The income distribution and contribution of palm sugar producer in increasing the household welfare of palm sugar maker in Kolaka Southeast Sulawesi Indonesia

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Abstract. The objective of the research were to analyze socio-economic characteristics and motivation of farmers in aren sugar processing business in Kolaka District, Southeast Sulawesi, Indonesia. The analysis used in this research was quantitative descriptive analysis. The results showed that average state of socio-economic characteristics of aren sugar farmer that were in the category of productive age, which was 46.12 years old, has fulfill basic education category (9 years education), low category of dependents as many as three people, the Average experience of aren sugar processing business during 18 years, and the Average aren trees were tapped as much as seven trees, every day, (b) farmer’s motivation in aren sugar processing business in low category, with the indicator is the motive of imitation, economic, security, affiliations, awards, and self-actualization

1. Introduction
The target of agricultural development is directed to increase the income and welfare of farmers through the empowerment of farming communities. In achieving the development goals, the policy and strategy of agricultural development is done through the development and system of agribusiness efforts as a whole and integrated. Agribusiness is not only agriculture, but includes industries that produce agricultural production facilities and agricultural processing industry (agroindustry) [1].

AREN sugar agroindustry is an effort to diversifying sugar and increase the utilization of aren sugar economically and stimulate the rural community to participate actively in small scale or household industry. Aren agroindustry is also a container to obtain or increase family income even though the processing is still very simple (process and its equipment), with limited human resources [2-5]. Discussion about income distribution concerning poverty and inequality was released in the 1970s in both developed and developing countries [6]. Assessment of the welfare problem is also widely done in Indonesia, including the distribution problem of land, farm income, and household incomes.

 Aren sugar has been produced in several districts in Southeast Sulawesi, namely, Bombana, Kolaka, and Muna. The most popular brown sugar in Kendari City (the capital of Southeast Sulawesi) is aren sugar from Kolaka District. Therefore, Objectives of this research were to find out how the
income distribution of aren sugar producer in household industry scale, to know the income contribution of aren sugar household industry to the total income of aren sugar producer household, and to know the role of aren sugar household industry to the welfare level of sugar producer in Kolaka District.

2. Material and Method
2.1. Sampling method
The population of this research was people who tapped aren sap and produce aren sap into aren sugar in household industry scale in the Wolo Sub District, Kolaka District, as much as 72 people. Sampling method for aren sugar producers was purposive random sampling method. Sample was taken using purposive random sampling method.

2.2. Data analysis
2.2.1. Income distribution. The measurement of the income distribution used the drawing method with the Lorenz Curve and the number method with the Gini coefficient. Gini coefficient was calculated by using the formula that is:

\[ G = 1 - \sum_{i=1}^{k} f_i \left( Y_i + Y_{i-1} \right) \]  

Where:
- G : Gini indeks
- k : number of group
- f_i : The proportion of the number of households in the class, i = 1
- Y_i : The cumulative proportion of income from the number of sample households to the i’s grade
- Y_{i-1} : The cumulative proportion of the previous amount of income

The criteria used to determine the level of equally or imbalances of aren sugar producer’s income distribution were:
- a. Imbalance is low when Gini coefficient is between 0.20 – 0.35
- b. Imbalance is medium when Gini coefficient is between 0.36 – 0.49
- c. Imbalance is high when Gini coefficient is between 0.50 – 0.70

2.2.2. Income contribution of aren sugar household industry to the total income of aren sugar producer household. The amount of income contribution of aren sugar household industry to the aren sugar producer household could be obtained by calculating the percentage of income of aren sugar household industry to the total household income, by using formula:

\[ \text{income contribution} = \frac{\text{income of aren sugar household industry}}{\text{total household income}} \times 100\% \]  

The criteria of income contribution [7] as follows:
- Income contribution is very low if its value < 25%.
- Income contribution is low if its value about 25 - 49%.
- Income contribution is very high if its value about 50 - 75%.
- Income contribution is very high if its value < 75%.

2.3. Analysis of household welfare
Welfare was analysed by GSR (Good Service Ratio), ie compare the consumption expenditure of (primary needs) to services and services (secondary needs).

\[ \text{GSR} = \frac{\text{the expenditure of primary needs}}{\text{the expenditure of secondary needs}} \]
Welfare criteria:
GSR > 1 means; aren sugar producer is less prosperous
GSR = 1 means; aren sugar producer is prosperous
GSR < 1 aren sugar producer is more prosperous

3. Result and Discussion
3.1. Household income of aren sugar producer
The income of aren sugar producer household comes from various sources. It was divided into two kind source, namely income from in and out of aren sugar house hold industry.

Table 1. Distribution of aren sugar producer by household income, Kolaka District, 2014

| No | Income of aren sugar household industry (Rp year\(^{-1}\)) | Number (people) | Percentage (%) |
|----|--------------------------------------------------------|-----------------|----------------|
| 1  | < 50,402,685.19                                       | 50              | 69.44          |
| 2  | 50,402,685.19 – 93,409,787.04                          | 20              | 27.78          |
| 3  | > 93,409,787.04                                        | 2               | 2.78           |
| Total |                                                 | 72              | 100.00          |

Average: 39,684,523.15
Max: 136,416,888.89
Min: 7,395,583.33

| No | Household income without income of aren sugar household industry (Rp year\(^{-1}\)) | Number (people) | Percentage (%) |
|----|----------------------------------------------------------------------------------|-----------------|----------------|
| 1  | < 41,911,500                                                                      | 69              | 95.83          |
| 2  | 41,911,500 – 83,823,000                                                           | 1               | 1.39           |
| 3  | > 83,823,000                                                                      | 2               | 2.78           |
| Total |                                                  | 72              | 100.00          |

Average: 11,107,720.15
Max: 125,734,500.00
Min: 0.00

| No | Total household income of aren sugar producer (Rp/year) | Number (people) | Percent (%) |
|----|--------------------------------------------------------|-----------------|-------------|
| 1  | <64,820,055.57                                        | 54              | 75.00       |
| 2  | 64,820,055.57 – 122,244,527.78                        | 14              | 19.44       |
| 3  | >122,244,527.78                                       | 4               | 5.56        |
| Total |                                                  | 72              | 100.00      |

Average: 50,792,245.29
Max: 179,669,000.00
Min: 7,395,583.33

Other income sources of aren sugar producer come from farming and services. The farming income came from food crops and or plantation, such as rice field, cocoa, clove, *langsat*, *durian*, and others. The incomes from services, among others carpenters, retailer of nine basic materials of daily needs, and merchant collectors, and other.

3.2 Income distribution
3.2.1. Gini index method (gini ratio). Based on the analysis of Gini Index, household income of aren sugar producer without income of aren sugar household industry and income of aren sugar household industry both were in the category of low imbalance with Gini Index each other of 0.35,
and 0.20. As well as the total household income of aren sugar producer was in the low imbalance category with Gini Index of 0.22.

Gini index of the income of aren sugar household industry lower than household income of aren sugar producer without income of aren sugar household industry. It means that the income of aren sugar household industry made the income distribution of aren sugar producer more balance. The analysis result of income distribution by using Gini Index could be seen in Table 2.

Table 2. Gini index value of household income index of aren sugar producer, Kolaka District, 2014

| No | Income source                  | Gini index value | Imbalance category |
|----|--------------------------------|------------------|--------------------|
| 1  | Aren sugar household industry  | 0.20             | Low                |
| 2  | Total household income without industry | 0.35         | Low                |
| 3  | Total Income                   | 0.22             | Low                |

3.2.2. Lorenz curve. The Lorenz curve provide an overview of the balance level and quantitative relationship between the percentage of income recipient and the percentage of income received. Here was a figure of Lorenz curve calculated from the Gini Index on Table 2.

![Lorenz curve of income distribution of aren sugar producer in Kolaka District](image)

Figure 1. Lorenz curve of income distribution of aren sugar producer in Kolaka District

Figure 1 showed that the Lorenz curve of total income distribution without the aren sugar household industry lies somewhat away from the perfect balance line, whereas Lorenz curve of income of aren sugar households industry was closest to the balance line, and the Lorenz curve of the total income distribution was between both. It could be explained that the income distribution of aren sugar household industry was more balance than others. Therefore, the income of aren sugar household industry played a role in improving the income distribution of aren sugar producer more balance.

3.2.3. Income contribution of aren sugar household industry to total household income. The income contribution of aren sugar household industry to the household’s income as follows:

\[
\text{income contribution} = \frac{\text{income of aren sugar household industry}}{\text{total household income}} \times 100\%
\]

\[
\text{IC} = \frac{39,684,523.15}{50,792,245.29} \times 100\% = 78.13\%
\]

The income contribution of aren sugar household industry to the total household income of aren sugar producer was 78.13 percent. This showed that the aren sugar household industry give high
contribute in supporting the household economy of aren sugar producer. It also showed by the result of one sample t-test, where the value of t-count was greater than t-table at error level $\alpha = 0.05 (10.529 > 2.646)$. The result of one sample t-Test of income contribution of aren sugar household industry could be seen in Table 3.

**Table 3.** The result analysis of one sample t-Test of income contribution, aren sugar household industry in Kolaka District, 2014

| Variable                  | Mean   | Standard Deviation | Mean Error Standard | Criteria | t-count |
|---------------------------|--------|--------------------|---------------------|----------|---------|
| Income contribution       | 77.4899| 22.15420           | 2.61090             | $\geq 50\%$ | 10.529  |

$\alpha = 0.05$; $N= 72$; $df = 71$; $t$-table = 2.646

3.2. 4. The welfare level of aren sugar producer

a. Criteria of good service ratio (GSR) welfare.

The average expenditure of aren sugar producer household for primary needs amounted to Rp 1,449,861.00 while for secondary needs amounted to Rp 2,148,905.00. Based on that value, GSR (Good Service Ratio) was calculated as follows:

$$GSR = \frac{the\ expenditure\ of\ primary\ needs}{the\ expenditure\ of\ secondary\ needs}$$

$$GSR = \frac{1,449,861}{2,148,905}$$  \hspace{1cm} (5)

$$GSR = 0.67$$

Based on the results of GSR analysis, the ratio of household consumption expenditure for primary and secondary needs was amounted 0.67 ($GSR < 1$). It means that the aren sugar producer household was more prosperous. It also showed by the result of one sample t-test that could be seen in Table 4.

**Table 4.** Result analysis one sample t-Test good service ratio, craftsman household industry sugar Aren in Kolaka District, Year 2014

| Variable | Mean   | Standard Deviation | Mean Error Standard | Criteria | t-count |
|----------|--------|--------------------|---------------------|----------|---------|
| GSR      | 0.8315 | 0.4896             | 0.0577              | $< 1$    | -2.920  |

$\alpha = 0.05$; $N= 72$; $df = 71$; $t$-table = 2.646

Table 4 showed that t-count value was smaller than t-table at error level $\alpha = 0.05 (-2.920 < 2.646)$. This means that the null hypothesis is rejected and the alternative hypothesis is accepted, therefore, it could be concluded that aren sugar producer was economically prosperous.

4. Conclusion

Based on the research concluded that (1) the income of aren sugar household industry made the income distribution of aren sugar producer more balance, (2) income contribution of aren sugar household industry to the total income of aren sugar producer household, (3) the aren sugar household industry have important role to the welfare level of aren sugar producer in Kolaka District.
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