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PETENTIAL PRODUCTION AND WASTE FOR LIVESTOCK CATTLE FOOD THREE HYBRID MAIZE ON THE YOUNG HARVEST

I N Adijaya, NLG Budiari and IPA Kertawirawan

Balai Pengkajian Teknologi Pertanian Bali
Jl. By Pas Ngurah Rai Pesanggaran Denpasar

e_mail:n_adijaya@yahoo.com

Abstract. The study was conducted in Sanggalangit Village, Gerokgak Subdistrict, Buleleng-Bali, from May - August 2018. Randomized block design (RBD) was used with 4 replications. Treatments tested were P1 (Bima 20 URI legowo), P2 (Bima 20 URI tegel), P3 (Nasa 29 Legowo), P4 (Nasa 29 tegel), P5 (Bisi 18 tegel) and P6 (Bisi 18 farmers planting). Legowo planting 2: 1 using 100 x 50 x 20 cm spacing with 1 plant /hole, tegel planting (75 x 40 cm) with 2 plants/hole, farmers's way was by hijacking. Result showed yield components of three corn varieties was significantly different except plant leaves number and cobs number/ plant. P1 and P2 gave highest weight per plant per hectare with 26.75 t / ha and 26.14 t / ha average significantly higher than other except for P5 (24.82 t / ha). P1 (11.01 t / ha) and P5 (10.56 t / ha) treatments gave significantly different than other except P2 (10.30 t / ha). Farming analysis results showed all treatments are feasible. Highest B / C ratio is produced by P1 (0.92). Increasing profit is caused by additional income from plants slash sold as cattle feed with a contribution reaching 33%.

1.Introduction

Corn is one of the most important plants in the world besides rice and wheat. Nurwahidah *et al*. [11] states that corn is a source of carbohydrate which is an alternative food, while Pramono [12] states corn is a food crop commodity that becomes a priority after rice. Determination of corn as a national strategic commodity is characterized by efforts to increase corn production through special efforts (UPSUS). In 2014, the target to be achieved in 2015 was 20.31 million tons with a growth of 5.57%. This increase in growth is an effort to meet the growing need for this commodity.

Increased demand for corn increases with increasing population as well as an increase in the needs of the food industry and the animal feed industry. Kumar *et al.* [8] stated that the consumption needs of corn were as varied as baby corn, popcorn, high protein corn and corn with high oil content, but Riadi *et al*. [14] states that from all the consumption corn, the most needed is sweet corn and pulut corn. But there are also those who use hybrid corn which is generally harvested old as well as for consumption with young harvested.

Consumption of young harvested corn is more for roasted corn, boiled or vegetables. So far, the fulfillment of corn, including sweet corn in Bali, was imported more from Java. This is in accordance with the statement of Basuki and Yuwono [4] which states that sweet corn farming in Java has a market share, one of which is the Province of Bali. In addition, the consumption of young corn from composite and hybrid types of corn which is generally harvested old is also a lot done because it feels more profitable.

The location of the study in Gerokgak sub-district, Buleleng Regency, Bali is a dry land of lowlands with a dry climate and is a center for the development of corn and cattle. The main obstacle to livestock raising in this area is the limited availability of feed in the dry season [18]. The limited availability of forage forage in the dry season is usually handled by farmers by using rice straw or corn straw that has been preserved with very low feed quality.

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The study on the yield test of three hybrid corn varieties aims to compare the yield of superior varieties of corn produced by the Agricultural Research and Development Agency with hybrid varieties commonly grown by farmers. Young harvest is done for time efficiency and to increase revenue from the sale of young fruits and stems which are widely used for animal feed, especially cattle with a much better nutritional quality compared to old harvest corn.

2.Methodology

The study was conducted in Sanggalangit Village, Gerokgak Subdistrict, Buleleng Regency, Bali, from May to August 2018. The study was designed in a randomized block design (RBD) with 6 treatments and 4 replications. The treatments tested were the use of hybrid corn varieties by planting legowo 2: 1, tiles and farmers' methods by treatment packages P1 (Bima 20 URI legowo), P2 (Bima 20 URI tiles), P3 (Nasa 29 Legowo), P4 (Nasa 29 tiles), P5 (Bisi 18 tiles) and P6 (Bisi 18 cata planting farmers).

Planting with legowo row 2: 1 planting spacing of 100 cm x 50 cm x 20 cm with 1 plant per hole (population 70,000 tons / ha), while the way of planting the planting distance 75 cm x 40 cm with 2 plants per hole (population 66,667 tons / ha), while the way farmers are carried out by hijacking (+ population 50,000 tons / ha). Fertilization is done by administering organic and inorganic fertilizers with a dose of organic fertilizer of 5 t / ha given during tillage, Urea 300 kg / ha, and NPK 400 kg / ha. The application of inorganic fertilizers is given by plant age of 21 DAPs and 36 DAPs by means of each ½ dose.

Table 1. Treatment and technical cultivation of 3 hybrid corn varieties by planting legowo 2: 1, tiles and how young farmers are harvested in Sanggalangit Village, Gerokgak District, Buleleng Bali in 2018

No	Description	Information
1.	Variety	- Nasa 29, Bima 20 URI and Bisi
2.	Cultivation	
	- Tillage	- Maximum tillage
	- Planting	- Legowo row 2: 1 planting system (100 cm x 50 cm x 20 cm) and tiles (80 cm x 40 cm)
	- Fertilization	- Organic fertilizer of 5 t / ha given at the time of tillage - Urea fertilizer 300 kg / ha, and NPK 400 kg / ha - Inorganic fertilizer is given the plant age of 21 HST and 36 HST by using the respective method of 1/2 dose
	- Weeding and piling	- Mechanical weeding
	- Irrigation	- Pipe irrigation
	- Pest control	- Integrated pest control in accordance with the concept of PTT
3.	- Harvest	- Harvesting is done on 70-75 DAPs

Production and Revenue

Agronomic data were analyzed for variance, if the treatment had a significant effect followed by LSD test 5% [5]. The agronomic data obtained were analyzed, namely the parameters of growth components, yield components and crop production in the way of farmers compared to the application

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of demonstration plot technology. The analytical method used is the Simple Partial Budget Analysis Method. According to Swastika [16], a simple partial budget analysis can be used to evaluate the performance of a technology. To find out the level of income / profits of farming with and without project, an income analysis is performed and then described descriptively [1]. Farm income / profit is the difference between the result of multiplying the amount of production and the price per unit of production with the total cost (cash) incurred in the production process. Mathematically, farm profit income is calculated with the following formulation:

I = P.Q - TC

Information :

I = Income
P = Production price per unit
Q = Number of productions
TC = Total cost of production (cash)

Furthermore, to determine the level of feasibility of farming is done through benefit cost ratio (B / C ratio) analysis. If the B / C ratio> 0, then the farm is feasible to be cultivated, conversely if the B / C ratio <0, then the farming is not feasible to be carried out. B / C ratio is the ratio between the income earned and the total costs (cash) incurred in the production process. Mathematically the B / C ratio is formulated as follows:

$$B/C\ ratio = \frac{I}{TC}$$

Information:

I = income / profit
TC = Amount of fees (cash)

The impact of applying new technology to farm household income can be approached using farm analysis by comparing the average farm income of farmers and applying new technology in the demonstration plot with a partial budgeting analysis approach. Marginal Benefit Cost Ratio (MBCR) can be used to measure the feasibility of new / introduced technology compared to farmers' technology (Swastika, [16]; Malian, [9] which can be formulated as follows:

$$MBCR = \frac{\text{Gross receipts (I) - Gross receipts (P)}}{\text{Total costs (I) - Total costs (P)}}$$

Where :

I = introduction technology
P = Farmer technology

Theoretically, the decision to adopt new technology is feasible if MBCR> 1. That is, the additional revenue obtained from the application of new technology must be greater than the additional costs [9].

3.Results and Discussion

3.1 Agronomic Performance of Plants

The performance of corn plant growth in the demonstration plot location showed that the Bima 20 URI variety gave the highest growth component, which was indicated by the production of mating weight per plant and per hectare (Table 2), whereas the 2: 1 legowo planting method and tiled had no significant effect except for the 18 Bisi variety. the farmer gives a very low weighted weight compared to the 2: 1 legowo planting method. This is caused by differences in the number of populations and the treatment of farmers' cultivation, especially fertilizing plants.

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Table 2. Components of growth of hybrid corn varieties by planting legowo 2: 1, tiles and ways of young harvest farmers in Sanggalangit Village, Gerokgak District, Buleleng Bali in 2018

Treatment	Plant hight (cm)	Number of leaves / plants (strands)	Crop waste/ plants (g)	Crop waste/ ha (t)
Bima 20 URI legowo	248.70 b	13.50 a	499.00 a	26.75 a
Bima 20 URI tegel	247.80 b	13.60 a	495.00 a	26.14 a
Nasa 29 Legowo	258.60 ab	13.50 a	422.00 b	22.62 b
Nasa 29 tegel	256.00 ab	13.50 a	424.00 b	22.39 b
Bisi 18 tegel	262.00 a	13.40 a	470.00 ab	24.82 ab
Bisi 18 cara petani	256.00 ab	13.50 a	312.00 c	16.50 c

Note: the numbers in the same column followed by the same letter are not significantly different in the BNT 5% test

The appearance of yield components and yields of three hybrid corn varieties that were tried gave a significantly different effect on the weight of cobs with kelobot / plants, the weight of peeled cobs per plant and the weight of peeled cobs per hectare, but did not differ on the number of cobs per plant (Table 3). The Bima 20 URI variety in the legowo 2: 1 planting system and Bisi 18 gave the highest weight of the peeled cobs / ha but it was not different from the Bima 20 URI variety in the way of planting tiles and was significantly different from other treatments.

The results of this study are consistent with the results of research Safruddin *et al.* [17] on three sweet corn varieties, that genetic factors play a major role in growth and yield. In the same treatment, the three varieties tested gave different responses. This shows that the potential of genes is crucial, and the results can be maximized if supported by environmental factors. This is in line with the results of the study between Antara [2] who get different types of corn also have different responses to fertilizer treatment where hybrid corn is more responsive to chemical fertilization compared to non-hybrid corn.

Table 3. Components of yields and yields of hybrid corn varieties by planting legowo 2: 1, tiles and how young farmers are harvested in Sanggalangit Village, Gerokgak District, Buleleng Bali in 2018

Treatment	Weight of cob/plant (g)	Number of cob/plant (cob)	Peeled cob weight/ plant (g	Peeled cob ha plant (t)
Bima 20 URI legowo	340.00 a	1.00 a	198.00 a	11.01 a
Bima 20 URI tegel	345.00 a	1.00 a	195.00 a	10.30 ab
Nasa 29 legowo	300.00 b	1.10 a	165.00 b	9.73 bc
Nasa 29 tegel	295.00 b	1.05 a	170.00 b	9.42 c
Bisi 18 tegel	345.00 a	1.00 a	200.00 a	10.56 a
Bisi 18 farmers plant	207.00 c	1.00 a	120.00 c	6.60 d

Note: the numbers in the same column followed by the same letter are not significantly different in the BNT 5% test

Azrai [3] which gets growth and yield of corn varieties is strongly influenced by environmental conditions, the higher the adaptation of varieties to their environment, the growth will increase marked by an increase in plant bio mass and an increase in plant yield components.

Harjadi [6] states the ability to produce from plants is largely determined by the ability of plants to utilize growth factors that are transplanted to storage organs (zinc). Source in the form of assimilates resulting from the photosynthesis process plays an important role in this regard. Plant leaves as an organ that functions in the process of photosynthesis will function optimally if the limiting factor can be minimized. Photosintat produced by corn is strongly influenced by ILD (leaf area index).

Purnomo [13] states that if the corn leaf area index is 1.14-2.42, it means that the prediction of intercepted light is 79-89% so that it still increases the economic yield of plants and affects the

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increase in the harvest index. Goldsworthy cit. Fischer and Palmer 1995 in Indradewa *et.al*. [7], that the optimum leaf area index for seed yields is between 2.5 and 5.0. If the leaf area index is greater than this value, the addition of dry matter produced is more buried in the stems.

3.2 Farm Analysis

The results of farming analysis conducted on three hybrid corn varieties in the legowo 2: 1 planting system and tiles and farmer methods (Table 6) show that the farming is feasible because the R / C ratio> 1. This means that all treatments tested give good benefits to the farm young harvest corn and old harvest.

The 2: 1 legowo planting system in the Bima 20 URI and Nasa 29 varieties gives a higher farm profitability with a higher B / C ratio compared to the tiled method. This shows that the planting system is more efficient in utilizing production inputs. A higher B / C ratio shows that with an input of Rp 1 used in the production process a higher profit will be generated, so that farming becomes more efficient.

Table 6. Farming analysis of three hybrid corn varieties by planting legowo 2: 1, tiles and how young farmers are harvested in Sanggalangit Village, Gerokgak District, Buleleng Bali in 2018

No	Description	Treatment					
		Bima 20 URI legowo	Bima 20 URI tegel	Nasa 29 Legowo	Nasa 29 tegel	Bisi 18 tegel	Bisi 18 farmers plant
1	Labor (Rp)	15.520.000	14.720.000	15.520.000	14.720.000	14.720.000	11.920.000
2	Production Facilities (Rp)	7.305.000	7.305.000	7.305.000	7.305.000	7.680.000	6.665.000
3	Total cost (Rp)	22.825.000	22.025.000	22.825.000	22.025.000	22.400.000	18.585.000
4	Revenue (Rp)	43.730.000	41.356.000	39.318.000	37.216.000	41.608.000	26.400.000
	- Peeled cobs	33.030.000	30.900.000	30.270.000	28.260.000	31,680.000	19.800.000
	- Crop waste (for feed)	10.700.000	10.456.000	9.048.000	8.956.000	9.928.000	6.600.000
5	Benefit (Rp)	20.905.000	19.331.000	16.493.000	15.191.000	19.208.000	7.815.000
6	B/C ratio	0,92	0,88	0,72	0,69	0,86	0,42
	MBCR	4.09	4.35	3.05	3.14	3.99	-

The higher profits in the 2: 1 legowo planting system are due to the higher productivity of maize compared to the tiled or farmer methods. With the legowo planting system of 2: 1, all plants become edge plants causing the growth component and yield component to be higher. This will affect crop productivity.

The results of this study show that young harvested corn is far more profitable compared to old harvested corn, because in addition to selling cob, a crop is also economically valuable. In addition to the harvest corn efficiency of farming time is 25-30 days compared to old harvest. Whereas Nugroho [10] states that the technical efficiency of a farm is shown by the existence of minimum expenditure with the same output. Rasio biaya manfaat marjinal (MBCR) menunjukkan semua yang diperlukan layak diterapkan pada nilai MBCR lebih dari 1.

4.Conclusion

- Planting system legowo 2: 1 can increase yields and increase farmers' income compared to the way of planting tiles and how to farmer plant.
- Introducing innovation can provide increased income and profit for farmers and is feasible to be adopted by farmers, characterized by an MBCR value of> 1

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