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Sociodemographic Factors Affecting Household Food Security in Sumedang Regency West Java Province

ABSTRACT

Sumedang Regency is categorized as food security at the regional level based on the 2015 Food Security and Vulnerability Atlas (FSVA), but at the household level, there are still cases of food insecurity. The problem faced is that the determinants of food security have not been identified based on household characteristics. The objective of this study was to determine the sociodemographic factors that affect household food security in Sumedang Regency. This study uses a quantitative method with 690 household analysis units obtained from the 2015 Susenas data. Data were analyzed by the logistic regression method. Sociodemographic factors that affect household food security in Sumedang Regency in 2015 from the aspect of household head characteristics are education, age, and smoking habits. While from the aspect of a household is the number of household members, rural residence, and position in work as a farm laborer. Household food security in Sumedang Regency will be better if there is an increase in household income sources of farm laborers, increased economic activity in rural communities, and expansion of community education accessibility, optimization of family planning programs, and increased knowledge and awareness of healthy living behaviors by reducing smoking habits.

Keywords: food security, rural, agriculture, household, sociodemographic

INTRODUCTION

Fulfilment of food sufficiency is the most basic rights for the community and is a prerequisite for the fulfilment of other basic rights, such as the right to obtain an education, health, and decent work (Badan Ketahanan Pangan, 2010). Food sufficiency is also an investment in the formation of higher quality human resources in the future. Food availability is often an indicator of an area's food security. However, adequate food supply at the regional level does not guarantee food security at the level of smaller administrative areas, even at the household and individual level (Kurniadin, 2015).

In Sumedang Regency, based on the Food Security and Vulnerability Atlas (FSVA) is a food security categorized area. However, the results of a West Java Development Data and Analysis Center study released in the 2013 West Java Food Security Statistics (Badan

Ketahanan Pangan Daerah Provinsi Jawa Barat, 2013) found that 28 villages in Sumedang Regency were potentially food insecure based on a review of 13 indicators on the FSVA. If it is classified based on the main source of income of the population in the villages with potential food insecurity, it turns out that 27 of the 28 villages are agriculture-based villages dominated by rice and secondary crops.

This condition is an irony, where the region which produces food with the main livelihood of its people as farmers but is not directly proportional to the conditions of food security of the people. On the other hand, the number of agricultural households in Sumedang Regency is still quite dominant when compared to other sectors. Based on the results of the 2013 Agriculture Census, there were 134,394 agricultural households in Sumedang (Badan Pusat Statistik Provinsi Jawa Barat, 2013). If it is assumed that each household has 4 members and the population in 2013 was 1,125,125 people, then almost half of the population in Sumedang relied on the agricultural sector as a source of income. This was reinforced by 2015 Sakernas (Survey of National Employment Work Force) data which estimated that 30% of the workforce in Sumedang Regency had their livelihoods depend on agriculture, forestry and fisheries, and another 70% spread across 16 sectors/categories of employment.

Food security in Sumedang Regency also faces threats due to the National Project for the Construction of the Jatigede Reservoir and the Development of the Cisumdawu Toll Road. The two projects caused the conversion of productive paddy fields around 2,183.30 hectares which consequently decreased rice production to at least 21,833 tons/(Badan Perencanaan Pembangunan Kabupaten Sumedang, 2011). On the other hand, according to data from the Agriculture and Fisheries Extension Service Agency for Agriculture and Forestry in Sumedang Regency (2016), culturally the Sumedang community still has a high dependency on rice. The existence of Affected Persons (Orang Terkena Dampak) due to the construction of the Jatigede reservoir can increase the potential for more serious food insecurity given that their access to food is very limited due to loss of jobs and the resources they have. This needs to be a matter of concern for the Sumedang Regency Government thus community food security is maintained, not only on the aspect of adequate food availability but also on food access and consumption.

Measuring food security is not enough only at the macro level that reflects food availability, but it needs to be measured up to the micro-level that illustrates how individuals or households can meet food needs. Food Law No. 7 of 1996 states that the fulfillment of food needs for every household is not only reflected in the availability of adequate quantity and quality of food, safe, equitable, and affordable but must be able to be accessed to the level of households and individuals without exception (Suharyanto, 2011).

To understand the condition of food security at the household level, information is needed on what factors affect household food security in Sumedang Regency. This is important so that policymakers can provide appropriate interventions to overcome the problem of food security at the micro-level based on existing conditions in Sumedang Regency. The problem faced is that the determinants of food security at the household level have not

yet been identified, especially when faced with the situation of agricultural households in rural areas which are thought to have lower levels of food security.

This study aims to address problems related to factors which are suspected to affect food security in Sumedang Regency at the micro-level, namely households, specifically sociodemographic aspects which include household characteristics. The results of this study are expected to provide a picture of food security at the household level that will complement food security studies that have been carried out at the macro level, namely in the aspect of food availability in Sumedang Regency.

Several previous studies related to household food security at the micro level were used as an approach to understanding the determinants of food security in Sumedang Regency. This paper emphasizes differences in sources of income and domicile of households, whether people who depend on agriculture and live in rural areas have better food security or vice versa, in addition to other factors that are allegedly strong in determining household food security. This is expected to be a reference for policymakers, especially in the Sumedang Regency Government to formulate a strategy to improve food security, which is largely dependent on the agricultural sector and in rural areas.

Food security is defined as a condition of food sufficiency that is experienced by regions, communities, or households, at certain times to meet the physiological needs standards for growth and public health (Dewan Ketahanan Pangan, 2010). At the micro or household level, food security can be measured by various approaches. According to the FAO at the 1996 World Food Summit, formulating food security was achieved when everyone at all times had physical and economic access to meet sufficient and nutritious food needs and support an active and healthy life (Kurniadin, 2015).

An indicator of the number of calories per capita per day is measured based on the Angka Kecukupan Gizi (AKG). Widyakarya Nasional Pangan dan Gizi (WNPG) X of 2014 recommends that food availability criteria be set at a minimum of 2,400 kcal/capita/day for energy and a minimum of 63 grams/capita/day for protein. While from the aspect of consumption, it meets a minimum of 2,150 kcal/capita/day for energy and a minimum of 57 grams/capita/day for protein (Badan Ketahanan Pangan, 2017). A household will be categorized as sufficient if its energy consumption exceeds 90% of the RDA (Recommended Dietary Allowance) or equal to 1,935 kcal/capita/day, and if it is equal or less than that amount then it is categorized as food insecurity. Meanwhile, if it less than 70% of the RDA or below 1,505 kcal/capita/day, it is categorized as very food insecure.

As for the criteria of food expenditures, household food expenditure can be categorized high if the proportion of household food expenditure exceeds 60%. Households with a large proportion of food expenditure are very vulnerable to food insecurity because if there is a decline in income (for example due to loss of work, natural disasters, severe illness that causes unemployment, or policy of rising prices), they only have very large reserves of resources limited to be allocated to meet the household food needs (Kurniadin, 2015).

In this study, indicators of food insecurity use a combination of the proportion of household food expenditure with calorie consumption (Table 1) or what is known as the

Jonsson and Toole Model adopted by Maxwell et.al (2000) as a measure of household food access (Blaney et al., 2009). In Indonesia, the model has been used in several studies (Arida et al., 2015; January, 2014; Widada et al., 2017) as an approach to measure household food security.

TABLE 1. THE LEVEL OF FOOD SECURITY BASED ON JONSSON AND TOOLE CLASSIFICATION WITH SOME MODIFICATION

Calorie Intake	Proportion of Food Expenditures	
	Low (<60% of total expenditure)	High (> 60% of total expenditure)
Sufficient (> 80% from AKE*)	Food secure *(food secure)*	Food Vulnerable *(food insecure)*
Not sufficient (<80% from AKE*)	Food less secure *(food insecure)*	Food Insecure *(food insecure)*

Source : Modified from Maxwell et al. (2000)
*AKE is Standard Indonesian Energy Sufficiency from food consumption equal to 2.150 kkal/capita/days

To determine the factors which are suspected to influence household food insecurity, it is pursued through a review of several empirical studies previously carried out by experts and researchers. Most of the previous studies used indicators of food insecurity as the amount of calorie intake. Standard minimum calorie requirements vary at each time and place, for example, research conducted in Pakistan is a minimum of 2,450 kcal/capita/day (Bashir et al., 2013; Khalid et al., 2012). In Nigeria, the minimum calorie requirement is 2,260 kcal/capita/day (Babatunde et al., 2007), while in Bangladesh it is 2,122 kcal/capita/day (Alam, 2014), even in South Africa the minimum energy consumption requirement for adults reaches 2,650 kcal/capita/day (Sekhampu, 2013). In West Java Province based on 2012 Susenas data, the average calorie consumption reached 1,967 kcal/capita/day (Kurniadin, 2015).

Based on the results of previous studies, food security/insecurity at the household level is largely determined by various factors both social, economic and demographic. Several previous studies have made sociodemographic factors as determining variables in understanding a problem at the micro or household level. Juanita et al. (2011) used sociodemographic factors such as employment, education, income, gender, location of residence, and health insurance as determinant variables in determining health subsidy policies for poor households related to smoking behavior. Rita & Kusumawati (2011), revealed the behavior of credit card use through sociodemographic variables including gender, age, education level, marital status, employment, position and income. Putri & Rahyuda (2017) make gender and income as sociodemographic factors that influence individual investment decisions.

Household income factors, number of household members and household head characteristics in terms of education, age, gender, and employment status are some sociodemographic variables that determine household food security (Alam, 2014; Babatunde et al., 2007; Bashir et al., 2013; Kurniadin, 2015; Sekhampu, 2013). In this study, the

employment status is clarified into agriculture and non-agriculture to prove whether those who work in the agricultural sector tend to be more vulnerable to food than other sectors.

Another factor not examined in some previous studies but which has an association with household food security is smoking, especially in low-income households, where smoker households have a higher chance of becoming food insecure (Armour et al., 2007; Kirkpatrick & Tarasuk, 2008).

Based on the results of previous studies and theories related to household food security, as well as food security conditions extracted from the data that has been presented, the hypothesis in this study is: household food security in Sumedang Regency is influenced by differences in the sociodemographic characteristics of households, particularly the employment sector and residence.

METHODOLOGY

This research uses quantitative methods. The scope of the study is limited to household food security which is influenced by sociodemographic aspects, namely household characteristics which include sources of income, residence, number of members, and several characteristics of household heads such as age, education, gender, and smoking habits.

The data source used is the result of the 2015 National Socio-Economic Survey (Survey Sosial Ekonomi Nasional/Susenas) with 798 households and 2,604 individuals in it (Badan Pusat Statistik, 2016). The unit of analysis of this study is households with a total of 690 units that have complete data based on the variables studied. The type of data is the cross-section.

The model in this study uses several variables from previous studies that are relevant to the problem under study. The dependent variable is a dummy variable that has a value of 1 for food secure households, and 0 (zero) for households that are not categorized as food secure. The independent variables used include the characteristics of the household and the head of the household as described in Table 2. The model in this study was formulated as follows:

$$
\begin{aligned}
foodsec\_hh = {}& \beta_0 + \beta_1 farmworker + \beta_2 sharecropper + \beta_3 rural + \beta_4 hhmember \\
&+ \beta_5 primary\_hhh + \beta_6 age\_hhh + \beta_7 agesq\_hhh + \beta_8 male\_hhh \\
&+ \beta_9 smoking\_hhh + U_i
\end{aligned}
$$

foodsec_hh   = 1 if household is food secure; 0 = food insecure households

farmworker   = 1 if the largest income households from the agricultural sector and its status as a labourer; 0 = other

sharecropper   = 1 if the largest household income is from the agricultural sector and its status as sharecropper; 0 = other

rural   = 1 if the household domicile in rural areas, 0 = if in urban areas

hhmember   = Number of household members (people)

primary_hhh   = 1 if the education of the household head only finished primary education; 0 = minimum high school graduation

age_hhh   = Age of household head (years)

agesq_hhh   = Age quadratic head of household (years)

male_hhh   = 1 if the gender of household head is male; 0 = household head is female
smoking_hhh = 1 if the head of household is smoking; 0 = head of household is not smoking

Data were processed with STATA software version 14 using the logit regression method as was done in several previous studies. Logit regression is an appropriate method for the dependent variable in this study is binary, which has odds of 1 (food security) or 0 (food insecurity).

RESULT AND DISCUSSIONS

Descriptive Analysis of Respondent Characteristics by Food Security Category

The number of households in the 2015 Susenas data for Sumedang Regency is 798 units. 690 households have complete data to be processed in logistic regression. Based on household food security indicators, most households in Sumedang Regency are categorized as food insecurity (Figure 1). This condition is in line with the findings of Kurniadin (2015) who also examined household food security in West Java Province using Susenas 2012 data, that more households are categorized as food vulnerable, although with a more equitable proportion than what happened in Sumedang Regency. This shows that there are still many households in Sumedang Regency that have a proportion of food expenditure that is large enough to indicate the level of welfare of the majority of the community is still relatively low.
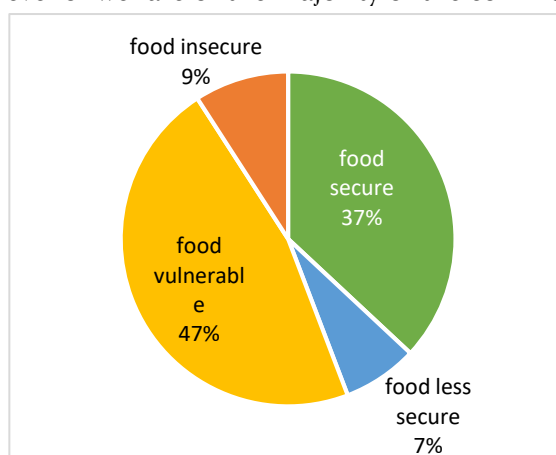

FIGURE 1. THE PROPORTION OF HOUSEHOLDS RESPONDENT ACCORDING TO FOOD SECURITY STATUS

Characteristics of sample households based on food security criteria in more detail are presented in Table 2. There are still many households that rely on the agricultural sector to support daily life (29% of the agricultural sector), but only a small proportion are categorized as food security, namely 54 houses households or around 27 percent of the total agricultural households that were respondents (198 households), or when compared to all households including non-agriculture the number is only 8 percent. While the non-agricultural households more resilient food (201 households or 29 percent of the total household). The number of members of sample households, in general, is a core family with the proportion of food security is better than a family that has more members of the household.

Based on the residence, 61 percent of respondents are households that live in rural areas. This is because most of the Sumedang Regency is rural. If we compare the proportion of households categorized food security in the rural areas still lower, only 130 households, or

about 31 percent of total household respondents, while food secure households living in urban areas the proportion is 46 percent. The highest number is in the category of food vulnerability which reaches 227 households in rural areas. This finding is in line with the research of Arida et al. (2015) where the proportion of household expenditure on food insecurity in rural areas is relatively higher than the urban population, with an average of above 60 percent, which means that food expenditure still dominates household expenditure in rural areas.

TABLE 2. CHARACTERISTICS OF RESPONDENT HOUSEHOLDS BASED ON FOOD SECURITY INDICATORS

Variable	Numbers of Household					
	Secure	Less	Vulnerable	Insecure	Total	Percentage
Sources of Revenue from the Agriculture Sector						
Farm workers	13	1	38	10	62	9%
Farmers Cultivators	41	7	81	7	136	20%
Non-agriculture	201	42	203	46	492	71%
Household Location						
Rural area	130	28	227	36	421	61%
Urban area	125	22	95	27	269	39%
Number of Household Members						
1 - 4	213	37	268	33	551	80%
> 4	42	13	54	30	139	20%
Educational Background of the Household Head						
Primary	166	38	283	58	545	79%
Mid-High	89	12	39	5	145	21%
Age of Head of Household						
15-64	228	46	266	53	593	86%
> 64	27	4	56	10	97	14%
Gender Head of Household						
Male	234	44	306	60	644	93%
Female	21	6	16	3	46	7%
Smoking Habit of Household Heads						
Smoking	172	34	247	50	503	73%
Non-Smoking	83	16	75	13	187	27%

Source: Susenas (2015)

Characteristics of household heads are seen from the level of education, most are primary school graduates or have a diploma up to junior high school level. Compared to head of households with secondary education to tertiary education, the proportion of household food security with the head of the household only to primary education is dominated by food vulnerable groups, while households with heads of secondary and higher education are dominated by the food security group.

The age of household heads is dominated by those of productive age (86 percent), most of whom are in the food vulnerable category. Viewed from the sex of the head of the household, most are male, with the largest portion being in the food vulnerable category. Another characteristic that attracts attention is the difference between Smoking Habit, whereas many as 73 percent of household heads have smoking habits. Judging from the status of household food security, even though smoking, the number of food secure households reaches 2 times more than non-smoking households. However, in households that have a smoking habit, the number of vulnerable and food insecure reaches 3 times more than households without smokers.

Statistical Testing and Analysis of Regression Results

The results of the statistical testing of each variable in the logit regression model are shown in Table 3. The effect of each variable is explained as follows.

TABLE 3. LOGIT REGRESSION RESULTS

Variabel	Logit Coefficient	Marginal Effect
farmworker	-0.672*	-0.139*
sharecropper	-0.122	-0.051
rural	-0.368**	-0.076**
hhmember	-0.213***	-0.044***
primary_hhh	1.120***	0.232***
age_hhh	0.130***	0.027***
agesq_hhh	-0.001***	-0.000***
male_hhh	-0.080	-0.017
smoking_hhh	-0.461*	-0.096**
Constant	-1.160	
chi2	77.146	77.146
# of obs.	690	690

$*\ p<0.1,\ **\ p<0.05,\ ***\ p<0.01$

The Largest Source of Household Income (Agriculture vs Non-Agriculture)

Following the hypothesis that the variable source of household income from agriculture and non-agriculture is one of the distinguishing factors of household food security in Sumedang Regency. In this study, the authors distinguish the status in employment in the agricultural sector, namely as farm labourers or sharecroppers who own agricultural land. This is aimed at obtaining more specific information about whether there are differences in household food security for those who work in the same agricultural sector but have different occupational positions.

The results of the marginal effect test from logit regression show the opposite direction to food security in both farm labourers and sharecroppers, but the significance is different where the farm labourers are significant at a 90 percent confidence level, while for sharecropping farmers it is not significant. This can be interpreted that not all households with the largest source of income come from the agricultural sector, therefore household food security is lower than households whose source of income is not from the agricultural sector.

Only households with occupational status in the agricultural sector as agricultural labourers have 13.9 percent lower food security compared to other jobs, assumes ceteris paribus.

The results of previous studies prove that ownership of agricultural land assets is one of the determinants of household food security, especially in rural areas (Alam, 2014; Babatunde et al., 2007). In other studies located in rural areas, ownership of productive assets such as agricultural land, vehicles, livestock and other equipment that can generate income has a positive relationship with food security (Bashir et al., 2013; Khalid et al., 2012). Based on data from the Agricultural Census of West Java Province (Badan Pusat Statistik, 2013), 134,394 agricultural land use households in Sumedang Regency, 103,764 (77%) were smallholder households with less than 0.5 hectares of land. This shows the low mastery of agricultural land by farmers in rural areas of Sumedang Regency which has an impact on the low business scale, inefficiency of production facilities, which ultimately leads to low income of agricultural households.

Other data supporting the results of this study are high poverty in the primary sector, especially in the palawija rice subsector which is a poverty enclave with 37.48% of poor households out of the total number of poor households in Sumedang Regency (Tim Nasional Percepatan Penanggulangan Kemiskinan, 2015). However, smallholder farmers still have a better level of household food security compared to farm labourers. Previous research also proves the same thing that the proportion of food-insecure households is still dominated by those who rely on work in the agricultural sector (Arida et al., 2015). In addition, the high level of poverty in rural areas also contributes to worsening food security conditions (Timmer, 2014).

The findings of this study reinforce the previous fact that rural areas that have the potential for food insecurity in Sumedang Regency are dominated by areas where the main source of income of the people comes from the agricultural sector, especially rice and secondary agriculture which has many farm labourers. It is this farm labour household that needs serious attention from the Sumedang Regency Government to improve its quality of life, considering that the biggest poverty pockets are in the palawija rice sub-sector.

Household Domicile

Household domicile is also a variable that significantly influences (at 90 percent confidence level) on household food security. Many previous studies have examined food insecurity in rural areas, including; Babatunde et al. (2007) in rural Nigeria, Bashir et al. (2013) and Khalid et al. (2012) in rural Pakistan, and (Sari & Prishardoyo, 2009) in Wiru Village, Bringin District, Semarang Regency. Marginal effect results show that at a 95 percent confidence level, households that live in rural areas have lower food security of 7.6 percent compared to households living in urban areas, assuming ceteris paribus.

This finding is reasonable considering the poverty rate in rural areas is still higher than in urban areas (Badan Pusat Statistik, 2016). According to Kurniadin (2015), this is related to the low productivity and quality of farmers and agriculture, the limited access of farmers to capital resources, and the low quality and quantity of agricultural and rural infrastructure. As

a result, the welfare of communities in rural areas, especially farmers, is still very low (Arida et al., 2015). Hopefully, through the current Dana Desa (Village Fund), rural infrastructure and other supporting facilities for the agricultural sector can be better.

Number of Household Members

In previous studies, it was known that more household members or family dependents would reduce household food security (Alam, 2014; Babatunde et al., 2007; Bashir et al., 2013; Khalid et al., 2012; Sekhampu, 2013). This study shows the same results with a 99 percent confidence level that each additional one household member will reduce food security by 4.4%, assuming ceteris paribus. A logical condition if the household has many household members, moreover still in school-age or not yet productive to help increase household income, then the share of household food expenditure will increase. This condition will have an impact on decreasing household food security, especially if it occurs to those who are low income or even poor.

Educational Background of the Household Head

As in previous studies, education of household heads is one of the factors that have a strong influence on household food security both in rural areas (Babatunde et al., 2007; Bashir et al., 2013; Sari & Prishardoyo, 2009) and in more regions broad includes rural and urban areas (Alam, 2014; Khalid et al., 2012; Kurniadin, 2015). From the marginal logit regression effect at a 99 percent confidence level, it can be interpreted that household heads who are only educated up to elementary school level shown by the basic KRT variable, have lower food security by 23.2% compared to household heads with secondary or higher education. , assuming ceteris paribus.

This condition reflects that the education of parents, especially the head of the household, plays an important role in improving the quality of life of household members. Higher education provides a broader opportunity for someone to obtain decent work so that they have sufficient income to meet quality food (Alam, 2014). In addition, the level of education also influences knowledge about nutrition and nutritional needs (Bashir et al., 2014). The results of this study reinforce that education is a long-term investment to improve the quality of life of the community.

Age of Head of Household

The age of the head of the household in this research model is used as in previous studies which included age squared as a control that the relationship of age and food security is not linear. Based on the calculation of the marginal effect at a 99 percent confidence level, it is known that every additional one year of age of the head of the household in the productive age period, the chances of the household to become food security will increase by 2.7%, assuming ceteris paribus. This result is in line with previous studies that the age of the head of the household is directly proportional to household food security (Babatunde et al., 2007; Bashir et al., 2013; Kurniadin, 2015; Sekhampu, 2013). The results of this study also indicate a relationship between the life cycle of a household head and economic stability with age.

However, increasing the age of the head of the household after passing through a productive period will reduce household food security due to limited financial capacity.

Gender of Head of Household

The gender difference in the head of the household in this study turned out not to be a determining factor in household food security in Sumedang Regency. Proved by the variable Male_hhh which showed insignificant results (Table 3). This shows that the empowerment of women in rural areas is better so that women are more independent and even help to make a living for their families. One of the programs, for example, the empowerment of women through the Kelompok Wanita Tani (Peasant Womens Group) in rural areas of Sumedang Regency. This could also be due to financial transfers from family members who are already working, or even the breadwinner is due to the wife due to her husband who is old or unable to work anymore. From several previous studies, only the Sekhampu (2013) study proved that the gender of the head of the household was a factor influencing household food security, while in Alam's study (2014) the results were not significant.

Smoking Habit of Household Heads

The smoking habit of the head of the household in this study is one of the factors that is proven to significantly affect household food security. From the calculation of the marginal effect at a 95 percent confidence level, it can be interpreted that if the head of the household has a smoking habit, the food security of the household is 9.6% lower than that of the household whose head of the household does not have a smoking habit, assuming ceteris paribus. The findings of this study reinforce the results of previous studies. The research results of Armour et.al. (2007) proved that poor households who have smoking habits have a 6% higher chance of becoming food insecure when compared to poor households who do not have smoking habits. Kirkpatrick & Tarasuk (2008) found a significant relationship between household food security status and smoking habits of adults in food-insecure households.

The influence of smoking habits on household food security will be very obvious in low-income households because smoking habits will increase household expenditure but in no way add calories and nutrients for smokers and family members. Research Suryawati et al. (2012) using data from the Indonesian Family Life Survey (IFLS) in 2007, 35.71 percent of poor households have a smoking habit with an average monthly cigarette expenditure of Rp. 86,496 or about 13.13 percent of total household expenditure. The worse impact of smoking habits, especially on poor households not only cause food insecurity but can cause malnutrition in children and toddlers (Semba et al., 2007).

CONCLUSIONS

Several factors affect household food security in Sumedang Regency, both in terms of household characteristics (the main source of income and position in employment, domicile, and number of household members) and characteristics of household heads (education, age, and smoking habits). Household food security in Sumedang Regency will be better if there is

an improvement in the income sources of farm labourers, increasing economic activity in rural communities, increasing accessibility of community education, optimizing family planning programs, and increasing knowledge and awareness of healthy living behaviours by reducing smoking habits.

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