Labor allocation dynamics, problem, and strategy for plantation development in Indonesia

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Abstract. Women have important role in farming activities they have and running their household. This paper aims to analyze gender-based working time allocation in farming plantation to support the fifth SDG’s “gender equality”. The data source was from a micro panel data survey of the National Farmers Panel (PATANAS) done by the Indonesian Center for Agricultural Socio Economic and Policy Studies, Ministry of Agriculture, in 2009 and 2018. The qualitative research was adopted, data analyzed descriptively by comparing results in 2009 and 2018. The results showed that the time allocation for female workers outside the family per hectare in 2018 increased compared to 2009 for sugarcane, rubber, and cacao commodities. The allocation of labor time in women’s families also increased in sugarcane (+37%) and rubber (+33%) but decreased for cacao (-55%) and oil palm (-42%) because were replaced by labor from outside the family. The allocation of time for labor within the family and outside the family in both 2009 and 2018 was dominated by male workers. Male and female laborer have certain activity in plantation farming and in general wages of male laborers are higher than those of women. In 2009 the labor wage difference was IDR 5,163 and getting higher in 2018 ranging from IDR 6,048 (cacao) to IDR 9,302 (sugarcane). Suggested that to increase the participation of women in plantation farming, special improvement should be addressed to women’s capacities in technical, managerial, wages system and problems of women’s working on plantations which showed increasing labor.

1. Introduction

One of the main drivers of the positive GDB growth in the agricultural sector is the plantation subsector which amounts to IDR 163.49 trillion (28.59%) of GDP [1]. This growth is due to the increased demand for plantation commodities such as cacao, rubber, cloves, and tobacco as well as the increased foreign demand for processed oil palm commodities (CPO). The plantation subsector is also the largest contributor to total exports with a contribution of 90.92% or IDR 359.5 trillion, 11.6% higher compared to 2019 (IDR 322.1 trillion). The biggest increase was contributed by oil palm, rubber, cacao, coconut, and coffee commodities. In addition to the increase in exports, the farmer’s exchange rate (NTP) also increased 99.45 in June, then 102.86 to 110 during November 2020 or increased by 2.25% compared to October. The increase mainly occurred in oil palm and rubber where there was an increase in commodity prices in the international market. Based on this fact, the exports were targeted to be tripled through strategic plantation commodities, especially the main export commodities, namely oil palm, rubber, coconut, tea, and tobacco. For rubber plantation, efforts to improve the yields, incomes, and
environmental sustainability of two million smallholder farmers by 2023, Indonesia cooperates with a Country Partnership (CP) with Grow Asia’s [2].

An alternative to achieve these targets, the participation of plantation farmer households in the production process should be increased or improved. Therefore, research on the household members’ involvement in the plantation farming activities should be studied. The Indonesian Center for Agricultural Socio Economic and Policy Studies (ICASEPS) had conducted research on dynamics of household labor allocation as one out of eight (8) goals of the National Farmers Panel Research (PATANAS) in 2009 and 2018 [3]. The importance of the research is to derive the database for the implementation of the Gender Mainstreaming (GM) since the implementation of GM in all development in Indonesia had been announced in the Presidential Instruction (INPRES No. 9/2000). Implementing GM means involved the community (including the families of plantation farmers) in the entire development process start from planning, implementation, monitoring, and evaluation as well as the achievement of the benefits of the development. The importance of GM in agriculture development was stated in the Long Term Development Plan of the Indonesian Ministry of Agriculture explicitly stated GM in the Strategic Plan (Renstra) 2020–2024 in Chapter 3, point 2.3.d [4] to support the fifth of the Sustainable Development Goals namely Gender Equity (SDGs).

Gender equity is the process to achieve gender equality, while “gender” is an individual’s performance except their nature but as the result of the construction of their natural and socio-economic environment [5]. Considering the importance of gender in development, especially for SAGs because the participation of female labor source in agriculture from South-East Asia 50% [6]. These information raise some questions such as: how are the participation of female labour in plantation farming in Indonesia? What problems do they faced? And What should be done for their better involvement in the plantation farming to achieve the development target. The objectives of this paper is to describe about the dynamic of gender labor time allocation, the problem faced by women and the strategy to overcome the problem for the development of the plantation in Indonesia.

2. Materials and methods

2.1. Data source

The data source was from microdata from a survey in the National Farmers Panel (PATANAS) collected by a team of researchers under the ICASEPS, Indonesian Ministry of Agriculture. Primary data and information were collected in 2009 and 2018 through interviews based on a structured questionnaire, while secondary data generated from related institutions.

2.2. Study area and respondents

The study was done in four provinces of plantation production centers, such as West Kalimantan for oil palm, East Java for sugarcane, South Sumatra for rubber, and South Sulawesi for cacao. Each province is represented by one or two districts, such as Lumajang and Malang (East Java), Batanghari and Muaro Jambi (South Sumatra), Luwu and Pinrang (South Sulawesi) and Sanggau (West Kalimantan). The total respondent were 320 households, they are representative of 40 households from each district. The sampling method was stratified random sampling based on farmers’ land holding.

2.3. Methods

The data analyzed is part of the Farming Business data, especially the data on the use of labor within the family and outside the family in the sample commodity farming business. The data and information were analyzed qualitatively refer to Collins and Stockton [7] and presented descriptively based on the different results in 2009 versus 2018 to get the dynamic figure of the average time allocation in plantation farming.
3. Results and discussion

3.1. The dynamics of time allocation in plantation farming

The labor force in plantation farming consists of households and outside household or hired labor. Their time allocation/ha land in plantation farming for sugarcane, rubber, cacao, and oil palm are presented in Table 1. The finding showed the decreased time allocation from 2009 compared to 2018, respectively as -2, -32, -61, and -71% for sugarcane, rubber, cacao, and oil palm. Based on the source of labor, was found that the time allocation of labor from the household was also decreasing from 45, 100, 70, and 75% in 2009 to 27, 58, 65, and 73% in 2018, respectively for sugarcane, rubber, cacao, and oil palm which had been replaced by wage labor.

The explanation on the reasons for decreasing time allocation in rubber plantations was reported, namely the low price of the rubber production that influence smallholders decided to abandon or selling their plantations and switching to other income-generating activities or replacing rubber such as with oil palm. The reason for replacing rubber with oil palm was that the economic benefit of oil palm was being improved [8].

Table 1. The dynamics of time allocation/ha of land for plantation based on the commodity in 2009 compared to 2018.

| Commodity       | Household labor | Wage laborer | Total (household labor+ wage laborer) |
|-----------------|-----------------|--------------|---------------------------------------|
|                 | Hours/ha/year   | Percent      | Hours/ha/year | Percent | Hours/ha/year | Percent |
| Time allocation in 2009 |                |              |              |          |              |         |
| Sugarcane       | 273             | 45           | 337          | 55       | 600          | 100     |
| Rubber          | 4.374           | 100          | 0            | 0        | 4.374        | 100     |
| Cacao           | 1.085           | 70           | 428          | 30       | 1.513        | 100     |
| Oil palm        | 1.13            | 75           | 374          | 25       | 1.504        | 100     |
| Time allocation in 2018 |                |              |              |          |              |         |
| Sugarcane       | 141             | 27           | 377          | 73       | 518          | 100     |
| Rubber          | 1.732           | 58           | 1.24         | 42       | 2.972        | 100     |
| Cacao           | 301             | 65           | 283          | 35       | 584          | 100     |
| Oil palm        | 321(73)         | 73           | 113          | 27       | 434          | 100     |

3.2. The dynamics of household time allocation

As described that the total time allocation in farming plantation activities was decreased, the households’ labor time allocation in 2009 was also decreased. The highest decrease occurred in households of oil palm (Table 2), which was -33%, the second was cacao (-17%) and the lowest was Sugarcane (-0.4). The household member who involves in the plantation farming are husband and wife, Table 2 showed that the husband allocates more time to farming than the wife, respectively 63, 70, 57, and 60% for sugarcane, rubber, cacao, and oil palm.

Table 2. The dynamics of labor in the household (husband and wife) time allocation based on the commodity in 2009 compared to 2018.

| Commodity       | Husband | Wife | Total (husband + wife) |
|-----------------|---------|------|------------------------|
|                 | Hours/ha/year | Percent | Hours/ha/year | Percent | Hours/ha/year | Percent |
| Time allocation in 2009 |         |       |              |          |              |         |
| Sugarcane       | 170     | 63   | 103          | 37       | 273          | 100     |
| Rubber          | 3.074   | 70   | 1.301        | 30       | 4.375        | 100     |
| Cacao           | 619     | 57   | 466          | 43       | 1.085        | 100     |
| Oil palm        | 673     | 60   | 457          | 40       | 1.13         | 100     |
| Time allocation in 2018 |         |       |              |          |              |         |
| Sugarcane       | 131     | 48   | 141          | 52       | 272          | 100     |
| Rubber          | 2.213   | 56   | 1732         | 44       | 3.945        | 100     |
| Cacao           | 599     | 67   | 301          | 33       | 900          | 100     |
| Oil palm        | 439     | 58   | 321          | 42       | 760          | 100     |
Compared to 2018, the husband time allocation has a similar trend which is more than the wife but showed decreasing time allocation (-23,-28, -3, and -35%). Instead, In 2018 the wife's time allocation for farming showed an increase, such as in sugarcane and rubber crop were significantly increase as 37 and 30% but decrease for cacao and oil palm (-35 and -30%). According to Azzahra [9], this finding is due to this is due to the family effort to meet their daily needs to survive, therefore they took the opportunity to work on an expanding oil palm plantation. This opportunity is also used by families from low economic strata to switch their livelihoods from laborers on rubber plantations to oil palm or who were originally housewives to workers in oil palm plantations.

3.3. The dynamics of outside household time allocation

Labor outside the family or hired labor is needed by farmers to help fertilize crops, clear land, spray weeds, and pests. Certain farming activities were done by male or female labor. In 2009, labor from outside the household was only found in sugarcane as 55% for males and 45% for females. In rubber, plantations were no labor outside the family from both male and female, but in cacao and oil palm were found male labor only (Table 3). Result in 2018 shows an increase in labor outside the family in all commodities, including rubber, and the presence of female workers in cacao but not in oil palm. The reasons that there was no female hired labor in oil palm farming was because in general hired laborers are men for oil palm farming in the sample village.

| Commodity | Male | Female | Total (male + female) |
|-----------|------|--------|-----------------------|
|           | Hours/ha/year | Percent | Hours/ha/year | Percent | Hours/ha/year | Percent |
| Sugarcane | 185 | 55 | 152 | 45 | 337 | 100 |
| Rubber    | -   | -   | -   | -   | -   | -   |
| Cacao     | 428 | 100 | 0   | 0   | 428 | 100 |
| Oil palm  | 374 | 100 | 0   | 0   | 374 | 100 |
| Sugarcane | 208 | 55 | 169 | 45 | 377 | 100 |
| Rubber    | 736 | 60 | 504 | 40 | 1,240 | 100 |
| Cacao     | 187 | 66 | 96  | 34 | 283 | 100 |
| Oil palm  | 261 | 100 | 0   | 100 | 261 | 100 |

The absence of female labor in plantation farming according to Samosir [10], in the case of oil palm plantation is that the contribution of women’s income as a laborer in oil palm plantation to total household income is considered as a substitution because women have the responsibility in household activities. The opposite finding was reported by Muttaqin et al. [11] who found that the time allocation of women in productive activities in oil palm plantation area is higher (33.74 hours/week) compared to reproductive (household) activities (22.82 hours/week). The factors that affect working time are age factor, experience working, and family dependents factor. The reasons of the first part of findings could be explained by Agustina et al. [12], who reported that the economic factors that motivated women to work as laborers in oil palm plantations are adequate salary (88.89%), the income of the head of the household needs support (88.89%) and women should responsible for the family needs (72.22%). Besides the economic factors, social factors were also interesting, such as of work as laborers in oil palm plantations is prestigious (88.8%) and as self-actualization (100%). The importance of wives in supporting the husband's income also reported by Lastinawati [13] that the main factors that encourage women to participate as oil palm plantation labor are the husband's income has not sufficient for the family's needs and the wife's age is still relatively young were physically still able to work. The education and number of dependents family members did not affect women's participation as laborers.
Other reasons for the increase of outside households were reported by Saptana et al. [3] such as the phenomenon of the workforce that entering employment opportunities available outside the villages especially the transmigration program. In aggregate, migrant workers increasing very high in the period 2009–2012 (56%) and continue to increase by 1.6% in 2012–2018. There has been a decline in migrant workers in cacao and sugarcane-based villages, on the contrary, there has been a higher increase in rubber and oil palm-based villages. Based on gender, in East Java migrant workers are predominantly female while migrants from outside of Java are male. Akter et al. [14] reported that country-specific gender intervention frameworks in South East Asia are necessary to overcome the gender gap in agriculture. These findings are also relevant for Indonesia, which even though it is in one country, but has very varied socio-economic and natural conditions. This report was supported by Sidiq and Achmad [15] who found that in Remote Indigenous Community, empowerment programs isolated the custom of communities and more often include women as objects in the process. According to de Vos and Delabre [16], plantation development also affects and changes social relations, leading to insecurity and anxiety and new forms of solidarity. Therefore it is suggested that in the development of plantations, it is necessary to consider that the “spaces for participation of women, in the negotiations and contestations on land acquisition.”

3.4. The problem in plantation farming
Wages laborer in plantation farming found in 2009 were only for sugarcane, cacao, and oil palm, not for rubber. Even wages for male laborers have not been found in rubber plantations, except in sugarcane (Table 4). In 2018, the wages of laborers consist of male and female except in oil palm the female laborers were not found. One of the reasons is because the income of farmers and hired labor in oil palm is very sufficient compared to other plantation products such as rubber and cacao. Especially with the implementation of agribusiness partnerships implemented by the oil palm company to create independent farmers [17]. This high income is also one of the reasons why women were not working as a laborer in oil palm. The wages of male laborers were higher than that of women, in 2009 the labor wage difference was IDR 5,163 and getting higher in 2018 ranging from IDR 6,048 (cacao) to IDR 9,302 (sugarcane). This finding is supported by reports [18] that the wages for men in 2008 were IDR 51,827 (for hoeing) while the wages for women were IDR 45,707 for weeding up to 47,670 for planting. The same trend was found in 2018 where the difference in wages for men compared to women was around IDR 5,096. For cacao, Effendy et al. [19] concluded that one out of the strategy to increase cacao farming efficiency that can help farmers to increase their per capita income and reduce poverty in rural areas is the participation of women and the farm manager’s gender.

| No. | Commodity | Wages of labor in 2009 (IDR) | Wages of labor in 2018 (IDR) |
|-----|-----------|-----------------------------|-----------------------------|
|     |           | Male | Female | Differences | Male | Female | Differences |
| 1.  | Sugarcane | 18,913 | 13,750 | 5,163 | 50,969 | 41,667 | 9,303 |
| 2.  | Rubber    | -    | -    | -    | 30,000 | 30,000 | 0 |
| 3.  | Cacao     | 33,730 | -    | -    | 51,048 | 45,000 | 6,048 |
| 4.  | Oil palm  | 54,200 | -    | -    | 130,040 | -    | -    |
|     | Average   | 35.49 | 70.51 | 35.02 | 38.88 | 31.63 | -    |

The data in Table 4 raises this question “Is the difference stems from gender or types of work? Say, women can receive the same wage if can also do the harvesting. Should the women will be recommended to work as harvesting labor too?” The answer is definitely yes, women who could do harvesting activities would receive the same wage as a man. First yes is for certain women who can do the harvesting (remember that not all men could do this harvesting) and the culture where women stay support, agree, not judge that harvesting is not good work. The second yes is when there is an appropriate technology for harvesting which could be operated easily by women. This answer arises a new question “How to
make appropriate harvesting technology for women?” The answer is through understanding what gender is, followed by implementing gender analysis. Results of gender analysis will inform who does what, when, where, and how an individual doing an activity as well as their access and control they have which influenced by their socioeconomic and natural factors. Finally, an appropriate technology for women to do harvesting would be developed.

4. Conclusions

Results from the research figured out that the participation of women are getting increase but the wages are lower than that of man, while the participation of women is actually for supporting the household needs. Especially for women with the head households’ income that needs support, otherwise, the family members could not have the standard of family basic needs meaning their family will consider as under the poverty line.

The level of women’s participation in plantation commodity farming activities is determined by the type of activity. Typical plantation farming activities are relatively different from other farming for example rice farming. In plantation farming, physical strength and certain skills are required which are generally more suitable for male workers. The well-being and empowerment of women are crucial. Women need to have significant roles as equal partners and decision-makers. We need to roll out the gender assessment to map out the actual roles, inclusivity, and involvement of women in the plantation sector by implementing gender analysis.

Based on these findings, suggested that to increase the participation of women in plantation farming, special improvement should be addressed to women’s capacities in technical, managerial, wages systems as well as problems they faced. Furthermore, the result is expected to assist the proper designing of appropriate interventions. This strategy should be implemented since improving the technical capacity of women enable them to operate appropriate technology, such as harvesters and tractors, as has been successfully operated by women in cultivating paddy fields. Through this appropriate technology, accompanied by improvement in managerial scale women could perform activities as men do which will lead women to get the same wages, salaries, income as men.

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