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IDENTIFICATION OF FOOD SELF SUFFICIENCY SUPPORTING FACTORS OF LIVESTOCK SUBSECTOR IN BATU CITY

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ABSTRACT

Building the food self sufficiency is the best strategy to get out from the food crisis. This study aims to describe the supporting factors for food self-sufficiency in Batu city. Sampling was carried out using a purposive sampling method as many as 52 farmers or breeders and 11 farmer or livestock groups. The results of the research show that 1). The linkage of production factors according to natural resources in the form of land area has the high linkages with food independence/ self sufficiency, as well as the experience of farming-livestock business and the use of capital itself has a high linkage to the food independence/self-sufficiency of the livestock subsector 2). The nature of innovation in the form of conformity, complexity, and easy to see results have a moderate linkage with food independence/ self-sufficiency in the livestock subsector 3). Food quality factors assessed according to packaging, halal quality assurance and post-harvest have high linkages to food independence in the livestock sub-sector in Batu City in terms of availability, stability of availability, affordability, security, and dependency of the food. 4). The factor of community empowerment obtained that non-formal education, capital aid and assistance together have high linkages with food independence in the availability, stability of availability, affordability, security, and dependency of the food in Batu City.

KEY WORDS

Livestock sub sector, food self-sufficiency, strategy, halal.

In the era of autonomy, the regions were given extensive authority to develop economic, social, political and cultural potential. One form of opportunity is the sharpening of development orientation based on regional potential, where each region is encouraged not only to be better able to take roles and initiatives in development planning, but also to be able to explore and exploit resources optimally to prosper the local people/community (Hudang, 2018).

The agricultural sector has also been shown to has an important role in the development of the economy of a nation (Gani & Scrimgeour, 2019; Reardon et al., 2019; Beugelsdijk et al., 2019; Paudel et al., 2019; Salmora et al., 2019; Svanbäck et al., 2019; Altieri, 2019). This is based on the contribution of the agricultural sector which does not only play a role in the formation of GDP, the creator of employment opportunities, the increase of people's income and the acquisition of foreign exchange (Kurniawan et al., 2017). The role of the agricultural sector in economic development is very important because some members of society in poor countries depend their lives on this sector (Dorosh & Thurlow, 2018; Ligon & Sadoulet, 2018; Santangelo, 2018; Emami et al., 2018; Diao et al., 2018; Mahmood & Munir, 2018). If the planners seriously pay attention to the welfare of the people, then the only way is to pay attention to the welfare of the community (Rompas, et al., 2015).

Simanjorang, et al (2017) argue that the livestock subsector is not the only superior sub-sector in the agricultural sector, so that in the development of each economic sub-sector in the agricultural sector, competition can occur between the superior subsectors. The impact is an important thing, either directly (in the sub-sectors) and indirect (in other sectors due to

the economic activity). Indirect impacts of livestock sub-sector can be known by analyzing the linkages between economic sectors by observing from the output side and from the input side. The linkage from the output side due to the production result of the livestock subsector will be used as input for other sectors (forward linkage) while the linkages from the input side arise because the livestock sub-sector also uses inputs originating from other sectors (backward linkage).

Food is one of the basic human needs so that its fulfillment becomes one of the human rights that must be met jointly by the state and its people (Davila & Dyball, 2018; Singh et al., 2019; Song et al., 2019; Vita et al., 2019; Kangmennaang & Elliott, 2019; O'Connell & Brannen, 2019). The availability, access and absorption of food is a sub-system that must be fulfilled in its entirety. One of the subsystems is not fulfilled, so a country cannot be said to have good food security. Although food is available sufficiently at the national and regional levels, but if the individual's access to meet his food needs is uneven, then food security is still said to be fragile (Hanani, 2012). Food self-sufficiency is very dependent on the empowerment of farmers in improving productivity (Meinzen-Dicet et al., 2019; Barik & Das, 2019), product quality, and added value from local food so that it has a high bargaining position and competitiveness (Yuliatmoko, 2012).

Livestock as part of the agricultural sector also has a role in economic activities in Batu City. Livestock can generally be divided into large livestock, small livestock and poultry. The population of large and small livestock such as beef cattle, dairy cows or horses, as well as goats and sheep all increase. Even the smallest livestock, rabbits, also increased (Batu City Central Bureau of Statistics, 2015). From the above explanation then it is necessary to identify the potential of the livestock sub-sector and the supporting factors for food self-sufficiency in Batu City.

METHODS OF RESEARCH

This research approach uses descriptive analysis aimed to describe the supporting factors for food self-sufficiency in Batu City by considering the following: Batu City has implemented several community empowerment programs, especially the livestock sub-sector, in realizing food independence (Bumiaji Subdistrict, Batu Subdistrict and Junrejo Subdistrict). In addition, Batu City is a tourist city with domestic and foreign tourist arrivals, making it a place for potential livestock food transactions and distribution. Sampling was carried out using a purposive sampling method of 52 farmers or breeders and 11 farmer or livestock groups. The Data Collection Technique is done by filling out the questionnaire which is done by structured interview technique. Structured interviews in the form of interviews using written questions that are alternative answers already exist and can be in the form of questionnaires.

RESULTS AND DISCUSSION

Food independence/self-sufficiency through community empowerment can be achieved by various factors that influence it. These factors are food potential, innovation, food quality, and community empowerment. The identification of the influence of these factors for food independence/self-sufficiency in Batu City is described in the following discussion.

Food production determines food availability. High and low food production is influenced by various factors of production (Ilham & Sinaga, 2007; Mun'im, 2016). In this study, factors of production consist of natural resources, namely land, and human resources, namely age, length of farm-livestock business, and management. As stated by Darwanto (2015) that the food security program is directed at the independence of the community / farmers based on local resources which are operationally carried out through programs to increase food production; maintain adequate, safe and halal food availability in each region at any time; and anticipation to avoid food insecurity.

The community has land that is used for various needs in its farming activities. There are several land areas owned by farmers in Batu City. Most have more than 0,5 hectares of

land, but not a few have land with an area ranging from 0,15 hectares to 0,25 hectares. Not only rice fields for food crops, but also gardens to cultivate horticulture plants. In addition, land is also used to build cages for livestock. There are also dry fields that are used to grow feed crops. Mr Syaiful Zulkifli, age 45, is a junior high school graduate living in Beji Village, Junrejo Subdistrict, revealing:

The land that I have is not wide, less than 1 hectare that I share the allotment. I use the biggest for rice fields, then to plant feed crops for my livestock, there are few gardens, and I also use them for cages. The land that I use to grow feed crops is rent, so it's not mine (Interview January 24th, 2018).



Figure 1 – Cage of Beef cattle (Left) and Dairy Cattle (Right)

Some types of livestock that are cultivated in Batu City include large livestock, small livestock, and poultry. The details can be seen in Table 1.

Table 1 – Types of Livestock Cultivated in Batu City

No	Large Livestock	Small Livestock	Poultry and Others
1	Dairy cows	Goat	Chicken
2	Beef cattle	Sheep	Land Fisheries
3	-	Rabbit	-

Source: Primary Data Processing, 2018.

The capital used in farming business is from its own capital and only a few make loans. The capital is used to purchase agricultural production facilities such as seeds/seedlings, polybags, fertilizers, medicines, agricultural equipment, building cages, livestock breeds, and others. This is as stated by Mr Sumari, a 45-year-old farmer with senior high school as the last education who lives in Tlekung Village, Junrejo Subdistrict:

The capital that I use is my own capital, not borrowing. For livestock, I use the capital for the construction and maintenance of cages, buy concentrates, then buy medicines for my livestock, etc. In addition to livestock, I also have to share the capital for farming. For this farm, I use the capital to buy seeds, fertilizers, farming tools, medicines, and other necessities. I also use it to grow feed crops for my livestock (Interview January 22nd, 2018).

Most of the livestock-farming business actors in Kota Batu have been doing business for more than 16 years. But there are also some who have less than 15 years experience in farming-livestock. Farmers who are active in conducting livestock-farming business on average are 49 years old; most of them are in the 45 to 53 years age group. Education is mostly high school (SMA) even though there are also quite a few who have graduated from elementary school (SD).

Management of livestock-farming is one of the factors of production which is also studied. The management carried out by livestock-farming actors in Kota Batu is already quite good. Things that have been done in managing livestock-farming business include planning the input use, using modern and traditional cultivation techniques, post-harvest treatment, diversification of food, owning a production market, but there are still some who have not yet done the bookkeeping.

Based on the description of the production factors above, the linkages between production factors according to natural resources in the form of land area are high related to food independence, as well as farming-livestock experience and the use of own capital have

a high linkage to food independence/self-sufficiency in the livestock sub-sector in Batu City. The findings of this study are supported by Chapman & Slaymaker (2002); Pretty et al. (2012); Rangkuti (2017); Knickel et al. (2009); Waisbord, (2018); Vicol et al. (2018); Reardon et al. (2019); Jayne et al. (2019); McCluskey et al. (2019); Tanner et al. (2019); Eitzinger et al. (2019); that the role of agricultural development communication is increasingly important in realizing food self-sufficiency and food diversification as the foundation for creating food independence and reliable food security. Food independence can only be realized if development is carried out on the initiative of the community as a form of awareness to build a modern farming business supported by effective and efficient communication strategies (Rivera et al., 2003; Meera et al., 2004; Xiao-Pan et al., 2019; Jacobi et al., 2019; Zucchella & Previtali, 2019). More detailed assessment results are presented in Table 2.

Table 2 – Linkage of Parameters of Production Factors with Food Independence/self-sufficiency of the Livestock Subsector in Batu City

No	Food Distribution	Food Independence/self-sufficiency									
		Availability		Stability		Affordability		Security		Dependency	
		B	K	B	K	B	K	B	K	B	K
1	Natural resources:										
	Land Area	60	T	60	T	60	T	60	T	60	T
2	Human resources:										
	Experience	60	T	60	T	60	T	60	T	60	T
	Age	30	S	30	S	30	S	30	S	30	S
3	Capital:										
	Own	60	T	60	T	60	T	60	T	60	T
	Loans	10	R	10	R	10	R	10	R	10	R
4	Management	30	S	30	S	30	S	30	S	30	S

Source: Primary Data Processing, 2018.

Note: B – Bobot / Weight; K – Kriteria / Criteria, where if the value of B = 10 then K = Low / Rendah (R); B = 30 then K = Medium / Sedang (S); the value of B = 60 then K = Tinggi (T).

Based on Table 2, the age of business actors and management of livestock-farming business have a medium linkage. The use of loan capital has a low linkage with food independence/self-sufficiency in the livestock sub-sector in Batu City in terms of availability, stability of availability, affordability, security and dependency of the food.

Innovation is defined as an idea, practice or object that is considered new by someone or by another adoption unit (Peshin et al., 2019; Borges et al., 2019; Scheller et al., 2019). New criteria is the main criteria of an innovation. In relation to technology, as long as the technology is new to the user's view, technology in this case can be considered an innovation. Adopting an innovation is based on four things, namely the willingness to do something, know how will to do it, know how to do it, and have the means to do it. Factors that influence the speed of adoption of innovation are relative advantages, compatibility, complexity, can be tried, and easily seen. (Roger, 1995)

Relative advantage means that innovation will be quickly adopted if it provides benefits compared to pre-existing technology. The Acceleration of Diversification of Food Consumption/Percepatan Penganekaragaman Konsumsi Pangan (P2KP) is a program to support the livestock subsector in order to increase nutritional intake in Batu City. The innovation offered is to utilize the potential that exists around the community, such as home yards, to be used in livestock-farming activities. Mr. Supriyanto, 47, a farmer who lives in Junrejo Village, Subdistrict of Junrejo, revealed:

The instructor gave us knowledge about the P2KP and encouraged us to try on the land we owned. In addition to science, we were also given assistance in the form of seeds, polybags, fertilizers, and medicines so that we could immediately practice the knowledge on our own land. Incidentally, I have enough yard. I also tried planting the yard with fruit and vegetable plants. I am thankful that the results of the yard can be consumed with my family. The result is not bad, we don't need to buy fruits and vegetables because they are available in the yard. (Interview January 3rd, 2018).

Another program carried out by the government to support food self-sufficiency in the livestock sub-sector is Special efforts of Broodstock Mandatory Pregnant/Upaya Khusus Sapi Indukan Wajib Bunting (Upsus Siwab). The program is an effort to increase the population of beef cattle through Artificial Insemination/Inseminasi Buatan (IB) and Intensification of Natural Mating/Intensifikasi Kawin Alam (Inka). The program uses the community's active role approach by optimizing available livestock resources so that the desired level of pregnancy is achieved.

The advantage of innovation given still less when viewed in terms of cost. Most said that the program costs less than 50 percent cheaper and only a few people said that the costs incurred were more than 90 percent cheaper compared to previous innovations. In addition, in terms of profits only produce less than 50 percent when compared to previous innovations.

Innovation will be adopted if it has conformity with the values of pre-existing trust or habits (Carolan, 2006). These values can be seen in terms of ethics, aesthetics, intellectuality, religion, and social. The empowerment program provided is considered to be in accordance with the values previously mentioned by most people. Meanwhile, if viewed in terms of conformity with previous ideas or innovations, there are still many people who say that the program or innovation is not appropriate because it only has conformity between 50-60 percent. In addition, this program is also not in accordance with community needs.

Adoption of technological innovation will increase productivity and product quality (Chavas, 2001; Sunding & Zilberman, 2001; Hall Khan, 2003, Abebe et al., 2013; Barnes et al., 2019; Reardon et al., 2019; Oliveira et al., 2019); increase added value with the approach of empowerment and farmer participation and strengthen institutions and competitiveness (Rangkuti, 2017).

Innovation will be fast and can be adopted if it is easy to try on existing situations and conditions. Limited land requires innovation to be able to be tested on a small scale of less than 250 square meters. Most say innovation can be tried on a very small scale with a land area ranging from 250 to 875 square meters. In addition to being able to be tried on a small scale, the visibility of innovation results is located at a level that is rather fast to quickly be seen. Innovation which slows to see it results will certainly make people reluctant to adopt it. Mr. M. Sururi, 45 years old, who lives in Pesanggrahan Village said:

I am very happy about the new innovations provided by the government. Like the Upsus Siwab program that taught me how to breed the beef cattle through IB and Inca. For farmers and small breeders like me this innovation is very helpful if it can be applied to limited land and the results can be quickly seen so as to increase my income. Certainly such programs must be held sustainably and if possible other programs must be sustainable with existing programs, so we don't need to learn from the beginning (Interview January 17th, 2018).

Table 3 – Linkage of Parameters of Innovation with Food self-sufficiency of the Livestock Subsector in Batu City

No	Nature of Innovation	Food self-sufficiency									
		Availability		Stability		Affordability		Security		Dependency	
		B	K	B	K	B	K	B	K	B	K
1	Advantage	10	R	10	R	10	R	10	R	10	R
2	Conformity	30	S	30	S	30	S	30	S	30	S
3	Complexity	30	S	30	S	30	S	30	S	30	S
4	Experimentality	60	T	60	T	60	T	60	T	60	T
5	Easily Seen	30	S	30	S	30	S	30	S	30	S

Source: Primary Data Processing, 2018.

Note: B - Bobot/ Weight; K - Kriteria/ Criteria, where if the value of B = 10 then K= Low / Rendah (R); B= 30 then K= Medium/ Sedang (S); the value of B= 60 then K= High/ Tinggi (T).

Explanation of the factors or nature of innovation above is then used to assess the linkage of innovation with food independence/self-sufficiency in the livestock sub-sector in Batu City. The informants who have been interviewed argue that innovation has a moderate

linkage, where the nature of innovation, namely trial, has a high linkage, while the benefits of innovation has the low linkage to food independence/ self-sufficiency in the livestock sub-sector in Batu City. An assessment of innovation can be seen in Table 3.

Based on Table 3 it shown that the nature of innovation in the form of conformity, complexity and easily seen results has a moderate relationship/linkage with food independence/self-sufficiency in the livestock sub-sector in Batu City judged by indicators of food availability, stability of food availability, food affordability, food security, and food dependency.

Some treatments are needed to be able to ensure the quality of food to be guaranteed. One such treatment is to conduct packaging on food products produced. Packaging aims to avoid contamination of foreign objects or substances that can reduce food quality. Most of the livestock-farming businesses in Batu City have already carried out product packaging in accordance with applicable standards.

As one of the processes of a series of post-harvest activities, packaging plays an important role in influencing consumers. Not only must be safe from foreign object contamination, but the packaging of a product must also be attractive. This is of course to make consumers interested in buying the product when they first see it. According to the recognition of livestock-farming business actors in Batu City, most of them have made attractive packaging for their products. In addition, their products already have halal quality assurance standards for the products they produce. Consumers do not need to worry about the halal products they buy. Mr. Sumadik, 49 years old, a farmer who breeds as a side business lives in Giripurno Village, Bumiaji Subdistrict, reveals:

In order to meet the demands of buyers, I always try to do the packaging of my crop product according to the standards they want. I also guarantee that my product is halal. The product I pack attractively so that consumers are interested in buying. I realized that with such treatment, my products were increasingly in demand by buyers (Interview January 29th, 2018).

A good and standard post-harvest treatment will be able to increase the income of farmers-breeders. Not only maintaining food quality, but also being able to increase it so that it can add value to the sale of products. The quality of food products has been considered by livestock-farming businesses in Batu City so that this factor has a high linkage. The results of the assessment are presented in Table 4.

Table 4 – Linkage of Food Quality Parameters to Food Self-Sufficiency of Livestock Subsectors in Batu City

No	Food Quality	Food Self-Sufficiency									
		Availability		Stability		Affordability		Security		Dependency	
		B	K	B	K	B	K	B	K	B	K
1	Packaging	60	T	60	T	60	T	60	T	60	T
2	Quality Assurance	60	T	60	T	60	T	60	T	60	T
3	PostHarvest	60	T	60	T	60	T	60	T	60	T

Source: Primary Data Processing, 2018.

Note: B – Bobot / Weight; K – Kriteria / Criteria, where if the value of B = 10 then K= Low / Rendah (R); B= 30 then K= Medium/ Sedang (S); the value of B= 60 then K= High/ Tinggi (T).

Based on Table 4. that the food quality factors assessed according to packaging, halal quality assurance, and post-harvest have high linkage to food independence of livestock sub-sector in Batu City in terms of availability, stability of availability, affordability, security, and dependency of the food.

Community empowerment is a series of planned efforts that aim to make changes to a community in order to change society from a state of helplessness to empowerment by emphasizing the activities of community-owned potential development carried out through non-formal education / extension activities (Fraser et al., 2006; Dillon, 2016; Christens, 2019).

The extension program as a manifestation of the community empowerment program of livestock-farmers actor in Batu City is carried out once every month on average. Furthermore, there are also groups of livestock-farming businesses actor visited by extension agents every two or one week. Others get counseling every two or three months.

Assistance made to livestock farming business actor is carried out by agricultural instructors. According to the livestock-farming business actors in Batu City, the quality of the material provided by the instructor is good. Extension agents are also considered to have performed their roles well. In general, the extension/counseling activities of livestock farming business in the city of Batu have provided satisfaction for livestock-farming business actors when viewed in terms of process, material and human resources of the extension agent.

The aspect of empowerment in addition to non-formal education through counseling is the provision of capital. The capital provider institution that serves the livestock-farming business in Batu City is Bank Rakyat Indonesia (BRI). Submission of capital funds to BRI can be done by farmer groups that already have a valid notary deed. The process of submitting and channeling funds for livestock-farming business actors can be started from the submission of requests for funds through Gapoktan then the funds obtained by farmer groups will be distributed to members of farmer groups of one million rupiah to each member.

Farming-livestock business actors are able to get average capital assistance once a year and others get twice capital assistance in one year. Only small percentages get capital assistance every two years or more than once every two years.

Farming-livestock business actors in the city of Batu also receive government assistance in the form of Special efforts of Broodstock Mandatory Pregnant/ Upaya Khusus Sapi Indukan Wajib Bunting UPSUS SIWAB to dairy farmers. Assistance also comes in the form of the giving 2-5 cows per farmer group which are intended to be treated together by members of the farmer group in the same location. The livestock-farming business actors is considered to have enough enthusiasm in accessing assistance and participating in empowerment activities. The enthusiasm of livestock-farming business actors is quite high as described by Darmadji 48 from the village of Junrejo.

Community the members of farmer groups tend to welcome the presence of empowerment activities in the form of teaching and material assistance. Examples in this Junrejo, in 2016 there was once the assistance of procurement of beef cattle seedlings. Beside that there has also been capital assistance for the development of farmer groups. If the assistance comes regularly every year the members of the farmer group also become helped because the business is also supported by the government (Interview Results January 4th, 2018).

Livestock farming business actors get assistance from government agencies/institutions. The intensity of extension activities carried out by institutions/agencies is on average once a month. Some others are conducted every three months. In the counseling, farmers get material about cultivation business. In general, the role of extension agents has been considered good by livestock-farming business actors. The quality of assistance provided by agencies / institutions is also considered good. An assessment of the parameters of changes in behavior of livestock farming actors in Batu City can be seen in Table 5.

Table 5 – Linkage of Parameters for Community Empowerment with Food Independence/Self-Sufficiency of the Livestock Subsector in Batu City

No	Community Empowerment	Food Self-Sufficiency									
		Availability		Stability		Affordability		Security		Dependency	
		B	K	B	K	B	K	B	K	B	K
1	Non-formal Education	60	T	60	T	60	T	60	T	60	T
2	Capital Assistance	60	T	60	T	60	T	60	T	60	T
3	Mentoring	60	T	60	T	60	T	60	T	60	T

Source: Primary Data Processing, 2018.

Note: B – Bobot / Weight; K – Kriteria / Criteria, where if the value of B = 10 then K= Slow / Rendah (R); B= 30 then K= Medium / Sedang (S); the value of B= 60 then K= High / Tinggi (T).

Based on Table 5, it can be concluded that non-formal education, capital assistance and assistance/ mentoring together have high linkage with food independence/ self-sufficiency in the availability, stability of availability, affordability, security, and dependency of the food in Batu City.

CONCLUSION AND RECOMMENDATIONS

Based on the findings of this study, it can be concluded that 1). the linkage of production factors according to natural resources in the form of land area has the high linkages with food independence/ self sufficiency, as well as the experience of farming-livestock business and the use of capital itself has a high linkage to the food independence/self-sufficiency of the livestock subsector, the nature of innovation in the form of conformity, complexity and easily seen results has a moderate relationship with food independence in the livestock sub-sector in Batu City judged by indicators of food availability, stability of food availability, food affordability, food security, and food dependence. In addition, based on food quality factors assessed according to packaging, halal quality assurance, and post-harvest have high linkage to food independence/self-sufficiency in the livestock sub-sector in terms of availability, stability of availability, affordability, security, and dependency of the food. Furthermore, for community empowerment factors obtained that non-formal education, capital assistance and assistance/mentoring together have high linkages with food independence/self-sufficiency in terms of availability, stability of availability, affordability, security and dependency of the food in Batu City.

This study recommends the importance of realizing food self-sufficiency in the livestock sub-sector in Batu City, efforts are needed to improve the quality of content and intensity of extension, providing production facilities, optimizing capital assistance programs, intensifying the use of breeding technology and facilitating the marketing of livestock products.

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