

Production Potential and Product Diversification to Increase Farmer's Business Capacity of Gondang Manis Rose Apple (*S. Malaccense*) in Jombang Regency East Java

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Abstract. Gondang Manis has a potential in superior fruit quality, a high production with 3 times harvest in a year. However, economically, it has not given an impact to the farmer's earnings. The productivity of the fruit production at the age of 4 reaches 100-200 kg. If the average of a tree produces 200 kg / tree/year and the price of guava in 2016 was around Rp 10.000,- per kilogram at the farmer, then one plant produces approximately Rp 2.000.000,-. Gondang Manis Rose Apple can be processed into an utilitarian food products because of its high content of vitamin C and anti oxidants. The examples of processed products are syrup, juice, jam, candy jelly, sweets and ice cream. 1 kg of fruit produces 400 cup juice of 100 ml with the price Rp 2000,- each cup. The income generated by the farmers from 1 tree increases 135% to Rp 8.000.000. The business absorb female direct labor as well as increase the village-owned enterprise capacity building.

Keywords: Guava, Gondang Manis, Functional food

INTRODUCTION

S. malaccense is a fast-growing tree, which reaches between 12 m to 18 m when fully grown-up (Fig. 1a). It has an erect stem and pyramidal or cylindrical crown. The green leaves are the opposite, short-petiole, *elliptic lanceolate* or *oblanceolate*, they have a length of 15-45 cm and a width of 9 to 20 cm. The flowers are abundant, somewhat fragrant, and are covered on the top stem; and along the adult branch is the leafless part of. The flowers grow in a cluster that runs consist of 2 to 8 in pink to dark red (Martin et al., 1987).

The fruit (figure 1b) is rectangular, obovoid or bell-shaped. The length is between 5 to 10 cm and the width is 2 to 8 cm. The skin is red and smooth. The fruit is white and juicy, with a sweet taste that resembles the taste of green grapes. It has a light brown seed and the diameter is around about 2 cm. Each fruit weighs about 39 ± 2 g. Most of the weight comes from the flesh (30 ± 2

g), followed by seeds (7 ± 1 g) and skin (3 ± 1 g) (Augusta et al., 2010)

In Indonesia, the flowering phase of *S. malaccense* occurs in May and June; the fertilization is in August and September. After the flowers open perfectly, the fruit will ripe in 60 days. *S. malaccense* fruit will easily fall and break when harvested. *S. malaccense* is not a source of vitamins, but the B1 and B2 vitamins can be compared with the fruit in general. The flesh of guava can reach 75% (Fernandes and Rodrigues, 2018). Batista's research (2017) about the content of *phenolite*, *caratenoit* and antioxidants showed that the content of bioactive compounds in the fruit can be correlated with hydrophilic antioxidants.

Agustina, et al (2010) reported in her study, 8.05% consists of rind and fiber-rich (9.34 g.100 g-1), vitamin C (292.59 mg.100 g-1), and *anthocyanin* (300.54 mg.100 g-1 skin). The pH value of 3.5 allows it to be categorized as a highly acidic food and suitable for jam, or juice to improve the crops. *Syzygium malaccense* shows a physical characteristic that make it industrial for fresh fruit, juices, jams, nectar and ice cream, and its skin shows a physical and chemical property that allow it to be used as a food and dye antioxidants and also to enrich diet. Based on these, by knowing the potential of Rose Apple fruit with *Syzygium malaccense* in Jombang Regency, it will help to increase the selling value and increase the economic value for the rose apple farmers.



Figure 1. Tree (1a) and fruit (1b) *Syzygium malaccense*

METHOD

The research was conducted in Gondang Legi, Prayungan, and Gondang Manis village, Bandar Kedungmulyo sub-district, Jombang regency. The data were collected by interviewing the farmers of Rose Apple. Descriptive analysis was employed by observing the conditions on the site and with the previous literature review and studies.

RESULT AND DISCUSSION

Area Potential

Bandar Kedungmulyo sub-district has a very strategic location, because it is located in the west-central part of Jombang regency and crossed the main road of Surabaya-Madiun. The area is bordered with Perak sub-district in the east, Kediri in the east, Nganjuk in the west, and Megaluh in the north. Geographically, Bandar Kedungmulyo sub-district is located between 1120 06' 37" west longitude to 1120 10' 30" east longitude and 070 31 '39 " north latitude and 070 36' 49" south latitude, with an area of 32.49 km². With an area of 3,250 ha, Bandar Kedung Mulyo district is a lowland with altitude <700 m above sea level which has slope <8%. It has a hot soil temperature regime (*Isohyperthermic*) and a wet moisture regime (*aquic*) if it is administered. The climate condition in the area is moderate with 3-4 months monsoon and 5-6 months of dry season. In general, Bandar Kedung Mulyo district has a great potential for agricultural development.



Figure 2. Map of Bandar Kedung Mulyo Subdistrict

Population Potential

Rose apple planting centers are scattered over East Java, West Java, Central Java and Yogyakarta. Rose apple does not yet become a commodity that is developed to plantation scale; it is generally grown as home garden plant only. In Java island, it is estimated that the amount of trees reaches 879,533 (BAPPENAS, 2000).

Jombang Regency has not been said to be the center of Rose Apple production, but with the characteristic that can arise because the influence of geographical and climate (environment) factors can support the increase of farmer's income and prosperity. Based on table 1, the number of trees in Jombang reaches 942 trees; they are scattered over 3 villages in Bandar Kedungmulyo sub-

district. When compared to the estimated number of trees in East Java, Jombang only provides 0.11% of them. The number is actually not much, but with a proper management and a potential location, *Syzygium malaccense* will have a major impact on society.

Table 1. Number of rose appletree in Bandar Kedungmulyo District

Village	Number of farmer	Number of tree	Average
Gondang Legi	18	369	20,5
Prayungan	62	295	4,76
Gondang Manis	99	278	2,8
Total	179	942	

Production Potential

Rose apple fruit can be harvested twice a year, with the second harvest only 50% of the first harvest. The productivity of Cianjur's red rose apple was ranging from 12.48 to 15.6 tons/season/ha or 18.72 - 23.4 tons/year/ha. With a population per ha of 156 trees, the productivity per tree was 120-150 kg/tree/year. The productivity began to decline when the plants reached the age of 30-years-old (BAPPENAS, 2000). The result showed that Rose Apple in Jombang has the potential to harvest 3 times in a year with the average of 100-200 kg/tree/year production potential. This is relatively lower than the production potential in other areas. The average farmers have not cultivated to obtain the best possible results so that production will increase if there is an improvement on the cultivation. Therefore, if the production of Rose Apple in Jombang can be optimized then the total population of existing trees can produce 113.04 - 141.30 kg/year.

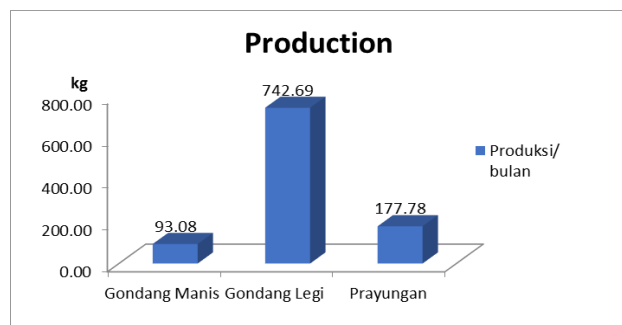


Figure 3 Guava production potential in Gondang Manis Village

The crops of Rose Apple production per year in 3 potential hamlets in Gondang Manis Village is presented on the graph in figure 3. The highest production was in Gondang Manis Village. It is according to the largest population potential in the Gondang Legi hamlet which is 369 trees. Besides, the potential of Rose Apple production in Gondang Legi hamlet is also higher than 2 other hamlets. The average farmer has more than 20 trees and has done the cultivation process that is fertilizing for

Table 2. Analysis of the feasibility of processed food business based on watery Rose Apple

Product	Jam(cup @125ml)	Syrup (bottle @60ml)	Pie/cake(pack @350gr)	Rose apple stick (pouch @350gr)
Number*	20	10	20	30
Unit price (IDR)	6.000	16.000	7.500	7.000
Income (IDR)	120.000	160.000	150.000	210.000
Fix cost (IDR)	28.894	55.630	31.498	42.783
Variable cost (IDR)	51.750	87.250	77.150	127.200
Total cost (IDR)	80.644	142.880	108.648	169.983
profit (IDR)	39.356	7.120	41.352	40.017
HPP (IDR)	40.032	14.288	5.432	5.666
R/C	1,49	1,12	1,38	1,24

Source : Roesali, *et.al.* (2007)

crops so that the average production can reach more than 100 kg/tree/year.

4. Economic potential

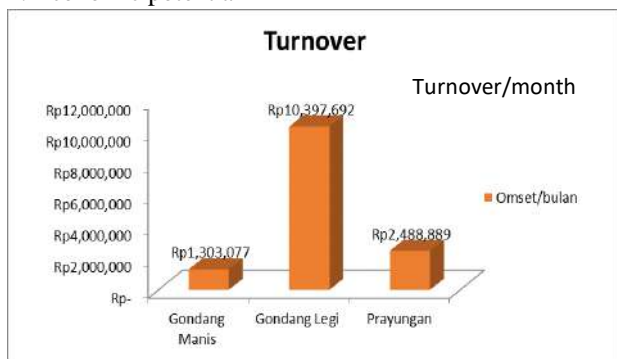


Figure 4 Sales turnover of rose apple Gondang Manis Village

The results of turnover research for the production of fresh fruit are presented in the graph in Figure 4. The results showed that the highest turnover is in Gondang Legi hamlet, with an average of Rp.10.000 per kg of total turnover of each tree, with an average production of 100-200 kg will be generated turnover Rp.1.000.000 up to Rp. 2.000.000,-. A premium fruit worth Rp.17.000 per kg, it is the fruit produced by the process of cultivation and grading so that the turnover can reach Rp. 3.400.000,-/ tree/ year.

Agricultural products diversification is an important mechanism for economic growth. These opportunities depend on diversification products and farmers' responses to the opportunities. Agricultural diversification can be facilitated by technological breakthroughs and or by demand policy (FAO, 2002). Research on feasibility analysis based on product diversification conducted by Roesali, *et al* (2007), some products are produced in table 2 used raw materials of watery Rose Apple. A processed food has an R/ C value of more than 1, which means profitable. The results are also supported by the acceptability of products by consumers through *organoleptic* tests; which the results are well-received. Based on that, in an effort to improve the prosperity of Rose Apple farmers, it is done by

multiplying the economic potential, through the development of product diversification.

Gondang Manis Rose Apple can be processed into utilitarian food product because of the rich of vitamin C and anti oxidant. The examples of processed products are juice, syrup, jam, jelly and ice cream. 1 kg of fruit can produce 400 cups of 100 ml of juice with a price of Rp. 2.000, - each cup. The income generated by the farmers from 1 tree increased 135% to Rp 8,000,000. The business also absorbs the local labor, especially women, and improves the business capacity of *BUMDES* (village-owned enterprises)

CONCLUSION

It can be concluded from the result of that Gondang Rose Apple has a potential to be developed in Gondang Manis village with the transition of technology cultivation and product diversification. The production potential can reach 200 kg/tree/year with the price of Rp 17.000/kg with the turnover of Rp. 3,400,000, -.

Product diversification can increase the farmer income by 135% or Rp.8.000.000, -. As well as increase the absorption of female labor and the business capacity of village-owned enterprises

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