Specific zone and development strategy of local coconut plantation in Aceh Besar regency

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Abstract, The purpose of this study was to find out the strategies for developing coconut in the areas that have the most potential to develop coconut commodity commodities in Aceh Besar Regency. The research method used is a potential survey and regional development policy FGD. Hierarchical and SWOT analysis to find priority development areas and future development strategies. The results of this study indicate that the most potentially developed areas of coconut plants to be developed as one of the mainstay commodities of the area in Aceh Besar Regency, Pulo Aceh Subdistrict, which occupy the first priority. The second priority is Darussalam Sub district. The third priority is the Mesjid Raya Sub-district, and Blang Bintang. The fourth priority is Kuta Cot Glie Sub-district, and Kuta Baro. The fifth priority is Seulimum Subdistrict and Lhong. The strategy for developing coconut plant commodities in Aceh Besar District is to expand information networks related to technology adoption in emphasizing various pest attacks in local coconut cultivation and seeking access to assistance from the government and strengthening partnership networks and utilizing partnerships in strengthening capital for the development of coconut farming in Aceh Besar Regency.

1. Introduction

Coconut plants (Cocos nucifera L.) are the main social commodities, spread in most regions in Indonesia involving millions of households / farmers. Coconut is a folk plant that has a social, cultural and economic role in the lives of Indonesian people, because almost 98% is cultivated as small scale farming [1][2]. The benefits of coconut plants not only lie in the fruit flesh which can be processed into coconut milk, copra and coconut oil but all parts of the coconut plant have great benefits. The benefits include fruit, wood, roots and leaves. Many coconut trees are cultivated in residential areas, as well as plantations. The benefits of coconut plants are so great that some call them trees of life. This native Indonesian plant has been around for thousands of years ago. Coconut is grown downhill since the ancestors. [3][4].

Coconut plants consist of 3 (three) types, namely local coconut, early coconut and hybrid coconut. Hybrid coconut is the result of a cross between local coconut and early coconut. Coconut as one of the species of the Cocos genus has 27 genera and 600 species, which are classified into two varieties namely Local coconut (typica Nar) and Early coconut (Nana Griff). There are also those that classify Coconut in three varieties, which are in addition to the local coconut and hybride coconut, there is also aurantia cae coconut. Each coconut variety has special characteristics that distinguish it from each other [4][8].

According to data from the Aceh Regional Planing Board (2017), Coconut production has decreased in 2005 due to the tsunami disaster that hit Aceh, and also a decrease in land due to land
conversion and also a decrease in people's interest in planting it. However, since 2010 production began to rise again even though it is still not consistent with the average productivity in 2015 reaching 815 kg / ha but still below the national level which reached 1,342 kg / ha. To increase the production and productivity of Local coconut commodities can be done in various ways, as has been done by the Aceh Government in 2014 by launching a community movement (germas) to plant coconut so that it will increase the motivation of the community to plant coconut. In addition, rejuvenation of old / unproductive plants and the use of superior seeds are very important factors. At the field level, there are several problems faced in developing Local coconuts, including: [5][6]

1. Productivity is still low, because many old plants over the age of 20 years and cultivation with native seeds and plant pests and diseases.
2. Lack of public awareness, especially plantation farmers, about the prospect of developing coconut and its processing which can be used as a promising farming business.
3. Limited partnership between entrepreneurs / industries and garden farmers.
4. Access to capital for commodity development is still limited.

Aceh Besar Regency is one of the development areas of Local Coconut which has high potential. However, the limited local seed is one of the problems faced in terms of developing plantation commodities, including Local coconut. The use of superior quality seeds is an effort to increase the production and productivity of local coconut plants in Aceh which is carried out for rejuvenation in local coconuts.

The Aceh Agriculture and Plantation Office and the Manado Palma Crop Research Institute (BALIT PALMA) are releasing Coconut varieties in Lampanah Subdistrict as bina seeds. The release of the Kelapa Lampanah variety as a bina seed is important for superior seed sources and building a parent garden. As a result, this variety has been released by the Minister of Agriculture through a Commission meeting in Bogor, West Java. [3][6].

The business of local coconut plants in the Regency of Aceh Besar in the last 5 years can be seen in the table below.

Table 1. Area and Production of Local Coconut Commodities in Aceh Besar Regency 2014 – 2018

| Year | TBM | TM  | TR  | Production (Kg/Ha) |
|------|-----|-----|-----|-------------------|
| 2013 | 2,554 | 8,205 | 3,592 | 8,025 |
| 2014 | 2,254 | 8,205 | 3,942 | 8,026 |
| 2015 | 2,085 | 8,429 | 3,887 | 8,260 |
| 2016 | 2,323 | 8,215 | 3,893 | 7,509 |
| 2017 | 2,369 | 8,205 | 3,887 | 5,908 |

Source: Aceh Besar Regency Statistic Center

Note: TBM : Plants have not yet produced. TM : Plants have already produced and TR : Old plants are less productivity

The arrangement of the areas with the most potential for coconut plants to be developed in Aceh Besar Regency in determining and putting consistency in the development of coconut plant commodities is what is expected both for policy makers or for policy formulation in the Regency of Aceh Besar. This study aims to find out the areas with the most potential for coconut crop commodities in Aceh Besar Regency to facilitate the development of coconut plant commodity strategies in Aceh Besar Regency starting from those who make policies for the development of coconut plant commodities in Aceh Besar Regency sustainably.
2. Research Methods

This research was conducted in Aceh Besar Regency, which was purposely determined in choosing secondary data to study the potential commodity areas of Local coconut plants. Then, the data used is secondary data assisted by the study of literature literature. The population and sample of this study are all sub-Regencies in Aceh Besar Regency. The data used in this study are secondary data obtained from publication data from the Central Bureau of Statistics, Department of Agriculture and Plantation and primary data obtained through interviews and exploration of respondents in Aceh Besar Regency.

This research is a qualitative and descriptive study conducted with secondary and primary data exploration methods, starting from the general conditions of the commodity of Local coconut plants in Aceh Besar Regency covering the planting area, harvest area, production and productivity in the last five years, where the data is analyzed using Eugen Value method to identify the potential of regions that have the potential to develop the commodity of Local Coconut in Aceh Besar Regency. Primary data obtained through interviews and exploration in the field are analyzed by process hierarchy analysis method.

Eugen Value (EV) which is calculated with the following formula: The rate of yielding plants in each region (District) EV Figures gives an indication of the order that has the potential to be mapped in the development area which is a commodity center that is feasible to develop.

This AHP model can process qualitative and quantitative data derived from human perception, so that the complexity of existing problems can be approached well by the AHP model. AHP technique has the ability to solve multi-objective and multi-criteria problems based on the comparison of preferences of each element in the hierarchy so that it can be said that the decision making model with AHP is a comprehensive decision-making model.[6][7][9][1-]

AHP steps as follows:

1. Make a paired comparison matrix that describes the relative contribution or influence of each element to the goal or criteria that are above it. Comparison is based on the choice or judgment of the decision maker by assessing the importance of an element compared to other elements.
2. Normalize data by dividing the value of each element in the matrix paired with the total value of each column.
3. Calculate the eigenvalue of the vector and test its consistency, if it is not consistent then retrieval of data (preference) needs to be repeated. The eigen vector value is the maximum eigen vector value obtained.
4. Repeat steps 3, 4 and 5 for all levels of the hierarchy.
5. Calculate eigen vector from each paired comparison matrix. The eigenvalue vector is the weight of each element.
6. Test the consistency of the hierarchy. If it does not meet with CR <0.100, the assessment must be repeated. [5][8]

3. Results and discussion

Table 2. Areas of Potential Development of Coconut Commodities

| No | Sub District                        | Average | EV |
|----|------------------------------------|---------|----|
| 1  | Pulo Aceh                          | 2.5     | 5  |
| 2  | Kuta Cot Glie                      | 4.5     | 4  |
| 3  | Kuta Baro and                      | 4.5     | 5  |
| 4  | Mesjid Raya                        | 5.5     | 3  |
| 5  | Blang Bintang and Darussalam       | 5.75    | 2  |
| 6  | Seulimumum and Lhong               | 10.25   | 1  |
Based on the results of a survey obtained by researchers there are various obstacles that have been obtained in terms of the development of coconut commodities in Aceh Besar Regency, based on the results of the survey obtained constraints faced by coconut commodity farmers are the application of technology, land management, labor management, superior varieties and limited absorption of information and capital.

Based on the results of the Egen Value analysis, the most potential areas for developing coconut commodities were Pulo Aceh Sub-District, Kuta Cot Glie Sub-District, Kuta Baro Sub-District, Mesjid Raya Sub-District, Blang Bintang District, Darussalam District and Seulimum Regency.

Based on the area obtained, the most potential development of coconut commodities is expected by the existence of coconut commodity development areas to be able to expand various aspects in supporting the development of coconut commodities in Aceh Besar Regency. The first priority is Pulau Aceh Subdistrict, the second priority is Blang Bintang and Darussalam District and so on. The development of the parent garden and the nursery center will be carried out at the location of the first and second priority slices.

The opinion of stakeholders (extensionist of plantations, farmers and the chief of production of Plantation, Forestry and Plantation Aceh Besar Regency) in the determination of mainstay commodity Aceh Besar is based on: (A) harvested area, (B) production, (C) productivity, (D) production values, (E) source of livelihood, (F) the volume of transactions / market, and (G) consumption. The order of priority coconut plantation zone are based on eight criteria above. In which Pulau Aceh Subdistrict still stands as the first sequence, then followed by hazelnut, Darussalam Sub district, Mesjid Raya Sub-district, and Blang Bintang, Kuta Cot Glie Sub-district, and Kuta Baro, Seulimum Subdistrict and Lhong; as shown in Figure 2.

Figure 1. Performance of Local Coconut Development Areas in Aceh Besar Regency

![Performance of Local Coconut Development Areas in Aceh Besar Regency](image-url)
Figure 2. Priority Coconut Plantation Zone are Based on Eight Criteria

Determination of Priority Strategies for the Development of Local Coconut Commodities
Determination of priority strategies in the development of Local Coconut commodities in Aceh Besar District was formulated based on the results of AHP analysis on the relevance factors of the SWOT matrix to obtain a priority sequence of strategies in the development of Local Coconut commodities in Aceh Besar Regency seen and clarified in the form of the table below:

Table 3. Results of AHP Analysis on Strategy for Developing Local Coconut Plantation

| No | SWOT Element | Relation of AHP | Weight of AHP | Number of AHP | Weight of AHP | Priority Scale |
|----|--------------|-----------------|---------------|---------------|---------------|----------------|
|    | SO Strategy  |                 |               |               |               |                |
| 1  | SO1          | (S: 2, 3, O: 1, 2) | 0.130         | 0.256         | 1             | 2              |
| 2  | SO2          | (S: 1, 3, 4, O: 2, 3, 4) | 0.126         |               |               | 2              |
|    | WO Strategy  |                 |               |               |               |                |
| 1  | WO1          | (W: 1, 4, O: 1, 2) | 0.105         | 0.217         | 2             | 4              |
| 2  | WO2          | (W: 2, 3, O: 3, 4) | 0.112         |               |               | 1              |
|    | ST Strategy  |                 |               |               |               |                |
| 1  | ST1          | (S: 1, 2, T: 1, 2) | 0.129         | 0.251         | 1             | 3              |
| 2  | ST2          | (S: 3, 4, T: 3, 4) | 0.122         |               |               | 2              |
|    | WT Strategy  |                 |               |               |               |                |
| 1  | WT1          | (W: 3, 4, T: 1, 2) | 0.141         | 0.276         | 1             | 1              |
| 2  | WT2          | (W: 1, 2, T: 3, 4) | 0.135         |               |               | 2              |
On the table above, it can be seen that the alternative order of the development strategy of the Coconut commodity based on the combined results of the SWOT and AHP results of each factor related to the SWOT matrix is as follows:

1) First priority (WT), namely;
   a. Expanding information networks related to technology adoption in emphasizing various pest attacks in Local Coconut cultivation and seeking access to assistance from the government.
   b. Strengthening the partnership network and utilizing partnerships in strengthening capital for the development of Local Coconut farming.

2) Second priority (SO), namely;
   a. Maintain quality and quantity to create market supply stability and utilize superior technology adoption in Local coconut cultivation in Aceh Besar Regency
   b. Optimizing natural resources that support the development of Local coconuts in Aceh Besar Regency and expanding the number of Local coconuts by expanding the area of development of Local coconuts and increasing productivity.

3) Third priority (ST), namely;
   a. Optimizing the use of land, keeping other ecosystems maintained and the reputation of farmers in increasing production and minimizing the cost of farming.
   b. Utilizing technology in recognizing uniform varieties, providing superior varieties in empowering good coconut plantation businesses and farm supervisors must be more active in fostering farmers from production to market aspects.

4) Fourth priority (WO), namely;
   a. Increasing the adoption of technology in the development of Local coconuts in an effort to meet market demand and strengthen farming business institutions in an effort to develop Local coconuts.

4. Conclusions and Recommendations

1) The area with the most potential for commodity development in Aceh Besar Regency is Seulimum District and Lhong Regency The second priority is Kuta Cot Glie District, and Kuta Baro Regency The third priority is the Mesjid Raya District, Blang Bintang Regency The fourth priority is Darussalam Regency The fifth priority is Pulo Aceh Regency. 2) Strategies for developing Local Coconut commodities in the Greater Aceh District, namely;
   a. Expanding information networks related to technology adoption in emphasizing various pest attacks in Local Coconut cultivation and seeking access to assistance from the government.
   b. Strengthening the partnership network and utilizing partnerships in strengthening capital for the development of Local Coconut farming.
   c. Maintain quality and quantity to create market supply stability and utilize superior technology adoption in Local coconut cultivation in Aceh Besar Regency
   d. Optimizing natural resources that support the development of Local coconuts in Aceh Besar Regency and expanding the number of Local coconuts by expanding the area of development of Local coconuts and increasing productivity.

The policy makers must coordinate with each other in developing the mainstay commodity, especially the coconut commodity, to make the Aceh Besar Regency an industrial raw material area from the agricultural sector.

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