Enhancing red onion agribusiness development: e-planting calendar and production allocation

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Abstract. Red onion farming faces some problems such as unstable price and supply, long marketing chain, weak bargaining position of farmers as well as the quality of the onion. The Toko Tani Indonesia (TTI) program in 2017 attempted to solve the problem. The onions were bought by Lembaga Usaha Pangan Masyarakat (LUPM) at 10% higher price than the market. There were 35tons/year medium-quality onions delivered to TTI, which located in a strategic location to provide consumers with easy access. The long supply chain was reduced to 3 chains (Farmers – LUPM – TTI). A research was conducted in 2018 (West and Central Java Provinces) to study the achievement of the program. Data was collected through the in-depth interview based on a structural questionnaire to 36 individuals related to the program. Results from the qualitative analyzes showed that one expected output namely shortens the supply chain, requires four modifications to be achieved. In conclusion, a packet of technology “E-Planting calendar and production Allocation” should be developed to monitor the implementation of planting and production allocation that could be monitored by related institutions.

1. Introduction
Red onion or shallot has high demand and economic potential but faced mainly five problems such as unstable price and supply, long marketing chain, week bargaining position, and the low-quality caused by the long transportation. The unstable price and supply are caused by its perishable characteristic and the price is very cheap during harvest time and expensive during the low season even though shallots are considered as basic needs throughout the year [1]. There were five variations of the marketing channels; with two up to six chains [2]. To overcome these problems, the Indonesian Government implemented a program called Toko Tani Indonesia (TTI) or Indonesian Farmers Shop [3]. The goals of the program were to stabilize the price and supply, shorten the supply chain, make easy access to buy, and to get a good quality of red onion. The implementation of the program was designed to reach its maximum achievement [4]. Through TTI Program, the red onion production of farmers was bought by a LUPM (Lembaga Usaha Pangan Masyarakat) which is farmers’ Groups and or Union of Farmers’ group who received a Community Food Business Program or Program Usaha Pangan Masyarakat (PUPM). To shorten the supply chain of shallots marketing, the production that had been bought by LUPM should be delivered to Indonesian Farmers’ Shop or TTI, which will sell the onion directly to the consumer. Through this marketing system, the marketing chain only consisted of 3 (three) actors (producers/farmers - LUPM – TTI) and finally consumers.
The actors in the TTI program have their rights and obligations based on the technical guidelines of the TTI program. LUPM received IDR100 million for the capital to buy onion from farmers at price 10% higher than the market and an additional budget of IDR60 million for cash work such as the wages for carrying, sorting, drying, packaging process and the transportation to deliver the shallot to TTI and compensation for price increase of the shallot price. The LUPM’s obligation is to be able to supply shallots at medium quality to TTI as much as 35 tons/year in periodic delivery. While the TTI should be located in a strategic location and has the responsibility to sell the shallot at a certain price according to the reference and only take benefit at about IDR2000; and if the delivered shallot had not been sold out when the LUPM send the following delivery, the shallots were replaced with the new ones that were still in good quality.

The following paper describes the achievements of the TTI program based on the outcome indicators that have been targeted as output indicators of the program, namely: 1) Farmers are guaranteed to get onion price 10% higher than local market price as the reference price; 2) LUPM can carry out a sustainable supply to TTI; 3) The marketing supply chain that only three actors; 4) Consumers could have easy access to buy and get a good quality of shallot and 5) Consumers obtain good price (10%) cheaper compared to the consumer in local market prices. This information would be used to derive a base strategy for the red onion agribusiness development.

2. Methodology

2.1. Theoretical framework

To get a base strategy for the onion agribusiness development, it should be based on two important aspects which were the characteristic of the shallot farming as it might influence the performance/achievement of the farmers’ production and identification of problems faced by the TTI actors in implementing the design of the program as well as how they overcome their problem. At the same time, the achievement of the program should be based on the outcome indicators as designed such as 1) the stable price; 2) stable supply; 3) the shorten of marketing chain only in three actors; 4) better bargaining position of the farmers; 5) consumers have easy access to get onion at a reasonable price and good quality of onion (Diagram 1).

![Diagram 1. Theoretical Frame Work to Get Strategy for Onion Agribusiness Development](image)

2.2. Locations

Shallot production centers are spread across the island of Sumatra (Solok), West Java (Bandung, Majalengka), Central Java (Cirebon, Brebes, Tegal, Kendal, Demak), NTB (Bima), East Java (Pati,
Nganjuk, Probolinggo), and South Sulawesi (Enrekang) [5]. In 2017 the TTI program for shallots was only implemented in four provinces with a certain number of LUPM in each respective province. West Java received support for 13 LUPMs, Central Java 11, East Java 15, and NTB 10. The location of the research was selected on purpose in West and Central Java provinces based on some consideration such as the efficiency in conducting the research namely the timing and ease of access as well as the suitability with the available funding.

2.3. Respondents
The respondents were institutions responsible for the TTI Program at the Province and district level as well as actors of the TTI program. West Java consisted of 7 related institutions, 3 LUPMs, a TTICD, 3 TTIs, and 3 consumers while Central Java consisted of 9 related institutions, 3 LUPM, a TTICD, 3 TTIs, and 3 consumers.

2.4. Data
Data were collected through a survey conducted during 2018. It consisted of secondary data from the related institutions’ report and primary data that collected through a focused group interviews guided by a structural questionnaire with information focused on:

a. The characteristics of the farmers’ farming business
b. The achievement of the LUPM based on the outcome Indicators of the success of the program such as:
   1) Farmers are guaranteed a purchase price of 10% higher from the reference price, determined by the agency in charge of food security at the provincial level.
   2) LUPM can carry out a sustainable supply as measured by the volume to TTI
   3) The ease of access to the red onion that measured by the sales volume at TTI
   4) Consumers obtain a fair food price at a TTI price compared to the consumer level market price at 10% lower than the market price
   5) The provisions of shallot quality are uniformity of variety, the tubers are old enough, with the same level of dryness as dry storage, the water content of 75-85%, and not mixed with dirt.

c. The problem faced during the implementation of the program design and their effort to overcome the problem.
In the analysis of the data, we’re referring to qualitative methods reported by Worthington [6] which explain the differences between Phenomenological Research and a Basic Qualitative Research design as the tool in analyzing the data.

3. Results
A union of farmer group or Gabungan Kelompok Tani (Gapoktan) is a farmers’ institution at the village level with members of several farmers’ group or kelompok tani which exists in a village that is formed as a media for exchanging agricultural technologies to achieve the agriculture development [7]; therefore it was selected as the beneficiary of the PUPM Program which named as LUPM. Table 1 illustrates that the red onion farmers’ group at LUPM in West Java and Central Java were established long before the formal Regulation of the Minister of Agriculture Number 67 / PERMENTAN / SM.050 / 12/2016 about the development of farmer institutions. These provinces continued to be fostered in developing shallot agribusiness considering that these two provinces are the production centers of red onion in Indonesia. In synergy with the age of the farmer groups, the ages and education of farmers also vary widely but the member of the group was not increasing because there were certain rules that the maximum number of a group which is 20 farmers.

In west Java, farmers plant five varieties of red onion while Central Java only “Sumenep” variety. The “Batu hijau” variety has been planted by the majority of the farmers since the production up to 12 tons/ha and has been started since 2017 [8]. All farmers in Central Java plant Sumenep variety that it has 17 different varieties in which the “Rubaru” variety is popular once that can produce 8 to 10 tons/ha [9]. These facts supported by the farmers report that LUPM in West Java showed higher production compare to Central Java. To know how does the level of production influenced the
achievement of LUPM to realize their responsibility to deliver their production to TTI is described as follows.

Table 1. Characteristics of Red Onion Farming at LUPM in West Java and Central Java

| No | Characteristic             | LUPM in West Java | LUPM in Central Java |
|----|---------------------------|-------------------|----------------------|
| 1  | Established (year)        | 2004-2015         | 2003-2009            |
| 2  | Total of members (person) | 26-60             | 36-72                |
| 3  | Age of the farmer (year)  | 25-70             | 25-60                |
| 4  | Education (year)          | 6-17              | 6-9                  |
| 5  | Average land cultivated (ha)| 0,6               | 0,5                  |
| 6  | Maximum cultivated land (ha)| 1,2               | 0,7                  |
| 7  | Variety (%)               |                   |                      |
|    | a. Batu Hijo              | 50                | 0                    |
|    | b. Bali karet             | 20                | 0                    |
|    | c. Maja Cipanas           | 10                | 0                    |
|    | d. Sumenep               | 10                | 100                  |
|    | e. Bima                   | 10                | 0                    |
| 8  | Production (Ton/ha)       | 12-13             | 8-10                 |
| 9  | Planting periods (Times)  | 3                 | 3                    |
| 10 | Input (IDR millions)      | 70-100            | 90                   |

Source: primary data (2018)

3.1. The price stability

To measure the price stability, farmers should be guaranteed to have a purchase price 10% higher from the reference price. The price is determined by the agency in charge of food security at the provincial level. Table 2 illustrated that farmers’ price higher than the national market price, meaning that farmers as a member of LUPM have a good price or good bargaining position from the program. At the same time, the consumers’ prices were lower than the national market price, meaning they got a good price.

Table 2. The Red onion price at LUPM compared to the Standard Price (BPS) in April 2018

| No | Results                | West Java        | Central Java     |
|----|------------------------|------------------|------------------|
| 1  | Farmers/LUPM           | 17.000           | 22.000           |
| 2  | BPS                    | 16.467-22.550    |                  |
| 3  | TTIC/D                 | 20,000           | 24,000           |
| 4  | TTI                    | 20,000           | 24,000           |
| 5  | Consumer               | 20,500           | 25,500           |
| 6  | Local market Price     | 25,000-26,000    | 27,000-28,000    |
| 7  | BPS                    | 26,509-33,798    |                  |

Source: LUPM Primary Data: April 2018 and BPS (2018)

The price in West Java was cheaper than Central Java that might be caused by some reasons, for example, there is some central market that sells a variety of products where consumers could get a good bargaining position as they prefer. The price in Central Java was more expensive compared to West Java, the reason was reported by Susanawati [10] that in Brebes District there are more alternatives to sell the red onion since some Agribusiness Terminal Station, stalls, and food processing industries made from shallots were found. Especially for the shallot industry that could absorb around 42% of the total production [11]. The difference in price is also caused by the marketing and demand chains where the longer the marketing chain and the higher the demand results in higher prices [12].

Other factors that influenced the price of red onion are the farming input [13]. West Java, Batu hijo variety has higher production compare to Sumenep variety planted in Central Java with lower
production. This difference of almost 20% caused the price in West Java is much cheaper than in Central Java.

The price of red onion in West and Central Java has only had small differences compared to the average national price reported by the Statistical Bureau [14]. This report confirmed by the report of Rahmawati [15] that producer markets such as Central Java, East Java, and West Nusa Tenggara are price-leading markets for the red union. This situation needs a solution such as the policy for floor price and the selling price for red onion as suggested by Sholihah and Karsinah 2020 [16].

3.2. The supply stability
The indicator of achievement of supply stability was that the LUPM can carry out a sustainable supply as measured by the volume of red onion delivered to TTI. According to the technical guideline, LUPM should responsible to supply red onion to TTI as much as 35 ton/year in a periodic delivery or on average of around 3 tons/months. Table 3 showed that LUPM could cover their obligation as in West Java, it bought the farmers’ production of 2.710 tons/month as targeted, but only delivered to TTI as 2.425 tons because they were unable to sell all of the production. Moreover, Central Java was able to fulfill the obligation to send shallots for only about 6 months; but the same as in West Java, it turned out that TTI was unable to sell all the products that had been received.

| No | Results                                | West Java | Central Java |
|----|----------------------------------------|-----------|--------------|
| 1  | Total onion bought from farmers (kg)   | 2.710     | 5.248        |
| 2  | Total volume delivered to TTI (Kg)     | 2.425     | 3.821        |
| 3  | Total volume for food exhibition (kg)  |           | 999          |
| 4  | Total volume of ready stock at LUPM    | 285       | 1.628        |

Source: Primary Data (2018)

The fact that could explain this situation was informed by the consumers that red onion is only needed as a complement to cooking ingredient and are needed in relatively small amounts so that going to TTI just to buy red onions is considered inefficient. Usually, household consumers buy shallots when buying other kitchen necessities from vegetable sellers, both in markets or vegetable traders who travel around the village.

3.3. Shorten the supply chain only to three actors
Based on the consumers' information and because there were five marketing channels that begin from only two-channel such as (farmer to consumers), four channels (Farmer-breeder-retailer-consumer), another four channels (farmers, collector trader-retailer-consumer), five channels (farmer-collector trader, wholesaler-retailer-consumers) and six channels (farmers- small collector trader – bigger collector trader – wholesaler –retailer and consumer) [2,10].

LUPM adheres to their commitment to carry out the obligations as the beneficiary of the program. Therefore, under the discussion and facilitation of the related institutions, to keep the channel only in three actors they modify the marketing channel of shallots marketing. The principle way of the modification is through approaching consumers such as sell the red onion in TTI Bazar, using TTI car to put the red onion and the car mobile to certain areas such as during the car-free day, selling for the market operation, and even using a special motorbike to carry shallots with a special backpack to reach residential areas.

3.4. Easy access to buy red onion in good quality
Based on the outcome indicator, the success of the TTI program in providing ease of access to red onion is measured by the sales volume at TTI. As explained in the above description, the TTI modification proved that consumers obtain the ease of access to buy red onion. LUPM were also able to provide the red onion quality as designed with such as uniformity of variety, the tubers are old
enough, with the same level of dryness as dry storage, the water content of 75-85% and not mixed with dirt since the quality of red onion that sold through the TTI modification were under control.

4. Conclusion and policy implication

4.1. Conclusion
Based on the results that had been described, it could be concluded that TTI Program was successful in helping farmers to get stable price; at the same time LUPM could achieve a good performance to stabilized the supply of onion in the expected volume. To have only 3 actors in the supply chain needs efforts such as modification in four variations and the consumers were guaranteed to have easy access, fair price as well as the good quality of red onion.

4.2. Policy implication
This very successful program should be expanded to centers of shallot production considering that only four out of 7 centers in Indonesia which had received the program and even only some of the shallot farmer groups who have the opportunity to receive the program. The experience of TTI to modify the supply chain provides an idea of the need for online technology on how to adjust cropping patterns followed by the distribution of production to consumers especially to non-shallot center areas. Therefore, a packet of technology such as “E-Planting calender and production Allocation” to monitor the implementation of the E-planting and production allocation should be developed. The benefit of the technology could also be used to allocate the production to penetrate the export market for red onion in the world.

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