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NETWORK PATTERNS AND COORDINATION OF UPSTREAM-DOWNSTREAM STAKEHOLDERS IN THE CORN AGRIBUSINESS CLUSTER

[1]Iranita Haryono, [2]Nurul Qisti, [3]Akbar,[4]Ardi Rumallang, [5]Nadirah, [6]Astrini Padapi, [7]Andi Nurwidah, [8]Zulfatun Najah

ABSTRACT-- *Agricultural development needs to be continuously developed to lead to the creation of an efficient, competitive farm, able to increase the income and standard of living of farmers especially corn agribusiness development. The purpose of this research is to describe the pattern of networks and coordination of upstream-downstream stakeholders in the corn agribusiness cluster. The research employed descriptive method. The results show that, the existence of agribusiness clusters provides great benefits in regional and national economic development in a more effective and efficient ways. There is no functional cooperation relationship between each level of upstream and downstream agricultural businesses. So, it is categorized into a relationship pattern.*

Keywords-- *Network patterns and coordination of upstream-downstream stakeholders in the corn agribusiness cluster*

I. INTRODUCTION

Corn is an agricultural commodity that has high economic value and has the potential to be developed. Although corn in Indonesia is the second most important food commodity after rice/rice, some people in Indonesia corn is still a mainstay food commodity. National corn demand from year to year continues to increase, not only

[1] *Muhammadiyah University of Sidenreng Rappang, Angkatan 45 No. 1A street. Phone: (0421) 93308 Lt. Salo Rappang, Sidrap, South Sulawesi, iranitaharyono.ih@gmail.com*

[2] *Muhammadiyah University of Sidenreng Rappang, Angkatan 45 No. 1A street. Phone: (0421) 93308 Lt. Salo Rappang, Sidrap, South Sulawesi.*

[3] *Muhammadiyah University of Makassar. Sultan Alauddin No.259 street, Gn. Sari, District of Rappocini, Makassar, South Sulawesi 90221.*

[4] *Muhammadiyah University of Makassar. Sultan Alauddin No.259 street, Gn. Sari, District of Rappocini, Makassar, South Sulawesi 90221.*

[5] *Muhammadiyah University of Sidenreng Rappang, Angkatan 45 No. 1A street. Phone: (0421) 93308 Lt. Salo Rappang, Sidrap, South Sulawesi.*

[6] *Muhammadiyah University of Sidenreng Rappang, Angkatan 45 No. 1A street. Phone: (0421) 93308 Lt. Salo Rappang, Sidrap, South Sulawesi.*

[7] *Muhammadiyah University of Sidenreng Rappang, Angkatan 45 No. 1A street. Phone: (0421) 93308 Lt. Salo Rappang, Sidrap, South Sulawesi.*

[8] *University of Sultan Ageng Tirtayasa (Untirta). Jalan Raya Jakarta-Serang Km 4, Pakupatan, Panancangan, district of Cipocok Jaya, Serang, Banten 42124.*

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because of population growth but also because of the growth of the livestock business and the food industry. The direction of agricultural development through increasing the pattern of agribusiness, especially improving the quality and quantity of production, diversifying leading commodities, increasing the added value of products and expanding market dominance.

In 2006 the volume of corn imports was quite high at 1,775,321 tons and exports at 28,074 tons. Corn imports declined in 2007 and 2008. In contrast, corn exports increased. However, in 2009 and 2010 corn imports experienced a sharp increase of 1,527,516 tons. On the other hand, corn exports declined in 2009 and 2010 by 41,954 tons [2]. Various efforts to improve the competitiveness of corn need to be improved immediately so that Indonesian corn has a comparative advantage and even eliminates the dependence of corn imports. Factors that need to be considered so that Indonesian corn production can be further increased and able to compete are started from production, which is then offered on the international market.

South Sulawesi is one of the corn production centres in Indonesia, and corn is one of the leading commodities in this region. The area of corn cultivation is 289,736 ha, and the production potential reaches 1,490,080 tons/year. Corn production contributes around 7.6% of the total national corn production. The area of maize development in South Sulawesi is spread over several areas, and one of them is Gowa Regency, this regency is one of the potential areas for corn development with a potential land of around 42,599 Ha and with maize production an average of 5.3 tons/ha. Based on data obtained from the Central Statistics Agency, it appears that geographically, the cultivation of corn in Gowa Regency tends to be agglomerated (centred) in the sub-district, namely in the District of Tompobulu. The corn cultivation business in the District forms a business group with the same character, the same type of workforce, and the product produced is also of one type, hybrid maize.

The existence of clusters provides great benefits in regional economic development, as revealed from the results of research [1] that the cluster approach is significantly able to improve the regional economy more effectively and efficiently and accelerate overall national economic development. The main element of cluster success is the presence of "adhesive power" or "social capital among centre members. Social capital is mostly shaped by behavioural factors such as willingness and habit to work together, in groups, and commitment to long-term shared goals [3]. Based on the previous discussion related to the condition of corn commodity farming and cluster modelling in increasing the competitiveness of corn commodities, the researcher is interested in studying about: "Network patterns and coordination of upstream-downstream stakeholders in the corn agribusiness cluster in Gowa Regency".

II. METHOD

This type of research is descriptive. Descriptions are describing symptoms, events, and events that occur factually, systematically, and accurately. This study illustrates the quantitative data obtained concerning the subject situation or phenomenon of a population that is the upstream and downstream corn agribusiness cluster, while the approach taken is a survey with the analysis of the individual corn farmers in district of Gowa, South Sulawesi, Indonesia.

III. RESULTS AND DISCUSSION

3.1 Overview of Research Site

Gowa Regency is at 12 ° 38.16 'East Longitude and 5 ° 33.6' East Longitude from the North Pole. While the administrative area lies between 12 ° 33.19 'to 13 ° 15.17' East Longitude and 5 ° 5 'to 5 ° 34.7' South Latitude. This regency in the southern part of South Sulawesi Province is bordered by seven other regencies/cities with the following territorial boundaries (Figure 1):

- In the north, it is bordered by Makassar City and Maros Regency.
- In the east it is bordered by Sinjai, Bulukumba and Bantaeng Regencies.
- In the south, it is bordered by Takalar and Jeneponto Regencies
- In the West, it borders Makassar City and Takalar.

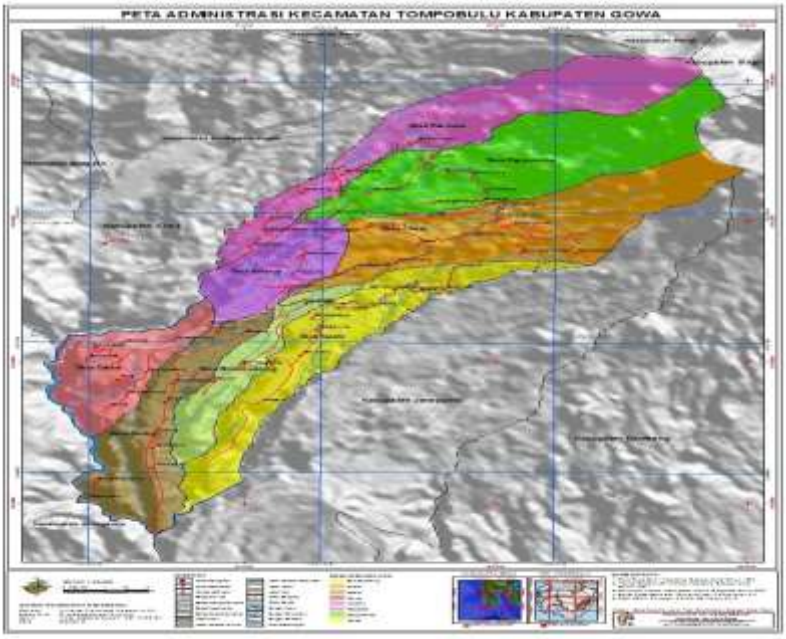

Figure 1: Map of Tompobulu Subdistrict Administration

The largest area is in the highlands (72.26%), and the rest (27.74%) is in the lowlands. This regency has six mountains, and the highest is Mount Bawakaraeng. This area is also crossed by 15 rivers where the Jeneberang River is the longest river with a river basin area of 881 Km2, and in the meeting area with the Jenelata River, a Bili-Bili Reservoir is built. This natural advantage makes Gowa rich in minerals, as well as fertile soil. The sub-district which has the most extensive area is the Buttono Pao Subdistrict located in the highlands, with an area of 251.82 Km2 (13.37% of the total area of Gowa Regency) while the district with the smallest area is West Bajeng District, where the area is only 19.04 Km2 (1.01%).

The total area of Gowa Regency, 35.30% have land slopes of above 40 degrees, namely in the districts of Parangloe, Tinggimoncong, Bungaya, Bontolempangan and Tompobulu. With the topographic form of the area which is mostly in the form of highlands, the Gowa Regency area is traversed by 15 large and small rivers which are very potential as sources of electricity and for irrigation. One of the largest rivers in South Sulawesi is the Jeneberang river with an area of 881 km2 and a length of 90 Km. On the Jeneberang river flow by the Government

of Gowa Regency in collaboration with the Government of Japan, has built a multifunction project of Bili-Bili DAM with an area of ± 2,415 km2 that can provide irrigation water covering ± 24,600 Ha, clean water consumption (PAM) for the people of Gowa Regency and Makassar as much as 35,000,000 m3 and for hydroelectric power plants with a strength of 16.30 Mega Watt.

The total area of Gowa Regency is 1,883.33 km2 or equal to 3.01% of the area of South Sulawesi Province. Gowa Regency is divided into 18 Subdistricts with the number of definitive Villages / Village totalling 167 and 726 Hamlets / Environments. Gowa Regency is mostly in the form of the hilly plateau, which is around 72.26% which covers nine districts namely Parangloe, Manuju, Tinggimoncong, Tombolo Pao, Parigi, Bungaya, Bontolempangan, Tompobulu and Biringbulu districts. The remaining 27.74% is in the form of lowlands with flat land topography covering nine districts namely SombaOpu, Bontomarannu, Pattallassang, Pallangga, Barombong, Bajeng, Bajeng, West Bajeng, Bontonompo and South Bontonompo Districts.

In terms of population, Gowa Regency is the third-largest regency in South Sulawesi after Makassar City and Bone Regency. Based on the 2007 Susenas results, the population of Gowa Regency was 594,423 people. In 2006 the population reached 586,069 people so that the population in 2007 increased by 1.43%. The population distribution in Gowa Regency in 18 districts varies. This can be seen from the population density per district that is still very lame. For the areas of SombaOpu, Pallangga, Bontonompo, South Bontonompo, Bajeng and West Bajeng, whose territory is only 11.42% of the entire Gowa Regency, it is inhabited by around 54.45% of the population of Gowa. While the Districts of Bontomarannu, Pattallassang, Parangloe, Manuju, Barombong, Tinggimoncong, Tombolo Pao, Parigi, Bungaya, Bontolempangan, Tompobulu and Biringbulu, which covered around 88.58% of Gowa, were only inhabited by approximately 45.55% of Gowa's population. This situation seems to be greatly influenced by geographical factors in the area. When viewed from the age group, the population of children (aged 0-14 years) amounts to 31.12%. In contrast, the productive age population reaches 63.18% and the elderly population there are 5.70% of the population in Gowa Regency.

In terms of gender, the total population of Gowa Regency is 293,956 or 49.45% male and 300,467 or 50.55% female. Thus, overall the male population in Gowa Regency is less than the female population as shown in the sex ratio of the population, which reaches 98 meaning there are 98 male residents among 100 female residents. Based on the results of preliminary figures of the National Socio-Economic Survey in 2008, it was noted that of the population aged 10 years and over who were from Gowa Regency, around 16.86 percent had never attended school, 18.82 percent were still in school and 64.32 percent were not in school anymore. It has become our common awareness that education currently plays a very important role in determining the future of a nation. So that development in the field of education should have received serious attention from all parties.

The true potential of Gowa Regency is the agriculture sector. The main occupation of the residents of Gowa Regency is farming with the food crops sub-sector as the mainstay. In 2009, the agriculture sector grew by 5.23%, higher than the previous year. This positive growth cannot be separated from the role of sub-sectors in it such as the food crops sub-sector experienced a growth of 5.29%, this is due to the production of rice, corn, sweet potato, cassava and other foodstuffs plants has increased. In 2009, rice production (lowland rice and field rice) increased by around 14.18% compared to 2008, from 217,991 tons to 248,912 tons, although the harvested area decreased by 1.61%. In terms of productivity and type of rice, the productivity of lowland rice is 52.72 quintals/ha, while the productivity of field rice is 39.77 quintals/ha.

Sub-districts in the highlands such as Parangloe, Bungaya and especially in the height of the snout are the centres of vegetable production. The most cultivated vegetables are potatoes, cabbage, mustard greens, leeks and green beans. The annual yield of vegetables exceeds 5,000 tons. Vegetables from Gowa Regency are able to meet the markets of Makassar City and surrounding areas, even to the islands of Kalimantan and Maluku through the Parepare Port and Mamuju Port. In addition to vegetable farming which has a short planting period, many Gowa farmers also farm long-life plants. One of them is passion fruit plants (Fassiforasp). Visiting Makassar is less pleasant if you don't bring passion fruit juice or syrup. If we see the view at the airport or port, most of the prospective passengers who will leave Makassar carry this fresh-scented juice. Plants originating from the mainland of South America are synonymous with South Sulawesi. Kanreapia Village, District of Muzzle High is one of the passion fruit-producing areas in Gowa Regency.

3.2 Characteristics of Farmers

Farmers characteristics are useful for describing the description of the Farmer's identity according to the determined research sample. One objective with the characteristics of farmers is to provide an overview of the objects that are sampled in this study. The characteristics of farmers who were sampled in this study were then grouped according to age, gender, education, and area of ownership of arable land. To clarify the characteristics of the intended farmers, a table of farmer's data will be presented as explained below:

3.2.1 Age

Age is one of the factors that can affect a person's ability to manage his farming business. In general, young and healthy farmers have stronger physical abilities, and relatively younger people accept new innovations compared to older farmers. It is easier to accept and apply technological developments and influence the maturity of farmers in making decisions. Therefore, the difference in age owned by someone can be used as an indicator to assess the ability of farmers' performance. The results showed that the age level of farmers varied, for more details can be seen in Table 1.

Table 1: Identity of Corn Farmers by Age Group

Age of Breeders (Year)	Number of Breeders (Person)	Percentage (%)
23-35	14	32.6
36-48	23	53.5
49-61	6	13.9
Total	43	100

Table 1 shows that the age of farmers varies greatly, which is dominated by farmers aged between 36-48 years around 53.5% than between ages 23-35 years around 32.6%, and above 49-61 years around 13.9%. This indicates that the average farmer has a productive age so that this potential can support the development of farmer

businesses. This is in line with the opinion of Adiwilaga (1973) that farmers who are at a productive age will be more effective in managing their business when compared to older farmers.

3.2.2 Characteristics of Farmers by Gender

Characteristics of farmers according to sex involved in maize business in Tompobulu sub-district, Gowa district can be seen in Table 2 below:

Table 2: Characteristics of Farmers by Gender

Gender	Frequency (people)	Percentage (%)
Male	40	93.02
Female	3	6.8
Total	43	100

Table 2 shows there are more male farmers than female farmers, namely 93.02%. This is because as many as 6.8% of female farmers make farm work as a side job that is only helping their husbands in managing their farming. However, some women farmers are the backbone of the family because they no longer have a husband, so some of them make agricultural work as their main job. In addition, farming activities require more male workers such as land management, maintenance, fertilization, irrigation, harvesting and post-harvest as well as physical abilities of men are stronger than women.

3.2.3 Identity of Farmers by Education Level

The intended education is formal education owned by farmers. This level of education is one of the determining factors in business development, especially concerning the absorption of innovations and new business techniques that support the achievement of optimal levels of production. The statement from [4] says that a good level of education can increase knowledge related to the level of accuracy of the assessment, which has an impact on the speed in adopting an innovation. In addition to the increase in one's education, it will affect the quality of work [5]. More details about the level of education of farmers can be seen in Table 3.

Table 3: Identity of Corn Farmer by education level

Farmer Education	Number of Breeders (People)	Percentage (%)
Primary School	14	27,9
Junior High School	17	39.5

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Senior High School / vocational high School	12	32.6
Total	43	100

Table 3 shows that the education level of farmers is still low, because it is dominated by farmers who only have a junior high school level of 17 people with a percentage (27.9%), this shows that the formal education level of farmers in the research location is still low, so it needs to be given additional education non-formal education through training and training by relevant agencies so that farmers are able to adopt and innovate technology in corn cultivation so that the business can be more efficient. This is consistent with the opinion [6] that the low level of education of farmers results in the low ability of farmers to manage their business so that it cannot develop properly and the average income is low. Someone is still possible to be given additional Education following the work done [7]. Non-formal education can be given to support low levels of formal education such as counselling or training according to farmers' needs. Improving the quality of human resources is more important because it is a long-term investment in the agricultural sector.

3.2.4 Farmers identities are based on the area of land ownership

The area of arable land is a factor that can affect how much production will be produced on corn farming. Basically, the greater the area of land owned by farmers, the greater the results of production obtained [8], the larger agricultural land, the higher production will be [9]. Therefore, it is important to avoid agricultural land conflict [10]. Identity of corn farmers by land area shown in Table 4.

Table 4: Identity of Corn Farmer based on Land Area

Farmer's Land Area (Ha)	Number of Farmers (People)	Percentage (%)
0.0-1.00	19	44.1
1.1-2.00	21	48.9
2.1-3.00	3	7
Total	43	100

In Table 4 it can be seen that the characteristics of the sample of corn farmers based on the area of land, namely the average majority of the farmer farmers have an area of land from 1.1 Ha to 2.00 Ha with a percentage rate of 48.9%, and a small portion has a land area of more than > 2.1 Ha with a percentage of 7%.

3.3 The Pattern of Corn Farmer Cooperation in Tompobulu District. The partnership is a network of mutually beneficial business cooperation between farmers and Partner Companies accompanied by coaching and development by Partner Companies so that they need each other, benefit and strengthen. Partnership as referred to in Law No. 9 of 1995, is a collaboration between small businesses with medium businesses or with large businesses accompanied by coaching and development by medium businesses or large businesses with the principle of mutual need, mutual reinforcement and mutual benefit.

The partnership is a form of partnership between two or more parties that forms a cooperative bond based on agreement and mutual need to increase capacity in a particular business field or certain goals so that it can obtain better results. The form of partnership in Indonesia consists of a nucleus-plasma partnership pattern, a subcontract partnership pattern, a general trade partnership pattern, an agency partnership pattern, and an agribusiness operational partnership (KOA) pattern. To identify the first problem, which is the pattern of upstream to downstream corn commodity in Tompobulu District, namely that the upstream network pattern involves government (Saprodi) producers and downstream involves producers (farmers), collectors, large traders (warehouses and animal feed) and processing industry. This channel has been arranged in such a way that all involved has been determined and with the permission of the government. The government, in this case, has a role as a supervisory channel for the marketing of seeds and corn fertilizer, so farmers can obtain quantities and prices following what has been set by the government (Figure 2).

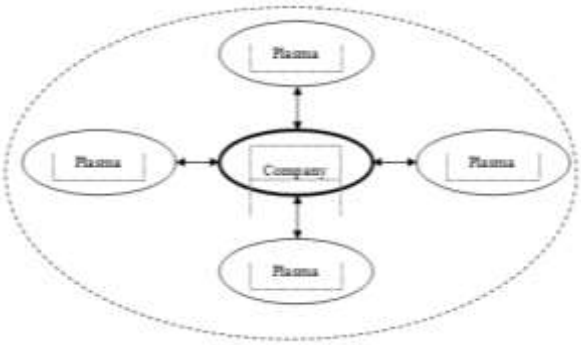

Figure 2: The pattern of Plasma Core Partnerships

(Source: Sumardjo, 2001)

3.3.1Upstream Networking Partnership Pattern

Partnerships are intended to ensure that both partners benefit from each other and thus need commitment between the partners. Both parties must maintain and fulfil their respective rights and obligations as outlined in the memorandum of understanding or agreement in accordance with the law and law. Thus in the event of a breach by either party, the other party may sue under applicable law.

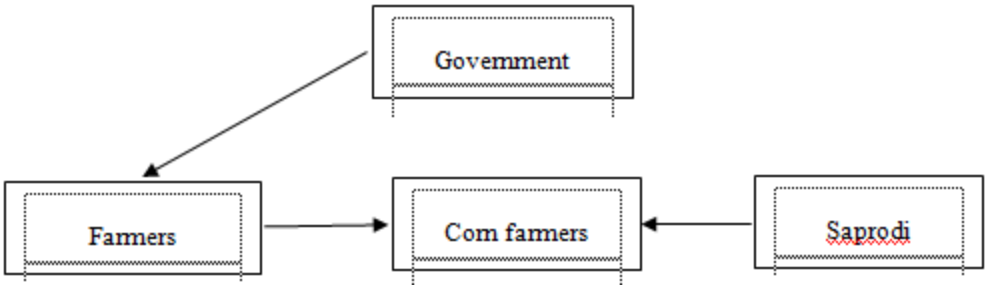

Figure 3: Upstream network pattern

The pattern of cooperative relations between farmers and saprodi-providers in Tompobulu District has not been going well, where farmers are self-financing their corn farming business from the provision of seeds, fertilizers and pesticides. No agreement binds both of them. Therefore, all corn farm financing is self-funded by farmers: seeds, seeds and pesticides purchased from input production providers in cash. The pattern of relationships that occur between farmers and input producers is a relationship pattern in which the pattern of relationships between business actors with each other has strong formal ties. The commercial type is characterized by no functional organizational relationship between each level of upstream and downstream agricultural businesses. The agribusiness network is only bound to market mechanisms, while the actors are indirect and impersonal. So that every agribusiness actor only thinks of his interests. In these conditions, the perpetrators do not realize that they need each other. Even one party, especially the investor, tends to be exploitative so that it leads to the death of a joint venture.

So far, farmers have only received subsidies from the government in the form of corn seeds and fertilizer through the Social Assistance Program for the Implementation of Integrated Crop Management (Bansos GP-PTT) Corn. This is one of the efforts made by the government to assist farmers in alleviating the burden of production costs through increasing the number of aid packages as stimulant instruments, as well as mentoring and escort support. GP-PTT is a refinement of the Integrated Crop Management Field School (SL-PTT) which has been implemented since 2008. Basically, the farmer groups (poktan) and the combined farmer groups (gapoktan) in Tompobulu sub-district that have been formed are not well organized, where the poktan / gapoktanis only intended for procedures to get help from the government. The forms of corn partnership that can be carried out by farmers include 1) sales contracts (contract farming), 2) post-harvest cooperation and warehousing, 3) financing and funding cooperation.

The description of the partnership form above can be submitted as follows:

a) Contract farming. Farmer groups can make contracts/sales agreements with entrepreneurs before the harvest season/planting season. With this partnership model, the entrepreneur can be asked to provide price certainty at the time of harvest while the farmer group is asked to provide certainty of the volume of corn provided. For both parties, this partnership model will be mutually beneficial.

b) Post-harvest cooperation and warehousing to overcome the problem of limited availability of post-harvest equipment, farmer groups can collaborate to utilize post-harvest facilities and warehousing owned by private companies or State-Owned Enterprises (BUMN). One company that has this facility is PT. Pertani (Persero) which has dryer and warehouse facilities. Farmer groups can take advantage of these facilities by paying a fee.

c) Cooperation in financing and financing to finance farming business, farmer groups can apply for a Food and Energy Security Credit Facility (KKPE) distributed through several government banks. KKPE with low interest is provided specifically to help finance farmers. Meanwhile, to overcome the drop in prices after harvest, farmer groups can take advantage of warehouse receipt facilities by leaving the yields to the warehouse receipt management agency and receiving bailouts before the sale. Farmer groups / Gapoktan are also advised to work with other formal institutions to get funding for farming, for example, with industry.

3.3.2 Downstream Networking Partnership Pattern

Corn producers are farmers, where farmers distribute their products to consumers using intermediary wholesalers such as animal feed, and warehouses, then from large traders distributed to the processing industry, then finally the industry sells corn in the form of animal feed to consumers. Marketing is a very fundamental aspect of achieving business profits. If the production is large but does not have a target market, the production results cannot be sold. The market is very important for business continuity. If the market's ability to absorb production is sufficiently high, then it is not a problem and farmers can sell their products at the right price and get high profits conversely, if the market is unable to absorb production due to declining demand.

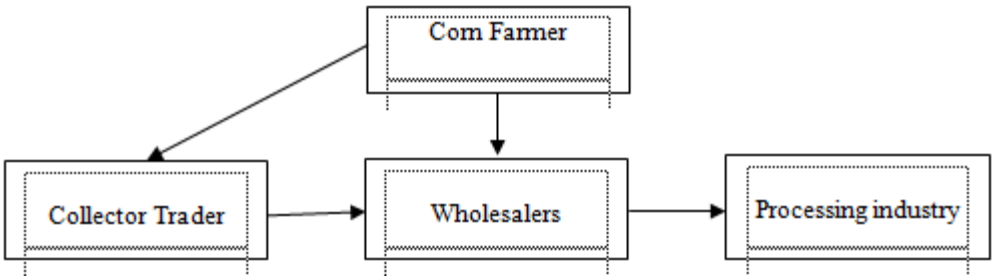

Figure 4: Network pattern/network downstream

Based on the results of the study it can be stated that the corn farmers in the research location sell their products in the form of wet corn to collectors at the village level and collector traders at the district level. These traders come to the corn farmers, so it is enough to help the corn farmers to market their products. From traders at the village / sub-district level and at the district level. Postharvest processing in this case drying is carried out by collecting traders at the village level and collecting traders at the district level. Traders prefer to buy corn in the wet form from farmers on the consideration that traders know more about what the dry processing industry wants. After the corn reaches the appropriate dry level, corn is delivered to the processing industry, PT. CharoonPokhpand located in Makassar City. The distance between the location of the collecting traders and district traders to the processing industry is about 30 km, transported by car. The corn marketing channels at the research location can be described in two patterns as below:

Both the pattern of cooperation in the upstream and downstream systems still adheres to the pattern of cooperation in labour, where there is no strong pattern of cooperation between farmers and input suppliers and farmers between farmers and traders. There is no functional organizational relationship between each level of upstream and downstream agricultural businesses. The agribusiness network is only bound to market mechanisms, while the actors are indirect and impersonal. So that every agribusiness actor only thinks of his own interests. In these conditions, the perpetrators do not realize that they actually need each other. Even one party, especially the investor, tends to be exploitative so that it leads to the death of a joint venture. In a dispersal type partnership, the entrepreneur is stronger than the producer. These entrepreneurs have an important role in dealing with weak producers. However, the relationship between the two parties is not synergistic and not sustainable because it is not a partnership. Such conditions create gaps in the upstream and downstream business systems. Gaps that occur in the form of information about quality, price, technology, and access to capital. Thus strong investors who are

generally broad-minded, more educated, and have a role in the downstream subsystems are benefited by the weaknesses of small entrepreneurs as producers.

IV. CONCLUSION

The existence of agribusiness clusters provides great benefits in regional and national economic development in a more effective and efficient ways. There is no functional cooperation relationship between each level of upstream and downstream agricultural business. So, it is categorized into a relationship pattern. Gaps that occur in the form of information about quality, price, technology, and access to capital. Thus strong investors who are generally broad-minded, more educated, and have a role in the downstream subsystems are benefited.

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