# Financial Analysis of Citrus "Keprok 55" In Conventional Way and Using Sprinkler Irrigation

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## ABSTRACT

Batu-Malang Government area is one of central production of citrus"Keprok 55" in East Java. In the dry season, citrus produces low production level, because there is insufficient water inside the soil. Based on this fact, some efforts is needed to increase the citrus production especially to face the dry season, through sprinkle irrigation system to increase citrus production. Sprinkle irrigation system has been installed on a citrus plantation in Selorejo Village, Batu.

Citrus is one of the horticultural commodities which have priority to be developed. One type of citrus that favored consumers are mandarin (tangerine). During the period 2005-2009 tangerine imports reached 504.063 tons or about 100.813 tons per year with a value of US $ 80,569,300. Management of commodity Citrus 55 in Selorejo village, subdistrict Dau, Malang does not get maximum benefit due to the limitations of the use of technological innovation as well as the lack of capital. The experiment calculated HPP, BEP, NPV, R / C ratio, IRR, and PP. This study was to compare the effect of management changes Citrus 55 between conventional and sprinkler irrigation. The financial viability of commodity management Citrus 55 in Selorejo Village declared eligible to run either conventionally or with sprinkler irrigation. Age commodity management business is ten years. Conventional management NVP value is IDR 1,234,468,408 and the value of NVP management with the use of sprinkler irrigation is IDR 5,200,599,957. PP value of conventional management is 5 years 2 months and sprinkler irrigation is 2 years and 5 months. Conventional management IRR value is 59.47% and value of management use sprinkle is 68.08%. R/C Ratio with conventional management is 1.4 and value R/C Ratio with sprinkle is 5.7. BEP value with management conventional is 5,719 Kilograms and with sprinkle is 16,059 Kilograms. HPP value with management conventional is IDR 784 and with sprinkle is IDR 191.

**Keywords:** Financial, Citrus 55 Batu, Conventional, Sprinkle.

## INTRODUCTION

Design and sprinkle irrigation system engineering technology that can be done on farmer scale still not been implemented, so that a reliable sprinkle irrigation system design is required. The advantage of sprinkler irrigation system is expected to stimulate flowering system, besides to water delivery methods, it is also expected to be used as a method of fertilization, and pest and disease eradication (Herman, 1991; Merriam, 1991).

Farmers have never achieved enhancement production of citrus 55 by the long dry season; it is because of the lack of water in the dry season, and it is a major obstacle to the successful production of citrus 55 crops in Batu-Malang. By sprinkle irrigation system design and engineering technology research, it is expected to create

a new technology that can boost horticultural farmers, especially to increase citrus 55 production, especially in the dry months so that the production will be the same as at the end of rainy season.

Batu-Malang region is a one of central production of citrus. Citrus 55 cultivation requires soil and plants maintenance, at the end of the rainy season, Citrus 55 crops are high productive because of adequate water in the ground. Otherwise, production in the long dry season is relatively small, this is due to the water in the soil is not sufficient for growth, besides too low production during the dry season, citrus 55 quality production is also not as good as when water is adequate.

Common problems that always faced by a group of citrus 55 farmers in Batu is a water problem, which only relies on rain shower, which every year is not always the same size. So, during the dry season, the low availability of soil water resulted in a significant drop and the quality of the fruit, as well as a decreasing in the production of citrus 55 drastically, reaching 40-45% (Data Statistik, 2005). On the other hand, in the dry season, citrus 55 price is relatively high, this situation encourages the citrus 55 farmer community in Batu to increase their production in the dry season, but constrained by the problems of water availability. Therefore, it is necessary to introduce new technology, such as sprinkler irrigation system. The technology might be more efficient to utilize water consumption, which is stabilized production either by the end of the rainy season and the dry season.

## MATERIALS AND METHODS

The financial analysis which are calculated in this study is the HPP (Main Production Cost), BEP (Break Event Point), NPV (Net Present Value), R/C Ratio (Business Efficiency), IRR (Internal Rate of Return) and PP (Payback Period). Main Production Cost (HPP) was calculated using formula as follows:

$$HPP = \frac{Total\ Cost}{Total\ Production}$$

*Break Event Point* (BEP) analysis is an analytical technique to study the relationship between fixed costs, variable costs, profits and volume of activities that occur in business. Break event is one situation where total revenue is the same as the total cost (Halim, 2009). Business Efficiency (R/C Ratio) Calculating Business Efficiency (R/C ratio) using formula as follows:

$$RC = \frac{TR}{TC}$$

The formula explanation as follow TR = P x Q;
TC = TFC − TVC;
TR  : Total Revenue;
TC  : Total Cost;
P    : Price;
Q    : Quantity;
TFC : Total Fix Cost;
TVC : Total Variable Cost.

Testing criteria using R/C ratio are as follows:
R/C < 1: Inefficient and detrimental business.

Where,
R/C = 1: Not profitable and not detrimental business and;
R/C > 1: Efficient and profitable business. The Net Present Value (NPV) was calculating Net Present Value using formula as follows:

$$NPV = \sum_{i=1}^{n} \left( \frac{NB_i}{(1+i)^n} \right)$$

The Formula explanation is NBi = Net Benefit (benefit cost) = Benefit - Cost;

I  =  Discount factor;
N  =  Time (year).

If the result of the calculation of NPV is greater than 0 (zero), it means the business/project is feasible to be implemented and if it is smaller than 0 (zero) is not feasible. The results of the NPV calculation is equal to 0 (zero) this means the business is at break-even point (BEP) where TR = TC in the form of present value.

*Internal Rate of Return (IRR)* is the discount rate when the NPV equal to zero and expressed as a percent, with the following formula:

$$IRR = i_1 + \frac{NPV_1}{NPV_1 - NPV_2} \times (i_2 - i_1)$$

The formula explanation is $i_1$= discount rate that results in NPV 1 (low discount rate);

$i_2$ = discount rate that leads to NPV 2 (high discount rate);

$NPV_1$ = present value of the additional net benefit flows on $i_1$.

$NPV_2$ = present value of the additional net benefit flows on $i_2$;

If the IRR of a project is greater than or equal to the applicable discount rate, the project is feasible. However, if the IRR of a project smaller than the applicable discount rate, the project is not feasible.

*Payback Periode (PP)* is investment appraisal by measuring the payback period of the investment costs and the net negative benefit, through nett revenue. The bases used in the cash flow calculation, so that the calculation method used is the discounted payback period. The faster the payback period of the investment costs and the net negative benefit, the better the project to be implemented. General formula that used to calculate the payback period is as follows:

$$PP = \left(t + \frac{b - c}{d - c}\right) x 12 \ months$$

The formula explanation is:

t = End of the year where the total of net cash are not reaching initial investment yet;

b = Initial investment;

c = The total of net cash inflow at the time t;

d = The total of net cash inflow at the time t+1.

## RESULTS AND DISCUSSION

### Study Area Description.

The total area of Selorejo Village is approximately 39.5 hectares with an agricultural area of 410.476 hectares consisting of agricultural soil types, fields, livestock and crops. Forest area are 2068.1 hectares scattered around the village. Topography Selorejo classified as hilly plateau area with an area of hills reaching 333.76 Ha. It is estimated the altitude of the village between 650-1200 m asl (above sea level) and has the highest average rainfall are over 100 mm/year (Bagus, 2012).

The selected data soil characteristics suitable for the soil conditions at the sites. The physical analysis had been done before to a class of land, pF water content, porosity and infiltration observations using three soil samples were obtained from the research field sites. Soil sampling in the field for the determination of water content pF can only be done at a depth of ± 50 cm. Data regarding total soil moisture available to the class dusty clay taken from the relevant literature is based on research that has been conducted on various types of soil grade. Land in the study site is dominated by the texture of the dust with an average composition of 56.33%, 23.67% sand and 20% clay so categorized as dusty clay class.

### Investments Cost Requirement of Citrus 55 in Conventional Way.

The cost of citrus business consisting of citrus 55 investment costs conventionally in

the Selorejo Village Subdistrict Dau for one hectare is IDR 183,150,000 used for garden equipment and citrus 55 land cost. The cost of land is IDR 150,000,000 assumed purchases in 2000. Fixed cost IDR 19,172,500 which consist of the workers salaries for citrus cultivation, workers salaries for irrigation, workers salaries for pruning, fertilizing and for the cost of land and building tax. Variable costs incurred for the cost of organic fertilizers and fungicides and insecticides are around IDR 24,955,500. Famers depreciation costs IDR 6,250,000 at the cost of the plantation.

The investment costs incurred by using sprinkler irrigation IDR 638,275,550 were used for irrigation (watering), garden tools and citrus 55 land. Fixed costs are IDR 15,722,500 consisting of salary costs citrus cultivation workers, salary for irrigation workers, salary for pruning workers, salary for fertilizing employees and for the cost of land and building tax. Variable expenses incurred for the cost of organic fertilizer, fuel (gasoline) as well as fungicides and insecticides IDR 25,555,500. Depreciation costs with the irrigation are IDR 37,250,000 of the expense of the plantation and the cost of sprinkler irrigation.

**Table 1.** Investment cost in Conventional way and using Sprinkler Irrigation citrus 55.

| No | Conventional | | | Sprinkler Irrigation | | |
|---|---|---|---|---|---|---|
| 1 | Investment cost | IDR | 183,150,.000 | Investment cost | IDR | 638,275,550 |
| 2 | Fixed cost | IDR | 19,172,500 | Fixed cost | IDR | 15,722,500 |
| 3 | Variable cost | IDR | 24,955,500 | Variable cost | IDR | 25,555,500 |
| 4 | Depreciation | IDR | 6,250,000 | Depreciation | IDR | 37,250,000 |

*Source: Calculation, 2016.*

**Farmers Income in Conventional Way vs. Using Sprinkler Irrigation**

Citrus 55 production in Selorejo village carried out once a year in May to June. In 2015, the harvest obtained by farmers citrus 55 of 56.250 kg with the amount of sales revenue of IDR 487,959,500. Yields will be sold divided into three classes, namely class AB at a price IDR 10,000 as much as 45%, grade A at a price IDR 8,500 by 35% and class BC at a price of IDR 6,000 as much as 20% of the total harvest. Citrus 55 class divisions classified by size and quality of the citrus. Class AB including grapefruit, citrus Class A including moderate and BC classes including small orange.

Citrus 55 production using sprinkler irrigation harvesting about 215,743 kg with an income of IDR 1,871,563,000. Before get sold they are classified into three classes, there are class AB at a price IDR 10,000 as much as 45%, grade A at a price IDR 8,500 by 35% and class BC at a price of IDR 6,000 as much as 20% of the total harvest. Citrus 55 class divisions classified by size and quality of the citrus. Class AB including grapefruit, citrus Class A including moderate and BC classes including small orange. Revenue details Citrus 55 can be seen in Table 2.

**Table 2.** Revenue Details of Citrus 55.

| Class | Conventional | | | Sprinkler Irrigation | | |
|---|---|---|---|---|---|---|
| | Price | Kg | Amount (IDR) | Price | Kg | Amount (IDR) |
| AB (45%) | 10,000 | 25,312 | 253,120,000 | 10,000 | 97,084 | 970,840,000 |
| A (35%) | 8,500 | 19,687 | 167,339,500 | 8,500 | 75,510 | 641,835,000 |
| BC (20%) | 6,000 | 11,250 | 67,500,000 | 6,000 | 43,148 | 258,888,000 |
| **Total** | | **56,250** | **487,959,500** | | **215,743** | **1,871,563,000** |

*Source: Calculation, 2016.*

Financial aspects are needed to assess the needs of the funds necessary for the commodity management of citrus 55. The financial aspects are analyzed the cost of production, Break Event Point (BEP), business efficiency (R/C), Net Present Value (NPV), Internal Rate of Return (IRR) and Payback Period (PP). To calculate the amount HPP, BEP and the R/C ratio it is important to know the details of the fixed costs and variable costs. In Table 3 shows the details of the financial analysis citrus 55 farmers and using sprinkler irrigation.

**Table 3.** Financial Analysis Details of Citrus 55 in Conventional Way and Using Sprinkler Irrigation.

| Financial Analysis | Conventional | | Sprinkler Irrigation | |
|---|---|---|---|---|
| HPP | IDR | 784 | IDR | 191 |
| BEP (Q) | | 5,719 Kg | | 16,059 Kg |
| BEP (Rp) | IDR | 32,159,376 | IDR | 17,617,551 |
| R/C ratio | | 1.4 | | 5.7 |
| Profits | IDR | 17,617,551 | IDR | 195,392,071 |
| NPV | IDR | 1,234,468,408 | IDR | 5,200,599,957 |
| NPV (0 year) | IDR | -183,150,000 | IDR | -638,275,550 |
| 1 | IDR | 13,726,838 | IDR | 139,652,722 |
| 2 | IDR | 68,059,333 | IDR | 329,505,000 |
| 3 | IDR | 125,460,613 | IDR | 529,989,955 |
| 4 | IDR | 188,090,598 | IDR | 748,710,210 |
| 5 | IDR | 255,967,908 | IDR | 985,682,305 |
| 6 | IDR | 329,093,873 | IDR | 1,240,907,470 |
| 7 | IDR | 407,468,493 | IDR | 1,545,235,705 |
| 8 | IDR | 491,091,768 | IDR | 1,836,967,010 |
| 9 | IDR | 579,963,698 | IDR | 2,146,951,385 |
| 10 | IDR | 674,084,283 | IDR | 2,475,188,830 |
| IRR | | 59.47% | | 68.08 % |
| PP | | 5 years 2 months | | 2 years 5 months |

*Source: Calculation, 2016.*

**Main Production cost for Citrus 55 in Conventional Way Condition.**

The cost of citrus 55 obtained from the total production costs divided by the number of production for one year. The total cost is the sum of fixed cost and variable cost. The main production price of citrus 55 is IDR 784. calculation of citrus 55 from farmers are as follows:

$$= \frac{Total\ Cost}{Total\ Production\ For\ 1\ Year}$$

$$= \frac{IDR\ 44,128,000}{IDR\ 56,250}$$

$$= 784$$

Table 4 are the calculation of the costs incurred by citrus 55 farmers. The selling price is a number of expenses incurred entrepreneurs to produce goods or services coupled with the presentation of the desired profit employers. To determine a number of profits earned by the entrepreneur can use the markup. According to Subanar (2001) the amount of markup level producers directly to consumers by 20%, if through an agent or retailer markup of 40% and when the retailer sells products to end consumers set a markup could reach 70%. Mark up used in a citrus 55 is 40%, so we get the selling price per kg of citrus 55 is IDR 1,097.

**Table 4.** Cost Calculation of Citrus 55 in Conventional Way.

| No | Type | Amount |
|----|------|--------|
| 1 | Fixed Cost (FC) | 19.172.500 |
| 2 | Variable Cost (VC) | 24.955.500 |
|  | **Total** | **44.128.000** |
| 3 | Total Production in 1 year (Q) (unit) | 56.250 |
| 4 | Variable Cost Per Unit (VC/Q) | 443 |

*Source: Calculation, 2016.*

**Main Production cost for Sprinkler Irrigation utilization.**

The amount of the cost citrus 55 production with using sprinkler irrigation is IDR 191. The cost of production with using sprinkler irrigation is smaller than the value of main production cost without the use of sprinkler irrigation; this is because the fixed costs are not higher and the amount of production that is highly increased by 215,743 kg. The cost of production with using sprinkler irrigation is smaller than without using sprinkler irrigation showed that their profit, this means by using sprinkler irrigation, the main cost production of citrus 55 can be reduced. In Table 5 can be seen the calculation of costs incurred citrus 55 with the use of sprinkler irrigation. The selling price of citrus 55 with using sprinkler irrigation are IDR 1,097. This price is adjusted with citrus 55 farmers prices.

**Table 5.** Cost Calculation of Citrus 55 Using Sprinkler Irrigation.

| No | Type | Amount |
|----|------|--------|
| 1 | Fixed Cost (FC) | 15.722.500 |
| 2 | Variable Cost (VC) | 25.555.500 |
|  | **Total** | **41.278.000** |
| 3 | Total Production For 1 Year (Q) (unit) | 215.743 |
| 4 | Variable Cost Per Unit (VC/Q) | 118 |

*Source: Calculation, 2016.*

**Break Event Point(BEP)**

Break Event Point (BEP) can be defined as a point or a situation where the entrepreneurs within its operations have nothing to gain and not a loss, in other words on the state of the gain or loss equal to zero. Break Event Point (BEP) is influenced by fixed costs (fixed cost), variable costs (variable costs) and the selling price per unit. The value of BEP (Q) citrus 55 is 5,719 units and BEP (IDR) is IDR 32,159,376. This means that entrepreneurs will have a

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profit after successfully selling citrus 55 as many as 5,719 units or IDR 32,159,376.

The amount of BEP (Q) with using sprinkler irrigation is 16,059 units and BEP (IDR) is IDR 17,617,551. This means that the company will have a profit after the company managed to sell the product at 16,059 units or IDR 17,617,551. Based on these data it can be seen there is a difference the value of BEP (Q) and BEP (IDR) between the farmers and the use of sprinkler irrigation, where the BEP with using sprinkler irrigation is smaller compared to without using sprinkler irrigation. It is heavily influenced by fixed costs, variable costs and the selling price per unit.

### Business Efficiency (R/C).

Business efficiency (R/C) is the ratio between the total receipts (revenue) at a total cost (cost). Business efficiency can be used as a benchmark or considerations and resource information to determine the policy in business development. The value of business efficiency citrus 55 is 1.4. R/C is greater than one indicates a citrus 55 businesses are eligible to run. Business efficiency criteria is if the R/C is greater than one, then the business is eligible to run, if the R/C is equal to one then venture to say not profitable and is not harmful, and if the R/C is less than one, then the business is not eligible to run. Income generated from the production of citrus 55 is IDR 17,578,250.

Business efficiency citrus 55 value with using sprinkler irrigation is 5.7. This indicates that the Business efficiency of citrus 55 with using sprinkler irrigation are feasible. The amount of profit generated from the production of tangerines 55 with the use of sprinkler irrigation is IDR 195,392,071. Citrus 55 profit generated by the use of sprinkler irrigation is greater compared without using sprinkler irrigation, this is because the production cost with the use of sprinkler irrigation is smaller compared without using sprinkler irrigation. The use of sprinkler

irrigation can increase the profits of commodity management citrus 55 in the Selorejo village.

### *Net Present Value* (NPV).

An important variable in the formula for calculating NPV is cash flow or cash flow. The use of cash flows in the calculation of NPV due to be able to generate additional profit it must have the cash to be reinvested so that the need for cash flow calculations. According to James (2004), the cash flow is method of research and selection of investment projects to adjust the cash flow at all times in accordance with the time value of money. Cash flow is calculated for evaluation of the project. Commodity age at management of citrus 55 business is ten years so the value of the cash flow in year zero is minus IDR 183,150,000 which is an initial investment cost of business. Great value of net cash flow for the first year is IDR 13,726,838, the second year is IDR 68,059,333, the third year is IDR 125,460,613, IDR 188,090,598 at fourth year, fifth year is IDR 255,967,908, the sixth year amounted to IDR 329,093,873, the seventh year is IDR 407,468,493, eight year amounted to IDR 491,091,768, the ninth year is IDR 579,963,698 and for ten years are IDR 674,084,283. The difference value of net cash flow each year due to inflation, the amount inflation rate used is 47.75%. The calculation of income tax range from 0-50 million by 5%.

Net Present Value (NPV) is one method of discounting cash flows using a discount rate. Discount factor value (DF) amounted to 11.75%, an interest rate based on Bank Negara Indonesia (BNI) limited company in May 2015. The value of NPV tangerine 55 is IDR 1,234,468,408. NPV is greater than zero, so tangerine 55 are feasible to run. This is according to Abraham (2009) which states that if the calculation of net present value is greater than zero, said the business is feasible to be implemented. Details of the commodity management NPV calculation citrus 55 can be seen in Table 6.

**Table 6.** NPV Calculation of Citrus 55 Commodity Management in Conventional Way.

| Years | Net Cash Flow (IDR) | Discount Factor (11.75%) | Present Value (IDR) |
|---|---|---|---|
| 0 | **-183,150,000** | 1.00 | **-183,150,000** |
| 1 | 13,726,838 | 0.8948 | 12,282,774 |
| 2 | 68,059,333 | 0.8007 | 54,495,107 |
| 3 | 125,460,613 | 0.716567991 | 89,901,059 |
| 4 | 188,090,598 | 0.641224153 | 120,608,234 |
| 5 | 255,967,908 | 0.573802374 | 146,874,993 |
| 6 | 329,093,873 | 0.513469686 | 168,979,727 |
| 7 | 407,468,493 | 0.459480704 | 187,223,909 |
| 8 | 491,091,768 | 0.411168415 | 201,921,423 |
| 9 | 579,963,698 | 0.367935942 | 213,389,489 |
| 10 | 674,084,283 | 0.329249165 | 221,941,687 |

*Source: Calculation, 2016.*

The amount of net cash flow by the use of sprinkler irrigation for years to zero at minus IDR 638,275,550. The amount of value cash flow for the first year is IDR 139,652,722, the second year is IDR 329,505,550, the third year is IDR 529,989,955, the fourth year is IDR 748,710,210, fifth year is IDR 985,682,305, the sixth year is IDR 1,240,907,470, the seventh year is IDR 1,545,235,705, eight years is IDR 1,836,967,010, the ninth year of IDR 2,146,951,385 and year to ten at IDR 2,475,188,830. Inflation rate used at 56.35%.

Net Present Value (NPV) with the use of sprinkler irrigation are IDR 761,273,973. NPV with the use of sprinkler irrigation is also calculated with using same interest rate with without the use of sprinkler irrigation at 11.75%. NPV value with the use of sprinkler irrigation is greater than zero so that the business is feasible. The calculation of income tax at a range from 50-250 million by 15%. Details of the calculation of NPV citrus 55 with the use of sprinkler irrigation can be seen in **Table 7**.

**Table 7.** NPV Calculation of Citrus 55 Commodity Management using Sprinkler irrigation.

| Years | Net Cash Value (Rp) | Discount Factor (68,1%) | Present Value (Rp) |
|---|---|---|---|
| 0 | -638.275.550 | 1,000 | -638.275.550 |
| 1 | 139.652.722 | 0,59488 | 83077169,54 |
| 2 | 329.505.000 | 0,353886 | 116607526,3 |
| 3 | 529.989.955 | 0,210521 | 111574384,1 |
| 4 | 748.710.210 | 0,125235 | 93765462,86 |
| 5 | 985.682.305 | 0,0745 | 73434204,22 |
| 6 | 1240907470 | 0,044319 | 54996255,17 |
| 7 | 1545235705 | 0,026364 | 40739973,35 |

| Years | Net Cash Value (Rp) | Discount Factor (68,1%) | Present Value (Rp) |
|-------|--------------------|-----------------------|-------------------|
| 8 | 1836967010 | 0,015684 | 28811087,37 |
| 9 | 2146951385 | 0,000933 | 20031468,55 |
| 10 | 2475188830 | 0,00555 | 13738243,26 |

Source: Calculation, 2016.

**Internal Rate of Return (IRR).**

Internal Rate of Return (IRR) is the discount rate that equates the present value of future net cash flows from the investment business with the initial cash outflow. IRR value not directly obtained but through a process of trial and error, namely by looking for value NPV at a specific interest rate chosen at random and then the results were compared with the cost of the investment. In the IRR calculation, citrus 55 got discount factor 59.5% to produce a negative NPV value amounting NPV2 - IDR 825,862 and the value of IRR citrus 55 were 59.47%. IRR citrus 55 is feasible because the IRR value obtained is greater than the interest rate is 11.75%. This is according to Abraham (2009), if the results of the calculation of the IRR is higher than the interest rate (discount factor) means that the business is feasible.

The amount of discount factor for citrus 55 with using sprinkler irrigation was 68.1% for NVP produce a negative value amounting NPV2 - IDR 1,499,775 and IRR tangerine 55 with the use of sprinkler irrigation is 68.08%. IRR citrus 55 with the use of sprinkler irrigation can be said to be feasible because the IRR is greater than the interest rate of 11.75%.

**Payback Period (PP).**

Payback Period (PP) is a method used to calculate the long payback period of investment in one year. The length of time the investment return citrus 55 is 5 years 2 months. Based on these data it is known that citrus 55 payback period is smaller than the age of the business, so the citrus 55 business either with using sprinkler irrigation and without using of sprinkler irrigation are feasible.

The length of the payback period on citrus 55 with the use of sprinkler irrigation are 2 years 5 months. Based on these data it is known that the payback period with the use of sprinkler irrigation is also feasible to run because the PP value are smaller than the age of the business.

**CONCLUSION**

Citrus 55 commodity management business in the Selorejo village, sub-district Dau, Malang Regency either in a conventional way or with the use of sprinkler irrigation are feasible financially. The value of R/C ratio of the commodity management tangerine 55 in a conventional way are 1.4 and commodity management citrus 55 with the use of sprinkler irrigation are 5.7. The value of R/C ratio are both feasible because its bigger than one. NPV value of commodity management citrus 55 in conventional way is IDR 1,234,468,408 and the value of commodity management NVP citrus 55 with the use of sprinkler irrigation is IDR 5,200,599,957. NPV of commodity management citrus 55 are both feasible because the value of NVP are over 0. IRR commodity management citrus 55 in conventional way is 59.47% and the value of IRR management of commodity citrus 55 with the use of sprinkler irrigation is 68.08%. Both IRR are feasible because it is larger than the value discount factor (11.75%). Payback Period or length of investment returns of commodity management citrus 55 in conventional way is 5 Years 2 Months and

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commodity management citrus 55 with the use of sprinkler irrigation 2 years 5 months. The value Payback Period are both feasible to run because the payback period value are smaller than the age of the business.

### REFERENCES

Bagus, Andika N. 2012. Desa Wisata Selorejo (Dau). http://andikaselorejodau.blogspot.com Diakses 24 Juli 2016 pukul 11.28 AM WIB.

Herman, D. F. 1991. *Fluid Dynamic of Sprinkle System. In Design and Operation Irrigation System.* Trans of ASAE. American J.

Ibrahim, H. M. Y. 2009. Studi Kelayakan Bisnis. Penerbit Rineka Cipta. Jakarta

James C, Van Home. 2004. *Fundamentals of Financial Management*. Finansial Times Prentice Hall. England. ISBN: 978-0-273-68598-2

Klimek, A., S. Rolbiecki., R. Rolbiecki., D. Hilszczańska, and P. Malczyk, 2011. Effects of Organic Fertilization and Mulching under Micro-Sprinkler Irrigation on Growth and Mycorrhizal Colonization of European Larch Seedlings, and Occurrence of Soil Mites, *Pol. J. Environ. Stud.* 20 (5): 1211-1219

Kobaissi. A. N, A. A. Kanso, H. J. Kanbar, and V. A. Kazpard, 1013. Morpho-physiological changes caused by soil compaction and irrigation on *Zea mays* Eurasian *Journal of Soil Science* 2 (2013) 114 – 121.

Subanar, H. 2001. Manajemen Usaha Kecil. Edisi Kesatu. BPFE. Yogyakarta.