

## Corn Commodity Value Chain Analysis and Strategy in Increasing Farmers' Income in Gorontalo Province, Indonesia

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### Abstract

The objectives of this study are to find out the profile of the potential agricultural resources particularly corn and to get the result of chain analysis of corn commodity value in Gorontalo Province. Besides, through a value chain analysis there are some important things can be formulated namely the strategy to strengthen the value chain, the proposed interventions, and the formulation of the development master plan which in turn will contribute to increase corn farmers' income in this province. Descriptive quantitative method and SWOT analysis were used in this research. The results show that agricultural potential of corn in Gorontalo Province in 2012 consisted of: a. the harvested area was 135,543 Hectare (ha), b. the production was 644,754 Ton, c. the productivity average was 47.57 Kw/ha, and d. the number of corn farmers was 165,858 or approximately 63.84% of 259.798 as the total farmers in Gorontalo province. The value chain analysis provides strategic issues in improving corn commodity consisting of three categories, they are: firstly; before planting, include: a. aspects of financial for the procurement of seed and fertilizer, b. land clearing disregarding the environmental aspects. Secondly; cultivation, include: a. farmer's knowledge of good farming practices, b. land conditions (slope), and the last is after planting, include: a. cash management, b. limitations of post-harvest facilities, c. farmers' weak bargaining position on the selling price, and d. infrastructure and transportation of crops that still need to be developed. Besides, there are some barriers in the development of corn commodity in this province: first; the lack of integration between the corn production with industrial needs, second; weaknesses in the application of a good cultivation process and stages, third; post-harvested handling is not maximal yet due to the loss of some of the crops and the declining quality of corn, and fourth is the weaknesses of supporting institution capacity at the level of farmers group (*POKTAN*) and its associations (*GAPOKTAN*) which make farmers have weaker bargaining position, limited access to information, capital, and technological resources.

**Keywords:** Chain analysis, Corn commodity value, Farmers' income

### Introduction

Based on the guidance of National Priority Research (called PENPRINAS) of Indonesian Master Plan in Accelerating and Widening Economic Development (known as MP3EI 2011-2025), Gorontalo province includes in Corridor Four Sulawesi where the theme of economic development is the production and processing center of agricultural, plantation, fisheries, oil and gas, and nationwide mining. This corridor main economic concerns are food crops (rice, corn, soybean, cassava), cocoa, fisheries (marine), nickel, oil and gas. Therefore, the focus of this research is the analysis of corn commodity value chain and strategy in increasing farmers' income in order to support the implementation of MP3EI in Corridor Four Sulawesi particularly in Gorontalo Province.

This research is taken based on the real condition of Gorontalo Province which has lower GDP per capita ADHB compared to the national average. In 2011, its GDP per capita of ADHB reached Rp. 8,612,114 ([gorontalo.bps.go.id](http://gorontalo.bps.go.id)). Meanwhile, national GDP Per Capita of ADHB in 2011 was Rp. 29.9 million (BPS, 2012). In addition, the population in this province was as many as 1,040,164 persons (Population Census, BPS, 2010). While the number of its poor people in March 2011 were 198.270 persons or 19.06% of the total population.

Based on the structure of GDP of ADHB in 2011, Gorontalo's economy was supported by four main sectors, namely, agriculture (29.43%), services (26.93%), trade, hotels and restaurants (10.74%) and financial & business services (10.41%). The contribution of food crops sub-sector particularly corn was relatively high, reaching 45.31% of the total agricultural sector and 13.33% to the total GDP (BPS, 2012). For some decades, it is predicted that the agricultural sector is still the foundation of economic growth of this province. Most of Gorontaloese income is still heavily depending on the agricultural sector, approximately 50-60% of the available workforce (BPTP Gorontalo, 2012).

Gorontalo province has some kinds of major commodities, namely: crops, horticulture, plantation and livestock. Based on BPS data in 2011, rice field harvested area was 52.811 (ha) and corn harvested area was 135.754 (ha).

The largest corn harvest area are in two districts namely, Pohuwato and Boalemo which have 63.806 (ha) and 39.727 (ha) respectively. Meanwhile, the production of corn in Gorontalo Province in 2011 reached 605.781 Tons.

In addition, corn which is identic to Gorontalo has also become a potential export commodity in the future. During 2011, it was able to export as many as 18,000 Tons of corn to the Philippines and Malaysia. Corn commodity has also become a brand image of this province as the producer of quality corn especially for animal feed. Therefore, in November 2012, this province hosted the International Corn Conference (IMC) which was attended by the corn experts, companies and institutions from around the world.

The aims of this study are to produce: 1) the potential profile of agricultural resources consisting of corn harvested area, production, productivity, number of farmers, POKTAN, GAPOKTAN, and the number of poor people in each district/city in this province, 2) the analysis of corn value chain in this province which is analyzed from the aspects of productions and markets, business environment, supporting actors, marketing and distribution of added value, stakeholders and institutional, as well as a SWOT analysis.

The expected impact of this study are: 1) the profile of potential agricultural resource of corn will be a valuable input for the government in implementing programs and development activities regarding to agricultural in each district in this province, 2) the results of corn value chain analysis will also be important input for the government to support poverty diminishing programs and for private sectors who are interested in investing their capital, 3) the profile of potential agricultural resource of corn and its derived products value chain analysis will be valuable input in making alternative policies that can be used by either the district or provincial government which in turn can actually increase the number of productions and corn-farmers' income in this province.

## **Methodology**

This research was conducted in all Districts/City in Gorontalo Province, where the locus of research were in: Department of Agriculture and Food Sustainability, Agricultural Advising Board, Corn Information and Advising Board (known as BPIJ), District Development Planning Board (called BAPPEDA), and POKTAN/GAPOKTAN. The research was done from July to November 2013.

The research was done based on the programs, activities, and outputs throughout the implementation of the activities. Since, the outputs are; 1) the profile of potential agricultural resource of corn in all Districts/City in Gorontalo Province, and 2) the analysis of corn value chain in this province which is analyzed from the aspects of productions and markets, business environment, supporting actors, marketing and distribution of added value, stakeholder and institutional analysis, so descriptive quantitative method was used.

Data were collected by using; 1) observation, 2) interview, 3) questionnaire, and 4) Focus Group Discussion (FGD). To achieve the aims of study, a series of activity carried out during this study included: 1) desk study and review of secondary data; 2) workshops and meetings with relevant stakeholders in order to get the latest information and to introduce the analysis of value chain; 3) develop a design study / questionnaire for the actors of the value chain, namely; farmers, traders and related boards (local governments, POKTAN/GAPOKTAN, banks); 4) site visits and in-depth interviews to value chain actors; 5) limited discussion (FGD) with relevant stakeholders to review the initial findings of the study and to explore the input for the formulation of strategic and potential areas of intervention; and 6) presentation and discussion about the results of the study along with stakeholders to get an agreement towards the implementation of value chain upgrading strategy. In analyzing the data, descriptive quantitative and SWOT analysis were used.

## **Research Findings and Its Implication**

### **A. Potential Corn Resources in All Districts/City in Gorontalo Province**

#### **1. Production**

Gorontalo Province is one of corn production regions in Indonesia which contributes up to 4% of the total national corn production. As one of the leading commodities in this province, corn commodity were fluctuated over the last five years (2008-2012).

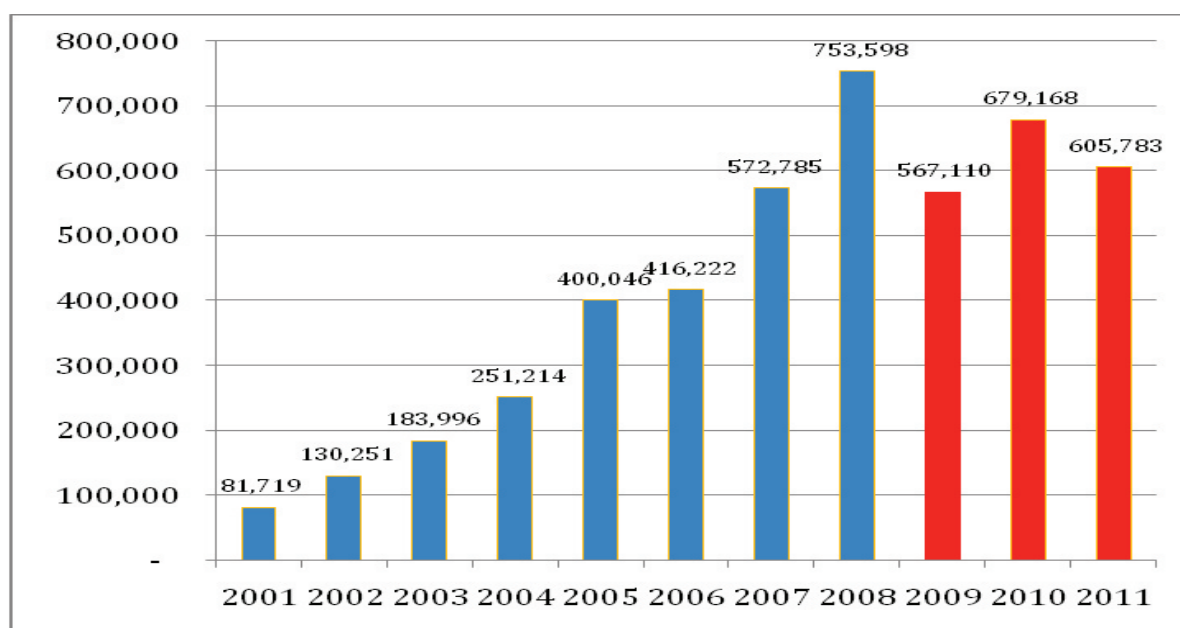
Table 1. Planted area, harvested area, production and productivity of corn in Gorontalo

	2008	2009	2010	2011	2012
Planted Area/Land (Ha)	136.087	156.898	105.479	164.999	147.264
Harvested Area/Land (Ha)	119.027	156.436	124.798	143.833	135.754
Productivity (Ku/Ha)	48,12	48,17	45,60	47,22	44,62
Production (Ton)	572.785	753.598	569.110	679.168	692.451

Sources: Fixed Rate Data (ATAP) 2007-2012 of Statistical Center Board (BPS) and the Department of Agriculture and Food Sustainability of Gorontalo Province, 2013.

Regarding to corn production in 2012, Pohuwato District was the highest at 339.509 Tons, Boalemo District was 186.402 Tons, Gorontalo District was 120.960 Tons, North Gorontalo District was 26.675 Tons, Bone Bolango District was 18.740 Tons and the lowest was Gorontalo City got 165 Tons.

Diagram 1. The figure of corn production in Gorontalo province in 2001-2011 (in Tons)



Source: Based on data from the Department of Agriculture and Food Sustainability, 2012

Fluctuation also occurred in corn productivity. In the graph below, it is seen that the productivity of corn commodity decreased in 2011 compared to 2010. This is caused by several factors, such as; (1) due to climate anomaly or weather uncertainty, (2) the chosen sampling areas determined by BPS were not good enough for plantation cycle, (3) The implemented model called SLPTT (Open School for Integrative Planting Preservation) has not yet covered the whole region, (4) some farmers decided to be miners which made numbers of uncultivated land were increased, (5) the delay of seeds distribution to POKTAN, (6) the used of corn cultivation technology was still lack.

Diagram 2. Corn Productivity Trends in Gorontalo Province (2007 -2011)



Sou

rces: Department of Agriculture and Food Sustainability, Gorontalo Province, 2012

## 2. Marketing

The corn production of this province is still marketed to other regions particularly to supply the raw materials for animal feed in several regions in Indonesia. From the available data, it is seen that the inter-island shipping corn from Gorontalo reached 70%, while the rest were for export (30%) to some countries such as Malaysia, the Philippines, and Korea. In 2012, PT. Mitra Makmur Mandiri Agri Gorontalo exported 4,000 Tons of corn to Vietnam.

Table 2. Corn Commodity Export from Gorontalo Harbor

Year	Inter-Island	Export	Countries	
			Malaysia	Filipina
2009	29.420	28.542	9.400	19.142
2010	88.025	17.000	13.000	4.000
2011	73.675	-	-	-

Source : Gorontalo Harbor, 2011

Table 3. Corn Commodity Loading in Gorontalo Harbor in 2007-2012

Year	Inter-Island	Export/Ton	Number
2007	87.581	83.448	171.029
2008	97.797	79.385	177.182
2009	58.550	42.900	151.450
2010	122.671	34.387	157.058
2011	78.620	6.600	85.220
2012	72.331	31.300	103.631

Notes : \* Condition till July 2012

Source : Agricultural Department of Gorontalo Province, 2013

The development of corn commodity in Gorontalo Province will still face some major challenges based on the Strategic Planning of Department of Agriculture and Food Sustainability 2012-2017, they are:

- The low productivity of corn commodity
- The low competitiveness and value-added products
- The changing of land functions and the threat of climate uncertainty
- Lack of agricultural infrastructure
- The functions and food sustainability system are not yet optimal
- Lack of agricultural land ownership.

#### B. Corn Commodity Value Chain Analysis in Gorontalo Province

Corn cultivation is the main livelihood of most residents in this province which reach 165.858 household farmers or approximately 63.84% of 259.798 as the total number of households. Besides, most of the seeds used are hybrid corn. The majority of corn production from Gorontalo is sold to meet the demand of the domestic animal feed industry (70%) and the rest is for export to Malaysia, the Philippines, Korea and Vietnam (30%).

Corn value chain in Gorontalo Province involves three main actors, namely

- 1) Farmers: do the entire process of corn cultivation, starting from preparing land, planting, cultivating, and harvesting.
- 2) Broker/Collector: buy the crops from farmers, collect and sell them to the traders at the district or provincial level.
- 3) Trader: buy crops from farmers or brokers /collectors and send it to the buyer for both inter-island and export shipping.

#### 1. Production and Marketing

##### 1.1 Production

Most of the sold corn are in the form of dry shelled corn with an average 17% moisture which derived from hybrid corn seeds. The main issue of the production aspect is low productivity. Currently, the average productivity of corn crop is still below 5 Tons/ha. In 2012, the average productivity was 4.46 Tons/ha. This figure is still below the national average of productivity in the same year which reached 4.5 Tons/ha. In addition, the average productivity is still below the potential productivity of existing corn varieties in which some other corn varieties are able to achieve 5-6 Tons/ha, while hybrids corn seeds are able to produce 8-10 Tons/ha.

Actually, the production and productivity of farmers can be improved through the application of good agricultural cultivation, including good fertilization. One method that can be applied is Legowo planting method

by giving more spaces in the row. The consequences of this planting method is that there will be extra cost since more seeds are planted. But, it can increase the number of corn production. Besides, the application of terracing for slopes above 25 degrees will also help to increase corn production and productivity.

## 1.2. Market

### 1.2.1. Domestic Market

Most of the corn production from Gorontalo Province is inter-island marketed which reach approximately 70%. The crops are sold to the brokers/collectors in the district or province level and then sold to buyers in Surabaya. Dry shelled corn with an average 17% moisture become the raw material for animal feed industries in Java. The corn are then shipped through the Port of Gorontalo to Surabaya, Manado and Bitung. However, a small portion (less than 1%) of corn crops are also sold by farmers in the traditional market in each districts of this province.

### 1.2.2. Export Market

Corn production from Gorontalo Province and supported by other corn production center in Sulawesi Island (Minahasa, Kotamobagu, Toli-Toli, Palu, Poso, Kendari and Morowali) is also for export market which shipped from Gorontalo Harbour to Malaysia, the Philippines and South Korea. Besides, in July 2012, 4,000 Tons of corn was also exported to Vietnam for the first time. Till July 2012, the trade of corn in Gorontalo Province reached 122.153 Tons for both inter-island and export trade, where the inter-island trade was 91.853 Tons, and export was 30.003 Tons shipped to the Philippines and Vietnam.

## 2. Operating Environment regarding to Government Policy

### 2.1. National Policy

The Indonesian government through its general policy for National Food Sustainability has determined that in 2014 Indonesia must achieve sustainable self-sufficiency in corn. This policy is outlined in the Road Map in Achieving the Target of Corn Production in 2012-2014 (Agricultural Ministry, 2012) which involves a series of strategic policies.

Government policy to extend the use of hybrid corn variety, which has composites of high production and nutritious to replace local composite corn which has low productivity, encourage the availability of corn with good quality required by the national industries. In addition, the increase used of hybrid seeds is expected to contribute to improve national corn production by 20% due to the level of corn productivity which can reach 7-10 Tons/ha.

### 2.2 Regional Policy

Agricultural development policy in Gorontalo Province until 2015 still remains on Corn-Based Agropolitan Programs. Thus, the position of corn as a major commodity crops in this province becomes more stable which is supported by both national and regional policies.

The development of corn commodity in Gorontalo has been supported through a series of government policies in either districts or provincial level aims to increase farmers' income and to introduce Gorontalo as the center of corn production nationally.

## 3. Analysis of Actors and Supporting Actors

### 3.1 Actors

#### 3.1.1 Farmer

The majority of farmers in Gorontalo Province are native of Gorontalo. However, in Pohuwato District and Boalemo District farmers are dominated by Javanese who migrated to these regions following transmigration program. Farmers gain farming knowledge from their ancestor inheritably over generations. Farmers are dominated by men (80%) with the main activities ranging from land preparing, planting, cultivating, until harvesting.

From the interview with farmers, it is known that their average income is Rp. 6.500.000, in each harvesting period (4 months), so each month they get Rp. 1.625.000. This income is still higher than Minimum Payment (UMP) in Gorontalo province in 2013 which was only Rp. 1,275,000.

Farmers' income is only enough to meet their daily needs and are not able to increase the productive assets. Farmers are so dependent to brokers or those men who have more capital to meet the needs of the production costs (seeds and fertilizer) which in turn weakening farmers' bargaining position towards the selling price which will impact on the income they receive.

### 3.1.2 Broker / Collector

Brokers or collectors are usually local residents in each district in Gorontalo Province who are often the staff of the merchant in district/provincial level. These brokers are given the tasks to buy and to collect the crop from farmers. The brokers also provide loans to farmers to buy seeds and fertilizer which will be taken into account in the crops payment and farmers even get lower price due to the corn moisture. Currently, there are many corn brokers/collectors in each district who get extra income from exporters.

### 3.1.3 Traders / Merchants

Traders in the corn value chain in Gorontalo Province consists of two groups, namely; district traders and province traders. In general, those groups have the same roles in the value chain who buy corn from farmers either directly or through the brokers/collectors and then do the next process such as sorting, drying, packing, temporary storing, sending/selling to the buyer for both inter-island and export purposes.

The main issue faced by traders is the incompatibility between the supplies with the demands of corn where there is a large number of demands of corn for both inter-island and export shipment whereas there is limited number of corn production. In addition, there is a high competitive among traders because of the emergence of new traders who build warehouses close to production centers. They wait the corn supply from farmers as their strategy to fulfill their compliance supply which also still lower than their demand.

## 3.2 Supporting Actors

### 3.2.1. Financial Aspects

Farmers' access to financial resources are very limited. To meet their needs for seeds and fertilizers, farmers get loan from the brokers/collectors. Additional support comes from the Central Government and Local Governments, such as giving capital assistance through Rural Agribusiness Development Program (PUAP) which are given through POKTAN/GAPOKTAN from the Ministry of Agriculture.

### 3.2.2 Information Aspects

The available information to farmers and traders is regarding to the selling price. However, information about the needs of the market are still difficult to obtain which causes discrepancy between supply and demand which make price instability.

### 3.2.3. Business Development Services

The existence of business development services is still less in Gorontalo Province. Networking with business development services from outside Gorontalo is only owned by Boalemo District which an MOU with Kemal and Nasser Institute, Jakarta. However, some districts such as Pohuwato, North Gorontalo and Gorontalo District are now having good collaboration with business development services from outside Gorontalo Province.

### 3.2.4. Research Institute

There are several research institutions that are specifically related to corn in Gorontalo such as the Board of Corn Information Centre, Institute for Agricultural Technology (BPTP) Gorontalo, and the Research Institute of the State University of Gorontalo.

#### 4. Cultivating and Post-Harvesting Technology

Most farmers in Gorontalo Province are still applying traditional cultivating and post-harvesting technology. They have not yet implemented good way to cultivate or utilize technology to support them in increasing their corn production. In some areas, farmers apply planting without land cultivation (TOT), in which planting preparation are made by clearing the land from weed using herbicides or un-weeded then seeds are planted at a certain distance (80 x 40 cm). The next process is the maintenance that is done through fertilization and unweeding with herbicide if the weed are getting higher. Last is harvesting period and then corn is dried.

#### 5. Stakeholders and Institutional Analysis

The condition of POKTAN/GAPOKTAN in Gorontalo Province is still far from the expectation. Most are still constrained by the limitations of capacity, resources, access to information, technology and knowledge. Although, it provides some of the support services required in the cultivation of corn crops, such as: renting alsintan, finely machine and savings and loan services, POKTAN/GAPOKTAN do not operate as a real business unit.

Strengthening the capacity of POKTAN/GAPOKTAN becomes a major issue in institutional corn commodity. Besides, these farmers' organization function as media for advising success because farmers themselves will disseminate those development programs to the other members.

#### 6. Dimensions of Environmental Impact

Local Government Policy in both provincial and district level in increasing corn productivity get positive responses from the farmer community through the development of both corn agriculture intensification and extension systems. The response is seen from the increase number of corn acreage planting in Gorontalo Province. In 2007, the total area of corn cultivation in this province was 136.087 (ha), and in 2011 it reached 147.264 (ha).

Corn in this province is cultivated on hilly or sloping land. From the interview with farmers and field observations, it is found that corn planting has been done without paying more attention to the principles of soil and water conservation. In other words, they do not make a terrace ring system which will bring negative environmental impacts such as the increase possibility of soil erosion, sedimentation, and surface water turbidity and decreased soil fertility.

#### 7. SWOT Identification

Strengths	Weaknesses
<ul style="list-style-type: none"> <li>• Gorontalo is identic as corn-producer province</li> <li>• Farmers' has high motivation in planting and cultivating corn</li> <li>• Boalemo District and Gorontalo Province Government have committed to choose corn as main commodity</li> <li>• There are some supporting institutions that are relevant to agriculture (BPIJ, BPTP)</li> <li>• There is a Government policy regarding to the minimum price of corn in the farmers' level</li> </ul>	<ul style="list-style-type: none"> <li>• GAPOKTAN's capacity as farmers' supporting institutions at the micro level is still weak</li> <li>• Farmers and traders have limited access to get information about the needs of animal feed industries which causes a mismatch between supply and demand.</li> <li>• Farmers have limited knowledge and skills in applying good farming process</li> <li>• Farmers get limited facilities and infrastructures to support post-harvesting period</li> </ul>



Opportunities	Threats
<ul style="list-style-type: none"> <li>• There is an increased demand for livestock feed industry</li> <li>• There is a big number of export market demand which still cannot be met (such as to the Philippines, Vietnam, Malaysia)</li> <li>• The corn processing along its waste can be made into high value-added derivative products (eg, flour, noodles, cosmetics, animal (fish, poultry) feed, and charcoal briquettes).</li> </ul>	<ul style="list-style-type: none"> <li>• Environmental degradation due to uncontrolled land clearing</li> <li>• Land clearing for other crops (palm oil and cocoa)</li> <li>• Buyers (industry) demand the consistency of supply and quality of corn</li> <li>• Climate change</li> <li>• Affordability of seed at the farmers' level.</li> <li>• Farmers are facing a monopsony or oligopoly market, thus, when there is abundant production of corn then the price is getting lower</li> </ul>

## Discussion

### The Main Constraints of Developing Corn Commodity Value Chain in Gorontalo Province

From the interview with farmers, traders (brokers/collectors and traders in District/Province level), relevant local government and the review of the results of related studies, some issues in the corn value chain in this province can be identified as follows:

First, there is still lack of integration between corn productions with the industrial needs. This leads to a mismatch between the supply and demand of the industry which result in price volatility, crops are not absorbed optimally which cause scarcity of supply for the industry.

Second, farmers have not yet implemented good farming process which causes a small number of production and productivity which also decrease farmers' income.

Third, post-harvest handling is still poor resulting in the loss of crops and decreasing the quality of the corn which impact farmers' income.

Fourth, supporting institutional capacity is still weak in farmers' organizational level (POKTAN/GAPOKTAN) which weakening their bargaining position, small access to resources, capital and technology.

## Conclusions

Agricultural potential of corn in Gorontalo province in 2012 consisted of: a. the harvested area was 135.543 (ha), b. the production was 644.754 Ton, c. the productivity average was 47.57 Kw/ha, and d. the number of corn farmers was 165.858 or approximately 63.84% of 259.798 as the total farmers in Gorontalo Province.

The value chain analysis provides strategic issues in improving corn commodity consisting of three categories, they are: firstly; before planting, include: a. aspects of financial for the procurement of seed and fertilizer, b. land clearing disregarding the environmental aspects. Secondly; cultivation, include: a. farmer's knowledge of good farming practices, b. land conditions (slope), and the last is after planting, include: a. cash management, b. limitations of post-harvest facilities, c. farmers' weak bargaining position on the selling price, and d. infrastructure and transportation of crops that still need to be developed.

There are still some barriers in the development of corn commodity in Gorontalo: first; the lack of integration between the corn production with industrial needs, second; weaknesses in the application of a good cultivation process and stages, third; post-harvested handling is not maximal yet due to the loss of some of the crops and the declining quality of corn, and fourth is the weaknesses of supporting institution capacity at the level of

*POKTAN/GAPOKTAN* which make farmers have weaker bargaining position, limited access to information, capital, and technological resources.

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