INTERNATIONAL JOURNAL OF MULTIDISCIPLINARY RESEARCH AND ANALYSIS

ISSN(print): 2643-9840, ISSN(online): 2643-9875

Volume 09 Issue 03 March 2026

DOI: 10.47191/ijmra/v9-i3-36, Impact Factor: 8.685

Page No. 1193-1208

Analysis of Production and Income of Corn Farming in Abiansemal District, Badung Regency, Bali Province

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ABSTRACT: Food crops are one of the main sources in developing agriculture toward a resilient agricultural system, as the agricultural sector plays a very important role as the primary source of livelihood and income for farming communities. Corn farming is one of the main indicators in agricultural activities that contributes significantly to increasing farmers' income. However, the increase in income from corn farming is also influenced by production results, which determine the rise and fall of farmers' income. This study aims to determine the correlation between land area, seeds, labor, fertilizers, pesticides, and farming experience with the production and income of corn farming in Abiansemal District, Badung Regency, Bali Province. Respondents were determined using a census method with a total sample of 80 farmers. The data analysis methods used were correlation analysis and income analysis. The results of the correlation analysis showed that the variables of land area, seeds, and fertilizers have a moderate relationship with production. The relationship between these variables is positive, indicating a correlation with production. Meanwhile, the variables of farming experience, labor, and pesticides do not have a relationship with production. The average income of corn farmers in Abiansemal District, Badung Regency, Bali Province is Rp. 57,925,545 per hectare. Corn farming in Abiansemal District, Badung Regency, Bali Province faces various constraints that affect production and farmers' income. These constraints include business, economic, social, and cultural aspects.

KEYWORDS: Production, Correlation, Farm Income, Corn

INTRODUCTION

Indonesia is an agrarian country with abundant natural resources that strongly support national economic development. The agricultural sector plays a strategic role in the national and regional economy because it serves as the primary source of livelihood and income for a large portion of the Indonesian population. Even during periods of economic crisis, the agricultural sector has demonstrated strong resilience in supporting the national economy, making it one of the key sectors expected to contribute to economic recovery and sustainable development (Huda, 2014).

Food crops are an important component of agricultural development aimed at building a resilient agricultural system. This is because the agricultural sector plays a crucial role as the main source of livelihood and income for farming communities. The development of the food crop subsector is directed toward meeting the increasing demand for food, which continues to rise due to population growth and economic development. One of the important food commodities in Indonesia is corn. Corn plays a vital role not only as a staple food substitute but also as an important raw material for the livestock feed industry and various food processing industries. However, the increasing demand for corn is often not matched by sufficient production levels.

Efforts to increase corn production can be carried out by optimizing the use of production inputs and improving cultivation technologies, including the proper use of seeds, fertilizers, labor, and other production factors. Nevertheless, many farmers still face constraints in accessing adequate capital and production inputs in the right quantity and at the right time. In addition, farmer organizations often have limited capacity to mobilize financial resources needed for agricultural production activities (Astuti, 2021).

Farmers expect that every investment made in farming activities will generate higher income or profit. Therefore, the efficient and appropriate allocation of production factors becomes very important because it directly influences both production levels and farmers' income in corn farming activities. In this context, the agricultural sector is considered one of the most reliable sectors in

supporting national economic recovery and improving rural welfare. Improving farmers' welfare remains a primary goal of agricultural development policies. The resilience of the agricultural sector has been proven during economic crises when it continued to supply sufficient food and maintain positive economic growth (Sinaga, 2022).

Corn is an important agricultural commodity with various uses for human consumption, animal feed, and industrial raw materials. In the food industry, corn is commonly used as an alternative food source to rice, often processed into corn porridge or traditional food products. In the livestock sector, corn is widely used as a major ingredient in animal feed and is often mixed with other materials such as sorghum and bran. In addition, corn is also used in various processing industries, including dry milling industries that produce corn flour, wet milling industries that produce starch, syrup, and corn sugar, and fermentation industries that produce ethanol, alcohol, lactic acid, and glycerol (Indriyani, 2022).

Production and productivity of corn farming are key indicators that influence the level of farmers' income. An increase in corn production generally leads to higher income for farmers, whereas low production can reduce farmers' earnings. Therefore, improving corn production requires attention to various production factors such as land area, seed quality, fertilizer use, labor availability, pesticide use, and farming experience. These factors interact with each other and collectively influence the quantity and quality of agricultural production.

In Abiansemal District, Badung Regency, Bali Province, corn farming is one of the agricultural activities carried out by local farmers. However, the level of corn production in this area is still relatively low and has not fully ensured stable income for farmers. The variability in the use of production inputs such as land area, seeds, fertilizers, labor, pesticides, and farming experience may affect the production outcomes and ultimately the income received by farmers.

Based on these conditions, it is important to conduct research on the analysis of production and income in corn farming in Abiansemal District, Badung Regency, Bali Province. This study aims to analyze the correlation between several production factors, including land area, seeds, labor, fertilizers, pesticides, and farming experience, with corn production. In addition, the study also aims to analyze the income obtained from corn farming and identify the constraints faced by farmers in developing corn farming activities in the study area.

RESEARCH METHOD

A. Research Design

This study aims to:

- **a.** determine the correlation between corn production and several production factors including land area, seed, labor, fertilizer, pesticide, and farming experience; and
- **b.** analyze the income obtained by corn farmers in Abiansemal District, Badung Regency, Bali Province.

This research uses a quantitative approach to analyze the correlation between production variables and to calculate farmers' income. The quantitative approach was chosen because it allows the relationship between variables to be analyzed objectively using statistical methods.

The data used in this study consist of primary data and secondary data. Primary data were collected through field observations and direct interviews with farmers using a structured questionnaire. Meanwhile, secondary data were obtained from the Central Bureau of Statistics (BPS) and other relevant institutions related to this research.

B. Location and Time of the Study

This research was conducted in Mambal Village and Sedang Village, Abiansemal District, Badung Regency, Bali Province. The research location was determined using a purposive sampling method, considering that these villages are among the areas where corn farming activities are actively carried out in Abiansemal District.

The study was conducted for five months, from January to May 2025, which included research preparation, field data collection, data processing, and analysis.

C. Research Variables and Measurement

The variables in this study consist of production variables and income variables. Production variables include land area, seed, farming experience, labor, fertilizer, and pesticide. Meanwhile, income variables include revenue, selling price, fixed costs, variable costs, and total production costs.

Corn production (Y) refers to the total harvest yield of corn measured in tons per hectare (ton/ha). Land area (X1) is measured in hectares (ha) and represents the size of the land used for corn farming activities. Seed (X2) is measured based on the quantity of seeds used in one planting season in kilograms (kg).

Farming experience (X3) is measured based on the length of time farmers have been involved in corn farming, expressed in years. Labor (X4) is measured based on the number of workdays (man-days or HOK) used during the production process.

Fertilizer use (X5) is measured based on the amount of fertilizer used, either organic or inorganic, expressed in kilograms or liters, while pesticide use (X6) is measured based on the type and volume of pesticide used, expressed in liters per hectare or milliliters per plant.

The income variable is calculated from farm revenue, which is obtained by multiplying the quantity of production by the selling price of corn. Production costs consist of fixed costs and variable costs incurred during the farming process.

D. Data Sources and Data Collection Techniques

a. Data Sources

This study uses two types of data sources, namely primary data and secondary data. Primary data were obtained directly from farmer respondents through observation and interviews using structured questionnaires. Secondary data were obtained from official publications such as the Central Bureau of Statistics (BPS) and documents from relevant institutions.

b. Data Collection Techniques

The data collection techniques used in this study include:

1. Observation

Observation was carried out through direct field observations to obtain information regarding the condition of corn farming and factors influencing production activities.

2. Interviews

Interviews were conducted directly with farmer respondents using a prepared questionnaire to obtain information related to production, input use, production costs, and farm income.

3. Documentation

Documentation was conducted by collecting records, reports, and archives related to corn production and farmers' income in Abiansemal District, Badung Regency.

E. Population and Sample

a. Population

The population in this study consists of all farmers engaged in corn farming in Mambal Village and Sedang Village, Abiansemal District, Badung Regency, Bali Province. Based on available data, the total population of corn farmers in these villages is 80 farmers.

b. Sample

The sampling technique used in this study is the census method, where all members of the population are included as research respondents. Therefore, the total sample size in this study is 80 respondents, consisting of 48 farmers from Mambal Village and 32 farmers from Sedang Village.

F. Data Analysis Method

a. Correlation Analysis

To determine the relationship between corn production and production factors, Spearman Rank Correlation analysis was used. Correlation analysis is used to measure the strength of the relationship between two or more variables with correlation coefficient values ranging from -1 to +1.

The interpretation of correlation coefficients is as follows:

Correlation Coefficient	Relationship Strength
0.00 – 0.25	Very weak
0.26 – 0.50	Moderate
0.51 – 0.75	Strong
0.76 – 0.99	Very strong
1.00	Perfect

The significance test is determined by the following criteria:

If the Sig. (2-tailed) value < 0.05, there is a significant correlation between variables.

If the Sig. (2-tailed) value ≥ 0.05, there is no significant correlation between variables.

b. Farm Income Analysis

Income analysis is used to determine the level of profit obtained by farmers from corn farming. Income is calculated using the following formula:

$\pi = TR - TC$

Where:
π=Income
TR=Total Revenue (Rp)
TC = Total Cost (Rp)
Total revenue is calculated as:
TR=P×Q
Where:
P = Selling price of corn (Rp/kg)
Q = Quantity of corn production (kg)
Total cost is calculated as:
TC=FC+VC
Where:
FC = Fixed Cost (Rp)
VC = Variable Cost (Rp)

c. Descriptive Qualitative Analysis of Constraints

The constraints faced by corn farmers in Abiansemal District, Badung Regency were analyzed using descriptive qualitative analysis based on field observations and interviews with respondents. This analysis aims to describe various problems that influence corn farming activities but cannot be fully explained through quantitative analysis.

These constraints include limited capital, fluctuations in input and output prices, unpredictable weather conditions, and limited farmer knowledge in applying cultivation technology. In addition, the availability of production facilities and access to agricultural information also affect the efficiency of corn farming.

This descriptive analysis provides a comprehensive overview of the real conditions faced by farmers and complements the correlation analysis in formulating recommendations for the development of corn farming.

RESULTS

Overview of the Research Location

Brief History of Mambal Village

Mambal Village is located in Badung Regency and serves as a connecting area between Gianyar Regency and Tabanan Regency. The name “Mambal” originates from historical records contained in Babad Dalem Pamancangah and Babad Mengwi, which have existed since the 10th century. Administratively, Mambal Village was established in 1925 during the Dutch colonial period with a total area of approximately 612 hectares.

Initially, Mambal Village was led by Ida Bagus Ketut Kajeng, who served as village head from 1925 to 1954. The leadership was later continued by several village heads including Ida Bagus Punia (1954–1973), I Gusti Putu Gede (1973–1983), I Nyoman Rimpeg (1983–1991), I Nyoman Tama (1991–2007), and I Made Susila (2007–2013).

Due to population growth, the village was expanded in 2003 into two administrative areas: Mambal Village and Mekar Bhuana Village.

Demographic Location of Mambal Village

Administratively, Mambal Village in Abiansemal District, Badung Regency, Bali Province has the following boundaries:North: Bongkasa Village

a. East: Mekar Bhuana Village
b. South: Sibang Kaja Village
c. West: Abiansemal Village

Geographically, Mambal Village is located in a hilly area with an altitude of approximately 600 meters above sea level and an average temperature of 31°C. The total area of the village is 612 hectares.

Population Conditions of Mambal Village

The total population of Mambal Village is 5,455 people, consisting of 2,730 males and 2,725 females, with a total of 1,579 households. The majority of the population works in the agricultural sector, while others are engaged in entrepreneurship, tourism, and service sectors.

The dominant religion practiced in the village is Hinduism with 81.96%, followed by Islam 11.01%, Christianity 6.24%, Buddhism 0.78%, and Confucianism 0.01%.

Population Based on Education Level in Mambal Village

Education is an important factor in supporting community development and economic activities. The level of education of residents in Mambal Village can be seen in Table 1.

Table 1. Classification of Population Based on Education Level in Mambal Village, Abiansemal District, Badung Regency, Bali Province, 2025

Education Level	Number (people)	Percentage (%)
Not/No Schooling	63	4.05
Kindergarten	129	8.25
Elementary School	391	25.03
Junior High School	251	16.06
Senior High School	279	17.86
Diploma 1	18	1.15
Diploma 3	54	3.45
Bachelor (S1)	368	23.55
Master (S2)	9	0.58
Total	1,562	100.00

Source: Mambal Village Population Data, 2025

Table 1 shows that the majority of residents have completed elementary education (25.03%), followed by bachelor's degree holders (23.55%) and senior high school graduates (17.86%).

Population Based on Occupation in Mambal Village

The occupations of residents in Mambal Village vary. The distribution of occupations can be seen in Table 2.

Table 2. Population Based on Occupation in Mambal Village, Abiansemal District, Badung Regency, Bali Province, 2025

No	Occupation	Number (people)	Percentage (%)
1	Farmer/Planter	308	11.79
2	Agricultural Laborer	85	3.25
3	Civil Servant	107	4.09
4	Mechanic	3	0.11
5	Private Doctor	11	0.42
6	Private Nurse	6	0.22
7	Private Midwife	4	0.15
8	Military (TNI)	3	0.11
9	Police	26	0.99
10	Private Lecturer	10	0.38
11	Notary	1	0.03
12	Private Company Employee	1,523	58.31
13	Entrepreneur	442	16.92
14	Home Industry Craftsman	83	3.17
Total		2,612	100

Source: Mambal Village Profile, 2025

Table 2 shows that most residents work as private company employees (58.31%), followed by entrepreneurs (16.92%), and farmers/planters (11.79%).

Infrastructure and Facilities in Mambal Village

Infrastructure is an important factor in supporting community activities and economic development. The infrastructure available in Mambal Village is presented in Table 3.

Table 3. Infrastructure and Facilities in Mambal Village, Abiansemal District, Badung Regency, Bali Province, 2025

Facilities	Number
Education	
Kindergarten	4
Elementary School	4

Village Library	1
Health Facilities	
Auxiliary Health Center	1
Posyandu	9
Places of Worship	
Temple	53
Government Facilities	
Village Hall	1
Village Office	1
PKK Office	1

Source: Mambal Village Profile, 2025

Table 3 shows that Mambal Village already has adequate facilities to support community activities, including education, health services, and government administration.

Geographical Conditions of Sedang Village

Sedang Village is located in Abiansemal District, Badung Regency, Bali Province. The village is also governed by traditional leadership through the Bendesa Adat system.

The administrative boundaries of Sedang Village are:

a. North: Mekar Bhuana Village
b. South: Angantaka Village
c. West: Sibang Gede Village
d. East: Singapadu Village (Gianyar Regency)

Geographically, Sedang Village is located at an altitude of approximately 200 meters above sea level with an average temperature of 38°C.

Land Area and Land Use in Sedang Village

The distribution of land use in Sedang Village can be seen in Table 4.

Table 4. Land Use in Sedang Village, Abiansemal District, Badung Regency, Bali Province, 2025

No	Land Use	Area (Ha)	Percentage (%)
1	Residential Area	1,635	39.98
2	Rice Fields	1,431	34.99
3	Plantation	1,023	25.01
4	Dry Land (Tegalan)	0.6134	0.01
Total		4,089	100.00

Source: Sedang Village Profile, 2025

Table 4 shows that a significant portion of land in Sedang Village is used for plantation and agricultural activities, indicating strong potential for agricultural development.

Population Based on Occupation in Sedang Village

The distribution of occupations in Sedang Village is presented in Table 5.

Table 5. Population Based on Occupation in Sedang Village, Abiansemal District, Badung Regency, Bali Province, 2025

No	Occupation	Number (people)	Percentage (%)
1	Farmer	369	35.04
2	Military/Police	121	11.49
3	Agricultural Laborer	45	4.27
4	Civil Servant	231	21.93
5	Livestock Farmer	122	11.58
6	Trader	131	12.44

7	Craftsman	7	0.66
8	Entrepreneur	27	2.56
Total		1,053	100.00

Source: Sedang Village Profile, 2025

Table 5 shows that the majority of residents work in the agricultural sector (35.04%), indicating that agriculture remains the dominant economic activity in Sedang Village.

Infrastructure and Facilities in Sedang Village

The infrastructure available in Sedang Village is presented in Table 6.

Table 6. Infrastructure and Facilities in Sedang Village, Abiansemal District, Badung Regency, Bali Province, 2025

Facilities	Number
Education	
Kindergarten	2
Elementary School	2
Junior High School	2
Health Facilities	
Auxiliary Health Center	2
Posyandu	3
Places of Worship	
Temple	4
Government Facilities	
Village Hall	1
Village Office	1

Source: Sedang Village Profile, 2025

Table 6 indicates that Sedang Village has adequate facilities to support community activities, particularly in education, health services, and government administration.

DISCUSSION

A. Characteristics of Respondents

Based on the results of interviews and observations conducted with 80 respondents in Abiansemal District, Badung Regency, Bali Province, particularly in Mambal Village and Sedang Village, using questionnaires or structured question lists, various characteristics of farmer respondents were identified. The characteristics of the respondents discussed in this study include farmers' age, education level, number of family dependents, and farming experience.

a. Age of Respondents

In general, age can influence an individual's ability both physically and mentally. Respondents who are relatively young and in good physical and mental health generally possess greater physical capacity, are more agile, and are quicker in adopting innovations or new ideas in order to improve the farming activities they manage. Farmers who are younger tend to have stronger physical abilities and higher work motivation compared to older farmers. The age classification of corn farmer respondents in Abiansemal District, Badung Regency, Bali Province can be seen in Table 7.

Table 7. Age Level of Corn Farmer Respondents in Abiansemal District, Badung Regency, Bali Province, 2025

No	Age Level	Number (people)	Percentage (%)
1	26–39	7	8.75
2	40–53	25	31.25
3	54–67	48	60.00
	Total	80	100.00

Source: Primary Data After Processing, 2025

Table 7 shows that the majority of corn farmers fall within the productive age range of 26–67 years, totaling 80 respondents (100.00%). This indicates that corn farmers in Abiansemal District, Badung Regency, Bali Province are within the productive labor

participation group. This condition becomes one of the supporting factors for corn production in Abiansemal District, considering that most respondents belong to the productive working-age category.

b. Education Level

Education is a supporting factor in farming activities and influences decision-making related to innovations associated with farming development. Individuals with higher levels of education tend to adopt new technologies more easily compared to those with lower levels of education. The education level of respondents can be seen in Table 8

Table 8. Education Level of Corn Farmer Respondents in Abiansemal District, Badung Regency, Bali Province, 2025

No	Education Level	Number of Respondents	Percentage (%)
1	Elementary School (SD)	23	28.75
2	Junior High School (SMP)	18	20.00
3	Senior High School (SMA)	39	48.75
4	Bachelor Degree (S1)	2	2.5
	Total	80	100.00

Source: Primary Data After Processing, 2025

Table 8 shows that the largest proportion of respondents have a senior high school education, totaling 39 individuals (48.75%). This is followed by elementary school graduates with 23 individuals (28.75%), junior high school graduates with 18 individuals (20.00%), and bachelor's degree holders with 2 individuals (2.5%). These findings indicate that the education level of corn farmer respondents in Abiansemal District, Badung Regency, Bali Province can be considered relatively adequate. With relatively sufficient formal education, farmers manage their corn farming activities based on established practices and information exchanged among fellow farmers. Nevertheless, respondents in Abiansemal District remain motivated to continuously learn and seek information about new technologies, particularly in efforts to increase their farming production.

Education contributes to improving farmers' knowledge. The higher a person's education level, the broader their perspective and understanding of problems, enabling them to think more quickly, effectively, and efficiently (Thamrin et al., 2012).

c. Number of Family Dependents

The number of family dependents consisting of the household head and other family members such as spouses and children plays an important role in supporting farm management. Changes in the number of family dependents also influence respondents in meeting their household needs. The number of family dependents has both advantages and disadvantages in farming activities. One advantage is that family members can help reduce production costs through their labor contribution during the production process. However, the number of dependents can also become a burden because household needs must continuously be fulfilled. The number of family dependents in Abiansemal District, Badung Regency, Bali Province can be seen in Table 9.

Table 9. Classification of the Number of Family Dependents of Corn Farmer Respondents in Abiansemal District, Badung Regency, Bali Province, 2025

No	Family Dependents	Number (people)	Percentage (%)
1	1–2	48	60.00
2	3–4	30	37.85
3	5–6	2	2.5
	Total	80	100

Source: Primary Data After Processing, 2025

Table 9 shows that most corn farmer respondents in Abiansemal District, Badung Regency, Bali Province have between 1–2 family dependents, totaling 48 respondents (60.00%). Meanwhile, 30 respondents (37.85%) have 3–4 dependents, and only 2 respondents (2.5%) have between 5–6 dependents.

d. Farming Experience

Farming experience is one of the determining factors for the success or failure of a farming business and is closely related to the education level of farmers. The length of time a farmer has been involved in cultivating a particular crop will influence the cultivation practices applied. The longer farmers engage in farming activities, the more skilled they tend to become. Farming experience also affects the management patterns of farming activities. The classification of farming experience can be seen in Table 10.

Table 10. Classification of Farming Experience of Corn Farmer Respondents in Abiansemal District, Badung Regency, Bali Province, 2025

No	Farming Experience (Years)	Number of Farmers (People)	Percentage (%)
1	7 – 10	43	53.75
2	11 – 14	22	27.5
3	15 – 18	15	18.75
	Total	80	100

Source: Primary Data After Processing, 2025

Table 10 shows that in Abiansemal District, Badung Regency, Bali Province, respondents with 7–10 years of farming experience total 43 individuals (53.75%). Respondents with 11–14 years of farming experience total 22 individuals (27.5%), while those with 15–18 years of farming experience total 15 individuals (18.75%). These findings indicate that respondent farmers in Abiansemal District possess sufficient farming experience; however, they still require additional knowledge from other farmers with more extensive experience. Such knowledge exchange can support the development of their farming activities both in the present and in the future and help reduce risks in farming.

B. Description of Production Factors

a. Land Area

Land area refers to the size of land managed in farming activities to produce agricultural output. Land area is one of the most important factors in farming, where the larger the area of land managed, the greater the production generated. Conversely, the smaller the land area managed, the lower the production obtained. The total land area cultivated by farmers in this study was 74.50 ha for all 80 corn farmer respondents, with an average land area of 0.93 ha. The land conversion value used was 1 ha, with land areas ranging from 0.5–2.5 ha among the 80 corn farmers. The size of land utilized influences the level of income obtained by farmers, because the larger the land area owned and cultivated by farmers, the greater the amount of production that can be generated.

b. Seeds

According to Rahim and Diah (2008), seeds determine the superiority of a commodity and are also one of the factors that determine the success of farming activities. Superior seeds tend to produce products of good quality; however, seed use must be carried out proportionally according to the needs of each land area. If the land area is relatively small, seed application should be adjusted to the existing land conditions and to the appropriate seed variety.

The influence of seeds on production is also determined by the use of either local seeds or improved seed varieties. The use of superior seeds can result in higher production, greater resistance to diseases, shorter production periods, and higher-quality commodity yields, allowing the products to compete better in the market. The results of the study indicate that the average use of corn seeds in Abiansemal District, Badung Regency, Bali Province was 32.03 kg per 0.93 ha. When converted, the amount of seed used was 34.44 kg per ha, with an average seed price of IDR 75,000 per kg.

c. Use of Urea and Phonska Fertilizers

Fertilizer is one of the production factors that can increase crop yields optimally if applied at the appropriate dosage and timing. Fertilization is necessary because at each stage of plant growth a considerable amount of nutrients is absorbed from the soil. Therefore, the timely application of fertilizers and the selection of appropriate fertilizer compositions based on soil nutrient requirements are essential.

Fertilization is intended to add nutrients required by plants. The types of fertilizers used by respondent farmers in Abiansemal District, Badung Regency, Bali Province were urea and Phonska. The average land area was 0.93 ha, with a land conversion value of 1 ha and a land size range of 0.5–2.5 ha. The average use of urea fertilizer was 192.88 kg, with an average cost of IDR 2,121,625. Meanwhile, the average use of Phonska fertilizer was 259.38 kg, with an average cost of IDR 3,112,500.

d. Use of Pesticides

The use of pesticides is adjusted to the condition of the crops and must follow the recommended dosage. Pesticide spraying is carried out when pests or weeds are present. The use of pesticides does not directly increase production but helps maintain corn production levels. At present, pesticide use plays an important role in maintaining corn production by controlling various types of pests and diseases that frequently attack corn plants.

The results of the study show that farmers in Abiansemal District, Badung Regency, Bali Province used pesticides such as Score 250 EC and Prevathon 50 SC. The average use of Score 250 EC pesticide was 129.38 ml per 0.93 ha, while the average use of

Prevathon 50 SC pesticide was 613.13 ml per 0.93 ha. The total average pesticide use was 742.50 ml per 0.93 ha, with a land conversion value of 1 ha and a land size range of 0.5–2.5 ha. The total average cost incurred for pesticide use was IDR 413,325. The use of pesticides was adjusted to the size of the land area and the pests and diseases attacking the corn plants.

e. Labor Use

Labor is one of the determining factors in farming activities, particularly in corn farming which is highly dependent on seasonal conditions. Effective labor with adequate expertise, skills, and capability is an important factor in achieving the objectives of farming activities. The quality of labor used greatly influences the implementation of farming operations. With sufficient expertise and skills possessed by the labor force, success in conducting farming activities can be achieved. The results of the study indicate that the average labor use was 11.34 HOK (workdays), with an average labor cost of IDR 667,250 per 0.93 ha.

C. Correlation Analysis

Correlation analysis is one of the statistical methods used to determine the relationship or the degree of association between two or more variables. The main objective of this analysis is to observe the extent to which changes in one variable are associated with changes in another variable. Therefore, correlation analysis becomes an important tool in quantitative research that functions to identify the direction and strength of the relationship among variables, whether positive or negative. Statistically, correlation is measured using the correlation coefficient (r), which has a value ranging from −1 to +1.

A positive value indicates a direct relationship, meaning that an increase in one variable will be followed by an increase in another variable. Conversely, a negative value indicates an inverse relationship, where an increase in one variable leads to a decrease in another variable. Meanwhile, a value close to zero indicates that there is no significant linear relationship among the variables. For further clarification, the explanation is presented as follows.

a. Correlation Between Land Area and Production

The correlation between land area and production shows a positive relationship in agricultural activities, where the larger the cultivated land area, the greater the potential production generated. This occurs because a larger land area allows a greater number of plants to be cultivated. However, the magnitude of production is not determined solely by land area; many other factors influence it, such as soil quality, the use of production inputs, and farm management techniques. Therefore, land area plays an important role in increasing production when it is managed optimally. This relationship is presented in Table 11.

Table 11. Correlation Test Between Land Area and Corn Production

Correlations	Land Area	Production
Land Area	Pearson Correlation	1
	Sig. (2-tailed)	
	N	80
Production	Pearson Correlation	0.518**
	Sig. (2-tailed)	0.000
	N	80

Source: Primary data processed using SPSS 23, 2025

Table 11 shows that the significance value for the land area and production variables is 0.000, meaning 0.000 < 0.05. Thus, the variables land area and production have a relationship or are correlated. The Pearson correlation value between land area and production is 0.518, indicating a moderate degree of correlation, and the form of the relationship between these two variables is positive, which means that the larger the land area, the greater the production obtained.

The results of a study conducted by Faradiba Jabnabillah (2022) indicated that based on the correlation test results, the significance value for the variables learning motivation and learning independence was 0.007, meaning 0.007 < 0.05. Thus, the variables learning motivation and learning independence have a relationship or are correlated. The Pearson correlation value between learning motivation and learning independence was 0.496, indicating a moderate correlation, and the form of the relationship between these two variables is positive, which means that the higher the learning motivation, the higher the learning independence. This explanation is consistent with research stating that learning motivation and learning independence have a positive influence on students in the learning process.

b. Correlation Between Seeds and Production

The correlation between seeds and production shows that the quality and proper use of seeds greatly influence agricultural production outcomes. Superior seeds that are suitable for land conditions tend to have good germination ability, resistance to

pests and diseases, and higher yield potential. The better the seed quality and the more appropriate its use, the higher the production tends to be. This relationship is presented in Table 12.

Table 12. Correlation Test Between Seeds and Corn Production

Correlations	Seeds	Production
Seeds	Pearson Correlation	1
	Sig. (2-tailed)	
	N	80
Production	Pearson Correlation	0.429**
	Sig. (2-tailed)	0.000
	N	80

Source: Primary data processed using SPSS 23, 2025

Table 12 shows that the significance value for the seed and production variables is 0.000, meaning 0.000 < 0.05. Thus, seed and production variables have a relationship or are correlated. The Pearson correlation value between seeds and production is 0.429, indicating a moderate correlation, and the relationship between the two variables is positive, meaning that the greater the number of seeds used, the higher the corn production obtained.

Seeds play an important role in increasing productivity, product quality, and the added value of crops. The seeds referred to here are high-quality seeds. Superior quality seeds have better adaptability, even on less productive land. High-quality seeds not only increase yield but also reduce the risk of crop failure due to pest and disease attacks. Superior and high-quality seeds can have a major impact on increasing production output, farmers' income, and farmers' welfare (Boediono, 2008).

c. Correlation Between Farming Experience and Production

Farming experience is one of the factors suspected to have a relationship with the level of production obtained by farmers. The longer the farming experience, the better the farmers' ability to manage their farming activities, which is expected to have an impact on increasing production. To determine the direction and strength of this relationship, a correlation analysis was conducted between the farming experience variable and production, as presented in Table 13.

Table 13. Correlation Test Between Farming Experience and Corn Production

Correlations	Farming Experience	Production
Farming Experience	Pearson Correlation	1
	Sig. (2-tailed)	
	N	80
Production	Pearson Correlation	0.032
	Sig. (2-tailed)	0.775
	N	80

Source: Primary data processed using SPSS 23, 2025

Table 13 shows that the significance value for the farming experience and production variables is 0.775, meaning 0.775 > 0.05. Thus, the variables farming experience and production do not have a relationship or are not correlated. The Pearson correlation value between farming experience and production is 0.032, indicating a weak correlation, and the form of the relationship between the two variables is positive.

d. Correlation Between Labor and Production

The correlation between labor and production plays an important role in supporting all production processes, starting from land preparation, planting, maintenance, to harvesting. The more optimal the number and quality of labor used, the more effectively and timely the production activities can be carried out, which tends to increase production results. This relationship is presented in Table 14.

Table 14. Correlation Test Between Labor and Corn Production

Correlations	Labor	Production
Labor	Pearson Correlation	1
	Sig. (2-tailed)	
	N	80

Production	Pearson Correlation	0.103
	Sig. (2-tailed)	0.364
	N	80

Source: Primary data processed using SPSS 23, 2025

Table 14 shows that the significance value for the labor and production variables is 0.364, meaning 0.364 > 0.05. Thus, labor and production do not have a relationship or are not correlated. The Pearson correlation value between labor and production is 0.103, indicating a very weak correlation, and the form of the relationship between the two variables is positive, meaning that increasing labor does not necessarily increase corn production results.

e. Correlation Between Fertilizer and Production

The correlation between fertilizer and production plays a role in improving soil fertility and the availability of nutrients for plants. Proper fertilizer application in terms of type, dosage, and timing can support optimal plant growth, thereby increasing production. However, inappropriate fertilizer use may reduce efficiency and productivity, therefore proper management is required. This relationship is presented in Table 15.

Table 15. Correlation Test Between Fertilizer and Corn Production

Correlations	Fertilizer	Production
Fertilizer	Pearson Correlation	1
	Sig. (2-tailed)	
	N	80
Production	Pearson Correlation	-0.077
	Sig. (2-tailed)	0.499
	N	80

Source: Primary data processed using SPSS 23, 2025

Table 15 shows that the significance value for the fertilizer and production variables is 0.499, meaning 0.499 > 0.05. Thus, fertilizer and production do not have a relationship or are not correlated. The Pearson correlation value between fertilizer and production is −0.077, indicating a strong correlation, and the relationship between the two variables is negative, meaning that the more fertilizer used appropriately according to the dosage or recommended rate, the higher the corn production obtained.

f. Correlation Between Pesticides and Production

The correlation between pesticides and production shows a relationship in controlling pests and plant diseases that may affect production outcomes. Proper pesticide use in terms of type, dosage, and timing can suppress pest attacks so that plant growth becomes more optimal and production increases. However, excessive or improper pesticide use can have negative impacts on plants and the environment; therefore, its effectiveness greatly depends on proper management. This relationship is presented in Table 16.

Table 16. Correlation Test Between Pesticides and Corn Production

Correlations	Pesticides	Production
Pesticides	Pearson Correlation	1
	Sig. (2-tailed)	
	N	80
Production	Pearson Correlation	-0.155
	Sig. (2-tailed)	0.170
	N	80

Source: Primary data processed using SPSS 23, 2025

Table 16 shows that the significance value for the pesticide and production variables is 0.170, meaning 0.170 > 0.05. Thus, pesticides and production do not have a relationship or are not correlated. The Pearson correlation value between pesticides and production is −0.155, indicating a very weak correlation, and the form of the relationship between the two variables is negative, meaning that excessive pesticide use or pesticide use that does not follow the recommended dosage may negatively affect corn production results.

D. Income Analysis of Corn Farming

a. Cost of Corn Farming

Farming activities are inseparable from the costs used to manage the farming operations. In order to obtain maximum production, corn farmers need to incur costs in the form of fixed costs and variable costs.

1. Variable Costs

Variable costs are costs whose magnitude is influenced by the level of production obtained. The amount of production will affect the costs required in farming, so these costs may vary in amount. The variable costs in this study include seeds, fertilizers, pesticides, and labor. The average variable cost incurred by farmers in corn farming in Abiansemal District, Badung Regency, Bali Province is IDR 17,944,700 per 0.93 ha or IDR 19,295,376 per hectare.

2. Fixed Costs

Fixed costs are costs that are relatively constant in amount and are not affected by the level of production obtained. Fixed costs include land tax, equipment depreciation, and land rent. The average fixed cost is IDR 4,104,754 per 0.93 ha per planting season (MT) or IDR 4,413,713 per hectare per planting season.

3. Total Cost of Corn Farming

Total cost is the sum of fixed costs and variable costs, where every farming activity cannot be separated from the costs required to manage the farming operations in order to obtain the expected results (Soekartawi, 2002). The average total cost of corn farming is IDR 22,049,454 per 0.93 ha per planting season or IDR 23,709,090 per hectare per planting season.

b. Revenue of Corn Farming

Corn farming revenue is obtained from the multiplication of the production obtained during one planting season and the selling price of the production at the farmer level. The amount of revenue received by farmers is determined by the level of production and the selling price. The average corn production obtained by farmers in Abiansemal District, Badung Regency, Bali Province during one planting season varies depending on the cultivated land area. The average farming revenue in Abiansemal District, Badung Regency, Bali Province is IDR 79,975,000 per 0.50–2.5 ha per planting season, with an average production of 11,425 kg per 0.50–2.5 ha or 12,284 kg per hectare per planting season, and the average selling price at the farmer level is IDR 7,000 per kg.

c. Income of Corn Farming

The income of corn farmers in Abiansemal District, Badung Regency, Bali Province during one planting season averages IDR 57,925,545 per 0.93 ha or IDR 62,285,532 per hectare. The complete income of corn farming is presented in Table 17.

Table 17. Average Revenue, Total Cost, and Income of Corn Farmers in Abiansemal District, Badung Regency, Bali Province, 2025

No	Description	Actual Value (IDR/0.93 ha)	Converted Value (IDR/Ha/Season)
1	Farm Revenue		
	Average Production (Kg)	11,425	12,284
	Selling Price (IDR/Kg)	7,000	7,526
	Average Revenue	79,975,000	85,994,623
2	Farming Costs		
	Fixed Costs		
	Land Tax	34,062	36,625
	Equipment Depreciation	39,441	42,409
	Land Rent	4,031,250	4,334,677
	Average Fixed Cost	4,104,754	4,413,713
	Variable Costs		
	Seeds	2,401,875	2,582,661
	Fertilizer	5,234,125	5,628,091
	Pesticides	413,325	444,435
	Labor	9,895,375	10,640,188

	Average Variable Cost	17,944,700	19,295,376
	Average Total Cost	22,049,454	23,709,090
3	Farm Income		
	Average Income (1 Planting Season)	57,925,545	62,285,532

Source: Primary data processed, 2025

Table 17 shows that the average revenue of corn farmers in Abiansemal District, Badung Regency, Bali Province is IDR 79,975,000 per 0.93 ha per planting season, with a land conversion value of 1 hectare and a land area range of 0.5–2.5 ha, or IDR 85,994,623 per hectare per planting season.

The average total farming cost is IDR 22,049,454 per hectare per planting season or IDR 23,709,090 per hectare per planting season, and the average income of corn farmers is IDR 57,925,545 per hectare per planting season or IDR 62,285,532.

The total cultivated land area is 74.50 ha, with an average land area of 0.93 ha per planting season, within a land area range of 0.5–2.5 ha for 80 respondent corn farmers.

E. Constraints in Corn Farming

The constraints faced by corn farmers in Abiansemal District, Badung Regency, Bali Province include technical/farming constraints, social, economic, and cultural constraints, as well as labor shortages during the peak harvest season, pest and disease attacks (Plant Pest Organisms/PPO), and the lack of pest control through environmentally friendly (biological) pesticide use. Even when corn is attacked by pests and diseases on a small scale, it can still affect corn production yields. Corn marketing is also a constraint faced by farmers due to external factors. However, the marketing of corn production in traditional markets is carried out through limited intermediaries and transportation facilities in order to obtain higher profits.

a. Business Constraints

Based on in-depth interviews, it was found that the use of production inputs has not been optimal and cultivation practices are still carried out in a simple manner, along with limitations in tools and machinery used in processes ranging from land preparation to post-harvest handling. Knowledge and application of modern cultivation techniques, superior varieties, and appropriate technologies remain low, such as the improper use of fertilizers and inadequate pest and disease control.

In addition, farming activities are highly dependent on climate and water availability, which increases the risk of crop failure due to drought or unpredictable rainfall.

b. Economic Constraints

Access to capital (credit or loans) is difficult due to collateral requirements and business feasibility constraints, so farmers often rely only on their own capital. Meanwhile, corn prices at the farmer level are uncertain, often low, and frequently do not meet farmers' expectations, especially during the peak harvest season. Farmers also have a weak bargaining position, as they do not have strong control in determining selling prices due to the dominance of collecting traders. In addition, production costs are relatively high, particularly due to the increasing prices of agricultural inputs such as fertilizers and pesticides.

c. Social Constraints

Farmers tend to be satisfied with the current production results and do not attempt to adopt modern cultivation techniques or new innovations, often due to fear of the risks associated with new investments. Furthermore, the quality of human resources (HR), especially in terms of education level and skills, remains limited. Many corn farmers still have relatively low levels of formal education, which directly affects their ability to absorb information, understand, and implement new technological innovations. Another social constraint is the lack of interest and participation of younger generations in the agricultural sector.

d. Cultural Constraints

Farmers who have long practiced traditional cultivation methods tend to develop a static mindset, meaning they remain trapped in old patterns of thinking. They feel satisfied with the existing results and are reluctant to adopt new innovations such as modern cultivation techniques, new cropping patterns, or the use of more efficient agricultural equipment. In addition, some farmers cultivate corn only as a secondary crop (for example, planted between other crops or while waiting for the rice or main crop season). This indicates that corn is often not the primary priority in the farming system and is only cultivated in a limited or less intensive manner.

CONCLUSIONS

The heading of the Conclusions section must be numbered.

Based on the results of the research conducted on the Analysis of Production and Income of Corn Farming in Abiansemal District, Badung Regency, Bali Province, the following conclusions can be drawn:

1. Based on the results of the correlation analysis, the variables land area and seeds have a moderate relationship with production with a positive relationship pattern, whereas the variables farming experience, labor, and pesticides do not have a relationship with production.
2. Based on the income analysis conducted in Abiansemal District, Badung Regency, Bali Province, it can be concluded that the average revenue of corn farmers in Abiansemal District, Badung Regency, Bali Province is IDR 79,975,000 per 0.93 ha per planting season (MT).
3. The constraints faced in corn farming in Abiansemal District, Badung Regency, Bali Province include limitations in technical/farming aspects, social, economic, and cultural factors, which have not yet enabled farmers to apply modern cultivation methods in the farming process to increase the yield of corn commodities. Efforts are needed to encourage innovation and improve human resources through training programs, particularly to enhance farmers' mindset in adopting improved technology and modern cultivation techniques, including the use of more efficient agricultural equipment.

RECOMMENDATIONS

In order to improve corn production and income in Abiansemal District, Badung Regency, Bali Province, the following recommendations can be proposed:

1. The use of labor, farming experience, and pesticides should be optimized more effectively through the implementation of appropriate cultivation methods, improvement of farmers' skills through agricultural training and extension programs, and the wise use of pesticides according to recommended dosages. These efforts are expected to increase production efficiency and support higher corn farming yields.
2. Land area is one of the main resources that should be expanded in order to maximize corn farming production. Land area greatly influences the production obtained in corn farming. This should also be supported by the use of quality seeds, because the greater the number of seeds planted, the greater the production that can be obtained by farmers.
3. The use of fertilizers in corn farming that currently contributes to reduced production is caused by insufficient attention in their application, resulting in less optimal yields. Therefore, greater attention is required in fertilizer management so that the production obtained becomes optimal. Increasing the appropriate fertilizer dosage is necessary to achieve greater efficiency in fertilizer use.

ACKNOWLEDGMENT

The author would like to express sincere gratitude to the Master Program in Agribusiness, Faculty of Agriculture, Udayana University for providing academic support and research facilities during this study. The author also thanks the supervisors and colleagues for their valuable suggestions and assistance throughout the research process. Appreciation is also extended to the farmers in Abiansemal District, Badung Regency, Bali Province, who provided valuable information and support for the completion of this research.

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