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Analysis of Bihar's food processing sector in the context of India's future global market system

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Abstract
The growth in total factor productivity is not much impressive during the globalised trade regime for most of the industries within the informal food processing sector. However, those sectors where capital intensity has increased over the years could make the growth in total factor productivity levels. Gainers in terms of growth in TFP in the informal food processing sector in India are processing and preservation of meat, fish and products thereof. In Bihar the gainers are processing and preservation of fruits & vegetables, manufacture of vegetables & animal oils & fats, and prepared animal feeds. There has been a shift in businesses from the countryside to the cities, and the number of small businesses has gone down while the number of large businesses has gone up. The average size of an enterprise depends on many things, such as its financial situation, its capabilities, its location, its infrastructure and human capital, its type of ownership, and its age. In informal food processing businesses, the increase in labour productivity over the last 20 years is mostly due to an increase in the amount of capital used, not necessarily an increase in the amount of work done. Over time, Bihar's output has become less sensitive to changes in the amount of capital put in, while it has become more sensitive to changes in the amount of labour put in. In the own account manufacturing enterprises, the output elasticity of labour inputs is higher than in the non-directory manufacturing enterprises and the directory manufacturing enterprises, where it is lower. In most of the years we looked at, both at the national level and for Bihar, the industry's returns to scale went down.

Keywords: Globalised, infrastructure, human capital, ownership and productivity

Introduction
The economic history of development is traced back to the development of processing industries based on agriculture and allied activities throughout the world. A history of economic development of the western world before the industrial development brought about the epochal change of economic transformation was no different from the development of processing industries based on agriculture and associated activities. The reason has been very simple. The agriculture that produces beyond domestic consumption is considered to be surplus that has a natural tendency to be utilised for value addition, especially in the context of the development of the market economy. The economic rationale of the development of the food processing industry (FPI)1 particularly in developing economies, are established by many scholars all over the world for quite some time. The initial contribution made by some of the well-known scholars in this field had been immense and inspiring especially for the policymakers, however these studies stress too much on capital accumulation out of surplus labour in the agricultural sector. Economists such as how the shift of surplus labour from the low productive agriculture to a more productive manufacturing sector can boost economic growth. This, however, did not happen in India as a large number of people still continues to clinch to agriculture as their survival with very low marginal productivity of labour.

The logic of development of FPI in India, which is a predominantly agricultural economy gains considerable relevance to arrest underdevelopment process and perpetual backwardness. Although commercially recognised lately in India, FPI has crucial development implications for the economy. With the re- creation of the ministry of food processing industries2 (MOFPI) recently, the significance of FPI has reached a new height. The Government has also accorded the FPI a high priority sector through various fiscal reliefs and incentives to encourage commercialisation and value addition in this sector. Despite this, several constraints hinder the growth prospect of FPI in India. Much has been written on the economics of the manufacturing sector as a whole in India (Kathuria *et al*., 2010; 2013; Raj & Sen, 2016) [14, 5, 16].

However, this sub-sector of manufacturing is still struggling to emerge and make people realise its importance even in the academic arena. Knowing the fact that the food processing sector is a sunrise sector and highly labour intensive (Rao & Dasgupta, 2009) [17], literature on FPI in India is relatively scanty, particularly on the informal segment that accounts for 99 percent of the enterprises in the FPI. Not much work has been done to understand the dynamics of the informal FPI under the globalised trade regime in the sub-continent. The sunrise sector lacks the academic and political support to address the issues of the FPI in India. With all potentials, functioning and performance of informal FPI in India, which is a major source of output and employment have remained under the shadow. This study will explore the functioning and performance of informal FPI in India in general and Bihar in specific. More specifically, present study deals with three prominent issues, *viz*,

- Analysing changes in the characteristics of informal FPI during two-decade period of the globalised trade regime during 1994-95 to 2015-16,
- Understanding the performance of FPI under the trade liberalisation regime, and,
- Understanding the factors affecting the growth and sustainability of FPI in India.

Increase in income, change in occupational pattern, structure of labour force, demographic pattern, and consumerism have further induced the consumption of processed food in the country. Younger population with higher income tend towards eating out and buying beverages and packaged food. These factors have increased the demand for processed food and beverages 3. Dev & Rao (2004) [18] mention that increasing middle class population, per capita income, participation of women in urban and non-farm jobs, and impact of globalisation have primarily inspired diet diversification in India. Due to changing consumption pattern, and hectic lifestyle, the demand for processed food has increased globally.

Table 1: Different Sectors of FPI and Products Processed in India

Sectors	Products
Dairy	Whole milk powder, skimmed milk powder, condensed milk, Ice cream, butter, ghee, cheese
Fruits and Vegetables	Beverages, juices, concentrates, pulps, slices, frozen & dehydrated products, potato wafers/chips, etc.
Grains and Cereals	Flow, bakeries, starch glucose, cornflakes, malted foods, vermicelli, beer and malt extracts, grain- based alcohol
Fisheries	Frozen, canned products mainly in fresh form
Meat and Poultry	Frozen and packed -mainly in fresh from egg powder
Consumer Foods	Snack food including salty snacks, biscuits, ready to eat food and alcoholic and non-alcoholic beverages

***Source*:** MOFPI (2004)

History of food processing industries

History of FPI Europe and the U.S

Preserving with salt, sun drying, fermentation, smoking, cooking over fire and several other fundamental ways of processing were in practice since pre-historic age. The processing of food was primarily confined to self-consumption, and it took a long time-period to realise the potentials of commercialisation of processed food. Processed foods were commercially produced in Europe and the U.S. initially for a specific group of people, including sailors and warriors. With the changes in the structure and need of the society, the methods and techniques of processing kept on changing 27, however at a slow pace until the industrial revolution took place in Europe at the end of the eighteenth century. Later on, changes in the occupational pattern and demographic structure brought changes in demand for processed food throughout the world.

History of FPI in India

While in Europe and the U.S., food processing was done in commercial enterprises as a result of a sudden rise in the demand for processed food by the state to serve food needs of soldiers, in India food processing evolved through an evolutionary process 28. The history of food processing is quite old in India. It is a widespread practice at the household level to preserve seasonally available fruits and vegetables in various forms for future consumption during seasonal food shortages. Although industrialisation in the food processing sector is slow in India, for self-consumption purpose, food processing is practiced in large scale in rural areas. In rural and semi-urban regions food is preserved and processed in the form of jam, pickles, chutney, and different snacks using various fruits, vegetables and food grains by women at the household level using indigenous techniques. In the early phases of the development of FPI in India, food processing was guided by households' demand at large. Food items were being preserved in traditional forms to avert the seasonal uncertainties in the stock of food items.

Status and Structure of FPI in India

The activities in the informal sector are frequently considered as peripheral and sometimes invisible to recognise, mostly in the developed economies where the size of this sector is relatively small. However, in the underdeveloped/developing economies, the informal sector has crucial implications for income and employment generation. In India, the size of the informal sector is prominent and visible, but unfortunately, it is less acknowledged and is at the margin. Food processing enterprises are part of the manufacturing sector in India as per the NIC, and therefore data on FPI can be obtained from the manufacturing surveys/censuses. More precisely, data on Indian FPI can be obtained from various sources including the CSO through the ASI and from the NSSO of the Ministry of Statistics and Programme implementation (MOSPI). Other sources of data on manufacturing enterprises including food processing enterprises are the reports published by the Ministry of Micro, Small and Medium Enterprises, and the Economic Census of the Government of India. The ASI and the NSSO periodically conduct nationwide surveys on different aspects of formal and informal manufacturing enterprises respectively and disseminate the data for policymakers and researchers to frame appropriate industrial policies in the interest of the nation. While the data on formal food processing enterprise can be accessed from the ASI database, the data on informal

food processing enterprises can be obtained from the NSSO database. The analysis in this section is based on data obtained from both the sources.

Changing Structure of FPI across States and in Bihar

The distributional pattern of informal FPI across major states has undergone manifold changes in the last two decade period since 1994-95. In the course of liberalisation, some states benefited while some others did not. The two major states of Andhra Pradesh and Maharashtra, which were earlier lagging far behind the state of Bihar till 2000-01 in terms of share in informal FPI, have more proportion of informal FPI than Bihar in 2015-16. The data also shows that during 1994-95 to 2015-16, informal FPI has grown more in southern and western states including Andhra Pradesh, Karnataka, Kerala, Maharashtra, Gujarat, and Tamil Nadu than in eastern and northern states such as Bihar, Orissa, Uttar Pradesh, and West Bengal. This unequal change in the distribution and expansion of informal FPI is a reflection of India's industrial policy so far. Not only the extent of informal food processing enterprises across states has undergone significant changes, but the average size of the enterprises across states have also changed significantly. Andhra Pradesh is the only state in India where average enterprise-size has increased along with an increase in the relative share of informal FPI. Enterprise-size in all other states have either remained constant or have even declined with increasing/decreasing relative share in the informal FPI. In aggregate at all India level, the enterprise-size has declined by 0.3 percent during the liberalisation period 1994-95 to 2015-16.

Review of Literature

Sinha and Sinha (1992) [10] examine growth prospects, and constraints in the fruit and vegetable processing industry in India. Utilising data from the ASI and other secondary data sources on registered food processing enterprises, they find that poor horticultural base, weak production system, market limitations, consumer preferences, and government policies are the main constraints in the growth of this industry.

Gandhi *et al*. (2001) [4] have examined the role and importance of agriculture based industries in India in relation to the development of rural and small farmers.

Chadha and Sahu (2003) [3] have analysed the potentials and growth constraints of the agro-based processing industries in India. Informal food processing enterprises are among the least researched subjects in India. A wide range of research is available on Indian manufacturing enterprises at the aggregate and disaggregated levels based on the Annual Survey of Industries (ASI) and the National Sample Survey office (NSSO)5 datasets, however, food processing enterprises could not get much space as a core theme in research. A few studies in India had tried to understand the characteristic of enterprises in the FPI and holistically examined their functioning. However, research on informal food processing enterprises has largely remained in periphery.

Sidhu (2005) [9] points out that "the processing industry's growth in the post-reform period may be attributed to various fiscal reliefs and policy initiatives. These policy initiatives include de-licensing of food processing industries, declaring a number of food processing sectors as high priority industries, permitting foreign equity investment up to 51 percent of the paid-up capital as also removing restrictions under the MRTP Act. However, the capacity utilisation of the industry has remained below 50 percent in the post-reform period".

Bedi (2006) [2] compares the production statistics of fruits and vegetables with their consumption estimates to examine their validity. Secondary data from the NAS, NSSO and, ASI are used in his paper. His study highlights inconsistencies in official statistics on fruit and vegetable production in terms of quantity and value.

Kumar, (2010) [6] have examined the performance and growth prospects of 15 sub-groups of the organised FPI using the ASI data published during 1989-2008. They finds that there are strong potentials for the development of this sector in order to generate employment and income, given that, the industry use more of labour which could be facilitated by liberal labour laws. They also point out that "although the FPI has become more capital intensive over time, it has strong potential in India to meet the national objective of employment creation and poverty reduction".

(Kathuria *et al*., 2013) [5] In many of developing economies, informal sector persists and dominates the formal sector in terms of number of enterprises and persons employed in it. It was presumed that with the growth of the economy under liberalised trade regime, formal manufacturing sector would expand, and informal manufacturing sector will shrink. However, despite rapid economic growth, informal manufacturing sector has shown no sign of contraction. The coexistence of a large informal sector along with a relatively smaller formal manufacturing sector re-establishes the fact that the manufacturing dualism continues to exist in India. Efforts have been made by scholars to understand manufacturing dualism in India with reference to productivity and performance.

Rais *et al*. (2013) **[8]** analyse the FPI in India, its science and technology capabilities, skills, and employment opportunities using data from the NSSO, ASI, and other sources. They find that a variety of policies and programmes undertaken by the government has not been very encouraging to develop the food processing sector. Therefore the state support is required to boost the science and technology capability, level of infrastructure, and human capital to develop the FPI.

Baliyan *et al*. (2015) **[1]** examine sub-sector wise total factor productivity growth and its sources in the Indian FPI during pre- and the post-reform period with the help of the ASI data and also assess the effect of trade reforms related variables on productivity and technical efficiency in the Indian manufacturing sector. They use data envelopment analysis to derive the Malmquist productivity index. They finds that "in the liberalisation period, capital investment across the FPI had significantly increased, after having not been fully utilised in most of the food processing segments in the initial years".

Research Gap

The available literature, therefore, does not explain the causes of growth in enterprise size, and change in productivity levels in informal food processing enterprises in India. The present study is an attempt to fill this hollowness in the literature. This study, therefore, examines the present status and structure of FPI in India and sample state of Bihar, then traces the evolution process of commercialisation of FPI, and examines the changing characteristics of informal food processing enterprises in

India as a whole and Bihar in specific. This study also analyses determinants of growth in enterprise size and productivity levels as well as growth constraints in informal food processing enterprises.

Research problem

Bihar has inherent capacity to develop FPI to address the problem of unemployment through its rich resource base. However, massive seasonal out-migration is evident to job-centric regions of India due to lack of industries within the state. Variety of fruits and vegetables such as mango, litchi, guava, fox nuts (makhana), lemon, jack fruit, potato, tomato, cauliflower, garlic, chili, pea, turmeric, etc. are grown in Bihar in large quantities. However, neither farmers nor wage-labourers are able to take advantage of the large scale agricultural production, majorly on account of inadequate pre- and post-harvest management10 and inadequacy of food processing units. Given the resource abundance, the FPI holds significant potential in the state of Bihar. About 14-15 percent of total fruits and vegetables produced in India comes from Bihar only. In such a resource-abundant state FPI can accelerate economic growth through its strong forward and backward linkages. It can generate ample employment opportunities for skilled, semi-skilled, and unskilled labours and can reduce poverty to a large extent.

Objectives of the study

The present study discusses the status, structure, and constraints of FPI in the context of India in overall and Bihar in specific. Four specific objectives of the present study are as follows:

- To analyse changes in the characteristics and growth of informal food processing enterprises under the globalised trade regime.
- To analyse factors affecting the growth of informal enterprises in FPI.
- To examine the extent and change in productivity of informal food processing enterprises.
- To examine the determinants of change in total factor productivity in the informal FPI particularly in the state of Bihar.

Table 2: Estimated number of FPI in India (1994-95 to 2015-16)

Sector	1994-95	2000-01	2005-06	2010-11	2015-16
Informal	2372926	2774725	2313785	2023185	2274234
Formal	21127	22905	24500	34023	37098
Total	2410178	2799213	2343352	2064309	2311333
Informal as % of Total	99.1	99.2	99.0	98.4	98.4

***Source*:** Estimations based on NSSO unit-level data and ASI various rounds. Note: Figures for formal enterprises show total no. of factories and not the factories in operation alone.

Scope of the study

The present study is devoted to understanding primarily the informal enterprises operating in FPI in India. This includes enterprises engaged in the manufacture/production/processing of food products that produce processed food for the consumption of human or animal. These enterprises process food mainly for the purpose of sale, whether fully or partly. These enterprises may be owned and operated by an individual on proprietorship basis or on partnership basis between members of one or more households or by an institutional body. However, following the NSSO classification of the informal sector, analysis in this study is confined only to 'proprietary' and 'partnership' (individual/household owned) enterprises, which covers more than 99 percent of the sample out of the entire FPI in each of the rounds included in the present study.

Research methodology

Based on the methodologies used, studies on food processing industry in India may be classified into two categories-

a. Theoretical studies,
b. Empirical studies.

Theoretical studies on FPI are quite scarce in India. Empirical studies can be further subdivided into studies based on secondary data, and studies based on primary data or field surveys.

Literature provides enormous data about food security at various levels; however, there appears to be a great lacuna in the data. Infact food security is the widest aspect of nutritional studies applicable at global level, national level and individual level. India comprises of a diverse population with varying food cultures, although volumes of literature presents the food and cultural information, limited literature is available about household food security from the coastal regions of Karnataka. Therefore, the study was taken up to assess the family food security and also to examine the gender based differences in food security. The details of methodologies included in the present study are given under the following heads.

Limitation of the study

Limitation of the present study lies in the fact that only secondary datasets have been used to understand factors that affect the growth of informal food processing enterprise in India as a whole and in the state of Bihar, the NSSO enterprise survey does not provide data on human capital of the enterprises in terms of education or training of owners, workers and managers of the related enterprises, and the NSSO enterprise survey also lacks data on infrastructure related important variables such as availability of warehouses, availability and type of transportation facilities in the proximity, etc. which can play crucial role in upward progression of enterprises in terms of labour-size. Therefore, the results of the determinants of growth in the informal FPI should be interpreted in the light of these constraints.

Conclusions

With the recreation of the MOFPI in 2001, the Government has conferred the FPI a high priority sector by providing many fiscal reliefs and incentives to increase commercialisation and value addition in food processing. Despite this, several constraints hinder the growth of the FPI

in India. With all potentials, the functioning and performance of FPI in India remain under the shadow. Given this background, this study attempts to understand as to what determines the growth of informal enterprises in the FPI in India in overall and Bihar in specific. Changes in the characteristics and growth of informal food processing enterprises in India and Bihar in the globalised trade regime; factors influencing the growth of informal enterprises in FPI in India and the state of Bihar; extent and change in productivity of informal food processing enterprises in India in general and Bihar in particular. Determinants of change in total factor productivity in the informal FPI in the state of Bihar.

The transformation of food processing from a non-market entity to a market entity in India is an evolutionary process, whereas in the Europe and US a sudden rise in demand of processed food by the state for the food needs of the army during wars initiated this transformation. In the pre-independent India, food processing witnessed this transformation initially to cater to the demand of British settlers and administrators and took a long time to reach to the ordinary people when their income level increased. The dominance of informal enterprises in terms of number is visible in all major states in India. However, southern states, including Andhra Pradesh, Tamil Nadu, Maharashtra, Karnataka, and Kerala share more than half of the formal enterprises in FPI in India. And the rest of the formal enterprises are primarily located in West Bengal, Punjab, Uttar Pradesh, Gujarat, and in some other states. The distribution of informal enterprises across major states is also more or less the same. Bihar, being one of the richest states in agriculture and manpower lags behind many states in FPI both in terms of share in the formal as well as in the informal enterprises.

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