Customary Forest Utilization: The Determinants of Indigenous (Adat) Community's Economic Welfare

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Abstract. Customary forest utilization to improve the indigenous (adat) community welfare must be in line with local wisdom and preserving ecological function, even though they are no longer part of the state forest. In term of sustainable customary forest management, knowledge related to customary forest utilization and community welfare is getting significant to be study object. The paper aims to identify and analyse the determinants of indigenous community’s income. It was conducted in indigenous community of Kasepuhan Karang, Banten in 2018. Data collection was taken by purposive sampling, processed by ordinal logistic correlation and descriptive analysis. The results show the indigenous community has high level of dependence on the forest through on and off farm. From the respondents, the average income from forest use is below the regional minimum wage. While from the partial test results, it is concluded the land owned area and the livelihood type have a significant positive effect on the income level. Therefore, land distribution should be well managed due to conservation issue and livelihoods diversification to increase income level. Nonetheless, formal education level undetermined on income level. Informal education, capacity building of the community regarding to sustainable customary forest management needs to be organized.

1. Introduction
In an effort to equalize development, poverty reduction is a problem that still requires a solution with the right strategy, including indigenous (adat) communities. There are various strategies that can be done to reduce poverty levels. Several approach strategies that can be taken include the welfare transfer system by the government [1], community empowerment [2], practice of profit sharing based on local wisdom of indigenous communities [3]. The essence of this approach is to increase community's income so that the level of welfare will also improve.

The approach strategy taken is generally influenced by social, economic, cultural and political conditions in the community. In order for the approach taken to be effective and efficient, it is necessary to study the factors that affect the level of community's income. Several factors can include land distribution [4], diversification of income sources [5], non-timber forest product extraction [6], and socio-economic characteristics of the community such as the number of cultivated plant species, cultivated area, membership status, and education level [7]. The approach is such a general approach that is applied in public community, non-indigenous community.

Access to forest management is believed to be an important part of economic, social and cultural activities [8]. Therefore, the recognition of the existence of customary forests and the conditionality of
indigenous (adat) communities continues to be strived for [9]. Customary forests need to be established in order to avoid discrimination in terms of recognizing, protecting and fulfilling the rights of indigenous (adat) communities to their customary territories [10]. Until the customary forest is well recognized, it is no longer become a state forest and will not be burdened by property rights. Therefore, it is hoped that indigenous adat communities will get access to forest management according to their respective local wisdom.

Nevertheless, the government stipulates customary forest on the condition that customary forest stakeholders are obliged to maintain, restore and improve forest functions, safeguard and protect customary forest and apply sustainable forest principles in their management [11].

Kasepuhan Karang adat community, as the study object, is located in customary forest in Halimun Salak National Park which has the ecological function as conservation area [11]. Therefore, the determination of customary forest can possibly be evaluated based on the ability of the stakeholders to keep the ecological function.

Given the limitations in customary forest management and the different characteristics of indigenous communities from the community in general, the approach is performed. It is as part of planning a strategy to improve welfare in different approach. Studies related to factors that affect the welfare of indigenous communities are significant to be studied. For this reason, this study aims to identify and describe the factors that influence the income level of indigenous communities.

2. Method

2.1. Study location
This study was conducted in Jagaraksa Village, Muncang District, Lebak Regency, Banten Province from April to November 2018. The basis for consideration for choosing the location is because Jagaraksa Village is the location of Kasepuhan Karang in Banten Province which has been designated as a customary forest.

2.2. Data collection
The data collection technique used a questionnaire of which filling was done through interviews. While the sample selection using purposive and accidental sampling. The criteria for respondents include the elderly, productive and teenagers with a total sample of 30 people.

2.3. Data analysis
The data were analysed using the ordinal logistic correlation method to find out what factors were correlated with the level of community income which became the projection of the welfare of indigenous (adat) communities. The variables that become factors are explained in more detail through qualitative and quantitative descriptive analysis based on interview data with a questionnaire guide. Data analysis technique for ordinal logistic correlation using the following model:

\[ \gamma (x) = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 \]  

where:

- \( Y \) = income level
- \( \alpha \) = constant
- \( \beta_1 \) = land area parameter
- \( \beta_2 \) = education parameter
- \( \beta_3 \) = livelihood parameter

The variables used in this study are in accordance with the primary data that has been collected, as follows:

In order to get the right model and prior interpretation, in this multinomial logistic analysis several tests were carried out, including:

a. Overall Parameter Estimation Test
This test aims to see the estimated parameter ($\beta$) on all independent variables. The interpretation of the result is that $H_0$ is rejected if the $p$-value $\leq 5\%$.

b. Partial test

This test is intended to see each parameter ($\beta$) on each independent variable individually. The interpretation of the results is that $H_0$ is rejected if the $p$-value $= 5\%$.

3. Results and discussion

3.1. Land area on income level

The indigenous (adat) communities of Kasepuhan Karang have divided their territory into three zones, one of which is leuweung garapan [11]. The leuweung garapan is located on a zone with a relatively gentle slope where the farmers planting horticulture. The area of arable land that can be managed by each head of the family is obtained from inheritance and distribution from the indigenous (adat) leader. Most respondents (73%) own less than 0.5 hectare of land and only a small proportion (7%) own more than 1 hectare [12].

3.2. Education on income level

Most of the respondents studied up to elementary school, which is 73% of the total number of respondents. Only a small percentage or 3% of the total respondents have education up to high school. In Jagaraksa village, where the Kasepuhan Karang indigenous (adat) community live, there are 3 elementary schools and 2 junior high schools [13]. Senior High school facilities in the village are not available yet. Long distance to continue school results in high costs. This can be one of the causes of their interest lack in continuing to higher education levels.

3.3. Livelihood on income level

Most of the community of Kasepuhan Karang (70%) work as farmers where their income comes from harvesting plantation crops and forestry crops [11]. About 10% of them have alternative livelihoods such as trader and labourer (off farm). The most respondents (90%) have an income below one million per month. This income figure is still far from the needs of a decent living where the district minimum wage is around 2.4 million/month. The majority of indigenous (adat) community rely on farming and non-farming activities in customary forest even with low income. Apart from being a source of livelihood, customary forests are also a source of medicinal plants, handicraft materials, places for carrying out traditional rituals, and providing springs for indigenous (adat) communities [14].

3.4. Correlation of land area, education, and livelihood to income level

Data processing to see the correlation of cultivated area variables, education and type of livelihood to income level, carried out several stages as follows:

a. Perform Parameter Estimation

To determine the correlation between land area, education and livelihoods on income levels in MHA Kasepuhan Karang, an ordinal logistic analysis and likelihood ratio test were carried out with two hypotheses. The first step in ordinal logistic analysis is to see whether the independent variable has an effect on the dependent variable as a whole. The results of the analysis are as follows:

| Model Fitting Information | -2 Log Likelihood | Chi-Square | df | Sig. |
|---------------------------|------------------|-------------|----|-----|
| Intercept Only            | 45.325           |             |    |     |
| Final                     | 29.397           | 15.929      | 3  | .001|

Link function: Logit.
The results in table 1 can be interpreted that when all independent variables are included in the model, it can be seen that the significant value (p-value) = 0.001 <, where = 0.05 at the 95% confidence level. So the conclusion is that from the included independent variables, there is at least one variable that affects the dependent variable (Y).

In order to determine the goodness and accuracy of the formulated model, the goodness of fit test (GoF) is used. The results in table 2 can be seen that the significance of 0.9 and 1 is more than 0.05. So the model can be said to be correct because there is no significant difference between the model and the observed value.

### Table 2. The Result of Goodness of Fit Test

| Goodness-of-Fit | Chi-Square | df | Sig. |
|-----------------|------------|----|------|
| Pearson         | 26.391     | 51 | .998 |
| Deviance        | 22.780     | 51 | 1.000|

Link function: Logit.

b. Performing a Partial Test of the Ordinal Logistics Regression Model

Partial test is intended to see the significance and parameter estimation of each independent variable. The test results are as follows:

### Table 3. Partial parameter test

| Parameter Estimates | Estimate | Std. Error | Wald | Df | Sig. |
|---------------------|----------|------------|------|----|------|
| Threshold<br>[income = 1.00] | 2.087 | .836 | 6.228 | 1 | .013 |
| [income = 2.00] | 6.692 | 2.029 | 10.873 | 1 | .001 |
| [income = 3.00] | 8.067 | 2.513 | 10.302 | 1 | .001 |
| Location<br>Land area | .162 | .066 | 6.021 | 1 | .014 |
| Formal education | -.279 | .809 | .119 | 1 | .730 |
| Livelihood | .316 | .138 | 5.234 | 1 | .022 |

Link function: Logit.

From the tests in the table, the models that can be obtained are as follows:

\[
\gamma_1 = 2.087 + 0.162X_1 - 0.279X_2 + 0.316X_3 \tag{2}
\]

\[
\gamma_2 = 6.692 + 0.162X_1 - 0.279X_2 + 0.316X_3 \tag{3}
\]

\[
\gamma_3 = 8.067 + 0.162X_1 - 0.279X_2 + 0.316X_3 \tag{4}
\]

Based on the results of the partial test in table 3 above, it can be concluded that the variables that have a significance p-value <0.05 are the land area variable (X1) and the type of livelihood variable (X3). So that the two variables have significant correlation to the level of income. Meanwhile, for the education variable, the significance value > 0.05 was considered unable to explain the dependent variable. This means that education is not correlated with income levels.

In ordinal logistic regression, large parameters can be interpreted by converting them into odds ratio coefficients. Odds ratio is the ratio value of the tendency of events to occur in the case group (dependent)
and control group (independent). The value of the odds ratio (OR) for the coefficients of the variables X1 and X2 in equations 1, 2 and 3 above is as follows:

| Variable       | Coefficient | Odds Ratio |
|----------------|-------------|------------|
| Land Area (X1) | 0.162       | 1.175      |
| Livelihood (X2)| 0.316       | 1.371      |

The interpretation of the three models that have been obtained can also be based on the coefficient of odds ratio as Table 4 above. The OR value of the land area variable can be interpreted that for every increase in land area of 625 square meters, it causes the ratio of the income level < Rp. 500,000 (1) to the income level of Rp. 500,000 – Rp. 1,000,000 (2) will increase by 1.175 times. The results of this study are in line with [4] study where access to arable land is strongly related to household income, so that patterns and trends in land distribution need to be used as the basis for planning poverty alleviation strategies.

The wider the arable land, the greater the income, but this cannot be used as the basis for a strategy to improve the welfare of indigenous (adat) communities. The area of the leuweung garapan zone cannot be expanded immediately considering that the Kasepuhan Karang customary forest is in a conservation and protected function area. Expansion of arable land to increase income from agricultural products is something that must be watched out for. For this reason, traditional stakeholders need to be given transfer of knowledge related to forestry landscape management so that there is no massive conversion of forest into arable land. The local wisdom of indigenous peoples in forest management, the basis for determining customary forests, needs to be obeyed from generation to generation so that the ecological function of the forest become sustainable.

As for the OR value of the livelihood variable (table 4), it can be interpreted that changes in livelihoods or diversification of livelihoods will be able to increase changes in income levels by 1.371 times. In order to increase the diversification of the livelihoods of indigenous (adat) communities, transfer knowledge of alternative livelihoods can be made through capacity building programs, empowerment of indigenous (adat) communities, and counselling. The determinants of livelihood diversification are empowerment to increase human capital, physical capital, and skills in financial management [15]. An alternative for managing sustainable livelihoods is mix crop combined with livestock [16]. Understanding the dependence on forest income is useful in planning and diversifying livelihoods [17].

The result of the study indicates that the level of formal education does not have a correlation with the income level of indigenous (adat) communities. It is not in line with the study [7] and [18], which concluded that the education is positively correlated with the income of the poor community. However, there are studies [19] who revealed that formal education in indigenous (adat) communities needs to be encouraged because it can increase knowledge in general.

Informal education can be another alternative to improve welfare because it has a significant influence in the knowledge transfer both to indigenous (adat) communities and the public community. Local wisdom can be taught in field school activities [20]. As the study [21], field schools are proven to be able to encourage motivation, skills, and productivity of farmers. The use of production factors is more effectively carried out by community who have attended field schools, especially in the use of fertilizers [22].

4. Conclusion

Indigenous (adat) community has high level of dependency to the forest even though their income through on farm and off farm under regional minimum wage. The determinants of income level are the area of arable and the type of livelihood. In order to secure ecological function, the distribution of arable land in the Adat indigenous (adat) community should be well planned. The wider the arable land, the
higher the community welfare, while on the other hand the total area of "leuweung garapan" that can be cultivated is very limited. For this reason, it is very important to have a landscape management plan for indigenous (adat) community. In addition, intensification in plant cultivation also needs to be implemented. Moreover, the livelihood diversification may increase income level. The diversification of livelihood could be encouraged by informal education through empowerment, capacity building, and counselling.

The variable level of formal education was not correlated with the level of income. This is different from study conducted on the general public where the level of education is correlated with the level of welfare. Informal education can be an alternative for transferring knowledge and skills of indigenous (adat) community who are mostly farmers.

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