Farmer institutional and economic feasibility study on red chilli pepper farming in Kepung District, Kediri Regency, East Java Province

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Abstract. Red chilli pepper is one of commodities which the price is fluctuate. The study was aimed to determine the performance of farmer institutional and to analyse the economic feasibility of red chilli pepper farming. A purposive sampling method was applied in this study. The study was conducted within August to December 2017, in Kepung District, Kediri Regency, East Java Province. Either the primary and secondary data were collected. As much as 25 respondents have been chosen randomly to obtain farmer institutional information in the study area. The economic feasibility was analysed based on Revenue-Cost Ratio (RCR). The results showed that the red chilli pepper farming in Kepung District was economically feasible as the R/C ratio value was 1.77. The skilled human resources, one aspects of farmer institutional, play important role to support the success of red chilli pepper farming. In conclusion, the red chilli pepper farming in Kepung District is greatly contributed to farmer’s income.

1. Introduction

Red chilli pepper (Capsicum annuum L.) is a type of horticultural commodity which cultivated commercially [1]. It has been considered as one of strategic commodities in Indonesia. Red chilli pepper utilization is not only for household needs, but also used as raw material for the food and pharmaceutical industries. As the red chilli peppers have high economic value, it has been widespread cultivated in almost all region in Indonesia, including in Java Island. One of the provinces that produce red chilli pepper is East Java Province. This province is one of the centers of red chilli pepper production areas in Indonesia. Within 2014-2018, the averaged harvested area of 13,532 ha and the averaged productivity reach 98,127 tonnes [2].

Several production factors affected on red chilli pepper production and profitability, namely land size, seeds, fertilizer and the number of labour [3]. The productivity rate affect on the farmer’s income. Nevertheless, red chilli pepper is one of commodities which the price is fluctuated during 2008-2018, which required the government role to control the stabilization price [4]. The lack of coordination among the chilli agribusiness actors contribute to this problem [5]. Thus, one of solutions is to develop
connectivity between regions, by creating price information system [4]. Nonetheless, the reference price application seems to be ineffective without sufficient production [6]. Despite unstable price, the demand of red chilli pepper tend to increase over time [7], which encouraged the farmers to continuously cultivate the red chilli pepper. Among three kinds of popular chilli in Indonesia, red chilli pepper is the most insisted which contributed to 50 percent of total chilli consumption [8].

Due to price fluctuation of red chilli pepper, the farmer might experienced high profits at one time and suffered of great lose at another time. Therefore, the purpose of this study was to determine the economic feasibility of red chilli pepper farming and the farmer institutional performance in Kepung District, Kediri Regency.

2. Methodology
A purposive sampling method was applied in this study. The study was carried out from August to December 2017 in Kepung District, Kediri Regency, one of centers of red chilli pepper farming in East Java Province. The primary and secondary data were collected through a survey, observation and interview of 25 respondents in the study area. The data were analyzed descriptively. The R/C ratio was measured to determine the economic feasibility of red chilli pepper farming [9].

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\frac{\pi}{R/C} = \frac{TR - TC}{TR / TC} \quad (1)
\]

Notes:
\[
\pi = \text{Benefit (IDR/ha/season)}
\]
\[
TR = \text{Total Revenue (IDR/ha/season)}
\]
\[
TC = \text{Total Cost (IDR/ha/season)}
\]
\[
R/C = \text{Revenue Cost Ratio}
\]

Notes :
R/C > 1, The farming is economically profitable
R/C = 1, The farm is economically at the break-even point
R/C < 1, The farming is not economically profitable

3. Results and discussion

3.1. Farmer institutional profil
One of the horticultural production centers in Kediri Regency is in Kepung District, Kebonrejo Village. In this village there are 7 farmer groups, which each group consisted of 20-25 people. Most of the farmer groups in Kebonrejo Village cultivate horticultural commodities including red chilli pepper, tomatoes, shallots and leeks. Nonetheless, almost 80% of the farmers in this village cultivated red chilli pepper. The farmers in this location commonly cultivate red chilli pepper in the dry season. The variety of red chilli pepper planted was Kencana variety. The findings showed that there were some problems experienced by chilli farmers in Kepung District namely: (1). Limited land area, (2). Post-harvest handling may contribute to high level of damage, (3). Product characteristics are perishable and not durable (very short shelf life), and (4). Marketing problems, especially unstable price of red chilli pepper.

The important factors in terms of farming activities are the market and prices. The price of red chilli pepper commonly fluctuated. Generally, if the production is abundant, then the prices will be decrease and the farmers tend to experienced losses. Furthermore, marketing inefficiency of longer supply chains contribute to relatively small profits for farmers [10]. Until now, red chilli pepper marketing in Kepung District still uses traditional marketing patterns. From traditional market, red chilli peppers were distributed to other cities in East Java Province, especially Surabaya.

The increase productivity related with the role of farmers in chilli production activities [11]. The skilled human resources, one of institutional factors, may contribute to the success of chilli pepper farming. The human resources factors that may affect include age, formal education, and length
The development of partnerships is one indicator of the development of horticultural areas. Strengthening the institutional and marketing sectors has been considered as one of important aspects in regional development. Institutional strengthening is supported by Gapoktan. Gapoktan is a gathering of several farmer groups that join and work together to improve economic and business efficiency.

If the red chilli farming is carried out through a farmer group, the internal factor that influences are the group leader, the organizational structure, number of members, division of tasks based on the main tasks, and functions of the farmer group [12]. Community empowerment also greatly determines the success of institutional formation, with the human resources factor being very decisive in internal factors. The skilled human resources will strengthen the existence of institutions.

If the organizational structure is supported by group members and all of them contribute according to their duties, then this internal factor will be strong and will affected positively on the red chilli farming. In addition, the availability and accessibility of farm credit, market information, and agronomic technologies have positive contribution to the business of red chilli pepper farming [7].

3.2. Economic feasibility analysis of red chilli pepper farming

Despite of the institutional factor, the input and environmental factors play an important role on red chilli pepper farming. The land condition in terms of land size and soil fertility is greatly influential on the production of agricultural commodities [9]. Moreover, it has been reported that it is not only the land condition, but also several environmental factors especially light, air temperature, humidity and rainfall influent to the plant growth [13, 14]. The environment factors have the major impact on the growth and yields of the crop. Climate is severely affected on chilli production [15]. As one of important input, red chilli pepper require a lot of water, especially during the dry season.

Red chili farming requires a lot of investment per hectare, and the cost of production facilities and labor can reach 43% of total cost. Activities that require a lot of energy are planting and harvesting activities. In Kepung District, the cooperatives can provide farm credit for the members. To cultivate red chili pepper, the total cost required was IDR28,367,000 per planting session. The costs of spraying pests and diseases were quite large, because chilli is a non resistant plant to pests and diseases. The total input of fertilizers and pesticides can reach up to 48% and play an important role to maintain the productivity of red chili pepper.

Kencana variety from the Balitsa (Vegetable Research Institute, Lembang) has been preferred because this variety has been considered to be resistant to pests and diseases. The results showed that the productivity of red chili pepper can reached 20 tonnes per hectare. Moreover, the ripe fruit performance of Kencana variety has been favored by farmers [16].

As well as the red chilli pepper seedling [17], the financial analysis of red chilli pepper farming showed that it was profitable, as indicated by the R/C ratio value of 1.77 (Table 1). The R/C ratio in this study was higher than the chilli farming in Bengkulu [18]. One of factors may affected the production cost is land tenure. The farmers in this study did not have to pay the land lease as they were the owner of their land for farming. Nevertheless, the limited size of land area may lead to inefficient result of farming [3].
Table 1. Economic analysis of red chili pepper farming in Kebonrejo Village, Kepung District, Kediri.

| Description                      | Total          | Planting season |
|----------------------------------|----------------|-----------------|
| I. Production cost               | 13,567,000 (48%) |                |
| 1. Seed                          | 44 pack        | 80,000          |
| 2. Fertilizer                    |                |                 |
| - SP-36                          | 300 kg         | 2,250           |
| - KCL                            | 240 kg         | 4,800           |
| - NPK/ponska                     | 840 kg         | 3,000           |
| - Compost (sack)                 | 100 sacks      | 7,000           |
| 3. Pesticide                     |                | 5,000,000       |
| II. Labor cost                   | 12,300,000 (43%) |                |
| 1. Tillage                       | 20 HOK         | 40,000          |
| 2. Planting                      | 40 people      | 20,000          |
| 3. Fertilizing (8 times)         | 80 HOK         | 20,000          |
| 4. Weeding                       | 80 HOK         | 20,000          |
| 5. Spraying                      | 80 HOK         | 30,000          |
| 6. Watering/Irrigation           | 20 HOK         | 20,000          |
| 7. Trimming                      | 20 HOK         | 20,000          |
| 8. Harvesting                    | 40 OH          | 20,000          |
| 9. Post harvest treatment        | 20 OH          | 20,000          |
| 10. Transporting                 | 30 sacks       | 10,000          |
| 11. Marketing (sack)             | 5 sacks (50 kg)| 400,000         |
| III. Other costs                 |                | 2,500,000 (9%)  |
| 1. Land lease/season             |                |                 |
| 2. Plastic mulch                 |                | 2,500,000       |
| IV. Total cost I + II + III (Rp)  | 28,367,000     |                 |
| V. Production                    | 7,200 kg       | 7,000           |
| VI. Revenue (V-IV)               | 17,713,000     |                 |
| VII. R/C ratio                   | 1.77           |                 |

Source: Processed primary data (2017)

4. Conclusion
The results of the feasibility analysis of red chilli farming in Kepung District, Kediri Regency have R/C ratio value of 1.77. This finding showed that despite the farming risks, the red chilli pepper farming business is profitable and feasible. Nevertheless, the improvement on marketing system will positively affect on the farmer’s income. In addition, institutional factors also influenced the success of the red chilli pepper farming. Skilled human resources and well experienced were capable to support the success of the red chilli pepper farming through sustainable institutions.

References
[1] Bhattacharya M and Mariyono J 2016 The economic aspects of chilli production in Central Java Economic Journal of Emerging Markets 8(2) pp 85–97
[2] BPS 2019 Indonesia dalam angka Jakarta: Badan Pusat Statistik
[3] Geo L, Ariani W O R and Saediman H 2020 Determinants and profitability of small-scale red chili production in Konawe District of Southeast Sulawesi IOSR J. of Agr. and Vet. Sci.13(3) pp 51-55
[4] Rachmawati E, Harianto, Syaukat Y and Novianti T 2020 Fluctuation and price responses retail level of red chili, cayenne pepper, shallot in five major cities in Java International J. of
Progressive Sci. and Tech. 21(1) pp 168-175
[5] Saptana, Sunarsih and Indraningsih K S 2006 Mewujudkan keunggulan kompetitif melalui pengembangan kemitraan usaha hortikultura Forum Penelitian Agro Ekonomi 24(1) pp 61-76
[6] Sativa M, Harianto and Suryana A 2017 Impact of red chilli reference price policy in Indonesia International J. of Agriculture System 5(2) pp 120-139
[7] Mariyono J 2015 Chilli production and adoption of chilli-based agribusiness in Indonesia J. of Agribusiness in Developing and Emerging Economies 5(1)
[8] Webb A J and Kosasih I A 2011 Analysis of Price Volatility in the Indonesia Fresh Chili Market The Annual Meeting of the International Agricultural Trade Research Consortium, December 11-13 2011 Tampa FL USA
[9] Soekartawi 2002 Prinsip Dasar Ekonomi Pertanian: Teori dan Aplikasinya Jakarta: PT Raja Grafindo Persada
[10] Puspitawati I R and Wardhani R M 2013 Analisa efisiensi pemasaran komoditi cabai pada beberapa saluran pemasaran di Kota Madiun Jurnal Agri-teknologi 14(1) pp 72-86
[11] Khaitov B, Hyw Jin Yun, Lee Y, Ruziev F, Le T H, Umurzokov M, Bo A B, Cho K M, Park K W 2019 Impact of organic manure on growth, nutrient content and yield of chilli pepper under various temperature environments International Journal of Environmental Research and Public Health 16(17) pp 1–14
[12] Hendayana R 2018 Membangun Sistem Diseminasi di Era Disripsi: Peluang dan Tantangan Mempercepat Hilirisasi Inovasi Pertanian Naskah Orasi Purna Tugas Peneliti Ahli Utama 31 Mei 2018 Bogor: Balai Besar Pengkajian dan Pengembangan Teknologi Pertanian
[13] Taskovics Z T, Orosz F and Kovacs A 2010 The effect of some environment factors on the growth of sweet pepper Acta Universitatis Sapientiae 2 pp 17–22
[14] Kesumawati E, Apriyatna D and Rahmawati M 2018 The effect of shading levels and varieties on the growth and yield of chili plants (Capsicum annuum L.) IOP Conference Series: Earth and Environmental Science 425 pp 1–7
[15] Bhutia L K et al. 2018 Effects of climate change on growth and development of chilli Agrotechnology 7 (2) pp 1–4
[16] Sujitno E and Dianawati M 2015 Produksi panen berbagai varietas unggul baru cabai rawit (Capsicum frutescens) di lahan kering Kabupaten Garut Jawa Barat Pros. Sem. Nas. Masy.Biodiv. Indon. 1 (4) pp 874–7
[17] Widyastuti D E, Ibrahim J T, Winaya A and Sukorini H 2019 Financial feasibility analysis of red chili pepper seedling at Karanganyar Ponokusumo Malang INSIST 4(1) pp 188-190
[18] Hartono R and Astuti HB 2015 Farming feasibility of local varieties of red chilli in the plateau of Mojorejo, Rejang Lebong, Bengkulu Proceeding International Seminar on Promoting Local Resources for Food and Health 12-13 October 2015 Bengkulu Indonesia pp 524-7.