



32 In recent years, it has gained increasing attention as a climate-resilient crop suitable for marginal  
33 and hilly regions due to its low input requirements and ability to thrive under diverse agro-  
34 climatic conditions. India is one of the leading producers of jackfruit, with Tamil Nadu  
35 contributing significantly to its cultivation, particularly in regions such as the Kolli Hills of  
36 Namakkal district. The fruit is rich in carbohydrates, vitamins, and dietary fiber, making it an  
37 important component of food security and nutrition (Morton, 1987; Swami et al., 2012,  
38 Rajasekar et al.,2025). Moreover, jackfruit has witnessed a surge in demand in both domestic and  
39 international markets due to its use in processed foods and as a plant-based meat alternative  
40 (Ranasinghe et al., 2019; FAO, 2020, Rajasekar &Sivagnanam, 2025). Despite its importance,  
41 jackfruit remains an underutilized crop in many parts of India, largely due to inadequate  
42 marketing infrastructure and limited value addition practices (Hossain, 2014; Singh & Singh,  
43 2018).

44 The Kolli Hills region, located in the Eastern Ghats, provides a unique ecological setting  
45 that supports jackfruit cultivation as a major livelihood activity among small and marginal  
46 farmers. The region's terrain and climatic conditions favor the growth of jackfruit trees, which  
47 require minimal maintenance compared to other commercial crops. However, the economic  
48 potential of jackfruit cultivation in this area is influenced by various factors, including  
49 production costs, yield variability, labor availability, and market access (Rajasekar  
50 &Sivagnanam, 2025). Previous studies have highlighted that while jackfruit cultivation offers  
51 high returns relative to investment, farmers often face challenges such as post-harvest losses,  
52 lack of storage facilities, and price instability (Reddy et al., 2016; Kumar et al., 2020).  
53 Additionally, the dominance of intermediaries in the marketing chain reduces farmers'  
54 bargaining power and limits their income realization (Birthal et al., 2015; Chand, 2017). These  
55 challenges necessitate a comprehensive analysis of both production economics and marketing  
56 systems to understand the true potential of jackfruit cultivation in the region.

57 In this context, the present study aims to analyze the economic aspects of jackfruit  
58 cultivation and examine the existing marketing channels in the Kolli Hills of Namakkal district.  
59 By focusing on cost structures, profitability, and price spread across different market  
60 intermediaries, the study seeks to identify key constraints and opportunities in the value chain.  
61 Understanding these dynamics is essential for formulating effective policy interventions that can  
62 enhance farmers' income and promote sustainable agricultural practices. The study also

63 contributes to the broader discourse on agricultural diversification and rural development by  
64 emphasizing the role of underutilized crops in improving livelihoods (Pingali, 2012;  
65 Sivagnanam& Rajasekar, 2025; Dev, 2018). Furthermore, strengthening market linkages,  
66 encouraging farmer-producer organizations, and promoting value addition are critical strategies  
67 for improving the competitiveness of jackfruit in both local and global markets (World Bank,  
68 2019; NABARD, 2021). Hence, this research provides valuable insights into the economic  
69 viability and market integration of jackfruit cultivation in a geographically unique and  
70 economically significant region.

### 71 **Objectives of the Study**

- 72 1. To analyze the cost and return structure of jackfruit cultivation in the Kolli Hills of  
73 Namakkal District.
- 74 2. To examine the profitability and economic viability of jackfruit production among farmers  
75 in the study area.
- 76 3. To identify and evaluate the existing marketing channels and price spread in the jackfruit  
77 supply chain.
- 78 4. To assess the major constraints faced by farmers in cultivation and marketing, and suggest  
79 suitable measures for improvement.

### 80 **Review of the Literature**

81 Arathi and Ushadevi (2024) examined consumer behavior toward jackfruit products in  
82 Kerala and found increasing demand due to nutritional and environmental benefits. The study  
83 highlights the growing commercialization of jackfruit-based products in urban markets. It also  
84 emphasizes the role of awareness in influencing purchasing decisions. The authors conclude that  
85 value addition significantly enhances market potential.

86 Singh et al. (2025) reviewed the nutritional and functional properties of jackfruit seeds,  
87 emphasizing their potential as value-added food ingredients. The study identifies high levels of  
88 proteins, fiber, and bioactive compounds. It also explores their applications in nutraceutical and  
89 pharmaceutical industries. The findings suggest reducing waste through seed utilization.

90 Manianga et al. (2024) explored the role of jackfruit seeds as a sustainable food source in  
91 rural India. The study highlights their importance in food security and subsistence economies. It

92 also emphasizes traditional knowledge systems in utilizing underexploited crops. The research  
93 supports integrating jackfruit into sustainable agricultural practices.

94 Tripathy (2024) discussed jackfruit as a globally emerging fruit with economic and  
95 cultural significance. The study highlights its versatility in food processing and international  
96 markets. It emphasizes its role as a plant-based meat alternative. The paper concludes that  
97 jackfruit has strong export and commercial potential.

98 Parveen et al. (2024) reviewed the multifaceted uses of jackfruit in food, medicine, and  
99 industry. The study highlights its nutritional richness and adaptability. It also identifies  
100 opportunities in value-added products such as chips and flour. The authors stress the economic  
101 importance of full plant utilization.

102 Reddy et al. (2019) conducted an economic analysis of jackfruit production and  
103 marketing in Tamil Nadu. The study evaluated cost structures, income levels, and price spread  
104 across marketing channels. It identified inefficiencies due to intermediaries. The findings  
105 highlight the need for improved marketing systems.

106 Gowda (2026) observed a significant rise in jackfruit prices due to increasing urban  
107 demand and value addition. The study notes a shift from whole fruit sales to processed bulb  
108 marketing. It highlights improved profitability for farmers. The research underscores the  
109 importance of market transformation in enhancing income.

110 Kumar et al. (2023) analyzed the constraints in jackfruit cultivation and marketing in  
111 India. The study identified issues such as post-harvest losses and inadequate storage. It  
112 emphasized the role of infrastructure development. The authors recommend strengthening supply  
113 chains for better returns.

114 Birthal et al. (2022) studied agricultural commercialization and market linkages in India.  
115 The research highlights the dominance of intermediaries in horticultural markets. It suggests that  
116 farmers receive a smaller share of consumer prices. The study recommends institutional reforms  
117 for better efficiency.

118 Chand (2021) examined price policies and agricultural marketing systems in India. The  
119 study highlights price volatility as a major challenge for farmers. It emphasizes the need for  
120 market reforms and digital platforms. The findings are relevant to perishable commodities like  
121 jackfruit.

122 The FAO (2020) report highlights the global importance of underutilized crops like  
123 jackfruit. It emphasizes their role in food security and climate resilience. The report encourages  
124 diversification of agriculture. It also stresses value chain development for improving farmer  
125 income.

126 NABARD (2021) focused on promoting farmer-producer organizations and rural  
127 agribusiness. The study highlights the role of collective marketing in improving price realization.  
128 It also emphasizes access to credit and infrastructure. The findings support strengthening  
129 jackfruit value chains.

130

### 131 **Statement of the Problem**

132 Jackfruit cultivation has gained increasing importance as a sustainable and economically  
133 viable horticultural activity in hilly regions such as the Kolli Hills of Namakkal District, Tamil  
134 Nadu. Despite its adaptability, low input requirements, and rising market demand, the crop  
135 remains largely underutilized in terms of its full economic potential. Farmers in the region  
136 continue to rely on traditional cultivation practices with limited access to scientific inputs,  
137 resulting in variability in yield and quality. Moreover, the absence of proper post-harvest  
138 management, storage facilities, and processing units leads to significant losses, thereby affecting  
139 overall profitability. A major concern lies in the inefficient marketing system associated with  
140 jackfruit. Farmers often depend on intermediaries for the sale of their produce, which reduces  
141 their bargaining power and limits their share in the final consumer price. Price fluctuations, lack  
142 of real-time market information, and inadequate access to organized markets further exacerbate  
143 the problem. In addition, poor transportation infrastructure in hilly terrains increases marketing  
144 costs and reduces market efficiency. These constraints collectively hinder farmers from realizing  
145 fair and stable income from jackfruit cultivation. Although jackfruit has strong potential for  
146 value addition and export opportunities, there is a lack of institutional support, awareness, and  
147 investment in developing an integrated value chain. Farmer-producer organizations and  
148 cooperative marketing systems are not sufficiently developed to empower small and marginal  
149 farmers. In this context, there is a need for a comprehensive economic analysis of jackfruit  
150 cultivation and its marketing practices to identify cost structures, profitability levels, and  
151 inefficiencies in the supply chain. Addressing these issues is essential for improving farmer

152 income, reducing post-harvest losses, and promoting jackfruit as a sustainable livelihood option  
153 in the region.

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155

## 156 **Scope of the Study**

157 The present study focuses on analyzing the economic aspects of jackfruit cultivation and  
158 its marketing practices in the Kolli Hills of Namakkal District, Tamil Nadu. It covers key  
159 dimensions such as cost of cultivation, yield patterns, profitability, and benefit–cost analysis  
160 among small and marginal farmers. The study also examines existing marketing channels, price  
161 spread, and the role of intermediaries in determining farmers’ income. Further, it explores the  
162 constraints related to production, post-harvest management, transportation, and market access.  
163 The scope extends to identifying opportunities for value addition, improved market linkages, and  
164 institutional support mechanisms such as farmer-producer organizations and cooperative  
165 marketing. However, the study is geographically limited to the Kolli Hills region and is based on  
166 primary data collected from selected farmers, which may restrict broader generalization. Despite  
167 these limitations, the study provides valuable insights into enhancing the economic viability and  
168 sustainability of jackfruit cultivation in similar hilly and resource-constrained regions.

169

## 170 **Methodology**

171 The present study adopts a descriptive and analytical research design to examine the  
172 economic aspects of jackfruit cultivation and marketing in the Kolli Hills of Namakkal District,  
173 Tamil Nadu. The study is primarily based on primary data collected from farmers engaged in  
174 jackfruit cultivation. A well-structured and pre-tested interview schedule was used to gather  
175 relevant information on cost of cultivation, yield, income, and marketing practices. Secondary  
176 data were also collected from government reports, journals, and institutional publications to  
177 support the analysis.

178 A multi-stage sampling technique was employed for the selection of respondents. In the  
179 first stage, Namakkal District was purposively selected due to its prominence in jackfruit  
180 cultivation. In the second stage, Kolli Hills was chosen based on its geographical suitability and  
181 concentration of jackfruit growers. In the third stage, selected villages within Kolli Hills were  
182 identified using stratified sampling based on the extent of cultivation. Finally, 316 jackfruit

183 farmers were selected using simple random sampling to ensure representativeness and reduce  
184 selection bias.

185 For data analysis, both descriptive and inferential statistical tools were used. Cost and  
186 return analysis, including the Benefit–Cost Ratio (BCR), was applied to evaluate the economic  
187 viability of jackfruit cultivation. Percentage analysis and mean values were used to describe the  
188 socio-economic characteristics and cost components. To examine relationships and test  
189 hypotheses, correlation analysis **and** multiple regression analysis were employed to identify the  
190 factors influencing profitability. Additionally, ANOVA (Analysis of Variance) was used to test  
191 differences in income levels across different categories of farmers. The statistical significance of  
192 the results was tested at appropriate levels (1% and 5%). The analysis was carried out using  
193 statistical software to ensure accuracy and reliability of the findings.

194

## 195 **Data Analysis and Interpretation**

196

**Table 1: Distribution of Respondents by Farm Size**

<b>Farm Size Category</b>	<b>Number of Respondents</b>	<b>Percentage (%)</b>
Marginal (<1 ha)	142	44.94
Small (1–2 ha)	108	34.18
Medium (2–4 ha)	46	14.56
Large (>4 ha)	20	6.32
<b>Total</b>	<b>316</b>	<b>100</b>

197

198 The distribution shows that a majority (79.12%) of jackfruit farmers belong to marginal  
199 and small categories, indicating that cultivation is predominantly practiced by resource-  
200 constrained farmers. This highlights the importance of jackfruit as a livelihood-supporting crop  
201 in the region.

202

**Table 2: Average Cost of Jackfruit Cultivation per Acre (₹)**

<b>Cost Component</b>	<b>Amount (₹)</b>	<b>Percentage (%)</b>
Labour Cost	18,500	37.00
Transportation	12,000	24.00
Fertilizers & Inputs	8,500	17.00
Maintenance	6,000	12.00
Miscellaneous	5,000	10.00

Cost Component	Amount (₹)	Percentage (%)
<b>Total Cost</b>	<b>50,000</b>	<b>100</b>

203  
204 The table indicates that labour cost constitutes the highest share (37%), followed by  
205 transportation (24%). This reflects the challenges posed by hilly terrain, increasing operational  
206 costs and affecting overall profitability.

207 **Table 3: Returns and Benefit–Cost Ratio**

Particulars	Value (₹)
Average Yield (fruits/acre)	6,500
Average Selling Price (₹/fruit)	12
Gross Income	78,000
Total Cost	50,000
Net Income	28,000
<b>BCR</b>	<b>1.56</b>

208  
209 The data indicates that jackfruit cultivation generates a gross income of ₹78,000 per acre  
210 against a total cost of ₹50,000, resulting in a net income of ₹28,000. The average yield of 6,500  
211 fruits per acre, combined with a selling price of ₹12 per fruit, reflects stable production and  
212 market demand. The Benefit–Cost Ratio (1.56) confirms that the enterprise is economically  
213 viable and yields positive returns. However, the margin of profit suggests moderate earnings,  
214 indicating scope for improvement through better pricing and cost reduction. Overall, the findings  
215 highlight that while jackfruit cultivation ensures income stability, enhancing productivity and  
216 market efficiency can further increase profitability.

217 **Table 4: Marketing Channels Used by Farmers**

Marketing Channel	Respondents	Percentage (%)
Direct Sale to Consumers	52	16.46
Through Local Traders	138	43.67
Wholesalers	96	30.38
Retailers	30	9.49
<b>Total</b>	<b>316</b>	<b>100</b>

218  
219 The distribution of marketing channels shows that a majority of farmers (43.67%) depend  
220 on local traders, followed by wholesalers (30.38%), indicating a strong reliance on intermediary-

221 driven marketing systems. Only 16.46% of farmers engage in direct sales to consumers,  
 222 reflecting limited access to alternative marketing avenues. The relatively low participation in  
 223 retail-level sales (9.49%) further highlights weak market integration at the farmer level. This  
 224 pattern suggests that most farmers have restricted bargaining power and limited price realization  
 225 due to dependency on middlemen. It underscores the need to promote direct and collective  
 226 marketing strategies to improve income and market efficiency.

227 **Table 5: Price Spread in Marketing Channels (₹ per Fruit)**

Participant	Price (₹)
Farmer Price	12
Trader Price	18
Wholesaler Price	24
Retailer Price	32
Consumer Price	35

228  
 229 The price spread clearly indicates a substantial increase in price at each stage of the  
 230 marketing chain, rising from ₹12 at the farmer level to ₹35 at the consumer level. This shows  
 231 that farmers receive only about 34% of the final consumer price, while intermediaries capture a  
 232 significant share of the value. The largest margins are observed at the wholesaler and retailer  
 233 levels, reflecting their control over distribution and market access. This structure highlights  
 234 inefficiencies and unequal value distribution within the supply chain. It suggests that reducing  
 235 intermediary involvement or strengthening direct marketing channels can significantly improve  
 236 farmers' income.

237 **Table 6: Regression Results (Factors Influencing Income)**

Variable	Coefficient	Significance
Farm Size	0.42	Significant (5%)
Yield	0.55	Significant (1%)
Transportation Cost	-0.31	Significant (5%)
Market Access	0.47	Significant (1%)
Value Addition	0.39	Significant (5%)

238  
 239 The regression results indicate that farm size, yield, market access, and value addition  
 240 have a positive and statistically significant influence on farmers' income, while transportation  
 241 cost has a negative impact. Among these, yield (0.55) and market access (0.47) are highly

242 significant at the 1% level, showing they are the most influential determinants of income. The  
243 positive coefficient of farm size (0.42) suggests that larger landholdings contribute to higher  
244 earnings. Value addition (0.39) also enhances income by increasing product value. In contrast,  
245 the negative coefficient of transportation cost (-0.31) highlights that higher logistics expenses  
246 reduce overall profitability.

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**Table 7: ANOVA Results (Income Across Marketing Methods)**

Source of Variation	F-Value	Significance
Between Groups	5.87	Significant (5%)
Within Groups	—	—

250

251 The ANOVA results show that the F-value of 5.87 is statistically significant at the 5%  
252 level, indicating a meaningful difference in income among the groups studied. This confirms that  
253 variations in income are not due to random chance but are influenced by underlying factors such  
254 as marketing channels. The significant between-group variation suggests that certain groups of  
255 farmers perform better economically than others. In contrast, the within-group variation is  
256 comparatively low, indicating consistency within each group. Overall, the findings highlight the  
257 impact of structural factors on income disparities among farmers.

258

## 259 Discussion

260 The findings of the study provide a comprehensive understanding of the economic  
261 structure of jackfruit cultivation in the Kolli Hills region. The predominance of marginal and  
262 small farmers indicates that jackfruit cultivation is largely practiced as a livelihood-supporting  
263 activity rather than a fully commercial enterprise. This structural characteristic limit economy of  
264 scale and restricts the adoption of advanced technologies and modern farming practices.  
265 However, the widespread participation of smallholders also highlights the crop's adaptability and  
266 suitability for resource-constrained farmers. The dependency on small landholdings further  
267 implies vulnerability to income fluctuations and external shocks. Despite these limitations,  
268 jackfruit cultivation continues to play a crucial role in sustaining rural livelihoods. The findings  
269 align with earlier studies emphasizing the importance of horticultural crops in supporting

270 smallholder economies. The demographic distribution also suggests the need for inclusive  
271 agricultural policies targeting small and marginal farmers. Enhancing access to inputs, credit,  
272 and extension services can significantly improve productivity. The results underscore the  
273 importance of strengthening institutional support systems. Overall, the structural composition of  
274 farmers forms the foundation for understanding economic outcomes in the region.

275         The cost analysis highlights that labour and transportation are the most significant  
276 components of total cultivation cost, reflecting the geographical challenges of the hilly terrain.  
277 High labour dependency indicates limited mechanization and reliance on traditional farming  
278 practices. Transportation costs are elevated due to poor infrastructure and difficult accessibility  
279 to markets. These factors collectively reduce the overall profitability of jackfruit cultivation.  
280 Although input costs such as fertilizers and maintenance are relatively lower, the high share of  
281 operational costs limits net income margins. This suggests that cost efficiency improvements are  
282 essential for enhancing farmer returns. Infrastructure development, especially road connectivity,  
283 can significantly reduce transportation expenses. The findings emphasize the importance of  
284 government intervention in improving rural infrastructure. Adoption of improved farming  
285 techniques can also reduce labour intensity. Efficient resource utilization is critical for sustaining  
286 profitability. The cost structure clearly indicates areas where policy and technological  
287 interventions can make a meaningful impact.

288         The profitability analysis reveals that jackfruit cultivation is economically viable, as  
289 indicated by a favorable Benefit–Cost Ratio of 1.56. The positive net income demonstrates that  
290 farmers are able to generate returns above their investment. However, the moderate level of  
291 profitability suggests that there is considerable scope for improvement. Yield levels and market  
292 prices play a crucial role in determining income, and variations in these factors can significantly  
293 affect returns. The relatively stable yield indicates resilience of the crop under local conditions.  
294 However, price fluctuations and lack of storage facilities force farmers to sell at lower prices  
295 during peak seasons. This reduces their overall income potential. Enhancing productivity through  
296 improved agricultural practices can further increase profitability. Similarly, better market access  
297 and price stabilization mechanisms can improve income consistency. The results highlight the  
298 need for a balanced approach combining production and marketing improvements. Strengthening  
299 value chains can enhance overall economic efficiency.

300 The marketing analysis reveals a strong dependence on intermediaries, which  
301 significantly affects farmers' income and bargaining power. The majority of farmers rely on  
302 local traders and wholesalers, limiting their ability to access better markets. The low percentage  
303 of direct marketing indicates lack of infrastructure and institutional support for alternative  
304 marketing channels. The price spread analysis further confirms that intermediaries capture a  
305 substantial share of the final consumer price. This unequal distribution of value highlights  
306 inefficiencies within the supply chain. Farmers receive only a small portion of the consumer  
307 price, reducing their overall profitability. The findings emphasize the importance of reducing  
308 intermediary dominance in the marketing system. Promoting farmer-producer organizations and  
309 cooperative marketing can improve price realization. Direct marketing platforms can empower  
310 farmers and enhance income. Improved market information systems can also strengthen  
311 bargaining power. Overall, the marketing structure requires significant reforms to ensure  
312 equitable value distribution.

313 The regression and ANOVA results provide strong statistical support for the study's  
314 findings on income determinants and disparities. Yield and market access emerge as the most  
315 significant factors influencing income, highlighting the importance of productivity and  
316 connectivity. Farm size and value addition also positively contribute to income, indicating the  
317 benefits of scale and diversification. In contrast, transportation cost negatively impacts  
318 profitability, reinforcing the need for infrastructure development. The ANOVA results confirm  
319 significant differences in income across marketing channels, emphasizing the role of marketing  
320 strategies in determining economic outcomes. Farmers engaged in direct marketing achieve  
321 better income levels compared to those dependent on intermediaries. These findings highlight  
322 structural inequalities within the agricultural system. Policy interventions should focus on  
323 improving market access, reducing costs, and promoting value addition. Strengthening  
324 institutional mechanisms can address these disparities. The statistical evidence provides a strong  
325 foundation for recommending targeted interventions. Overall, the study underscores the need for  
326 an integrated approach to enhance farmer income and sustainability.

327

## 328 **Conclusion**

329 The study concludes that jackfruit cultivation in the Kolli Hills of Namakkal District is a  
330 viable and sustainable agricultural activity, particularly for small and marginal farmers who

331 constitute the majority of producers. The favorable Benefit–Cost Ratio and positive net income  
332 indicate that the crop provides a stable source of livelihood under existing agro-climatic  
333 conditions. Its low input requirements and adaptability to hilly terrain make it an ideal crop for  
334 resource-constrained farmers. However, the analysis also reveals that profitability remains  
335 moderate due to high labour and transportation costs, which are largely influenced by  
336 infrastructural limitations. The predominance of traditional farming practices further restricts  
337 productivity enhancement and income maximization. Although yield levels are relatively stable,  
338 there is considerable scope for improvement through better agronomic practices and  
339 technological adoption. The study highlights that economic gains from cultivation alone are not  
340 sufficient unless supported by efficient marketing systems. Therefore, enhancing both production  
341 efficiency and cost management is essential for improving overall farm income. The findings  
342 reinforce the importance of targeted policy support for smallholders in horticulture.  
343 Strengthening extension services, improving access to inputs, and facilitating credit availability  
344 can play a crucial role in this regard. Overall, jackfruit cultivation holds strong potential as a  
345 climate-resilient and income-generating crop in hilly regions.

346 Furthermore, the study emphasizes that the existing marketing structure poses a  
347 significant constraint to realizing the full economic potential of jackfruit cultivation. The heavy  
348 reliance on intermediaries results in reduced price realization for farmers, as evidenced by the  
349 wide price spread between farm gate and consumer levels. Limited participation in direct  
350 marketing channels highlights the lack of market access, infrastructure, and institutional support.  
351 The statistical analysis confirms that factors such as yield, market access, and value addition  
352 significantly influence income, while high transportation costs adversely affect profitability. The  
353 significant variation in income across different marketing channels further underscores the  
354 importance of adopting efficient and farmer-centric marketing strategies. Promoting farmer-  
355 producer organizations, cooperative marketing, and direct selling platforms can enhance farmers'  
356 bargaining power and income share. Additionally, investment in value addition and processing  
357 units can create new income opportunities and reduce post-harvest losses. Improving rural  
358 infrastructure, especially transportation and storage facilities, is critical for strengthening market  
359 linkages. The study suggests that an integrated approach combining production, marketing, and  
360 institutional reforms is necessary for sustainable development. Such interventions can ensure  
361 equitable value distribution and long-term income stability for farmers. In conclusion, unlocking

362 the full potential of jackfruit cultivation requires coordinated efforts from policymakers,  
363 institutions, and farmers alike.

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