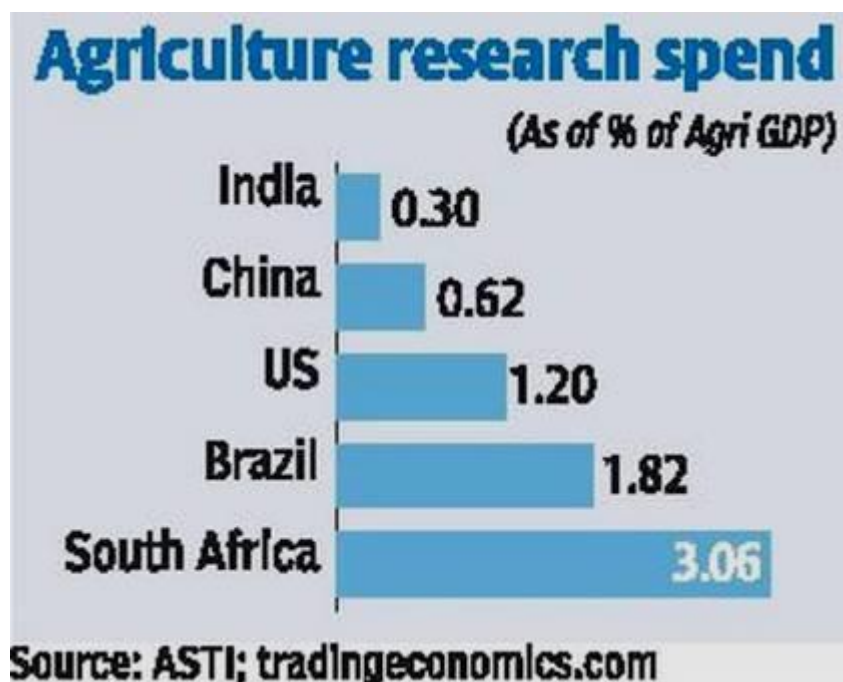
But steps like the Accelerated Irrigation Benefit Program (AIBP) to several fast-track irrigation initiatives have not yielded results. These are of course general pointers and not an agriculturist's prescription. The data however is something to ponder over.

5 AGRICULTURAL R & D IN INDIA AND CHINA

According to the *Economic Survey* 2017-18, the total R&D expenditure in India as percentage of GDP has been stagnant at 0.6 to 0.7 per cent in the last two decades — much lower than the US (2.8 per cent), China (2.1 per cent), South Korea (4.3 per cent) and Israel (4.2 per cent). To keep the numbers in perspective, one must keep in mind that GDPs of the US and China are around seven and four times bigger than that of India. Agriculture Science and Technology Indicators (ASTI) data reveal that India currently spends 0.30 per cent of agriculture GDP on agricultural research, which is just half the share invested by China (0.62 per cent).

China's spending on agriculture research is 3-4 times that of India. It is high time India increases its share keeping in view Prime Minister Narendra Modi's goal of doubling farmers' income by 2022. The return on investment in agriculture sector is far better than other infrastructure projects.

Picture-1



A mathematical model cited in a recently launched book 'Supporting Indian Farms the Smart Way' shows that every rupee spent on agricultural research and development, yields better returns (11.2), compared to returns on every rupee spent on fertiliser subsidy (0.88), power subsidy (0.79) or on roads (1.10).

More importantly, the spending on agriculture R&D would lead to sustainable development with comparatively more equal distribution of resources. According to Shenggen Fan, Director-General of the Washington DC-based International Food Policy Research Institute (IFPRI), agriculture is the key to meeting half of the 17 Sustainable Development Goal (SDG) targets set for 2030. These SDG targets include eliminating poverty and hunger and reducing inequalities. So increasing R&D spending on agriculture is not only a vital necessity for ensuring food security, but also important from the socio-economic point of view. So the onus is on the government to increase financial allocation to research and create an enabling environment for private investments (Bhaskar B, 2018).

6 WHY IS CHINA AHEAD OF INDIA?

The very pertinent question in the minds of many scholars today is why is it that while we rate democracy as the better form of government, it is single party ruled China that has been more successful at bringing more people out of poverty than democratic India? Professor **Amartya Sen** has given a right answer to this question. Professor Sen argues that it is not the nature of government that is the main factor in China's growth and success but its investment in health and education that provided fuel to its explosive growth. India he said has under-invested in these key areas and hence its economic growth is poorly supported by quality human capital. Professor Sen was critical of the suggestion that countries could grow economically first and then invest in education later saying that it was the reverse that is true. He supported his claim bringing historical evidence of Japan's rapid growth since the second decade of the 20th century being driven by its investment in health and education. More recently, similar investment by Korea and the South

East Asian countries provided impetus to economic growth in these countries. In the case of India, while efforts have been made to improve literacy, its literacy **rate in 2011 is 74%** well below **China's at 95% (in 2010)**. In fact India's literacy level today is even less than what China's was in 1990. The case of health is no different. In the case of life expectancy, once again **India's life expectancy in 2011 is below what it was in China's in 1990**. Today India's life expectancy (66 years) is 11 years below that of China (77 years).

Democracies are more likely to spend money on more visible goods such as roads, subsidized fuel, public sector jobs while the benefits from investments in education and health are in the long term and hence less visible.

While China and India walked abreast on agriculture till the early 1990s, China has taken substantially longer strides since, whether it is in grain yield enhancement or growth in agricultural capital formation or maintaining trade surplus with roughly about half on average per capita the farm holding as India (1.2 hectares as compared to about 0.6 hectares in China). It can be attributed largely to China's commitment to improve agricultural resource administration, especially with respect to on-farm irrigation water management. Globally, China stands with the largest irrigated area (69.1 as compared 67 million hectares in India). At present, 48% of irrigated area in China has micro-irrigation systems (drip/sprinklers) that make optimal use of water (Chaturvedy s, 2018). Fundamentally, China's radical adoption of water-saving irrigation ensues from inherently higher irrigation water use efficiency (the percentage of water applied and actually taken up by crops). With current average efficiency at 0.53, (up from 0.44 in 2004) China leaps way forward of India (barely 0.30). China has taken tough measures such as the Three Red Lines water policy to curb water use, increase water use efficiency and reduce water pollution risks. What similar measures has India undertaken? While China is rapidly moving towards solar-/wind-powered irrigation facilities that serve dual purposes —cutting down on low-quality on-farm electricity supply services (a major concern in India) as much as adhering to future emission reduction targets — electric-/diesel-powered pump-sets are rampant in India, causing huge air quality concerns. China invests significantly more in agricultural research and development compared to India to produce high-yield and quicker-growing crop varieties. This, along with better irrigation and more intensive cultivation of the land by double or even triple cropping, are the primary reasons for China's superior yields.

7 CONCLUSION

As of now both are fast developing economies in the world and also most populous countries and having population reached at 1.4 billion and 1.2 billion. Despite the similarities, Chinese agriculture has fared better than Indian agriculture on most counts over the past few decades. Both India and China are among the world's top three producers of important crops such as rice, wheat, cotton and maize, but China produces much more from each hectare of land than India does. The manner in which China put in place incentives for small farmers and supported them through sizeable public investments in agriculture and rural electrification holds important lessons for India. At the same time India, must guard against policies responsible for large-scale rural discontent, which can have drastic consequences in a democratic set-up.

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