



Local Government Support for the Development of Nutmeg Industry in Fakfak Regency, West Papua, Indonesia

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Abstract This study aims to evaluate the impact of the local government support in farmers' level and to analyze the potential of rural development through the improvement of nutmeg production system in Fakfak Regency. The results can be concluded as follows: (1) Nutmeg industry in Fakfak Regency has been developed intensively by the support of local government; (2) The nutmeg industry is deeply connected with traditional culture. Meanwhile, the recent development efforts including local government support seem to meet many obstacles when confronted with tradition; (3) However, there are farmers who showed positive attitudes towards development, especially those who realize the importance of sustaining production for their future generations; (4) Farmers will be highly motivated to improve their skills and production when they can personally prove that their efforts can directly lead to the increase of their family income.

Keywords nutmeg production, local government, local culture, rural development

INTRODUCTION

Papuan nutmeg (*Myristica argentea* Warb) is one of nutmeg varieties indigenous to Fakfak Regency (Musaad et al., 2016) and has been traditionally grown in the wild forests by the indigenous people of Fakfak (INOBU, 2017). Development of nutmeg cultivation in Fakfak Regency has been carried throughout generations. With a total cultivated area of 16,733 hectares (UNIPA, 2013), nutmeg is a major commodity of Fakfak Regency and plays a key role to the local economy as an important source of income.

On the other hand, nutmeg industry in Fakfak Regency faces two major problems, namely low productivity and low-quality products. Low productivity occurred due to inappropriate management practices in cultivated lands. In farmers' level, nutmegs are planted naturally in high density, narrow planting spaces (about 3x3m) and random distribution of male-female ratio, while the ideal planting space is 10x10m (Gardner et. al., 1991; Deptan, 1986) and recommended composition of male-female ratio is 1:10 (Hadad and Syakir, 1992). It has been identified that the current planting condition may have caused the low productivity and emergence of disease infection (Musaad et al., 2016). Meanwhile, low-quality products were caused by lack of awareness during harvesting, processing and distribution, such as early-harvest, incomplete drying process and high-humidity storage. To solve these problems and enhance the development of nutmeg industry in Fakfak Regency, the local government has been conducting support programs since 2011. However, the impact of the support programs and the actual condition of nutmeg production in farmers' level are still unclarified.

OBJECTIVES

This study aims to evaluate the impact of the local government support in farmers' level and to analyze the potential of rural development through the improvement of nutmeg production system in Fakfak Regency.

METHODOLOGY

Data Collection and Selection

This study is conducted through interview and questionnaire surveys of nutmeg farmers and government officials in Fakfak Regency, West Papua Province, Indonesia. The first interview survey of the government officials of Regional Estates Crops Office of Fakfak Regency (the representative of the local government) was carried out in October 2016. Through the assistance of this office, a total of 39 nutmeg farmers from 10 districts were selected using convenience sampling method due to distance and time constraints during data collection. The 39 respondents were interviewed to clarify the characteristics of nutmeg industry in the regency and to identify the form of local government support in farmers' level. In order to evaluate the impact of the current local government support, the second survey was carried out in September 2017 through structured questionnaires and in-depth interviews with 9 farmers who showed important characteristics in terms of production and sales among the 39 nutmeg farmers.

Data Analysis

Based on primary data of 39 farmers, the average values and component ratios were calculated to clarify the general condition and the characteristics of nutmeg industry in Fakfak Regency (i.e. cultivating areas, cropping and harvesting patterns, and yield). Cost and profit analysis was conducted to estimate the economic values of nutmeg industry in farmers' level. Moreover, questionnaire was also structured using Likert Scale scoring method to grasp quantitative values on farmers' evaluation of the local government support. Lastly, through the case study of selected farmers, descriptive analysis was used to describe the actual condition of nutmeg production and sales in farmers' level.

RESULTS AND DISCUSSION

Characteristics of Nutmeg Industry in Fakfak Regency

Nutmeg production is distributed widely in 14 districts out of the 17 districts across Fakfak Regency and has been an indispensable part of Fakfak society (Disbun Fakfak, 2017). Based on the local culture, lands and nutmeg trees are inherited by the family members. The ownership of lands is divided equally among the male members of the family. However, the female members also have the rights to collect nutmeg fruits during harvest seasons.

Nutmeg cultivations spread from seacoast to semi-mountainous and mountainous areas at latitude between 0 and 700 meters above sea level with different patterns and productivity (Musaad et al., 2016). Survey of 39 farmers revealed seven (7) main results, namely (1) Generally, farmers in Fakfak Regency own lands in 3 different areas with an average cultivated area of 4.8 hectares per farmer; (2) Nutmeg fruits in Fakfak Regency can be harvested twice a year. The first harvest season called as "The Big Harvest" usually starts from around October to February. Meanwhile, the second harvest usually starts around April to June with the quantity of nearly half of the first season; (3) Farmers usually start the harvest from lands in seacoast area and continue up to the mountain area; (4) On the average, nutmeg farmers can produce around 30,000 fruits per hectare during "The Big Harvest"; (5) Nutmeg fruits in Fakfak Regency are processed into nutmeg spices. Farmers usually count harvested fruits while separating seeds and mace to be used for nutmeg spices and leave out flesh on the ground as natural fertilizer for the trees; (6) Nutmeg seeds and

mace will be dried separately before sold to the buyers; (7) Depends on the cultivation areas, weight of dried seeds and dried mace per 1,000 fruits vary from 8-15 kg and 1-1.5 kg, respectively.

Local Government Support for Nutmeg Industry

Indonesian central government under the 5-Year Strategic Plan of Ministry of Agriculture 2015-2019 aimed to realize sustainable agriculture and bioindustry system that produces varieties of healthy foods and high added value products from regional resources (Secretariat General of Indonesian Ministry of Agriculture, 2014). Through the support of this strategic plan, the local government has been conducting the various support programs based on two main objectives, namely, to preserve the sustainability of the Papuan nutmeg and to increase their local production. In relation to the former objective, the local government conducted three programs, such as Certification of Geographic Indication Commodity for Papuan nutmeg, Issuance of the Local Regulation, and Distribution of Papuan nutmeg varieties. On the other hand, in relation to the latter objective, farm rehabilitation and extensification of nutmeg cultivating lands have been intensively conducted with the assistance of Regional Estate Crops Office of Fakfak Regency. Specifically, these support programs can be categorized into three different stages: cultivation, processing, and sales.

In the cultivation stage, farm rehabilitation and extensification are the main programs. Local government started the programs by spreading information through radio broadcasting. Then, local extension workers from Regional Estate Crops Office will do on-site counseling and training by conducting one-day seminar and making sample plot in selected villages. Due to budget limitation, on-site activities are conducted in 10-13 selected villages annually. Leaders of the selected villages will propose several farmers as participants of the programs. Selected farmers will receive support of seedlings and fertilizer to be used in their own lands. Pesticides were also distributed to farmers whose lands have been infected by diseases. In the farm rehabilitation, farmers are encouraged to reduce numbers of trees, replace old trees with young seedlings, and clean up their cultivated lands. Meanwhile, in the extensification program farmers are obligated to implement proper cultivation method in newly opened lands.

In the processing stage, the local government put efforts to preserve the quality of nutmeg spices. As nutmeg spices from Fakfak Regency are mostly exported to international market, price of nutmeg spices highly depends on its quality. Recently, the local government has set the quality standard of Fakfak's nutmeg spices, which mainly includes appropriate harvesting period and drying method, determination of moisture content, and grading classification for nutmeg seeds and mace. Under the supervision of Industrial and Trade Office of Fakfak Regency, wholesaler companies are required to undergo quality control before shipping nutmeg spices.

In the sales stage, through the Certification of Geographic Indication Commodity program managed by the central government, the local government has been working to certify nutmegs produce in Fakfak Regency. During the certification, 300 farmers were randomly selected to check the whole production processes, from seedlings selection to cultivation, harvest, and processing methods. Through these processes, the local government was able to clarify and legally issue the Local Regulation (*PERDA*) regarding the quality standard of their nutmeg products.

Implementation of Local Government Support in Farmers' Level

To analyze the implementation of the support programs in farmers' level, the second survey was conducted through structured questionnaires and in-depth interviews with 9 farmers from 2 different areas. Selected farmers were asked to evaluate their own condition in each stage using specified scoring methods. Table 1 shows results of farmers' evaluation towards their personal condition.

Farmers in central Fakfak own 9.8 hectares of cultivated areas which are 5 times bigger than in eastern Fakfak (1.8 hectares). The interview also confirmed that farmers in central Fakfak generally have cultivated lands in three different areas, seacoast, semi-mountainous, and mountainous areas. Meanwhile, farmers in eastern Fakfak mostly own lands in seacoast area only.

Table 1 Farmers's evaluation towards personal condition

Nutmeg cultivation areas	Central Fakfak	Eastern Fakfak
Average distances from city center (km)	12	40
Number of surveyed farmers (persons)	4	5
Average cultivated land areas (ha)	9.8	1.8
Average harvested land areas (ha)	3.0	1.4
Personal evaluation on nutmeg cultivation		
Satisfaction towards own cultivation ¹⁾	3.5	4.6
Percentage of nutmeg trees infected by diseases ²⁾	1.8	1.0
Knowledge and skills of nutmeg cultivation method ³⁾		
a. Adjusting planting spaces	2.0	1.2
b. Adjusting distribution of male/female ratio	2.0	0.8
c. Preventing disease infection	1.0	1.6
Personal evaluation on nutmeg harvesting		
Importance during harvesting process (%) ⁴⁾		
Time effectiveness	25	100
Quality of harvested fruits	75	0
Personal evaluation on nutmeg processing		
Knowledge and skills of nutmeg spices processing method ^{3) 5)}	2.0	1.2
Knowledge and skills of nutmeg flesh processing method ³⁾	1.8	1.6
Personal evaluation on nutmeg sales		
Satisfaction towards own sales condition ^{1) 6)}	2.0	1.9

Source: Author's calculation based on survey data in 2016 and 2017.

1) Questions were answered using 5-level scoring system (1-very bad, 2-bad, 3-average, 4-good, 5-very good).

2) Question was answered using 5-level scoring system (1-0%, 2-25%, 3-50%, 4-75%, 5-100%).

3) Questions were answered using 3-level scoring system (0-not understand, 1-understood, 2-understood & implemented).

4) Numbers showed are percentage of respondents.

5) Knowledge and skills about nutmeg spices processing method consist of the following items: a) Conducting post-harvest treatment, b) Drying processes of nutmeg seeds, c) Drying processes of nutmeg mace, d) Separating seeds skin, and e) Classifying grade of nutmeg spices. Respondents were asked to answer each item using 3-level scoring system, and numbers showed are the average score of all items from all respondents.

6) Satisfaction towards own sales condition consists of satisfaction towards the following items: a) Sales quantity, b) Current price, and c) Current buyers. Respondents were asked to answer each item using 5-level scoring system, and numbers showed are the average score of all items from all respondents.

In the cultivation stage, farmers in central Fakfak felt less satisfied on their own cultivation (3.5/5.0 points). This is because some of them realized that they spent less time to manage their lands, especially in mountainous areas. It is also confirmed that there has been disease infection found in central Fakfak (around 25%), while there is none in eastern Fakfak (0%). However, the interview revealed that farmers in central Fakfak have not received any support on disease infection. Although some farmers have personally tried to prevent further infection by burning infected trees, collective actions are necessary before diseases infections spread to other areas.

Moreover, to evaluate farmers' understanding and awareness in proper cultivation method, farmers were asked whether they know and apply ideal spacing and male-female ratio in planting nutmeg trees. The survey clarified that farmers in Fakfak Regency face difficult barriers in applying the proper method. There are beliefs in society that cutting nutmeg trees means cutting the hands of their ancestors since trees were inherited throughout generations, hence farmers have hesitated to apply the proper method when cutting trees is required. However, despite of this condition, the survey also showed that farmers in central Fakfak have understood and been trying hard to implement the method in their lands (2.0 points). Although it is still difficult to cut old trees, some farmers have felt that applying proper method (e.g. at least cleaning their lands) has increased their production. The assistance of local extension worker who lives in same village also helps

farmers to get information. Despite of no formal program from the local government, farmers felt that there is a person available for consulting their problems. Hence farmers' awareness and motivation increase when they fully understand the importance of conducting the proper method.

On the other hand, farmers in eastern Fakfak still have resistance to apply the proper method. One of the reasons is because they have not actually seen the results of applying proper method in nearby areas. Moreover, farmers refused to use seedlings distributed in the programs because they could not trust and guarantee that those seedlings would properly bear fruit. They also did not use the fertilizer and pesticide because they were afraid that trees would depend on those chemical materials once it was given. Thus, it can be highlighted that besides dealing with traditional custom, it is important for the local government to gain trust from farmers and provide proof of benefits of the programs.

In the processing stage, there are clear differences in both areas in relation to harvesting process. Seventy-five percent of farmers in central Fakfak pay attention to quality when harvesting fruits, while 100% of eastern Fakfak farmers consider more on time efficiency. The survey also confirmed that farmers in central Fakfak have properly applied processing method (2.0 points). Although there is barely significant support on processing method from local government, farmers in central Fakfak have closer access to the market and local government offices. Thus, once information is received, farmers regularly share it with their fellow farmers during village gathering, which helped them to get updated to the current condition. Moreover, farmers in central and eastern Fakfak mentioned that they have received training on nutmeg flesh processing method (1.8 and 1.6 points, respectively). In Fakfak Regency, farmers only use seeds and mace to produce nutmeg spices. Every year there are about 2.4 million kilograms of nutmeg flesh being wasted and left to the ground. To maximize the use of fresh fruits into more value-added products, the local government has conducted training on nutmeg juice and syrup processing to housewives of nutmeg farmers. However, interview revealed that producers still find it difficult to sell the processed products to the market, hence some of them conduct order-based processing or only produced by orders and some were not really motivated to continue their productions.

On the other hand, all farmers gave same responses towards sales condition. Farmers were unsatisfied with their current sales, including quantity, price, and buyers (2.0/5.0 and 1.9/5.0 points). Farmers had no bargaining power on sales and no access to information on where and how their nutmeg spices were distributed once sold to buyers. Although the local government has legally issued the Local Regulation for quality standard of nutmeg spices and conduct quality control in wholesalers' level, it seems that it has not been implemented in farmers' level. Currently, there is also no regulation for standard selling prices in local market.

Impact of Local Government Support in Farmers' Level

To evaluate further the impact of local government support in farmers' level, Table 2 shows the actual condition of nutmeg production of 4 farmers in central Fakfak. Farmers were asked to record their production between October 2016 to September 2017 to calculate their actual cost and income.

Farmers O and P live in the same village. Farmer O was known for his hard work in managing his land. Before formally participated in the farm rehabilitation program, he has been implementing approximately 5x5m planting spaces in his own land. Aside from nutmeg cultivation, farmer O also plants other crops such as taro and coconut trees. He learned that by giving enough spaces, plants grow bigger and less diseases. Hence, with high motivation to sustain his nutmeg production, he implemented the same method to his nutmegs and was able to maximize his production and reach 30,000 fruits per hectare regardless of relatively small cultivated area than other farmers in central Fakfak. Meanwhile, farmer P started implementing proper method after receiving support programs. The interview revealed that before implementing proper method, he barely cleaned his lands, hence his production was rather small. Despite of owning 3 hectares of cultivated areas, his production only reached around 20 to 30 thousand fruits per year. However, in 2016 he was able to produce 50,000 fruits. Thus, among all farmers, farmer P gave a very positive response to the support programs. He stated that he was able to get more knowledge and improve his production through the programs and have felt the benefits of the programs himself.

Table 2 Profile of selected farmers in Central Fakfak (Production Year 2016)

Nutmeg Farmers (age years old)	O (41)	P (47)	Y (41)	A (46)
Number of household members (persons)	5	5	6	7
Total areas of nutmeg cultivated lands (ha)	1	4	10	24
Targeted buyers of nutmeg products	Middlemen	Middlemen	Middlemen	Wholesaler
Selling price of fresh fruits (IDR/piece)	350	350	350	500
Selling price of dried seeds (IDR/kg) ¹⁾	40,000	45,000	60,000	65,000
Selling price of dried mace (IDR/kg)	110,000	110,000	90,000	108,000
Support programs received from local government	Farm rehabilitation	Extensification; Farm rehabilitation	Selected high-producing farmer; Extensification	-
Nutmeg fruits yield (pieces)	30,000	50,000	164,850	390,000
Harvested land areas (ha)	1	3	5	12
Yield per hectare (pieces/ha)	30,000	16,667	32,970	32,500
Total sales (IDR/year)	13,350,000	24,000,000	91,491,750	240,630,000
Total production cost (IDR/year)	1,419,750	4,523,750	35,950,000	100,498,750
Hired labor cost (IDR/year)	-	-	28,848,750	97,500,000
Firewood cost (IDR/year) ²⁾	960,000	3,360,000	5,120,000	-
Tools and machinery (IDR/year)	333,750	883,750	1,901,250	2,868,750
Transportation cost (IDR/year)	126,000	240,000	-	-
Taxes (IDR/year)	-	40,000	80,000	130,000
Net profit (IDR/year)	11,930,250	19,476,250	55,541,750	140,131,250
Net profit per hectare (IDR/year)	11,930,250	6,492,083	11,108,350	11,677,604
Net profit per family member (IDR/year)	2,386,050	3,895,250	9,256,958	20,018,750

Source: Author's calculation based on survey data in 2016 and 2017.

1) Selling price of dried seeds shown on the table is price of SS grade dried seeds. SS grade is the classification of mixed dried seeds with skin, the most common type of dried seeds sold in the local market.

2) Firewood cost was calculated from the time spent by farmers to gather firewood for drying nutmeg seeds. Firewood cost for farmer A was included in hired labor cost.

Farmer Y was categorized as one of high producing farmers (a total yield of 164,850 fruits), who reached more than an average yield of 30,000 fruits per hectare. Thus, during the certification program he was selected as one of *High-producing Farmers* (i.e. farmers whose lands produce good quality of nutmegs and chosen as seedlings resources) for his good production. Hence, the government has issued instructions to use seedlings from *high-producing farmers* to be distributed in the support programs. However, interview revealed that before being chosen as *high-producing farmer*, farmer Y has never actually received any program. He has been personally implementing proper method (i.e. 5x5m planting spaces) by learning from experience and sharing knowledge with other farmers who have participated in the program. Unlike other farmers who mostly conduct all activities by family members, farmer Y hires laborers during harvest season to maximize his production, while tries to manage lands on his own by conducting weekly cleaning with his family. On the other hand, farmer Y seems to be unsatisfied with the program. He stated that regardless of being selected as high-producing farmer, he cannot get higher price when selling his nutmeg products. Thus, at this moment farmer Y has not personally felt any benefit of the program.

Farmer A was the only surveyed farmer who has not participated in any program. However, he was one of the biggest land-owners in Fakfak Regency and his family was known as the early generation of Fakfak's nutmeg farmers. He owns 12 hectares of cultivated lands and currently is expanding his cultivation by opening new lands in privately owned wild forest. Despite of not participating in any program, farmer A manages to conduct proper method by himself. His father used to travel outside Fakfak Regency to learn about agriculture and try new method in his lands. Thus, farmer A took after his father and continued implementing the methods. Because of their

hard work and high production, his family was able to connect with local wholesaler and gain trust to regularly supply nutmeg spices to this buyer. Farmer A stated that he is satisfied with his current production and sales, since he has been able to sell all his products in higher price than average. His good relationship with the buyer also helps him to get the latest information of nutmegs' market regardless of no support from the local government.

Based on cost and profit calculation, it is clarified that farmers earn significant incomes from nutmeg production. The bigger the lands are cultivated; the more incomes can be earned. For farmer O and P, nutmeg production has become an important source of household income, combined with incomes from other on-farm activities (i.e. vegetables, fruits, and livestock). As for farmer Y, with his good production, he was able to earn stable incomes and reach the same level of Indonesia's middle-class households with incomes between IDR 36-120 million per year (Deloitte, 2016). Moreover, with large cultivation areas, farmer A can be categorized as the high-income farmer. Hence, by conducting proper methods, there is a high potential for nutmeg farmers in Fakfak Regency especially those who have more than 5 hectares cultivating areas to earn as much as incomes of the middle-class households in Indonesia.

CONCLUSION

This study has clarified that nutmeg industry in Fakfak Regency has been intensively developed by the support of the local government. Although there are difficulties to instantly shift from a long-standing tradition to proper cultivation methods, there are farmers who showed positive attitude towards development and willing to improve their productions. It has also been confirmed that access to information and proofs of the benefits are very important to increase farmers' understanding and awareness to implement proper methods themselves. In the future, the following actions are essential to enhance the development of nutmeg industry in Fakfak Regency. First, it is important for the local government to ensure farmers receive necessary information. Increasing support through assistance of local extension worker and providing opportunities to exchange knowledge with other farmers can be effective ways to provide information. Second, farmers will be highly motivated to improve their production when they can personally prove that their efforts in production can also benefit their sales. Not only in cultivation stage, through cooperation with other related offices, the local government should intensively expand their support to processing and sales stages. Third, setting a legal sales regulation is highly necessary to ensure that proper quality standard and fair price in sales activities are applied from farmers to wholesalers' level. Lastly, due to the small number of respondents in this study, it is necessary to broaden the scope of this research and conduct further analysis. Comparison study with other areas where the local government support has also been implemented should be conducted to analyze necessary improvements on the current support programs.

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