

Evaluation of Maize Production Technology Component to Increase Farmer's Income in Rainfed Low Land

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ABSTRACT. Agricultural development successfully assessment not only in production increased but prosperity increase also. Therefore farm must be more productive and management efficient in production process. There were several on farm technology for maize have been created to increase farmer production and optimum benefit. Research of maize technology component in rain fed low land was conducted in Pangkep Regency South Sulawesi on Mei-September 2011. The research planted Hybrid Bisi-2 and Bima-3 Bantimurung by 11 treatments of technology components and furthermore economic efficiency of technology component evaluated. Results showed that cost production of Bisi-2 is Rp 6,872,500-7,123,000/ha range, mean while Bima-3 Bantimurung is Rp 6,589,000-7,005,500/ha. The highest maize production achieved by Bisi-2 is 10.21-10.75 t/ha, and Bima-3 Bantimurung is 8.02-8.92 t/ha. Economic evaluated of technology component which tested showed that whole treatments were efficient caused beneficial by RCR value >1. The highest benefit of Bisi-2 achieved Rp. 16,750,500.- by 75 cm x20 cm plant distance (66,666 plant/ha) with RCR value 3.43 and cost of production Rp 642/kg grain. Meanwhile highest benefit of Bima-3 Bantimurung 12,651,000/ha is achieved on 70 cm x20 cm (71,428 plant/ha)+ LCC by RCR value 2.81 and cost production Rp 782/kg grain. Benefit achieved of another technology components is high enough, so that they necessary flexible in choose maize technology production, suitability stakeholder need, capital ability and laborer availability.

Key words: Technology Productivity, Benefit, Maize

Introduction

Maize is the main cash crops caused by not only as the food and feed but the raw material for bio ethanol industry also. View effort to increase production for instance applied maize production technology and their effect was significant indicated with increasing national maize production. BPS Data (2010) showed that national production of maize reach 18,0 million ton with productivity 4.3 t/ha.

AARD has prepare production technology to support increasing maize production. Through technology component research have conducted during several years and create technology package. This package could be gave synergism influence and applied by integrated plant management approach.

Maize production technology that purposes was consisted of superior varieties, quality seed, optimum plant density, and efficient fertilizer, suitable with socio-economic of community. Growing maize with technology component approach, we hope capable take optimum productivity and income of farmers, caused by efficient in production process. Maize development successfully using land available potential, ones of them will be most affected by benefit degree for farmer achieved. Maize development

will be going fast if farmer get benefit suitable they desired. For this case farm technology needed which gave (a) high productivity per unit area, (b) efficient cost production, and (c) high product quality.

Maize farming that competitive and comparative benefit especially on low land in dry season is the strategic way due to fulfill maize deficit production in a year, grain product more good quality, and maize price is high (Badan Litbang Pertanian 2007 dan 2008). Expansion maize growing area on low land addressed to rain fed low land and low land restricted irrigation on dry season that lag optimum growing rice. For rain fed low land potential area in South Sulawesi is 576,964 ha spreaded on 24 regency and 16,066 ha located in Pangkep Regency (BPS Sulawesi Selatan 2010).

Agricultural development successfully not only assess on increasing production but income for farmer also. Therefore agricultural development must be more productive and efficient in farm management. Combining view production technology component desired could be increase productivity and income for farmer in maize farming. Related this case research was conducted about evaluation component technology of maize production on rain fed low land that capable gave productivity and optimum income caused production efficiency increase.

Methodology

Maize production technology component evaluation to increase farmers income in rainfed low land was conducted at MandallePangkep Regency South Sulawesi on Mei-September 2011. Pangkep regency is one regency in South Sulawesi have potential of rain fed low land in large area. This research was conducted based on choose technology component have prepare included socio-economic aspect with locally farmer.

The research of technology component that evaluated of combining component consisted of variety, plant density, plant distance, and fertilization that create 11 combining treatments. Planting activities in rain fed low land after harvested rice. Landpreparation for maize no tillage system, but using gramoxon herbicide. The research using hybrid maize varieties Ie:Bisi-2 and Bima-3 Bantimurung. Fertilizing with urea and phoska agree with each treatment. Seed treatment by soromil dosage 2.5 g/kg to control downymildew. To control stem and ear borer using Furadan 3G applied at planting time and tip of leaf 5 kg/ha respectively. This technology component of maize production that evaluated shown in Table 1 as follows:

Socio-economic aspect primer data collection from research technique activities beginning from land preparation until harvest, grain processing, and marketing. Data collecting include using material of production, using laborer, spend of time in maize farming, grain yield achieved, grain processing cost, and grain price.

Economic analysis conducted by calculating cost degree and benefit that could be achieved each treatment by formula as follows:

Benefit farm analysis measured by using formula (Sukartawi 1995, Hanafie 2010)

$$\pi = TR - TC$$

Where : π = Benefit (Rp)
 TR = Total achievement ie: product multiply by price per unit (Rp)
 TC = Total cost sum of farmcost (Rp)

Furthermore to estimate farming efficiency that treated and technology component of maize production analysis using formula RCR (Anonim 1987)

Results And Discussion

This research shows that total material of production that use on growing Bisi-2 and Bima-3 Bantimurung depend on treatments where observation. Applying seed, phoska, herbicide, pest and diseases control, and gasoline using same total for whole treatments. Except urea dosage were different depend on treatment.

Production based on material using total cost showed that growing Bisi-2 by cost about Rp 3,772,000 – 4,042,000/ha. Whereas for Bima-3 Bantimurung about Rp 3,632,000 – 3,902,000/ha (Table 2). Material cost are different beside fertilizer adding on LCC treatment and different seeds price ie: Bisi-2 price higher than Bima-3 Bantimurung. Related by maize growing in dry season most depend on water availability to overcome harvest failed of maize in dry season.

Related by growing maize in dry season most depend on water available to overcome harvest fail caused lag of water in dry season. Growing hybrid variety needed more water compared to composite. In this activities water using slightly high until 9 times during growing season so that influence of total cost production.

Labor utilizing fixed by work day amount of people in certain activity. Labor that used in this research is family and outer family. Total of labor cost of growing Bisi-2 and Bima-3 Bantimurung slightly differ range of Rp 2,932,000-3,127,500/ha. High cost of Bisi-2 on 75 cm x 20 cm is Rp3,127,500/ha, while Bima-3 Bantimurung (90-50) x 20 cm + LCC) is Rp3,103,500/ha. The low spend of labor cost on Bisi-2 and Bima-3 Bantimurung have shown on treatment (100-50) x 20 + LCC ie: Rp3,081,000/ha and 75 x 20 + LCC ie. Rp 2,932,000/ha (Table 2).

Laborer using in this research activities generally most worker in harvesting (beginning take cobs until shelling), besides planting and fertilizing activities. Labor using in

Tabel 1. Technology component of maize production that evaluated in Pangkep Regency, Sulawesi Selatan, 2011.

Varieties, plant distance and LCC	Plant density	Fertilizer dosage (kg ha ⁻¹)
Bisi-2 variety:		
75 x 20 cm	66,666	Urea 400 + phoska 270
(100-50) x 20 cm	66,666	Urea 400 + phoska 270
(100-50) x 20 + BWD*)	66,666	Urea 550 + phoska 270
Bima-3 Bantimurung variety:		
75 x 20 cm	66,666	Urea 400 + phoska 270
75 x 20 + BWD*)	66,666	Urea 550 + phoska 270
(100-50) x 20 cm	66,666	Urea 400 + phoska 270
(100-50) x 20 + BWD*)	66,666	Urea 550 + phoska 270
70 x 20 cm	71,428	Urea 400 + phoska 270
70 x 20 + BWD*)	71,428	Urea 550 + phoska 270
(90-50) x 20 cm	71,428	Urea 400 + phoska 270
(90-50) x 20 + BWD*)	71,428	Urea 550 + phoska 270

*) LCC 150 kg urea/ha

Table3. Maize production and income forview technology component of maize production Pangkep Regency, South Sulawesi, 2011.

Treatments	Farming cost (Rp ha ⁻¹)	Yield (tha ⁻¹)	Production value (Rp ha ⁻¹)*	Benefit (Rp ha ⁻¹)	RCR	Grain kg ⁻¹ cost ratio
Bisi-2 variety						
• 75 x 20 cm	6,899,500	10.75	23,650,000	16,750,500	3.43	642
• (100-50) x 20 cm	6,872,500	10.21	22,462,000	15,589,500	3.27	673
• (100-50) x 20 + BWD	7,123,000	10.52	23,144,000	16,021,000	3.25	677
Bima-3 Bantimurung variety						
• 75 x 20 cm	6,589,000	8.04	17,688,000	11,099,000	2.68	820
• 75 x 20 + BWD	6,834,000	8.24	18,128,000	11,294,000	2.65	829
• (100-50) x 20 cm	6,658,000	8.02	17,644,000	10,986,000	2.65	830
• (100-50) x 20 + BWD	6,885,500	8.57	18,854,000	11,968,500	2.74	803
• 70 x 20 cm	6,681,000	8.48	18,656,000	11,975,000	2.79	788
• 70 x 20 + BWD	6,973,000	8.92	19,624,000	12,651,000	2.81	782
• (90-50) x 20 cm	6,720,500	8.57	18,854,000	12,133,500	2.81	784
• (90-50) x 20 + BWD	7,005,500	8.87	19,514,000	12,508,500	2.79	790

Source: Primer data 2011

Note: *) Grain price = Rp 2.200 kg⁻¹

for Bima-3 Bantimurung is 70 cm x 20 cm + LCCfertilized urea 550 kg + phonska270 kg/ha, RCR value 3.43and 2.81 for Bisi-2 and Bima-3 Bantimurung respectively. Besides cost production per kg grain of both treatments is lower ieRp 660.-for Bisi-2 and Rp782.-for Bima-3 Bantimurung.with RCR value are 3.33 and 2.81respectively. Besides maize cost production per kg grain in both treatments lower ie; Rp 642.-for Bisi-2 andRp782.-for Bima-3 Bantimurung. Grain maize cost production of Bima-3 Bantimurung has been reported but still in range of cost maize production in Indonesia; Rp 500 – Rp 1,150/kggrain(Bahar 2002; Wahid *et al.* 2003; Subandi *et al.* 2004 dan 2005; BPTP Sulsel dan Syngenta Indonesia 2004). Cost production vary depend on soil fertility, applied degree of technology production, sosial conditions included labor cost. How ever it was opportunity to reduce cost production by using appropriate technology.component.

Based on economic analysis of this activities showed that Bisi-2 and Bima-3 Bantimurung of whole treatments were tested is beneficial and efficient by RCR value >1, so that technology suitable to apply. For that reason choosing technology component of maize productionflexible necessary based on capital ability and labor ability.

Conclusions

1. Grain yield range of Bisi-2 is 10.21-10.75 t/ha and Bima-3 Bantimurung is 8.02-8.92 t/ha. The highest grain yield reached of Bisi-2 (10.75t/ha) where produced by treatment 75 cm x 20cm plants distance(population 66,666 plants/ha) by fertilized of urea 400 kg + phonska 270 kg/ha, while Bima-3 Bantimurung highest grain

yield (8.92 t/ha) produced by treatment 70 cm x 20 cm +LCC (density 71,428 plants/ha)by fertilized urea 550 kg + phonska 270 kg/ha.

2. Technology component of maize production where tested by Bisi-2 and Bima-3 Bantimurung varieties is beneficial. For Bisi-2 Rp.15,589,500-16,750,500/ha whereas Bima-3 Bantimurung Rp.10,986,000-12,651,000/ha. Beside that RCR value of technology component >1, so that farming is efficient. Therefore to applied maize production technology must be agree with capital and labor availability.

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