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The Household Food Security at the Food Resilience Village Programme in Java

Tedy Dirhamsyah[1], Jangkung Handoyo Mulyo[2&3], Dwidjono Hadi Darwanto[2], Slamet Hartono[2]

[1]*Food Security Agency, Ministry of Agriculture Republic of Indonesia*
Jl. Harsono RM No. 3 Bulding E of 6th Floor, Ragunan, South Jakarta
[2]*Faculty of Agriculture Gadjah Mada University Jl. Flora No. 1 Bulaksumur, Yogyakarta*
[3]*Center For Population And Policy Studies Gadjah Mada University Jl. Tevesia, Bulaksumur, Yogyakarta*

***Abstract**: The food security in Indonesia still encounters many problems, among others, the increase of food needs in number, its quality and diversity in line with population growth. In order to overcome the food security problems, Government through the Food Security Agency (FSA), Department of Agriculture, since 2006 has launched the Food Resilience Village Programme (Demapan). Demapan is conducted within four years through four stages: preparation, growth, development, and self sufficiency. Given the wide scope of activities and the amount of budget allocated to Demapan, the research on the impact of Demapan to the food security of households in Java is necessary to be conducted. The objective of this research is to analyze the food security level of households in the Demapan in Java and the factors that influences it. The basic method used is descriptive analysis. The area sampling was conducted by using a purposive sampling method. The analysis result showed that Demapan encourage the poor households which in general are the food insecurity households, to become the food vulnerable, even improve to become the food security households. The household food security level in the Demapan in Java, the highest was in the agriculture agro-ecosystems areas close to urban as much as 10%. The factors that has effected the positive odds value to the food security is the land area, members of group participation on training and important activity of Demapan, as well as the agro-ecosystem of the household who reside in the close urban. The factors that has effected the negative odds value to the food security is the amount of household members, rice and corn prices.*

***Keywords:** Food Security, Food Resilience Village Programme (Demapan)*

I. Introduction

The Constitusion of The Republic of Indonesia Number 18, 2012 on Food, defines the food security as "the fulfillment of food conditions for the country to the individual, which is reflected in the sufficient food availability, whether in quantity and quality, safe, diverse, nutritious, equitable, and affordable and does not conflict with religion, beliefs, and community culture, to be able to live healthy, active, and productive in sustainable manner".

The incrase of food security in Indonesia still encounter many problems, among others, the increase of food needs in number, its quality and diversity in line with population growth. In another side is still the large the population proportion who experience the transient food insecurity due to natural disasters and calamity as well as the chronic food insecurity due to poverty (Food Security Council, 2010).

The data show that amount of poor population in Indonesia is more decreased. In 2005, amounts of poor population as much as 35.10 million, then decreased into 31.02 million in 2010. The decrease of the amount of poor population in Indonesia for period 2005-2010, has not given an indication the decrease amount of population that vulnerable to the food insecurity. The highly food-insecurity population in 2007 amounted to 29.21 million, increased into 35.71 million in 2010, and the food-insecurity population in 2007amounted to 61.57 million, increased into 72.44 million in 2010 (BKP, 2011).

In order to overcome the food insecurity problems, Government through the Food Security Agency (FSA), Department of Agriculture, since 2006 has launched the Food Resilience Village Programme (Demapan) which are expected to encourage the capability of village communities to materialize the food security and their family nutrition, so that can live healthy and productive. Demapan was conducted within four years through four stages: preparation, growth, development, and self sufficient. The efforts are conducted gradually through empowering process of community to recognize their potential and capability, looking for alternative opportunities and solving problems, as well as being able to take decisions to manage and exploit the natural resources in an effective, efficient, and sustainable (BKP, 2010).

Given the wide scope of activities and the amount of budget allocated to Demapan through APBN until 2012 to venture capital assistance of tehe affinity group as much as Rp 250,042,000,000.00 (BKP, 2013), the research on the household food security at Demapan in Java is necessary to be conducted. In general the

objective of research is to analyze the food security of households in Demapan in Java and the factors that influence it.

II. Research Method

The basic method used in this research is descriptive analysis method. The area sampling was conducted by using a purposive sampling method. Pasaribu (1983); Herman (2005); Suratno and Arsyad (1988) gives the meaning of purposive sampling as a way of selecting sample intentionally with special considerations or based on specific criteria which owned by the sample. The sample selected with consideration in accordance with the objective of research is the location of Demapan in Java that have reached the Resiliencestage, started since 2006 are listed in Table 1.

The households sampling was conducted in random sampling. In accordance with Sumodmingrat (2007) opinion stated that in a limited population a random sample is obtained by giving equal opportunities to every individual in population to be selected as sample. When the amount of population is small, it can be conducted by raffle the "Cointoss" (Nasution, 2012). The sample (RT) households criteria is the poor households who are members of the affinity group (RTKA) are receiving programme and the poor households are not members of KA (RTBKA). Total respondents households amounted to 300, taken from 30 households (15 RTKA and 15 RTBKA) per village.

Table 1. The Research Location with Agroecosystem Approach

No	Province	Regency	Subregency(Village)	Agroecosystem
1	Banten	Pandeglang	Pagelaran (Bulagor), and Patia (Babakan Keusik)	Ciliman Watersheds
2	West Java	Sumedang	Situradja (Karangheuleut and Kaduwulung)	Upland area
3	Central Java	Brebes	Tanjung (Mundu and Sarirejo)	Area near the northern coast of Java
4	D.I. Yogyakarta	Bantul	Imogiri (Selopamioro), and Dlingo (Muntuk)	Agricultural areas near urban
5	East Java	Pacitan	Donorojo (Belah) and Punung (Piton)	Dryland area

To measure the food security level either households or individuals, some institutions and experts using different indicators (Food Act. 2012; FAO, 1996; BKP, 2011; Department of Health, 1996 in BKP, 2011; WNPG X, 2012; Kartono et al, 2012; Jonsson and Tolle, 1991 in Maxwell, D. et al, 2000 and LIPI, 2004). Measuring the food security level by calculating the food availability and energy consumption per capita per day (BKP 2011; WNPG VIII, 2004; and Jonsson and Tolle, 1991 in Maxwell, D et al, 2000). In this study, the researchers propose different indicators to the prior researchers about indicators and the food security level by combining indicators of Food Security Agency (2011), Department of Health RJ (1996), Widyakarya National Food and Nutrition / WNPG X (2012), Kartono et al (2012), and Jonsson and Tolle, 1991 in Maxwell, D. et al (2000) that is combination between energy sufficiency at the availability level with the energy sufficiency at the consumption level as in.

Table 2. The Household Food Security Level

Energy consumption (2,150 kcal per capita per day-AKE)	Energy availability (2,400 kcal per capita per day-AKE)	
	> 90% of energy availability	< 90% of energy availability
81% -110% of energy sufficiency	Food security	Food vulnerable
< 80% of energy sufficiency	Food vulnerable	Food insecurity

Note: AKE = Figures of Energy Sufficiency (WNPG X, 2012)

The analysis methods to examine the impact of Demapan to the food security was analyzed using Ordered Logit Model. By analyzing Table 2, the household food security level is classified ordinally that is 3 to the food security, 2 to food vulnerable, and 1 to food insecurity.

The factors assusmed to affect the food security is head of family education (PKK), household income (PDT), amount of household members (JART), land area (LL), rice price (HB), corn price (HJ), cassava / sweet potato price (HUKJ), chicken meat price (HD), eggs price (HT), amount of social assistance of Mapan village received by group members (BANSOS), members of group participation on training and important activities of Mapan (KEGPEN), watersheds agroekosistem dummy (D21), coast agroecosystem dummy (D22), agriculture agroecosystem dummy near urban (D23), and dry land agroecosystem dummy (D24). The model for the household food security analysis:

KP = food security level (food security, vulnerable, and insecurity)

β = regression coefficients (parameter estimated)

d_2	=	dummy variable coefficients (parameter estimated)
PKK	=	head of family education (years)
PDT	=	household income (Rp)
JART	=	amount of household members (people)
LL	=	land area (ha)
HB	=	rice prices (Rp/ kg)
HJ	=	corn prices (Rp/ kg)
HUKJ	=	cassava price/ sweet potato (Rp/ kg)
HD	=	chicken meat prices (Rp/ kg)
HT	=	egg prices (Rp/ kg)
BANSOS	=	amount of social assistance of Demapan received by group members
KEGPEN	=	members of group participation on training and important Demapan activities
$D_{2.1}$	=	1 = if it is watershed, 0 = if the other agroecosyistem
$D_{2.2}$	=	1 = if the coastal areas, 0 = if the other agroecosyistem
$D_{2.3}$	=	1 = if the agricultural area near urban, 0 = if the other agroecosyistem
$D_{2.4}$	=	1 = if the dry land, 0 = if the other agroecosyistem

III. Results And Discussion

The Household Food Security at Resilience Food Village Programme in Java

The respondents household are all the affinity group members in 2006 which are the poor households, and the poor households are not affinity groups members in the village. The analysis result of primary data in Table 3, showed that not all the poor households are not households with food insecurity, there are also the food vulnerable households, even the food secure. This suggests that the Demapan is able to increase the status of the household food security from the not secure households into the food vulnerable households, even the food secure (Table 3).

Table 3. Distribution of the Household Food Security Level in the Food Resilience Village in Java

Regency-Province	Food Security Level						Total	
	Food security		Food vulnerable		Food insecurity			
	Amount	%	Amount	%	Amount	%	Amount	%
Pandeglang-Banten	2	3.33	13	21.67	45	75	60	100
Sumedang-West Java	1	1.67	13	21.67	46	76.67	60	100
Brebes-Central Java	2	3.33	13	21.67	45	75	60	100
Bantul-DI.Yogyakarta	6	10	22	36.67	32	53.33	60	100
Pacitan-East Java	1	1.67	5	8.33	54	90	60	100
Java	12	4	66	22	222	74	300	100

Source: Primary data analysis 2013

In general, the household food security of Demapan in Java was as follows: food insecurity as much as 74% (222 households), food vulnerable 22% (66 households), and food security 4% (12 households). Table 2 also shows that households of Demapan in Java that is food security are most numerous in Bantul Regency which is the agricultural agro-ecosystems area near the urban area was 10%, higher than average from the whole area of research that is 4%. As for the other four districts, the households that its food security below average of Java, namely Pandeglang Regency was 3.33%, Sumedang was 1.67%, Brebes was 3.33% and Pacitan was 1.67%. Bantul Regency to became the area with the highest household with food security among other possibilities as: infrastructure (farm roads, villages and subdistricts, irrigation for agriculture) are relatively better compared wiyh Pandeglang Regency (watersheds agroecosystems), Sumedang (upland agroekosistem), Brebes (coastal agroekosistem), and Pacitan (dry land agroekosistem). In addition, the location of research villages in Bantul are relatively closer to regency capital and provinces, so that the distribution and household food access is relatively better than four other districts.

The Household of Demapan in Java that the most food vulnerable is available in Bantul Regency at 36.67%, higher than average of the whole area of research that is 22%. As for the three districts, its food vulnerable households close to the average in Java about 21.67% that is Pandeglang, Sumedang, and Brebes Regency. As for Pacitan Regency is the area with most little of its food vulnerable households that is 8.33%. Furthermore the households of Demapan in Java that food insecurity is in Pacitan by 90%, followed by Sumedang Regency 76.67%, Pandeglang Regency was 75%, and Brebes Regency was 75%. The fourth

districts the households that food insecurity is higher than average of Java was 74%. As for Bantul Regency is an most little area with households that food insecurity was 53.33%.

Pacitan Regency has the largest amount of households that insecurity food of 90%, higher than other regions. This is possible due to the area is the dry land area, where the difficulties in agriculture, as well as higher risk of crop failure if compared with other areas. As we know, dry land in its farming effort relies heavily on the nature gift, especially in terms of water sources that rely on rain. In addition to natural factors that become obstacles, the possibility of infrastructure supporting the farming effort is still limited, such as the absence of irrigation networks both technical and non-technical. In the end, the main commodities produced on dry land are tubers that the economic value is lower than other crops.

The Factors Affecting the Household Food Security in Food Resilience Village Programme in Java

The Ordinal logit regression analysis results in Table 4, shows that the model used has Pseudo R^2 value of 0.2377, meaning that independent variables used in the model is able to explain approximately 23.77% to the household food security level, and the rest 76.23% is explained by other variables not included in the model. The LR X^2 value is significant at 1% error rate that means independent variables togetherly has significant affect to the household food security, so the model can be said is good. The estimated coefficient (independent variables) were significant as much as 6 (six) of 15 (fifteen) variables predicted.

Table 4. The Ordinal Logit Analysis Result the Factors Affecting the Household Food Security in the Food Resilience Village Programme in Java

Variabel	Coefficient	Std. Err.	z-Stat.	Prob.	OR	(OR-1)*100
Cut off/limit 1	-73.70478					
Cut off/limit 2	-70.96405					
pkk	0.1481021	0.0909458	1.63	0.103	1.159631	15.9631
pdt	0.1463818	0.1849067	0.79	0.429	1.157638	15.7638
jart	-1.827577***	0.4220941	-4.33	0.000	0.1608027	-83.91973
ll	0.1165863***	0.0342483	3.40	0.001	1.123654	12.3654
hb	-4.348789*	2.224928	-1.95	0.051	0.0129225	-98.70775
hj	-1.013876*	0.5681722	-1.78	0.074	0.36281	-63.719
hukj	-0.3766588	0.3773883	-1.00	0.318	0.6861502	-31.38498
hd	-2.786902	1.820311	-1.53	0.126	0.0616118	-93.83882
ht	0.2506766	0.5916986	0.42	0.672	1.284894	28.4894
bansos	-0.0297999	0.020547	-1.45	0.147	0.9706397	-2.93603
kegpen	0.1155292*	0.0647644	1.78	0.074	1.122467	12.2467
d21	0.2030386	1.035945	0.20	0.845	1.22512	22.512
d22	1.084629	0.7386084	1.47	0.142	2.958341	195.8341
d23	2.393115***	0.6737641	3.55	0.000	10.94754	994.754
d24	0.2625077	0.7972345	0.33	0.742	1.300186	30.0186
LR statistic (15df)				97.64***		
Prob (LR stat)				0.000		
LR index (Pseudo R2)				0.2377		

Source: Primary data analysis 2013

Note: *significant at α = 10%, **significant at α = 5%, and *** significant at α = 1%

The division of food security levels categories is indicated by cut-off or limit value from the model estimation results in Table 4. Assuming ceteris paribus, the food communities security level of Demapan location in Java in various categories in util units namely:

1. Probability of food security : Pr (KP> -70.96405).
2. Probability of food vulnerable: Pr (-73.70478 <KP <-70.96405).
3. Probability of food insecurity : Pr (KP <-73.70478).

The Ordinal logit model estimation results in Table 4, shows that there are two categories of odds percentage: (a) percentage of positive odds means that each occurs the increase of independent variable 1unit cause an increase in odds or probability the occurrence of food security level, and (b) percentage of negative odds means that each the occurrence of increasing in independent variable will cause the decrease in the odds or probability of the food security level.

The percentage of positive odds

Based on Table 4 it appear that the percentage of positive odds are in: land area, members of group participation on training and important activities of Mapan, as well as agriculture agro-ecosystem dummy near the urban. The logit positive values can be interpreted that the land area, members of group participation on training and important activities of Demapan, as well as agriculture agroecosystem dummy near the urban will increase probability of the communities food security level in location of Demapan.

The land area variable has OR value of 1.123654 means that each the occurrence of improvement /addition 1 unit of land area causes thr increase in the new odds value or probability of the occurrence of the food security level of 1.123654 times from previous value. If expressed as a percentage, assuming other independent variables in the steady condition (ceteris paribus), each the increase/addition of 1 unit of land area will lead to the increase of the communities food security location of Demapan in Java for (OR-1) x 100 = 12, 3654%. The increase of land area will increase the community food production. By the increase of food production, the food availability whether to be consumed, as food reserves or to be sold as household income will also be increased. The combination of the food availability produced themselves with food consumption and the increase of revenues will have impact on the increase of the community food security

The participation variable of group members on training and important activities of Demapan has OR value of 1.122467 means that each the occurrence of 1 unit of the members of group participation on training and important activities of Demapan cause the increase in the new odds new value or probability the occurrence of the food security level at 1.122467 times from previous value. If expressed as a percentage, assuming other independent variables in the steady condition (ceteris paribus), any increase/addition 1 unit of members of group participation in training and important activities of Demapan will cause the increase of the community food security the locations of Demapan in Java about (OR-1) x 100 = 12.2467%. In the more active of the members of group in training and activities of Demapan, directly or indirectly, the members of group were able to improve the knowledge and skills, both in terms of agriculture cultivation to increase their food production, knowledge of how to consume variety of nutritionally and balanced foods, as well as knowledge in terms of trying to improve their incomes. The increase of food production, knowledge of food consumption, and income of group members, it will encourage the food security.

As for the training and activities of group members in their respective group are: a) Administration (administration in recording and bookkeeping of group activity); b) Cultivation (agriculture, livestock and fisheries); c) Craft skills (adjusted to potential and local innovation); d) processing outcome (agriculture, livestock and fisheries); e) Microfinance (recording, micro-finance management); f) Marketing (agricultural products, crafts, and local potential); g) The use of the yard as the family food source; h) Management and utilization of family food reserves, community or village; g) Diversification of food consumption; h) The monthly meeting of group; and i) Saving and borrowing for members of group.

The agriculture agroecosystem dummy variable near the urban has positive coefficient and significant at 1% significance level, this means that community in the agriculture agro-ecosystems near the urban more has food security than community in watersheds agroecosystems, upland agro-ecosystems, coastal agro-ecosystems, and dry land agroekosistem.

The negative odds percentage

Table 4 shows that variables that have a negative odds value is the amount of household members, rice price and corn prices. The negative logit coefficient values can be interpreted that with the increase amount of household members, rice price, and corn prices, will reduce the probability of the community food security in the Demapan.

The variable amount of household members has odds value of 0.1608027, meaning that each additional 1 people of household member causes the decdease in the new odds value of 0.1608027 times from previous value. If expressed as percentage, assuming the other independent variables in the steady conditions (ceteris paribus), each additional 1 person of household member will cause the decrease in the community food security level of (OR-1) x 100 = 83.91973%.

The rice price variable has odds value of 0.0129225, meaning that each one increase in one rice prices unit led to the decrease in the new odds value of 0.0129225 times from previous value. If expressed as percentage, assuming the other independent variables in the steady conditions (ceteris paribus) , each 1 unit increase in the rice price will cause the decrease in the community food security level of (OR-1) x 100 = 98.70775%.

The corn price variable has odds value of 0.36281, meaning that each increase in one corn prices unit causes the decrease in the new odds value at 0.36281 times from previous value. If expressed as percentage, assuming the other independent variables in the steady conditions (ceteris paribm), each increase one unit in corn prices would lead to the decrease in the community food security level (OR-1) x 100 = 63.719%.

A further analysis was to determine the marginal effect of determinants (significant factor) to the occurrence of any probability of each food security level (KP), then should be analyzed the marginal effect (Musyafak, 2012). The analysis results of marginal effects are presented in Table 5. The analysis shows that any increase in the amount of household members (jart) 1 person it will decrease probability of the occurrence of food security (KP = 3) of households on location of Demapan in Java to 2.46565%, and decrease probability of the food vulnerable (KP = 2) amounted to 24.14619%, at the same time will increase probability of food insecurity (KP = 1) amounted to 26.61184%.

Table 5. The Results of Ordinal Logit Marginal Effect Analysis of the Factors Affecting the Impact of Food Resilience Village Program to the Food Security in Java

Variable	Pr(KP=1)	Pr(KP=2)	Pr(KP=3)
jart***	0.2661184	-0.2414619	-0.0246565
ll***	-0.0169764	0.0154035	0.0015729
hb*	0.6332389	-0.5745678	-0.0586711
hj*	0.1476332	-0.1339547	-0.0136786
kegpen*	-0.0168225	0.0152639	0.0015586
d23***	-0.4756371	0.3981716	0.0774655

Source: Primary data analysis 2013

Description:

Pr(KP=1): Probability of food insecurity

Pr(KP=2): Probability of food vulnerable

Pr(KP=3): Probability of food security

The further analysis results of marginal effect, shows that any increase in land area (ll) 1 unit area will increase probability of the occurrence of food security (KP = 3) of households on location of the Demapan in Java amounted to 0.15729%, and probability of food vulnerable (KP = 2) amount to 1.54035%, at the same time will decrease probability of food insecurity (KP = 1) amount to 1.69764%.

Table 5 shows that any increase in the rice price (hb) 1 rupiah, it will decrease probability the occurrence of the food security (KP = 3) of households on location of the Demapan in Java amounted to 0.586711%, and will decrease probability of the food vulnerable (KP = 2) amounted to 57.45678%, and at the same time will increase probability of the food insecurity (KP = 1) amounted to 63.32389%.

Further analysis shows that any increase in corn price (hj) 1 rupiah, it will decrease probability of the occurrence of the food security (KP = 3) of households on location of Demapan in Java amounted to 1.36786%, and will decrease probability of the food vulnerable (KP = 2) amounted to 13.39547%, and at the same time will increase probability of the food insecurity (KP = 1) amounted to 14.76332%.

The marginal effects analysis results in Table 5, shows that each increase in 1 unit of members of group the participation on training and important activities of Demapan (kegpen) will increae probability of the occurrence of the food security (KP = 3) of households on location of the food resilience villages in Java amounted to 0,15586%, and probability of the food vurnerble (KP = 2) amounted to 1.52639%, at the same time will decrease probability of the food insecurity (KP = 1) amounted to 1.68225%

IV. Conclusion

1. The Food Resilience Village Programme encourage the poor households from the food insecurity households to becomes the food vulnerable households, even improve more to become the food security households.
2. The highest level of food security households is in agriculture agro-ecosystems areas close to the urban (10%), followed by watersheds agro-ecosystems (3.33%), coastal agroecosystem (3.33%), upland agroecosystem (1.67%) and dry land agroecosystem (1.67%).
3. The factors that has affected to the positive odds value to the food security is the land area, members of group participation on training and important activities of Demapan, as well as agriculture agro-ecosystem close to the urban. The factors that has effected to the negative odds value to the food security is the amount of household members, rice and corn prices.

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