An Economic Analysis of Investment and Marketing Efficiency of Jaggery Industry in UP: A Study of Ayodhya District

ABSTRACT

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1.1 Introduction

Gur or Jaggery is a natural and traditional non-centrifugal product of sugarcane. It is consumed in Asia, Africa, Latin America and the Caribbean. It is considered to be the best sweetener in the world owing to the presence of minerals and vitamins inherited from sugarcane. India is the largest producer of jaggery contributing more than 70% of the total production of jaggery in the world[1].

Jaggery and Khandsari are one of the major agro-based cottage industries majorly centred in rural sector of our country. In 2016, the percent utilisation of sugarcane in jaggery and khandsari was 14.2%[2]. But in the last couple of years, out of total sugarcane annually produced in India, around 79.91% is used to produce sugar, 11.29% used to produce jaggery and remaining is used for other commercial purposes. In India, the states of Maharashtra, Uttar Pradesh, Punjab, and Bihar produce the maximum quantities of sugarcane. It is one of the important cash crops grown in Uttar Pradesh which plays crucial role in the growth and development of the state's economy. About 42-44% of the total sugarcane production takes place in Uttar Pradesh. (Selvi et al. 2021: 1)

This industry lifts up the rural economic system by providing employment opportunities to illiterate or semi-literate rural people, raising income level by providing an avenue for business besides agriculture and reaching out to external markets through various value-added products of jaggery. Such an industry requires low capital investment in the form of small plants and

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[1] https://apeda.gov.in/apedawebsite/subhead_products/jaggery_and_confectionary.htm

[2]https://www.mofpi.gov.in/mediapr/enewsfeb4.html#:~:text=In%202016%2C%20about%2014.2%25%20of,recognised%20at%20the%20international%20level.

simple machineries. Due to its high nutritional composition as against sugar which only has sucrose, its demand is steadily gaining momentum as an alternate sweetener all over the world.

Jaggery industry has a huge market potential because besides being a healthy alternative, delayed payments by sugar mills, complex transaction mechanism, immediate sale of cane has made cane growers favour supply of sugarcane to jaggery units. (Nath et al. 2015: 1). It is, therefore, essential to safeguard the interest, improve and also modernize the activities of jaggery in rural sector of the country as it provides job to the unemployed rural people.

All of the above factors gave rise to the present study. But, above all, it was the selection of Ayodhya district for jaggery under the scheme named "One District One Product" which drew attention towards jaggery industry of Ayodhya.

One District One Product (ODOP) Scheme in Uttar Pradesh[3]

On 14th January 2018, a scheme named "One District One Product" was launched in UP in order to boost the GSDP of the state by encouraging one indigenous and specialised product from each district. Such a scheme would preserve and develop the local crafts and skills; resolve the issue of regional imbalance and decrease migration by giving employment opportunities in migrant's district. Each product will be unique and GI-tagged to that district like Kala Namak rice of Siddharth Nagar, brass ware craft of Sank Kabir Nagar, Chikankari of Lucknow, wheat-stalk products of Bahraich, flute of Pilibhit and so on. For Ayodhya and Muzaffarnagar, jaggery has been identified under ODOP scheme owing to their good quality jaggery and huge potential in jaggery industry.

[3] http://odopup.in/en

This scheme would only be successful if proper action plan would be taken to ensure the assistance to artisans and manufacturers in the areas of marketing, finance, product development, technical training of the craft, availability of raw material on time at reasonable cost, etc.

1.2 Research Gap and Scope of the Study

From the review of literature, it was realized that majority of literatures regarding financial feasibility and marketing efficiency of jaggery processing units were related to Maharashtra, Karnataka, Andhra Pradesh but no such literature was available for showing the production and marketing efficiency of jaggery processing units in UP with special reference to Ayodhya district. We chose this district as our study area because it was selected for jaggery in the ODOP scheme launched in January 2018. Additionally, it has large number of small and medium jaggery units along with many large jaggery manufacturers which are even exporting to the world. As Ayodhya climate is suitable for sugarcane production, the research work is based on the economic analysis of the production and marketing of jaggery industry in UP by throwing light on weaknesses and strengths of this industry in Ayodhya district.

1.3 Research Methodology

The study is based on secondary as well as primary data. There are two chapters (3rd and 4th) based on secondary data for examining export growth of jaggery in Uttar Pradesh; utilisation of sugarcane for different purposes in India; per capita consumption of sugar and jaggery in India; area, production, yield of sugarcane in India and Uttar Pradesh. The sources of secondary data used in the study are, Indiastat.com, Agricultural and Processed Food Products Export Development Authority (APEDA), Cane Commissioner office (Lucknow), Ministry of

Commerce and Industry, Directorate of Economics and Statistics, Uttar Pradesh, District Industrial Centre (Ayodhya).

On the other hand, for assessing the investment pattern, estimating the the cost and return of jaggery manufacturing, marketing efficiency and profitability of jaggery industry, field survey of jaggery units of Ayodhya district was carried out through personal interview of owners of the sampled jaggery-making units, wholesalers and retailers using a well-structured questionnaire.

For the collection of primary data, appropriate sample was selected using **convenience and snowball sampling method[4].** These sampling techniques were chosen owing to lack of official records about the total number of registered or unregistered units in the study area. Though, it might sound ironical that the district, which has been selected for jaggery under One District One product, has no separate and organized data regarding the number of jaggery units in Ayodhya. Hence, at first few famous and renowned units were selected from Purabazar block of Sadar Tehsil under convenience sampling method and then snowball sampling technique was adopted to enlarge the sample size. The period chosen for the collection of primary data was November 2021- February 2022.

The total units selected for the sample are 76 out of which 24 units are from Sadar and Rudauli each and 28 units are from Bikapur. Though, all the five tehsils named: Sohawal, Milkipur,

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[4] Arora and Gupta, 2016, p.31 Convenience sampling is one of the non-probability sampling methods which is used in exploratory research where an easily accessible group of people is chosen and everyone is surveyed. On the other hand, snowball sampling method is undertaken when the sample is difficult to find. It is also one of the non-probability sampling methods in which the investigator asks the present participants about the potential participants and the process goes on till the desired sample size is taken.

Rudauli, Sadar and Bikapur were surveyed, yet we did not see any operational and commercialized jaggery unit in Sohawal and Milkipur. We saw a few units there which unfortunately could not stand the brunt of second wave of corona and collapsed. Hence, we constituted our sample from different blocks of Bikapur, Rudauli and Sadar.

These units have been segregated as micro, small, medium and large by their cane crushing capacity per day as given by Dwivedi in 2010 in his working paper and we did not resort to the classifications mentioned in the MSME Act, 2006 because as per that act, 98% of the units would have fallen in the category of micro units (capital investment less than Rs.25 lakhs). This is as follows, **(Dwivedi 2010: 7)**

Table 1.1 Different Categories of Units

Type of unit	**Cane crushing capacity/ day (in quintals)**	**Capital Investment* (for establishing a unit)**	**Total number of Units**
Micro	40-75	Rs. 5-8 Lakhs	16
Small	75-100	Rs. 8-12 Lakhs	20
Medium	100-200	Rs. 12-20 Lakhs	29
Large	200- 300	Rs. 20-30 Lakhs	11

Source: Field Survey

Capital Investment comprises investment expenditure on infrastructure and machinery equipments but value of land has been kept out of its ambit because it varied across different localities. Some micro and small units had locational benefit for their land than the large units and inclusion of that would have resulted in converting micro and small units, which had a little share in total production of jaggery in the district, into large units and large units into medium and small units

The three tehsils: - Sadar, Bikapur and Rudauli were found to have maximum number of units. From Sadar, total 24 units were selected of which micro, small, medium and large are 2, 4, 12, 6, respectively. From Bikapur, total 28 units were selected of which micro, small, medium and large are 7, 5, 13, 3, respectively. Lastly, from Rudauli, total 24 units were selected of which micro, small, medium and large are 7, 11, 4, 2, respectively.

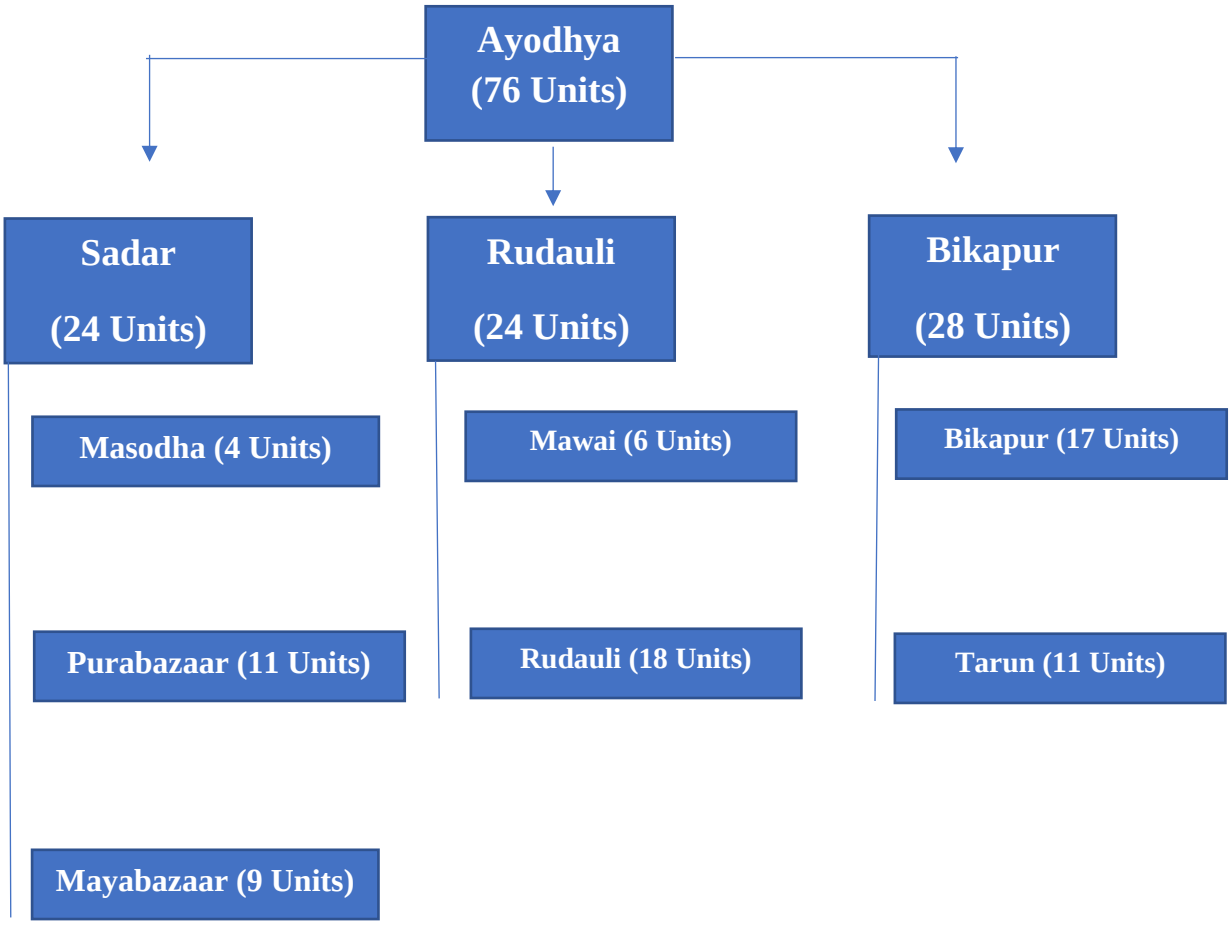
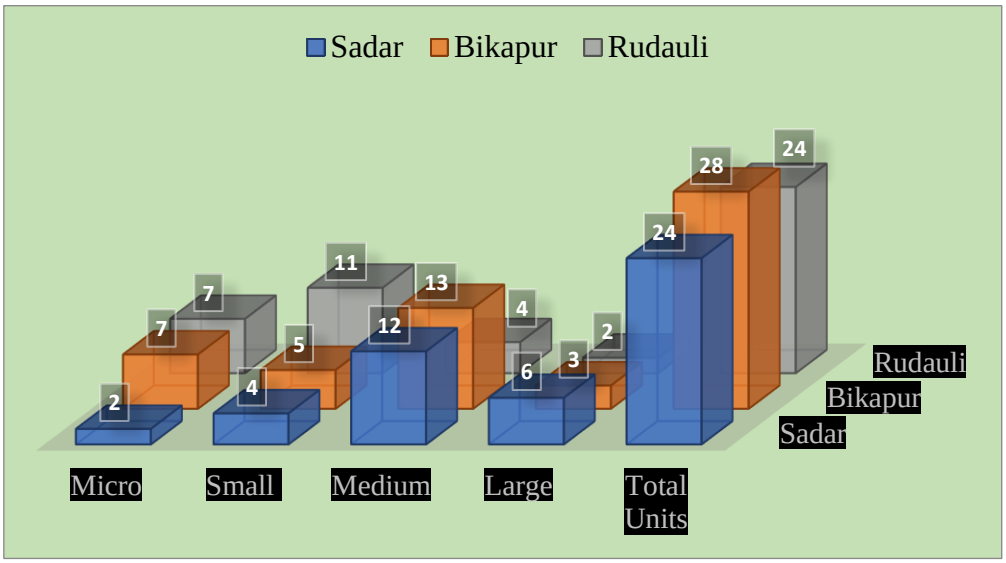


Figure 1.1 Number of Different Categories of Units in Tehsils of Ayodhya



Source: Field Survey

For the data related to tehsil-wise area under sugarcane cultivation, we resorted to annual statistical reports of District Statistical Office, Ayodhya and Directorate of Economics and Statistics, Lucknow. But for the sample jaggery units, we relied totally on field survey, personal interviews and discussions.

For estimating the costs & returns of jaggery production and examining the financial feasibility of jaggery industry, we resorted to following financial instruments: Benefit-cost ratio, payback period, net present value and internal rate of return (Ramarao 2011: 237-238). Whereas, for examining and comparing the marketing efficiency of different marketing channels present in Ayodhya district, price spread and Acharya's approach of Modified Marketing Efficiency **(Acharya and Agarwal 1999: 311)** were employed.

1.3.1 Objectives

1. To assess the jaggery consumption and utilisation of sugarcane in jaggery production in India.
2. To assess the investment pattern in jaggery industry.
3. To estimate the cost and returns of jaggery production in the study area.

4. To identify the marketing channels and estimate the price spread in the marketing of jaggery in the study area.
5. To examine the production and export growth of jaggery of Uttar Pradesh in the last decade.
6. To identify the major constraints in production and marketing of jaggery.

1.3.2 Hypotheses

With the help of primary and secondary data, the following hypotheses were ventured to be tested:

H_{01}: There is insignificant growth in U.P.'s exports of jaggery and confectionary in the last decade.

H_{02}: There is presence of financial feasibility in jaggery industry of the study area.

H_{03}: There is low marketing efficiency in jaggery industry of the study area.

1.4 Significance of the Study

The study will focus on improving the investment, production efficiency and marketing efficiency to make it more competitive not only at local/national level but at international level as well. As Jaggery industry is basically a cottage and small-scale industry which is labour-intensive and requires low capital investment in the form of small plants and simple machineries, its expansion will provide employment opportunities to illiterate or semi-literate people. This study will figure out the factors constraining the investment in production and marketing to bring in the improvement in jaggery production. India, being the largest sugarcane producer in Asia, could cash in on by increasing production efficiency of jaggery industry using better and affordable technology and by enhancing marketing efficiency with fall in marketing margins and costs to make Indian jaggery more export competitive. Its growth will provide the

farmers an avenue for business besides agriculture and reach out to external markets through various value-added products of jaggery. The present study will be highlighting the hardships faced by the jaggery processors involved in jaggery production as well as the jaggery-producing units. The study will also help in formulating policies to encourage jaggery-producing units produce jaggery efficiently and put the country on high growth trajectory. Moreover, it is the need of hour to enhance the efficiency of jaggery units in this highly competitive world because it, being a healthy alternative, could save the sugarcane farmers from delayed payments by sugar mills, complex transaction mechanism, higher price and immediate sale of cane has made cane growers favour supply of sugarcane to jaggery units.

1.5 Organisation of the Thesis

The **First** Chapter titled "Introduction and Review of Literature" is an outline of the thesis based on review of literature and it envisions the sequence and format of thesis.

The **Second** Chapter titled "Theoretical and Conceptual Framework of Agro-based Industry" based on the theoretical and conceptual dimensions of investment decisions and market efficiency. It begins with the concept of agro-based industry and its contribution in an economic development of developing countries. Some theories by Lewis, Ranis-Fei and Hirschman have been mentioned to capture the agriculture-industry linkage in order to attain economic development. This chapter also covers the various theories of investment along with the concept of marketing efficiency. Such an extensive study of theories would prove to be very important for economic analysis of investment and marketing efficiency in jaggery industry in the research.

The **Third** Chapter, "Framework of Jaggery Industry in India- An Overview" is purely based on secondary data and it gives an overview of sugarcane production and jaggery industry in India. It analyses the position of India in world cane production and throw light on the state-

level cane production in the country. Some trends in jaggery production and consumption have been shown using trendline to present the changes over time. This chapter will deal with the objective of assessing the jaggery consumption and utilisation of sugarcane in jaggery production in India.

The **Fourth** Chapter as its title depicts, "Production and Export of Jaggery in Uttar Pradesh", encompasses the analysis of jaggery production and export performance of Uttar Pradesh in jaggery and confectionary by measuring its export growth, changes in its major export destinations and fluctuations in its share in India's exports of jaggery and confectionary. It caters to one of our objectives: to examine the production and export growth of jaggery industry in Uttar Pradesh in the last decade. At the end of the chapter, hypothesis of insignificant export growth of jaggery of Uttar Pradesh has been tested.

The **Fifth** Chapter titled, "Investment Pattern and Financial Analysis" will assess the investment pattern and financial feasibility of jaggery industry in Ayodhya district in order to cater to two of our objectives: 1. Estimation of costs and returns of jaggery production in the study area; 2. Assessment of the investment pattern in jaggery industry. It will be done by collecting data on costs involved in jaggery processing, sale price of jaggery and percentage of various fixed and variable costs involved in jaggery manufacturing in total cost. This chapter begins with the description of study area, i.e., Ayodhya district, the concept of investment and techniques used for investment analysis, selection of the samples, the sampling techniques followed, employment of tools and techniques for analyzing and synthesizing the data. At the end of the chapter, hypothesis of presence of financial feasibility in jaggery industry of Ayodhya will be tested.

The **Sixth** Chapter, "Marketing Efficiency and Problems of Jaggery Industry" deals with two objectives: Identification of the marketing channels and estimating their price spread to

measure the marketing efficiency; to identify major constraints in production and marketing of jaggery. It utilizes the information gathered from the owners of 76 jaggery units, wholesalers and retailers on various marketing costs and margins viz, sale price, storage cost, labour cost, commission, market fee, etc. This helps in measuring the price spread for each marketing channel to identify the best channel and testing the hypothesis of low marketing efficiency of jaggery producers.

The **Seventh** and the last Chapter, "Summary, Findings and Policy Recommendations" summarises the whole thesis and lists down the major findings of the study. It brings up the challenges being faced by the jaggery manufacturers based on which certain policy recommendations are jotted down. With this chapter, we wrap up our thesis.

1.6 Main Findings of the Study

1. Jaggery production in Uttar Pradesh increased from 1026 lakh in 2005-06 to 1891 lakh in 2019-20. But in the entire period there are wide fluctuations with minimum production of 875 lakh in 2011-12 and maximum production of 1891 lakh in 2019-20.
2. CAGR for the period under study (2005-2020) turned out to be 4.16% for jaggery production and -0.78% for cane crushing used in jaggery production. This validates increase in recovery rate of jaggery during the period with minor fluctuations in between.
3. We observe a higher CAGR (2008-2020) for the value of exports of jaggery and confectionary (23.58%) than that for the quantum of exports (12.65%) in the state which points at the higher growth rate of prices for jaggery and confectionary in the world market.
4. There are wide fluctuations in the percentage share of U.P. in India's Export of Jaggery & Confectionary over the concerned period of time (2008-2020), but overall, the share

has evidently increased from 0.82% in 2008-09 to 5.12% in 2019-20 claiming a CAGR of 16.49%.

5. Quantity of exports has wide fluctuations which happen due to year-wise variations in cane production, changes in percentage utilization of cane in jaggery, changing preferences of farmers to sell their cane to sugar mills or jaggery manufacturers depending upon the prices offered and government jaggery control policies for increasing sugar production.
6. U.P.'s Export of Jaggery and Confectionary in value increased from 15.29 (crore) in 2009-10 to 83.62 (crore) in 2019-20.
7. Revealed Comparative Advantage (RCA) and Revealed Symmetric Comparative Advantage (RSCA) index revealed that U.P. has comparative disadvantage from 2011-12 to 2014-15 and in 2019-20 in the exports of jaggery as RCA found to be less than unity and RSCA was negative. The main reason behind this could be lower share of U.P.'s Export of Jaggery and Confectionary in India's Export of Jaggery and Confectionary than the share of U.P.'s total exports in India's total exports.
8. The share of top ten importing countries of U.P.'s jaggery and confectionary always claimed more than 95% of the total value of exports of U.P.'s jaggery and confectionary. Among the top ten importers, Nepal has always been positioned at the first place and its share has increased from 48.05% in 2010-11 to 73.74% in 2019-20.
9. Only the **Early variety** of sugarcane is used for jaggery making in Ayodhya- 8436, 038, 7282, 8432, 039, CoG85. Out of these, COG85 gives highest recovery of about 16%.
10. The total investment cost on an average is Rs. 6,90,988, Rs. 8,97,646, Rs. 13,62,035 and Rs. 27,34,721in case of micro, small, medium and large unit respectively. Such a

result is economically viable because the total investment will have to increase as the size of unit increases.

11. The investment pattern changes when we go up from micro to large unit as the percent share of investment on infrastructure in total investment increases from 43.88 percent to 58.43 percent whereas the percent share of investment on machinery equipments declines from 56.12 percent to 41.57 percent. However, the absolute values are undoubtedly increasing.
12. Across different sized units, the major items of investment are: Warehouse (21-35%), Shed (14-19%), Cane crusher (11-24%), Pans (11-16%), Generator/ Engine (8-13%), Electrical Motor (3-4%).
13. Among Micro and small units, the largest share in total investment lies with cane crusher and then warehouse whereas in case of medium and large units, they spend highest amount on warehouse.
14. The total cost per day varies from Rs. 17,650 in micro units to Rs. 86,488 in large units. In all categories of units, variable costs constitute around 98 percent of the total cost and in variable costs, cost of sugarcane claims more than 78 percent of the costs.
15. Cost of sugarcane, wages and fuel charges altogether contribute around 97 percent to the total cost.
16. The average recovery rate of jaggery is around 11%. When there is conducive environment for jaggery manufacturing (May-Oct), that time recovery is low around 10-11% because of old sugarcane (harvested in Nov-Jan). On the other hand, when the environment for jaggery manufacturing is odd, then also recovery rate is around 10-11% due to freshly harvested juicy sugarcane. Hence, on an average, recovery rate in a year revolves around 11%.

17. The cost per quintal of jaggery is highest in micro units (Rs. 3,209) followed by small (Rs. 3,178), medium (Rs. 3,152) and then large units (Rs. 3,145). This is in line with the theory of economies of scale which states that a firm is able to bring down its per unit cost with the increase in level of production because the cost is spread over a large number of units.
18. Share of fuel charges in total costs is declining from 8.08 percent in micro units to 3.9 percent in large units. Such a result is due to the fact that micro and small units are generally unregistered, so, they depend upon generator/engine to run their crushers which is three times costlier than using electricity. As medium and large units are generally registered, they curtail down their fuel charges by using electricity and thereby decrease their diesel costs.
19. BCR is greater than unity across different categories of units which alludes to the presence of profitability in all the units but, it is lowest in micro (1.05) and small (1.06) units whereas in case of medium and large units, the condition is still better as the profit is 8 and 11 paise respectively on a rupee spent.
20. The net present value in all the units is positive at 12% discount rate and average life span of 5 years which also points to the profitability.
21. All categories of units are financially feasible because IRR of all the units is greater than the borrowing cost of 12%. But IRR of large units (94%) is the highest followed by medium (60%) small (35%) and micro units (14%).
22. The Break-Even Output (BEO) is 3071, 3506, 4586 and 6888 quintals in micro, small, medium and large units, respectively. The result is in sync with practicality because BEO is that level of output where the total costs is just equal to the total returns. As cost and returns are obviously larger in case of large units, hence it is highest in large units and lowest in micro units.

23. Pay-back period is the lowest in large units (250 days) followed by medium (321 days), small (398 days) and micro units (558 days).
24. Jaggery-processing is a profitable business though the returns are very low in micro and small units. But it is fair enough (more than 8%) in medium and large units.
25. On an average, units have 125 operational days, hence, the total employment generation in one season happens to be 875, 1125, 1750 and 3000 man-days in micro, small, medium and large units.
26. With the increase in size of unit, labour productivity is increasing from .79 quintal in micro units to 1.15 quintal in large units which validates the theory of economies of scale.
27. Three marketing Channels were identified in the study area which are as follows:

    Channel 1: Producer → Commission Agent → Wholesaler → Retailer → Consumer

    Channel 2: Producer → Wholesaler → Retailer → Consumer

    Channel 3: Producer → Retailer → Consumer
28. Majority of units are following channel I because of absence of any regulated market. About 57 percent of sample units are following channel I, 24 percent following Channel II and 19 percent following Channel III.
29. Each category of units incurs different marketing costs, reason being differences in packaging only. Micro and small units generally use gunny bags (plastic and jute gunny bags) over carton because one quintal of jaggery require Rs.50 per quintal in case of gunny bag whereas Rs.240 per quintal in cartons. On the other hand, medium and large units prefer cartons over gunny bags in 75 percent cases because their produce is sold in large distances too. So, they pack it properly using carton for a hassle-free and safe travel.

30. Price spread is the highest in channel I (Rs. 1055) followed by channel II (Rs. 943) and then channel III (Rs. 530) thereby, we can deduce that channel III is the most efficient marketing channel which is validated by the value of modified marketing efficiency being highest in case of channel III, i.e., 6.8, because there is only one intermediary (retailer) between producer and consumer. But because of the absence of a regulated market, producers have to follow channel I which is the least efficient one.
31. Units, which are running on small scale, use crushers 18-18, 14-16. They are unregistered and don't pay taxes. Few units are registered and tax payee and they use crusher 20-20.
32. Small kolhus prefer to sell jaggery at the same rate (Rs.32/kg) to commission agents and retailers just to increase their customer base. In case, final consumers come to their unit then they sell it at retail price of around Rs.40/kg.
33. There are certain common problems faced by jaggery manufacturers in producing and marketing jaggery, such as, lack of electricity, lack of labour, climate-related problem, banking loan issue, price fluctuations, absence of regulated market and absence of modern storage facility.

1.7 Policy Recommendations

1. Government should promote the production of COG85 by availing its seeds to cane-growers as it gives highest recovery of about 16%.
2. There should be a regulated market for jaggery as it will help in removing the intermediaries resulting in fetching more profits to jaggery units and lesser price to consumers.
3. Banking loan facility should be supervised by the government because micro and small units are the ones which suffer the most in getting the loan sanctioned. Due to less

awareness about the existing collateral free banking schemes among jaggery manufacturers, bank employees ask for hush money for issuing the loan amount. Hence, government should run awareness programmes about various loan schemes for the upliftment of jaggery units along with proper supervision of execution of such loan schemes.

4. The government should work on identifying the unregistered units and encourage them to get registered. This will bring in everything in place because these units will also need to apply under Section 143 of UPZA & LR act 1950 and then they would become eligible to receive the benefits from various collateral free schemes launched under ODOP for MSMEs.
5. There should be facility of free/subsidized electricity connection for jaggery units because the cost of getting commercial connection is about Rs.30,000-40,000. That is the reason why people hold themselves back and as a result their per day diesel cost is skyrocketing. They can produce same level of produce with one-third lesser cost if there is electricity. And even if some people have commercial electricity connection, the power-cuts are very high and they barely get power for about 14-15 hours (production is done for 24 hours).
6. Government should construct warehouses and storage rooms for jaggery which have automated temperature maintenance. This will help in increasing production without the fear of getting jaggery spoiled. Many jaggery units, especially, micro and small units don't store jaggery because of no facility of proper storage which make them suffer a lot due to price fluctuations. Hence, Government should work on this.
7. Use of modern automated machines in jaggery production should be introduced and promoted by the government which will result in increase in jaggery production. Instead of open pans, there should be boiler which would retain the heat and decrease the time

taken to manufacture a certain quantity of jaggery. In other words, production efficiency would increase. Fully automatic machines for molding jaggery would result in lesser number of labourers required and drastically reduce the labour cost along with the time taken.

1.8 Limitations of the Study

The study is based on Ayodhya district so it would be insufficient to make any generalization at a state or national level. As the study is majorly based on primary data, so any misinformation by respondent would have affected the result. Hence, presence of human error is possible in the study. For assessing the export growth over the last decade, we relied on data from APEDA where there is no separate data on jaggery and it has been clubbed with confectionary items. So, we could not examine the export growth rate of jaggery alone. Lastly, we encountered with the major limitation of a smaller number of units in the study area and cluster of units a few kilometres away in the adjacent district, Ambedkar Nagar which is outside the ambit of our study. This led to small sample size of 76 units. Otherwise, we would have enlarged the sample size to have better understanding of the topic. In nutshell, the limitations can be summarised as follows:

1. As it is a district level study, it can't be generalized to state or national level (because it has got certain limitations at production and market level which are very much specific to it only).
2. It is based on primary data collected using questionnaire. So, presence of human error due to misinformation is possible.
3. For primary survey, we take only commercialized jaggery units which also happen to be almost 95% of the total jaggery units in Ayodhya.
4. There is no separate export data on jaggery alone. Combined with confectionary

5. Absence of any official record about number of gur units in Ayodhya which affected the methodology.
6. Data available on Jaggery Production in UP for 2006-2020 only for licensed units.

1.9 Further Scope of the Study

The present study was confined to assessing the investment patterns and marketing efficiency of jaggery units in Ayodhya. The findings show low level of marketing efficiency (Modified Marketing Efficiency of Channel 1 is 3.12) in the district and the profitability (majority earning less than 8%) is also not that high given the fact that the district has been identified for Jaggery under ODOP scheme. There is further scope for comparative analysis of jaggery units of Ayodhya with those of Muzaffarnagar (which is Asia's biggest market for Jaggery). Such a comparative analysis would help in identifying the areas due to which Ayodhya lags behind Muzaffarnagar. Additionally, the implementation and impact of various financial schemes run under the aegis of ODOP scheme at the ground level needs to be examined.

References

- Acharya, S.S. and Agarwal, N.L. (1999). *Agricultural Marketing in India*. New Delhi, Oxford and IBH Publishing.
- Exports of Jaggery and Confectionary from India and Uttar Pradesh. https://apeda.gov.in/apedawebsite/index.html accessed as on 30th August, 2022 at 3:43 PM)
- Hirschman, A.O. (1987). *The New Palgrave A Dictionary of Economics*. London, The Macmillan Press.
- Kanchan (2016). Development of Agro based Industries. *International Journal of Research in Economics and Social Sciences*, *6*(10), 260-61.
- Lewis, W. A. (1954). Economic development with unlimited supplies of labour. *The Manchester school*, *22*(2), 139-191.
- Nath, A., Dutta, D., Kumar, P., & Singh, J. P. (2015). Review on recent advances in value addition of jaggery based products. *Journal of Food Processing and Technology*, *6*(4), 1-4.
- Raju, V. T., Raju, V. T., Shankar, V., & Rao, V. S. (2003). *Economics of farm production and management*. Oxford and IBH Publishing Company Pvt. Limited.
- Ramarao, I. V. Y. (2011). An Economic Appraisal of Manufacturing and Marketing of Jaggery in Andhra Pradesh state, India. *Sugar Tech*, *13*(3), 236-244.
- Ranis, G., & Fei, J. C. (1961). A theory of economic development. *The American economic review*, 533-565.
- Revathy, R., Murali, P., Venkatasubramanian, V., Prathap, D. P., & Balamurali, S. (2021). An appraisal of indian jaggery and confectionery exports in the global market: markov chain model approach. *Sugar Tech*, *23*(1), 118-129.
- Selvi, V. M., Mathialagan, M., & Mohan, S. (2021). The Art and Science of Jaggery Making: A Review. *Agric. Rev.*, *1*.