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## Journal of Development Research

PURUSHOTTAM BUNG



Volume 5

March - September 2013

Issue 1

(ISSN No. 2229 - 7561)

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# **“Comparative study between the functioning of NHB (National Horticulture Board) of India and EMBRAPA (Brazilian Agency for Agriculture Research and Animal Husbandry) of Brazil, the nodal apex bodies controlling horticulture industry”**

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## **Abstract**

Regulating/controlling/facilitating nodal bodies (Governmental/private/semi governmental/NGO/ Institutional) play a crucial role in the growth of respective sectors in a given economy. Effective and efficient functioning of these nodal bodies is a prerequisite to achieve the desired growth of a given sector in an economy.

As the title very clearly explains, attempt has been made in this research article to compare the functioning of NHB (National Horticulture Board) of India and EMBRAPA (Brazilian Agency for Agriculture Research and Animal Husbandry) of Brazil, the nodal apex bodies controlling horticulture industry in their respective countries.

Lack of integration of all the activities starting from farm gate till final consumers because of ill functioning of the NHB in collaboration/association with the related Governmental departments/institutions, with no clear direction and goals prohibit the horticulture industry of India from attaining the desired growth.

There lies a most promising scope to import the '**Brazilian model**' where in a single nodal agency '**EMBRAPA**' takes complete care of horticulture industry (both farming community and processing industry) by having a fool proof mechanism/system in place to address all their concerns/problems and working in an integrated fashion, with more clearer objectives, strategies and policies, to sort out the contemporary upcoming issues. This is the secret of the success of Brazilian horticulture industry.

## **Key words**

**Comparative study, NHB, EMBRAPA, Horticulture Industry, India, Brazil**

## **Introduction**

India and Brazil are both developing countries with open market economies share the common history. Both had been the colonies of Portuguese. Brazil became independent in 1822, where as India got its independence in 1947. After independence both countries opted to have democratic rule in their nations, resulted in India becoming the biggest democracy in the world with the population of 1110 million and Brazil, the democracy with the population of 189 million as on 2008<sup>1</sup>.

Economic condition of the two countries is also comparable. Gross Domestic Product (GDP) of India was US\$ 911.8 billion for the year 2008 where as the GDP of Brazil was US\$ 1067.5 billion during the same year. Total Indian exports were worth US\$ 99.45 billion during year 2005 where as the total Brazilian exports were worth US\$ 118.3 billion during the same year. India imported goods and services worth US\$ 138.09 billion during year 2005 where as Brazilian imports were worth US\$ 77.62 billion during the same year. Exports and imports structure, both region wise and commodity wise, of both nations are comparable. Inflation, unemployment rate, GDP growth rate, and poverty rate are also comparable<sup>1</sup>.

Both countries enjoy almost the similar climatic conditions, i.e., both are tropical with vast agro climatic variations leading to enormous bio diversity. Hence they share the long history of crop husbandry. As shown in table-I, both countries lead the world in the production of fruits. In 2003, India produced 46 million metric tons (mmt) of fruits where as Brazil produced 34 mmt of fruits, contributing to 9.55% and 7.09% of global production, respectively<sup>2</sup> (Refer tableI).

In spite of the above commonalties and



similarities between the two nations, both countries stand miles apart when one compare the size and growth of the horticulture industry and also the total loss of fruits due to wastage and value destruction at various levels. Following discussion prove this statement.

Brazil processes 70% of the total horticultural production with a minimum loss of around 20%<sup>3</sup>, whereas India processes just 2% of the total production with an alarming loss of around 40-50%<sup>4</sup>. The comparison of exports of horticultural produce between the two nations reveal that Brazilian exports of fruits and processed fruit products were worth US\$ 719 million during year 2004, whereas Indian exports of the same were worth US\$ 109 million in the same year (around 15% of the Brazilian exports).

Indian Horticulture Industry seems to be in its infancy stage and growing at a very slow pace. In year 1998-99 there exist over 4000 Fruit Processing units in India with an aggregate capacity of 1.2 million metric tons which was less than 4% of total fruit production. This industry is growing at around 20% every year. Moreover the industry is dominated by large no of smaller units (cottage scale / home scale / small scale) having small capacities ranging from 20 tons to 250 tons per year. Only 20% of the production of processed fruits is being exported<sup>5</sup>.

In spite of several serious measures taken by the Govt. of India to re-vitalize the industry like;

1. Formation of altogether separate ministry called Ministry of Food Processing Industries to take care of this Industry.
2. Liberalization of import of technology.
3. Allowing equity participation.
4. Drastic reduction of duties on import of capital goods required for Food Processing.
5. De licensing all food processing industries except beer, potable alcohol and wine
6. Automatic approval of foreign investment up

to 51% except few items reserved for small scale sector.

7. Foreign technology tie-ups, etc.

The position of the Indian horticulture industry seems to be improving rather very slowly<sup>7</sup>.

Considering the following facts about this industry:

1. It has a very high multiplier effect on economy than that of power and telecom sectors.

2. Vast export potential

3. Rapid growth in the domestic demand for processed fruit products because of;

- i. Smaller nuclear family set-ups.
- ii. Percentage of working women is increasing rapidly.
- iii. Income levels are rising, especially income of the middle class population. The sheer size of the middle class population is also increasing at a phenomenal rate.
- iv. Tangible changes in the eating habits of people.
- v. People in general have become health conscious.

4. Fruits and vegetables are the food of the future<sup>8</sup>.

5. Horticulture The focus of the next phase of green revolution<sup>9</sup>.

6. India has the unique distinction of being able to grow almost all types of fruits and vegetables.

It is being argued that India has a huge potential and can be the largest horticultural industry in the world<sup>10</sup>.

The possible reasons for the poor growth of this industry in India include;

1. Low productivity at the farm level because of the following problems which leads to higher cost of raw material;



i. Inferior quality of seeds/seedlings/saplings

ii. **Mechanisms** for assessing Quality of seeds, seedlings / saplings are not made available to cultivators

iii. Predominance of old and senile orchards

iv. Hi-tech horticulture is being adapted on a very limited scale<sup>11</sup>

2. Non availability of ideal processing varieties of fruits. Too many varieties (over 3000 varieties of mango for example) have been grown in India and majority of them are table varieties which are not suitable for processing.

3. Indian production is made up of produce of large number of varieties and therefore lacks uniformity in physiochemical characteristics. This leads to poor o/p due to poorer yield.

E.g. 16 tons of Indian pineapple produce one ton of concentrate where as only 8 tons of Philippine pineapple produce the same output.

E.g. 7 tons of Indian tomato produces 1 ton paste, where as 4 tons of Italian tomato produce the same output<sup>12</sup>.

4. Poor post harvest management leading to huge post harvest loss because of;

i. Poor infrastructure facilities to store and transport.

ii. Weak processing infrastructure. Lack of sufficient no. of processing units is a major bottleneck, as the crops are seasonal and are perishable.

5. Lack of necessary infrastructure facilities like cold storage units, cold chain, drying yards, freeze drying units, pre cooling centers, etc., surrounding major cultivation areas. This leads to non availability of raw material to processing units throughout the year.

6. Huge storage and transportation costs; because farms, raw material markets, cold storage units and processing centers (units) are situated in distant locations. This results in higher prices of

raw material. This is the reason prices of Indian products (both fruits and processed fruit products) are higher than the prices prevailing in the international markets (E.g. Indian export prices of pineapple and oranges are two to four times higher than the prices prevailing in the international markets<sup>13</sup>).

7. Majority of the small FPIs (Fruit Processing Industries) function only during the harvesting season of the crop and remain idle for the rest of the year. Fruits need very specific handling and storing requirements if their quality and freshness are to be maintained. Moreover products need to be stored at specific temperature and humidity levels. Cold chain is required right from the farm gate till the end product reaches customer. This will ensure continuous supply of raw material to such industries.

8. Horticulture crops were treated as one of the several means of land use of secondary importance, with food grain crops receiving prime attention. Hence it leads to reduced production of fruits and thus inadequate supply of raw material to Fruit Processing Industry.

9. Domestic demand for processed fruits is quite meager because of economic conditions and eating habits of people. Indian people, in general, prefer fresh fruits and vegetables than processed fruit products.

10. Non availability of credit facilities by the banks and financial Institutions to the fruit processors in order to meet the seasonal financial requirements of this sector.

11. Less 'R&D' work is being undertaken in this sector. It is carried out by few national Institutions like ICAR (Indian Council for Agriculture Research), CFTRI (Center for Food Technology Research Institute), etc.

12. Poor sanitary and phyto-sanitary measures.

13. Lack of innovation with respect to packaging.



Looking at the above problems / constraints facing this industry, it is clear that they involve following stake holders;

01. Fruit cultivators
02. Private and public fruit processors
03. Government Departments / Nodal bodies like / Concerned Institutions like; **NHB** (National Horticulture Board), **NHM** (National Horticulture Mission), **MOFPI** (Ministry of Food Processing Industry), **APEDA** (The Agriculture & Processed Food Products Export Development Authority), **ICAR** (Indian Council for Agriculture Research), **CFTRI** (Center for Food Technology Research Institute, Mysore), **SAUs** (State Agriculture Universities), etc.
04. Ministry of Agriculture (of both State and Central Government), the APEX body which frames strategies and policies for the future.
05. Cold chain members
06. Cultivators co-operative organizations, Processors co-operative organizations, Other Associations, NGOs, etc.
07. Middle men
08. Retailers, Wholesellers, Super markets, and other channel members

It becomes clear that all the stake holders involved are pursuing their own interests without much co-ordination amongst them, leading to poor growth of this industry. Hence a coordinated, integrated and strategic effort of all the above bodies (stake holders) is must to turnaround this industry. Horticulture Industry of India has to undergo a radical shift to address all the above constraints and reap the enormous advantages/benefits/ profits which this sector is to offer and be the world's largest Horticulture Industry. Problems / constraints have to be studied in wholesome, integrated and strategic manner rather than adopting piecemeal approach.

Regulating/controlling/facilitating nodal bodies (Governmental/private/semi governmental/NGO/ Institutional) play a crucial role in the growth of respective sectors in a given economy. Effective and efficient functioning of these nodal bodies is a prerequisite to achieve the desired growth of a given sector in an economy.

## Literature Review

TIFAC Report (2000), the task force on Agro food processing of TIFAC on the sub group on fruits and vegetables, has given the technology status and future vision for India. The report states that the total production of fruits in the world is around 370 mmt. India ranks first in the world with an annual output of 32 mmt. TIFAC study has focused on 12 selected vegetables which accounts for about 65% of the total production in India. It is estimated that around 20-25% of the total vegetables is lost due to poor post harvesting practices. Further while discussing about the future trends, the report highlighted that fruits and vegetables would continue to be harvested manually in the future. While small land holdings and non availability of good quality planting material have been the major issues of concern, it is expected that quality of planting material would improve in the long run due to right selection, hybridization, proper breeding and adoption of tissue culture.

Biodiversity International News of Brazil, (2006), made a remark on EMBRAPA (Brazilian Agency for Agriculture Research and Animal husbandry), a prime government nodal agency of Brazil, about the announcement that the number of seed samples stored in its Gene Bank had topped 102000, putting the Brazilian gene bank at No. 7 in the world in total number of accessions. More than 500 species were represented in the gene bank, which has restored lost varieties and species of local communities in Brazil. The gene bank will open four new cold storage chambers this month, doubling its capacity to 240000 accessions.

NFI Archive Report (2003), reported that the fruits and vegetables that are grown only



on 6-7 percent of gross cropped area have contributed more than 18.8 percent of the gross value of agricultural output and 52% export earnings out of total agricultural produce. They further opined that during the last few years considerable emphasis has been given to this sector. Accordingly, areas under fruit production has increased by 172 percent from 1961-1993, productivity per hectare was nearly doubled leading to an increase in production to the tune of 320 percent. The average labor requirement for fruit production is 860 man-days per hectare per annum as against 143 man-days for cereals crops. Crops like grapes, bananas, and pineapple generates much larger employment roughly from 1000 to 2500 man-days per hectare per annum, the researcher added.

MOFPI (Ministry of Food Processing Industries) Report, (1998), reported that India is the largest producer of fruits (41.5 mmt) and second largest producer of vegetables (67.28 mmt) in the world. The country tops in production of banana, mango, potato, tomato, onion, green peas and coconut. **Only 2% of the fruits/vegetables produced are being processed at present.** The installed capacity of fruits and vegetables processing industries has increased to 21 lakh tons in 1999 with 4589 fruit/vegetables processing units. Exports during 1998-99 were worth Rs. 678 crores.

MOFPI report (2001), It's report on summary on fruits and vegetable processing documented in the report of Ministry of Food Processing Industries (MOFPI) highlights the following facts;

1. India is the second largest producer of vegetables and third largest producer of fruits.
2. Thirty percent of the fruits and vegetables get wasted due to lack of proper processing and packaging facilities.
3. Only two to three percent of the total produce is being processed in India.
4. Total cultivation area under fruit and vegetables is around 12.0 million hectares and

accounts for 7% of the total cultivation area.

5. Main fruits produced in India are Mango, Banana, citrus, Guava and apple. These fruits account for 75 to 80 percent of total fruit production.

K.P.Prabhakaran Nair (2006), expressed that Indian agriculture is being undermined because of the unreformed policies in the agriculture sector that continue to encourage monoculture such as wheat and rice in Punjab and sugarcane in Maharashtra, where the cultivation has lead to exploitation of ground water causing long term environmental degradation. The extensive input subsidies which are not conducive to efficient agro practices may cause greater harm in the future. Indian agricultural extension network is comparatively inefficient when compared with the other countries like China and Brazil.

Researcher argued that China's success in the agriculture processing sector is mainly due to their '**bottom up**' approach where in around 1.5 million **farmer agro technology extension agents**, who work shoulder to shoulder with the farmers in the field adopting innovative practices all the time. Whereas we adopt '**top down**' approach, where in agricultural scientists, doing research, frame strategies and policies for future in consultation with politicians and bureaucrats. But least importance has been given to extension activities through which technological innovations and advance practices will reach to ultimate farmers.

According to the researcher Indian agriculture sector will bloom only when the mentality of India's agricultural fraternity will give top priority to providing necessary help and support to our farmers in the field.

Manish Jain (2002), in his article explained that India accounts for 10% of the total world production of fruits and ranks second after China. It leads the world in the production of mango, banana, sapota and acid lime and has recorded highest productivity in grapes. Area



under fruit has increased from 2.87 million hectares during 1991-92 to 3.729 million hectares during 1998-99 recording an increase of 29.93%. Similarly production increased from 28.63 mmt (million metric tonnes) to 44.02 mmt recording an increase of 53.83%. During the same period, productivity of fruits increased by 18.4%. Further he listed five largest fruit producing states of the country viz. Maharashtra (17.08%), Karnataka (12.37%), Andhra Pradesh (10.42%), Bihar (8.82%) and Uttar Pradesh (8.20%).

Researcher also noted the trend that out of the horticultural crops produced in the country, approximately 60% is consumed by the local population or marketed in the nearby market yards and only about 40% of the produce is channeled through the regulated markets for the consumption of urban population in the cities. Export markets account for less than 5% of the total production except in some commodities like cashew, spices, onion, etc. He noted further that the bare minimum infrastructural facilities are lacking even in the regulated markets. The horticulture produce suffer significant post harvest losses due to lack of adequate post harvest and marketing infrastructure viz. Processing units, packaging and grading facilities, cold storage facility, refrigerated transport vehicles/ containers, storage and phytosanitary facilities, etc.

Researcher strongly recommends for an integrated development of horticulture industry in order to meet not only the requirements/ demand of the domestic market but also to exploit the export potential to maximum extent. Emphasis on quality production needs to be strengthened together with sound post harvest management of the highly perishable horticultural commodities.

McKinsey and CII study report, (2001), in their article reported that, according to a joint study conducted by McKinsey and Confederation of Indian Industry (CII), a staggering fifty percent of production of fruits and vegetables in India are lost due to wastage

and value destruction. In monetary terms, the loss was estimated at over Rs.23000.00 crores a year.

## Research Methodology

The research undertaken is purely secondary in nature. Attempt has been made in this research article to compare the functioning of NHB (National Horticulture Board) of India and EMBRAPA (Brazilian Agency for Agriculture Research and Animal Husbandry) of Brazil, the nodal apex bodies controlling horticulture industry in their respective countries. The information is collected from all the available sources including the official websites of these nodal bodies and valid inferences were drawn after thorough comparison.

## Research findings and discussion

The organization structure and style of functioning of NHB (National Horticulture Board), the apex Governmental nodal body for promoting horticulture industry in India is described briefly here-in-under;

It came in to existence in 1984. The objectives framed by the board, then by its founder Dr. M.S.Swaminathan (The man behind horticulture revolution in India), were as follows:

1. To encourage and promote development of horticulture industry in the country.
2. To encourage the participation of small and marginal farmers and growers in Horticulture Development Programmes so that they become beneficiaries of the growth of the Horticulture Industry.
3. To assist in establishment of growers' societies to advance the economic and social status of the farmers.
4. To encourage adoption of appropriate post-harvest management technologies which include grading, packing, storage, transportation, marketing, etc. for maximizing return to the farmers/growers.



5. To provide technological, financial and other assistance to various organizations for the development of horticulture.
6. To assist and organize Udyan Pandit Competition, Fruit/Vegetable/Flower Shows
7. Training of farmers and in-service officials.
8. To prepare feasibility studies on marketing, processing plants, cold storage facility, transportation system, etc., for raw and processed perishable horticultural products and other related fields. To undertake designing, planning and setting up of such kind of projects.
9. To arrange supplies of critical inputs for horticultural development.
10. To promote consumption of fruits/vegetables in fresh and processed form.

The Organization structure of NHB reveals the following facts and figures (as per audited annual report of 2005):

- It employs 31 directors (majority of them are bureaucrats and politicians) and 1 economic analyst under group A
- It employs 39 executives under group B
- It employs 18 clerks under group C
- It employs 45 unskilled and semiskilled people under group D
- Altogether, it employs 134 people out of which 32 are directors.

The only activity that NHB has been doing seriously is distribution of grants and subsidies. NHB has distributed grants and subsidies worth Rs.504 lakhs under various schemes listed below;

- i. Introduction of new technology and concepts in Horticulture
- ii. Establishment of Nutritional gardens in rural areas
- iii. Establishment of market information service centers for fruits and vegetables of commercial

importance

- iv. Development of horticulture in tribal and nontraditional areas
- v. Transfer of technology through training and visits
- vi. Techno economic feasibility studies

When we compare the functioning of NHB (the apex Government nodal body of India, established in 1984, with the sole objective of strengthening the horticulture industry of India) with 'EMBRAPA' (Brazilian Agency for Agriculture Research and Animal Husbandry) we note significant differences in their organization structure and style of functioning.

Following facts and figures about 'EMBRAPA' (Brazilian Agency for Agri. Research and Animal Husbandry) prove the above statement.

➤ There is only one apex Government nodal body for entire agriculture and animal husbandry industry of Brazil, unlike in India where we have many nodal bodies catering to specific industries like horticulture, cotton, sugar, Food processing, fisheries, Poultry, dairy, etc.

➤ It takes complete care of interests of farmers, keep them aware about latest developments, provide them the necessary inputs in terms of knowledge, expertise, infrastructure, facilities, technology, etc.

➤ It employs 120000 Farmer Agro Technology Extension Agents who work shoulder to shoulder with the farmers in the field using a 'bottom up' approach, innovating all the time, as opposed to our 'top down' approach where the office loving agricultural scientists dish out recommendations and vanish. Indian agriculture extension network is the most inefficient in the world. (30 th Nov 2006 Times of India)

➤ EMBRAPA doesn't distribute grants and subsidies to farmers like India. Rather it builds necessary state of the art infrastructure like;



1. Cargo airports in remote areas to facilitate zero time transfer of perishables to processing centers (Total no. of airports in Brazil: 4276, compared with 341 in India),
2. Gene banks to store seed samples,
3. Cold chain facility throughout the country to minimize post harvest loss,
4. New state of the art technologies to bring down the cost,
5. Ongoing continuous research in the field of sustainable and organic agriculture to lead the world in agriculture and animal husbandry,
6. Developing better varieties to enhance the yield, etc.

## Conclusion

Governmental nodal bodies including NHB have to change their style of functioning. Giving financial incentives and subsidies will not suffice. They should have a vast, strong and dedicated team of extension officers working in the field with the cultivators supporting them throughout.

From the above findings and discussion, it can be inferred that the government nodal bodies including NHB are not functioning properly. They are functioning like conventional government department (bureaucratic and political). Following are some of the key reasons for ill functioning of these government nodal bodies:

1. The bureaucratic 'top down' approach
2. Having strong influence of 'Inspector Raj'
3. Lack of incentives to work in the field. This will result in lack of interest to work in the field with either cultivators or processors.
4. Relying heavily on grants and aids from the government (either central or state) than making the nodal agency a self sustainable one.
5. Believing in subsidies and other financial incentives than providing necessary consultation, support services, technological knowhow, etc., to the processors.
6. Lack of strong, technically sound, dedicated, and vast extension network at ground level throughout the nation.
7. Lack of a strong well articulated clear cut vision and mission.
8. Lack of strong leadership (transformational) at the top.
9. Lack of co-ordination and integration within the organization, and also with other nodal bodies.

Thus there lies a most promising scope to import the 'Brazilian Model' where in a single nodal agency '**EMBRAPA**' takes complete care of both farming community and processing industry by having a fool proof mechanism/system in place to address all their concerns/problems and working in an integrated fashion with more clearer objectives, strategies and policies to sort out the contemporary upcoming issues. This is the secret of the success of Brazilian Horticulture Industry.

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