ROLE OF TECHNOLOGY IN REVAMPING AGRICULTURE SECTOR IN INDIA : AN INDICATOR OF ECONOMIC GROWTH AS ENVISAGED BY INDIAN DIASPORA

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Abstract

People from India have been migrating to various countries in search of green pasture. Those who had grown up in poor economic condition with less education in India could stand the test of the time in foreign countries. These people have joined the club of the Indian diaspora. After going to foreign countries, working hard with education, many Indians have prospered. Most Indians had their background in agriculture that used primitive technology. However, after experiencing western technology and expertise in their adopted lands, they started to implement and experiment in Indian agriculture fields when they came back to their motherland.

India has seen incredible growth in the agriculture sector for the past seven decades. Making use of science & technology, research, advanced tools, and other equipment in the cultivation of crops across the country has put India on the world map. The members of the Indian diaspora, who have settled in foreign countries and those who went for higher studies, have come back to India and put their knowledge and skills in enhancing the agriculture production in India. The diaspora had enough money to buy the necessary tools and machinery that are useful in the agricultural fields.

The contribution of diaspora in each Indian state is unique. Gujarati diaspora has invested huge amount for green energy and solar technology in Gujarat. Punjabi diaspora has assisted in getting bumper crops in Punjab and Haryana. People from Kerala, who had gone to Gulf countries, could use the scientific method of cultivation in their lands in Kerala. Indian diaspora from Tamil Nadu, Telangana and Andhra Pradesh could send steady remittances to their people so that they could invest in the best technology and harvest bumper crops. My research paper tries to concentrate on Indian diaspora's role in augmenting the growth of agriculture sector in India by using updated technology, machinery, scientific tools, high yielding seeds and adopting change in the agriculture pattern. Paper also focuses on how Indian diaspora learned various skills from western countries agriculture farmers and how they have used their expertise in India.

Keywords : *Diaspora, Technology, Expertise, Knowledge, Scientific, Agriculture, Tools*

Introduction

India is a land of villages. Agriculture activities take place in villages and not in cities, definitely not in metro cities. People from towns and big cities get regular agriculture products. They are all sorts of vegetables, pulses, rice, wheat, and other agriculture products. Those who are buying these products have no idea of, from where does the product come and the hardship involved behind the cultivation of the products. This is the saga of Indian agriculture system. This way Indian farmer silently satisfies the hunger of people across the country.

People from villages who have agriculture land have migrated to various cities in India. However, they have retained the agriculture lands appointing many overseers for the land. The caretaker of agriculture land does cultivate crops of various kinds. It has become a fashion for the real owners of the land to visit their villages once in a year and spend a few days. Similarly, members of Indian diaspora visit their native land occasionally and prefer to spend days in their agriculture fields that give them serenity. Those people who have gone from India to various countries can come under Indian Diaspora. Today the strength of Indian diaspora outside India is:

> "India's population living abroad is the largest in the world with 1.6 crores (16 million) people living outside the country in 2015, according to a latest UN survey on international migrant trends" (UN survey, as reported by NDTV, January 2016).

Not only the number of Indians living abroad is the largest in the world, but they also send remittances which is the highest compared to other countries:

> "India retained its top spot in 2015, attracting about $69 billion in remittances, down from $70 billion in 2014. Other large recipients in 2015 were China, with $64 billion, the Philippines ($28 billion), Mexico ($25 billion), and Nigeria ($21 billion)" (World Bank Report, April 2016).

This indicates that Indian diaspora has enough money in India to invest in various sectors. Indian diaspora who had their agriculture lands before leaving India did not squander for anything. They were reluctant to sell their agriculture lands, which was cultivated by their ancestors for many years. The emotional attachment that they had towards their agriculture land had prevented them to dispose of it off to others. While returning from abroad with their technological expertise and money, many Indians have been using technology and machinery in their agriculture fields to harvest bumper crops.

The Progress of Indian Agriculture After 1947

Free India had many challenges. It had to have policies for various sectors. The population of India was less and the people were reluctant to go abroad. The economic growth was slow. Agriculture activities were going on; however, the productivity was less due to the usage of the primitive method of cultivation. While writing on Indian Agriculture after Independence, Samiksha opines,

> "When India became independent in 1947, agricultural productivity was very low (about 50 million tonnes). Agriculture was mainly dependent on rain and was being done as a subsistence farming using mainly animate sources of farm power, traditional tools and equipment. More than 80% of the population living in rural areas was dependent on agriculture for their livelihood" (Samiksha S for YourArticleLibrary.com).

The above statement from S. Samiksha makes us see the real situation of the agriculture sector during the time of Independence. However, the then prime minister of India, Jawaharlal Nehru and his trusted scientist Prof. Prasanta Chandra Mahalanobis tackled these challenges efficiently. Various five-year plans had some sops for the Indian agriculture sector. The gradual growth of agriculture sector could be noticed in following years where universities had research centres dealing with various crops and pulses as well as implementing fertilizer, high yielding seeds, tools and technology in the agriculture work to get desired product in abundance.

During the five-year plans, the emphasis was given for enhancing science and technology expenditure by the government. This was done keeping in mind as the industrialization process was going on, the agriculture sector should not suffer but get maximum benefits from science and technology. The report says:

> "In the total S&T expenditure by the government, the share of non-scientific ministries has been approximately 30 percent combined for all sectors, including agriculture, rural development, energy, industry and minerals, transport, communication and others" (United Nations Industrial Development Report, page 19).

The present-day agriculture sector has seen steady growth since Indian Independence. There were revolutions in a few crops. Every successive government had to do many things in the agriculture sector. Over the years, policy towards agriculture has immensely developed the sector and India can today say that it has enough in its warehouse to satisfy the hunger of the hungry people.

Indian Diaspora and its Contribution Towards the Growth of the Agriculture Sector

Migration from India to various foreign countries had impetus due to the sheer demand of Indian workers in different Gulf Countries. There was a demand for highly skilled Indians in different sectors in America, Canada, Europe, and Australia. Chain migration benefitted not only the whole family but also in some cases, the whole village. Annual Report of Ministry of External Affairs, Government of India gives the reasons for migration:

> "Contemporary flows from India are of two kinds: The first is the emigration of highly skilled professionals, workers, and students with tertiary and higher educational qualifications migrating to developed countries, particularly to USA, UK, Canada, Australia, and New Zealand. This flow started after Indian independence and gathered momentum with the emigration of IT professional in the 1990s. The second is the flow of unskilled and semi-skilled workers going mostly to the Gulf countries and Malaysia, following the oil boom in the Gulf countries, mainly from Kerala and other south Indian states" (Annual Report of MEA, 2012 – 2013).

Whichever countries Indians had gone to, whether skilled workers, professionals, unskilled or semi-skilled, they had worked hard, saved enough, sent regular remittances to India and left an impression in the minds of the people of the host countries. Today Indian people are respected the world over due to the unique nature of India and its people. Firm belief and faith in democracy, a futuristic Constitution of India, non-violent approach, Indian cuisine, Bollywood romance shown in Hindi movies are some of the features Indians spread among others when they are in foreign countries.

Those Indians who had gone to foreign countries and who are now in foreign countries had their difficult times when they were in India. Many had agricultural land with the primitive method of cultivation that was sufficient with three meals per day for the family. Indians who had gone for higher studies to various countries had closely observed the western method of cultivation. They could observe in the adopted lands the way agriculture sector progressed due to high yielding crops, fertilizer, usage of tools and technology and better storage facilities.

When these western educated Indian people came to India though not necessarily had degrees in agriculture filed, started implementing the cultivation method that they had keenly observed while they were in a foreign land. There was an amazing report that showed many Indian graduates who had foreign degrees started to work in their fields by putting diversified crops and benefitting annually. They could work in their fields without employing many persons but by deploying machinery and tools that helped these agriculturists from ploughing lands to the harvesting of crops and transferring the crops to their barns.

Necessary tools were already in the process of manufacturing in Allahabad Agricultural Institute where the production of tools that were needed for regional agriculture sector were manufactured. Apurva S, in her article, make mention of:

> "Agricultural Development Society at Naini a factory established by the Allahabad Agricultural Institute started producing agricultural implements on large scale. Also came into the manufacture of Punjab, U.P., No. 1 and 2 ploughs, Kanpur cultivators, Olpad Threshers, etc. Now, a number of firms and factories are involved in the manufacturing of agricultural machinery and implements. In addition, development of seed drills, sugarcane crushers, diesel pump sets, and other water lifting devices hand chaff cutter and use of pneumatic tyres and bullock carts came into use" (Apurva S. for YourArticleLibrary.com).

The above statement of Apurva indicates that the agriculture tools and machinery manufacturing were in the initial stages of the Indian agriculture sector. Later years saw the mass production of sophisticated, scientifically tested and technologically advanced tools and machinery that took care of the agriculture activities of different crops in different parts of India.

Government of India since the time of Jawaharlal Nehru had been giving emphasis on science and technology. In the initial decades after independence, farmers could not opt for massive tools, technology and scientific methods of cultivation due to their marginal status. They had no capital with them. However, the government through its various five-year plans organized massive training and awareness programmes. This investment was in almost all departments. The UN Industrial Report states:

> "It emphasized training of scientific and technical personnel to fulfill needs in the fields of science and education, agriculture, industry, and defense as well as to ensure an adequate supply of scientists and to recognize their work" (United Nations Industrial Development Report, page 20).

Training that was imparted on various officials particularly in the agriculture department over the years had its positive effect especially in village levels where farmers were reluctant to forgo the primitive method of cultivation. NABARD became the saviour for many members of Indian diaspora who had come back to India to carry on the experiments in crop cultivation in their fields. The generous policies of every successive government towards sanctioning of short-term and long-term agriculture loans facilitated

the farmers to go for various agriculture-related purchases including high yielding seeds, fertilizer, scientific tools, and machinery.

The drastic crash of onion prices in Maharashtra and Madhya Pradesh have sent the farmers under depression. UN report says that the food-processing industry should enhance the benefit what agriculture products have given to the cultivators:

> "A strong and dynamic food processing industry is important for diversification and commercialization of agriculture. It ensures value addition to the agricultural products, generates employment, enhances the income of farmers and creates a surplus for export of agro foods" (United Nations Industrial Development, page 25).

Further, the UN report bats for the preservation of agriculture production. It is the duty of the respective states and local government to make policies towards this. The report stresses on using technology in processing agriculture products:

> "India processes only 2% of its agriculture output. Over 70% of this is processed primarily through the unorganized sector. Therefore, the adoption and usage of technologies in the areas of food safety, preservation, transportation, processing, and handling is quite low" (United Nations Industrial Development, page 26).

Gujarati Diaspora and Agriculture Activities in Gujarat

Gujarati people are business oriented by nature. They are involved in risk-taking businesses such as huge investment in infrastructure building, acquisition of small and medium industries and they go for capital investment. People of Gujarat had considerable acres of land in villages, especially the Patel community. They are also called Patidars due to the ownership of land that was given to them during the time of British rule. In those days, the owner of the land was respected in the village and eventually they kept their surnames as Patel, which resembles the village headman. The report of the Gujarat Agriculture states that Gujarat had double-digit growth during the Xth Five Year Plan,

> "Gujarat is one of the fastest growing states of India. The state has adopted a novel pattern of progress with the strategic development of the key sectors like energy, industry, and agriculture for which it has achieved ambitious double-digit growth rate since 10th Five Year Plan period" (Mrutyunjay Swain, 2012).

This could not be possible without the help from Gujarati diaspora who are well experienced in observing the method of western countries in cultivation and that has been implemented in Gujarat when they come back to their native land. Agriculture in Gujarat, though the emphasis on industries is laid, could not be neglected due to the sheer availability of cultivable land. Mrutyunjay and his associates note in the Report,

> "Agriculture continues to be the primary occupation for the majority of rural people in the state. About 51.8 percent of total workers are cultivators and agricultural labourers. Thus, agriculture in the state has been a major source of labour absorption. Moreover, agriculture provides indirect employment to a large portion of the population in agro-based occupations. Thus, the prosperity and well-being of people in Gujarat are closely linked with agriculture and allied activities" (Mrutyunjay Swain, 2012).

Many Gujarati people set sail for African coasts in the 1940s and 1950s. By 1970s, they were in the USA, UK, Australia, Canada and other western countries where they set up their business empire. They had, over the years sent crores of Rupees to Gujarat. Biplab and Amita comment on their migration pattern:

> "Gujarat depicts a different pattern with respect to the extent, the outcomes, especially, remittances, and the long-term implications for the societies and communities in the place of origin. Emigration from Gujarat over centuries seems to have been driven by traders and those intending to set up business overseas. The pattern, of course, is subject to changes over time and space" (Biplab Dhak & Amita Shah, 2011).

When they were in India, their family members used to grow traditional crops mostly wheat, oilseeds, cotton, groundnuts, bazra, and vegetables. Most of the Gujaratis are vegetarian, hence, abundant growth of vegetables of different varieties are found across Gujarat. Special love and care shown towards livestock especially cows and buffaloes has helped in agricultural activities.

As steady remittances were sent to Gujarat, the changes in agriculture crop pattern, method of cultivation, using scientific tools and machinery in agriculture fields could be seen over the years that resulted in good crops with less workforce. The real story was that machinery was urgently needed in Gujarat villages where agriculture activities had been carried out due to less workforce. Chain migration from various villages had brought out scarcity in agriculture labour. Internal migration was another problem for agriculture work. Hence, usage of machinery and scientific tools helped to carry out the work in the fields. Farmers in Gujarat do not face fund crunch. Their Non-Resident Indian (NRI) and People of Indian Origin (PIO) relatives and friends are ever ready to help these farmers.

Punjabi Diaspora and their Benevolent Nature Towards the Agriculture Sector

Yet another diaspora community from India, which is the largest segment in Canada, USA, UK, and Australia, are people from Punjab. They are traditionally agriculturists with the cultivation of wheat which had prominence in Punjab, Haryana and Northern Uttar Pradesh. Most of the Punjabis who had migrated to North America had the firsthand experience in agriculture production, the methods, and scientific tools that were deployed by the westerners in the cultivation of various crops. There was a time when the Sikhs in Punjab were struggling to get a good harvest but eventually, the policies of the successive governments and the effect of five-year plan coupled with the extension of loan facilities, has had the desired results in agriculture production.

However, the drastic changes were noticed in agriculture fields only when the migrated Sikhs could send regular remittances to their homeland. This helped the people gradually augment the cultivated area and purchase machinery, scientific tools, high yielding seeds, fertilizer and better irrigation facility that ensured bumper crops. The UN report had stated that the government of India's investment in science and technology greatly benefited almost all the industries including agriculture:

> "The primary users of machine tools are in the automotive, automobile and ancillaries, railways, defense, agriculture, steel, fertilizers, electrical, electronics, telecommunications, textile machinery, ball and roller bearings, industrial valves, power-driven pumps, multi-product engineering companies, earth moving machinery, compressors and consumer products industry sectors" (United Nations Industrial Development, page, 30).

In the initial stages, some machinery had been imported, later on, when the technology transfer agreement was signed between the like-minded countries, India started to produce machinery and tools that are more suited to Indian agriculture fields. Punjab is blessed with water facility due to rivers that bring water throughout the year due to its proximity to the Himalayas. This has a direct influence on agriculture production. Using tractors in large numbers for multi-purpose work had its own benefit. While referring to mechanization in Punjab agriculture sector, way back in 1970, it was documented that even in 1960s farmers of Punjab were using various scientific tools and machines for agriculture activities. Martin and Arjan have had in-depth study on the usage of machines for wheat revolution, they observe:

> "Seed-bed preparation, which is the major function to which tractors are put, includes, besides ploughing, a number of other operations such as planking, leveling, farmyard manure application, banding and watercourse making" (Martin and Arjan, 1970).

For the last forty-five years, Punjab has adopted various scientific tools and new machines in its agriculture activities. People from neighbouring states such as Haryana, Uttar Pradesh, Rajasthan, and Bihar had a lesson from the agriculture opulence that Punjab reaped due to its massive adoption of scientific tools, machines, high yielding seeds and fertilizer. Generous remittances from Punjabi diaspora has made the people of Punjab to realize their dream of enjoying a good standard of living, having health and sanitation facilities and sending their children to good schools and colleges.

Diaspora and the South Indian States

South Indian states like Tamil Nadu, Andhra Pradesh, Telangana, Karnataka, and Kerala predominately are rice cultivators and consumers. These five states have a population in various countries. Kerala has a considerable number of people in various Gulf countries. Hence, there was no dearth of capital to invest in agriculture-related activities. However, Kerala isn't geographically suited for paddy fields in large scale while comparing to other southern states. It is so because the seawater is very close to many locations in Kerala. However, commercial crops like rubber, coir from coconut, various spices and other commodities needed machines in good numbers. People from Kerala who are involved in agriculture have adopted science and technology in the cultivation of various crops and harvesting as well as preparing of boiled rice, which is not polished, known as brown rice that has superior nutritional values for health. The rice making mills have installed machines that are more suitable to do much work than human labour force.

Andhra Pradesh, Telangana, Tamil Nadu, and Karnataka grow rice in abundance. There are other agriculture produces grown in the fields by using scientific tools, fertilizer, and high yielding seeds. These states are always depending on South West monsoon and the months from June to September with the commencing of monsoon the season of agriculture begins. Farmers while ploughing the fields, cultivating, segregating of weeds, harvesting and separating rice from paddy plants, often use tillers, tractors and other tools and machines. Diaspora members though tech-savvy who had settled in western countries, generously sent remittances to their homes so that people who are engaged in agriculture activities could invest that money for machines and tools. G. S. Bhalla while talking on transfer of technology and agriculture productivity expresses:

> "In any case, contrary to the often expressed view, at the current level of technology, the growth of output seems to be directly associated with the growth of employment in Indian agriculture and the new technology has helped in generating more productive employment in agriculture" (G. S. Bhalla, 1979).

The above observation of Bhalla indicates that using technology, however, under fear to minimize the workforce, actually employs more people. To this effect, Indian diaspora members who are residing in Malaysia and Singapore who migrated from Tamil Nadu know the hardship that they had undergone when they were assisting their elders while in Tamil Nadu. Telugu Association of North America (TANA), North American Telugu Association (NATA), American Telugu Association (ATA) and many more Telugu associations across US and Canada haven't forgotten their Indian roots. The newly formed Telangana state has carved its own Telugu association in America. It is under the able guidance of its founder Srinivas Reddy who manages the Telangana American Telugu Association (TATA). It is to be seen that Chandrababu Naidu, the present Chief Minister of Andhra Pradesh, who had given a clarion call to Telugu speaking people of Andhra Pradesh who are in the USA to develop Andhra Pradesh in every sector. There is a competition between Telangana and Andhra Pradesh over the phase of development. Predominantly, the agriculture-based economy of both states will see a drastic improvement in agriculture production through the usage of scientific tools and machinery. It is to be observed and noted in the coming years that Telugu speaking people who are in North America would transform both the states through a competitive mode with the diaspora's money, advice, and technology.

The main aim is in revamping agriculture sector by discarding the primitive technology and adopting new machinery and technology. Apurva further emphasizes on giving a chance to local people who could be in a position to design their own tools and machines that would help in deploying the tools in the agriculture sector. She further opines:

> "In general, the objectives should be to develop implements and machinery which will raise productivity, reduce drudgery and which can be worked with ease, speed and accuracy. In designing new implements, local talents should not be ignored. In the field of mechanical and electrical power, it is the tractor, which is the most versatile in farming operations. All tillage operations could be performed through it. It can also be used for stationary jobs like threshing, operating any machine like water pumps, harvesting crops or threshing. It has versatile use" (Apurva S. for YourArticleLibrary.com).

The tractor has become a multipurpose machine. It does various activities starting from ploughing to carrying the agriculture products to the market. The brand name Mahindra tractors had revolutionized Indian farmers dream for many years. How could state like Gujarat reap a good harvest in whatever it sowed? It is the technology, tools and the machinery that Gujaratis use in their agriculture work had paid the dividends. Gujarati diaspora has enough to offer in terms of money, expertise, and advice. Mrutyunjay in his report from SP University, Anand, speaks about Gujarat's progress in agriculture:

> "Gujarat is India's largest producer of cotton, castor, cumin, and isabgul. The state is the second largest producer of sesame and groundnut in the country. The agricultural productivity of some crops in the state is highest in India as well as in the World. The productivity of mustard, castor, cotton, onion, and potato is highest in the state compared to other states in India. The productivity of groundnut, bajra, and banana is the second highest in India" (Mrutyunjay Swain, 2012).

It does not mean that other states are not implementing the necessary tools that are required for better agriculture output. As the purchasing power of the people increases due to an increase in their monthly salary, they demand more goods and services. This demand puts pressure on agriculture output. The demand for agriculture production can be met by using the latest scientific method of cultivation that

includes scientific tools, hybrid seeds, fertilizer, and various machines. Devinder Sharma in his article to a web portal predicts that raise in salaries will lead to demand for products:

> "Keeping agriculture impoverished all these years has sustained economic reforms. The big bang reform India needs is essential in agriculture. Providing the rightful income into the hands of farmers is what will push domestic demand and at the same time revitalize the rural economy. If the Seventh Pay Commission is being seen as an economic booster, as it is expected to create more demand for consumer goods, imagine the kind of shot in the arm a higher income in agriculture will give to the Indian economy" (Devinder Sharma for Deccan Herald, 26 August 2016).

South Indian states have been depending upon agriculture labourers for quite some time now. However, the diaspora network who had enough savings could invest in their farms and bring new innovations in crop cultivation through machinery and technology.

Conclusion

Though there is enough technology that is being used to get better agriculture production the need of the hour is to have good storage facilities.

The present central government has a close tie-up with Indian diaspora. It hearkens the issues diaspora people are facing across the globe. Prominent members of Indian diaspora have repeatedly advised every successive government to adopt new technology in cultivation and processing of agriculture items. The present prime minister of India last week had addressed the NITI – Aayog where he emphasized on rapid growth:

> "Prime Minister Narendra Modi on Friday inaugurated the maiden annual lecture of the NITI-Aayog where he stressed on 'Rapid, not gradual change'. My vision for India is a rapid transformation, not gradual evolution" (TOI, 26 Friday 2016).

His vision for India cannot bypass the agriculture sector. Being a chief minister of a fast developing state like Gujarat for about a decade has helped him shape himself as a fine policy maker when it comes to the agriculture sector. There will be further growth in the agriculture sector in India by using scientific tools, fertilizer, high yielding seeds, and various machinery.

The central and state governments across the country are going for solar and green energy that are renewable in nature. India needs to grow in every field. Still, people are emotionally attached to their agriculture lands in villages. Those who had gone to various foreign countries either come back to work in their fields with the implementation of new technology or send regular remittances for their loved ones to carry on the agriculture work with new technology and machinery. Coming years, Indian agriculture sector will show further impetus due to the persistent policies of the present central government that always gets support and encouragement from the Indian diaspora. Spending many years in foreign countries Indian diaspora has closely observed the western method of cultivation. Many people in the diaspora have landed in their adopted countries. The experiment that they had made in their fields with western technology, scientific tools, and machinery had been put to use in Indian agriculture fields. This had resulted in less workforce and good harvest. This process will be further updated as research in technology progresses that will revamp the agriculture cultivation method. There is a bright future for the Indian agriculture

sector, to the prosperity it brings to the farmers and other stakeholders. This will eventually bring greater fillip in the nation-building task.

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