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Communication Networks of Organic Rice Farmers in Tasikmalaya

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Abstract

Communication network is an interaction between individuals with the immediate environment. The importance of one's position in the networks is not only determined by how much he/she is connected to many people but also considered as a bridge with lots of networks. The study was conducted in Tasikmalaya, in Jembar II, Sundamekar, Mekar Karya and Serbaguna II groups. The purposes of this study were to determine the actor who played the local, global and betweeness centrality; determine the factors associated with local, global and betweenees centrality; and to see the relationship dynamics and density of the group. The method used for this research was through survey, data were collected by interview using a questionnaire. This current research employed cluster random and census sampling techniques. Communication networks were analyzed using Ucinet 6 software, relationships between variables were analyzed using Pearson correlation analysis.The results of this study explained that the group of Mekar Karya has the highest score in local, global and betweenees centrality, while the lowest value of local, global and betweeness centrality owned by Serbaguna II group. The actor who plays the highest local centrality in production and marketing networks is the group leader.

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While the global centrality and betweenees on the production networks played by members of the group and marketing networks played by the group's chairman. The lower value of local, global and betweenneess centrality, both in production and marketing networks, were played by members of the group. Factors associated with the communication networks is a non-formal education, support of NGOs, KOPERASI support, group purpose, group function and group pressure. Group dynamics are not related to the density of communication, but rather is determined by the group clarity of purpose, group function and group pressure.

Keywords: communication networks; organic farming**.**

1. Introduction

Institutional farmer is a strategic forum agribusiness development, because the institutional farmers contribute to the acceleration of socio-economic development, accessibility of agricultural information, accessibility to capital, infrastructure, markets and adoption of agricultural innovation and improve the competitiveness in development of agribusiness systems [1, 14]. Socio-technical, empowerment of farmers can be done through the activation and the dynamic group of farmers, farmer organizations, joint farmer groups, and creating a networks (communication and bussiness networks) between farmer groupswith support institutions and agricultural resources [12]. The social structure in a system or organizationmay explain the effectiveness of the farmers performance that would be better accomplished in groups. In addition to the social structure, communication structure is also considered as one of the factors determining the performance of an organization, in this case the farmer institutions [11].

Patterns of communication, organizational management is closely related to organizational climate and work culture of its members. The concept is placing the thoughts, feelings, interests, and selection of human actions that support the organization as a central focus so that each activity of the organization can be part of their life totality [3]. For it is necessary to build a communication networks in farmers organization (farmers 'groups, farmers associations, farmers' unions, etc.) to improve the bargaining position of farmers [8]. This has been proven in developed countries that farmer organizations are progressing in agriculture sector. Through research, [9] demonstrated that the adoption of agricultural technology innovation is more effective with their communication networks, as through a networks of communication between individuals and between groups led to a process of sharing knowledge among farmers.

Development of agri-food crops, especially organic rice is one of the agribusiness activities developed in West Java. Organic rice agribusiness activity is a system that requires coordination, synchronization and support of all stakeholders or the public agribusiness from planning to implementation and supervision [2]. Simultaneously it is necessary to develop the support of macro policies and the regulatory arrangements that conducive and siding with the farmers such as tariff and non-tariff policy, import-export, capital / credit, security price, business administration and fiscal so that all the subsystems of agri-food crops can function optimally and harmoniously.

Based on the above, this research focuses on the productivity of the farmer groups through the analysis of communication networks. Robins [10] argued that the communications networks is the vertical and horizontal

dimensions in organizational communication that are combined in a variety of patterns. According to Rogers and Kincaid [11] there are five levels of analysis unit in a communications networks which includes: (1) individual, (2) personal communication networks, (3) dyadic relationship, (4) click and (5) the system (networks). Analysis of communication networks continues to grow, according to Jensen [6] in communication networks, also known as Total Networks System, which consists of patterns of communication between all the individuals in the system as an organization. This networks consists of thousands of individuals in large organizations. Similarly to Rogers and Kincaid [11], Jensen [6] also noted that the communication networks at the level of clicks, defined as a system of elements that interact with each other. In general, click consist of 5-25 members (some can be larger). Therefore, click into one of the main components of the communication networks in an organization. Furthermore, Jensen [6] describes the Personal Networks / Private Networks, defined as those that are interconnected by communication patterns flowing to any particular individual. In relation to that, each individual has a personal networks with whom they interacts on a consistent basis and communicate a particular topic. Thus, each individual has a communications environment where the private networks may partly explain the behavior of individuals.

Scott [13] also added a number of indicators that can be used in analyzing the communication networks. One indicator of the networks can be seen from some degree of measurement, namely the centrality. Centrality is divided into three: local centrality, global centrality, and betweenees centrality. Local centrality is the degree to which an individual dealing with other individuals in the system. Local centrality shows the number of relationships that can be created by individuals in the system. According to Freeman [5], local centrality can be relative. This will be particularly important if the group size is not the same. Local centrality draw attention to the relative advantages of the individual in their closest relationship.

Freeman in Scott [13] proposed a global centrality measurements based on the terms surrounding the "closeness" or the proximity of the individual. Freeman global centrality measurements are expressed in "distance" term between diverse individuals. Global centrality draw attention to individual excellence with the overall networks. The value of global centrality shows the number of bonds that someone needed to contact all individuals in the networks. The smaller the value of global centrality shows the easier for someone to contact all the individuals in the networks.

Freeman in Scott [13] adds betweenees centrality which measures the extent to which a particular individual is situated between other individuals in a networks. He also noted that the concept of Freeman betweeness centrality refers to an individual frequency levels among the individuals who deal in the lines of communication.Based on the explanation and description above the research problem can be formulated by the actor who plays on local, global and betweenees centrality; determined the factors related to communication networks; and measure the relationship between group dynamics and communication density.

2. Research Method

The researcher was employed the survey method and performed the research in Tasikmalaya regency, in group of Jembar II, Sundamekar, Mekar Karya and Serbaguna II. Cluster random sampling was used by determining

the advanced and developed districts/regencies and groups. Selected groups were considered as the research sample and taken by census. Total samples examined in this study was 132 respondents. The study was conducted from February to April 2015. The primary data obtained through interviews using a structured questionnaire. Secondary data were obtained from the Department of Agriculture, Counseling, Regional Development Planning Agency (Bappeda) and Farmers Union (Gapoktan). Communication networks analyzed in this study were: local centrality, global centrality, betweenees and density. Analysis of the communication networks data was using 6.0 Ucinet program and relation between variables was using Pearson correlation analysis.

A. Communication Networks

Local centrality

Local centrality measures the degree of individual linkage with each other in a system. In other words, the centrality also measure individual excellence within the community or group. In essence, the individual has the local centrality if he/she has a large number of connections with other individuals in their immediate environment [13]. In a communication networks group of organic rice farmers in the Tasikmalaya, Mekar Karya group has the highest of local centrality both for production and marketing networks. Networks centrality of local production has a maximum value of 33 and a minimum of 0. While marketing networks has a local centrality with maximum value of 41 and minimum of 0. This means that people who are considered the most prominent in the production networks has been linked to 33 other people, and the most prominent in the networks marketing has been linked to 41 people. The actor who plays as the local centrality to the production and marketing networks is node 12.

The actor is the chairman of the group, administrator in Gapoktan Simpatik as purchasing coordinator and also coordinator of commission and approval committee of Fair Trade. The number of positions played by the actor makes the node 12 becomes central to the farmer. Things are often asked by group members to the group leader are the issues related to seed production, type of seeds planted in Gapoktan Simpatik are: Sintanur, Ciherang, Black and Red. Each group will rotate once every two seasons, therefore, the chairman of Gapoktan Simpatik should really know about it. Similarly to marketing, the production of farmers will be noted by the chairman of the group and will be paid according to the contract price. The amount of information available on the group's chairman could make him become the central in Tasikmalaya. According to Malinick et al. (2013) that the one who become the center of this communication networks would in total control of the transmitted information. Internal factors such as the charismatic appeal, popularity, the overall level of involvement in the networks and responsibility can obviously affected the networks centrality. Index Average, Maximum, Minimum Value of Local Centrality Based on Communication Networks Topic of Production and Marketing at Four Farmer Groups in Tasikmalaya can be seen in Table 1.

Table 1 shows that the group of Serbaguna II has the lowest value of local centrality both for production and marketing networks. Local centrality for the production networks has a maximum value of 19 and a minimum of 0. While the local centrality to the marketing networks has a maximum value of 18 and a minimum of 0.

Therefore, people who are considered to have the lowest value of local centrality only have relevance to 19 people in production and 18 people in marketing networks. The actor who plays the lowest local centrality in production and marketing networks is node 14. The actor is a member of a group that works as a guide in the village, because it is a traditional village that became a tourist destination. The village public awareness is very high in protecting the environment, the use of chemicals in everyday life is very low, as well as in agriculture. System of organic farming for generations has been executed. Often talked about in regard to the production sector is a matter of planted seeds and related to marketing is the recording of the production outcome .

Table 1: Index of Average, Maximum, Minimum Value of Local Centrality Based on Communication Networks Topic of Production and Marketing at Four Farmer Groups in Tasikmalaya

Number	Group	Production			Marketing		
		Average	Maximum	Minimum	Average	Maximum	Minimum
1	Jembar II	4.587	28	0	2.971	27	0
2	Sundamekar	4.820	20	0	2.949	24	0
3	Mekar Karya	4.667	33	0	3.009	41	0
4	Serbaguna II	4.981	19	0	3.149	18	0

Global centrality

Another index to measure the importance of a person in a networks is global centrality or in Freeman terms known as closeness centrality [13]. The index shows a person's position in the system. Values obtained show the number of lanes of a person who is connected with all the points or other participants in the networks. The smaller the value of global centrality of a person, the easier the person to grab all the points or other participants in the networks. Technically, the index measuring the length of geodesic calculations leading to any point on the networks. The lowest value on the production and marketing networks owned by Mekar Karya group. The average global centrality of production networks is 12618.33 with maximum value 12882 and minimum of 9153. While the global centrality average value for marketing networks is 12234.77 with 12432 for maximum value and 7770 for minimum value. According to Scott [13] a person who has the lowest value of global centrality in production and marketing networks considered as the most strategic person that connect with everyone in the group. The actor who plays as the global centrality in production networks is node 8 and node 11. The actor who plays a role as the global centrality in marketing is node 12 and node 43. In production networks relevant actors are members of the group, while the marketing networks the actor is the group's chairman. This indicates that the head of the group has the most strategic role in the marketing, while members of the group has a strategic role in production networks. This is due to the high mobility of group leader, so to encounter the production problems, more members of the group contacted by other group members, but to deal with the problem of sale products, group members are more likely to straight forward to the head of the group. Index Average, Maximum, Minimum Value of Global Centrality Based on Communication Networks Topic in Production and Marketing at Four Farmer Groups in Tasikmalaya can be seen in Table 2.

Table 2: Index of Average, Maximum, Minimum Value of Global Centrality Based on Communications Networks Topic in Production and Marketing at Four Farmer Groups in Tasikmalaya

Number	Group	Production			Marketing		
		Average	Maximum	Minimum	Average	Maximum	Minimum
1	Jembar II	6493.80	6806	328	4727.48	4830	2967
2	Sundamekar	3515.41	3660	2460	3336.47	3422	2030
3	Mekar Karya	12618.33	12882	9153	12234.77	12432	7770
4	Serbaguna II	2626.49	2756	1768	2089.57	2162	1334

The highest value of global centrality in Tasikmalaya owned by Serbaguna II group both for production and marketing networks. The average value of global centrality in production networks is 1987 with maximum value of 2,273 and 1,887 for the minimum. The average value for marketing networks is 2.205 with maximum value of 2,381 and 2,128 for the minimum. According to Scott [13], the highest value of global centrality of the people with the least connected to everyone in the group. The actor who plays the highest global centrality in production and marketing networks is node 14. The actor is a public figure who became a tour guide at the village.

Betweeness Centrality

Another tool for measuring the achievement of a person in a networks is betweeness. According to Borgatti [3] betweeness refers to an individual frequency levels among the individuals associated in a communication path. If someone is in a communication path that connects between individuals or clicks then that person will have a central position. Individuals with high value of betweenees will have a position to control the communication and considered as a potential broker or gatekeeper in a networks. Other individuals will be subject to that person (broker) because the line that connects them with others must pass the “broker” person.

From Table 3 it can be observed that the highest betweenees owned by Mekar Karya group. The betweenees maximum value for the production networks is 1818.988 and the minimum value is 0. The maximum value for the marketing networks is 1452,537 and minimum value is 0. According to Borgatti [3] actor who has maximum value of betweeness in production and marketing networks would be in control the communication in production and marketing networks. The actor who has maximum value of betweenees in production networks is node 39 and node 12. The actors who play a role in betweenees of the production networks are public figures and actor involved in marketing networks is the group's chairman who also doubles as the administrator of the Gapoktan Simpatik. They have a lot of information regarding the production and marketing because they both relate to many information sources such as the Department of Agriculture, Counseling, and administrators of Gapoktan Simpatik. Index of average, maximum and minimum value of betweeneess based on communication networks topic in production and marketing at four farmer groups in Tasikmalaya can be seen in Table 3.

Table 3: Index of average, maximum and minimum value of betweeneess based on communication networks topic in production and marketing at four farmer groups in Tasikmalaya

Number	Group	Production			Marketing		
		Average	Maximum	Minimum	Average	Maximum	Minimum
1	Jembar II	51.240	819.063	0	31.386	537.950	0
2	Sundamekar	43.098	470.479	0	23.746	500.196	0
3	Mekar Karya	89.868	1818.988	0	62.207	1452.537	0
4	Serbaguna II	36.038	319.647	0	17.766	220.292	0

Lowest value of betweenees was owned by Serbaguna II. Lowest value of betweenees in production networks has the maximum value of 319.647 and minimum value of 0. As for the marketing networks, the maximum value is 220.292 and minimum is 0. According to Borgatti [3] actor who plays a role in production and marketing networks has a networks communications control production and marketing in the group , The actor who plays a role in both betweeness centrality in the networks of production and marketing networks is the node 14. The actor is a public figure who is trusted by the chairman of the group running the organic rice cultivation.

B. Factors Associated to Communication Networks

Factors significantly associated positively with local centrality is extension support, the support of NGOs, the group's goals, group function, and pressure groups. While the associated significant negative is the experience of farmers, support the department of agriculture, farmers' capacity to explore the potential of agribusiness, agribusiness take advantage of opportunities and capacity to overcome the problems of agribusiness.

The highest local centrality played by the chairman of the group, both in production and marketing. There is a positive relationship between the centrality of the local extension support, meaning the head of the group contributed to the elucidation of organic rice cultivation. trainers in Tasikmalaya regency officer synergy with the Internal Control System (ICS) in assisting farmers in organic rice cultivation. The group leader also support NGOs in taking care of the organic certifications and permits for the export. The support group leader which is the safeguarding and control group members to consistently running the organic certification standards, so the quality is maintained. The magnitude of the role of group leader in the dynamically the group has confirmed the group's goals are clear, the control function of the group as well as the pressure of group goals.

Lowest local centrality played by members of the group, both in production and in marketing. There is a negative correlation between the experience of farmers with local centrality, meaning members of the group that acts as a central figure not much role in the farmers highly experienced, as well as the role of the central figures are low in giving support to the department of agriculture, low in exploring the potential of agribusiness members, low in take advantage of agribusiness opportunities and low in addressing agribusiness. This is because the central character played by members of the group do not have a high ability both in production and

in marketing. Factors associated with the communication networks can be seen in Table 4.

Table 4: Factors associated to communication networks in Tasikmalaya

Number	Factors related	Local Centrality		Global Centrality		Betweenness Centrality	
		Production	Marketing	Production	Marketing	Production	Marketing
Farmer Characteristics							
1	Non-formal Education	0.058	0.000	-0.005	-0.097	0.238**	0.264**
2	Experience	-0.565**	-0.511**	-0.537**	-0.513**	-0.058	0.026
Supporting Organizations							
3	Agriculture Department	-0.122	-0.235**	-0.014	-0.115	0.149	0.008
4	Instructor	0.183*	0.142	0.126	0.139	0.057	0.101
5	Non-Governmental Organizations	0.323**	0.176*	0.176*	0.320**	0.127	0.024
6	Koperasi	-0.023	-0.005	0.200*	0.024	0.190*	0.115
Group Dynamic							
7	Group Purpose	0.213*	0.153	0.254**	0.173*	-0.061	0.031
8	Group Function	0.196*	0.116	0.205*	0.115	0.022	0.055
9	Group Atmosphere	0.092	0.042	0.109	0.034	0.052	0.148
10	Group Pressure	0.196*	0.243**	0.224**	0.290**	-0.068	-0.042
Agribussiness Capacity							
11	Agribussiness Potency	-0.110	-0.223*	-0.168	-0.267**	0.037	-0.077
12	Agribussiness Opportunity	-0.535**	-0.513**	-0.537**	-0.528**	-0.058	-0.052
13	Agribussiness Issue	-0.223*	-0.060	-0.329**	-0.292**	0.067	0.064
14	Agribussiness Sustainability	-0.059	-0.150	-0.094	-0.189*	0.118	0.073

Factors significantly positive associated with global centrality is the support of NGOs, support of KOPERASI, the group purpose, groups function and groups pressure. While significant negative relationship is the experience of farmers, farmers' capacity to explore the potential of agribusiness, agribusiness take advantage of opportunities, overcome the problem of agribusiness, and the capacity to maintain the sustainability of

agribusiness.

Lowest score/value of global centrality in production networks played by members of the group, while the marketing networks is played by the group's chairman. Both the central figures support the NGOs and KOPERASI, as the two central figures of the people who are easy to contact and be contacted by other members, making it easier for NGOs and cooperatives to ask for a commitment to the members of the group in carrying out the Standard Operating Procedure (SOP). While at the highest global centrality played by members of the group. Members of the group who acts as the central figure, not many roles on high experienced farmers, and not able to dig postensi agribusiness farmers, agribusiness low in taking advantage of opportunities and not able to resolve the issue in agribusiness, as well as not being able to maintain the sustainability of agribusiness. This is because many strategic roles are not able ditangi by members of the group.

Factors significantly associated positively with betweenees is nonfomal education and support cooperatives. Actor in control communication on the production networks is a public figure and the marketing networks is the group's chairman. The more often a person trained organic rice cultivation then the person in charge of communication about the production. Similarly, with the support of the cooperative, the higher the cooperative support of the group members, the cooperative control of the marketing of organic rice production. This is because cooperatives in the Group, Simpatik managing organic rice production output of the group.

Based on the above description indicates that the support of NGOs and pressure groups need to be considered in the development of a communication network for testing inferentially indicates that both indicators relate to the local and global centrality, both on production and marketing networks.

C. Relationship between Group Dynamics and Communication Density

Group dynamics are not significantly correlated to the density of communication. Pearson correlation index between the dynamics of the group with a density of communication on the production and marketing is 0.038 (p = 0962) and 0820 (p = 0.180). This means that the dynamics of the group is not determined by the intensity of communication between members of a group communication networks, but the dynamics are more influenced by the clarity of purpose, the functioning of the group and pressure on group goals. According to Eriyanto [4] numbers in density (density) ranging from 0 to 1, the larger value indicates the higher density (density) of a networks. In the analysis of communication networks in this study found that a low density values (<1) in each group both in production networks as well as in networks marketing. Higher group dynamics was accomplished by small connections that occur between members of the group and communicating or associating only with people who are competent or responsible directly to production and marketing sectors. To put it in other words, people should only communicate with alters who are needed to accomplish their task, while including too many links to unrelated people will lower the group performance. Therefore, unnecessary communication with group members unrelated to the production and marketing tasks will lower the value of group dynamics [15].

3. Conclusion

1. The actor who plays on the local centrality of production and marketing networks are the group leaders.

As for the global centrality and betweenees in production and marketing networks are the group members.

2. Factors associated with communication networks are the support of NGOs and group pressures both in production and marketing network.

3. The dynamic group is not determined by the density of communication, but rather determined by the group purposes, group functions and group pressures.

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