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# Factors Affecting Cassava Cultivation in Jombok Village Ngoro Sub-District Jombang Regency

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## ABSTRACT
Jombok Village is one of the producers of cassava in Jombang Regency. In the initial observations in the field, about 70% of farmers in Jombok Village have planted cassava in the last 5 years. This study aims to determine the factors of cassava cultivation in Jombok Village Ngoro Sub-district Jombang Regency. Cultivation factors can affect the yields produced. The research was conducted using a purposive method based on the availability of data and information in the field. The results of the study will be analyzed qualitatively using biotic and abiotic factors in Jombok Village. A total of 20 research samples showed that most of them were influenced by other factors. Abiotic factors are influenced by rainfall, environmental temperature, water, soil, and sunlight, while abiotic factors are influenced by plant pests. From several factors, if the needs of cassava plants have not been met, the productivity will decrease. The average temperature in Jombok Village is 27.90C. The productivity of cassava plants annually reaches 118 tons.

***Keywords**: Cultivation System; Cassava; Jombang.*

## INTRODUCTION
Indonesia is a tropical country that has many nutrients so that plant diversity has the potential to grow well and fertile. One of the plants that can grow well in a tropical climate are tubers such as honey tubers, gembolo, gembili, cassava, sweet potatoes, purple tubers, gadung tubers and canna tubers and even potato tubers are also widely found and easy to obtain. (Aini & Rahayu, 2015)

Cassava *(Manihot utillisima)* is a food plant in the form of a low plant with another name cassava. Cassava comes from the Americas, to be precise from Brazil. Cassava grows in countries that are famous for their agricultural areas and entered Indonesia in 1852. Cassava *(Manihot utilissima)* is the third staple food after rice and corn for the people of Indonesia (Ami & Yuliana, 2021). This plant can grow all year round in the tropics and has a high adaptability to various soil conditions. This plant has a fairly complete nutritional content. The chemical and nutritional content of cassava is carbohydrates, fat, protein, dietary fiber, vitamins (B1, C), minerals (Fe, F, Ca), non-nutritive substances and water. (Soenarso, 2004 in Manan, 2013). In 2011 cassava production in Indonesia reached 24,044,025 tons, while in 2012 it increased to 24,177,327 tons. (BPS Indonesia, 2012)

In 2011 cassava production in Indonesia reached 24,044,025 tons, while in 2012 it increased to 24,177,327 tons (BPS Indonesia, 2012). In the use of cassava plants other than the tubers, the community also uses all parts of this plant, starting from the stems, leaves, and skin. The higher the amount of cassava production, the higher the skin it produces (Nasirudin & Qomariyah, 2021).

Jombok Village is one of the producers of cassava in Jombang Regency. According to BPS Jombang data (2018) the realization of cassava harvested area in Jombok Village is 30 ha with a productivity of 0.02 ton/ha. This can be interpreted that the cultivation of cassava plants contributes quite a lot to the income of the people of Jombok Village. It is important to conduct an in-depth study to study the cassava cultivation system affecting cultivation and the factors that affect the cassava cultivation system in Jombok Village, Ngoro District, Jombang Regency.

Early observations in the field realized that around 70% of farmers in Jombok Village had planted cassava for the last 5 years. The consistency of cassava cultivation in Jombok Village is interesting to study, especially the factors that can affect cassava cultivation. Cassava cultivation involves several factors in the growth process, which are related to abiotic and biotic interactions. The purpose of this study was to determine the factors that influence the cultivation of cassava (manihot utilissima) in Jombok Village, Ngoro District, Jombang Regency.

## METHOD

This research was conducted in Jombok Village, Ngoro District, Jombang Regency. In March-May 2021. There are 20 locations where data was collected, observations were made on the ground and conducted interviews.

This research is to find factors that influence cassava cultivation in Jombok Village. The parameters observed were soil type, height of the soil where cassava was planted, environmental temperature, sun intensity, irrigation and rainfall. The materials used are notebooks, observation sheets, and cassava plants in the research location. The tree data was analyzed qualitatively and presented in the form of a diagram to make it easier to draw conclusions.

## RESULT AND DISCUSSION

Jombok Village has several sectors that support the village economy, one of which is agriculture. Jombok Village has an area of about 422 ha with an area of 128.9 ha used as a settlement and 313.1 ha used as agricultural land in the food crop sector such as rice and cassava. Jombok village is located in the lowlands with an altitude of about 500 meters above sea level. The humidity is around 90% and the average rainfall is between 1,103-1,519 mm/year.

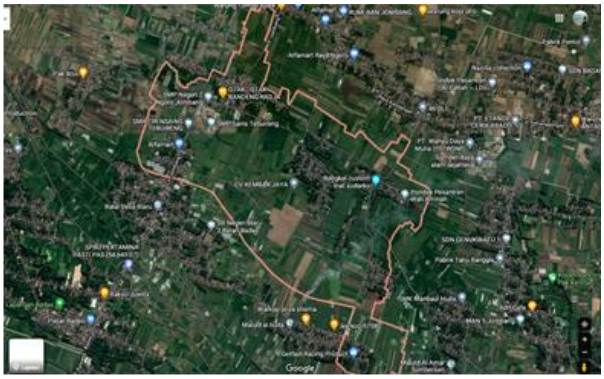

**Figure 1**. Map Jombok Village

### Result

Productivity of cassava plants in Jombok Village, Ngoro District. Based on table 1, the harvest in Jombok Village in March 2021 obtained about 0.3 tons / ha with details of the total area of 47.45 ha divided by the total number of harvests. This yield has decreased compared to 2020 with yields reaching 348.75 Kw/Ha ( BPS, 2020).

**Table 1.** Yield of Cassava in Jombok Village

| Land area (m2) | Yields (Ton) |
|---|---|
| 2100 | 6 |
| 3500 | 10 |
| 10290 | 28 |
| 4200 | 12 |
| 4200 | 12 |
| 10290 | 29 |
| 2100 | 6 |
| 4200 | 12 |
| 4200 | 12 |
| 2100 | 6 |
| 1400 | 4 |
| 2100 | 6 |

| Land area (m2) | Yields (Ton) |
|---|---|
| 4200 | 12 |
| 2450 | 7 |
| 1050 | 3 |
| 4200 | 12 |
| 1400 | 4 |
| 1400 | 4 |
| 1050 | 3 |
| 66430 | 188 |

Several production factors that can affect the level of production include; the area of land owned, the amount of labor used, the number of seeds used, the amount of fertilizer used and the amount of pesticides used, the state of irrigation, the level of knowledge and skills, the level of soil fertility, climate or season, available capital. (Soekartawi, 2002 dalam Harahap, 2018).

Jombok Village has a different temperature every hour, with an average temperature of 27.90C. The highest temperature during observations in Jombok Village, Ngoro Sub-district, Jombang Regency, was at 14.00 WIB at 31℃, while the lowest temperature was at 05.34 WIB at 25℃ (Figure 1). Thus, the air temperature in Jombok Village is quite ideal for cassava cultivation (*Manihot utillisima*). The average temperature is higher than the temperature in the city of Malang which occurred in November 2018 at 24.990C (Maulana & Herlina, 2020).

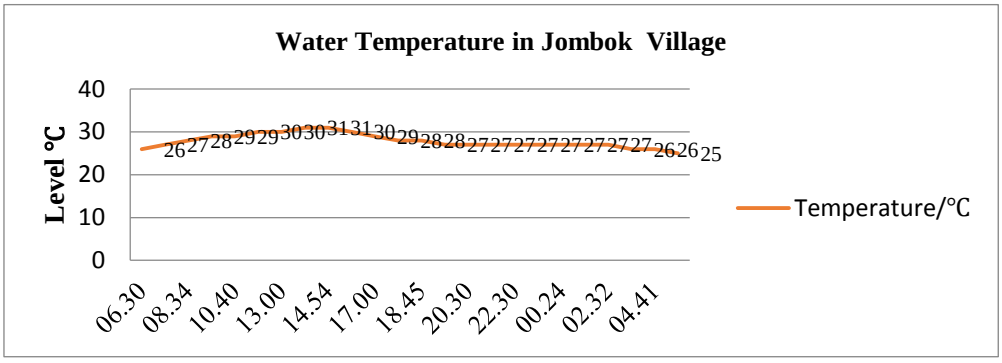


**Figure 2**. Hourly Temperature in Jombok Village

The environmental temperature affects the rate of evaporation in plant tissues, causing the photosynthesis process of plants to be disturbed (Wahyuningsih et al., 2021). According to Yahaya et al., 2016 The optimum temperature for photosynthesis and growth of cassava plants ranges from 25-270 C, Above or below this temperature, the rate of photosynthesis and growth of cassava plants is reduced, which causes cassava production to decrease.

**Table 2.** Results of Data Collection in the Field (Control)

| No Responden | Constraint | Spraying |
|---|---|---|
| 1 | Price and grass | - |
| 2 | Grass | - |
| 3 | Price and grass | - |
| 4 | Rat | - |
| 5 | Water (gayas, rat) | - |
| 6 | Gayas | Rondup 1 bottle |
| 7 | Red Mite | Kampidor |
| 8 | Gayas | Poradan |
| 9 | Water and grass | - |
| 10 | Rat, planthopper | - |
| 11 | Rat | - |
| 12 | Red Mite | - |
| 13 | Rat | - |
| 14 | Rat | - |
| 15 | Rat | Spicescassava (rat medicine) |
| 16 | Grass Water | - |

| No Responden | Constraint | Spraying |
|---|---|---|
| 17 | Rat | - |
| 18 | Unstoppable Water | Superdok |
| 19 | Rat | Regen |
| 20 | Water , Grass | - |

Based on table 2, biotic factors also affect the productivity of cassava plants, namely plant pests. Pests of cassava plants in the Village of Jombok are red mites, gayas, rats. Red mite attack (*Dermanyssus gallinae*) can cause plant death if not treated seriously which can reduce plant productivity. Characteristics of red mite attacks are yellow spots on the base of the leaves, continuing around the main leaf bones, and the leaves turning brown. (Balitkabi, 2016).

Gayas attack (*Lepidiota stigma*) usually occurs in plant roots by eating cassava root bark that has developed into tubers. The characteristics of the pest attack are that the cassava leaves suddenly wither even though the air temperature is optimal for carrying out the vegetative phase of cassava plants. Gayas pest control by means of crop rotation and weed cleaning around cassava plants (Balitkabi, 2016).

The pest of rats (*Rattus argentiventer*) is the plague that most farming communities complain about, rats are active at night during times of high population density and can climb trees but cannot swim well. The damage caused by rat attacks started when cassava plants were still being planted until post-harvest (Virman, 2016). Rat control can be done by means of crop rotation and also provided enemies of rat pests.

**Discussion**

Based on Figure 1, environmental temperature can affect several factors of cassava plant production, namely the temperature is influenced by the length of sunlight, rainfall, soil, fertilization and irrigation that occurs in the land. Sunshine long sun irradiation 10 hours / day. The longer the sunlight, the more evaporation of the roots of the cassava plant. Rainfall in Jombok village affects the productivity of cassava plants. rainfall will make water reserves to have a close effect on existing water reserves in the soil, this is because the availability of water in the soil encourages the rate of decomposition of organic matter and the formation of soil structure, so that the penetration of cassava roots can be deeper and able to get more nutrients in Howeler, (2001) in Maulana & Herlina, 2020.

The water supply around the cassava plantation (Manihot utillisima) in Jombok Village, Ngoro District, Jombang Regency is still not sufficient because there is no irrigation channel which causes no distribution of water on the land, in addition to the absence of irrigation channels, there is also no drainage channel which causes when cassava (Manihot utillisima) land becomes inundated.

Fertilization carried out by cassava farmers in Jombok village was carried out 2 times during the planting period, fertilization was carried out so that cassava productivity was increased. One of the limiting factors for cassava production is nutrients so that to get good production, nutrients must be available according to plant needs. Nutrients can be obtained through fertilization using inorganic fertilizers and organic fertilizers (Tumewu et al., 2015).

Good soil for cassava cultivation is a loose or crumb structure that can be maintained from the early stages of growth until harvest. These conditions can ensure the circulation of O2 and CO2 in the soil, especially in the tillage layer, so that the activity of microorganisms and optimal root function in nutrient absorption. (Tumewu et al., 2015).

According Saleh et al., 2013 There are several pests that often attack cassava plants (Manihot utillisima) as follows: Red Mites Symptoms of attack begin with the appearance of yellow spots along the leaf bones on the lower and middle leaves. Symptoms of flour bedbug attacks are stunted at the growing point area, the internodes become short, the new leaves that have just grown to become kesi; and frown. Shield lice Symptoms caused by shield lice are cassava leaves will show yellow symptoms and fall off. Whitefly the damage caused by the Whitefly attack is not that great. Gayas/Uret pests attack or eat the roots so that the plants wither and die**.** The spiral-forming mealybugs are symptomatic in the form of white spots on the leaf surface, the plant becomes weak, early wilting and the growth of cassava plants becomes stunted. Termites in young plants cause plant growth disturbances and can even die, while in old plants cause stems to become weak and break easily. Grasshoppers cause irregular movements of the leaves which can even cause the leaves to become severely damaged. The caterpillar attack resulted in total defoliation of the leaves and poor tuber quality. Caterpillars caterpillar attacks, both young and old, cause the leaves of the kajaughan to look white.

## CONCLUSION

The productivity of cassava plants in Jombok village is caused by abiotic and biotic factors. The abiotic factors are sunlight, rainfall, soil, fertilization temperature. Sunlight, while the biotic factors are only plant pests. Rats are the main factor in decreasing the productivity of cassava plants. Rats attack cassava while the plant is still in the field and also post-harvest, other pests also cannot be ignored such as Gayas attack and red mites. Control of rat pests in Jombok Village has not been carried out optimally because there has been an explosion of rat pests, the control is only done chemically. Irrigation is also a problem because the water source for irrigation is far from the source. The productivity of cassava plants with a land area of 66430 $m^2$ produces 180 tons, an increase compared to 2018 which only produced 0.02 tons/ha.

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