

Abstract

Introduction: As per FiBL report 2021, the organic food market is one of the fastest growing sectors in the world, and country-wise, the United States is the largest organic market with a share of 49.50 billion euros. India is in an advantageous position as it has the largest number of organic producers in the world, which is 15,99,010 (Willer et al., 2021a). Although India has the largest organic producers in the world, the size of India's organic food market is less than one percent of the global organic food market.

The North Eastern part of India has tremendous potential for the promotion of organic farming due to its low rates of synthetic fertilizers (12.0 kg/ha) and chemicals (Singh, et al., 2021). The land of this region is almost virgin and crops grown are organic by default. Due to low chemical usage, North East India has huge potential for organic crop production and to turn the region into an "Organic Hub" for the economic development of the region and environmental sustainability (Singh, et al., 2021). Sikkim is the first organic state of India with all its land converted to organic and produces crops in a completely organic manner. Northeast shares around 7.83% of total organic land in India. Among all the states of the northeastern region, Sikkim ranks 6th in India in terms of organic land coverage with 75,475.28 hectares.

Assam has 18,102.94 hectares of organic land, ranks 16th in terms of organic land, and also ranks 16th in terms of organic produce in India with 15,897.00 metric tonnes of various organic commodities for the year 2021-22 (APEDA, 2022). As organic products continue to gain appeal on a global scale, the state of Assam is gearing up to participate in the next phase of the "organic farming green revolution". Many different types of horticulture organic crops are being grown in these regions, from both Government and private/individual initiatives. With proper value addition, these organic products can enter the growing domestic and international organic markets. Two approaches are found for developing and promoting organic agriculture: the demand-side approach and the supply-side approach. The demand-side approach is driven by private agents (Entrepreneurs, Producer Organizations, etc) and the supply-side approach is driven by the government through various schemes and policies. In Assam, organic farming is an emerging sector, and the government is promoting organic farming through three central sector government schemes as given below (*Organic Cultivation / Directorate of Horticulture & Food Processing / Government Of Assam, India, n.d.*):

- i. Parampragat Krishi Vikas Yojana (PKVY)
- ii. Rashtriya Krishi Vikash Yojana- Organic (RKVY- Organic)
- iii. Mission Organic Value Chain Development in North-eastern (MOVCD- Assam)

The organic food market in India is mostly export-driven, and is dominated by non-value-added commodities. Organic fresh produce also requires a highly sophisticated and integrated value chain compared to conventional crops; a strong network structure is inevitable. Value chain analysis is the process of breaking the chain into its constituent parts to have a better understanding of structure and functioning. As per the definition of Food and Agriculture Organization, A value chain can be defined as the full range of activities that are required to bring a product or service from conception through the different phases of production (involving a combination of physical transformation and the input of various producer services), delivery to final customers, and final disposal after use (Hellin & Meijer, 2006). To capture the lucrative organic market, FPC/ FPOs are producing varieties of value-added products from organic produce like jam, jelly, juice, pickle, health mix, etc, with proper branding, packaging, and labeling as per organic standards. The organic food value chain is being strengthened by the corporate sector's ongoing investments in agribusiness, organic farming, and agrotech facilities that comply with NPOP/USDA/EU standards.

Organic products require a sophisticated value chain with strict compliance with organic guidelines like certification, packaging, and use of organic logos. However, the market is dominated by non-value-added organic products. In India, only fourteen articles on the value chain of various agricultural or horticultural commodities were published. Two articles, each are published concerning an impact evaluation study of Mission Organic Value Chain Development Scheme, organic tea in Assam, and organic mission in Sikkim. The study by Arora et al.(2013) focuses on the Global Value Chain (GVC) for organic basmati rice in North India and finds that there is some disjuncture between official standards of GVC and actual practices by farmers. The disjuncture between these two should be nurtured to give farmers more benefits and maintain farm ecology. Sahoo & Sarangi (2018), identified three marketing channels in the value chain of organic turmeric in Odisha. The marketing efficiency of channel II (producer-big trader-processor-retailer-consumer) is found to be higher as compared to channel I (includes small traders) and III (through KASAM), which was 0.67. In the constraints from the farmer's side, the high cost of labour is ranked first, followed by a personal obligation with traders. Studies by Deka & Goswami(2022) and Sandeep & Sharma (2023) focused mainly on the value chain development of organic tea in

Assam and suggested various policy measures to develop the same. Singh et al., (2021) found that organic chili cultivation in north-eastern hilly region is profitable as compared to conventional, and proper technological intervention is required to benefit the farmers. In the value chain of organic large cardamom in Sikkim, inappropriate drying techniques, the absence of marketing infrastructure, and the limited overseas market are major obstacles to exploring the premium organic market(Yadav et al., 2018). Kulkarni & Shahid (2021), after examining and understanding various constraints faced by the farmers, the system maps were created. It is suggested that service design can be a solution to make the whole organic farming system of Sikkim sustainable. V et al. (2021), in their study, discussed opportunities and constraints in organic horticulture in Kerala, and it was found that organic fruits and vegetables have huge potential inside and outside Kerala, and value-addition centers need to be developed to capture the organic market. Value chain mapping of certified organic bananas in Kerala is discussed in the study by Sherief (2021), which finds poor awareness among consumers about PGS certification as a major constraint followed by reduced yields. Only two studies, Das & Roy (2021) and Das & Roy (2023), the author of the present study is found related to value chain analysis of organic pumpkin and organic pineapple in Assam. The study by Ao et al.(2018) discussed the value chain in the marketing of organic pineapple in Nagaland. Products are categorized into four categories according to the harvesting stage which are H1 (fully matured but no color development), H2 (1/8th color development), H3 (1/4th color development), and H4 (1/2 color development). In similar to these, packaging containers are categorized as P1 (Wooden boxes), P2 (Bamboo boxes), P3 (CFB boxes), and P4 (used cartoon boxes). It was found that the H4 categories had the best physiochemical qualities, and P3 (CFB boxes) had higher fiber contents, shelf life, sweetness, and lower post-harvest. The best combination in terms of benefit-cost ratio (BCR) is H1P4.

In the impact evaluation study of MOVCD in Assam, Arunachal Pradesh, and Mizoram by Reddy(2018), discussed the adaptability and scenario of the scheme and suggested various measures for a strong value chain. Various recommendations such as technological upgrades, infrastructure development, capacity building, national-level insurance agency, market and brand development, and timely financial assistance are of utmost importance to strengthen the existing chain. The literature on the value chain analysis of organic crops presented many problems related to the value chain like disjuncture between official and global standards, high labor cost, marketing infrastructures, market linkage, packaging, and labeling as major constraints in the value chain. All the studies focus on specific areas or steps in the value

chain, like mapping of products/services, analysis of marketing margin, opportunities and constraints in the chain, and governance structure of the chain. Except for the two study by auhor of the present, no significant studies have been found related to the value chain analysis of organic crops in Assam. The present study also found that most of the studies were descriptive and conceptual, and constraints identified in their findings are not sufficiently summarised and analysed. Assam and other North Eastern states of India have tremendous potential for the promotion of organic farming, and to turn this region into the organic hub of India. The study on the complete value chain of various organic crops in Assam will give an insight into the existing organic value chain and will be beneficial for policymakers, academicians and researchers. Moreover, the study also draws a comparative analysis of the value chain of government and non - government sponsored organic farms to know the existing value chain and scope further upgradation.

Objectives of the Study

The following are objectives of the study

1. To identify the network structure of the value chain of selected organic crops in Assam.
2. To examine the value addition at each phase by all chain actors.
3. To identify and examine various constraints and opportunities for upgrading the value chain of the selected organic crop.
4. To analyse the governance and institutional features of the value chain.
5. To make a comparative analysis of value chain of government and non-government sponsored organic farms.

(The first four objective are crop specific for five organic crops: organic pineapple, organic pumpkin, organic non-basmati rice, organic red rice and organic turmeric and fifth objective is firm specific).

Methodology

As the organic food sector in India is developing and dominated by non-value-added products (Yes Bank & Ingenus Strategy and Creative Research,2016). A value chain analysis framework for developing countries developed by Trienekens (2011) and Ruben et al. (2007) is considered for this study. In this framework, the value chain is characterized by its network structure, governance structure, identification of constraints & opportunities, and the way

values are added. Based on this approach, the following four parameters are considered for this study.

- i. *Mapping of the value chain:* To clearly understand the flow of products, services, marketing channels, and price spread among various actors.
- ii. *Value chain upgradation:* This involves value addition by various actors and upgrading strategies.
- iii. *Identification of Constraints and Opportunities in Upgrading the Value Chain:* This involves the identification of various constraints related to market information, resources, and infrastructure for upgrading the value chain.
- iv. *Governance structure:* This involves rules and regulations, relationships, linkage, the flow of information, and trust among actors in the chain.

To study the state of the value chain of the organic food industry in Assam, which is still developing and mostly unorganized, the MOVCD scheme provided the basis to select organic crops for the study as it is the major initiative to promote organic farming in Assam. Out of the nine districts of MOVCD-Assam, five districts are purposively selected for the study on the basis of the highest land coverage. The study is descriptive and exploratory and adopted both quantitative and qualitative research designs. For objective 1, 2, 3, and 4, data are collected from various actors in the chain (farmers, commission agents, wholesalers, retailers and FPC) using a structured schedule. The voluntary cooperatoor method is used to select organic farmers and snowball sampling is used to trace commission agents, wholesalers and retailers. A sample of total 375 organic farmers growing five organic crops (75 organic farmers each growing organic pineapple, organic pumpkin, organic non-basmati rice, organic red rice, and organic turmeric) is considered for the study. Two separate schedules are used to collect data from farmers and traders. The schedule consists of various close-ended questions that include dichotomous, multiple-choice, quantitative research, and ranking questions. For objective two, cost of cultivation is computed by using ABC cost measures (Manual on Cost of Cultivation Survey, Ministry of Statistics and Programme Implementation, Government of India). A modified formula described by (Murthy et al., 2007) is used to calculate Farmer's Net Price and Marketing Margin for objective two, Garrett's ranking tool is used to identify various constraints in objective three. The questions in the schedule are divided into five parts: demographic variables, mapping of the value chain, value addition of various stages of the chain, value chain upgradation, and governance structure. For objective five, a case study approach is used to compare the value chain of three non-Government sponsored and five

Government sponsored organic firms. Ten parameters of the agricultural value chain used by Kumari et al.(2021), for comparative analysis of value chain is considered for the present study. A structured schedule is used to collect information related to ten parameters of the value chain.

Results and Discussion

For objective 1, Six marketing channels are identified for organic pineapple and products are mostly sold to wholesalers and directly to the local market/street side by the farmers. Channel (II), (III), and (VI) are partly organic whereas, channels (I), (IV), and (V) are organic as shown in 9. Farmers receive the highest price from direct sales and for sales to wholesalers, farmers receive the lowest price in comparison to other actors. Four marketing channels are identified in the value chain of organic pumpkin. Channels I and IV are organic and channels II and III are partly organic as shown in figure 12. Farmers receive the highest price which is Rs. 15.68 per kg with direct sales followed by sales through commission agents and wholesalers which is Rs. 13.03 and Rs. 10.06 for November. Three marketing channels are identified for the flow of organic non-basmati rice/paddy from farmers to consumers and in all channels, organic paddy is mixed with the conventional chain. Only the value chain channel of organic red rice and organic turmeric are fully organic and products are sold to customers per organic standards.

For objective two, for organic pineapple in channel II, the highest degree of value addition is found with retailers at 12.60%, followed by commission agents and wholesalers at 11.65% and 10.82% respectively. However, the degree of value addition is only determined by the difference in the buying and selling price and without any actual value addition. Marketing efficiency for channels II and III is 1.69 and 0.99, respectively. Marketing efficiency is high in channel II due to the high price realization of farmers and other actors of the chain as pineapples are sold at market price. For organic pumpkin, the marketing efficiency for channel III is 0.50 which is high as compared to channel II i.e., 0.44 as farmers receive high prices from commission agents in channel III. The price spread for channel III is 33.72% which is higher as compared to channel II with 31%. For the organic non-basmati rice value chain, the marketing efficiency for channel I and channel II are found to be 1.01 and 1.26 as farmers received high prices from rice millers as compared to commission agents in the channel I. For organic red rice, the marketing efficiency for channels II and III is found to be 0.93 and 1.29. The price spread for channels II and III is found to be 51.65% and 43.60%.

Lastly, for organic turmeric, the marketing efficiency for channels II and III is found to be 2.56 and 1.65. The price spread for channels II and III is found to be 28.07% and 37.60%. The highest value addition is found in channel III, which is around 42.30%.

For objective three, for the upgradation of the value chain of organic pineapple, farmers rank “policy support”; commission agents rank “lack of marketing network to trade organic products”; wholesalers rank “inadequate and untimely supply of organic products” and retailers rank “buyers trust issue in buying organic products” as a major constraint for upgradation of the organic pineapple value chain. In the organic pumpkin value chain, farmers rank “involvement with farmers’ association/organization”; commission agents rank “lack of marketing network to trade organic products”; wholesalers rank “inadequate and untimely supply of organic products” and retailers rank “lack of market for organic produces” as major constraints in upgrading the chain. For organic non-basmati-rice, farmers rank “lack of market for organic produces”; commission agents rank “lack of infrastructure to handle organic products”; wholesalers rank “lack of marketing network to trade organic products” and retailers rank “lack of market for organic produces” as major constraints in upgrading the value chain. Farmers of organic red rice and organic turmeric rank “low yield during conversion period” and “lack of a market for organic produce” respectively as major constraints in upgrading the chain.

For objective four, it was found that the FPC acts as a center of gravity in the value chain as it controls the information flows, provides the necessary information to regulatory bodies and other chain actors, provides inputs and technical assistance, and is involved in value chain upgradation. In the organic pineapple value chain, the majority i.e., 53.33% of the farmers follow a relational governance structure. For the value chain of organic red rice and organic turmeric, farmers opted for a farmer association-based governance structure which is more structured and formal as compared to the value chain of organic pineapple, organic pumpkin, and organic non-basmati rice. Related to information flow, weak understanding is found in to packaging, labelling, grading, and delivery aspects of the organic products.

For objective five, the mean score of non-govt. sponsored organic firms for all ten parameters is found to be more as compared to govt. sponsored organic firms indicating a better value chain management system for non-govt. sponsored organic firms. In the inter-firm comparison, the overall mean score is found to be highest with JeevAnksh Eco Products Ltd (non-govt. sponsored) which is 4.38 followed by Padumpathar Agro Organic Producer Company Ltd. (PaAOPCL; govt. sponsored) with a mean score of 3.80. The Dol Agro

Organic Producer Company Ltd. (DAOPCL; govt. sponsored) and Nahar Organic (non-govt. sponsored) ranked third and fourth among all the firms with a mean score of 3.46 and 3.42 respectively. In the parameters-wise comparison, out of ten parameters, JeevAnksh Eco Products Ltd has the highest mean score in seven parameters (technology, mean score: 4.80; information, mean score: 4.60; diversified products, mean score: 4.60; awareness and knowledge, mean score: 4.80; capacity building, mean score: 4.20; pricing, mean score: 4.80 and logistics drivers, mean score: 3.60) indicating a strong and efficient value chain as compared to other organic firms. However, few govt. sponsored organic firms particularly PaAOPCL and DAOPCL are identified with strong value chain structures ranked as second and fourth in the overall ranking among all the organic firms considered for the study.

Implication of the Study

The managerial implications and contribution of the study are as follows:

- a) The study observed the various aspects of the value chain of five organic crops and found that the value chain is in initial stage. The findings will help the policy makers and stakeholders to develop network structure, improve value addition of organic produces and to build an efficient governance structure to develop end-to-end organic value chain.
- b) The study will be helpful to government to know the current condition of organic crops value chain of MOVCD-NER scheme. The same will help the Government to frame or changes the existing policies for a strong value chain.
- c) India with the highest number of organic producers, shares less than one percent of global organic food market, indicates lack of value-added organic product. The present study discussed the existing value chain of organic crops of Assam and found that value chain of organic pineapples, organic pumpkin and organic non-basmati rice identified with non-value adding and necessary non-value adding activities. The findings of this study will help the concerned FPCs, Horticulture Dept. and policy makers to improve the value processing activities.
- d) The present study found that the organic products from Assam is yet to establish a regular market. The organic commodity (fresh, semi-processed, and processed) from Assam shall explore the B2B market with organic key players by which farmers and FPC can fetch premium price for the organic produces.

e) In the inter-firm comparison of value chain of organic firms, few govt. sponsored organic firms are identified with strong value chain (PaAOPCL: rank 2nd and DAOPCL: rank 4th) which indicates that govt. sponsored firms are performing well as per non-govt. sponsored organic firms. However, the score of Puthimari Agro Organic Producer Co. Ltd. is found to be lowest which is 1.34, and needs adequate policy measures to revive the same.

e) The study will help the academicians and researchers to add new dimension to the existing literature of organic food sector and will encourage further research.