Nutmeg Cultivation Intensity (Myristica fragrans Houtt) in Banda District

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Abstract. This study aims to determine and analyze the components of nutmeg cultivation at the farm level. The method used in the study was a survey method of plant cultivation. Sampling was done by using the multistage random sampling method. The area of research selected uses the private area stratification. Each village was randomly sampled as many as 10 farmers, the total number of which was 20 sampled farmers. The results showed that farmers in Lonthor Village and Selamong Village, Banda Subdistrict, had not fully carried out intensive nutmeg cultivation that included land cultivation, seeding, fertilization, maintenance and post-harvest processing. This is because the existing nutmeg plants generally inherited from their parents so that it affects the decreased nutmeg production.

1. Introduction
Nutmeg is a specific commodity that is superior in Maluku region apart from cloves, which expected to provide an economic contribution to the region, especially for farming communities in order to increase their income and welfare. Apart from being a regional superior commodity, nutmeg is also an export commodity for Indonesia. Until now, Indonesia is the largest nutmeg exporting country in the world market, 75% and 25% of Grenada [7]. Although the nutmeg plant has long been known and cultivated, a common problem of nutmeg in several regions in Indonesia is the problem of crop cultivation. Nutmeg cultivation problems in North Halmahera Regency: Garden sanitation, poor nutmeg cultivation practices and harvesting [4]. The productivity of nutmeg in Maluku is classified as low, which is less than 1500 - 3000 seeds / tree / year or equivalent to 0.70 t / ha. The low productivity is due to the seeds used in the form of random seeds and the farmers do not fertilize or control plant pests [8].

The results of Legoh's research showed that generally the seeds used for seedlings did not come from the mother tree but came from sweeping seeds. The spacing applied by farmers was still very varied, farmers did not fertilize due to farmers' lack of knowledge regarding fertilization. Although there are farmers who receive fertilizer assistance, fertilizers only used to fertilize other crops [4]. Parliansyah stated that the average nutmeg production in HKm Rangai Sejahtera is up to 60 kg of wet nutmeg / tree / year so it can categorized as high nutmeg production [6]. The Central Bureau of Statistics of Central Maluku Regency stated that the average production of wet nutmeg throughout
Indonesia was only 48.4 kg/tree/year [1]. Meanwhile, for the Banda Islands, which are the original habitat for nutmeg plants, the yield of wet nutmeg only reaches 54 kg/tree/year [1]. Hamka stated that the production of nutmeg in Central Halmahera was only 3 kg/tree/year [2]. This study aims to determine the intensity of the nutmeg cultivation technique, especially in Central Maluku Regency, whether this plant is cultivated in accordance with good cultivation techniques or whether this plant is allowed to grow and farmers only take the results.

2. Methods
The method used in the study was a survey method of plant cultivation. The research was conducted in Banda Subdistrict, Lonthor Village. The selected area is determined with the consideration that the area is a nutmeg production center, has a large population of nutmeg plants and has a different cropping style and type. The material used was a sample of the nutmeg plant population. The tools used were clinometers, voice recorders, questionnaires, stationery and cameras.

Sampling has taken by using the multistage random sampling method. The area selected for the study area uses the land ownership area stratification. 10 farmers were randomly sampled in each village so that the total number of farmers was 20 farmers. Information will collected from sample locations, namely primary data by means of direct observation on how to cultivate nutmeg and interviews, while secondary data comes from related agencies. The research data were analyzed using qualitative and quantitative methods. Quantitative data using tabulation system to analyzed descriptively. Descriptive analysis used to determine the general description of the object of research, the characteristics of farmers including age, gender, education level, farming experience and farming characteristics.

3. Results and discussion
3.1. Regional Characteristics
Central Maluku Regency is part of Maluku Province which has ten regencies and one city. Banda sub-district is an island cluster area because there are 11 inhabited islands and 5 uninhabited islands. the sub-districts area of Central Maluku district of 172.0 km² and has a coastline length of 90,377 Km. The topography of Banda sub-district is a sloping sea level ranging from 25 to 75 m from the lowest ebb and the others are steep waters. The sea was 38 - 3,125 m depth while the highest land surface is in the volcano island with an altitude of ± 600 m and is an active volcano [1].

Nutmeg in its growth requires a hot climate with bulk high rainfall and evenly with ambient air temperature around 20-30 °C. Nutmeg is also a type of plant that is susceptible to dry spells for several months, loose and fertile soil is needed for nutmeg and is suitable and productive in well-drained volcanic soils [5]. The climate in Maluku Tengah Regency is a tropical marine climate and a monsoon climate. This climate occurs because the Central Maluku islands surrounded by a wide sea, so the climate in this area is very much influenced by the sea that goes in tune with the existing seasons. Apart from local climatic conditions, the development of nutmeg also related to soil conditions. In the Maluku area which partly volcanic soil, it is very beneficial for the nutmeg plant. Volcanoes on the island of Banda that for a certain period give off volcanic ash and other materials are very helpful in replacing mineral nutrients that have long used by nutmeg plants for their growth.

Table 1. Soil Analysis and Soil Textu Results in Lonthor Village and Selamong Village, Banda District

| Sub district         | pH | C-Org | N Tot | P Tot | K Tot | Ca Tot | Tekstur class  |
|----------------------|----|-------|-------|-------|-------|--------|----------------|
| Lonthor Village      | 5,8| 6,24  | 0,32  | 18,12 | 0,02  | 0,23   | loam sandy    |
| Selamong Village     | 6,1| 2,89  | 0,35  | 160,8 | 0,04  | 0,52   | loam sandy    |

Source: UGM Soil Science Laboratory, Yogyakarta
Plant growth directly or indirectly determined by soil pH. Soil pH directly affects plant growth
through the direct influence of H⁺ ions and indirectly, namely soil pH can cause nutrient
unavailability. Most plants are tolerant of extreme low or high pH, but in the soil there are sufficient
nutrients that are greatly influenced by pH, where some nutrients are not available at extreme pH and
others at toxic levels [3].

Soil conditions/soil fertility in Lonthor Village, Selamong Village characterized by physical and
chemical characteristics of soil pH ranging from 5.8 to 6.1 so that the soil classified as acidic. For C-
organic also, Lonthor Village classified as very high and Selamong Village classified as medium. The
N-total for both villages is moderate. P-total classified as low, very high. Soil in Banda Subdistrict,
Lonthor Village and Selamong Village, the soil type is podsolic. It was should explained that most of
the nutmeg plantations in Banda Subdistrict are located on mountain slopes that form nutmeg forest
stands.

3.2. Nutmeg Cultivation Level in Banda District

The results of the percentage of farmers who answered the questionnaire are presented in Figure 1 and
Table 2. The results of the questionnaire showed that, on average, most of them used nutmeg from the
seeds and its fustion. Selamong Village Maintenance is limited to cleaning weeds around the plant
area as well as eradicating pests and diseases without using pesticides this is because farmers do not
have enough capital to buy pesticides

![Figure 1. Percentage of Farmers Who Carry Out Nutmeg Cultivation in Banda District](image)

| No. | Uraian                                      |
|-----|--------------------------------------------|
| I-a | Nutmeg Cultivation                         |
| I-b | Follow the cultivation method recommended by the Dinas |
| I-c | Unfollow the cultivation method recommended by Dinas |
| II-a| Mixed cropping patterns                     |
| II-b| Monoculture cropping patterns               |
| III-a| do your own nursery                        |
| III-b| swep seeds                                  |
| III-c| seeds selected                              |
| III-d| using spacing                               |
| IV-a| using spacing                               |
| IV-b| Not using spacing                           |
| V   | Do not vertilize                            |
| VI-a| Maintenance through weed weeds              |
VI-b Eradicating pests and diseases without pesticides
VII-a Harvest time 6 months after flowering
VII-b Harvest time 7 months after flowering
VIII-a The process of drying the seeds through drying
VIII-b The process of drying the seeds through fumigation
VIII-c The process of drying the seeds through drying and smoking
IX-a The process of drying the mace through drying
IX-b The process of drying the mace through fumigation
X-a The pulp is used in the form of sweets
X-b The pulp is used in the form of syrup
X-c The pulp is used in the form of jam
X-d Seeds and mace are not processed into essential oils

The percentage of farmers who answered the questionnaire showed that 100% of farmers cultivated plants (question no I-a). Banda Subdistrict for Lonthor Village and Selamong Village are farmers who follow the cultivation method recommended by the Department for 38% and do not follow the cultivation method recommended by the Office 63% this is because the nutmeg plants currently in existence are inherited from their parents so that they have not been able to carry out proper cultivation. Well done by farmers. The cropping patterns used by farmers in Lonthor and Selamong Villages are mixed cropping patterns and monocultures (questions no II-a and II-b) this is because most people in Banda District use the dusung system so that annual and annual crops are both plants. Plantations or fruit trees or other crops of economic value planted in one area to form a dusung.

Most of the Lonthor and Selamong Villages carry out their own nurseries 100% (question no III-a) but the seeds used as seedlings are quite diverse. There are farmers who use selected seeds, sweeping seeds and some are using selected seeds and sweeping seeds. 50% used selected seeds and 50% used sweeping seeds (questions no III-b, -c, -d) and this greatly affected the yield of nutmeg. The seeds used, if we use the sweep seeds as seeds, where the sweep seeds are the seeds taken for sowing without knowing the origin of the mother tree so that the production of the nutmeg plants is also greatly influenced, determine the yield of the nutmeg plant. In addition to the seeds used, the spacing also greatly affects the production of the nutmeg plant. If the spacing is too close, the resulting fruit will be small. 65% of Lonthor Villages use spacing and 35% of Selamong Villages do not use spacing (Question no IV) The cropping pattern used in Lonthor Village is a monoculture cropping pattern because it is a nutmeg plantation so that the spacing can be adjusted. The cropping pattern used in Selamong Village is a mixed cropping pattern in which the nutmeg plant is in one area with other annual plants.

The growth and development of the nutmeg plants in both villages both cultivate nutmeg plants but in processing, the nutmeg plant and the results of the nutmeg plant are still better. Selamong (question no V). For pest and disease eradication, 100% do not use pesticides, either chemical pesticides or bio-aggressive pesticides, while for weeding 100% of farmers do it (questions no VI-a and VI-b). The harvest time carried out by Lonthor Village farmers and Selamong Village Farmers is six months after flowering and some seven months after flowering, marked by the breaking of the nutmeg, many of these things are done so that the quality of the seeds and mace of nutmeg is good (question no VII). The process of drying the seeds and mace and utilizing the nutmeg pulp (questions no. IX and X) 50% of the farmers do fumigation and 50% of the farmers dry and fumigate them. In utilizing the nutmeg pulp, farmers in Lonthor Village and Selamong Village farmers process it into snacks in the form of sweets, jams and syrups.
4. Conclusion
Farmers in Banda Subdistrict have not fully carried out intensive nutmeg cultivation including land cultivation, fertilization, pest and disease control. This results in decreased nutmeg production.

5. References
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