

# Constraints of agripreneurs engaged in value addition of jackfruit in Kerala, India

## ABSTRACT

**Aims:** India is a leading producer of jackfruit in the world with Kerala being the top-producing state. Jackfruit is the state fruit of Kerala and has recently been recognized around the globe for its health benefits. Even then, jackfruit which is abundantly found in Kerala is not used to its full potential and is rotting in the trees which could be reduced by the process of value addition. Many of the agripreneurs are already in this sector processing jackfruit and its value-added products but still, the fruit is underutilized. Given this, the study identifies the constraints faced by the agripreneurs engaged in the value addition of jackfruit in Kerala. **By addressing these, initiatives can be put forward to harness these hurdles and to make a conducive environment for the agripreneurs engaged in the value addition of jackfruit in Kerala.**

**Methodology:** **The data for the study were purposively collected from 39 agripreneurs engaged in the value addition of Jackfruit. The selected agripreneurs were the proprietors of jackfruit processing units registered under the DICs in Kerala and were operating the unit at the time of the survey.**

**Results:** According to the study, the main financial problem that agripreneurs encountered was the inability to purchase modern machinery. The primary barrier to marketing was limited market accessibility, while the cost and shortage of competent labour hindered technological innovation. Few of the agripreneurs faced legal restrictions. A lack of knowledge and the complexity of the licensing procedures were the biggest concerns for them. The seasonality and decreased availability of quality jackfruit driven by climate change caused additional difficulties for the agripreneurs involved in jackfruit value addition in Kerala.

**Conclusion:** The limitations of agripreneurs can be abridged with the right help from government institutions, such as through the organizing of exhibitions, knowledge enhancement initiatives, hand-holding support, and financial aid. Kerala may see a rise in income and job possibilities as a result.

**Keywords:** Agripreneur, Jackfruit, Value addition, Garrett's ranking, Constraints

## INTRODUCTION

Jackfruit (*Artocarpus heterophyllus*) is a tropical fruit said to be the largest tree-borne fruit in the world, and it has recently gained admiration and recognition. India is a largest producer of this miracle fruit with a production of 32,91,500 MT in the year 2023-24 according to MoA&FW, GoI. Out of this total

production, around 43 percent is being produced in the state of Kerala (14,11,930 MT) making it the top-producing state of jackfruit. Also, the government of Kerala declared jackfruit as its state fruit in 2018 recognizing the potential and nutrition of the fruit. The jackfruit is a multipurpose fruit that can be used for producing industrial, medical, food, fuel, and fodder products. However, the fruit is underutilized and is being squandered in the fields. This can be abridged to an extent by means of value addition. Also, through value addition, farmers and processors could earn extra revenue by making it available even during off-season and research shows that jackfruit with proper value addition generates over 95 percent more revenue than it is sold raw (Deepa and Murthy, 2018).

Kerala has a plethora of this wonder fruit but the market is still unorganized despite the fruit's many benefits and huge market potential. Agripreneurs in the jackfruit processing sector encounter numerous challenges that keep the sector from realizing its full potential for value addition. Considering these, the study was conducted to identify the bottlenecks of agripreneurs engaged in the value addition of jackfruit.

## LITERATURE REVIEW

According to **Kumar (2019)**, a number of crucial setbacks, such as capital intensity, the year-round shortage of raw materials, and challenging infrastructure, could impede the expansion of India's food processing sector if they are not addressed sooner.

**Reddy et al. (2019)** in their study identified the major constraint in the jack-growing belt as the lack of awareness and guidance on value addition and export-related aspects and suggested the establishment of a jack promotion council to provide training to the required community.

**Chikkanna (2021)** observed a large amount of jackfruit being wasted and the employment and production of revenue for small food producers from it. He identified the primary impediment as the disorganized supply chain raised from the challenge of transporting jackfruit to the processing facilities.

In her research, **Ruma (2021)** determined that the two main issues with jackfruit as the high cost of inputs and the inferior storage facilities. To boost jackfruit's economic potential, the study suggested value addition and standard post-harvest treatment practices.

**Swathy and Anitha (2024)** in their study looked into issues of raw materials, marketing, and financing and determined financing to be a significant challenge among the industries of value-added jackfruit products in Kerala.

## METHODOLOGY

For the study, a total of 39 agripreneurs were selected purposively from the registered jackfruit-based processing units in Kerala. The jackfruit processing units that were operational at the time of the survey were only selected for the study. The sample included 25 micro units and 14 small units. A structured questionnaire was used for collecting the data and the collected data was analysed using Garrett's ranking technique.

The agripreneurs engaged in the value addition of jackfruit were asked to rank the constraints faced by them in various aspects such as finance, market, technology, legal, and those specific to the crop. These ranks were converted to percent position which was then converted to scores with the help of Garrett's table.

$Percent\ position = \frac{100(R_{ij}-0.5)}{N_j}$  where,  $R_{ij}$  = rank given for the  $i^{th}$  variable by  $j^{th}$  respondent and  $N_j$  = number of variables ranked by  $j$  respondents.

The constraint with the highest score was then considered the major constraint.

## RESULTS AND DISCUSSIONS

### 3.1. Profile of jackfruit processing units

Among the agripreneurs selected for the study, 64 percent were operating micro units and 36 percent were operating small units for processing jackfruit and its value-added products.

**Table 1. Profile of jackfruit processing units**

Type	Frequency	Percentage
Micro unit	25	64
Small unit	14	36
<b>Total</b>	<b>39</b>	<b>100</b>

**Source:** Primary data

The relatively large number of micro units was because some of the units were started by women agripreneurs who wanted to earn an income. They started the unit as a micro-unit at their own home so that they could take care of their family as well while being employed.

### 3.2. Financial constraints

Most businesses are forced to deal with financial restraints for a variety of reasons. Among the agripreneurs surveyed, 77 percent reported having financial constraints.

**Table 2. Financial constraints**

S. No.	Financial constraints	Micro ( $n = 20$ ) <sup>*</sup>		Small ( $n = 10$ ) <sup>**</sup>	
		Score	Rank	Score	Rank
1.	Difficulty in accessing loans	1043	4	440	5
2.	High interest rates on loans	1053	3	466	4
3.	Insufficiency of amount	1195	2	605	1

4.	Shortages in working capital	1026	5	597	2
5.	Delayed payments from buyers	460	6	310	6
6.	Inability to invest in modern equipment	1223	1	582	3

**Source:** Primary data

**Note:** \*5 micro units had no financial constraints

\*\*4 small units had no financial constraints

The inability to invest in modern equipment was one of the prime constraints due to financial obligations in the units engaged in the value addition of jackfruit. To produce quality products, they required good equipment because manual labour reduced the processing of jackfruits as alleged by the agripreneurs. With years passing by, the machines and equipment that are already in use become obsolete affecting the quality of the products. To get past this, a huge investment was required which seemed to be a significant limitation in the case of the micro units operating in Kerala. Therefore, this was identified as the foremost financial problem they faced. The insufficiency in the amount was ranked second in micro units as they found the amount obtained as loans often failed to meet all the requirements of the unit. The high interest rates on loans were then ranked by the micro-units.

In the case of the small processing units engaged in the value addition of jackfruit, the major constraint was the insufficiency of the amount followed by the shortages in working capital and then the inability to invest in modern equipment. Previous studies found that financial institutions were not providing the MSMEs with a satisfactory amount of loans (Ali and Husain, 2014). These insufficiencies in the finance of the units lead them to lesser working capital and also make them incompetent in investing in the upgradation of superseded equipment they were using.

The delayed payment from the buyers was ranked last indicating the prompt payment made by the buyers. However, some of the agripreneurs claimed that the payments were delayed during the COVID-19 pandemic.

### 3.3. Market constraints

Despite being widely available in Kerala, only a small number of processing facilities commercially produce jackfruit (Mittal et al., 2018), for a variety of reasons and market constraints are one such reason limiting the commerciality of the fruit. Seventy-two percent of the agripreneurs claimed they had constraints in marketing their produce.

**Table 3. Market constraints**

S. No.	Market constraints	Micro ( <i>n</i> = 18) *		Small ( <i>n</i> = 10) **	
		Score	Rank	Score	Rank
1.	Limited market access	1149	1	626	2
2.	Barriers to the international market	801	5	477	4
3.	High competition	923	4	555	3

4.	Inadequate marketing knowledge	937	3	342	5
5.	Lack of branding and promotion	569	6	281	6
6.	Seasonal fluctuations in demand	1021	2	719	1

**Source:** Primary data

**Note:** \*7 micro units had no market constraints

\*\*4 small units had no market constraints

Limited market access was the most prevalent marketing limitation that agripreneurs encountered. Many of them relied on melas and exhibitions, and the majority promoted their goods at local marketplaces. Exhibition-centred agripreneurs claimed that it is quite challenging for them because the majority of exhibitions conducted by government organizations are held just once or twice a year. They have to incur a high price to attend exhibitions and trade shows organized by private agencies, which is beyond their affordability. With the profligacy in the conduct of the jackfruit fest and similar events, the agripreneurs were strained in getting into the consumers.

Among all the units, seasonal variations in demand were likewise a highly scored limitation. Although there is a local market for jackfruit goods, agripreneurs say that demand vacillates. Nonetheless, there is a great deal of opportunity for exporting. However, exporting the products requires more legal requirements and regular, high production, which was difficult for most agripreneurs.

Another limitation that plagued the units, especially small units, was the intense competition in the market. Speaking with the agripreneurs of these units, they pointed out that new businesses have been popping up all around, particularly after COVID-19 opened the door for intense competition in the sector. Some of the units' profits were retracted due to this intense competition.

According to the agripreneurs of micro-units, their inexperience with marketing has prevented them from reaching a larger audience. Previous studies have shown that despite producing products with significant market potential, the majority of micro-enterprises are unable to implement efficient marketing plans and respond quickly to changing market conditions because they lack an understanding of contemporary business and marketing (Rahman, 2017).

### 3.4. Technological constraints

Quality improvement and technology innovation are two important variables that have evolved recently to make the MSME industry more competitive (Son, 2023). So, it is imperative that the processing units improve their present technology in order to stay competitive in the market. Out of the agripreneurs taken for the survey, 75 percent encountered technological constraints.

**Table 4. Technological constraints**

S. No.	Technological constraints	Micro (n = 21) *		Small (n = 8) **	
		Score	Rank	Score	Rank
1.	Inadequate processing technology	670	5	245	5

2.	High cost of purchase of technology	1355	1	460	2
3.	Difficulty in technology adoption	1040	3	345	4
4.	Lack of skilled labour	1180	2	570	1
5.	Limited access to technical knowledge	1005	4	380	3

**Source:** Primary data

**Note:** \*4 micro units had no technological constraints

\*\*6 small units had no technological constraints

The high cost of purchasing technology was the main issue for a micro-unit involved in jackfruit value addition. These units had to pay a certain sum to the relevant institutions in order to purchase the technologies that they provided, which occasionally becomes a burden for the unit and prevents it from using these technologies that would have otherwise improved its production efficiency. The second limitation imposed by micro-units is that, even if they can afford to purchase the necessary equipment, they still need competent workers to operate it. According to studies, the use of technology speeds up the expansion and enhances the operations of value addition in MSMEs (Cunningham et al., 2023). However, in the context of micro-units involved in jackfruit value addition, technology adoption is a hurdle. The lack of skilled labour and the cost of technology was a problem for the small units as well.

### 3.5. Legal constraints

The vast majority of the units questioned claim to have no difficulties in the legalities. Only 31 percent of the agripreneurs faced legal constraints.

**Table 5. Legal constraints**

S. No.	Legal constraints	Micro (n = 9) *		Small (n = 3) **	
		Score	Rank	Score	Rank
1.	Complex licensing procedures	524	3	225	1
2.	High compliance costs	581	2	140	4
3.	Frequent regulatory changes	333	5	75	5
4.	Inadequate legal support	462	4	160	2
5.	Limited awareness of regulations	593	1	150	3

**Source:** Primary data

**Note:** \*16 micro units had no legal constraints

\*\*11 small units had no legal constraints

Micro units were less aware of the legal requirements that must be met in order to operate a processing unit. Some of them also mentioned that, despite their desire to export, they are limited to the local market due to their inexperience with export regulations. After then, there was the expense

of meeting the legal requirements. The frequent regulatory changes were ranked as the constraint that was least influenced. The other thing that worried them was the intricacy of the licensing processes.

The convoluted nature of the licensing processes was the main issue for agripreneurs of small units. According to several of the agripreneurs who have been operating for more than five years, the licensing processes used to be draining but have now gotten easier. Inadequate institutional support for legal concerns was the second-ranked issue. Furthermore, according to a few of them, the Kudumbashree mission-sponsored units had greater government support and recognition than those that were founded on their own.

### 3.6. Crop-specific constraints

In agro-processing, crop-specific limitations are apparent due to the unique traits of agricultural products, such as seasonality and perishability. Eighty-five percent of the agripreneurs faced crop-specific constraints.

**Table 6. Crop-specific constraints**

S. No.	Crop-specific constraints	Micro ( <i>n</i> = 22) *		Small ( <i>n</i> = 11) **	
		Score	Rank	Score	Rank
1.	Seasonal availability	1310	2	735	1
2.	Reduced availability of quality jackfruit due to climatic changes	1507	1	690	2
3.	Perishability of jackfruit	1270	3	555	3
4.	Varietal differences	911	5	360	5
5.	High transportation cost	1096	4	410	4

**Source:** Primary data

**Note:** \*3 micro units had no crop-specific constraints

\*\*3 small units had no crop-specific constraints

The scarcity of good-quality jackfruit brought on by climate change was the biggest issue faced by the agripreneurs. This might be as said in previous studies that climate change has affected normal growth and development, floral behaviour, fruit production quality, and the prevalence of illnesses and pests (Chawla et al., 2021). Agripreneurs and jackfruit farmers have also observed a delay in flowering, even though jackfruit is more resistant to the effects of climate change (Weintraub et al., 2022). The agripreneurs blamed the state's erratic rainfall pattern for the delay in blossoming (Martin, 2024). This unpredictable downpour also made it difficult for them to get the fruit off the trees in time, and the fruit's quality suffered because of water leaking inside of it.

The fruit's seasonal availability also placed restrictions on the units. Owing to seasonality, several of the agripreneurs were only processing jackfruit value-added products during the season. The primary cause of this was the insufficient infrastructure to preserve the large fruits from spoilage. Fruit perishability was also an issue for both micro and small units. Jackfruit harvested during superfluity is wasted because of its inherent compositional and textural characteristics, which make it very perishable and unsuitable for long-term preservation (Mondal et al., 2013). Large refrigerators to keep the fruit from spoiling were out of reach for many of the processors which catalysed this limitation.

## CONCLUSION

The jackfruit is a fruit of wonders that has enormous potential to bring in revenues for the state. The major financial constraint of the agripreneurs in this sector was their inability to invest in modern equipment. Limited market accessibility was the main obstacle to marketing, while technological advancement was hampered by their cost and lack of skilled workers. Their foremost legal concerns were the intricacy of the licensing requirements and a lack of understanding. The agripreneurs also faced challenges as a result of climate change-induced decreasing availability of high-quality jackfruit and the seasonality of the crop.

The agripreneurs involved in its value addition had multiple hurdles that stalled their operations and prevented them from consistently turning a profit. But even if it hindered their ability to operate smoothly, the majority of the agripreneurs felt poised about taking on these impediments. However, the difficulties faced by agripreneurs can be allayed to an extent with the right assistance from the various government agencies, such as steering more exhibitions and trade fairs, offering funding for the creation of innovative jackfruit products, conducting more knowledge-enhancement programs such as training to enhance their technical skills in processing jackfruit and its value-added products, and offering hand holding assistance to the agripreneurs. And with this, the revenue and job opportunities might potentially be increased in Kerala.

## Disclaimer (Artificial intelligence)

Author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc.) and text-to-image generators have been used during the writing or editing of manuscripts.

## REFERENCES

1. Ali, A. and Husain, F. MSMEs in India: Problems, solutions and prospectus in present scenario. Int. J. Engg. Manag. Sci. 2014. 5 (2): 109-115. Available: [https://www.researchgate.net/publication/314508273\\_MSMEs\\_IN\\_INDIA\\_PROBLEMS\\_SOLUTIONS\\_AND\\_PROSPECTUS\\_IN\\_PRESENT\\_SCENARIO](https://www.researchgate.net/publication/314508273_MSMEs_IN_INDIA_PROBLEMS_SOLUTIONS_AND_PROSPECTUS_IN_PRESENT_SCENARIO)
2. Chawla, R., Mohit, R., Sadawarti, R. K. and Sheokand, A. Impact of climate change on fruit production and various approaches to mitigate these impacts. Pharma Innov. 2021. 10 (3): 564-571. Available: <https://www.thepharmajournal.com/archives/2021/vol10issue3/PartH/10-2-96-689.pdf>

3. Chikkanna, G. S. Technical facts on the current scenario and future potential of jackfruit processing. Res. Biotica. 2021. 3(2): 94-106. Available: <https://www.biospub.com/index.php/resbio/article/download/841/1063>
4. Cunningham, J. A., Damij, N., Modic, D. and Olan, F. MSME technology adoption, entrepreneurial mindset and value creation: a configurational approach. J. Technol. Transf. 2023. 48: 1574 – 1598. Available: <https://doi.org/10.1007/s10961-023-10022-0>
5. Deepa, M.P.M. and Murthy, P.S. Economic analysis of direct marketing of jackfruit through institutional intervention in Bengaluru rural district. Indian j. Agric. Mark. 2018. 32(3s): 129-135.
6. GOI [Government of India]. 2024. Ministry of Agriculture and Farmers Welfare, Govt. of India. [online]. Available: <https://agriwelfare.gov.in/en/who> [25 October 2024].
7. Kumar, N. Major constraints of Indian food processing industry: a study. EPRA Int. J. Econ. Bus. Rev. 2019. 7 (6): 69-71. Available: <https://eprajournals.com/IJES/article/7779/download>
8. Martin, K. A. Processors perceive shortage of jackfruit, blame unstable rainfall for triggering flowering delay. The Hindu. 20 Feb. 2024. Available: <https://www.thehindu.com/news/cities/Kochi/processors-perceive-shortage-of-jackfruit-blame-unstable-rainfall-for-triggering-flowering-delay/article67867133.ece>
9. Mittal, R., Sankaran, K. and Achar, A. P. Research project on market feasibility study for jackfruit value added products. National Institute of Agricultural Marketing, Jaipur; 2018: 87p. Available: <https://ccsniam.gov.in/images/pdfs/Market-Feasibility-Study-For-Jackfruit-Value-Added-Products20.pdf>
10. Rahman, R. Micro-enterprises – Marketing skills and strategies. In: Shyam, S. S. and Athira, N. R. editors. Theeranaipunya III: Scaling up Fisher Youth Domains in Cognitive Development. Manual. Central Marine Fisheries Research Institute, Kochi; 2017: 237 – 242. Available: [http://eprints.cmfri.org.in/12227/1/Ramees%20Rahman\\_Theeranaipunya-3\\_2017.pdf](http://eprints.cmfri.org.in/12227/1/Ramees%20Rahman_Theeranaipunya-3_2017.pdf)
11. Reddy, C. I., Prabakar, C., Devi, S. K., Ponnarasi, T. and Peter, S. Y. An economic analysis on jackfruit production and marketing in Cuddalore district of Tamil Nadu, India. Plant Arch. 2019. 19 (2): 2801-2809.
12. Ruma, F. J. Agroeconomic performance of jackfruit based agroforestry systems and value-added product of jackfruit in Netrokona district. M. Sc. thesis, Sher-E-Bangla Agricultural University, Dhakla. 2021. 70p. Available: <http://www.saulibrary.edu.bd/daatj/public/uploads/Done%2014-05830.pdf>
13. Son, D. The impact of technology on MSME sector in India. EPRA Int. J. Environ. Econ. Commer. Educ. Manag. 2023. 10 (7): 64-68. Available: <https://eprajournals.com/IJCM/article/11068>
14. Swathy, K. S. and Anitha, S. Roadblocks and remedies for jackfruit value addition in Kerala. SSRN Electron. J. 2024. Available: <https://ssrn.com/abstract=4673618>.

15. Weintraub, K., Rodrigues, C. and Tabai, K. Perspectives on sustainable management of jackfruit trees for food consumption in Rio de Janeiro, Brazil. Environ. Sci. Proc. 2022. 15 (1): 1-8. Available: <https://doi.org/10.3390/environsciproc2022015008>

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