The Comparative Advantage of Fisheries Products: A Case Study of the West Kotawaringin District of Indonesia

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Abstract: The West Kotawaringin District is one of the areas in Indonesia that has potential in the fisheries sector. This study aims to investigate the comparative advantage(s) of the fishery industry in the district, and identify the fishery products that can be the base/leading products by using Location Quotient (LQ). This study further uses Klassen Typology to find out the development strategy for fishery products. The result of LQ shows that all of the sub-districts in the West Kotawaringin District have different leading fishery products that can be developed. Furthermore, the results of Klassen typology show that two are the primary products, 37 are developing products, and 11 are underdeveloped products.
Keywords: Fisheries commodities, Location Quotient, Klassen Typology, Indonesia.

INTRODUCTION

West Kotawaringin District with an area of 10,759 km is geographically located in the Central Kalimantan province of Indonesia. Considered the Regional Autonomy System, there are a lot of resources divided into several sectors that have contributed to the Gross Domestic Regional Product (GDRP) as well as the original local government revenue (PAD acronym in Indonesia) through local taxes and retribution in the West Kotawaringin District of Indonesia. Its agriculture is the leading sector, contributing 27.19% to the total GDRP of West Kotawaringin District [1].

Fishery is one of the potential comparative industries in the West Kotawaringin District. According to the Marine and Fisheries of West Kotawaringin 2015 report, the catch quantity of marine fisheries in the area reaches 10 thousand tons in 2014. However, the capacity of marine fisheries catchment is approximately 25 thousand tons per year, which implies that about half of the marine resources in the district are underutilized. Furthermore, there are three big rivers across six sub-districts, swamps and lakes that are potentiality related to the fisheries industry in the West Kotawaringin District. The aquaculture fishery, including pond, cage and brackish ponds cultivation in all sub-districts, has been increasing annually.

Fishery is the second largest contributor to the agriculture sector of the West Kotwaringin district after the farming sector. However, the fishery sector is decreasing, in line with the growth rate of agriculture sub-sector that is fluctuating. Thus, it is important to increase production and ensure that it is going to be on a growth track.

Since the regional autonomy is enacted in Indonesia, every region needs to understand its comparative and competitive advantage in natural resources. Hence, identification of the leading commodities in a region is important for regional development. Without any scrutiny on the comparative advantage of local businesses, local governments will have difficulty to initiate local development strategy and policy [1].

In order to know the base or leading commodities, the Economic Base Theory is used which classifies all economic activities into two commodities, namely the base and non-base commodities. Base or leading commodities are the commodities within the region that are intended for regional, national and international export, while the non-base commodities are commodities within the region that are produced

and only sufficient for the people within the region itself.

The purpose of this study is to identify the base or leading commodities of the fisheries industry in the West Kotwaringin district and develop related strategies to improve the industry. Through the identification of the base or leading commodities of fisheries industries that existed in the West Kotawaringin District, it is expected to initiate the generation of the base or leading commodities maps which can be useful for the local government or stakeholders in presenting a local development strategy for the fisheries industry. This study contributes to regional economic research.

LITERATURE REVIEW

In order to achieve regional economic development, local governments and communities must be able to manage and utilize local resources and establish partnership with each other to create jobs. Firstly, it is important to identify regional specialties with regard to its geographical conditions. The approach that can be used is Location Quotient analysis [2].

Munir [3] states that the basic concept of the regional development is the existence of a development policy based on the characteristics of the area by using the local potential including human, institutional and natural resources.

It is important to have a specific regional development strategy in Indonesia due to following reasons [4]: First, Indonesia is an archipelago in which its development is mainly centralized in Java, Sumatra, and Sulawesi islands. The centralization of development would cause problems in regional development. Second, past development strategy was overemphasized on land than ocean economies. Third, the quality and quantity of regional resources change with its geographic and ecological difference. Last but not least, a sustainable regional autonomy policy requires the local governments to develop the regions by utilizing local resources and capacities.

Richardson [5] proposed the economic base theory for the development of the regional economy. Richardson stated that the economic growth of a region is directly impacted by the demand of goods and services from outside regions. Thus, this theory distinguished base-sector and non-base-sector activities for regional development.

Hendayana [6] stated that identification of base/leading product is the first step in fishery development. The leading commodity is the one that has high productivity and has high added value. The determination of the leading or base commodity in the region should contribute to the economic growth and development of the region [7].

Not a few previous studies use Location Quotient (LQ) to identify regional product with comparative advantage product:

Yulistyo [8] showed that the Semarang district of Indonesia has comparative advantage in agropolitant, with types of superior agribusiness products such as horticultural, especially vegetables, crops, fruits, ornamental plants and medicinal. However, the weaknesses and threats of the Semarang district are agribusiness management regulations. The results of SWOT analysis show the agribusinesses in the area are weak and highly threatened.

Sucipto [9] conducted an LQ research on Blega Sub-district, Bangkalan district and Madura. Results show some superior products in Blega Subdistrict, namely food crops including rice, corn, peanuts and cassava, vegetables and chili, fruits including guava, sapodilla, bananas, mango, jackfruit and durian, and other products such as coconut, cotton, cashew, and chilly herbs.

A study of Yulianto and Santoso [8], mapped the base/leading product of each sub-district along the south cross road (JLS) of East Java that crossed from Tulungagung district to Trenggalek District. This study used LQ analysis and results show that commodities such as rice paddy, upland rice, corn, peanuts, soybeans, cashew, coconut, kapok, cloves, sengon, acacia, capture fisheries, beef cattle, goats, iron sand and marble are the potential commodities that existed in the sub-district within those two districts.

Oksatriandhi and Santoso [10] conducted their research in the Pasaman district by using LQ and DLQ. They found out that the products in the Pasaman district identified to be base/leading products are rice field, paddy fields, peanuts, bananas, mangoes, chili, spinach, rubber, cocoa, and palm oil.

The study site

The study site of this paper is the West Kotawaringin District of the Central Kalimantan Province, Indonesia. This district is selected for its fisheries potential. The district consists of six sub-districts including Arut Selatan, Kotawawringin Lama, Arut Utara, Kumai, Pangkalan Lada, and Pangkalan Banteng. As shown in Figure 1, the district has favourable geographic position; the south is directly adjacent to the Java Sea, which is renowned for abundant fishery resources in terms of both quantity and diversity.

Based on the data of the department of Regional Finance Management of West Kotawaringin

[1], the contribution of the fisheries sub-sector to the original local government revenue of the West Kotawaringin District is about 279 million Rp. [1] during the period of 2010-2014. That was small compared with the contribution values of the other 17 departments that existed in the West Kotawaringin.

The catchment quantity of marine fishing in the West Kotawaringin District in 2014 is 10 thousand tons with the value of 252 billion Rp. The 18 products are presented in Table 1. The capacity of marine fishery in the area is 25 thousand tons per year. Compared with the recently catchment quantity, the marine fishing only utilized around 42 % and still has the potential to develop.
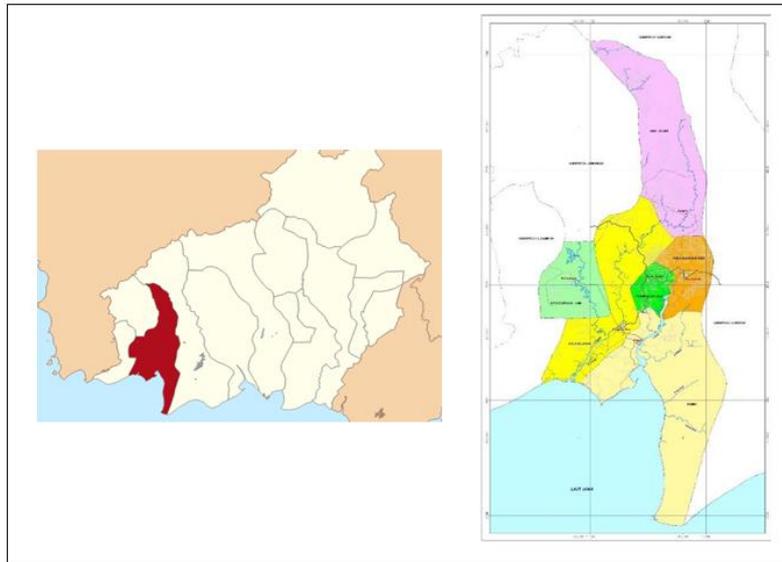
Fig-1: Administrative maps of West Kotawaringin District (Scale 1:330.000)
Sources: Google Image [14]

Table-1: The Quantity and Value of Marine Fishing of 2014

No	Product Name	Catchment (Tons)	Catchment (Rp.000)
	Fish		
1	Manyung fish	603.7	3,774,450
2	White pomfret	199.6	6,853,500
3	Black pomfret	281.8	4,204,700
4	Gutter fish	301.4	2,275,450
5	White Snapper fish	508.8	11,814,600
6	Mullet fish	369.8	7,036,700
7	Senangin fish	538	11,528,150
8	Crayfish	665.6	14,842,200
9	Chub mackerel	804.9	10,087,050
10	Spanish mackerel	1,132.8	23,648,100
11	Leopard stingray	356.2	2,550,200
12	Others fish	659.9	6,081,500
	Crustacean		
13	Red shrimp	684.4	23,481,200
14	White shrimp	779.2	42,856,000
15	Other shrimp	1,185.3	34,184,000
16	Mud Crab	569.8	21,856,000
17	Blue Swimmer Crab	646.3	22,615,600
18	Others Crab	242.6	2,338,800
	Total	10,602.1	252,028,200

Sources: The department of Marine and Fisheries of the West Kotawaringin[3]

The potential of inland water fishing is seen in the existing rivers, lake and swamps in the district. The three water ecosystems record a total catchment quantity of 1,560.3 tons that are comprised of 12 products as presented in Table 2.

Besides fishing activities, the aquaculture fisheries in this district has also the potential to develop, as reflected by the existence of aquaculture systems in the West Kotawaringin such as ponds, cage and brackish ponds systems that spread into six sub-districts within the West Kotawaringin such as South Arut, North Arut, Kumai, Pangkalan Lada, Kotawaringin Lama and Pangkalan Banteng. This aquaculture economy has increased annually from 1323.93 tons in 2010 to 3372.23 tons in 2014 with the average of 2,491 tons.

Table-2: The Quantity and Value of Inland Water Fishing of 2014

No	Product	Catchment (Tons)	Catchment (Rp.000)
	Fish		
1	Climbing perch fish	149.6	4,401,531
2	Mystus	119	2,888,011
3	Giant snakehead	47.9	1,420,810
4	Stripped snakehead	216.3	3,989,005
5	Marble goby fish	30.4	2,449,510
6	Catfish	71.3	1,415,804
7	Kissing gourami	113.6	2,575,312
8	Asian knifefishes fish	95.5	3,306,019
9	Jambal fish	122.6	2,715,345
10	Glass Catfish	147.3	2,869,846
11	Other fish	374.8	3,574,093
	Crustacean		
12	Giant freshwater shrimp	72.3	4,338,000
	Total	1,560.6	35,943,286

Sources: The Department of Marine and Fisheries, West Kotawaringin [3]

This upward trend reflects that the local community needs fish products due to the fact that most local communities have the habit of putting fish on their main menu every day.

Table-3: Average Production of Aquaculture during 2010 – 2014 Units: tons

No	Product	Production Quantity					
		1	2	3	4	5	6
1	Goldfish	95.5	13.3	0.8	1.5	10.5	10.4
2	Nile	599.9	88.4	18.9	45.2	41.7	61.5
3	Mekong Catfish	347.1	42.6	13.8	23.2	15.3	25.9
4	Catfish	16.2	3.8	0.6	4.8	15.2	13.1
5	Pomfret fish	21.7	0.0	0.0	0.0	0.0	0.0
6	Giant Snakehead fish	2.5	2.9	0.2	0.2	0.0	0.0
7	Milk Fish	114.6	0.0	0.0	400.9	0.0	0.0
8	Others Fish	8.6	3.5	0.0	0.3	0.7	0.6
9	Giant Tiger Prawn	10.7	0.0	0.0	63.6	0.0	0.0
10	Other prawn	24.6	0.0	0.0	57.6	0.0	0.0
11	Seaweed	0.0	0.0	0.0	269.2	0.0	0.0
	Total	1,241.3	154.5	34.3	866.5	83.3	111.5

Sub-district codes: 1. South Arut, 2. Kotawaringin Lama, 3. North Arut, 4. Kumai, 5. Pangkalan Lada, 6. Pangkalan Banteng

It corresponds to the data from the department of Marine and Fisheries of West Kotawaringin [1], reporting that the local fish consumption is 45.27 Kg per capita and the quantity is higher than national fish consumption levelof 38.14 Kg per capita.

The fish-processing sector in the district consists of frozen (3,540 tons), dried (300 tons), salting (1,905 tons), fish flour (180 tons), shrimp paste (72,96 tons), crab meat (96 tons), jerky fish (36 tons), fish steam (24 tons) and others (11,04 tons). Among all, frozen has the highest value of about 121.800.000.000 Rp. being one of the profitable businesses in the area.

DATA AND METHODS
Data
This study uses secondary data collected from three departments in the West Kotawaringin District, including the annual data production of fisheries industry from the department of Marine and Fisheries, annual financial regional repot from Regional Finances Management, and additional data from Central Bureau of Statistics.

Method
Location Quotient (LQ)
According to Miller, Gibson, and Wright [11] in Darmawansyah [12], the Location Quotient (LQ) is often used to identify the base products. The formula of LQ is expressed as follows:

$$L = \frac{li/e}{Li/E}$$

Where :
Where:

li = The total production quantity of i product in a sub-district.

e = The total production quantity of all fish products from aquaculture in a Sub-district.

Li = The total production quantity of i fish product from aquaculture fisheries in a district.

E = The total production quantity of all fish products from aquaculture fisheries in a district.

The interpretation of LQ analysis will be based on sub-district level with the provision as follows:

LQ > 1 indicates a relative concentration of the product in the area compared with other areas in the district. It means that (i) product is the product with a comparative advantage in the area.

LQ = 1 indicates a product without comparative advantage. The production of that i product sufficient only to meet the needs of the sub-district itself.

LQ < 1 indicates that a product is non-base, which means that the product in a particular area has no comparative advantage, the production is insufficient to meet local needs, thus supply is needed from outside sub-district.

This study compares the production quantity of each type of catchment and cultivated fish of the fishery industry with the production of the same type of fish in district level.

Klassen Typology
Klassen Typology is used to classify the fishery products into four categories: prime product, developing product, potential product, and underdeveloped product. This analysis is based on the growth rate of product contributions and averages of product contributions to GDRP of the West Kotawaringin [13].

Table-4: Klassen Typology Matrix of Fisheries product

Average Growth Rate of Product / Average Contribution of Product	High Contribution The contribution of i product ≥ The contribution of West Kotawaringin GRDP	Low Contribution The contribution of i product ≤ The contribution of West Kotawaringin GRDP
High Growth (rProduct i ≥ rGRDP)	Prime Product	Developing Product
Low Growth (rProduct i ≤ rGRDP)	Potential Product	Underdeveloped Product

Sources: Sjafrizal [15]
Where; Where rProduct i is growth rate of fisheries (i) product in the West Kotawaringin District;
rGDRP is growth rate of GRDP of West Kotawaringin District

RESULTS AND DISCUSSION
Location Quotient (LQ)
Table 5 is the result of LQ on aquaculture products in the six sub-districts of the West Kotawaringin District during 2010 – 2014.

APPENDIX
Appendix 1 Growth Rate of Production Value of Fisheries Product in West Kotawaringin District

Table-5: LQ result for aquaculture products

No	Product	LQ Value				
		1	2	3	4	5
1	Goldfish	1.5	1.6	0.5	0.0	2.4
2	Nile	1.4	1.7	1.6	0.2	1.5
3	Mekong catfish	1.5	1.5	2.1	0.1	1.0
4	Catfish	0.6	1.1	0.8	0.3	8.5
5	Pomfret fish	2.0	0.0	0.0	0.0	0.0
6	Snake head fish	0.9	8.1	2.8	0.1	0.0
7	Milk fish	0.4	0.0	0.0	2.2	0.0
8	Other fish	1.3	4.1	0.0	0.1	1.5
9	Giant tiger prawn	0.3	0.0	0.0	2.5	0.0
10	Other prawn	0.6	0.0	0.0	2.0	0.0
11	Seaweed	0.0	0.0	0.0	2.9	0.0

Notes: 1 is South Arut, 2 Kotawaringin Lama, 3 North Arut, 4 Kumai, 5 Pangkalan Lada and 6 Pangkalan Banteng.

Table 5 shows

- **South Arut sub-district**

The result of LQ for the South Arut sub-district shows that gold fish, nile, mekong catfish, and pomfret fish have an LQ higher than one, which means those products are the leading products in the area. In particular, pomfret fish is the product with the highest LQ value among all products and cross districts.

- **Kotawaringin Lama sub-district**

The gold fish, nile, mekong catfish, catfish, and giant snakehead are the products with comparative advantage in the Kotawaringin Lama sub-district (LQ> 1) and have the potential for export to supply the demands for the products in other sub-districts. In particular, giant snakehead is found to be the product with the highest LQ value.

- **North Arut sub-district**

In this sub-district, it shows that nile, mekong catfish, and giant snakehead are the leading products in the sub-district. This result indicates that the production of the three products is sufficient to meet local needs and can further export to other sub-districts.

- **Kumai sub-district**

The milkfish, giant tiger prawn, and seaweed are the leading products in the Kumai sub-district. Moreover, the three products are the products with the highest LQ value. This result indicates that the three products have the opportunities to be exported and supply the demands of other sub-districts for those three products.

- **Pangkalan Lada sub-district**

The result of LQ analysis in terms of production in Pangkalan Lada sub-district shows that goldfish, nile, mekong catfish, and catfish have base / leading positions in Pangkalan Lada sub-district since the LQ value of these products is higher than one. The values indicated that catfish has the potential for export to other sub-districts.

- **Pangkalan Banteng sub-district**

The result of LQ analysis on the Pangkalan Banteng sub-district shows that goldfish, nile, mekong catfish, and catfish are the base / leading product in the area. This result indicates that the production of those fish products has the potential for export to other sub-districts.

Klassen Typology

The classifications of fishing, aquaculture and fish-processing products are based on two indicators such as average of the growth rate value and average of the contribution value of each product. This, compared with the average of the growth rate of GRDP of West Kotawaringin District and the average contribution of GRDP value the West Kotawaringin District toward the GRDP of Central Kalimantan province, has the higher level. The results are presented in Tables 6-9.

Table-6: Klassen Typology of Marine Fishing Products

No	Product	1	2	3	4	5
1	Manyung fish	0.30	12.74	92.96	6.87	Developing
2	Black pomfret	0.45	12.74	51.89	6.87	Developing
3	White pomfret	0.94	12.74	11.68	6.87	Developing
4	Gutter fish	0.21	12.74	57.60	6.87	Developing
5	White snapper fish	1.80	12.74	6.99	6.87	Developing
6	Mullet fish	1.13	12.74	0.68	6.87	Underdeveloped
7	Senangin fish	1.89	12.74	1.10	6.87	Underdeveloped
8	Crayfish	2.35	12.74	4.65	6.87	Underdeveloped
9	Chub mackerel	1.04	12.74	33.71	6.87	Developing
10	Spanish mackerel	2.99	12.74	15.76	6.87	Developing
11	Leopard stingray	0.48	12.74	-6.80	6.87	Underdeveloped
12	Others fish	0.95	12.74	0.73	6.87	Underdeveloped
13	Red shrimp	3.11	12.74	9.34	6.87	Developing
14	White shrimp	7.93	12.74	-8.34	6.87	Underdeveloped
15	Others shrimp	6.13	12.74	-0.32	6.87	Underdeveloped
16	Mud crab	4.29	12.74	-9.25	6.87	Underdeveloped
17	Blue swimmer crab	4.16	12.74	-4.99	6.87	Underdeveloped
18	Other crab	0.38	12.74	-6.37	6.87	Underdeveloped

Notes: 1 is Fisheries Product Contributions; 2 The Contribution of GRDP West Kotawaringin on GRDP of Central Kalimantan Province; 3 The Growth Rate of Product, 4 The Growth Rate of GRDP of West Kotawaringin District, and 5 Product Categories.

Table 6 above shows that all the products of marine fishing can be classified into two categories: developing and under-developed categories. The former includes manyung fish, black pomfret, white pomfret, gutter fish, white snapper fish, chub mackerel, spanish mackerel, red shrimp, and the latter includes mullet fish, senangin fish, crayfish, leopard stingray, other fish, white shrimp, other shrimps, mud crab, blue swimmer crab, and other crab product.

Table 7 shows that fish classified as developing category are mystus, stripped snakehead, kissing gourami, asian knifefishes fish, jambal fish, glass catfish, giant snakehead, marble goby, catfish, and others. Meanwhile, giant freshwater shrimp is found to be the only one product of inland-water fishing that is classified into underdeveloped category.

Table-7: Klassen Typology of Inland-water Fishing Products in West Kotawaringin

No	Product	1	2	3	4	5
1	Climbing perch fish	0.69	12.74	15.45	6.87	Developing
2	Mystus	0.41	12.74	18.19	6.87	Developing
3	Stripped snakehead	0.61	12.74	8.45	6.87	Developing
4	Kissing gourami	0.37	12.74	7.60	6.87	Developing
5	Asian knifefishes fish	0.46	12.74	19.62	6.87	Developing
6	Jambal fish	0.35	12.74	32.90	6.87	Developing
7	Glass catfish	0.42	12.74	18.03	6.87	Developing
8	Giant snakehead	0.22	12.74	14.54	6.87	Developing
9	Marble goby fish	0.33	12.74	55.90	6.87	Developing
10	Catfish	0.22	12.74	13.42	6.87	Developing
11	Other fish	0.50	12.74	28.42	6.87	Developing
12	Giant freshwater shrimp	0.78	12.74	3.45	6.87	Underdeveloped

1) The Fisheries Product Contributions, 2) The Contribution of GRDP West Kotawaringin on GRDP of Central Kalimantan Province, 3) The Growth Rate of Product, 4) The Growth Rate of GRDP of West Kotawaringin District, 5) Product Categories.

The aquaculture products are classified into two categories including developing product and underdeveloped product categories. The former includes goldfish, nile, mekong catfish, pomfret fish, snake head fish, catfish, milkfish, other prawn, and seaweed, and the latter only includes Giant tiger prawn.

Table-8: Klassen Typology of Aquaculture Products

No	Product	1	2	3	4	5
1	Goldfish	0.76	12.74	28.37	6.87	Developing
2	Nile	5.47	12.74	27.05	6.87	Developing
3	Mekong catfish	2.63	12.74	59.71	6.87	Developing
4	Pomfret fish	0.12	12.74	467.22	6.87	Developing
5	Snake head fish	0.03	12.74	19.31	6.87	Developing
6	Catfish	0.18	12.74	155.77	6.87	Developing
7	Milk fish	1.79	12.74	13.24	6.87	Developing
8	Other fish	0.13	12.74	52.45	6.87	Developing
9	Giant tiger prawn	0.12	12.74	-18.81	6.87	Underdeveloped
10	Other prawn	0.15	12.74	44.79	6.87	Developing
11	Seaweed	0.03	12.74	61.11	6.87	Developing

1) The Fisheries Product Contributions, 2) The Contribution of GRDP West Kotawaringin on GRDP of Central Kalimantan Province, 3) The Growth Rate of Product, 4) The Growth Rate of GRDP of West Kotawaringin District, 5) Product Categories.

Table 9 shows that the fish-processing products can be classified into two categories such as primary products and developing products. Frozen fish products and fish crackers are classified into primary category, while dried-fish, salted-fish, smoked-fish, fish flour, shrimp paste, crab meat, fish jerky and steamed-fish are in the developing product category.

Table-9: Klassen typology of Fish-Processing Products

No	Product	1	2	3	4	5
1	Frozen ish	19.78	12.74	14.29	6.87	Primary
2	Dried-fish	1.24	12.74	16.67	6.87	Developing
3	Salted-fish	4.53	12.74	25.24	6.87	Developing
4	Smoked-fish	0.03	12.74	44.00	6.87	Developing
5	Fish Cracker	13.93	12.74	16.89	6.87	Primary
6	Fish Flour	0.03	12.74	100.00	6.87	Developing
7	Shrimp Paste	0.26	12.74	32.73	6.87	Developing
8	Crab Meat	2.58	12.74	25.00	6.87	Developing
9	Jerky Fish	0.48	12.74	11.11	6.87	Developing
10	Steamed Fish	0.16	12.74	20.00	6.87	Developing
11	Others	0.13	12.74	35.28	6.87	Developing

1) The Fisheries Product Contributions, 2) The Contribution of GRDP West Kotawaringin District on GRDP of Central Kalimantan Province, 3) The Growth Rate of Product, 4) The Growth Rate of GRDP of West Kotawaringin District, 5) Product Categories.

CONCLUSION

LQ indicators show that 6 sub-districts in the West Kotawaringin District have their own leading products. This finding indicates that each sub-district has a comparatively advantageous product that can be exported to other sub-districts. South Arut and Kumai sub-district have one product with LQ > 1 in each of these two districts, whereas the same product in other district has LQ < 1 such as pomfret fish in South Arut sub-district, milk fish, giant tiger prawn, other prawn and seaweeds in Kumai sub-district.

The results of Klassen Typology show that frozen-fish products and fish-cracker products are classified into the prime products. The developing product category includes 37 products. This finding indicates that most of the fishery products in the Kotawaringin district have an opportunity to develop, because the products in the developing category have

increased yearly. Therefore, local government should put more efforts to increase these products for the regional economic development of the West Kotawaringin District.

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Table-10: Growth Rate of Production Value of Marine Fishing catchment of West Kotawaringin in 2012 – 2014 (%)

No	Product	Years		
		2012	2013	2014
1	Manyung fish	27.48	18.09	233.31
2	Black pomfret	-6.43	124.11	37.98
3	White pomfret	-3.62	19.92	18.73
4	Gutter fish	20.28	20.78	131.75
5	White snapper fish	5.36	9.49	6.12
6	Mullet fish	-5.35	8.38	-1.00
7	Senangin fish	1.16	3.67	-1.54
8	Crayfish	6.22	4.68	3.05
9	Chub mackerel	-11.41	-1.05	113.59
10	Spanish mackerel	-2.81	6.66	43.43
11	Leopard stingray	-1.25	-5.72	-13.42
12	Others fish	-10.09	8.74	3.54
13	Red shrimp	-17.86	20.23	25.64
14	White shrimp	-11.41	2.74	-16.33
15	Others shrimp	13.51	-6.03	-8.43
16	Mud crab	-9.30	5.31	-23.78
17	Blue swimmer crab	-5.80	8.99	-18.17
18	Other crab	-20.27	-3.86	5.02

Sources: Processed Data, 2016

Table-11: Growth Rate of Catchment Value of Inland Water Fishing of 2012 – 2014 (%)

Product	Years		
	2012	2013	2014
Climbing perch fish	23.71	2.97	19.67
Mystus	13.77	-6.37	47.18
Stripped snakehead	-2.43	4.63	23.16
Kissing gourami	-15.50	0.25	38.06
Asian knifefishes fish	6.91	13.72	38.24
Jambal fish	25.37	12.46	60.88
Glass catfish	13.76	3.69	36.62
Giant snakehead	20.61	5.29	17.70
Marble goby fish	102.98	12.30	52.43
Catfish	13.79	5.61	20.86
Other fish	35.51	4.54	45.20
Giant freshwater shrimp	6.89	-0.82	4.29

Sources: Processed Data, 2016

Table-12: Growth Rate of Production Value of Aquaculture Fisheries 2012 – 2014 (%)

Product	Years		
	2012	2013	2014
Goldfish	34,77	31.00	19.34
Nile	15.01	33.88	32.24
Mekong catfish	126.75	6.19	46.20
Pomfret fish	110.42	124.95	1166.29
Snake head fish	91.27	-20.47	-12.87
Catfish	53.50	17.41	396.41
Milk fish	34.65	35.19	-30.11
Other fish	68.86	148.40	-59.91
Giant tiger prawn	-70.81	-36.41	50.79
Other prawn	18.08	359.73	160.37
Seaweed	15.91	-62.02	229.43

Sources: Processed Data, 2016

Appendix 2: The Calculation of Contribution Value of Fisheries Product in West Kotawaringin District

Table-13: The Product Contributions of Marine Catchment Products in West Kotawaringin District of 2012 – 2014 (%)

Product	Years		
	2012	2013	2014
Manyung fish	0.18	0.18	0.55
Black pomfret	0.25	0.50	0.61
White pomfret	0.89	0.94	1.00
Gutter fish	0.15	0.16	0.33
White snapper fish	1.88	1.81	1.72
Mullet fish	1.21	1.16	1.02
Senangin fish	2.09	1.90	1.67
Crayfish	2.55	2.34	2.16
Chub mackerel	0.88	0.77	1.46
Spanish mackerel	2.86	2.68	3.43
Leopard stingray	0.58	0.48	0.37
Others fish	1.00	0.96	0.88
Red shrimp	2.88	3.04	3.41
White shrimp	9.22	8.33	6.22
Others shrimp	7.35	6.07	4.96
Mud crab	5.04	4.66	3.17
Blue swimmer crab	4.69	4.49	3.28
Other crab	0.43	0.36	0.34

Sources: Processed Data, 2016

Table-14: The Product Contributions of Inland-Water Catchment Products 2012 – 2014 (%)

Product	Years		
	2012	2013	2014
Climbing perch fish	0.66	0.60	0.81
Mystus	0.39	0.32	0.53
Stripped snakehead	0.57	0.53	0.74
Kissing gourami	0.34	0.30	0.48
Asian knifefishes fish	0.39	0.39	0.61
Jambal fish	0.28	0.27	0.50
Glass catfish	0.37	0.34	0.53
Giant snakehead	0.21	0.20	0.26
Marble goby fish	0.26	0.26	0.45
Catfish	0.21	0.19	0.26
Other fish	0.44	0.40	0.66
Giant freshwater shrimp	0.81	0.71	0.84

Sources: Processed Data, 2016

Table-15: The Product Contributions of aquaculture / fish cultivation Products in West Kotawaringin District of 2012 – 2014 (%)

Product	Years		
	2012	2013	2014
Goldfish	0.67	0.77	0.82
Nile	4.60	5.41	6.39
Mekong catfish	2.51	2.34	3.05
Pomfret fish	0.01	0.03	0.31
Snake head fish	0.04	0.02	0.02
Catfish	0.08	0.08	0.37
Milk fish	1.83	2.18	1.36
Other fish	0.10	0.21	0.08
Giant tiger prawn	0.12	0.10	0.14
Other prawn	0.17	0.08	0.19
Seaweed	0.04	0.01	0.04

Sources: Processed Data, 2016

Table-16: The Product Contributions of Fish-Processing Products in West Kotawaringin District of 2012 – 2014 (%)

Product	Years		
	2012	2013	2014
Frozen Fish	19.31	19.81	20.22
Dried Fish	1.18	1.24	1.30
Salted Fish	3.89	4.57	5.12
Smoked Fish	0.02	0.03	0.04
Fish Cracker	13.22	13.98	14.60
Fish Flour	0.00	0.00	0.08
Shrimp Paste	0.21	0.27	0.32
Crab Meat	2.22	2.60	2.90
Jerky Fish	0.49	0.48	0.48
Steamed Fish	0.15	0.16	0.17
Others	0.10	0.13	0.16

Sources: Processed Data, 2016

Appendix 3 the Calculation of West Kotawaringin District GRDP Contributions to Central Kalimantan Province GRDP in 2012 – 2014.

GRDP of Central Kalimantan Province in 2012 – 2014 (Rp. 000)

2012	2013	2014	Average
6,464,917,000	6,941,099,000	7,372,487,000	6,926,167,667

GRDP of West Kotawaringin District in 2012 – 2014 (Rp. 000)

2012	2013	2014	Average
823,929,394	881,236,285	942,498,766	882,554,815

GDRP Contributions = x 100%
 = x 100%
 = 12,74%