Performance and added value of brown sugar production in Rembang Regency

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Abstract. Sugar cane processing into brown sugar in Rembang Regency is done by home industries. This activity has been done for 100 days in a year based on sugarcane harvest period. Research has been conducted from May to November 2019 at the production center in Karangharjo Village, Sulang - Rembang with the aim to see the performance and added value of processing sugar cane into brown sugar. Data obtained through interviews and observations were analyzed descriptively by calculating the added value using the Hayami approach. The results showed that the processing of sugar cane into brown sugar by the home industry was still feasible with an added value of Rp 2,308 per kg or 24.00% at a market price of Rp 7,400. Brown Sugar Processing, including labor-intensive activities with contributions of 72.20%, is still carried out by employers because it can be a solution when sugar cane production from the farmer is less valued by the sugar factory. The industry production is sold to soy sauce company with simple requirements and cash payment.

1. Introduction
Rembang is one of the largest sugar cane producing districts in Central Java with a planting area of 7,062 ha. Sugar cane from this district is produced by smallholder businesses with an average planting area of 2.73 ha per farmer household (RTP) [1]. The farmer plant sugar cane by establishing a partnership contract with the Koperasi Petani Tebu Rakyat (KPTR) which is formed by the Sugar Factory (PG) as well as planting independently. Sugar Factory partnership processes sugar cane into white crystal sugar, while independent farmers process sugar cane into brown sugar and have free market. There are three PGs who are establishing partnership with farmers and are willing to accept harvested sugar cane, such as PG, GMM, PG, Pakis and PG, Rendeng. The PG contributions are business capital facilitation, technology development and guarantees for processing sugar cane into sugar for KPTR members who make partnerships. Sugar cane is usually harvested from July to September according to the maturity level of the cane in the field.

The majority of sugar cane in Rembang Regency is almost entirely planted on dry land with the BL variety so that the harvest period also coincides. This condition results in the accumulation of sugarcane production at one time not being balanced with the processing capacity at PG. The limited capacity of PG mills and workers in the field often effects in the harvest processing not running smoothly which decreasing in the quality and productivity of sugar cane. The limitation of sugar cane milling capacity at PG is a disadvantage for farmers. The quality of sugar cane in the field will
experience a decrease in the percentage of brix (solid value in sap) and pol (sucrose value in sap) as sugar-forming ingredients [2]. A further loss could be higher if the sugar cane experiences processing delays as a result of queuing too long for mills at the sugar factory. The requirement for farmers to send sugarcane crops to PG is part of a cooperation contract where farmers have received benefits from capital facilitation in the form of an implementation fee of Rp 5,000,000 / Ha as well as costs for production facilities in the form of seeds, fertilizers, and cutting and transport which amount is according to their needs and is agreed upon, by PG. This fee must be paid by farmers when they accept the sale of sugar. Sugar Factory will sell sugar products from farmers by way of an auction and then deduct the sales proceeds. For small farmers who need cash immediately, this mechanism is less effective, so they look for other alternatives by selling or processing sugar cane themselves.

The independent sugar cane planting business is carried out with their own fund and skills so that farmers are free to determine their production allocation. Over time, this business is increasingly in demand. Currently, the area of independent sugar cane reaches 2,210 hectares, involving 1,079 RTP or an average of 2.05 Ha / RTP [1]. Most of the independent people’s sugarcane production is processed into brown sugar to be deposited to food industry companies or sold directly to PG based on the weight of the sugar cane.

Sugarcane farmers’ efforts to earn income quickly and efficiently are carried out through processing sugar cane into “gula merah awur”, This type of sugar is a type of brown sugar cane which has different names between regions in Indonesia. Some say “gulo abang”, “gulo jowo”, “gula tumbu” and so on. The process of producing fresh brown sugar uses traditional technology eventhough it has been running for years. The brown sugar processing industry is an informal industrial sector in rural areas that does not have a license and a company name. Gula merah awur produced in Rembang Regency is the result of evaporation of sugar cane juice with the principle of making brown sugar, as in general, it is only added with certain mechanical treatments so that the results are in the form of coarse chunks and are easily put in sack packages. This is done because the target market for gula merah awur from Rembang Regency is only intended as raw material for the soy sauce and dodol industry. Gula merah awur from home industrial in Rembang Regency is not found in the retail market because it is only sold by order or marketed directly to the food processing industry outside Rembang Regency. This product is rarely used by household consumers even though it actually has the same benefits as other brown sugar.

The use of brown sugar is different from white crystal sugar because brown sugar produces a sweet caramel flavor that is not present in white sugar so that it has a respective role in food processing [3]. In terms of nutritional content, brown sugar has advantages in terms of antioxidant and antiproliferative content of phenol molecules, trisin, glucoside acylation in sugarcane juice which plays a role in cancer prevention [4-7]. In addition, there are also components of iron and vitamin C which are anti-oxidant [4]. Judging from the nutritional content and its benefits on health, brown sugar can be said to be healthier than white sugar [4,5].

The persistence of brown sugar producers in their efforts deserves appreciation considering that the products are cheaper than other brown sugar cane. As an illustration, in 2019 the price of dry brown sugar is only Rp. 7,000-Rp. 8,000 per kg, while the price of printed brown sugar reaches Rp, 15,000 per kg. This cannot be separated from the efficient use of available resources. The choice of the type of brown sugar to be produced is based more on the ease of terms and marketing of the product, Information related to the added value and contribution to the creation of business activities in rural areas carried out by ordinary brown sugar entrepreneurs is still limited, so this research was conducted with the aim of knowing the amount of added value obtained and the compensation for the owners of production factors.
2. Research Methodology
The research was conducted in Karangharjo Village, Sulang - Rembang, which is known as the center for planting sugar cane and processing the most sugar cane. Data was taken by census and observations on 17 gula awur industries from May to November 2019, including data on production input output and other related aspects. To calculate added value, share of labor, margin and so on, Hayami calculation approach can be used. This calculation method has been widely used to calculate the added value of various processing businesses [8-10]. Added value is calculated based on the formula as shown in Table 1. To assess wage performance, an hourly wage is compared between the amount of wages received for processing brown sugar and wages based on the UMK Rembang standard according to the Governor of Central Java [11].

Table 1. Added value calculation formula.

| Variable                          | Notation | Calculation       |
|----------------------------------|----------|-------------------|
| **Output, Input and Price**      |          |                   |
| 1. Brown Sugar (kg/day)          | OP       |                   |
| 2. Sugar Cane (kg/day)           | IP       |                   |
| 3. Worker (HOK/day)              | LB       |                   |
| 4. Conversion Factor             | FKO      | OP/IP             |
| 5. Worker Coefficient (HOK/ kg)  | KTK      | LB/IP             |
| 6. Price of Brown Sugar (Rp/kg)  | HO       | Rp                |
| 7. Price of Sugar Cane (Rp/kg)   | HP       | Rp                |
| 8. Worker Wage (Rp/ HOK)         | UP       | Rp                |
| **Acceptance and Profit**        |          |                   |
| 9. Sugar Cane Raw Material Value (Rp/day) | NBB   | IP*HP             |
| 10. Another Input Value (Rp/day) | NIL      | Rp                |
| 11. Brown Sugar Value (Rp/day)   | NO       | OP*HO             |
| 12. Added Value (Rp/day)         | NT       | (NO-NIL-NBB)      |
| 13. Added Value Ratio (%)        | RNT      | (NT/NO)*100       |
| 14. Worker (Rp/day)              | RTK      | KTK*UP*HOK        |
| 15. Share of Worker (%)          | PTK      | (RTK/NT)*100      |
| 16. Profit (Rp/kg)               | PFT      | NT-RTK            |
| 17. Profit Rate (%)              | TPF      | (PFT/NT)*100      |
| **Compensation For The Owner Of Production Factors** | | |
| 18. Margin (Rp/day)              | MR       | (N0-NBB)          |
| 19. Worker Income (%)            | MTK      | (RTK/MR)*100      |
| 20. Other Input Donation (%)     | MIL      | ((NIL/MR)*100     |
| 21. Entreprenuer Profit (%)      | MP       | (PFT/MR)*100      |

Source: Hayami et al in (1,2,3)

3. Results and Discussion

3.1. Brown Sugar Processing Industry Profile
The profile of brown sugar home industry in Rembang Regency is presented in Table 2. Based on the indicators of the number of workers and working capital used, BPS and the Micro, Small and Medium Enterprises Law No, 20 of 2008 are categorized as small-scale businesses. The majority of these businesses are carried out by sugar cane farmers [12]. However, the sugar cane yield from the planting itself is usually not sufficient to meet the production capacity of the brown sugar processing being
carried out. To meet the production capacity during the milling period, 1,000-1,200 tons of sugar cane are needed per business unit. The productivity of sugar cane in the research location is low, which is only 30-40 tonnes / ha, so it takes a sugar cane plantation of 25-30 ha per unit of brown sugar processing business. No brown sugar processing business owner owns such an area, so to meet the raw materials obtained from self-planting and buying from other farmers, this is done so that the availability of raw materials is guaranteed. The same is done by brown sugar entrepreneurs who are also non-sugar cane entrepreneurs. Brown sugar processors who are also entrepreneurs usually plant relatively narrow sugar cane so they are more aggressive in purchasing sugar cane from farmers. The source of raw material for sugar cane for processing brown sugar is obtained from around the location of each brown sugar processing industry with a distance of a maximum distance of 5 km. This is intended so that the transportation cost is cheap and the raw materials obtained are still fresh until the mill process. Currently, the competition for raw materials is increasing because PG also purchases raw materials from non-contract farmers. In general, brown sugar entrepreneurs make cash payments for farmers' sugarcane, whereas those made by PG are usually paid a few days later. This is what makes farmers happier to partner with brown sugar entrepreneurs. The raw material for processing brown sugar cane comes from the purchase of farmers who are selected based on the selection of quality sugarcane because they are purchased from good sugarcane planting.

Table 2. Brown sugar processing business profile in Rembang 2019.

| Variable               | Description                                      | Information |
|------------------------|--------------------------------------------------|-------------|
| Livelihood             | Sugar Cane Farmer and Brown                       | 70          |
|                        | Sugar Production (%)                              | 30          |
| Raw Materials Origin   | Own Plant (%)                                     | 60          |
|                        | Purchase (%)                                     | 40          |
| Work Capacity          | Machine (PK)                                      | 24          |
|                        | Mill (ton/day)                                    | 10          |
|                        | Work Day (day/year)                               | 100-120     |
|                        | Worker (person/day)                               | 6-11        |
|                        | Working Capital (Rp 000)                           | 300-500     |

Source: Primary Data

The location for the processing of brown sugar is a simple barracks and a place to collect around the location where the business owner lives. The processing of raw sugar is carried out by 6-11 workers who are supported by the use of a diesel engine with a power of 18-24 PK and a series of sap evaporation furnaces containing 6-10 large pans. This machine is only used to mill sugar cane to produce sap with the machine working 6-8 hours a day. Furthermore, the sap is evaporated using a large skillet on the stove which is lined with fuel from the bagasse produced from the sugar cane squeezing process. The cooking of the sap is carried out until it reaches a certain thickness to be poured into a wooden container to make awur. The workers carry out activities is adjusted to the amount of raw sugar cane supplied in a working day and processed until they run out. Usually the raw material that is milled reaches 10-12 tons per day. Based on this volume, it takes 8-11 hours to carry out the activity with 6 times the process of cooking brown sugar. Work in one unit of the brown sugar processing industry includes work of cutting sugar cane, loading and unloading, transportation, milling sugar cane, evaporation of sap, forming raw sugar and packaging. The sugar processing industry is a labor-intensive industry that does not consume a lot of fuel because the solid waste produced can be used directly as fuel for evaporation of sap. However, work in the brown sugar processing industry is a kind of hard physical work because everything has to be done manually. The working team in brown
sugar processing consists of business owners and wage workers from their own environment who are managed in a family manner. They get wages, food consumption and temporary housing. Business owners usually act only as managers who are not directly involved in the production process.

3.2. Product Qualification

The technology used in the brown sugar manufactures is still traditional and simple until running today. These activities include milking the sap, filtering, applying lime, evaporating the sap, forming and packaging. The final result is brown sugar in the form of coarse chunks packed in a plastic bag. This product is accepted and can be used directly by the soy sauce and dodol jenang industry because the resulting texture is considered suitable for the processed product to be made. The producers of this dry form of brown sugar are benefited by consumers because they no longer need to carry out long storage. The quality of brown sugar can be damaged if the quality of storage is poor [7] Industrial consumers generally do not require a certain quality because goods are obtained when they are fresh and the price is relatively cheap compared to other brown sugar products. The marketing chain for plain sugar is very short because it only involves producers and consumers, this is different from the marketing of brown sugar in the form of printed or granular or coconut brown sugar, whose marketing involves many other actors, so that the price of brown sugar is more competitive [13]. As an illustration, the price of raw sugar is Rp 7,400 / kg while other types of brown sugar cane reach Rp 12,000 / kg.

Brown sugar products produced by home industries in the research location do not meet the SNI requirements for all tested variables [14]. In the trade arena, the quality of brown sugar has certain standards according to SNI No 01-6237-2000 in terms of moisture content, color, hardness and so on (Table 3). Based on the table, it can be seen that the water content is very high because the result of the processing there is no further treatment or improvement of the packaging method that can inhibit the entry of moisture. However, this high water content and reducing sugar is not a problem for consumers because the brown sugar purchased will be used directly and not stored for a long time so that further damage to this brown sugar does not occur. The same thing applies to the color variable, the resulting brown sugar tends to be dark. In the market, brightly colored brown sugar is considered a quality product. The presence of dark color in the resulting brown sugar is influenced by the sugarcane variety used. Sugar cane that is used in general is the BL variety. This cane has a purplish red stem color so it affects the color of the sugar produced. The BL variety is known as sugar cane with high productivity and yield so that many farmers are still planted in Rembang Regency and become raw material for brown sugar [3,15]. Processing industry consumers do not mind the dark color in the sugar because this dark color matches the distinctive colors of soy sauce and dodol jenang.

**Table 3. Brown sugar qualification.**

| Variable                        | In Research Area | SNI Standard |
|---------------------------------|------------------|--------------|
| Water Content (%)               | 12.08-20.37      | 8-11         |
| Ash Content (%)                 | 2.19-5.16        | Max 2        |
| Lipid Content (%)               | 0.48-0.61        |              |
| Protein Content (%)             | 2.23-2.99        |              |
| Reduced Sugar Content (%)       | 15.49-17.24      | 11-14        |
| Contamination Level (log cfu/g) | 2.00-2.95        | Max 3.48     |
| pH                              | 4.39-4.56        |              |
| Residue Ca (ppm)                | 2333-3126        |              |
| Color                           | Dark Brown       | Light Brown – Dark Brown |
| Hardness                        | Not Hard         | Cohesive, soft sandy, not too hard |

Source: Ambarwati et al 2017
3.3. Results of Input-Output and Price Identification

The results of input-output identification and processing price of dark brown sugar are presented in Table 4. Based on the production capacity and productivity. It is known that the processing of sugar cane into brown sugar has a conversion of 0.1. This figure shows that on average, each processing of 100 kg of raw sugarcane will produce 10 kg of unripe brown sugar. This conversion rate is higher than the yield obtained from processing PG white crystal sugar. This can occur because in the processing of brown sugar all solid elements contained in the sap can be made into products [6] meanwhile in the manufacture of white crystal sugar only sucrose content is used. Information was obtained that between brown sugar processing business units resulted in different conversion rates. In each business unit there are differences in terms of technology application, equipment used, production management, quality of raw materials and different production constraints. This condition results in brown sugar being sold in the market with varying quality and price, the same thing also happens to the raw materials used. Basuki et al [16] reported that the condition of sugarcane planting in the study location was less productive because the majority had never been replanted and the maintenance was not optimal. In good sugar cane cultivation, sugar cane garden rejuvenation by replacing old plants (unloading ratoon) every 5 harvests or 5 years, meanwhile many farmer's crops have reached 18 harvests and are still continuing. The market price of raw sugar ranges from Rp 6,700-8,100 per kg. while the price of sugar cane on the land is around Rp. 400-600 per kg.

The processing of sugar cane into brown sugar is the interaction of various production factors which include raw materials, auxiliary materials, fuel, milling machines, labor and equipment. To achieve production efficiency, business owners make work arrangements based on their best experiences. The mechanism of the production process and the division of the roles of each worker have been adjusted according to the needs, so this arrangement starts from cutting sugarcane to packaging the results. The cooking capacity of the sap determines the amount of raw material processed and the length of daily working hours. Based on the cooking capacity of the sap, the average amount of sugarcane required reaches 10-12 tons. As much sugar cane was obtained from the cutting and transport team of 5 people. Furthermore, in the process of processing into sugar, a workforce of 5-6 people is needed to carry out the work of extracting the sap by machine, cooking the sap, making crusts and packaging the results. The whole series of activities is completed in one working day or for 8-11 hours. The brown sugar production period goes on following the availability of raw materials for the sugarcane plant in the land. The existence of sugar cane plants that are suitable for making sugar on dry land such as in Rembang Regency is available from June to September so that the brown sugar processing business only takes about 100 days a year. Based on the ability of workers in handling the raw materials used, the coefficient value of workers is 0.00083. This means that every 10,000 kg of sugar cane that is processed into brown sugar requires 8.3 HOK of workers. The value of the coefficient of workers in all observed units shows a difference. With the same production capacity the value ranges from 0.00080-0.00110. This condition can occur because the facilities and infrastructure as well as the management capabilities of each production unit are different.

| Table 4. Input, output and price for brown sugar production Rembang 2019. |
|---------------------------------|-----------|-----------|
| **Output, Input and Price**     | **Per Day** | **Per Year** |
| 1. Brown Sugar (kg/ day)        | 12,000    | 1,200,000 |
| 2. Sugar Cane (kg/ day)         | 1,200     | 120,000   |
| 3. Worker (HOK/ day)            | 10        | 1,000     |
| 4. Conversion Factor            | 0.1       | 0.1       |
| 5. Worker Coefficient (HOK/ kg) | 0.00083   | 0.00083   |
| 6. Price of Brown Sugar (Rp/ kg)| 7,400     | 7,400     |
| 7. Price of Sugar Cane (Rp/ kg)  | 500       | 500       |
| 8. Worker Wage (Rp/ HOK)        | 200,000   | 20,000,000 |
Source: Processed Primary Data

3.4. Added Value

The added value from processing sugar cane into brown sugar is presented in Table 5. It appears that the added value generated is directly affected by the level of raw material prices and the final product selling price. Each kilogram of brown sugar in the market costs Rp 7,400, meanwhile in the production process the value of a number of raw materials and other inputs reaches Rp 5,092. So based on these data, the added value contained in each kilogram of brown sugar is Rp 2,308 or 24%. The proportion of added value can change at any time following the dynamics of changes in raw material prices and brown sugar prices in the market. The price of raw materials will increase if the price of white crystal sugar increases. Up to a certain price, farmers will choose their sugarcane to be processed into crystal sugar in PG because the value for the results of the final product obtained is considered more profitable compared to sales in the brown sugar industry. On the other hand, the brown sugar processing industry must maintain its business continuity; therefore it will also increase the purchase price of raw materials. The competition for this raw material benefits sugarcane farmers because farmers have alternatives in distributing their sugarcane based on the desired level of profit. The price level of sugar cane reaches Rp. 400-Rp. 600 per kg following the dynamics of the price of sugar and the quality of sugar cane being offered.

From Table 4, it is known that the value in each kilogram of brown sugar is a worker contribution of Rp. 1,667 or 72.2%. The size of this proportion illustrates that the brown sugar processing industry is a labor-intensive industry which is still profitable, namely 27.8%, or Rp. 641 per kg. The value of the contribution of workers has a direct effect on the level of profitability. To increase profits, the management must increase production efficiency by increasing the productivity of its workforce.

Table 5. Acceptance and profit brown sugar production in Rembang 2019.

| Acceptance and Profit | Value               |
|-----------------------|---------------------|
|                       | Per Kg Product      | Per Day         | Per Year         |
| 1. Sugar Cane Raw Material Value (Rp)  | 5,000               | 600,000         | 60,00,000       |
| 2. Another Input Value (Rp)            | 92                  | 110,000         | 11,000,000      |
| 3. Brown Sugar Value (Rp)              | 7,400               | 8,880,000       | 888,000,000     |
| 4. Added Value (Rp)                    | 2,308               | 2,770,000       | 277,000,000     |
| 5. Added Value Ratio (%)               |                     | 24.00           |                |
| 6. Worker (Rp)                        | 1,667               | 2,000,000       | 200,000,000     |
| 7. Share of Worker (%)                 |                     | 72.20           |                |
| 8. Profit (Rp)                        | 641                 | 770,000         | 77,000,000      |
| 9. Profit Rate (%)                    |                     | 27.80           |                |

Source: Processed Primary Data

3.5. Production Factor Owner’s Fee

Fees for production factor owners are presented in Table 6. The fee for the owner of the production factor is derived from the level of margin obtained from the sugar processing industry. The amount of margin shows the difference between the value of the final product and the value of raw materials. This means that margin is the sum of the value of workers’ income, contributions from other inputs and profits earned by employers. From this table, it can be seen that the largest service fee value is spent to finance the workers involved and the smallest part is the financing of other inputs such as lime, fuel, depreciation costs, equipment service costs and so on. Based on the allocation of the margin distribution, the entrepreneurs get a net profit of 26.74% or a moderate level [9]. However, currently there is a tendency for the number of sugar processing industries to decline as a result of higher rain
patterns at the same time as the sugar cane harvest season. This condition encourages skilled workers in the brown sugar processing industry to leave and choose to work in their own agricultural business.

Table 6. Compensation for the owner of production factors in Rembang 2019.

| Production Factor Owner | Compensation Value Per Day (Rp) | Value Per Year (Rp) |
|-------------------------|---------------------------------|---------------------|
| Margin (Rp)             | 2,880,000                       | 288,000,000         |
| Worker Wage (%)         | 69.44                           | 69.44               |
| Other Input Donation (%)| 3.82                            | 3.82                |
| Entrepreneur Profit (%) | 26.74                           | 26.74               |

Source: Processed Primary Data

3.6. Wage Performance of the Brown Sugar Processing Industry

The wage performance in the brown sugar processing industry is presented in Table 7, seen from the productivity of the average hourly wage, it appears 108% higher than the district minimum wage (UMK) Rembang [11]. The UMR standard is a reference for measuring the appropriateness of the level of wages that employers provide to workers. Based on the data in Table 7, the level of wages of workers in the brown sugar processing industry is very feasible. The brown sugar processing industry which is still active is around 50 units out of 150 units that have been recorded by the Asosiasi Petani Tebu Rakyat in Rembang Regency. The existence of the brown sugar industry here is very beneficial in terms of job creation and plays a role in reducing the interest in urbanization of seasonal workers. Moreover, the brown sugar processing industry is a labor-intensive industry which in one milling season the number of workers involved reaches 500-600 people. The amount of labor absorption in this industry is very meaningful considering that agricultural employment during the dry season is only small. The average wage value for work from brown sugar processing is relatively high in financial terms because the workload and job characteristics are different from other work industries. Likewise, the number of working days, both per week and per month, appears to be more because the length of time people do work adjusts to the availability of raw materials and equipment capacity so that workers do not get a day off during the production period. This type of work is only available for 100 days a year. Wages according to the UMR reference are based on continuously available work in accordance with the principles of labor relations in UU No 13 Tahun 2003 on employment exempted for small businesses [17]. The workers consider that work in the brown sugar processing industry is not their main job, therefore they also have other jobs, for example as farmers, ranchers, agricultural laborers or other jobs that are still related to agriculture when the brown sugar processing season is over.

Table 7. Wage performance in brown sugar production in Rembang 2019.

| Work                                      | Average Wage (Rp/hour) |
|-------------------------------------------|------------------------|
| Brown Sugar Production                    | 20,000                 |
| In Accordance With UMK Rembang Work Standards | 9,595                 |

Source: Primary Data 2019 and BPS Rembang

4. Conclusion

Sugar cane processing into brown sugar in Rembang Regency is a small-scale home industry that absorbs a workforce of 500-600 people during the production season. The average wage rate for workers is Rp 20,000 per hour or 108% higher than the minimum wage requirement. The resulting product does not meet SNI requirements but is favored by industrial consumers because the nature of the product is easily adapted to the processing method in the food industry that uses it. Consumers...
benefit from products that are completely new, while producers also benefit from cash payments so that financial provision becomes smooth.

The conversion of sugar cane processing into brown sugar is 10% with a worker coefficient of 0.00083 or which means that every 10 kg of brown sugar is obtained from 10,000 kg of sugarcane with 8.3 HOK of workers. The added value that was successfully obtained was 24%, including the medium category or Rp 2,308 per kg of brown sugar according to the prevailing market price. The allocation of the largest margin is the worker's income, amounting to 69.44%, while the employer's net profit is 26.74%. The existence of the brown sugar industry is an alternative solution for farmers who want effective income from selling their sugar cane.

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