**Invisible Labour, Tangible Gains: The Economic Value of Imputed Labour in Women’s Joint Liability Groups**

**Abstract**

*The study titled “Invisible Labour, Tangible Gains: The Economic Value of Imputed Labour in Women’s Joint Liability Groups" examines the profitability of group farming through Joint Liability Groups, with specific focus on labour productivity. As JLGs, primarily formed by women interested in farming, engage in collective agricultural activities, the study investigates the role of imputed labour—unpaid contributions from group members—and its direct impact on economic outcomes. By employing the Cost A method for examining the production cost and calculating total revenue based on market prices and cultivated quantities of paddy, banana, and vegetables, the study provides a comprehensive financial assessment. Using multi-stage stratified random sampling, data was gathered from 170 JLGs, and statistical analyses, including ANOVA and post hoc tests, confirm that the dedication of group members through imputed labour significantly enhances profitability. The findings highlight the crucial role of imputed labour in the success of farming, offering valuable insights for policy-making and strategies to improve agricultural sustainability and economic viability of women farmers.*

**Key words**: *JLG, Imputed labour, hired labour, group farming, Profitability*

**Introduction**

Group farming has emerged as a transformative approach in Kerala’s agricultural sector, fostering collective participation and sustainable practices. While cooperative farming has long been a part of Kerala’s agricultural landscape, the government has actively promoted structured collective farming to enhance food production and rural livelihoods. A significant force behind this initiative is Kudumbashree, Kerala’s flagship poverty eradication and women’s empowerment program. Established in 1997, Kudumbashree extended its reach to the agricultural sector in 2004, creating opportunities for small-scale farmers to engage in lease-land farming. This model gradually evolved into a structured group farming system under Joint Liability Groups (JLGs), offering financial support, shared resources, and improved risk management. By integrating traditional agricultural wisdom with modern techniques, group farming continues to play a crucial role in Kerala’s efforts to ensure food security and economic stability.

The JLG farming through the institutional support of Kudumbasree is giving opportunity for the landless women to cultivate by providing bank linkage amount. There is a coordinated structure to the farming activities through the interference of local self-governing institutions. The productivity growth in agriculture is both a necessary and sufficient condition for the development of the sector as well as the economy.

Group farming is a form of day-to-day agricultural production. It has become the lifestyle of the marginal farmers. By sharing land, labour, capital, raw materials, and the organizing capacity, farmers boost their capability to invest, innovate, and can make use of leisure time activities in a productive manner. The success of group farming depends upon the cooperation and coordination among the group members.

Labour is an important factor of production. The idea of giving institutional support to women through Kudumbasree came when it realized that those women who were engaged as agricultural workers were interested to take agriculture as their livelihood. Though women, who were working in their family land were considered their work only as an extension of the household work or their responsibility towards working as a housewife (Arun,1999,2012; Osella &Osella,2000). Also, many of them are interested in farming activities but no land to work with. By forming JLGs they got an opportunity to take land on lease. It benefitted them to avail bank linkage amount too.

The present study is an attempt to examine the role of labour used in the JLG farming. The specific objective of the study is to examine the importance of imputed labour by the group members in the working of JLGs

**Research Methodology**

Primary data were collected from 170 JLGs in the five blocks of Palakkad district during January 2020 to March 2020. All the 14 districts in the State are participating in the JLG farming. As per 2019 data obtained from Kudumbasree website, 75 per cent of the registered JLGs are engaged in the cultivation in Palakkad and Malappuram districts, have a participation rate of 87 per cent which is the highest in the state. Looking at the percentage of active JLGs with that of total registered JLGs in each district, Malappuram and Palakkad are seen to be at the highest level. Among the two districts, Palakkad district is selected purposively because Palakkad is considered as the agricultural belt of Kerala. Even then many of the lands are lying as fallow in Palakkad district. At the same time, the district has to depend upon other districts for meeting the daily needs of food grains and vegetables.

 As per the data published by Kudumbasree in 2019, there were 3371 registered JLGs in Palakkad district among which 2921 JLGs were active**.** Out of 13 blocks in the district,10 blocks are cultivating at least 3 crops. The major crops cultivated in the area are paddy, banana, tubers, and vegetables. The study has taken only those blocks which are cultivating at least 3 crops. Of these 10 blocks, five blocks were selected on the basis of crop diversification and area under cultivation (i.e., which have more than 500 acres). There are 1466 JLGs in the selected 5 blocks. In the next stage, the selection was done on the groups which cultivate diversified crops and at the same time, but concentrating on one major crop. There were 170 such JLGs from the selected blocks, out of which 89 concentrate on paddy, 61 concentrate on banana and 20 concentrate on vegetables. Thus, the data were taken from these 170 JLGs which concentrate on one prime crop to get reliable results on profit. The labour productivity of the JLGs were calculated by using the formula;

$$Labour productivity=\frac{Total Output}{Number of labourers}$$

Total labour productivity is measured as a summation of hired labour productivity and imputed labour productivity. The imputed labour cost is calculated by the number of group labour employed multiplied by the prevailing market wage rate. The average number of farmers in a group is 4, majority of JLGs have to hire labourers. Hired Labour productivity is the productivity of the hired labour which means that the productivity of labourers other than the labour of the group members, that can be estimated by the equation;

$$Hired Labour Productivity=\frac{Total Output}{Number of hired labourers}$$

Imputed labour productivity is the productivity of imputed labour, that can be estimated as;

$$Imputed labour productivity=\frac{Total Output}{Number of imputed labourers}$$

 For the present study, the last harvest of the crops is considered. The output obtained is measured in kilograms. To calculate the revenue, average selling price of the product is considered and it is multiplied by the total output in kilograms. Total cost is calculated as per the cost A calculation method followed by the methodology of Directorate of Economics and Statistics, Govt of Kerala. In addition to this, lease land cost is calculated separately. The lease value varies greatly from place to place. The imputed value of labor performed by the group members is calculated separately.

$$Total profit =Total Revenue-Total cost$$

 The imputed and hired labour costs of the groups were found and groups were classified based on the same. Efficiency in the sector can be measured in terms of agricultural productivity and net profit. The difference in efficiency with respect to the different levels of imputed labour and hired labour is analyzed using ANOVA and post-hoc analysis.

**Results & Discussion**

In group farming, most of the farmers have previous experience as agriculture labourers. So, the labour power employed by the group members are the major source of imputed labour. Many of the groups are making use of family labour. The imputed labour cost is calculated by the number of group labour employed multiplied by the prevailing market wage rate. The family labour used in group farming is of two types - Paid family labour and Unpaid family labour. In the case of paid labour wages are given to the labourers whereas the unpaid labourers are not getting any wage for their labour. More labourers are needed for paddy cultivation. So, the groups are hiring labour from MGNREG (Mahatma Gandhi National Rural Employment Guarantee Programme) and local agricultural labourers. But in the case of vegetable cultivation no labour is hired. Hence, the JLG groups are utilizing their own labour (imputed labour). The nature of labour employed separately in paddy, Banana and vegetable cultivating JLGs is presented in Table 1.

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| **Table 1** |
| **Crop-Wise Nature of Labour Employed in Sample JLGs** |
| **(figures in brackets shows percentages)** |
| Sl. No. |  Crops | Nature of Labour | Total  |
| Only Own labour | Only Hired Labour | Both |
| 1 | Paddy | 0 (0.00) | 6 (6.74) | 83 (93.26) | 89 (100) |
| 2 | Banana | 10 (16.39) | 0 (0.00) | 51 (83.61) | 61 (100) |
| 3 | vegetables | 20 (100) | 0 (0.00) | 0 (0.00) | 20 (100) |
| Total | 30 (17.65) | 6 (3.53) | 134 (78.82) | 170 (100) |
| Source: Primary Data |

The table shows distribution of sample JLGs based on nature of labour employed in different crops. It shows that vegetable cultivated JLGs employed only own labour. At the same time, most of the paddy cultivated JLGs (93.26%) employed both own and hired labours and some other paddy cultivated JLGs (6.74%) utilized only hired labours. In case of banana cultivated JLGs, majority of them (83.61%) employed both own and hired labours, while a few of them (16.39) depended solely on own labour.

**Revenue from cultivation**

The revenue earned by each JLG is calculated and its average value per crop were also measured. Crop-wise revenue from cultivation is presented in Table 2

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| Table 2 |
| Crop-wise Revenue from cultivation |
| **Variable** | **Crops** |
| **Paddy** | **Banana** | **Vegetables** |
| Total area(acres)\* | 278.57 | 186.66 | 42.8 |
| Number of JLGs | 89 | 61 | 20 |
| Total output(kg) | 201229 | 184281 | 77400 |
| Average Price (per kg) | 28 | 35 | 37 |
| Total revenue(rupees) | 5634412 | 6449835 | 2863800 |
| Revenue per acre (Rs/acre) | 20226.2 | 34553.92 | 66911.21 |
| Revenue per JLG (Rs/JLG) | 63308 | 105735 | 143190 |
| Source: Primary Data |

The table shows the crop-wise revenue from a single harvest by JLGs.It is found that the average price of 1 kg of vegetables that they produced was more than that of other crops. It was 37 rupees for vegetables whereas 35 rupees for banana and 28 rupees for paddy. The revenue from unit area reveals that it is much higher for vegetables (66911.21 rupees), next comes banana with 34553.92 rupees per acre and the least revenue is from paddy crop, 20226.20 rupees per acre. When revenue per JLG is considered, it also shows the same pattern with vegetable crop at the top position (143190 rupees), banana in the medium position (105735 rupees) and paddy the least of 63308 rupees.

**Cost of production**

The crop-wise cost of paddy, Banana and vegetables can be summarized with help of primary information. It includes different categories of cost as per the Cost A method. In addition to that imputed labour cost of different crops were separately examined. After that total cost of production except imputed labour cost is calculated. Total cost of production per acre and per JLG were calculated. Crop-wise cost of production under various heads is presented in Table 3.

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| Table 3 |
| Crop-wise Cost of Production |
| (Figures in brackets show the percentage of the resource cost to the total cost) |
| Resources |  Cost of Production (Rs per JLG) |
| Paddy |  Banana |  Vegetables |
| Seed  | 1818(3.86) | 4112(13.08) | 1070(5.31) |
| Fertilisers/manures | 6750(14.33) | 6700(21.32) | 10700(53.09) |
| Pesticides &weedicides | 890(1.89) | 769(2.45) | 935(4.64) |
| Machineries | 31200(66.23) | 7664(24.39) | 5350(26.54) |
| Hired labour  | 5200(11.04) | 11112(35.36) | 1200(5.95) |
| Other expenses | 1253(2.65) | 1070(3.40) | 900(4.47) |
| Total Cost per JLG of all resources excluding imputed labour | 47111(100) | 31427(100) | 20155(100) |
| Imputed labour cost | 61159 | 100490 | 149310 |
|   | Cost of Production (Rs per acre) |
| Paddy | Banana | Vegetables |
| Total Cost per acre of all resources excluding imputed labour | 15051.43 | 10270.26 | 9418.22 |
| Imputed labour cost | 19539.62 | 32839.87 | 69771.03 |
| Source: Primary Data |

The table depicts the resource-wise cost of production of the three crops. In the present study, it is found that machinery cost is the largest component (66.23%) in the cost of production of paddy. The cost of machineries means the running expenses of the same. That means, both labour and fuel are needed to run the machineries and the JLGs have incurred a considerably large cost on it. Banana and vegetable cultivation make use of machineries at the beginning for preparation of land and for the irrigation throughout. The running costs of machineries to total cost are 24.39 percent and 26.54 percent for banana and vegetables respectively. Fertilizers incurred 14.33 percent of total cost and hired labour incurred 11.04 percent in paddy cultivation. As per the Agricultural Census of 2015, the hired labour cost of paddy production in Kerala was 56 percent of the total cost (Dept of Economics and Statistics, Kerala, 2016). In JLG farming, the hired labour cost is lower because of imputed labour. In Kerala the hired labour cost of banana production is 44.34 percent as per the Agricultural Census. But in JLG farming, it is only 35.39 percent. In the cultivation of vegetables, the hired labour cost is only 5.95 percent of the total cost. Fertilizer/manure cost is the largest cost component in vegetable cultivation (53.09%). It is found that there is a great role for imputed labour in JLG farming. The imputed labour cost is greater among the vegetable cultivating groups. Thus, it can be inferred that the imputed labour could reduce total money cost of production by JLGs. However, the total cost of production per JLG or per acre excluding the imputed labour is the highest in paddy cultivation and the lowest in vegetable cultivation. Banana comes in the middle position in this case. But when we consider the imputed labour cost, it is much higher for vegetable production. So, the cost of production including imputed labour cost would show a reverse picture as vegetable cultivation comes in the top position, banana in middle and paddy in the lowest position.

**Profit of Cultivation**

The study considered profit as an efficiency indicator. The profit per acre and per JLG is examined separately. The net profit received by farmers is shown in the table:4.

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| Table 4 |
| Crop wise Profit of Cultivation from JLG farming |
| Sl. No. | Crops | Revenue (Rs) | Cost (Rs) |  Profit (Rs) |
| Per acre | Per JLG |  Per acre |  Per JLG | Per acre | Per JLG |
| 1 | Paddy | 20226.2 | 63308 | 15051.43 | 47111 | 5174.77 | 16197 |
| 2 | Banana | 34553.92 | 105735 | 10270.26 | 31427 | 24283.7 | 74308 |
| 3 | Vegetables | 66911.21 | 143190 | 9418.22 | 20155 | 57493 | 123035 |
| Source: Primary Data |

The profit per JLG is much greater for vegetable cultivation (Rs 123035) when compared to banana (Rs 74308) and paddy (Rs 16197) crops. The average net profit assessed area-wise also follows this pattern. The average net profit per acre is lower for paddy (Rs 5174.77). The vegetable cultivation is showing higher level of profit per acre of 57492.99 rupees. In this context we have to think about why vegetable cultivation is more profitable among the JLGs.

**Correlation between Profit and Resource Cost**

It is found that there is no hired labour in vegetable cultivation, but the imputed labour cost is the highest. More unpaid family labour and more participation of group members are involved in vegetable cultivation. So, it is interesting to examine the correlation between profit and resource costs. Correlation between Profit and Resource Cost of Production is depicted in Table 5.

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| Table 5 |
| Correlation between Profit and Resource Cost of Production |
| (Figures in brackets indicate the p value) |
| Sl. No. | Resources  | Correlation coefficient |
| 1 | Seed | 0.03 (0.71) |
| 2 | Fertiliser | 0.29(0.70) |
| 3 | Pesticides | 0.25(0.68) |
| 4 | Machine | -0.23(0.00) |
| 5 | Hired labour | -0.67(0.00) |
| 6 | Imputed labour | 0.81(0.00) |
| 7 | Linkage amount | -0.12 (0.11) |
| 8 | Lease amount | 0.08(0.27) |
| Source: Primary Data |

Among the resources, machinery cost, hired labour cost and imputed labour cost show significant correlation with profit. Of these, machine cost and hired labour cost are negatively related to profit. The cost of imputed labour has a high positive relation with profit, reveals that profit increases with increase in imputed labour. Since imputed labour is the major contributing factor in the vegetable cultivation, we can infer that its high profitability is due to the dedication of imputed labour.

**Relationship between imputed labour cost and profit**

To examine the relation between profit and imputed labour of JLGs, the JLGs are classified into 4 categories based on imputed labour cost – low, medium, high and very high. Category of JLGs on the basis of value of imputed labour cost is shown in Table 6.

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| Table 6 |
| Categorization of JLGs as per Imputed Labour cost |
| (figures in brackets shows percentages) |
| Sl. No. | Category of JLGs  | Value of imputed labour (in rupees) | No of JLGs |
| 1 | Low |  41680 or Less  | 8 (4.71) |
| 2 | Medium | 41681 -85641 | 100(58.82) |
| 3 | High | 85642 - 129604 | 39(22.94) |
| 4 | Very high | above 129604 | 23(13.53) |
| Total | 170(100) |
| Source: Primary Data |

It is found that 100 out of 170 JLGs (58.82%) come under the middle category of imputed labour cost and 13.53 percent come under the ‘very high’ category of imputed labour cost.

The efficiency of JLGs is different among different categories based on imputed labour. The efficiency is described in terms of profit. The difference in efficiency with respect to the different levels of imputed labour is analyzed using ANOVA, the results of which are given in Table 7. To examine the group-to-group difference in net profit, post-hoc analysis is also done. The groups where there is higher imputed labour have a greater level of profit. It is clear from the mean difference in the profit.

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| Table 7 |
| Mean difference in Profit across Imputed Labour Cost Groups |
| (Figures in brackets are the corresponding p values) |
| Sl. No. | Category of groups as per imputed labour | Mean Difference in profit | Std. Error |
|  |
| 1 | Low | Medium | -69927.58(0.00) | 17466.66 |  |
| high | -140807.04 (0.00) | 18450.77 |  |
| Very high | -258805.40(0.00) | 19512.59 |  |
| 2 | Medium | Low | 69927.58(0.00) | 17466.66 |  |
| high | -70879.47(0.00) | 8974.66 |  |
| Very high | -188877.82 (0.00) | 10993.39 |  |
| 3 | High | Low | 140807.04 (0.00) | 18450.77 |  |
| Medium | 70879.47(0.00) | 8974.66 |  |
| Very high | -117998.36(.00) | 12498.06 |  |
| 4 | Very high | low | 258805.40(0.00) | 19512.59 |  |
| Medium | 188877.82(0.00) | 10993.39 |  |
| high | 117998.36(0.00) | 12498.06 |  |
| Source: Primary Data |  |

The efficiency of medium, high and very high groups is greater than that of low, medium, and high groups respectively. The efficiency of those groups with ‘very high’ level of imputed labour is greater than those groups with high, medium, and low imputed labour. The mean differences in profit between the categories are highly significant. From this analysis, it can be inferred that imputed labour makes a notable positive difference in the efficiency of JLG farming. This result makes an interest in knowing whether the efficiency is varying with respect to different levels of hired labour cost.

**Relationship between Hired Labour Cost and Profit**

As per the hired labour cost incurred by the JLGs, they are categorised in to four as low, medium, high and very high. Table 8 shows category of JLGs on the basis of hired labour cost.

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| Table 8 |
| Categorization of JLGs as per the Hired labor cost |
| (figures in brackets shows percentages) |
| Sl. No. | Category  | Labour Cost (in Rupees) | Number of JLGs |
| 1 | Low | Less than 770 | 28(16.47) |
| 2 | Medium | 770 - 1866 | 57(33.53) |
| 3 | High | 1867 - 2964 | 68(40.00) |
| 4 | Very high | 2964. and above | 17(10.00) |
| Total | 170(100) |
| Source: Primary Data |   |   |

It is understood that majority (40%) of JLGs come under the category of ‘high’ hired labour cost. Also, 33.53 percent of JLGs come in the ‘medium’ category and 10 percent in ‘very high’ category of hired labour cost.

Table 9 reveals that the mean difference in profit among different hired labour cost categories of JLGs are different. The JLGs with lower level of hired labour are showing higher level of net profit than medium, good and high groups. Groups with high level of hired labour are having lower level of net profit.

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| Table 9 |
| Mean difference in Profit across the hired labour cost groups |
| Sl. No. | Category of groups as per hired labour cost | Mean Difference in profit  | Std. Error | p-value |
|  |
| 1 | Low | medium | 76684.62 | 14867.13 | 0 |  |
| good | 134299.82 | 14465.59 | 0 |  |
| high | 176669.51 | 19807.83 | 0 |  |
| 2 | Medium | low | -76684.62 | 14867.13 | 0 |  |
| good | 57615.2 | 11569.03 | 0 |  |
| high | 99984.88 | 17802.79 | 0 |  |
| 3 | High | low | -134299.8 | 14465.59 | 0 |  |
| medium | -57615.2 | 11569.03 | 0 |  |
| high | 42369.68 | 17468.86 | 0.02 |  |
| 4 | Very high | low | -176669.5 | 19807.83 | 0 |  |
| medium | -99984.88 | 17802.79 | 0 |  |
| good | -42369.68 | 17468.86 | 0.02 |  |
| Source: Primary Data |  |

It is found that mean difference in net profit between any two categories of JLGs based on hired labour cost is highly significant.

**Marginal Product of Hired Labour and Imputed Labour**

The productivity of imputed labour is lower when compared to that of hired labour. But the marginal product of imputed labour is positive, though very less. The marginal product of hired labour is negative with respect to all crops.

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| Table 10 |
| Crop wise Marginal Product of Hired and Imputed Labour |
| Sl. No. | Crops | Marginal Product |
| Hired labour | Imputed labour |
| 1 | Paddy | -1.6 | 0.06 |
| 2 | Banana | -1.4 | 0.03 |
| 3 | Vegetables | NA | 0.06 |
| Total | -0.9 | 0.04 |
| Source: Primary Data |

The marginal products of imputed labour with respect to paddy and vegetable cultivation are the same equal to 0.06 while it is 0.03 for banana cultivation. However imputed labour is contributing positively to the farming process. Since this labour is exclusively by the JLG members, their collective effort is to be accounted.

**Conclusion**

The study concludes that the profit per acre and per JLG is much higher for vegetables when compared to Banana and Paddy. The high profitability of vegetable cultivation compared to paddy and banana farming can largely be attributed to the dedication and efficiency of imputed labour, which consists of unpaid family or self-contributed work. Unlike hired labour, imputed labour is driven by personal investment in the farm’s success, leading to meticulous care, timely interventions, and cost savings that enhance overall profitability. Vegetables, being labour-intensive and requiring frequent monitoring, benefit significantly from the flexible and adaptive work patterns of imputed labour, ensuring better yields and market readiness. In contrast, paddy and banana cultivation rely more on seasonal or consistent hired labour, which may not always match the efficiency and commitment of family-managed farms. To bridge this gap, initiatives such as specialized training for hired workers, incentive-based payment structures, and technological advancements in farm management could help enhance productivity across all crops. Understanding and leveraging the role of imputed labour can provide valuable insights for agricultural policies and farm management.

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