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Full Length Research

Determining agricultural superior commodity in the district of Sukabumi through a combination method of LQ, description scoring, and competitive analysis

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The objectives of this study was that a superior commodity could be carefully determined and well developed. Technique of analysis was the combination of location quotation (LQ), description scoring, and competitive analysis. Agregation method was conducted by using Comparative Performance Index (CPI), a comparison technique between performance index or composite index to determine ranking of various alternatives. The commodities being analyzed consisted of corn, peanut, cassava, chili, tomato, legume, papaya, banana, mangosteen, durian, mango, rambutan, chrysanthemum, and tuberose. The results of this study indicated that the first rank of a superior commodity was papaya. Based on this study, the determintation of superior agricultural commodity through this combination model could be used as the best alternative and could be developed for any other region.

Key words: Superior commodity, LQ, description scoring, competitiveness, CPI

INTRODUCTION

The challenge of Indonesian agricultural development in facing globalization, as a matter of fact, related to small scale of business farming. Educational level of the peasants were relatively low, small size of farm land being occupied, low of capital as well as low productivity. Those condition may certainly require a concept which is really focus and that is able to create business integration, upstream to downstream businesses. For those reasons, developing a superior agricultural commodity could be offered as alternative of solution.

A case study was applied in the district of Sukabumi due to her potential agricultural resources as geographical characteristics of this region which so far had not been developed. Although Sukabumi is one of the largest district among the others in Java and Bali, in fact it needs to make some efforts in enhancing its development. And one of the efforts is to develop a superior agricultural commodity.

Within the context of developing superior agricultural commodity, the governmental agency on agriculture in this district had made a special arrangement to develop production center of the superior commodity in each of the sub-districts in Sukabumi. Unfortunately, the efforts were just only a general policy to enlarge a special commodity in this region, whereas the determination of value added for the farmers and the advantage of regional income for the district were neglected.

Some of the agricultural commodities that were determined as superior, according to the governmental agency in the district that were also mentioned in her 2012 – 2015 strategic planning period consisted of corn, peanut, cassava, red chili, tomato, papaya, banana, mangosteen, chrysanthemum, and tuberose. The

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Table 1. Production of Potential Superior Commodities in District of Sukabumi 2012.

No	Item of Commodity	Production	Measurement Criteria
1	Corn	41.143	Ton – dry seed
2	Peanut	5.499	Ton – dry seed
3	Cassava	204.885	Ton – wet tuber
4	Chili	125.869	Ton
5	Tomato	137.518	Ton
6	Legume	137.815	Ton
7	Papaya	235.043	Ton
8	Banana	1.298.183	Ton
9	Mangosteen	22.329	Ton
10	Durian	56.724	Ton
11	Mango	62.054	Ton
12	Rambutan	19.762	Ton
13	Chrysanthemum	33.503.567	Stem
14	Tuberose	682.969	Stem

Source: Strategic Planning of 2011-2015 of Governmental Agency on Agriculture District of Sukabumi, LKPJ Regent of District of Sukabumi 2011, *Blue Print* Agricultural Development 2012-2015, BPS, 2013.

identification of these superior commodities were a bit difference with the related previous study. Asrul Sani (2009) had mentioned, based on his study by applying location quotient (LQ), location coefficient (α), and specialization coefficient (β), superior commodities in the district of Sukabumi consisted of red chili, legume, tomato, durian, mango, papaya, and rambutan.

The different results in determining those superior commodities due to a different criteria in its approach of analysis. The analysis applied on these previous studies were just based on a certain criteria aforementioned, such as how it spread over the region, number of farmers conducted its farm business, acreage of the land being cultivated for each of commodity, and related dissemination programme from the governmental agency on agriculture. By those reasons, further and deeper study was needed to determine a superior commodity based on all potential aspects from the previous studies. Number of 14 commodities included in this study (Table 1).

Technical analysis in this study may include location quotient (LQ) method combine with other methods. According to Hendayana (2003), LQ analysis has a weakness related to the unclear delineation of the region which was only stressing on the supply aspect. Based on this limitation. LQ approach was combined with description scoring where the indicator of superior criteria was supplemented with competitive analysis for each commodity. For these reasons, the objectives of this study included: (1) Application in the determination of the local superior commodity through a combination of LQ, description scoring and its competitiveness, (2) What kind of superior commodity that should be developed in the district of Sukabumi.

METHODOLOGY

A survey was applied in this study. The sample was taken in two stages. Firstly to decide the subdistrict location and the village. The village chosen based on the existing size of planted area. And secondly, to determine sample of the farmers that was randomly selected, whereas for the respected trader and industry was determined based on the information from the sample farmers.

Technical analysis in this study may include location quotient (LQ) method combine with description scoring, and competitive analysis.

Location Quotient (LQ), according to Budhiharsono (2001):

$$LQ = \frac{p_i / p_t}{P_i / Pt}$$

Note:

p_i= Quantity of production/planted area of commodity i in the region being studied

p_t= Quantity of production/planted area of all commodity in the region being studied

P_i= Quantity of production/planted area of commodity i in the upper level region

P_t = Quantity of production /planted area of all commodity in the upper level region

1. Using method of description scoring through evaluation toward indicators from each criterion for a superior commodity that will be determined.
2. Using competitiveness analysis through PCR/Private

Cost Ratio and DRCR/Domestic Resource Cost Ratio approach (Monke and Pearson, 1989).

$$PCR = \frac{DFC_{HP}}{(R_{HP} - TIC_{HP})}$$

Which: $DFC_{HP} = \Sigma (X_d P_{dHP})$; $R_{HS} = \Sigma (Q_y P_{yHP})$; $TIC_{HP} = \Sigma (X_t P_{tHP})$

PCR = Private Cost Ratio
DFC_{HP} = Domestic Factor Cost in term of private price
R_{HP} = Amount of gross income in term of private price
TIC_{HP} = Cost of tradable inputs in term of private price
Xd = Amount of domestic factors used
P_{dHP} = Domestic factors in term of private price
Q_y = Amount of tradable output
P_{yHP} = Tradable output in term of private price
X_t = Amount of tradable input used
P_{tHP} = The price of private tradable input

$$DRCR = \frac{DFC_{HS}}{(R_{HS} - TIC_{HS})}$$

Which: $DFC_{HS}= \Sigma (XdPd_{HS})$;$R_{HS} = \Sigma (Qy\ Py_{HS})$;$TIC_{HS} = \Sigma (XtP_{tHS})$

DRCR = Domestic Resource Cost Ratio
DFC_{HS} = Domestic factor cost with social price
R_{HS} = Amount of gross income with social price
TIC_{HS} = Cost of tradable inputs in term of social price
Xd = Amount of domestic factors used
P_{dHS} = Social price of domestic factors
Q_y = Amount of tradable output
P_{yHS} = The social price of tradable output
X_t = Amount of tradable inputs used
P_{tHS} = Social price of tradable inputs

Analysis of CPI (comparative performance index)

The fourteenth superior commodities that have been analysed using LQ analysis, superiority criteria and competitive analysis then being combined with CPI (Marimin dan Nurul Maghfiroh, 2010).

A_{ij} = X_{ij}(min) x 100 / X_{ij} (min)
$A_{(i+1.j)}$ = ($X_{(I+1.j)}$) / X_{ij} (min) x 100
I_{ij} = A_{ij} x P_j

$$I_i = \sum_{J=1}^{n} (I_{ij})$$

Note:
A_{ij} = the 1st alternative value on the –j criteria
X_{ij}(min) = the 1st alternative value on the criteria of the1st alternative value on the-j minimum early criteria
$A_{(i+1.j)}$ = the 1st alternative value + 1 on the –j criteria
($X_{(I+1.j)}$ = the 1st alternative value + 1 on the –j early criteria
P_j = quality of criteria importance of j
I_{ij} =Alternative index of the-I
I_i =Criteria combination index on the-I alternative
I = 1, 2, 3, ..., n
J = 1, 2, 3, ..., m

RESULTS

The determination of superior commodity had been conducted through the combination of LQ, description scoring and competitiveness analysis. Number of 14 commodities included corn, peanut, cassava, chili, tomato, legume, papaya, banana, mangosteen, durian, mango, rambutan, chrysanthemum and tuberose.

Based on the Table 2, among the 14 commodities, there are 8 commodities which are considered as basis, and the highest LQ value is papaya. Hence, according to Widiatnaka *et al*. (2013), the highest value of LQ indicated the relative share value of the commodity being accounted. It was proven in this study in which planted and harvested area of papaya in district of Sukabumi were not the largest compared to some other plants existed in district of Sukabumi. The highest LQ for each of commodities group is peanut for cash crops, legume for vegetables, papaya for fruits and chrysanthemum for ornamental plants. The table also indicated that from superiority criteria, mangosteen is the best, papaya is the second, chilli is in the third and so forth. Meanwhile, among the group of commodities, the highest superior criteria is cassava for food crops, chilli for vegetables, mangosteen for fruits, and chrysanthemum for ornamental plants. Finally, based on the competitive analysis, 9 out of 14 commodities have competitive value and the best one is peanut. If it is viewed based on group of commodities, peanut has the highest competitive value among cash crops, legume for vegetables, papaya for fruits and chrysanthemum for ornamental plants.

Following previous analysis by using LQ, superiority criteria and competitiveness, agregation by using comparative performance index (CPI) was applied. CPI is comparison technique on index performance or composite index which is used to determine ranking value of each alternative. On the first matrix, score value is to be unified while remains considering its positive and negative trend by determining the minimum value of each row (every status of situation), and determining that a minimum value is equal to a hundred. Then other value in the same row is compared to that minimum value, and lastly alternative value is accounted based on the value of each criteria, multiplied by the weight of each row to obtain series of alternatives from its best.By those approach, from all of the 14 commodities, through test combination using CPI, the matrix results can be seen in the T able 3.

Table 2. LQ Value of Potential commodities in the District of Sukabumi.

Num	Commodity Type	LQ Value	Superiority Criteria	Competitiveness Analysis	
				PCR	DRC
	Cash Crops				
1	Corn	0.72	60.73	0.73	0.71
2	Peanut	1.48	58.87	0.07	0.07
3	Cassava	1.22	61.60	1.38	1.47
	Vegetables				
4	Chilli	1.58	64.73	0.49	1.15
5	Tomato	1.41	61.33	0.35	1.32
6	Legume	2.21	56.20	0.63	0.65
	Fruits				
7	Papaya	4.94	66.90	0.21	0.23
8	Banana	1.49	60.27	0.59	0.13
9	Mangosteen	0.72	68.30	0.50	1.39
10	Durian	0.86	61.33	0.16	0.52
11	Mango	0.51	57.40	0.54	1.88
12	Rambutan	0.19	55.27	0.33	0.28
	Ornamental Plants				
13	Chrysanthemum	0.96	62.33	0.19	0.06
14	Tuberose	1.63	61.00	0.16	0.29

And papaya is indicated as the highest that could be recommended to be developed in the district of Sukabumi.

The Table 3 indicates that the first rank of superior commodity after being combined with CPI method is papaya. Thus, papaya can be determined as superior commodity in the district of Sukabumi.

DISCUSSION

In order to achieve farmers' welfare, agricultural development should be competitively, democracy, sustainable and decentralized conducted. Competitiveness is indicated by its market orientation, and increasing domestic as well as international market share. For international trade in particular, productivity and the improvement of added value by taking advantage of capital, technology and the creativity of the human skill. The abundance of natural resource and a huge number of labor, but unskilled, may not give any guarantee at all. Democracy is characterized by utilizing resourcces that are owned and cultivated by a large number of people, and creating the organization of the people and their business network to become the role player managers in the development of agribusiness.

Sustainability is characterized by its ability to response market changes immediately and efficiently, long run oriented, and adopting innovation of environmentally friendly technology. Whereas decentralize is characterized by the ability to take advantage of local resources and local businessmen as well and the local people may certainly enjoying benefit from the additional value from their local agricultural products.

The development of superior agricultural commodity can be viewed as an application of agricultural development with its initial characteristics of competitive, democracy and sustainable. It means that the commodity should be supported with appropriate and innovative technology, market oriented and competitive, besides a large involvement of the local people and the use of its natural resources. These upstream and downstream agribusiness, by the spirit of democracy, environmentally friendly, and sustainable should able to perform decentralize characters of local and cultural superiority. The paradigm of agricultural development therefore is not only focusing on the increase of production, but also to change the capability to develop various efforts to produce the best commodity.

In determining the best commodity, combination of LQ, description scoring, and competitive analysis can be applied as an alternative. By using LQ analysis, if the result is more than one, it means that the region is better in producing a certain commodity compared to other regions. With respect to this commodity, its region is considered as a basis. Whereas through a description scoring, a commodity is considered as superior based on certain criteria. The commodity that meet the superior

Table 3. The Result of CPI Analysis.

Commodity type	LQ value	Superiority criteria value	Competitive Value		LQ Value	Superiority criteria value	Competitive Value		Alternative Value	Ranking
			PCR	DRC			PCR	DRC		
Corn	0.72	61.73	0.73	0.71	141,176	120,261	9,589	8,451	93,163	12
Peanut	1.48	58.87	0.07	0.07	290,196	114,689	100,000	85,714	160,792	3
Cassava	1.22	61.00	1.38	1.47	239,216	118,839	5,072	4,082	120,673	9
Chilli	1.58	64.73	0.49	1.15	309,804	126,106	14,286	5,217	146,309	5
Tomato	1.41	51.33	0.35	1.32	276,471	100,000	20,000	4,545	126,623	7
Legume	2.21	56.20	0.63	0.65	433,333	109,488	11,111	9,231	176,846	2
Papaya	4.94	66.90	0.21	0.23	968,627	130,333	33,333	26,087	351,635	1
Banana	1.49	60.27	0.59	0.13	292,157	117,417	11,864	46,154	143,316	6
Mangosteen	0.72	68.30	0.50	1.39	141,176	133,061	14,000	4,317	98,325	11
Durian	0.86	61.33	0.16	0.52	168,627	119,482	43,750	11,538	106,674	10
Mango	0.51	57.40	0.54	1.88	100,000	111,825	12,963	3,191	77,153	13
Rambutan	0.19	55.27	0.33	0.28	37,255	107,676	21,212	21,429	60,643	14
Chrysanthemum	0.96	62.33	0.19	0.06	188,235	121,430	36,842	100,000	125,569	8
Tuberose	1.63	61.00	0.16	0.29	319,608	118,839	43,750	20,690	153,084	4
Weight Criteria					0.3	0.4	0.15	0.15		

criteria may certainly able to contribute to the income as well the farmers' welfare if it focusly developed. On the other hand, competitively analysis indicated whether or not the commodity could be able to survive with or without government intervention. The combination of those three approaches will determine the best commodity in which focusly developed will give maximum result not only for the benefit of the respected farmers but also for the region as well. In other words the superior commodity may has a leverage role to accelerate the development of the region.

At this moment there are some sub-districts in Sukabumi which have become a basis for some food, vegetable, and fruit commodities with respect to each ecosystem. Unfortunately there was no any certain commodity that spread over the whole sub-district in Sukabumi. On the other hand, there was no any sub-district specializing on a certain commodity, either food, vegetable, fruit or ornamental plant. As a matter of fact, a policy provided by the government at the district of Sukabumi, as specifically mentioned in her strategic planning of 2011-2015, is just only related to production center area, focusing upon food security and agribusiness. This is the reason why Sukabumi is not known as production center of a certain commodity, like apple in Malang, duku in Palembang, mango in Indramayu or shallot in Brebes.

If agricultural development in Sukabumi focusing on a certain her superior commodity, either from its supply or its demand side related to its competitiveness, this commodity would certainly be able to leverage this district. It is in line with what was mentioned by Syafaat and Supena (2000) that a superior commodity should be viewed from its demand and its supply as well. From its supply, this commodity has a superiority in its cultivation which is adjustable to its local bio-physical and regional socio-economic condition, and the ability of the farmers to apply appropriate technology. The socio-economic condition may include farmers' ability in applying appropriate technology, accessibility upon the markets, and the existing infrastructure. Whereas from the demand side, a superior commodity has a strong demand due to its competitiveness, either for domestic or international market.

Based on the three approaches of analysis, papaya is a superior one with its value of LQ, PCR and DRC is 4.94, 0.21 and 0.23 respectively. The score for its superiority criteria is 66.9. Center of production of papaya in Sukabumi spread over 71 villages in 7 sub-districts of Kalapanunggal, Lengkong, Cibadak, Cicurug, Cidahu, Parakansalak, and Cikidang. Production of papaya in Sukabumi accounted to 30.93 per cent of papaya production in West Java.

Based on group of commodity, the frst one is peanut for cash crops, legume for vegetables, papaya for frits, and tuberose for ornamental plants. Each of of the superior commodity based on its group is possible to be develop in Sukabumi related to the availability of existed potential area in this district.

These ideal findings are not so easy to be imple-mented. Some deeper studies upon the characteristics of those identified commodities are necessary to be conducted for their development with respect to appropriate cultivation, competitiveness, the availablity of

local natural and human resources. The development of these commodities should also be supported with other facilities related to financial, equipment, information, infrastructure, transportation and other facilities. The successful of the efforts, socially and economically should also be supported by all potential aspects included appropriate strategic planning provided by the government at the district up until the village levels. For those reasons, every part of the region should be encouraged to compete fairly one with the other by taking advantage upon the identified superior potential sources and related development programme.

Conclusion

1. The superior one among those commodities is papaya. The contribution of this crop is 30.93 per cent of the total papaya produced in West Java.
2. The determination of superior commodity through the combination methods of LQ, description scoring and competitive analysis can be used as the best alternative to develop a superior one in the district region.

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