New Farmers’ Incentives under the New Tangerine Farming Support: The Case of Tuban, Indonesia

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ABSTRACT
This research analyzes incentives for new tangerine farmers by different intermediaries in Tuban, Indonesia. Direct interviews and a survey were conducted in 2014 and 2015 with new farmers, Bakul (small local collectors), wholesalers, tangerine middlemen, and the government office. New tangerine farmers in Tuban use three alternative logistic routes: the Bakul and/or wholesalers, the tangerine Tebasan system, and the tangerine Ijon system. This study found that new farmers obtain over twice the margins when they sell tangerines to the Bakul and/or wholesalers compared with farmers who use the tangerine Tebasan system and the tangerine Ijon system. However, some new farmers prefer to use the tangerine Tebasan system or the tangerine Ijon system to obtain immediate cash before harvest terms, to avoid harvesting failure, and to enjoy leisure in summer, although these tangerine farmers gain relatively small margins compared to those who sell tangerines to Bakul and/or wholesalers.

KEYWORDS
New tangerine support program; farmer margins; tangerine Tebasan system; tangerine Ijon system

Introduction
The tangerine and mandarin orange are both citrus reticulata. Their difference is the pericarp color: the mandarin orange is a yellow- to orange-colored pericarp, while the tangerine is orange-red colored. The tangerine is a high-value, popular citrus and has huge market potential in Indonesia (Indonesian Agency for Agricultural Research and Development (IAARD), 2012). The varieties of citrus planted in Indonesia are tangerine (75%), mandarin orange (24%), and other varieties (1%), including pomelo, orange, lemon, and lime. This composition is considered proportionate because current Indonesian consumers prefer tangerines. With increasingly high-quality tangerine imports, Indonesian consumers prefer tangerines (Indonesian Agency for Agricultural Research and Development (IAARD), 2012). Indonesia mainly imports tangerines from China, and these imports have increased significantly in the last decade compared to other types of citrus in Indonesia (Mufidah et al., 2019). However, harvested citrus land decreased from 65,000 hectares in 1994 to 45,000 hectares in 2012 due to citrus greening, also known as Huanglongbing (HLB) disease (Nurhadi, 2015). Since 2010, the government has responded to the increase in imported tangerines and the decrease due to HLB disease by launching a new tangerine farming support program to increase tangerine planting areas in 80 regions in Indonesia (Hanif et al. 2015; Mufidah et al., 2019).

The new tangerine farming support program was designed as an innovation-driven and regional-based program that has three specific scopes of activities: 1) providing and disseminating innovation and encouraging initiation and institutional development; 2) establishing a pilot model of innovation development as a starting point for the realization of citrus agribusiness that emphasizes the use of...
local resources to improve competitiveness; and 3) coordinating the involvement of relevant agencies in upstream and downstream sectors to strengthen cooperation in the development of innovation. This new tangerine farming support aimed to double farmers’ income within five years after the implementation of the program in 2010 (Indonesian Agency for Agricultural Research and Development (IAARD), 2012). The support program aims to recover Indonesian domestic tangerine production and farming job creation in local villages using illegal logging areas in the national land. Most new local farmers under this support program grow tangerines for the first time in many locations, including Tuban.

East Java Province is the largest citrus producer in Indonesia. Tuban, located on the north coast of Java Island in Indonesia in East Java province, is the target city for introducing the new tangerine farming supports and is the pilot project city for developing tangerines in a low land (Figure 1). Citrus fruits produced by Tuban farmers circulate in Tuban and neighboring cities and have high selling values in Indonesia’s fruit market (Sahara et al., 2019). The government lends local villages vast national lands, which are illegal logging fields. In Tuban, which has low rent, new farmers pay low land fees to their villages. This support program in Tuban involves two varieties of tangerine harvests, Tangerine Tejakula and Tangerine Madule. These harvests expanded from 50 hectares in 2010 to 1050 hectares in 2015. Fields cultivated for tangerines increased by approximately twenty times between 2010 and 2015. Before the new tangerine farming supports were applied in 2010, local farmers mainly cultivated corn, cassava, and peanuts in their small fields in Tuban.

The Indonesian Agency for Agricultural Research and Development (IAARD) provides new tangerine farmers with supplies of citrus seedlings, technological cultivation support, and input costs, such as fertilizers, pesticides, and herbicides, until the first harvest. New tangerine farmers cultivate corn (from June to August) and peanuts (after harvesting corn) in their new tangerine farms for supplemental income as agroforestry (Figure 2). New farmers increased their income after the first tangerine harvest in 2013 to 34.5 million Indonesian rupiahs per hectare in 2015. Therefore, the income of new tangerine farmers has more than doubled compared with the 2008 income, although the average new farmer’s income is only fifteen million Indonesian rupiahs. According to the Tuban Agricultural Office, joining tangerine farmer groups has several advantages for new tangerine farmers: these groups reinvigorate farmers’ motivation and facilitate the distribution of government start-up support, including certified seedlings, land acquisition, organic/inorganic fertilizers, and postharvest facilities. One of the essential issues for perennial crop farmers over the long term is the choice of seedlings, which is a significant component of farm profitability (Hasibuan et al., 2019). Therefore, this program supports certified seedlings for all new tangerine farmers.

Figure 1. Location of Tuban, Indonesia. Note: Created by authors.

1Approximately 2,330 US dollars.
Additionally, new tangerine farmers gain an average of 9 million and 5.5 million Indonesian rupiahs per hectare for cultivating corn and peanuts as agroforestry, respectively. Figure 2 shows tangerine farming and other agricultural product cultivation areas. The gray-colored zones between tangerine trees are areas for corn and peanut cultivation. Although the current average new farmer’s income has more than doubled due to the introduction of tangerines, there are income differences among new tangerine farmers due to different selling methods in Tuban. There are three alternative logistic routes: the Bakul and/or wholesalers, the Tebasan system, and the Ijon system. The amount of new farmers’ income depends on the alternative selling route they use. Therefore, this research aims to analyze new tangerine farmer incentives under the three alternative logistic routes in Tuban, Indonesia.

**Tangerine Logistics in Tuban**

Hanif et al. (2015) identified the value chain of Tuban’s citrus fruit logistics, including tangerines. Figure 3 presents a simplified Tuban tangerine logistic route. There are three logistic routes between tangerine farmers and retailers. In the first route, farmers sell tangerines to Bakul and/or wholesalers. The second route is the Tebasan system, in which farmers sell tangerines to intermediaries before harvest. The last route involves using the Ijon system to sell tangerines to middlemen three to four months before harvest.

We collected information on tangerine farming, including harvesting costs and selling prices, from new tangerine farmers, Bakul, wholesalers, middlemen, and retailers in Tuban in August and September 2014 and 2015. The survey participants were new tangerine farmers who had used the support program since 2010; there were a total of eighty-two new tangerine farmers in Tuban. All of the new farmers in our sample were members of a tangerine farmer group, Tani Muyo, which started from this support program. The other two tangerine farmer groups in Tuban are Trubus and Jaya Makmur, which were created two years after the program started. Sixty-five of the eighty-two Tani Muyo farmers used the Bakul and/or wholesalers to sell their tangerine products, while five and twelve
farmers contracted with intermediaries under the Tebasan system and the Ijon system, respectively (Figure 3). Table 1 shows the cost and price information on tangerine logistics in Tuban. There are five specific tangerine labor costs: fertilization, spraying, thinning, surveillance, and harvesting. The input costs are organic and inorganic fertilizers, pesticides, and herbicides. Labor costs constitute approximately 82% of Tuban tangerine farmers’ total cost.

**Route 1: Bakul/wholesalers**

The Bakul is a traditional Indonesian intermediary with a unique product collection and can directly purchase small amounts of tangerines from Tuban farmers. They also purchase other agricultural products from farmers in Tuban. Therefore, new tangerine farmers use Bakul and sell tangerines and other agricultural products that new farmers produce as agroforestry in the tangerine fields. The Bakul then sells the product to local retailers in municipal-level kiosks with a spot market institutional arrangement in Tuban and other neighboring subprovinces, such as Bojonegoro. The Bakul and regular wholesalers are different intermediaries for new tangerine farmers. The Bakul purchases tangerines per kilogram from farmers, while regular wholesalers purchase them per ton. Therefore, most new tangerine farmers choose the Bakul as an intermediary when their products are small and/or they prefer to simultaneously sell other agricultural products, while they use regular wholesalers when they have plentiful tangerine harvests. Interestingly, sales prices to the Bakul and regular wholesalers...
are the same in Tuban because there is no business conflict of sales between the Bakul and regular wholesalers. The Bakul sells a small number of tangerines to local retailers, and regular wholesalers bring tangerines to large cities.

The total cost to farmers is 4,154 Indonesian rupiahs when new farmers use the Bakul and/or wholesalers (Table 1). New farmers spend a total of 3,395 Indonesian rupiahs as their labor cost, including fertilization, spraying, thinning, surveillance and harvesting of tangerine farms, when they sell to the Bakul and/or wholesalers (route 1). The total input cost is 759 Indonesian rupiahs and includes organic fertilizer, inorganic fertilizer, pesticide, and herbicide. According to direct interviews with new tangerine farmers and IAARD, there is no irrigation cost for Tuban tangerine farms since these harvest areas use water only in the rainy season. Under the support program, IAARD instructs all new farmers in fertilizer, pesticide, and herbicide applications.

**Route 2: Tebasan System**

According to surveys and interviews conducted in Tuban in 2014 and 2015, we found a unique operation for tangerine wholesalers using a preharvest procurement system called the tangerine Tebasan system. The Tebasan system is a unique Indonesian system. In rice fields in Java, Indonesia, many rice farmers seek to reduce their harvesting costs, and they sell their rice before harvest to a middleman, a middleman of rice logistics (Hansen, 1981). The penebas purchases mature rice crops and recruits a small number of local laborers to undertake an actual rice harvest (Hansen, 1981). This is the Tebasan system and is a common practice in rural areas in Java, Indonesia (Collier et al., 1973).

Interestingly, this Tebasan system was applied to new tangerine farms under the new farming support programs in Tuban, although IAARD prefers that new farmers do not use the Tebasan system to maintain farmers’ larger margins. In the tangerine Tebasan system in Tuban, some new tangerine farmers choose not to harvest their products since intermediaries owned the tangerine products before the harvest terms (Ton et al., 2018). Upon the middleman’s agreement under the tangerine Tebasan system, new tangerine farmers receive cash immediately from the middleman, while the middleman obtains the harvesting rights to tangerine trees in the fields. If grown tangerine plants are damaged during the agreement period in this system, the penalty fees need to be compensated by the middleman. Since tangerines are perennial plants, the middlemen can harvest tangerine fruit for a particular duration upon agreement (Table 2). The rights to tangerine fields subsequently return to farmers. Under the tangerine Tebasan system, intermediaries hire local laborers to work in spraying, surveillance, and harvesting in the tangerine fields between May and August. When tangerine farmers use the Tebasan system, their labor cost is 3,043 Indonesian rupiahs, which is less than the cost of using the Bakul and/or wholesalers. The total cost to farmers is 3,802 Indonesian rupiahs. The difference between routes 1 and 2 is only the harvesting cost (Table 1).

**Route 3: Ijon System**

An original Ijon system appeared in the middle of the twentieth century in Java. This system is a form of credit that is repayable in agricultural products that are still green. The loan is granted from a local bank (Partadireja, 1974). The advantage of using the Ijon system is improved market access to farmers by reducing costs from cultivation to harvest (Hayami and Kawagoe, 1992). The tangerine Ijon system developed from the original Ijon system, although the original feature of the Ijon system, i.e., a form of repayable credit, is gone. Therefore, the tangerine Ijon system is similar to the tangerine Tebasan system. However, a middleman under the Ijon system owns tangerine products three to four months before harvesting. The difference between the tangerine Tebasan system and the tangerine Ijon system for farmers is the contract term for tangerine farms in Tuban. In the tangerine Ijon system, a middleman needs to manage tangerine
products for a longer period. The middleman obtains management rights to tangerine plants during the period of the contract. The middleman pays new farmers with estimated tangerine prices since the contract is before the harvest season. Usually, a middleman in the tangerine Ijon system hires local laborers to spray tangerine trees in February. Therefore, the middleman manages the field from February and returns the field to the tangerine farmers in September after finishing the harvest (Table 2). Since the middlemen manage the tangerine fields for a longer term under the tangerine Ijon system, tangerine farmers’ labor cost is 2,087 Indonesian rupiahs, and the input cost under route 3 is 512 Indonesian rupiahs. Therefore, the farmer’s total cost is only 2,599 Indonesian rupiahs, approximately 63% of the farmer’s total cost under route 1.

Results

Table 3 shows the calculated tangerine margins of farmers, intermediaries, and retailers in Tuban. The Bakul and/or wholesalers purchase tangerine fruits from farmers, while intermediaries buy the right to harvest tangerines from farmers through the tangerine Tebasan system and the tangerine Ijon system. We assume that all intermediaries sell tangerines to local retailers in this study (Figure 3). Although most regular wholesalers bring tangerines to cities, some sell tangerines to local retailers. The middlemen of the tangerine Ijon system sell tangerine products to both local and city retailers. Therefore, the intermediary selling price to local retailers is the same among routes.

The average new tangerine farmer’s selling prices differ in the different tangerine logistic routes. The selling prices of tangerines to the intermediary are 7,000 Indonesian rupiahs for route 1 (to the Bakul and/or wholesalers), 6,020 Indonesian rupiahs for route 2 (under the tangerine Tebasan system), and 4,023 Indonesian rupiahs for route 3 (under the tangerine Ijon system) (Table 3). Tangerine farmers’ costs are 4,154, 3,802, and 2,599 Indonesian rupiahs and their margins are 2,846, 2,218, and 1,424 Indonesian rupiahs in routes 1, 2, and 3, respectively. Therefore, tangerine farmers who use the Bakul and/or wholesalers have the most significant margins among the selling routes. Under route 2, tangerine farmers’ margin is approximately 78% of that in route 1. Surprisingly, Tuban farmers receive only a half margin under route 3 compared with the margin in route 1. In Tuban, twelve new tangerine
Table 3. Margin analyses of tangerine logistics by scenarios (Rp/kg).

| Route              | Farmer’s Selling Price to Bakul/Wholesalers | Bakul/Wholesalers’ Selling Price to Retailer | Middleman’s Selling Price to Retailer |
|--------------------|---------------------------------------------|---------------------------------------------|--------------------------------------|
| Route 1            | 7,000                                       |                                              | 13,000                               |
| Farmer’s Cost      | 4,154                                       | Purchasing Price from Farmer                | 7,000                                |
| Farmer’s Margin    | 2,846                                       | Additional Cost                             | 400                                  |
|                    |                                             | Intermediary’s Margin                       | 5,600                                |
| Route 2            | 6,020                                       |                                              | 13,000                               |
| Farmer’s Cost      | 3,802                                       | Purchasing Price from Farmer                | 6,020                                |
| Farmer’s Margin    | 2,218                                       | Additional Cost                             | 800                                  |
|                    |                                             | Intermediary’s Margin                       | 6,180                                |
| Route 3            | 4,023                                       |                                              | 13,000                               |
| Farmer’s Cost      | 2,599                                       | Purchasing Price from Farmer                | 4,023                                |
| Farmer’s Margin    | 1,424                                       | Additional Cost                             | 1,200                                |
|                    |                                             | Intermediary’s Margin                       | 7,777                                |

Notes: Source: Authors’ calculation. All numbers in Rp/kg is Indonesian Rupiah per kilogram.

farmers used route 3, the tangerine Ijon system, sixty-five new farmers chose the Bakul and/or wholesalers, while five new farmers used the tangerine Tebasan system. Therefore, the majority of new tangerine farmers perform the harvest themselves to obtain the most significant margins. In contrast, some farmers use the tangerine Tebasan system or the tangerine Ijon system for other incentives to receive direct cash in early summer or before and to avoid paying for harvesting labor in Tuban.

Next, we calculated the intermediary margins by route (Table 3). Again, we assume that all intermediaries sell tangerines to local retailers, and all selling prices to local retailers are 13,000 Indonesian rupiahs. Intermediaries pay additional costs for tangerines before selling to local retailers. The additional costs of the Bakul and/or wholesalers are 400 Indonesian rupiahs, including cleaning, grading, packing, and packaging. Additional costs of the middlemen in the tangerine Tebasan system are 800 Indonesian rupiahs and are related to harvesting, cleaning, grading, packing, and packaging.

In contrast, the middleman’s additional costs under the tangerine Ijon system are fertilization, spraying, thinning, surveillance, harvesting, cleaning, grading, packing, and packaging, for a total of 1,200 Indonesian rupiahs. Therefore, the intermediary margins for routes 1, 2, and 3 are 5,600, 6,180, and 7,777 Indonesian rupiahs, respectively. For intermediaries, route 3 is the most beneficial route since a more significant margin was obtained, even though risks such as citrus disease or harvest failure are higher than for route 1 or 2. New tangerine farmers who prefer the most significant margin use route 1, while farmers who want to compromise choose route 2 with medium risk.

Farmers make different decisions regarding tangerine logistic routes in Tuban, Indonesia. In 2013, there was large tangerine theft in Tuban. Because of this theft case, some tangerine farmers chose the tangerine Tebasan system or the tangerine Ijon system for their sales after 2014. Other farmers select the tangerine Tebasan system or the tangerine Ijon system because of the significant direct amount of cash before the harvesting term (summer). Some of them use this direct cash payment for their loan payments and/or purchase luxury goods such as a new motorbike. Others sell tangerine products to the Bakul and/or wholesalers to earn the highest income.

Conclusions

Tuban tangerine fields covered 1050 hectares in the last year of the support program, 2015, and there were 786 hectares of tangerine fields in 2018. Most new farmers under the support program continued their tangerine agribusiness, with the exception of withering due to drought, after 2015. Additionally, the tangerine fields of the Singgahan subdistrict in Tuban increased from 120 hectares in 2015 to 330 hectares in 2018 (Statistics of Tuban Regency, 2019).
This research analyzes new tangerine farmer incentives by different intermediaries in Tuban, Indonesia. New Tuban farmers use three alternative routes, the Bakul and/or wholesalers, the tangerine Tebasan system, and the tangerine Ijon system, although the new tangerine farming support program recommends that farmers use the Bakul and/or wholesalers. This study found that tangerine farmers obtained over twice the margins using route 1, in which farmers sell the tangerines to the Bakul and/or wholesalers, compared to those who used routes 2 and 3, in which farmers contract with intermediaries in the tangerine Tebasan system and the tangerine Ijon system, respectively. The margins of new tangerine farmers differ among the three routes, and there has been no significant fruit theft in Tuban tangerine fields after 2013. However, some farmers prefer to use the tangerine Tebasan system or the tangerine Ijon system with lower margins because new tangerine farmers’ incentives in Tuban provide higher income and allow them to obtain immediate cash before harvest terms to avoid harvesting failure, purchase luxury goods, and reduce their labor during the summer term.

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