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FARMER'S CASHEW (ANACARDIUM OCCIDENTALE) CULTIVATION PATTERN: STUDY CASE IN GUNUNGKIDUL REGENCY

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ABSTRACT:

This research aims to determine how farmers in Gunungkidul Regency conducted the cashew nut (*Anacardium occidentale*) cultivation technique until the post-harvest process. This research was conducted in Ngeposari village and Pacarejo village in Semanu subdistrict, and Gedangsari village and Jatiayu village in Karangmojo district. The primary method used in this research is descriptive. The research results show that cashew cultivation patterns in Gunungkidul farmers are carried out with an intercropping planting system. Cashew crops are served as a shade plant (protector) and land barrier. In crop maintenance activities, farmers perform treatments such as weeding, fertilizing, pest control, and pruning. Cashew harvesting is usually from September to November. The post-harvest process is like stripping and cashews drying. From the research results, the pattern of cashew nuts among the farmers of Gunungkidul following the technical cultivation of the proper crops, although cashew crops, not as a major commodity cultivated by farmers.

This study concluded that the cashew plant cultivation pattern in Gunungkidul Regency followed the appropriate plant cultivation techniques. The selection of the intercropping cropping pattern is a form of optimal land use. Plant care measures to post-harvest measures are carried out according to proper cultivation techniques, so that cashew plants produce well. The novelty of the research revealed that the cashew cultivation pattern in Gunungkidul district depended on regional conditions. The limited land owned makes farmers implement intercropping planting patterns so that land use can be maximized.

INTRODUCTION

Cashew (*Anacardium occidentale*) as a food is a need that plays a important role in the life of a nation (Sumadi, Jumintono, & Ardiani, 2020). Cashew is among the major edible nuts with increasing demand in the global market (Tola & Mazengia, 2019). Cashew production is potentially an important value for small farmers in emerging countries and an immense potential for cashew by-product exploitation that can add value to cashew agribusiness (Oliveira, Mothé, Mothé, & de Oliveira, 2020). The cashew (*Anacardium occidentale*) belongs to the Anacardiaceae family, composed of some 60 to 74 genera and 400 to 600 species (Bezerra, De Lacerda, Gomes Filho, De Abreu, & Prisco, 2007). The Anacardiaceae includes trees and shrubs with resin canals, resinous bark, and clear to milky exudates primarily. The trees or shrubs have alternate, often trifoliate, or pinnate leaves. Flowers are generally not highly conspicuous and can either be unisexual or bisexual (Adeigbe, Olasupo, Adewale, & Muyiwa, 2015). The people cultivate the whole cashew crop in various ways of cultivation to improve and even distribute farmers' income and improve the quality of the environment.

Cashew crop farming was once Indonesia's national flagship. Indonesian cashew production contributes 2.86% of world production. There needs to be an increase in crop production or productivity through the support of appropriate technology and ecology-based, ranging from land suitability, superior varieties, fertilizing to cropping patterns (Rosman, 2019). Cashew is a conservation plant, and its development in Indonesia has been started since 1975 through the Ministry of Forestry project as a conservation crop to improve critical land (Kaharuddin, Ola, & Yusria, 2019). One of the areas becoming centers of cashew plant development determined by the Government is Gunungkidul Regency. At first, this plant was only a conservation plant. This is because cashew plants are very suitable to be cultivated in the dry land, classified as marginal, which has a long dry month (Pranowo & Purwanto, 2011). However, these plants become plants cultivated by local farmers over time because they can provide valuable products for farmers. The cashew crop harvest area is 14,675 ha with a total production of 420,000 kg of dry logs and an average production of 28.62 kg/ha of dry logs (Pertanian, 2015). Therefore, this study aims to determine how the cultivation of cashew nuts (Anacardium occidentale) to the post-harvest process carried out by farmers in Gunungkidul Regency. The critical success factor for the development of cashew agro-industry with the highest relative importance is the availability of raw materials determined by farmers' performance in their farming (Indrawanto, 2008).

RESEARCH METHODOLOGY

This research was conducted in November 2014-January 2015. This research method is descriptive qualitative (Noviana & Ardiani, 2020) and quantitive. The type of data used is primary and secondary data. Primary data is taken directly on research through observation, surveys, interviews with farmers, and related agencies. This is done by distributing questionnaires to cashew farmers using a purposive sampling method, which selects farmers active in farmer group activities to provide information related to research. The selection of Karangmojo Subdistrict and Semanu Subdistrict as the research area was conducted by purposive sampling. This was based on the consideration that the

two sub-districts are cashew centers in Gunungkidul Regency. The selected villages are Ngeposari and Pacarejo villages in Semanu District and Gedangsari and Jatiayu villages in Karangmojo District. This village was chosen because the four villages were cashew plant centers in the sub-district. The number of respondents in this study was 25 people who cultivate cashew plants. The data collected are land area, number of cashew plants owned, plant age, maintenance measures (fertilization, weeding, pruning, pest control), crop production, and post-harvest measures. The collected data is then analyzed qualitatively and quantitatively. This was analyzed according to the research objectives.

RESULT & DISCUSSION

Cultivation

Gunungkidul Regency is one of the districts in the Yogyakarta Special Region Province. Geographically, Gunungkidul Regency is located between 1100° 21' - 1100° 50' east longitude and 70° 46' - 80° 09' south latitude. Gunungkidul Regency includes a tropical climate with an average daily temperature of 27.7°C, a minimum temperature of 23.2°C and a maximum temperature of 32.4°C. Relative humidity ranges from 80% - 85%, not affected by altitude, but more influenced by season. Soil types in the study area are latosol and red mediterranean. Cashew plantings in Gunungkidul Regency are dominated in areas that have a slope of less than 15° which are classified as gentle slopes. The average rain day is 96.67, and rainfall is 2,138.33 mm/year. The spacing of about 10 x 10 meters in rainfed land. The cropping pattern used is intercropping, where cashew plants function as edge crops, land boundaries, and protective plants for plants underneath. Cashew crops are intercropped with food crops and crops, such as rice (Oryza sativa), maize (Zea mays), peanuts (Arachis hypogaea), soybeans (Glycine max), cassava (Manihot utillisima), long beans (Vigna unguiculate), and other crops considered by farmers to help meet the daily needs of farmers' food. Tapioca, beans, turmeric, ginger, sweet potatoes, corn, etc., can be planted as inter-crop plants with the primary purpose of earning income until cashew starts to provide economic returns (Visalakshi, Jawaharlal, & Ganga, 2015; Shabbir et al., 2019; Siddiqi et al., 2019). Regression results reveal that maize is the most cost-effective intercropping in cashew plantations in the southwestern state of Oyo, during the initial stage from which high profits can accrue to farmers (Lawal & Uwagboe, 2017; Sulaiman et al., 2020). The cashew cultivation pattern is shown in Figure 1.

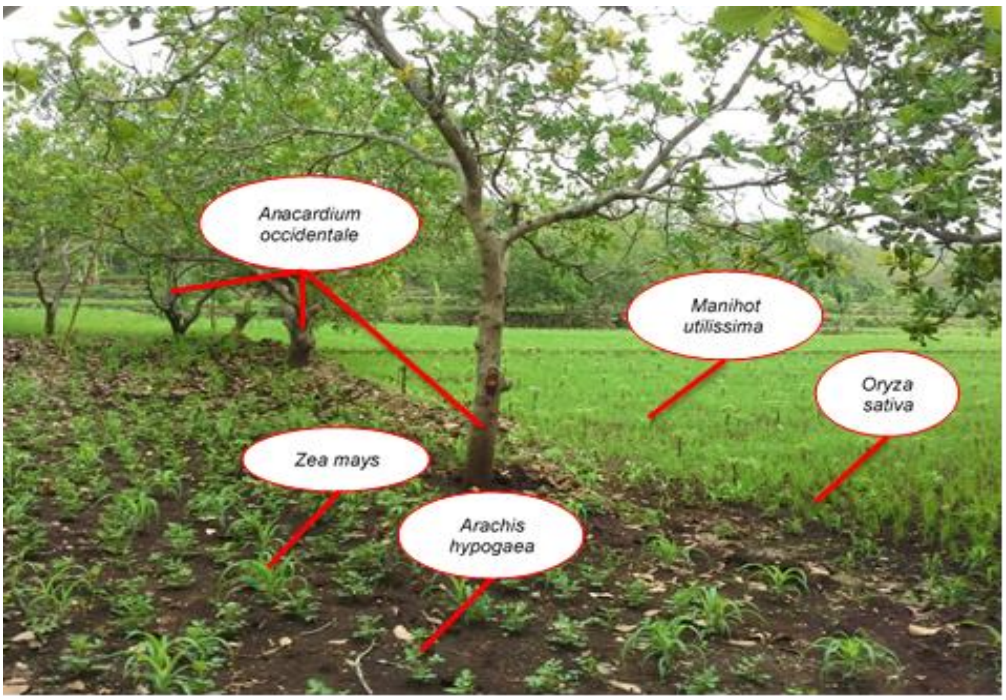

Figure 1 Intercropping of cashew, rice, maize, peanuts and sweet potatoes on farmers' land
Source: documentation's author, 2015

Farmers in Gunungkidul Regency have rainfed land with an average area of 1,000 - 5,000 m2 or 0.1 - 0.5 Ha. In this area, farmers cultivate some of the above plants with intercropping systems. The main crops to be cultivated are food crops, while cashew plants are restricted or protective plants. Thus, farmers' amount of cashew tends to be small, namely an average of 10 - 50 trees (Table 1).

Table 1. Land Ownership and The Number of Cashew Plants Owned by Farmers in Gunungkidul Regency

Description	Number of Respondents	%
Land area (m^2)		
< 1,000	1	4
1,000 – 5,000	20	80
> 5,000	4	16
Total	25	100
Number of Cashew Plants (trees)		
10 – 30	8	32
31 – 50	10	40
> 50	7	28
Total	25	100

Source: processed data

Plants Treatment
Plants treatment by farmers includes weeding, pest and disease control, fertilizing, and pruning, as presented in Table 2.

Table 2. Cashew Plant Care Activities by Farmers in Gunungkidul Regency

Treatments	Respondent's Answer			
	Yes		No	
	Qty	%	Qty	%
Weeding	100	100	0	0
Pest and disease control	40	0	60	0
Fertilizing	100	0	100	0
Pruning	100	100	0	0

Source: processed data

Weed weeding on the plant disc is generally done indirectly by the farmer, where the farmer aims to clear the land for food crops under the cashew crop. Weeding measures for cashew plants are aimed at weeds that spread in plants. Previous studies have shown that cashew-rice and cashew-king cropping intercropping patterns with lower weed biomass and comparable vegetative growth can be recommended to cashew farmers rather than just single planting (Famaye & Adeyemi, 2011).

Pests attacking cashew plants in Gunungkidul are Spingognata pelida and Cricula trifenestrata caterpillars. Farmers carry out Spingognata pelida pest control by lighting a fire around the plant to repel the caterpillars. If a large number of attacks, the plants will be immediately cut down and burned. For pest control Cricula trifenestrata or the so-called the gold silkworm is done manually or directly quoted. Cricula trifenestrata attacks the plant's shoots so that it can reduce the number of flowers formed (Siswanti, Supriyadi, & Subagiya, 2017). It is known to control these leaf-eating caterpillars. Farmers do not want to use synthetic chemical insecticides because the soil between cashew stands is planted with Kolonjono grass, which is a fodder crop. Other crops, such as cassava and nuts, are feared that it can poison animals, livestock, and humans (Herwindo, 2011; Usak et al., 2019).

Fertilization is done only once a year, namely at the beginning of the rainy season. Fertilizers used are NPK (Nitrogen, Phosphorus, and Potassium) and manure (compost). Fertilizing is done by putting it into a shallow ditch that surrounds the plant. The NPK dose used by farmers is 106.5 grams/tree. Proper NPK fertilizer management is an additional tool to minimize the use of pesticides in cashews (Adejumo, 2010). The dose of manure is 14.11 kg/tree. When organic matter is added to the soil, soil microbes work on it and convert it into nutrients available to plants and improve soil structure. Studies on nutrition management show that 1/3 of the recommended dosage will be sufficient to maintain cashew plantations when planted on high-density plantations, in terms of intercropping patterns (Kalaivanan & Rupa, 2017). Previous studies have shown that C, N, and K's total values are higher in organic compost than biochar (Nduka et al., 2019).

Farmers do prune 1-2 times a year. Pruning is done before flowering plants. The purpose of pruning is to facilitate flowering plants, thereby increasing cashew production. Annual pruning can help plants stay productive (Nayak, 2011). In mid-July, pruning proved beneficial for producing higher beans yields per tree, with an increasing percentage of 23.6 and 17.68% (Prasanna Kumar, Hari Babu, & Srihari, 2015).

Harvest and Post-harvest

The cashew harvest in Gunungkidul Regency falls from September to November. The harvest period is influenced by the first time of the rainy season. In 2010-2014, the production of Gunungkidul cashew decreased. This is due to the rainy season falls coinciding with cashew season. Many cashews that fall and do not develop into a fruit. Agro-climate stress index and amount of rainfall, and the number of rainy days are the main factors determining the production of cashew trees (Ibouraïman et al., 2016). The average production of cashew farmers in Gunungkidul at this time tends to be small at 62.07 kg/ha wet logs (soaked cashew). According to (Kapinga, Kasuga, & Kafiriti, 2017)The characteristics of the old cashew fruit (Figure 2) are as follows:

- The color and shape of apples becomes yellowish, greenish-yellow or red, varying by cultivar
- The size of apples is larger than the nut.
- The texture of the flesh is soft, the taste is sour, slightly sweet, watery, and the aroma of the fruit (apples) is similar to the aroma of a strawberry.
- The color of the seed (nut) coat becomes grayish white and shiny

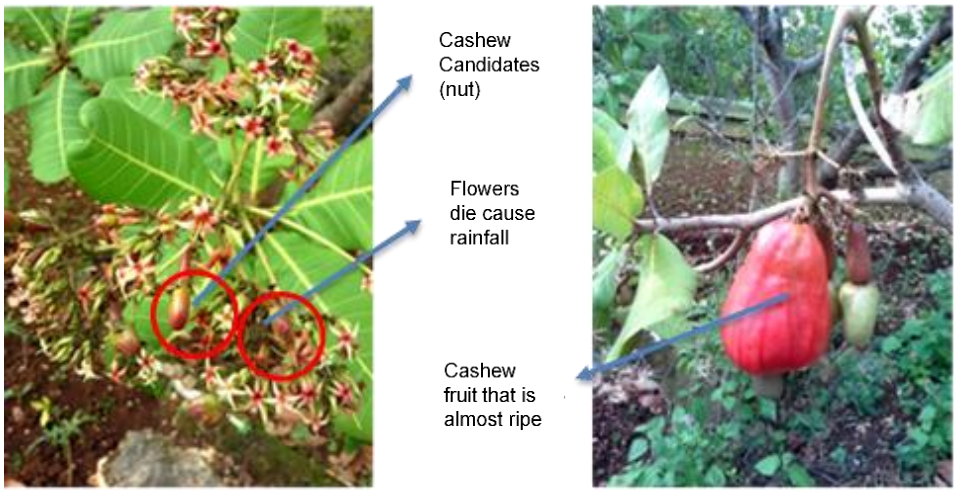

Figure 2 Cashew Flowers and Fruit
Source: documentation's author, 2015

The post-harvest action taken is the drying process to produce dried spindles and stripping to produce cashew nuts. From the study results, it was found that only 4% of respondents took action after harvest. Farmers keep some cashew logs by placing them on sacks (Figure 3). Wet cashew nutshell is a freshly picked or separated cashew spindle. After drying or drying for 3-4 days, dry cashew will be obtained. The action of drying is done to reduce the moisture content of cashew seeds. After drying, the log weight will shrink to 5%. Nuts should be left in the sun immediately after harvesting for 3-4 days until the humidity level is 10-12% or until the seeds crackle in the shell (Gyedu-Akoto, 2014). Drying and roasting is the most critical process so that cashews become rancid due to fat degradation and protein freezing (Phuoc Minh, Thinh Pham, Tan Da, Quang Vinh, & Quoc Thuan, 2019).

(a) (b)

Figure 3 (a) Soaked Cashew, (b) Dry Cashew
Source: documentation's author, 2015

Dry cashew is then stripped. The purpose of stripping is to separate the cashews from the skin. Stripping is usually done using a simple tool like Figure 4.

(a) (b)

Figure 4 (a) Stripping Tools, (b) Cashews that have been Peeled
Source: documentation's author, 2015

The farmer's cashew cultivation pattern in Gunungkidul Regency can shows in Figure 5.

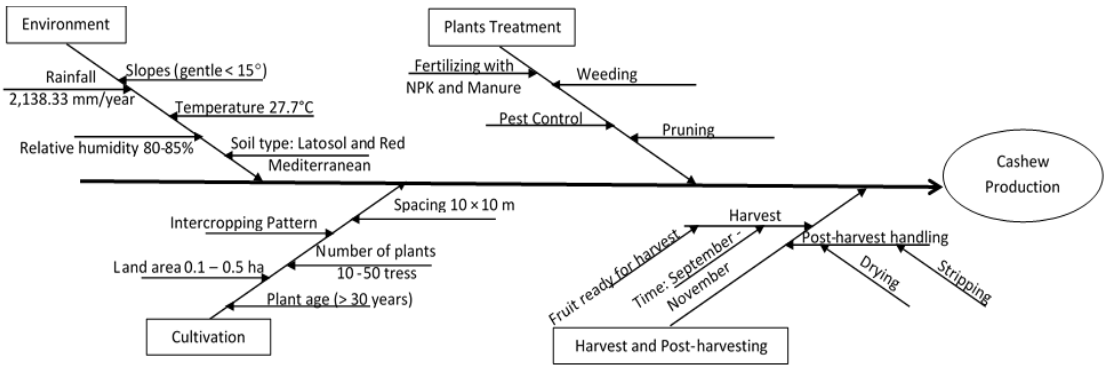

Figure 5 Farmer's cashew cultivation pattern in Gunungkidul Regency
Source: processed data

CONCLUSION

This study concluded that the cashew plant cultivation pattern in Gunungkidul Regency followed the appropriate plant cultivation techniques. The selection of the intercropping cropping pattern is a form of optimal land use. Plant care measures to post-harvest measures are carried out according to proper cultivation techniques, so that cashew plants produce well.

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