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An Analysis of Regional Sustainable Food Security in Jambi Province

Suandi[1], Dompak Napitupulu[2], Yusma Damayanti[3]

Agriculture Faculty, University Of Jambi, Jl. Jambi-Muara Bulian KM-15, Jambi, 36361, Indonesia

Abstract: ***This study was aimed to: (1) determine the regional food security, (2) determine the household food security, and (3) analyze the food security sustainability in Jambi Province. The study was conducted in Jambi Province by purposively selecting four districts, namely: Kerinci, Merangin, Muara Jambi, and Tanjung Jabung Barat district. This study used cross-section primary data. The data collection was conducted from May until August 2017 by interviewing 400 respondents who were selected by cluster and purposive sampling. Data were analyzed in descriptive and Multi-Dimensional Scaling (MDS) approach, with RAPFISh (Assessment Technique for Fisheries) technique. The results showed that food security in the study area was classified as food secure group. The household food security was adequate. The data analysis showed that the food security is quite sustainable with the status of 52,35.***

Keywords: food security, household, RAPFISH, regional, sustainable

1. Introduction

The economic growth of Jambi Province shows a significant increase from year to year, as it was shown in the year 2004 that Jambi Province economic growth was 5.38 percent before experiencing a sharp increase as much as 7.93 percent in 2014, higher than the national economic growth which was 6.4 percent [1]. Even though that high rate of economic growth was also followed by an increase in population of 2.56 percent in 2010 and much higher than the population growth of the previous ten years of only 1.89 percent per year. Any increase in the well-being of the population is theoretically inversely related to the increase in the number of children desired [2]. This indicates that the implementation of development in Jambi Province has not been positively correlated with the sectors because it is done partially especially in economic sector and social sector

The high population growth rate of Jambi Province over the past ten years will certainly have an adverse impact on development, including poverty. Statistics show that in 2005, there were 317.8 thousand people or 11.88 percent poor people with details, in urban areas as much as 130,800people and rural areas 194,300people. In 2008 and 2014 the number of poor people in Jambi Province decreased by 9.28 and 8.28 percent respectively, meaning that in 2014 there were 270,080 poor people in Jambi Province [3]. The number of poor people from year to year have decreased, but the absolute poverty rate is still relatively high, so the burden of the government is still large. Therefore, there still needs to be a breakthrough to overcome this problem.

The fundamental problems faced by the population are the lack of access to basic needs of households such as food, capital resources, markets and technology, as well as weak community organizations. Future development plans must be comprehensive and holistic oriented towards the concept of sustainable welfare development, so it is important for every region (province and regency / municipality) to develop a food plan to achieve sustainable food security that can have a direct impact, especially on the poor. This concept is in line with the development targets stated in the Government Regulation No 7 year 2005 on Medium Term Development Plan including concerning the fulfillment of quality food in sufficient quantity and diversity, safe and affordable from time to time (sustainable) for the poor [4].

2. Research Methods

The main purposes of the research were to analyze: (1) the household food security in Jambi Province, and (2) the sustainable food security level in Jambi Province. This study was designed in cross sectional methods and the data was collected in survey methods. Research location was in Jambi Province and was conducted in six months, the object of study was household which was classified based on its basic daily life needs. Research variables in this study were: regional, and household food security, sustainable food security based on ecological, economic, and socio-cultural aspects. In addition to primary data, secondary data were also collected in this study. Primary data were collected in observation as well as direct interview methods. The number of respondents interviewed were 400 households which are taken in cluster stratified random sampling. In the other hand, secondary data were collected from various documentation publicized by government offices. Data were analysed by using Multi-Dimensional Scaling (MDS) approach, with RAPFISH Assessment Technique for Fisheries methods [5].

Multi-dimensional Scaling (MDS) methods was firstly initiated to analysis the sustainability fishing activity in a certain area which is called Rapid Appraisal Fisher (RAPFISH) Program. This program is the newest multi-disciplinary rapid appraisal technics in evaluating comparative sustainability by using scoring system [6]. This multi-dimensional analysis is developed based on statistics technique to transform multi-dimensional measure into more simple attributes [7].

3. Results and Discussion

A. Regional Food Security

Food Security is the condition of the fulfillment of food for the state up to the individual, which is reflected in the

availability of adequate food, both quantity and quality, safe, diverse, nutritious, equitable, and affordable and not contrary to the religion, beliefs and culture of the community, to be able to live healthy, active, and productive on an ongoing basis [8]. Food security is grouped into three subsystems, namely: (1) Food availability with main source of supply from domestic production and food reserves; (2) food affordability by the whole community, both physically and economically; and (3) the use of food to improve the quality of food and nutrition consumption, including the development of food security. One of the important subsystems in food security is the availability subsystem.

According to the Jambi Provincial Food Security Service Report (2017), the availability of food based on energy sources averaged was 3,206 Kcal /Cap/day, while the average energy consumption norms according to the WNPG Recommendation in 2012 amounted to 2,150 Kcal /Cap/day. Based on these data it can be seen that the availability of food in Jambi Province far exceeds the adequacy required by the population, never the less, the analysis shows that food security of Jambi Province is classified as less secure food secure group. This is because the availability of food provided is concentrated on the availability of carbohydrates, whereas food security level is achieved if an area is able to provide food to feed the people in accordance with the desirable dietary pattern (PPH)as it is presented in Table 1. Based on these data, it can be seen that Jambi Province only reached PPH value only 61.89 percent of the ideal PPH target. The composition of the availability of food groups is not yet balanced and still dominated by grains, tubers, oils and fats, oily fruits / seeds, while the availability of animal food groups, nuts, sugar, vegetables and fruits remains unmet.

Table 1: Energy Availability Condition Based on Food Balance Sheet (NBM) compared to Ideal Energy availability in Jambi Province, Year 2017

No.	Energy Sources	Energy Availability (Kcal/Cap/Day)2017*	Ideal Energy availability (Kcal/Cap/Day)
1	Rice	1.720	1.172
2	Tubers	294	116
3	Meat	105	260
4	Oil and Fat	678	212
5	Oily Fruit	209	44
6	Peanuts	39	92
7	Sugar	91	92
8	Fruit and Vegetable	69	116
9	Others		44
	Total	3.206	2.150

Note : *Generated from DKP Office - Jambi Province, 2017.*

B. Household Food Security

Household food security is defined as food access by everyone always to get adequate food for a healthy and active life. Food security also includes access, adequacy, and food sustainability [9]. Food security is the condition of the fulfillment of household food as reflected in the availability of adequate food, both quantity and quality, safe, equitable, and affordable [8].

Food security is closely related to the allocation of household food expenditure, so that to measure the degree of food security at the household level is used cross-classification of two indicators of food security, namely the share of food expenditure and the adequacy of energy consumption (Kcal) [9]. The identification of household food security can use a single indicator of nutritional adequacy/energy and can also use cross-indicator between share of household expenditure and energy consumption (food security degree) adjusted to the needs of analysis [10].Based on the analysis result, it was found that household food security of Jambi Province was classified as food secure group that reached 53.75%, while households belonging to food susceptible group reached 38.75%, and the population belonging to the food group was only 7.5%, and no households in Jambi Province was in the food insecurity group (Table 2). This indicates that the population of Jambi Province is only 53.75 percent able to meet the energy sufficiency with the allocation of expenditure below 60 percent and 38.75 percent others are susceptible to food, meaning that the people of Jambi Province canfulfil their energy adequacy even though it should spend for about 60 percent of total household expenditures for food needs. Household food security in addition to being determined by the level of household expenditure is also determined by other factors, such as the adequacy of food availability, stability of food availability, accessibility to food and quality / food security [11].

Table 2: Food Security of Jambi Province Population Based on Energy Sufficiency and Share of Food Expenditure, 2017

Energy consumption per unit of adult equivalent	Household Expenditure			
	Low (<60% Total Expenditures)		High (≥60% Total Expenditures)	
	Food Secure		Food vulnerable	
	Total	Percent	Total	Percent
Sufficient (≥80% of energy adequacy)	215	53,75	155	38,75
	Less Food		Food insecurity	
Lack (<80% of energy adequacy)	30,00	7,50	0,00	0,00

Source**:** Jonsson and Toole: Maxwell D, et al (2000)(p.78).

Food Security has three subsystems, namely availability, accessibility, and utilization of nutritional consumption or consumption patterns. The pattern of food consumption is the composition of the type and amount of food consumed by a person or group of people at a certain time to obtain the necessary nutrients by the body. This pattern of public consumption can indicate the level of diversity of people's food and consumption habits of a group of people. The consumption pattern describes the food of the population, community, or family, in other words the pattern of human consumption is determined by the nature of ecology, tradition, and religion, so the consumption pattern describes the main characteristics of the local culture of society which in turn affects the welfare of the population [12]. The national consumption rate of AKE and PPA is 2150 kcal / capita / day and 57 gr / capita / day [13]. The result of analysis shows that the consumption portion for food type of rice (source of carbohydrate) especially energy source reaches 47,42%, then side dish 30,89%, and vegetable food / fruits 21,68%, but source of protein is dominated source food side dishes that reached 41.45 percent, then rice food by 35.53 percent, and vegetable food sources / fruits of 23.03 percent. This indicates that household food security is

directly proportional to the food security of the region, either based on food sources consumed or based on the distribution of expenditures for food needs.

Based on the observation that the consumption of food and nutrition in Jambi Province is still low, especially the consumption of protein. The latest data indicate that household protein consumption in Jambi Province is not sufficient for the recommended standard of 52.28 grams / capita / day lower than the recommended 57 grams / capita / day (Anonymous, 2017). This is because of the variety of food consumption consumed by households, the limited knowledge of the importance of protein needs in the household, and they still attach importance to the daily needs of food sufficiency rather than nutritional adequacy. This condition is in line with the research results of [14] through a case study in Muaro Jambi Regency that the food needs consumed by the community has not been diverse and balanced among the nine types of food based on the desirable dietary pattern (PPH). In fact, the potential of food for the needs of public consumption available in the village is quite a lot, especially local food both derived from vegetable sources and food sources of animal rich in nutrients.

According to Nguyen et al., at[15], that the pattern of individual or household food consumption can reflect the nutritional adequacy of a person. Diversity of food consumption is one's effort to fulfil the nutritional intake of either energy, protein, vitamins, minerals and others. Basically, the more diverse consumption of one's food the greater the opportunity to meet the nutritional needs.

C. Sustainable Food Security

As it was mentioned by WECD at [16], sustainable food security borrows the concept of sustainable development globally. "Sustainable development is development that embodies current needs without compromising the ability of future generations to realize their needs". Furthermore, Munasinghe at [16] said that Operationally, sustainable development has various dimensions and components but is based on three pillars, namely: economic, social, and ecological pillars. The concept of sustainable development in other words is oriented to three dimensions of sustainability, namely: economic sustainability (profit), sustainability of human social life (people), natural ecology sustainability (planet), or Triple-P pillars.

According to [17], sustainable development is viewed from the aspect of human welfare that is a development that has techniques and ways of maintaining and improving welfare in a sustainable manner, both in terms of ecological, social and economic sustainability. The same expression is also expressed by Johann Dréo at [18], who said that sustainable development is interconnected with economic, social, and ecological systems so that the study of sustainable development and welfare is a synergistic study. The study of human well-being is also defined by the study of sustainable development that cannot be separated from one another [19].Based on those understandings, the sustainable food security contains the definition of food product development that still maintains the sustainability of natural resources and the environment to maintain the sustainability of food in the long term. Sustainability is divided into three aspects, namely: ecological, economic and social aspects. According to [20], in the 21st century food security programs must be able to create sustainable food systems, where policies must integrate social elements, environmental resources and economic elements in an integrated manner, so that at global, regional, as well as at local level should pay attention to the interrelationship of these three dimensions.

Sustainability analysis in this research measured the level of sustainability based on food security indicators. The parameters observed include the parameters of ecological, economic, socio-cultural sustainability, as shown in Table 3. The analysis is carried out through several stages: the determination of attribute of food security toward sustainable food covering 3 dimensions (ecological, economic and socio-cultural dimension) attributes on an ordinal scale based on the sustainability criteria of each dimension, ordination analysis "Rap-DESIGN" based on the "multidimensional scaling" (MDS) method [5], as well as the compilation of index and food sustainability status assessed in each dimension. The food security sustainability index score ranges from 0 to 100 percent. If the index value is more than 50% then the aspect is sustainable, and if it less than 50% means not sustainableyet. This research tries to make four categories of sustainability status based on the basic scale as it was sugessted by [21] namely: (a) index value = (0-24%) is categorized bad, (b) index value = (25-49%) is categorized less, (c) index value = (50-74%) is categorized sufficient, and (d) index value = (75-100%) is categorized good.

Sustainable food security analysis using a multidimensional scaling approach (MDS) is an evaluation of the sustainability status of fisheries / RAPFISH, a recent multi-disciplinary rapid appraisal technique to evaluate the comparative sustainability of fisheries based on a large number of skewed attributes is done by Fauzi and Anna at [6]. RAPFISH (Rapid Appraisal for Fisheries) is a new technique developed by the University of British Columbia, Canada on sustainable fisheries development. Multi-dimensional analysis is basically a statistical technique that tries to perform multidimensional transformations into a lower dimension. This transformation is to determine the relative position of the fishery against good and bad ordinate. To assess the position of each dimension greatly determined leverage by the attributes used [7].

The results showed that the sustainability of food security in Jambi Province was in the category of sustainability with sufficient category, with the average number 52.35 (Table 3). The value of each dimension obtained that the socio-cultural dimension has the highest value of reaching 62.73, then the economic dimension has a value of sustainability status of 54.32 and the ecological dimension has a sustainability value of 52.70. The data indicate that the sustainability of socio-cultural dimension is better than the sustainability of economic dimension and ecological dimension, therefore the improvement of sustainability status in the future needs to be improved towards sensitive attributes.

Table 3 also shows the sustainability status of food security in Jambi Province from statistical values such as stress and R square values. The statistical value has a valid value with R square 0,94-0,95, and stress value 0,15-0,16. This indicates that the value of the statistical value is quite valid and meets the standard calculation through RAPFISH model applied by Fauzi and Anna at [21] in analysing sustainable food security in Jambi Province and in line with the results of research conducted by.

The status of sustainability of socio-cultural dimension of food in Jambi Province which has the highest value compared with the economic and ecological dimension is evidenced by the high level of solidarity and cooperation among community groups or better known as social capital. Social capital is a strategic investment both individually and in groups. This relationship can be done in the relationship of family / kinship (bonding), relationships in the community (bridging), and relationships in work / formal (linking). The sustainability of this relationship is determined by the five elements of social capital, namely: trust, reciprocity, social networks, norms, and elements of commitment as it was mention by Narayan at [22]. On the other hand, social capital is a form of social and economic networks in society that occur between individuals and groups both formal and informal are beneficial and profitable.

Table 3: Multidimensional Scaling Results (MDS) and Parameters Sustainable Food Security Statistics, 2017

Dimensions	Status	Category	Statistics Value	
			Stress	R^2
Ecology	52,70	Fairly Sustainable	0,16	0,94
Economics	54,32	Fairly Sustainable	0,16	0,95
Socio-cultural	62,73	Fairly Sustainable	0,15	0,95
Multidimensional	52,35	Fairly Sustainable	0,15	0,95

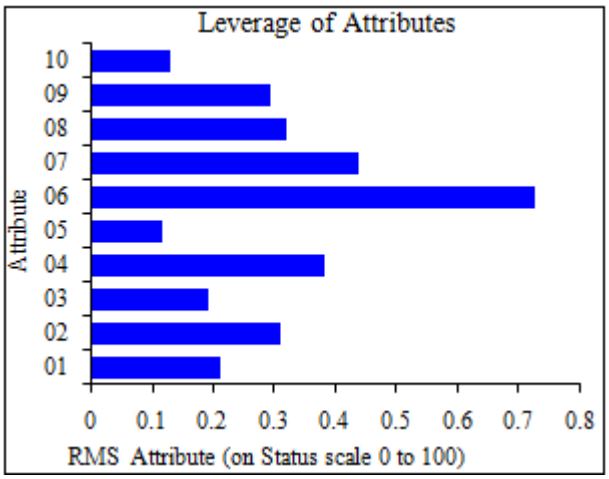
Social capital can be operationalized operatively through two interrelated dimensions, namely the structural dimension and the character dimension [2]. Other social capital that plays an important role in the life of the people of Jambi is the Majelis Ta'lim group, collective action, and Yasinan groups [23]. *Gotong royong*, work hand in hand in a group, can be a social capital because it plays a role to form institutional strength at the community, people, country and group level across the nation and state of Indonesia in realizing prosperity. It is also because in the *gotong royong* contained the meaning of collective action to struggle, self-governing, common goal, and sovereignty as it was mentioned by Pranadji at [24]. The findings of Suandi are supported by [25] who found that social capital (family / kinship relationship) exists, both in rural and urban communities as a binding factor in family food fulfillment. Similar results are also shown by [26] who found that social capital has a positive effect on food security in rural areas. Family or socioeconomic factors are closely related to household food sustainability systems and sustainability [27]. The Research finding is supported by [28] who found that household food security status is statistically influenced by farm productivity. Other socioeconomic factors that are not less important in meeting food demand and nutritional intake are the level of education factor and the work of the head of the family [29].

The data show that the socio-cultural dimension is the highest dimension in the sustainability status of household food security. The high sustainability value of socio-cultural dimension is strongly influenced by the levers factor in this research. The highest attribute of leverage is the attribute of household commitment to the prevailing norms in the study area. Another attribute that has a very important role in the socio-cultural dimension is the attribute of the level of dependence of each other's households in sustainable household food security. Household or community commitment is high enough to the norms prevailing in the community, since the communities in the research areas, especially in rural areas, follow customary or customary law. According to the people's recognition, custom law is the supreme law which they follow where customary law is based on "*adat bersendi sara', sara' bersendi kitabullah*". Custom adopted by the community in the research area comes from the Qur'an. In addition to customary law, social norms greatly contribute to wealth and health [30]. The results of analysis indicate that the wealth owned by the community both in developed and developing countries is donated from social norms of 12-28 percent.

D. Sensitivity Analysis (leverage)

Leverage analysis was performed to see which contributing attributes are the most sensitive in influencing the sustainability index value in each dimension. The attribute is sensitive if it has mean root square value (RMS) in the middle up to the highest value (Figures 1,2, and 3). This sensitive attribute is like step wise methods on Regression Test that is as independent variable, while dimension is dependent variable. That is, if these attributes are well managed then they can improve the status of sustainability.

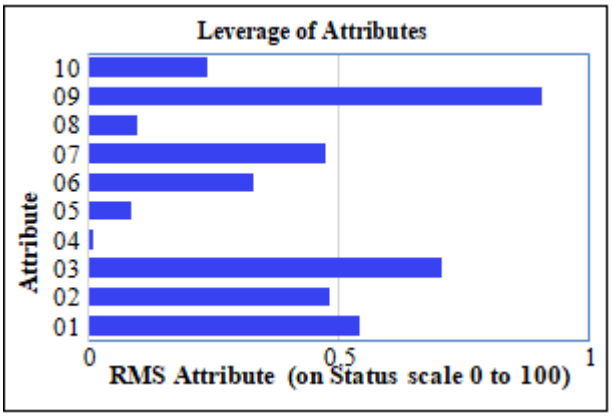
The study showed that the attributes on each dimension provide various patterns of sensitivity in leverage the contribution to changes in sustainability status in each dimension. For example, in the ecological dimension, the most important or highest leverage factor was soil and water conservation, followed by technological access and sustainability attributes in the use of pesticides, while the lowest leverage factor in the ecological dimension was the sustainability of fertilizer, air temperature and land fertility attributes, while the other attributes are at a moderate level of leverage (Figure 1). Thus, to improve the sustainability status of food security in the future it is necessary to maintain the three highest attributes, but other efforts need to attribute with relatively low RMS value, for example the attribute of fertilizer use, air temperature, and land fertility attribute. Particularly the attributes of fertilizer use and soil fertility need to be of concern with the pattern of use and suggestions in accordance with the technology package.



Note:
01 Land Supporting Capacity
02 Land Processing System
03 Soil Fertility
04 Pesticides Using
05 Fertilizer Using
06 Land and Water Conservation
07 Technology Access
08 Land Suitability
09 Rainfall Average
10 Temperature Average

Figure 1: The Value of Attribute Ecological System Distribution of Sustainable Food Security

Further more, the economic dimension has the most important factor or the highest leverage is the status of land tenure, then followed by the source of income of palm oil, and attribute sustainability in the level of household income, while the lowest leverage factor in the economic dimension is the sustainability of paddy rice income sources, , and commodity prices, but other attributes are at a moderate level of leverage (Figure 2). Land tenure status indicator, data indicated that land tenure status in the study area was 88.5% of ownership status, and only 11.5% of tenant and tenant households. Then, other factor of leverage that need to be observed is farmer earnings level, field data indicate that average of household income is big enough or belong to household that is sufficient is Rp.4.780.402. This indicates that the factors of leverage on land tenure status and income level play a significant role in improving the sustainability status of food security in the research area.

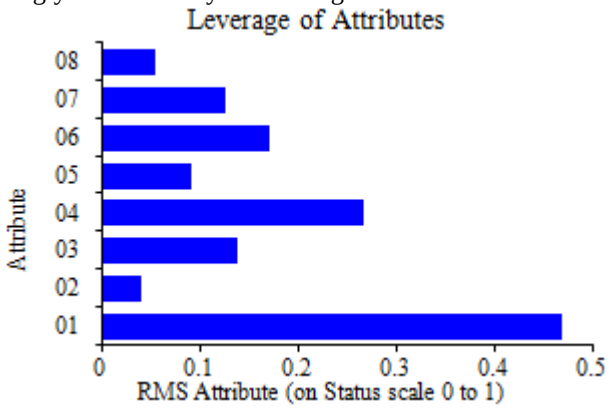


Note:
01 Household Income
02 Rubber Smallholder Income
03 Palm Oil Smallholder Income
04 Rice Farm Smallholder Income
05 Non-Farm Income
06 Bank Access
07 Traditional Market Access
08 Agriculture Product Price
09 Land Tenure Status
10 Farm Land Area

Figure 2: The Value of Attribute Economic System Distribution of Sustainable Food Security

However, the value of leverage factors of rice revenue sources, non-agricultural income sources, and commodity prices are low. Therefore, the leverage factor should be concerned by future households and government to be able to play a role in improving the sustainability status of household food security in the research area

Another dimension that is not less important to be observed in the analysis of sustainable food security in Jambi Province is social culture dimension. The data show that the socio-cultural dimension is the highest dimension in the sustainability status of household food security. The high value of sustainability of socio-cultural dimension is strongly influenced by the leverage factor in this research.



Note:
01 Norm Commitment
02 Honesty Value 03 Responsibility Commitment
04 Community member Interdependence
05 Cooperation Mindset
06 Village Development Sensitivity
07 Work hard Minded
08 Job Responsibility

Figure 3: The Value of Attribute Socio-Culture System Distribution of Sustainable Food Security

As shown in Figure 3, the average root mean square value of this dimension is quite high. The highest atribute leveragevalue was attribute number 1 that is the household commitment to the norms appropriate in the research area. In addition, another attribute that has a very important role in the socio-cultural dimension is the attribute of the level of dependence of each other's households in sustainable household food security. The high commitment of the household or community to the norms prevailing in the community considering the community in the research area, especially in rural areas following customary or customary law. According to the people's admission that customary law is the supreme law which they follow where customary law is applicable with the basis of " *adat bersendi sara', sara' bersendi kita bullah* ". That means the adopted customs in

research areas was mainly based on the Qur'an. The results of this study are in line with [6] in their finding that the sustainability of fishing effort, beside being determined by ecological leverage factor, it is also determined by the ethical or normative factors agreed by the fishermen group

4. Conclusion

Jambi Province food security was on the food secure group though less secure. Food security is still less secure because food is concentrated on the availability of carbohydrates, whereas food security level achieved if such a region can provide food for the population in accordance with the desirable dietary pattern (PPH).

Household food security of Jambi Province is categorized as food secure level with 53.75 percent distribution is classified as food secure, while 38.75 percent belong to food-susceptible group, and the population belonging to food group is only 7.5 percent, and there are no households in Jambi Province which is classified as a group of food insecurity.

Food security in Jambi Province is in a sustainable category with sufficient category, an average score of 52.35. The highest dimension is the socio-cultural dimension that reaches 62.73, the economic dimension 54.32 and the ecological dimension has a sustainability value of 52.70.

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Declarations
This research was done to elaborate and to analyze the regional household food security sustainability. The data is collected from a number of household samples which were selected randomly. The information, then was not exposing personal data but instead pictured the population information.

Ethics approval and consent to participate
“Not applicable”

Consent for publication
“Not applicable”

Availability of data and material
The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

Competing interests
"The authors declare that they have no competing interests"

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Authors' contributions
- SD : Coordinated the research activities, analyzed and interpreted the data and wrote the report,
- DN: Together with SD and YD coordinated the data collecting, analyzed and interpreted the data and wrote the report,
- YD: Together with SD and DN coordinated the data collecting, analyzed and interpreted the data and wrote the report

References

[1] BPS. 2014. Berita Resmi Badan Pusat Statistik Provinsi Jambi. Jambi: Badan Pusat Statistik Provinsi Jambi. No. 05/01/15/Th.VII, 2 Januari 2014. (Official Data, BPS-Statistics Jambi Province. No. 05/01/15/Th.VII, 2 January 2014)

[2] Suandi. 2014. Hubungan Modal Sosial dengan Kesejahteraan Ekonomi Keluarga di Daerah Perdesaan Jambi. Jurnal KOMUNITAS Jurusan Sosiologi dan Antropologi UNES Semarang, Volume 6 Nomor 1, Maret 2014. ISSN: 2086-5465 (cetak), ISSN: 2337-5426 (online), Terakreditasi Berdasarkan SK Dikti No.58/DIKTI/Kep/2013, page: 38-46. (The Relationship between Social Capital and Family Economic Welfare in JambiRural Areas. Journal of the UNESCO Sociology and Anthropology Community. Semarang, Volume 6 No. 1, March 2014. ISSN: 2086-5465 (print), ISSN: 2337-5426 (online), Accredited ByDikti No.58/DIKTI/Kep/2013, page: 38-46.

[3] BPS. 2014. Berita Resmi Badan Pusat Statistik Provinsi Jambi. Jambi: Badan Pusat Statistik Provinsi Jambi. No. 05/01/15/Th.VII, 2 Januari 2014. (Official Data, BPS-Statistics Jambi Province. No. 05/01/15/Th.VII, 2 January 2014)

[4] Anonymous. 2005. Peraturan Pemerintah (Perpres) No 7 Tahun 2005 tentang Rencana Pembangunan Jangka Menengah. Menteri Hukum dan Hak Asasi Manusia Republik Indonesia.(Government Regulation No. 7 Year 2005 about The National Development Middle Planning. Indonesian Law and Right Ministry.)

[5] PitchPitcher TJ, David Preikshot. 2001. RAPFISH: A Rapid Appraisal Technique to Evaluate the Sustainability Status of Fisheries. Fisheries Research 49 (2001). Canada: Fisheries Centre, University of British Columbia, 2204 Main Mall, Vancouver, Canada V7R 2L7. page:255-270

[6] Mulyana R, John Haluan, Mulyono S. Baskoro, dan Sugeng Hari Wisudo. 2011. Analisis Multidimensional untuk Pengelolaan Perizinan Perikanan yang Berkelanjutan: Studi Kasus WPP Laut Arafura. *Jurnal*

Teknologi Perikanan dan Kelautan. Vol. 2. No. 1 November 2011: ISSN 2087-4871. Bogor: Departemen Pemanfaatan Sumberdaya PerikananFakultas Perikanan dan Ilmu Kelautan IPB *page:71-79.* (Multidimensional Analysis for Sustainable Fishery Permit Management: Case Stuty at Fihery Area Arafura Ocean. *JTPK Vol. 2. No. 1 November 2011: ISSN 2087-4871. Bogor:* Fish Resource Utilization Department. Ocean and Fish Science Faculty. IPB *page:71-79.)*

[7] Kavanagh, P. and Pitcher, T.J. 2004. *Implementing Microsoft Excel Software for RAPFISH: A Technique for The Rapid Appraisal of Fisheries Status*. Canada: The Fisheries Centre, University of British Columbia, 2259 Lower Mall Vancouver.

[8] Anonymous. 2015. Peraturan Pemerintah Republik Indonesia Nomor 17 Tahun 2015 Tentang Ketahanan Pangan Dan Gizi. Menteri Hukum dan Hak Asasi Manusia Republik Indonesia.(Government Regulation No. 17 Year 2015 about Nutrient and Food Security. Jakarta: Indonesian Law and Human Right Ministry.)

[9] Maxwell D, Carol Levin, Margaret Armar-Klemesu, Marie Ruel, Saul Morris, Clement Ahiadeke. 2000. Urban Livelihoods and Food and Nutrition Security in Greater Accra, Ghana. Washington: "*The International Food Policy Research Institute; In collaboration with the Noguchi Memorial Institute for Medical Research and The World Health Organization*." ISBN 0-89629-115-4.

[10] Bastuti Purwantini T. 2014. Pendekatan Rawan Pangan dan Gizi: Besaran, Karakteristik, dan Penyebabnya. Forum Penelitian Agro Ekonomi, Volume 32 No. 1, Juli 2014. Bogor: *Pusat Sosial Ekonomi dan Kebijakan Pertanian. page:* 1 – 17.(Nutrient and Food insecurity Approach: Measurement, Characteristics, and Cause. Agro-Economics Researcher Forum. Volume 32. No. 1 July 2014. Bogor)

[11] Anonymous. 2012. Undang-undang Republik Indonesia Nomor 18 Tahun 2012 tentang Pangan. Jakarta: Diundang pada Tanggal 17 November 2012. Jakarta: Menteri Hukum dan Hak Asasi Manusia Republik Indonesia. (The Indonesian Act. Number 18 Year 2012 about Food. Enacted in Jakarta on 17 November 2012. : Indonesian Law and Human Right Ministry.)

[12] Abdalla, Samar; and Ingrit-Ute Leonhauser. 2013. *Dietary Food Consumption Patterns in Sudan*. Sudan: Basic Research Journal of Agricultural Science and Review. ISSN 2315-6880, Vol. 2(9), September 2013. pp. 180-185.

[13] Hardinsyah, Hadi Riyadi dan Victor Napitupulu. 2012. Kecukupan Energi, Protein, Lemak Dan Karbohidrat Bogor. Departemen Gizi Masyarakat Fakultas Ekologi Manusia, Institut Pertanian Bogor. (The Adequacy of Energy, Protein, Fat, and Carbohydrates in Bogor. Society Nutrition Department, Human Ecology Faculty. Bogor Agriculture University)

[14] Suandi and Yusma Damayanti. 2016. The Relationship between Socioeconomic Status and The Patterns of Food and Nutrition Consumption of the Household in Rural Areas of Muaro Jambi Regency. KOMUNITAS: International Journal of Indonesian Society And Culture. Volume 8, Nomor 1, Maret 2016ISSN: 2337-5426 (online), *page: 118-124.*

[15] Khomsan A, Hadi Riyadi, Sri Anna Marliyati. 2013. Ketahanan Pangan dan Gizi serta Mekanisme Bertahan pada Masyarakat Tradisional Suku Ciptagelar di Jawa Barat. Jurnal Ilmu Pertanian Indonesia (JIPI), Periode Desember 2013, Volume 18, Nomor 3, ISSN 0853 – 4217. page: 186-193 (Nutrient and Food Security and Ciptagelar Traditional Ethnic Survive Mechanism in West Java. JIPI December 2013. Volume 18, Nomor 3 ISSN 0853 – 4217. Page 186 – 193)

[16] Achmad Suryana. 2004. Ketahanan Pangan di Indonesia. Prosiding Widyakarya Nasional Pangan dan Gizi VIII 2004. Ketahanan Pangan dan Gizi era otonomi Daerah dan Globalisasi. LIPI. Jakarta.Indonesian Food Security. National Widyakarya on Food and Nutrient VIII. Nutrient and Food Security on the Era of Regional Autonomy and Globalization. LIPI. Jakarta)

[17] Holdren, John P. 2008. "*Science and Technology for Sustainable Well-Being*". San Fransisco: Science, Volume 319, January. page: 424-434. www.sciencemag.org.

[18] Richard B, Howarth. 2012. "*Sustainability, Well-Being, and Economic Growth*". NewYork: MINDING NATURE *a journal of the* CENTER FOR HUMANS AND NATURE: *Expanding our Natural and Civic Imagination.* Volume 5, Number 2, September 2012, *page: 32-39.*

[19] Kjell, Oscar N.E. 2011. "*Sustainable Well-Being: A Potential Synergy BetweenSustainability and Well-Being Research*". America: Review of General Psychology. Vol. 15, No. 3, page: 255-266.

[20] Lang T, and David Barling. 2012. Food security and food sustainability:reformulating the debate.*The Geographical Journal*, Volume 178, Nomor 4, Periode December 2012. London: *Centre for Food Policy, City University London, London EC1V 0HB*. doi: 10.1111/j.1475-4959.2012.00480.x. pp. 313–326

[21] Syafruddin, Surjono Hadi Sutjahjo, Yayuk Farida Baliwati, dan Rita Nurmalina. 2007. "Strategi Pengelolaan dan Analisis Status Keberlanjutan Ketahanan Pangan di Kabupaten Halmahaera Tengah". Jurnal Pengkajian dan Pengembangan Teknologi Pertanian, Volume 10 Nomor 1, Periode Juni 2007. page: 30-38. (Management Strategy and Analysis of the Status of Sustainable Food Security in Central Halmahaera Regency". Journal of Agricultural Technology Assessment and Development Volume 10 No. 1, June 2007 Period. Page: 30-3)

[22] Mehrdad Madhooshi, Mohammad Hossein Jafari Samimi. 2015. *Social Entrepreneurship & Social Capital:A Theoretical Analysis.*American Journal of Economics, Finance andManagement, Vol. 1, No. 3, 2015. New York: American Institut of Science. pp. 102-112

[23] Murdy S, dan Suandi. 2015. Determinants of Sustainable Rubber Plantation in Jambi Province, Indonesia. Philipine: International Society for Southeast Asian Agricultural Sciences (ISSAAS)*Volume 21, Nomor 1, tahun 2015. ISSN: 0859-3132. pp: 18-30*

[24] Rochmadi. 2012. Menjadikan Nilai Budaya Gotong-RoyongSebagai *Common Identity*dalam Kehidupan Bertetangga Negara-Negara ASEAN. Paper. Malang: Universitas Negeri Malang. (To Make "Gotong-Royong" Culture to be Common Identity in ASEAN

Countries Neighboring Life. Paper. Malang State University)

[25] Mustofa. 2012. Analisis Ketahanan Pangan Rumah Tangga Miskin dan Modal Sosial di Provinsi DIY. Jurnal Geomedia: Sains Geografi. Volume 10, Nomor 1, Periode Mei 2012. ISSN: 1412-5285. Yogyakarta: Jurusan Pendidikan Geografi Universitas Negeri Yogyakarta. page:1-21. (Poor Household Food Security Analysis and Social Capital in DIY Province. Geomedia Journal: Geography Science. Volume 10, Number 1, May 2012. ISSN: 1412-5285. Yogyakarta: Georaphy Education Department Yogyakarta State University. page:1-21)

[26] Dzanja J, Mike Christie, Ioan Fazey and Tony Hyde. *2015.* The Role of Social Capital in Rural Household Food Security: TheCase Study of Dowa and Lilongwe Districts in Central Malawi. Journal of Agricultural Science; Vol. 7, No. 12; 2015. ISSN 1916-9752 E-ISSN 1916-9760. Canada: Canadian Center of Science and Education, page: 165-176.

[27] Prosperi P,. 2016. Sustainability and Food and Nutrition Security: An Indicator-based Vulnerability and Resilience Approach for the Mediterranean Region. Proceedings of The 52nd Sidea Conference. ISSN (print): 0035-6190; ISSN (online):2281-1559. DOI: 10.13128/REA-18677. page: 635-648.

[28] Ibok, Otu W.; Idiong C; Nsikan E Bassey; and Ekaette S. Udoh. 2014. Food Security and Productivity of Urban Food Crop Farming Households Southern Nigeria. *Agricultural Science*. Published by Science and Education Centre of North America. Volume 2, Issue 3 (2014), 01-12. ISSN: 2291-4471, E-ISSN: 2291-448X

[29] Abdollahi, Morteza; Fatemeh Mohammadi-Nasrabadi, Anahita Houshiarrad, Masumeh Ghaffarpur, Delaram Ghodsi, Naser Kalantari. 2014. Socio-economic Differences in Dietary Intakes: The Comprehensive Study on Household Food Consumption Patterns and Nutritional Status of I.R. Iran. Iran: Nutrition and Food Sciences Research. Vol 1, No 1, Jul-Sep 2014, pp:19-26.

[30] Hamilton, Kirk; John Helliwell, and Michael Woolcock. 2016. *Social Capital, Trust, and Well-beingin the Evaluation of Wealth*. Policy Research Working Paper. Francisco: Development Research GroupPoverty and Inequality TeamJune 2016.