Growth and yields of two varieties of maize (Zea mays L.) intercropped with peanut (Arachys hypogaea L.) applied by bokashi plus fertilizer between the rows of teak trees based agroforestry system

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Abstract. Nutrient shortages are the main problems faced by farmers, so as to improve soil fertility using organic fertilizer is compulsory. The main objective was to analyze the effects of bokashi plus fertilizer on the growth and yields of two varieties of maize intercropped with peanut under three years old teak trees in agroforestry system. The research was arranged in randomized completely block design in factorial pattern with two factors, maize variety: local maize and hybrid corn bisi-2; and bokashi plus fertilizer doses: 0, 3, 6 and 9 t ha⁻¹. Maize growth recorded were plant height, leaf number, stem diameter and leaf area at 2, 4, 6 and 8 WAP and maize yields recorded were cob weight with cornhusk, cob weight without cornhusk, cob length, diameter, row number, 100 seeds dry weight, biomass dry weight, yield and LER. The results showed that interaction between maize variety and bokashi plus fertilizer had significant effect on the growth and yield of maize intercropped with peanut under three years of teak trees in agroforestry system. The best effects of maize growth and yield were obtained at 9 t ha⁻¹ with highest yield of local maize and hybrid maize of 4.69 and 5.79 t ha⁻¹.

1. Introduction
Maize (Zea mays L) is the second strategic commodity after rice because corn is one of the cereal commodities that contains high nutritional values and has high economic value. [1] reported that the nutrient contents of 100 g maize grain composed of amylum (73.4%), fiber (9.5%), protein (9.1%), lipid (4.4%) and ash (1.4%). This result was consistent with the application of appropriate quantity of organic fertilizer that may increase agriculture crop yields which also result in an enhanced quality of grain [2] and [3]. The role of corn, apart from being food and feed, is now widely used as a raw
material for energy (fuel) and other industrial raw materials whose needs continue to increase every year [4].

Problems in corn cultivation consist of biotic and abiotic factors, traditional cultivation techniques, using varieties that have low yield potential, low plant populations, and use of fertilizers that are not optimal [5]. Several important factors that need to be considered to increase corn production include the use of new high-yielding varieties, optimum fertilization, and arrangement of the planting population. These factors are interconnected so that in increasing corn production an understanding is needed to manage them in a synergistic manner so that high yields are obtained [6].

Maize may cultivate both in intercropping pattern with legume crops or monocropping. One of the best legume crops that can be intercropped with maize is peanut. This legume crop is generally cultivated in tropical countries which may produce adequate yield for food [7]. Studies on the success of cropping system research have been obtained as reported by [8], in particular on the combination of planting annual and perennial crops known as agroforestry [9]; [10]; [11], which had been usually practiced for a long time in order to obtain not only for agriculture production, but also for sustaining biological diversity in improved agroforestry system.

Napabulano district where agroforestry system is being practiced, was selected as the place to carry out this research since abundant natural resources dominated by Chromolaena odorata L that contains high quantity of nutrients [12], known as local name “komba-komba” with the addition of chicken dung and rice bran mixed with EM4 and water to make bokashi plus fertilizer. The results of previous research on the effects of organic fertilizer to improve soil nutrient had been reported by [13]. In addition according to [14], revealed that the use of bokashi plus fertilizer into the soil might increase soil nutrient contents and if integrated with appropriate arrangement of two or more crops were greatly recommended to elucidate the problems of soil nutrient shortages and to guarantee the better quality of grain.

The use of high-yielding maize variety and superior local maize intercropped with peanut under early growth development of teak trees treated by bokashi plus fertilizer is interesting to be studied. However, how the growth and yields of two varieties of maize intercropped with peanut perform under teak trees based agroforestry system has been unknown. The main purpose of writing this paper was aimed at analyzing the effects of bokashi plus fertilizer on the growth and yields of two varieties of maize intercropped with peanut cultivated between the rows of three years old teak trees in sustainable agroforestry system in Pentiro Village, Napabulano District, Muna Regency, Southeast Sulawesi Province.

2. Materials and methods

2.1. Place and time
The research was conducted in the farmer’s land of Pentiro village, Napabulano District. Three years old teak trees stand with proper space arrangement of 6 m x 6 m was used for demonstration plot. This research was carried out from December 2020 to May 2021.

2.2. Materials and equipment
There were some materials used in this research such as hybrid maize bisi-2, local peanut, bokashi plus fertilizer (mixture of Chromolaena odorata L., chicken dung, rice bran, EM4, water and palm sugar), label, poles and newsprint. Equipment used were hoe for soil collection, analytical balance, filter, metric scales, ropes, watering tools, scissors, plastic pouches, camera, stationery writing, leaf area meter, waring net, electric oven, and tools for soil analysis. Other equipment used in the field were chopper machine, hand tractor, knife, sprayer, measurement and soil thermometer.
2.3. Methods

Research design was arranged in factorial pattern with randomized completely block design (RCBD), consisting of two factors. First factor was maize variety (M), consisting of two levels, such as local maize (M1) and hybrid corn bisi-2 (M2). Second factor was various doses of bokashi plus fertilizer (F), consisting of four levels, such as 0 t ha$^{-1}$ or without bokashi plus fertilizer (F0), 3 t ha$^{-1}$ of bokashi fertilizer plus (F1), 6 t ha$^{-1}$ of bokashi fertilizer plus (F2) and 9 t ha$^{-1}$ of bokashi fertilizer plus (F3). Therefore, there were eight combinations, i.e. M1F0, M1F1, M1F2, M1F3, M2F0, M2F1, M2F2 and M2F3. Every combination was conducted four repetitions so that there were 32 experimental units for intercropping and added with eight plots for monocropping. Maize growth components recorded were plant height, stem diameter, number of leaves and leaf areas collected at the ages of 2, 4, 6 and 8 weeks after planting (WAP). Yield component on flowering time were determined when 50% of maize in one plot was flowering. Other yields components such as cob dry weight with husk, cob dry weight without husk, cob length, cob diameter, row number, 100 seeds dry weight, biomass dry weight, yield per ha and LER were recorded. All variables collected were tabulated using excel program and then analyzed using analyses of variances (ANOVA), and if significant different, then followed by Honestly Significant Difference (HSD) α=0.05 or 95 percent confidence level.

3. Results and discussion

3.1. Results

3.1.1. Maize growth components. The growth dynamic of maize in the combination treatment of maize variety and various doses of bokashi plus appplication had significant effects and consistent results on the averages of plant height and number of leaves recorded at 2, 4, 6 and 8 WAP in Pentiro village (Table 1). The highest plant height and leaf number of maize growth were achieved at the combination of M2F3 and the lowest one was found at the combination of M1F0. This indicated that hybrid maize bisi-2 applied by the doses of bokashi plus fertilizer 9 t ha$^{-1}$ gave a better response compared with other combinations. The results also showed that the increase quantity of bokashi plus doses applied to the soil, the higher the plant height and number of maize leaves cultivated in intercropping system with peanut as shown in Table 1.

| Combination | Plant height (cm) | Leaf Number (strands) |
|-------------|------------------|-----------------------|
|             | 2 WAP | 4 WAP | 6 WAP | 8 WAP | 2 WAP | 4 WAP | 6 WAP | 8 WAP |
| M1F0        | 31.64d | 51.55d | 128.82d | 158.75c | 6.26d | 9.35b | 12.34a | 14.21c |
| M1F1        | 38.52bcd | 59.63cd | 132.93d | 160.48c | 7.04cd | 9.94b | 13.62ab | 15.64bc |
| M1F2        | 42.78abc | 63.81bc | 146.54cd | 174.50bc | 7.68bcd | 10.65ab | 13.89ab | 16.48ab |
| M1F3        | 44.69abc | 69.05abc | 159.87bc | 186.66ab | 8.05abcd | 11.27ab | 14.75ab | 16.90ab |
| M2F0        | 36.49cd | 66.22bc | 143.56cd | 173.45bc | 7.81abcd | 9.18ab | 14.16ab | 15.76ab |
| M2F1        | 42.72abc | 71.45abc | 165.82ab | 187.87ab | 8.53abc | 10.56ab | 15.31ab | 16.15ab |
| M2F2        | 45.86ab | 75.56ab | 173.24ab | 192.64ab | 9.30ab | 11.74ab | 15.88ab | 17.25ab |
| M2F3        | 50.18a | 80.84a | 179.02a | 201.08a | 9.76a | 12.86a | 16.45a | 17.98a |

Table 1. Data on the averages of plant height (cm) and number of leaves (strands) of maize intercropped with peanut applied by bokashi plus fertilizer at 2, 4, 6, and 8 WAP.

Notes: Figures shown in eight columns followed by difference letters were significant difference using Honestly Significant Difference (HSD) α=0.05.

In terms of stem diameter and leaf area of maize growth, the results of study showed that the combination treatment of maize variety and various doses of bokashi plus fertilizer had significant effects and consistent results of maize stem diameter and the area of leaves observed at 2, 4, 6 and 8
WAP in Pentiro village (Table 2). The highest stem diameter and leaf area of maize growth were achieved at the combination of M2F3 and the lowest one was found at the combination of M1F0, indicating that hybrid maize bisi-2 applied by the doses of bokashi plus fertilizer 9 t h⁻¹ gave a better response compared with other combinations. The research results also showed that the increase doses of bokashi plus fertilizer applied to the soil, the higher growth of maize on stem diameter and the area of leaves cultivated in intercropping system with peanut between the rows of three years old teak trees based agroforestry system as shown in Table 2.

Table 2. Data on the averages of stem diameter (cm) and area of leaves (cm²) of maize cultivated in intercropping system with peanut treated by bokashi plus fertilizer at 2, 4, 6 and 8 WAP.

| Combination | Stem Diameter (cm) | Leaf Area (cm²) |
|-------------|--------------------|-----------------|
|             | 2 WAP   | 4 WAP   | 6 WAP   | 8 WAP   | 2 WAP   | 4 WAP   | 6 WAP   | 8 WAP   |
| M1F0        | 0.38    | 1.05c   | 1.42c   | 1.82c   | 23.57c  | 208.17d | 452.90c | 590.45e |
| M1F1        | 0.42    | 1.16bc  | 1.49bc  | 1.94bc  | 28.48c  | 235.64c | 526.06b | 646.25de|
| M1F2        | 0.45    | 1.22bc  | 1.65abc | 2.26abc | 37.12ab | 286.91b | 578.72ab| 685.32cd|
| M1F3        | 0.47    | 1.31bc  | 1.72abc | 2.38ab  | 41.63a  | 314.65a | 606.15a | 719.70bcd|
| M2F0        | 0.40    | 1.23bc  | 1.54abc | 2.32abc | 25.48c  | 217.42cd| 478.54bc| 737.55bc|
| M2F1        | 0.52    | 1.38ab  | 1.66abc | 2.47ab  | 29.62bc | 239.66c | 527.85b | 765.91abc|
| M2F2        | 0.61    | 1.45ab  | 1.79ab  | 2.52a   | 37.98a  | 306.91a | 595.51a | 796.33ab|
| M2F3        | 0.66    | 1.67a   | 1.87a   | 2.75a   | 42.85a  | 327.54a | 622.94a | 838.05a |

HSD α=0.05 ns 0.32 0.34 0.55 7.86 26.04 67.51 82.04

Notes: Numbers shown in eight columns followed by difference symbols were significant difference using Honestly Significant Difference (HSD) α=0.05

3.1.2. Maize yields components. Data collection of averages yields components observed on two maize varieties cultivated in intercropping system with peanut applied by bokashi plus fertilizer between the rows of three years old teak trees were determined using Honestly Significant Difference (HSD) α=0.05 figured out in Table 3, 4, 5, 6, 7 and Table 8.

Table 3. Effects of bokashi plus fertilizer on flowering time, cob weight with husk, cob weight without husk, length of cob and cob diameter of maize intercropped with peanut under three years old teak trees.

| Combination | Flowering time (day) | Cob weight with husk (g) | Cob weight without husk (g) | Length of cob (cm) | Diameter of cob (cm) |
|-------------|----------------------|-------------------------|----------------------------|-------------------|---------------------|
| M1F0        | 46.26c               | 187.50f                 | 194.01d                    | 14.65b            | 3.91c               |
| M1F1        | 46.74c               | 195.11ef                | 206.85cd                   | 15.24b            | 4.33bc              |
| M1F2        | 47.05c               | 207.92cde               | 218.42abc                  | 15.85b            | 4.72abc             |
| M1F3        | 47.65bc              | 214.04bc                | 221.93abc                  | 16.17b            | 5.14abc             |
| M2F0        | 58.46ab              | 198.20def               | 219.25bcd                  | 18.37ab           | 4.94abc             |
| M2F1        | 59.43a               | 216.18abc               | 227.56abc                  | 19.25ab           | 5.88ab              |
| M2F2        | 59.65a               | 228.95ab                | 239.42ab                   | 19.64ab           | 6.02ab              |
| M2F3        | 60.02a               | 231.85a                 | 246.06a                    | 22.03a            | 6.15a               |

HSD α=0.05 10.82 16.97 24.63 5.81 1.75

Notes: Numbers shown in five columns followed by difference symbols were significant difference using Honestly Significant Difference (HSD) α=0.05.

Table 3 showed that the combination of variety of maize and bokashi plus fertilizer gave better response and significant effects on the flowering time, cob weight with husk, cob weight without husk,
cob length and cob diameter of maize intercropped with peanut between the rows of three years old teak trees based agroforestry system in Pentiro village, Napabalano district. The longest flowering time, highest cob weight with husk, the highest cob weight without husk, the highest cob length and the highest cob diameter were consistently achieved at the combination of M2F3 and the lowest one was found at the combination of M1F0, indicating that hybrid maize bisi-2 applied by various doses of bokashi plus 9 t h⁻¹ gave a better response compared with other combinations. The research results revealed that the increasing doses of bokashi plus fertilizer applied into the soil, the better flowering time obtained. Moreover, the higher cob weight with husk, the higher cob weight without husk, the better length of cob and the bigger cob diameter of maize planted in intercropping with peanut under teak trees based agroforestry system as figured out in Table 3.

Based on Table 4, it showed that the combination of variety of maize and bokashi plus fertilizer gave better response and significant effects on the averages of row number (lines), dry weight of 100 seeds (g), biomass dry weight (t ha⁻¹), yield (t ha⁻¹) and LER of maize intercropped with peanut under teak trees based agroforestry system in Pentiro village. The highest averages number of row (lines), the highest 100 seeds dry weight (g), the highest dry weight of biomass (t ha⁻¹), the highest yield (t ha⁻¹) and the highest land equivalent ratio (LER) were consistently achieved at the combination of M2F3 and the lowest one was found at the combination of M1F0, indicating that hybrid maize bisi-2 applied by bokashi plus fertilizer amounted to 9 t h⁻¹ gave a better response compared with other combinations. The research results confirmed showed that the increasing doses of bokashi plus fertilizer applied to the soil, the better averages row number (lines), dry weight of 100 seeds (g), biomass dry weight (t ha⁻¹), yield of maize crop (t ha⁻¹) and LER of maize planted in intercropping with peanut under teak trees based agroforestry system as figured out in Table 4, indicating high adaptability of maize variety to the local condition.

Table 4. The effects of bokashi plus fertilizer on row number, dry weight of 100 seeds, biomass dry weight, maize yield and LER of maize intercropped with local peanut under three years old teak trees.

| Combination | Row number (lines) | Dry weight of 100 seeds (g) | Biomass dry weight (t ha⁻¹) | Maize yield (t ha⁻¹) | LER   |
|-------------|--------------------|-----------------------------|-----------------------------|----------------------|-------|
| M1F0        | 11.62c             | 21.86c                      | 21.43c                      | 4.31b                | 1.20c |
| M1F1        | 11.78c             | 22.45bc                     | 24.24bc                     | 4.45b                | 1.25abc |
| M1F2        | 12.49bc            | 24.38abc                    | 25.48ab                     | 4.68b                | 1.26abc |
| M1F3        | 13.13ab            | 24.56abc                    | 25.74ab                     | 5.32ab               | 1.33ab |
| M2F0        | 12.48bc            | 23.95abc                    | 26.27ab                     | 4.86b                | 1.24bc |
| M2F1        | 13.54ab            | 25.84abc                    | 26.35ab                     | 5.37ab               | 1.27abc |
| M2F2        | 13.79a             | 26.85ab                     | 27.64ab                     | 6.40a                | 1.34ab |
| M2F3        | 13.85a             | 28.37a                      | 28.76a                      | 6.52a                | 1.36a |

HSD α=0.05

| Notes: Numbers shown in five columns followed by difference symbols were significant difference using Honestly Significant Difference (HSD) α=0.05. |

Based on Table 5, it showed that maize variety of hybrid bisi-2 gave significant different compared with local maize on flowering time (day), cob weight with husk (g), cob weight without husk (g), length of cob (cm) and diameter of cob (cm) of maize cultivated in intercropping system with peanut applied by bokashi plus fertilizer under three years old teak trees in Pentiro village. The longest averages flowering time (day), the highest cob weight with husk (g), the highest cob weight without husk (g), the length of cob (cm) and the biggest diameter of cob (cm) recorded were significantly different achieved at the hybrid maize bisi-2.
Table 5. The yields performances of two maize varieties planted in intercropping system with peanut treated by bokashi plus between the rows of three years old teak trees.

| Maize variety | Flowering time (day) | Cob with husk (g) | Cob weight without husk (g) | Length of cob (cm) | Diameter of cob (cm) |
|---------------|----------------------|------------------|-----------------------------|-------------------|---------------------|
| M1            | 46.93b               | 201.14b          | 210.30b                     | 15.48b            | 4.53b               |
| M2            | 59.39a               | 218.80a          | 233.07a                     | 19.82a            | 5.75a               |

HSD α=0.05 2.46 7.95 12.40 3.86 1.05

Notes: Numbers shown in five columns followed by difference symbols were significant difference using Honestly Significant Difference (HSD) α=0.05.

Based on Table 6, it showed that the variety of hybrid maize bisi-2 gave significant different compared with local maize on the averages row number (lines), dry weight of 100 seeds (g), biomass dry weight (t ha⁻¹), maize yield (t ha⁻¹) and LER of maize planted in intercropping system with peanut applied by bokashi plus organic fertilizer between the rows of three years old teak trees in Pentiro village. It showed that hybrid maize bisi-2 was higher than that of local maize on the averages row number (lines), dry weight of 100 seeds (g), biomass dry weight (t ha⁻¹), maize yield (t ha⁻¹) and LER.

Table 6. The yields performances of two maize varieties planted in intercropping system with peanut applied by bokashi plus organic fertilizer between the rows of three years old teak trees.

| Maize variety | Row number (lines) | Dry weight of 100 seeds (g) | Biomass dry weight (t ha⁻¹) | Maize yield (t ha⁻¹) | LER |
|---------------|--------------------|-----------------------------|----------------------------|----------------------|-----|
| M1            | 12.26              | 23.31b                      | 24.22b                     | 4.69b                | 1.26 |
| M2            | 13.42              | 26.25a                      | 27.26a                     | 5.79a                | 1.30 |

HSD α=0.05 ns 2.48 2.69 1.08 0.13

Notes: Numbers shown in five columns followed by difference symbols were significant difference using Honestly Significant Difference (HSD) α=0.05.

Table 7. Effects of bokashi plus fertilizer on flowering time, cob weight with husk, weight of cob without husk, length of cob and diameter of maize cob intercropped with peanut under three years old teak trees.

| Doses of bokashi plus | Flowering time (day) | Cob weight with husk (g) | Weight of cob without husk (g) | Length of cob (cm) | Diameter of cob (cm) |
|-----------------------|----------------------|--------------------------|-------------------------------|-------------------|---------------------|
| 0 t ha⁻¹               | 52.36                | 192.85b                  | 206.63c                       | 16.51b            | 4.43c               |
| 3 t ha⁻¹               | 53.09                | 205.65ab                 | 217.21bc                      | 17.25ab           | 5.11bc              |
| 6 t ha⁻¹               | 53.35                | 218.44ab                 | 228.92ab                      | 17.75a            | 5.37ab              |
| 9 t ha⁻¹               | 53.84                | 222.95a                  | 234.00a                       | 19.10a            | 5.65a               |

HSD 0.05 ns 8.85 14.82 2.41 0.27

Notes: Numbers shown in five columns followed by difference symbols were significant difference using Honestly Significant Difference (HSD) α=0.05.

Based on Table 7, it showed that the use of bokashi plus organic fertilizer had better response and significant different on the averages of flowering time (day), cob weight with husk (g), cob weight without husk (g), length of cob (cm) and diameter of cob (cm) of two maize varieties intercropped with peanut under three years old teak trees in Pentiro village. The treatment of 9 t ha⁻¹ was consistently the best response and significant different compared with other treatments on flowering time (day), cob with husk (g), cob without husk (g), length of cob (cm) and diameter of cob (cm) of
two maize varieties intercropped with peanut under three years old teak trees in Pentiro village, while the lowest one was found at the treatment of without bokashi plus fertilizer (Table 7).

Based on Table 8, it showed that the treatment of bokashi plus organic fertilizer had better response and significant different on the averages of row number (lines), dry weight of 100 seeds (g), biomass dry weight (t ha\(^{-1}\)), maize yield (t ha\(^{-1}\)) and LER of two maize varieties cultivated in intercropping system with peanut under three years old teak trees in Pentiro village. The treatment of 9 t ha\(^{-1}\) was consistently the best response and significant different compared with other treatments on number of row (lines), 100 seeds dry weight (g), dry weight of biomass (t ha\(^{-1}\)), yield of maize (t ha\(^{-1}\)) and land equivalent ratio (LER) of two maize varieties intercropped with peanut under three years old teak trees in Pentiro village, while the lowest one was consistently recorded at the treatment without bokashi plus fertilizer (Table 8), indicating a high adaptability of maize variety on the treatment of organic fertilizer.

**Table 8.** The effects of bokashi plus fertilizer on row number, dry weight of 100 seeds, dry weight of biomass, maize yield and LER of maize intercropped with peanut under three years old teak trees.

| Doses of bokashi plus (t ha\(^{-1}\)) | Row number (lines) | Dry weight of 100 seeds (g) | Dry weight of biomass (t ha\(^{-1}\)) | Maize yield (t ha\(^{-1}\)) | LER |
|----------------------------------------|--------------------|-----------------------------|--------------------------------------|-----------------------------|-----|
| 0 t ha\(^{-1}\)                        | 12.05b             | 22.91b                      | 23.85c                               | 4.59b                       | 1.22c |
| 3 t ha\(^{-1}\)                        | 12.66ab            | 24.15ab                     | 25.30bc                              | 4.91ab                      | 1.26bc |
| 6 t ha\(^{-1}\)                        | 13.14ab            | 25.62ab                     | 26.56ab                              | 5.54ab                      | 1.30ab |
| 9 t ha\(^{-1}\)                        | 13.49a             | 26.47a                      | 27.25a                               | 5.92a                       | 1.35a |
| HSD 0.05                               | 1.14               | 3.35                        | 2.18                                 | 1.06                        | 0.07 |

Notes: Numbers shown in five columns followed by difference symbols were significant difference using Honestly Significant Difference (HSD) \(\alpha=0.05\).

### 3.2. Discussion

The growth and yield of maize intercropped with peanut were significantly influenced by the interaction of maize variety and availability of nutrient contents derived from bokashi plus fertilizer in intercropping system under three years old teak trees (Table 1, 2, 3, 4, 5, 6, 7 and Table 8). These revealed that bokashi plus organic fertilizer applied amounted to 3, 6 and 9 t ha\(^{-1}\) could increase the variables of maize growth and yields cultivated in intercropping system with peanut under three years old teak trees. This phenomenon indicated that maize and peanut in intercropping system might grow and produce sufficient yield under three years old teak trees stands, eventhough these results of growth and yield components were a bit lower compared with the previous findings [15]; [16]. In this research, best response on the variables of maize growth and yields planted in intercropping system with peanut between the rows of three years old teak trees was resulted in sufficient space, light and quantity of macro nutrients (N, P, K, Ca and Mg) and micronutrients that might support metabolic process of plants. [17] reported that sufficient space, light, nutrient and water availability might lead to proper performances of plants growth and yields cultivated in intercropping pattern. This finding was in line with previous reports [18] and [19], revealed that the application of higher doses of bokashi plus organic fertilizer might compose a plenty of macro and micronutrients that provide nutrient balance and support optimal photosynthesis, and photosyntetic results could be allocated and distributed to all parts of maize tissues.

As shown in Table 1, 2, 7 and Table 8, these confirmed that the application of adequate bokashi plus organic fertilizer might improve the capacity of soil fertility that could be identified on the better variables of maize growth and yields development compared with the lower one. This was assumed due to the use of sufficient quantity of bokashi fertilizer was capable of providing nutrients that meet plant growth requirement and might establish suitable soil physical and chemical conditions for best growth and yield of maize. According to [20], that the absorbed nutrients will be accumulated in the
leaves into protein that can form seeds, with the fulfillment of plant nutrient needs causing metabolism to run optimally so that the formation of protein, carbohydrates and starch is not hampered, as a result the accumulation of metabolic products in the formation of seeds will increase causing the seeds to be formed have the maximum size and weight. This phenomenon was relevant to the previous finding as reported by [21], revealed that physiological activity would take place well depending on the accessibility of nutrients in the media and plant tissues that would determine the distribution of photosynthetic results on root, stem and leave organs [19].

Observation of vegetative growth under three years old teak trees (Table 1 and Table 2), especially plant height is one of the key parameters to determine the level of adaptation of a variety in each different agroecosystem [6]. According to [22], that tall plants are able to receive the full intensity of sunlight, so that the photosynthesis process can take place optimally thereby increasing the supply of dry matter to leaves, stems and seeds that trigger plant growth and biomass, leaf number, stem diameter and leaf area. The number of leaves is influenced by genotype and the environment, a large number of leaves is thought to make a major contribution to the photosynthetic activity of plants because leaves are plant organs that function as a place for photosynthesis to occur [23]. The genotype had a significant effect on flowering time, length of the ear and number of rows. Plant age is related to plant genetic factors, which is why each strain or variety tested has a different plant age. This is in accordance with what was stated by [24], that plants will show ripe harvest if the total energy adopted has reached a certain level limit (growing degree day) and a certain level limit is different for each plant caused by genetic factors. The results of observations of flowering age (Table 3 and Table 4) show that local maize has a faster flowering time than bisi-2 hybrid maize. Varieties that have a 50% shorter flowering age, the maturity age of the line/variety is also shorter. The ability of a variety depends on genetic traits, environment, sunlight intensity and temperature. A plant planted in a certain area has a faster harvest time, if planted in another area it does not always have the same age, because the growing environment is also different [25]; [26] and [27] The yield of hybrid corn will be optimal if it is supported by fertilization carried out with the right dose, time and method [28]. Furthermore, according to [20], one of the characteristics of hybrid corn varieties is that it is responsive to fertilization so that it is suitable to be planted in fertile land such as rice fields with the target of high productivity. In addition, fertilization based on soil nutrient status and using high yielding varieties can support plant growth and improve harvest quantity and quality [14] and [29]. In the formation of bokashi fertilizer, the addition of EM4 that contains Lactobacillus, Actinomycetes, fermentation fungy, photosynthetic bacteria, yeast and phosphate solvent bacteria to accelerate biomass decomposition, could easily provide nutrients added to the soil more obtainable and the nutrients would simply be absorbed by maize plants [30] and [31].

The research findings as recorded on the maize growth components revealed that the higher the increase of bokashi organic fertilizer applied into the soil media of maize habitat, the better the average maize plant height, number of leaves, stem diameter and leaf areas of two varieties of maize cultivated in intercropping system with peanut obtained at 2, 4, 6 and 8 WAP between the rows of three years old teak trees. In terms of maize yield components, a better yield of maize obtained at the treatment of 9 t ha⁻¹, implying the higher adaptation of maize grow in intercropping system with peanut between the rows of three years old teak plantation. This research also showed a promising result of maize crop to produce enough yields even though the availability of sunlight was greatly decreased due to closed canopy of teak trees but the growth and yields of maize was not influenced as long as the soil media could provide enough quantity of nutrients, water and other elements to support the development of maize [14]; [15], [16] and [32].

4. Conclusion
The conclusions were as follows (1) the interaction between the variety of maize and the various doses of bokashi plus fertilizer gave significant effect on the maize growth and yields cultivated in intercropping system with peanut between the rows of three years old teak plantation, (2) the increase doses of bokashi plus organic fertilizer applied into the soil, the better the maize growth and yield
components of maize cultivated in intercropping system with peanut produced and both factors tested were solely highly significant, (3) the use of proper variety of maize and bokashi plus organic fertilizer had the best response on maize growth and yields cultivated in intercropping system with peanut between the rows of three years old agroforestry teak trees based system, (4) the best treatment of bokashi organic fertilizer was 9 t ha⁻¹ with the yields of hybrid maize bisi-2, local maize and peanut under agroforestry teak trees based system amounted to 5.79, 4.59, 2.16 t ha⁻¹ and the best LER = 1.35, and (5) it was recommended that the combination of hybrid maize bisi-2 and the bokashi plus dose of 9 t ha⁻¹ was the best growth and yield response of maize cultivated in intercropping system with peanut between the rows of three years old teak plantation.

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