



INCOME ANALYSIS OF DEWA CARAMBOLA FARMING IN SAWANGAN SUBDISTRICT, DEPOK CITY, WEST JAVA

Lola Rahmadona¹⁾; Febiola Devitasari²⁾;

^{1,2)} Agriculture Faculty, Muhammadiyah University Jakarta

Email: ¹⁾ lola.rahmadona@umj.ac.id; ²⁾ febioladevitaaa04@gmail.com

How to Cite :

Rahmadona, L, F. Devitasari. 2022. Income analysis of Dewa Carambola farming in sawangan subdistrict, Depok City, West Java. *Journal of Agri Socio Economics and Business*. 4 (1): 57-68. DOI: <https://doi.org/10.31186/jaseb.04.1.57-68>

ABSTRACT

ARTICLE HISTORY

Received [xx Month xxxx]

Revised [xx Month xxxx]

Accepted [xx Month xxxx]

KEYWORDS

Dewa Carambola

Characteristics

Income

R/C ratio

This is an open access article under the [CC-BY-SA](https://creativecommons.org/licenses/by-sa/4.0/) license



In 2009, Dewa Carambola was inaugurated as an icon of Depok City due to a lot of carambola production in West Java Province. Sawangan sub-district was chosen as the research location because it is one of the centers for carambola production in Depok City. The occurrence of land-use change, the price of production inputs is increasingly high, and PDO (Plant Disturbing Organisms) are problems in the farming activities of the dewa carambola in Sawangan District. This study aimed to determine carambola farming characteristics and income analysis in the Sawangan District. Respondents were determined purposively with 30 farmers using the Slovin formula. In this study, the characteristics of the farm are described descriptively, and the analysis of farm income uses the R/C ratio analysis. The analysis results show that the total cost per hectare per year of carambola farming in Sawangan District is IDR 29,147,430,444. The result is the sum of the cash costs of IDR 20,644,741,935 per hectare per year and the calculated costs of IDR 8,502,688,508 per hectare per year. The highest cash costs incurred were wages for non-family labor (TKLK) of IDR 7,288,709,677/ha/yr. Meanwhile, the highest calculated cost is the TKDK fee of 65.90%, or around IDR 5,668,548,387 per hectare per year. Meanwhile, the income for carambola farming in Sawangan sub-district for cash costs is IDR 13,125,677,419 per hectare and the value of income for total costs is IDR 4,622,988,911 per hectare. The analysis results of the R/C ratio of cash costs are 1.63 and the R/C ratio of total costs is 1.15. So it can be said that carambola farming in Sawangan District is efficient or feasible to cultivate.

INTRODUCTION

The agricultural sector is one of the important sectors in the Indonesian economy. This can be seen from the contribution and growth rate of the agricultural sector to the national Gross Domestic Product (GDP). According to quarterly GDP at current prices, the structure of the Indonesian economy by business sector from one quarter to another quarter did not change significantly. In the second quarter of 2020, Agriculture, Forestry, and Fisheries gave the largest contribution, 15.46% (BPS, 2020).

The agricultural sector consists of several sub-sectors: food crops, plantations, and horticulture. Horticulture is a sub-field that has a very important role and has the potential to be developed. In the last four years, the contribution of horticultural crops has continued to increase, starting from 2016 at 187,402.6 billion Rupiah to 2019 at 238,830.5 billion Rupiah. The Director-General of Horticulture (2017) explained that fruit products are one of the horticultural commodities with high economic value that can be a source of income for the community.

Horticultural GDP data from 2009 to 2012 shows that fruit is a commodity that has a fairly high contribution and increases every year. In addition, horticultural crop production data shows that fruit production increased in 2014 compared to 2013, 8.30%. One type of fruit that is in demand by the community and can be developed commercially is carambola. Carambola is an annual fruit plant and is classified as tropical fruit. Carambola plants can bear fruit throughout the year and can bear fruit 3-4 times a year. Carambola, better known by the Latin term *Averrhoa carambola* L., has a pretty good business opportunity in Depok City. Carambola cultivation in Depok City continues to be developed in Depok City. One of them is the carambola variety, widely known to consumers and has become an icon of Depok City, namely the Dewa carambola variety.

The magnitude of the carambola business opportunity in Depok City has made many agribusiness actors interested in doing carambola farming. However, even though Depok City has become the largest carambola production center, based on data from the Depok City Agriculture Service, the reality shows that the development of the production of Dewa carambola is decreasing in 2011 compared to 2015, 44.17%. This causes the low productivity level of carambola in Depok City.

The dewa carambola is widely developed on community-owned land. One area that is well-known as a carambola cultivation area is Pasir Putih Village, Sawangan District. However, according to the Agricultural Extension Agency of Sawangan (BPP), a land conversion has reduced the number of carambola farming lands in this district. This affects the production and productivity of carambola in the Sawangan sub-district. In addition to the basic problems in farming, Dewa carambola is a problem of pests and inputs that are increasingly expensive. The problem of pests on the carambola of the dewa causes the production of carambola to decrease, while the inputs used during farming require a large amount of money. Many farmers feel that there is no comparison between farming expenses and their

income. Based on the description above, this study aims to analyze the income of the carambola farming in Sawangan District, Depok City.

RESEARCH METHODS

Method of Collecting Data

This research was conducted in Sawangan District, Depok City. The selection of research locations was carried out purposively considering that Sawangan District, Depok City is one area that has the potential to be developed.

According to Sugiyono (2012), the notion of the sample is part of the number and characteristics possessed by the population, so the sample taken must be truly representative. The method used in sampling in this study is purposive sampling. Purposive sampling determines the sample based on certain criteria (Sugiyono, 2012). The purposive sampling technique is a sampling technique with certain considerations. Namely farmers who owns his own land and only cultivates dewa carambola.

The population of farmers who cultivate Carambola in Sawangan District is 70, spread over two villages namely Pasir Putih and Bedahan Village. The number of samples in this study was determined using the Slovin formula (Sugiyono, 2009). Based on the calculation results of the number of samples in the study were 30 respondents with a precision value of 15%.

Data Analysis Method

The study takes data for one year observation, i.e., October 2020 to October 2021. The quantitative method is used in the analysis process in this research. The quantitative analysis aims to analyze income analysis of dewa carambola farming in sawangan subdistrict, Depok City, West Java.

Quantitative analysis was conducted apply cost analysis, farm income, and cost parity analysis (R/C analysis). Before being processed, the primary data be gathered first by means of data verification and validation process. While, the output of processed primary data are shown in the table which is then interpreted in the form of discussion. Following closely to Soekartawi (2016), and Apriani (2017), the efficiency of farm income, mathematical calculations are formulated as follows:

1. Costs Analysis

Total costs are the sum of fixed and variable costs used together in the production process. It can be systematically formulated as follows:

$$TC = FC + VC$$

Notes: TC = Total Cost (IDR); FC = Fixed Cost (IDR); VC = Variable Cost (IDR)

2. Revenue Analysis

Revenue is obtained from multiplying the amount of production with the selling price of the product produced. It can be systematically formulated as follows:

$$TR = Y \times P_y$$

Notes: TR = Total Revenue (IDR); Y = Production (Kg); P_y = Price Y (IDR/kg)

3. Income Analysis

Farming is good or profitable if the output produced is greater than the input used. It can be systematically formulated as follows:

$$Y = TR - TC$$

Notes: Y = Farm Income; TR = Total Revenue (IDR); TC = Total Cost (IDR)

4. Efficiency Analysis

Farming is efficient if the ratio between revenue and expenditure results > 1, if R/C ratio < 1 then the farm not efficient. The efficiency of a farm can be known by calculating the R/C ratio, which can systematically be formulated as follows:

$$R/C \text{ ratio} = \frac{TR}{TC}$$

Notes: R/C = Revenue/Cost ratio; TR = Total Revenue (IDR); TC = Total Cost (IDR)

RESULTS AND DISCUSSION

The Used of Dewa Carambola Farming Production Facilities

The production factors used in the farming of dewa carambola in the Sawangan District consist of land, seeds, organic fertilizers, inorganic fertilizers, pesticides, labor, and farming equipment.

a. Land

According to Assis et al. (2014), land area is a factor that has a significant effect on farmers' income. If the land area increases, the population will increase farmers' production and income. The land used by all respondent farmers is their land. The average area of land cultivated by respondent farmers is 1.03 hectares. In the calculation of income analysis, the cost of land is a land tax included in the cash cost. If the land is to be rented out, renting the land is the Opportunity Cost (opportunity cost) which is included in the calculated cost. The average cost of land tax in Sawangan District per hectare

is IDR 325,806.452 per year. The average Opportunity Cost in Sawangan District per hectare is IDR 2,500,000.00 per year.

Tabel 1. Components of Dewa Carambola Farming Production

No.	Components	Unit	Volume
1.	Manure	Kg/ha	2.206,452
2.	NPK Mutiara	Kg/ha	147,290
3.	Pesticides	Liter/ha	2,361
4.	Mulch Plastic	Roll/ha	0,968
5.	TKLK	HOK/ha	5,161
6.	TKDK	HOK/ha	0,355

Source : Primary Data (processed), 2021

b. Seeds

The seeds used by respondent farmers in Sawangan District are superior varieties, namely Dewa varieties. The number of seeds used in this farming corresponds to the number of trees planted. The more seeds used, the greater the opportunity to produce more products so that the income obtained by farmers will increase (Thamrin et al, 2013; Siregar, 2016; Akbar et al, 2020; Devitasari, 2020). The carambola plant is an annual plant. The calculation of seeds cost issued by farmers is not included in the cost analysis in this study because the cost of seeds is calculated in the first year of farming. In contrast, the analysis of this study takes the age of the carambola plant above seven years.

c. Fertilizers and Pesticides

The fertilizer used by respondent farmers consisted of goat manure and NPK Mutiara fertilizer. Meanwhile, the pesticides used for pest control are chemical pesticides such as Decis and Curacron. The use of fertilizers and pesticides in the Sawangan district varies according to the number of plants owned. Goat manure and NPK Mutiara are given at the beginning of the Dewa carambola season to stimulate the appearance of the fruit, and pesticides are given twice a week using steam or sprayer because of the large number of fruit flies and fruit borers that can damage carambola. The average use of goat manure is 2206,452 kg per hectare per year, NPK Mutiara is 147.290 kg per hectare per year, and pesticides are 2,361 liters per hectare per year. The average cost of using goat drum fertilizer is IDR 1,103,226, NPK is IDR 1,446,774, and pesticides are IDR 559,258,065.

d. Labor

The laborer used in the dewa carambola farming in the Sawangan district are outside the family labor (TKLK) and the family labor (TKDK). Based on interview data, TKLK and TKDK only consisted of men employed for fertilization, pruning, pest control, fruit thinning, fruit packaging, and harvesting. In calculating the data, the researcher uses the HOK (Working Person's Day) unit, so the number and wages of workers are converted into HOK. The wage system in this Dewa carambola farming is a daily wage system, both TKLK, and TKDK of IDR 150,000.00 per person with eight working hours, but for fertilization, it is only half of the working hours with a wage of IDR 75,000.00. The average cost of wages for TKLK is IDR 17,288,709,677 per hectare, and the average cost of wages for TKDK is IDR 5,668,548,387 per hectare.

e. Farming Tools

Agricultural tools used by respondent farmers in this dewa carambola farming include hoes, sickles, pruning shears, ladders, sprayers, steam, and barrels. These tools are used in the pruning process up to the harvesting stage. The equipment is owned by the farmers themselves. The purchase of agricultural equipment is not carried out every season because it can still be reused until its economic value runs out. The economic life of each equipment is different, the average economic life of each equipment used is 3 to 5 years. The cost of depreciation of agricultural equipment used during farming, including costs, is calculated. The average depreciation value of the equipment is IDR 334,140,121 per hectare.

Dewa Carambola Farming Revenue

Farming revenue is the amount of money received from the sale of production obtained by multiplying the production and the selling price of the product or carambola per kilogram.

The amount of production per hectare and the selling price of carambola will affect farmers' income levels. The higher the production and selling price, the higher the farmer's income. Carambola farmers harvest three times in one year of cultivation. The age of harvesting the dewa carambola is above four years.

The average price of carambola sold at the farmer level is IDR 8967.742 per kilogram. Farmers sell their products to middlemen, so they have less bargaining power because the selling price is based on the price set by the middleman. The average amount of carambola production in the Sawangan district is 3677.419 kilograms, with an average farm income of IDR 33,770,419,355 per hectare.

Expenditures for Dewa Carambola Farming

Costs for Dewa carambola farming are all costs incurred by farmers in doing Dewa carambola farming. Farming costs consist of cash costs and indirect costs.

1. Cash Costs

Cash costs are costs paid in cash during farming. Cash costs in this study include manure, NPK Mutiara, pesticides, plastic mulch, TKLK, and land taxes. The following is a table of cash costs for carambola farming in the Sawangan district.

Table 2. Components of Cash Costs for Dewa Carambola Farming

Production Factors	Value (IDR/Ha/Year)	Percentage (%)
Manure	367.741,935	1,78
NPK Mutiara	1.446.774	7,20
Pesticides	559.258,065	2,70
Mulch Plastic	656.451,613	3,18
TKLK	7.288.709,677	83,74
Land Tax	325.806,452	1,57
Total	20.644.741,935	100,00

Source : Primary Data (processed), 2021

The highest cash costs incurred are wages for non-family labor (TKLK) of IDR 7,288,709,677 per hectare per year. Enormous labor costs are incurred when controlling pests or spraying pests. Pests that often attack this Dewa carambola plant are fruit flies and fruit borers. Therefore pest spraying is carried out every two times a week. This makes labor costs the highest cash costs.

The second-highest cash cost is the purchase of NPK Mutiara fertilizer, which is 7.20% or IDR 1,446,774,000 per hectare per year. The need for NPK Mutiara is a lot, and the price is quite high, resulting in quite large expenditures for the cost of this fertilizer. The cash costs per hectare per year are followed by plastic mulch IDR 656,451,613, pesticides IDR 559,258,065, manure IDR 367,741,935, and land tax IDR 325,806.452.

The total value of the use of production factors on cash costs is added up so that the total cash cost of the whole carambola farmers in the Sawangan district is IDR 20,644,741,935 per hectare per year. In line with research conducted by Mas'ud (2011), Putrisya (2018) and Gultom (2021) that the largest cost component in cash costs is labor costs outside the family. Then the second largest cash cost component is fertilizer, namely goat manure at IDR 367,741,935 per hectare per year and NPK Mutiara IDR 1,446,774 per hectare per year. The results of this study are the same as the results of research conducted by Putrisya (2018) that the second largest cost component is fertilizer. This is because in Putrisya's research (2018) using various types of fertilizers, namely drum fertilizer, Urea, TSP, NPK Yaramila, Phonska, KCL, Atonic, and Gndasil b.

2. Non-Calculated Costs

Non-Calculated costs are costs that are not disbursed in cash or directly by farmers but must still be taken into account to find out how much the value of the resources expended. The costs calculated in this study include depreciation costs for equipment, TKDK, and opportunity costs for land rental.

Table 3. Components of Non-Calculated Costs for Dewa Carambola Farming

Production Factors	Value (IDR/Ha/Year)	Percentage (%)
TKDK	5.668.548,387	66,66
Tools Depreciation	334.140,121	3,93
Land Rent Non Cash	2.500.000	29,40
Total	8.502.688,508	100,00

Source : Primary Data (processed), 2021

Non-Calculated costs, it can be seen that the highest calculated costs are TKDK costs of 65.90% or around IDR 5,668,548,387 per hectare per year. Only a few farmers in the Sawangan district still rely on themselves to run their carambola farming (including TKDK). This is because the number of plants owned is only about 10-15, so farmers do not use external workers. The next calculated cost is the opportunity cost of land rental (opportunity cost) of 29.06%, or around IDR 2,500,000. The opportunity cost of land rental is farmers' cost if they rent out their land. Next is the equipment depreciation expense of 5.02% or IDR 334,140,121 per hectare per year—the method of calculating depreciation expense using the straight-line basis.

The total value of the production factors at the calculated cost is added up so that the total cost calculated for the whole dewa carambola farmers per year is IDR 8,502,688,508 per hectare per year.

3. Total Costs

The total cost of carambola farming in the Sawangan district is the sum of all cost components, namely cash and implicit costs. The value of cash and implicit costs is added to the total cost with a value per hectare.

Based on the table, the total cost per hectare per year for carambola farming in the Sawangan district is IDR 29,147,430,444 per hectare per year. The result is the sum of the cash costs of IDR 20,644,741,935 per hectare per year and the implicit costs of IDR 8,502,688,508 per hectare per year. This research is in line with the research conducted by Putrisya (2018), Sinaga et al (2019), which also shows that cash expenditures are more significant than non-cash expenditures (calculated).

Tabel 4. Components of Total Costs for Dewa Carambola Farming

Components	Value (IDR/Ha/Year)
Cash Costs	20.644.741,935
Non-Calculated Costs	8.502.688,508
Total	29.147.430,444

Source : Primary Data (processed), 2021

Income and Efficiency of Dewa Carambola Farming

The subtraction of the total revenue to the total cost is farming income. The farming income in above statement is income on cash costs and total cost income. The income on cash costs is the deviation between the total cash receipts and cash costs spent by farmers in farming. Next, The income on total costs is quarrel between total revenue and total costs. The efficiency of farming traced by the value R/C ratio. The value of the R/C ratio is a ratio between the output value and the input value, indicated that is a farm is efficient or not (Soekartawi, 2016).

Table 5. Dewa Carambola Farming Income

Components	Value (IDR/ha/year)
A Total Revenue	33.770.419,000
B Cash Costs	20.644.741,935
C Non-Calculated Costs	8.502.688,508
D Total Costs (B+C)	29.147.430,444
Income on Cash Costs (A-B)	13.125.677,419
Income on total Costs (A-D)	4.622.988,911
R/C on cash costs	1,636
R/C on total costs	1,159

The income value of Dewa carambola farming in the Sawangan district for cash costs and total costs shows a value greater than zero. The value of income on cash costs is IDR 13,125,677,419 per hectare per year, and the value of income for total costs is IDR 4,622,988,911 per hectare per year, which means that farming activities can be said to be profitable. In contrast to the research of Mas'ud (2011) and Putrisya (2018). In Mas'ud's research (2011) the total farm income in this study is very different from this research, which is Rp. 169,462,228.58 per hectare per year. This is because the average production of star fruit Dewa is 31,030.54 kg per hectare per year with a selling price of Rp. 5,461.14 per kilogram. In Putrisya's research (2018), it shows that the average total income is Rp. 99,936,388.9 per hectare per year with a total cost income of Rp. 47,706,395 per hectare per year. The reason is, the production of star fruit Dewa is 267,100 kg per hectare per year with a selling

price of Rp. 8,000 per kilogram. According to Andriansyah *et al* (2021), Subhan 2020) & Assidiki *et al* (2021), if the income is greater than the costs, then the farm is profitable.

The results of the R/C ratio on cash and total costs are greater than one. They are 1.63 for the R/C ratio on cash and 1.15 for the R/C ratio on total costs. These results indicate that every one rupiah of cash spent on the cultivation of Dewa Carambola will generate an income of Rp. 1.63. Furthermore, every one rupiah of the total cost spent will generate an income of Rp. 1.15. It was concluded that the Dewa Carambola farming in Sawangan district could continue to be cultivated because it had a significant effect on increasing income based on the results of the R/C ratio. According to Soekartawi (2016) if the R/C ratio is more than one, the farm is to be efficient or feasible to cultivate.

CONCLUSIONS AND SUGGESTIONS

Conclusions

1. The total cost of carambola farming in the Sawangan district is the sum of all cost components, namely cash and implicit costs. The total cost per hectare per year for carambola farming in the Sawangan district is IDR 29,147,430,444. The result is the sum of the cash costs of IDR 20,644,741,935 per hectare per year and the calculated costs of IDR 8,502,688,508 per hectare per year. The highest cash costs incurred were wages for non-family labor (TKLK) of IDR 7,288,709,677 per hectare per year. Meanwhile, the highest implicit cost is the TKDK cost of 65.90%, or around IDR 5,668,548,387 per hectare per year.
2. The income of the dewa carambola farming in Sawangan district for cash costs is IDR 13,125,677,419 and the value of income for total costs is IDR 4,622,988,911. While the R/C value of the cash cost ratio is 1.63, and the R/C ratio of the total cost is 1.15, which means that the Dewa carambola farming activities in the Sawangan district are efficient and profitable.

Suggestion

Based on the conclusions obtained that the dewa carambola farming activities are still profitable and profitable to run, it is better to develop the dewa carambola farming in the future. Farmers can follow up on subsidized fertilizers provided by the local Agriculture Service so that they can /reduce spending on production inputs so that farmers can get more profits.

REFERENCE

- Akbar, R. F., Firmansyah, H., & Husaini, M. 2020. Analisis Usahatani Ubi Kayu di Desa Cindai Alus, Kecamatan Martapura Kota, Kabupaten Banjar. *Frontier Agribisnis*, 3(4), 108-114.
- Andriansyah, Rahmat, A Kholik, M T Tirkaamina. 2021. Pemanfaatan lahan dengan pola agroforestry pada kebun belimbing di Desa Manunggal Jaya Kecamatan Tenggara Sebrang. *Jurnal Ilmu Pertanian dan Kehutanan*. Vol 20 (1) 1-15.
- Apriani, A. E., Soetoro, S., & Yusuf, M. N. 2017. Analisis usahatani jagung (*Zea mays* L). *Jurnal Ilmiah Mahasiswa Agroinfo Galuh*, 2(3), 145-150.
- Assidiki, Hasbi, D Rochdiani, M N Yusuf. 2021. Analisis keberlanjutan Usahatani Belimbing di Desa Waringinsari Kecamatan Langensari Kota Banjar. *Jurnal Ilmiah Agroinfo Galuh*. Vol 8 (1) 59-72.
- Assis, K., Nurrul Azzah, Z & Mohammad Amizi. 2014. Relationship Between Socioeconomic Factors, Income And Productivity Of Farmers : A Case Study On Pineapple Farmers. *International Journal of Research in Humanities, Arts and Literature*.
- Badan Pusat Statistik. 2020. Statistik Produk Domestik Bruto. Indonesia Triwulanan [internet]. [diunduh 5 Desember 2020]. Tersedia pada <https://bps.go.id>.
- Devitasari, E., Sitepu, H., & Pramono, R. 2020. Analisis Usahatani Ubi Kayu "Varietas Daplang"(Manihot utilissima Pohl) Di Petak 15 Wilayah Sekuro Kecamatan Mlonggo Kabupaten Jepara. *AGROMEDIA: Berkala Ilmiah Ilmu-ilmu Pertanian*, 38(2), 67-75.
- Direktorat Jenderal Hortikultura. 2015. Rencana Strategis Direktorat Jenderal Hortikultura 2015 – 2019. Tersedia pada <http://hortikultura.pertanian.go.id/>. [diunduh pada 9 Desember 2020]
- Direktorat Jenderal Hortikultura. 2015. Statistik Produksi Hortikultura Tahun 2014. Tersedia pada : <http://hortikultura.pertanian.go.id/> [diunduh pada 10 Desember 2020]
- Gultom, H. H., Hasibuan, S., & Saleh, K. 2021. Faktor-Faktor Yang Mempengaruhi Pendapatan Petani Padi Sawah di Desa Pagar Jati. *Jurnal Ilmiah Pertanian (JIPERTA)*, 3(1), 24-33.
- Mas'ud, Faith Ahmad. 2011. Analisis usahatani dan faktor-faktor produksi belimbing dewa pada kelompok tani Maju Bersama Kelurahan Tugu Kelapa Dua Kecamatan Cimanggis Kota Depok. [Skripsi]. Fakultas Ekonomi dan Manajemen. IPB
- Putrisya, Audya Annisa. 2018. Analisis pendapatan dan faktor-faktor yang mempengaruhi pendapatan usahatani komoditas belimbing dewa di kota Depok. [Skripsi]. Fakultas Ekonomi dan Manajemen. IPB

- Sinaga, B., Tarigan, K., & Wibowo, R. P. 2019. Analisis pendapatan dan faktor-faktor yang mempengaruhi pendapatan usahatani jahe. *Social Economic of Agriculture and Agribusiness*, 9(9), 1-15.
- Siregar, B. C., & Ginting, M. J. 2016. Analisis Usahatani Ubi Kayu (*Manihot esculenta*) Studi Kasus: Desa Marihat Bandar, Kecamatan Bandar, Kabupaten Simalungun. *Journal of Agriculture and Agribusiness Socioeconomics*, 4(12), 94964.
- Soekartawi. 2016. Analisis Usahatani. UI Press. Jakarta.
- Subhan, M., Setiawan, I., & Setia, B. 2020. Analisis Keberlanjutan Usahatani Buah Naga Berbasis Komunitas. *Jurnal Ilmiah Mahasiswa Agroinfo Galuh*, 7(2), 380-386.
- Sugiyono. 2012. Teknik pengambilan sampel purposive adalah teknik penentuan sampel dengan pertimbangan tertentu. Dalam penelitian ini peneliti akan menetapkan beberapa kriteria sampel.
- Sugiyono. 2009. Metode Penelitian Pendidikan Pendekatan Kuantitatif, Kualitatif, dan R&D. Alfabeta; Bandung.
- Syafruddin. 2003. Potensi dan kesesuaian lahan untuk pengembangan pakan ruminansia di lembah Palu. Prosiding Seminar Nasional Teknologi Peternakan dan Veteriner. Bogor,
- Thamrin, Muhammad., Ainul Mardhiyah dan Samsul Efendi Marpaung. 2013. Analisis Usahatani Ubi Kayu (*Manihot utilissima*). *Jurnal Agrium*, Vol. 18 (1): 57 – 63