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Perceived food security status – a case study of households in North Luwu, Indonesia

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Abstract
Purpose – The purpose of this study was to investigate the socioeconomic impact on perceived household food security in the North Luwu District of South Sulawesi Province in the eastern part of Indonesia. In Indonesia, 87 million people are presently vulnerable to food insecurity. Thus, the United Nations Development Programme’s primary millennium development goal for Indonesia is to halve the number of people who suffer from hunger by 2015. It is clear that food security at the household level is crucial to achieving this target.

Design/methodology/approach – In total, 371 household heads were interviewed. The household’s perceptions of their food security status were captured by asking the household head the following question: “How do you perceive your household’s food security status during the last month”? Respondents could select from the following options: insecure, somewhat insecure, somewhat secure, secure and highly secure. Here, the household head’s answer is regarded as the household’s subjective food security status (SFSS). We then applied descriptive analysis and an ordered logit model to determine the socioeconomic factors that influence SFSS.

Findings – As expected, in both analyses, household income and formal level of education have a strong relationship to SFSS. However, this study finds that food nutrition knowledge also shows a significant role in enhancing the probability that household SFSS will be in a better food security category. This could be a breakthrough in improving household food security status given the lack of formal education.

Practical implications – Neighborhood resource-based food preparation counseling programs are essential. Existing food programs for Indonesian households should be reoriented and incorporated into the non-formal educational curriculum and should be carried out at the family level or in small groups to ensure that the message of the program is delivered effectively. In the short term, for non-farm households, the government should provide targeted households with crash programs such as revolving funds for household-level business activities. For farm households, ensuring that farming infrastructures, facilities and technologies are adequate and affordable is crucial to sustaining their production process.

Originality/value – This is the first study to investigate the perceptions of household heads on their food security status in Indonesia. Most prior studies on household food security in Indonesia were conducted in response to Indonesia’s 1997 economic crisis and focused predominantly on Java, in the western part of Indonesia; there is little existing research on the eastern part of Indonesia. Moreover, this study is the first to emphasize the significant role of food nutrition knowledge in increasing the probability of household heads’ perceptions on their food security status being in a better category.

Keywords Household, Indonesia, Food security, Ordered logit model, Perceived

Paper type Research paper
Introduction
Since the 1997 Asian financial crisis, Indonesia has progressed to become an emerging low-to middle-income country. However, many issues with equitable development remain to be resolved. In the 2009 Indonesian Food Security and Vulnerability Atlas, the World Food Programme reported that 87 million Indonesians are still vulnerable to food insecurity (World Food Programme, 2012). Indonesia also faces the threat of frequent natural disasters and the adverse effects of climate change. For these reasons, the United Nations Development Programme aims to increase the effectiveness of the national and sub-national governments, as well as key stakeholders in reducing poverty and vulnerability in the country. One of this organization’s millennium development goals is to halve the number of Indonesians who suffer from hunger by 2015 (United Nations Development Programme, 2012). It is clear that food security at the household level is crucial to achieving this target. To meet this target, the Indonesian government, through its national food security agency, has set a twin-track approach for its national food security development strategy. Its first approach is to prioritize the development of agriculture and the rural-based economy to provide more jobs and income. The second approach is to provide food to the poor and food-insecure groups, using direct assistance to prevent their situations from becoming worse and empowering them to achieve food security independently.

Food security is a multi-dimensional issue, which makes accurate measurement and policy targeting quite challenging. Individual and household food security status can be assessed both objectively and subjectively. The objective perspective involves methodologies that examine caloric availability, income and expenditure balances and other measures to determine a household’s food security status. Most studies on household food security in Indonesia have used this perspective (Frankenberg et al., 1999; Hartini et al., 2003a; Skoufias et al., 2003).

The subjective perspective encompasses individuals’ ability to perceive and make sense of their food security situation based on all available influences. Perception is the process by which humans arrange sensory stimulation into organized, meaningful experiences (Lindsay and Norman, 1977). It is a complex outcome of experience, culture, environment and sense-making (Weick, 1995). As perception is subjective by definition, it is likely to deviate from reality more often than not (Nisbet and Ross, 1980; Fiske and Taylor, 1984). The gap between perception and reality could be the difference between the success or failure of a program designed to ameliorate the identified food security status.

Food security status, whether based on the objective/quantitative or subjective/qualitative perspective, is assumed to be a function of socioeconomic and behavioral factors. Both have strengths and weaknesses (Gacitua-Mario and Wodon, 2001). Quantitative approaches, which rely primarily on statistics, provide good results if they have appropriate samples. However, quantitative data cannot fully capture causality because of their failure to provide contextual information (Hentschel, 1999). Qualitative methods such as close observation or surveys with interviews can explain the economic, sociocultural or political context of the processes under study. In other words, qualitative assessments provide a better understanding of stakeholders’ perceptions and priorities (Baker, 2000).

The purpose of this study was to investigate the influence of socioeconomic factors on perceived food security status at the household level in the suburban area of the North Luwu District of South Sulawesi Province in the eastern part of Indonesia. We chose this study area because most prior studies on household food security in Indonesia were conducted in
response to Indonesia’s 1997 economic crisis and focused predominantly on Java, in the
western part of Indonesia (Studdert et al., 2001; Hartini et al., 2003b; Ngwenya and Ray, 2007;
Usfar et al., 2007; Matsumoto et al., 2012). Therefore, this is the first study to address the
perceptions of Indonesia’s household heads on their food security status, especially in the
eastern part of Indonesia. To focus the analysis, this study uses the definition of food security
given by the Food and Agriculture Organization:

[...] a situation that exists when all people, at all times, have physical, social, and economic
access to sufficient, safe, and nutritious food that meets their dietary needs and food preference
for an active and healthy life.

This definition comprises four key dimensions of food supplies: availability, stability,
accessibility and utilization. A food system is vulnerable when one or more of these four
components is uncertain and insecure (Food and Agriculture Organization, 2008).

Methods
The North Luwu District is located about 440 km from Makassar, the capital city of
South Sulawesi Province. South Sulawesi, a major province of the eastern part of
Indonesia, was not greatly affected by the 1997 economic crisis. The North Luwu
District has an area of 7,502.58 km² and is divided into 11 sub-districts, 167 villages and
703 neighborhoods. According to the most recent census, there were 290,365 people in

The household sample used in this study was chosen randomly from a household list
supplied by the sub-district ward office for 21 villages/neighborhoods located in
suburban areas that have many households that are below the poverty line. The number
of households sampled from each village/neighborhood was determined by considering
the total population of that village/neighborhood. Following the validation process, 371
households were included in the analytical process.

The perceived food security status of households in the study area was captured by
asking household heads the following question: “How do you perceive your household’s
food security status during the last month?” Respondents could select from the
following options: insecure (coded: 0), somewhat insecure (coded: 1), somewhat secure
(coded: 2), secure (coded: 3) and highly secure (coded: 4). This question was followed by
an explanation of each option. The answer provided by the household head is regarded
as that household’s subjective food security status (SFSS). The “insecure” category
applies when at least one household member frequently (more than 10 times in the last
month) experienced hunger for a day and a night. The “somewhat insecure” category
applies when at least one household member sometimes (3-10 times in the last month)
experienced hunger for a day and a night. The “somewhat secure” category applies
when at least one household member seldom (not more than twice in the last month)
experienced hunger for a day and a night. The “secure” category applies when all
household members never experienced hunger but sometimes ate less than their regular
portion, did not eat their preferred choice of food, or both because of a lack of funds for
food allocation. The “highly secure” category applies when all household members
always eat according to their portion and preference.

The SFSS of individual i is assumed to be explained in a two-dimensional space by
socioeconomic (SE) and behavioral (B) factors. Socioeconomic factors include
demographic variables (θ), such as the gender and age of the household head, and
household size and type. For socioeconomic factors (\(\alpha\)), in addition to education level, total household monthly income and the household dependency ratio, we include the household head’s knowledge of nutrition as a possible determinant. In some studies, this factor has a significant relationship with health (Lehman et al., 2006; Burns et al., 1987) and dietary patterns (Varyam et al., 1999; Cupisti et al., 2002). The behavioral factor (\(\alpha\)) included in this study is the reason for an individual’s food consumption:

\[
SFSS_i = f(SE(\theta, \sigma), B(\alpha))
\]  

(1)

In reality, a household head’s perception of his food security status is dynamic. However, for simplicity and because of data availability, we adopt a static framework. Suppose that the perceived household food security status, \(SFSS_i\), is a linear function of \(K\) factors, with values for individual \(i\) described by \(X_{ik}\), \(k = 1 \ldots, K\). Then, the structural model is as follows:

\[
SFSS_i = \sum_{k=1}^{K} \beta_k X_{ik} + \epsilon_i
\]

(2)

where \(\beta_k\) is the coefficient associated with the \(k\)-th variable, \(Z_i = \sum_{k=1}^{K} \beta_k X_{ik}\) and \(\epsilon_i\) is an error term. The error term is assumed to have a standard logistic distribution with a mean of zero and a variance of \(\pi^2/3\). \(SFSS_i\) is the latent variable or unobserved dependent variable.

A number of different modeling approaches associated with ordinal dependent variable analysis exist, including the cumulative, stage and adjacent approaches (Menard, 1995; Fullerton, 2009). The data and the type of comparison required among the categories determine which approach is appropriate for the study. Because the SFSS status follows an ordinal scale but represents an underlying continuous measure, Fullerton (2009) recommends using the cumulative approach. Traditionally, the cumulative approach represents the classic ordered logit model approach. For this model:

\[
SFSS_i^* = \beta_i X_{ik} + \epsilon_i
\]

(3)

where \(SFSS_i^*\) is the underlying latent variable that indexes the SFSS. The latent variable exhibits itself in ordinal categories, which are coded as \(j = 0, 1, 2, 3\) and \(4\). Therefore, the observed response in category \(J\) when the underlying continuous response falls in the \(j\)-th interval is as follows:

- \(SFSS = 0\) if \(SFSS^* \leq \delta_1\)
- \(SFSS = 1\) if \(\delta_1 < SFSS^* \leq \delta_2\)
- \(SFSS = 2\) if \(\delta_2 < SFSS^* \leq \delta_3\)
- \(SFSS = 3\) if \(\delta_3 < SFSS^* \leq \delta_4\)
- \(SFSS = 4\) if \(\delta_4 \leq SFSS^*\)

where \(\delta_j (j = 0, 1, 2, 3, 4)\) are the unobservable cutoff point (threshold) parameters that will be estimated together with other parameters in the model. For the purpose of statistical analysis, the standard for significance is \(p < 0.05\).
Table I summarizes the dependent and independent variables. For the purpose of statistical analysis, the gender of the household head (GENDER) is a binary categorical variable (0 = Male; 1 = Female), whereas the age of the household head (AGE) is specified in years. Household size (SIZE) is the total number of people living in a household. Household type (TYPE) is based on the household’s primary income-generating activity and is also a binary categorical variable (0 = Non-farm; 1 = Farm). The educational level of the household head (EDUCATION) reflects the level of formal education completed by the household head. There are five categories for this factor:

1. less than elementary school (references variable);
2. elementary school (ELEMENTARY);
3. junior high school (JUNIOR);
4. senior high school (SENIOR); and
5. undergraduate (UNDERGRAD).

The household head’s knowledge of nutrition (NUTRIKNOW) is measured by asking the household head or spouse five simple questions. These questions relate to preparing food in the correct manner as well as to nutrition for adults, children, and pregnant women. The answers to the questions are evaluated and scored between zero and two points. The minimum score for this variable is zero, and the maximum score is 10 points.

<table>
<thead>
<tr>
<th>Description of variables</th>
<th>Code of variables</th>
<th>Unit</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Dependent</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Subjective Food Security Status</td>
<td>SFSS</td>
<td>–</td>
<td></td>
</tr>
<tr>
<td><strong>Independent</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Household head age</td>
<td>AGE</td>
<td>Years</td>
<td></td>
</tr>
<tr>
<td>Household size</td>
<td>SIZE</td>
<td>People</td>
<td></td>
</tr>
<tr>
<td>Household income</td>
<td>INCOME</td>
<td>IDR/month</td>
<td></td>
</tr>
<tr>
<td>Nutrition knowledge</td>
<td>NUTRIKNOW</td>
<td>Score</td>
<td></td>
</tr>
<tr>
<td>$\alpha$Dependency$^{a,b}$</td>
<td>$\alpha$DEPENDENCY</td>
<td>–</td>
<td></td>
</tr>
<tr>
<td>$\beta$Dependency$^{c,b}$</td>
<td>$\beta$DEPENDENCY</td>
<td>–</td>
<td></td>
</tr>
<tr>
<td>Household head gender</td>
<td>FEMALE</td>
<td>–</td>
<td>Female: 1; Male: 0</td>
</tr>
<tr>
<td>Household type</td>
<td>FARM</td>
<td>–</td>
<td>Farm: 1; Non-farm: 0</td>
</tr>
<tr>
<td><strong>Education level</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Incomplete elementary school</td>
<td>ELEMENTARY</td>
<td>–</td>
<td>Incomplete: 1; Otherwise: 0</td>
</tr>
<tr>
<td>Complete elementary school</td>
<td>ELEMENTARY</td>
<td>–</td>
<td>Elementary: 1; Otherwise: 0</td>
</tr>
<tr>
<td>Complete junior high school</td>
<td>JUNIOR</td>
<td>–</td>
<td>Junior: 1; Otherwise: 0</td>
</tr>
<tr>
<td>Complete senior high school</td>
<td>SENIOR</td>
<td>–</td>
<td>Senior: 1; Otherwise: 0</td>
</tr>
<tr>
<td>Complete undergraduate</td>
<td>UNDERGRAD</td>
<td>–</td>
<td>Undergraduate: 1; Otherwise: 0</td>
</tr>
<tr>
<td><strong>Food consumption reasoning</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Select because its nutrition</td>
<td>(Reference)</td>
<td>–</td>
<td>Nutrition: 1; Otherwise: 0</td>
</tr>
<tr>
<td>Select because it is satiating</td>
<td>SATIATE</td>
<td>–</td>
<td>Satiate: 1; Otherwise: 0</td>
</tr>
<tr>
<td>Select because it is affordable</td>
<td>AFFORDABLE</td>
<td>–</td>
<td>Affordable: 1; Otherwise: 0</td>
</tr>
</tbody>
</table>

**Notes:** $^a$Reflects a household’s potential to earn income and be economically active; $^b$Cock et al. (2013); $^c$Reflects how many household members contribute to the household.
Household income (INCOME) is the total annual income from all household members in rupiah per month (IDR/Month). Here, two dependency ratios were computed. The first is $\alpha$DEPENDENCY, which is the number of potentially active persons (people aged between 18 and 65 years) divided by the total household size. $\alpha$DEPENDENCY reflects a household’s potential to earn income and be economically active. The second ratio is $\beta$DEPENDENCY, which reflects how many household members contribute to the household (Cock et al., 2013). Both dependency ratios are dimensionless, and higher scores correspond to better economic support for the household. The final factor is the reason for food selection (REASON), which considers why the household head or spouse selected the food they did for the household. This is a categorical variable with three categories, i.e. food may be selected:

1. because of its nutrition (NUTRITION);
2. because it is filling even though its nutrition is not sufficient (SATIATE); or
3. because it is affordable, which is a compromise between nutrition and price (AFFORDABLE).

Results and discussion
On average, a household is composed of 4.4 members, with a standard deviation (SD) of 1.6. The average age of the household head is 45.1 (SD ± 13.1) years. This implies that household heads in the sample area were the middle of their productive age. In the sample, 91.6 per cent of household heads are men, whereas 8.4 per cent are women. Furthermore, household heads have a generally medium level of formal education. About 20.8 per cent have no formal education or have only completed elementary school. However, most household heads completed either junior high (33.2 per cent) or senior high (29.9 per cent), but only 6.2 per cent had an undergraduate degree. Moreover, the knowledge of household heads or their spouses on basic nutrition was 5.6 (SD ± 1.9). This medium level of knowledge on nutrition is closely related to their average formal level of education. Indonesia’s national formal education curriculum, particularly in junior high and high school, includes the Family Wellness Education Program (Pendidikan Kesejahteraan Keluarga [PKK]) (Kolopaking et al., 2011), which includes instruction about how to prepare food with balanced nutrition in a household. This had been a compulsory subject requiring 3 h per week per semester. However, since 2002, this subject has been an elective (Ministry of Education Republic of Indonesia, 2013). Regarding the reason for food selection, 58.8 per cent of household heads said that the most important consideration in selecting and serving food was how filling it was; only 7.5 per cent of household heads put nutrition as their primary consideration.

The sample households have an $\alpha$DEPENDENCY of 0.6 (SD ± 0.2). This means that they have significant potential to earn a higher income because the households contain more members of a productive age than of a non-productive age. However, this potential was not being fully optimized, as reflected in the $\beta$DEPENDENCY score of 0.3 (SD ± 0.2). This index tells us that only a few household members contributed income. Therefore, idle household members that contribute to the lower $\beta$DEPENDENCY score should be encouraged to undertake productive activity, so that they can contribute to the total household income. It is not surprising that the average household income in the sample area was about IDR 1,119,960.0 (about US$ 97) (SD ± IDR 703,174.7, about
This figure is substantially lower than Indonesia’s gross national income per capita, which, in 2012, was US$ 297 (Central Bureau of Statistics, 2012a). The poorest household sampled had a total income of only IDR 150,000.0 (US$ 13). The welfare level of the sample households was relatively homogenous, regardless of whether they were categorized as non-farm (44.7 per cent) or farm (55.3 per cent) households. In all, 10.2 per cent of households live below the national poverty line and are of Type I (chronic). However, there were more non-farm households (50.2 per cent) living below the national poverty line (Type II) than farm households (39.2 per cent). It should be noted that the composition of farm households in each income class might have been very different had the survey been conducted during the post-harvest season.

Most household heads (60.4 per cent) in the sample area perceived their households’ food security status as secure. About 23.5 per cent felt that their households were somewhat secure, whereas 4.0 per cent felt that their status was highly secure. However, 10.8 per cent of household heads perceived their household status to be somewhat insecure, whereas 1.3 per cent of household heads perceived their household status to be insecure. Table II shows the relationship between the SFSS and household characteristics.

Among male household heads, 62.6 per cent perceived their household status to be secure, whereas only 10.6 and 1.5 per cent considered their status to be somewhat insecure and insecure, respectively. The percentages for female household heads in the insecure and somewhat insecure categories were similar to the male group. However, 45.1 per cent female heads perceived their status to be somewhat secure, whereas only 35.5 and 6.5 per cent thought their status was secure and highly secure, respectively. This result suggests that more attention should be paid to the perceived food security status of female heads of households. With regard to household type, non-farm and farm households had similar percentages in the secure and somewhat secure categories: there were 59.6 per cent non-farm and 60.9 per cent farm households in the secure category and 21.1 per cent non-farm and 25.4 per cent farm households in the somewhat secure category.

A cross-tabulation of formal education and SFSS shows that the percentage of households in the secure category increases linearly against the level of formal education of the household head. In the secure category, the percentage of household heads who had not completed elementary school was only 12.5 per cent. This percentage is five to six times lower than the percentage of household heads who completed high school. Moreover, the percentage of household heads who completed their undergraduate studies was as high as 74.0 per cent. In those households whose heads did not complete elementary school, most (66.7 per cent) fall in the somewhat secure category. However, households whose heads completed formal education, whether at the elementary or high school or at the undergraduate level, mostly fall into the secure category. These figures underline the importance of formal education to household welfare, in general, and to household food security status, in particular, from both quantitative and qualitative perspectives. Ogundari and Aromolaran (2013) also recently showed that the education level of the household head is related to improving the economic welfare of households in a country.

It is interesting that the proportion of households in the secure category that selected and served food based on how filling it was is smaller than the proportions in the same category that had different reasons for selecting food. Here, the percentages of
Table II. SFSS in relation to the household socioeconomics characteristics

<table>
<thead>
<tr>
<th>SFSS (%)</th>
<th>Insecure</th>
<th>Somewhat insecure</th>
<th>Somewhat secure</th>
<th>Secure</th>
<th>Highly secure</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1.3</td>
<td>10.8</td>
<td>23.5</td>
<td>60.4</td>
<td>4.0</td>
</tr>
</tbody>
</table>

**Mean (SD)**

| Household head age (years) | 47.4 (10.4) | 44.1 (14.9) | 47.2 (14.4) | 44.4 (12.3) | 45.0 (11.0) |
| Household size (people)    | 5.0 (1.2)   | 4.2 (1.7)    | 4.1 (1.8)   | 4.5 (1.5)   | 3.7 (1.4)   |
| Household income (IDR/month) | 234000.0 (115238.9) | 715,000.0 (297,036.6) | 1,067,126.4 (526,482.2) | 1,101,317.0 (622,291.2) | 3,080,000.0 (243,339.9) |
| Household head nutrition knowledge (score) | 2.6 (0.9) | 4.9 (2.1) | 5.7 (2.0) | 5.6 (1.8) | 7.4 (1.5) |
| αDEPENDENCY<sup>bc</sup> | 0.7 (0.2) | 0.6 (0.3) | 0.6 (0.2) | 0.6 (0.2) | 0.7 (0.2) |
| βDEPENDENCY<sup>cd</sup> | 0.2 (0.0) | 0.4 (0.2) | 0.3 (0.2) | 0.3 (0.2) | 0.2 (0.0) |

**Household head gender**

<table>
<thead>
<tr>
<th></th>
<th>Male head (%)</th>
<th>Female head (%)</th>
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<td>0.0</td>
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<tr>
<td></td>
<td>10.6</td>
<td>12.9</td>
</tr>
<tr>
<td></td>
<td>21.5</td>
<td>45.1</td>
</tr>
<tr>
<td></td>
<td>62.6</td>
<td>35.5</td>
</tr>
<tr>
<td></td>
<td>3.8</td>
<td>6.5</td>
</tr>
</tbody>
</table>

**Household type:**

<table>
<thead>
<tr>
<th></th>
<th>Farm (%)</th>
<th>Non-farm (%)</th>
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<tbody>
<tr>
<td></td>
<td>1.5</td>
<td>1.2</td>
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<tr>
<td></td>
<td>9.3</td>
<td>12.7</td>
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<td></td>
<td>25.4</td>
<td>21.1</td>
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<td></td>
<td>60.9</td>
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<tr>
<td></td>
<td>2.9</td>
<td>5.4</td>
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**Household head educational level**

<table>
<thead>
<tr>
<th></th>
<th>Incomplete elementary (%)</th>
<th>ELEMENTARY SCHOOL (%)</th>
<th>JUNIOR HIGH SCHOOL (%)</th>
<th>SENIOR HIGH SCHOOL (%)</th>
<th>UNDER GRADUATE (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0.0</td>
<td>0.3</td>
<td>1.6</td>
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<td>0.0</td>
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<tr>
<td></td>
<td>20.8</td>
<td>16.7</td>
<td>13.0</td>
<td>3.6</td>
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<td></td>
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<td>66.7</td>
<td>18.9</td>
<td>22.8</td>
<td>20.7</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>12.5</td>
<td>56.7</td>
<td>61.0</td>
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<td>1.6</td>
<td>70.3</td>
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<td>13.0</td>
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</tbody>
</table>

**Food consumption reasoning**

<table>
<thead>
<tr>
<th></th>
<th>NUTRITION (%)</th>
<th>SATIATE (%)</th>
<th>AFFORDABLE (%)</th>
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</thead>
<tbody>
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**Notes:**<sup>a</sup> US$1 ≈ IDR 10,000; JPY1 ≈ IDR 110; <sup>b</sup> Reflects a household’s potential to earn income and be economically active; <sup>c</sup> Cock et al. (2013); <sup>d</sup> Reflects how many household members contribute to the household.

**Source:** Original field survey, March 2012.
households that selected and served food based on affordability and nutrition are 75.2 and 60.7 per cent, respectively. It is clear that household heads who selected food based on nutrition, or at least by compromising between nutrition and affordability, were more confident that their households were in the secure category than those who chose food purely because of how filling it might be.

There do not appear to be patterns between gender, age or the $\alpha$ and $\beta$ dependencies and perceived food security by the household head. However, the household size, household income and nutrition knowledge score of the household head have clear patterns. The fewer members there were in a household, the better they perceived their food security status to be. Although household heads with an average of 5.0 (SD $\pm$ 1.2) people in their households generally felt that they were in the insecure category, household heads with an average of 3.7 (SD $\pm$ 1.4) household members perceived that they were in the highly secure category. These findings become even more important when associated with the failure of the national birth control family planning program (Ministry of Health Republic of Indonesia, 2013). The same is also true for the household income factor: as expected, household heads with larger total household income placed their household food security status in a better category. The nutrition knowledge of household heads also showed a clear pattern in relation to food security status. In most cases, household heads with a lower nutrition knowledge score (average 2.6; SD $\pm$ 0.9) fall into the insecure category. In contrast, the average nutrition knowledge score was 7.4 (SD $\pm$ 1.5) in the highly secure category.

Table III shows the results of the ordered logistic regression analysis of SFSS with the socioeconomic and behavioral factors. The chi-square likelihood ratio of 125.33 and the $p < 0.0001$ indicate that the model as a whole is statistically significant. The pseudo-$R^2$ model is 0.1575. As Table III shows, based on a one-unit increase in household income, the odds ratio of the highly secure group is 1.87 times greater than that of the other categories combined given that the other variables in the model are held constant. Likewise, the odds ratio of the highly secure category is 1.04 times greater than the other categories combined when nutrition knowledge is increased by one unit. With regard to the educational effects, when household heads have finished elementary school, the odds ratio of the highly secure category versus the other categories is 3.40 times greater than that of household heads who did not finish elementary school. When the household head has an undergraduate degree, the odds ratio of the highly secure category versus the other categories is 12.99 times greater than that of the household heads who did not finish elementary school.

The odds ratio coefficients of the ordered logistic regression analysis show that the household income and formal education level of the household head are likely to increase the probability of a household’s SFSS being in a better food security category, and that the nutrition knowledge of the household head has a similar effect. Therefore, efforts should be directed toward improving household income and enhancing both formal education and nutrition knowledge to help those who perceive themselves to be in food-insecure categories. However, there is no easy way to increase household income, especially in rural areas that have a mix of farm and non-farm households. In addition, it is impossible to change the reality that the formal educational level of household heads is poor. Therefore, the fact that better nutrition knowledge can enhance a household’s SFSS is good news, particularly given that this knowledge can also be imparted via non-formal education programs for household heads and other family members.
et al. (1999) and Belle (2000) have shown how investing in non-formal education can contribute to life skills and enhance the income and status of poor and marginal people.

Although the significant influence of nutrition knowledge on health and dietary patterns has been well-documented, this study is the first to reveal the relationship between nutrition knowledge and household heads’ perceptions of their food security status. This could be seen to interlock with the findings of Block (2004), Kolopaking et al. (2011), and Pipi et al. (2014) in Indonesia. Block (2004) finds that households with nutrition knowledge in the bottom group of the expenditure distribution in which the mother only finished elementary school allocate 20 per cent more of their food budget to high-quality food than do households lacking this level of nutrition knowledge. In other words, nutrition knowledge appears to have a strong effect on households’ allocation of their food budget. Kolopaking et al. (2011) find similar results – most respondents in their study had a lack of knowledge regarding health and nutrition, which influenced their competence in providing balanced meals.

Conclusions and policy implications
This study becomes the first to emphasize the significant role that food nutrition knowledge plays in increasing the probability of enhancing the household head’s
perception of their food security status. The descriptive and ordered logistic analyses show that together with the household income and formal educational level of household heads, the nutrition knowledge factor should be given more attention to help those who perceive themselves to be in food-insecure categories. Based on these conclusions, two policies are proposed:

1. increasing the food nutrition knowledge of household members as a long-term program; and
2. elevating their welfare by increasing household income as a short-term action.

To increase the food nutrition knowledge of household members, neighborhood resource-based food preparation counseling programs are essential. Existing food programs for Indonesian households, such as The Family Wellness Education Program (PKK), should be reoriented: it should not only be implemented in the formal educational curriculum, but counseling programs should be carried out within the family base or in small groups of neighbors to ensure that the message of the program is delivered effectively to the largest possible number of households to provide greater opportunity for household members to share their personal experience with food nutrition. If these programs work, they can alleviate the effects of low levels of formal education. Of course, as a long-term program, the impact of a non-formal food nutrition educational program will not be felt instantly. The government and the community itself must invest together in an adequate preparation and structured implementation phase.

Furthermore, for non-farm households, the best way to increase household income is by encouraging idle or unemployed household members to undertake regular paid jobs. However, to find such jobs in rural agricultural areas is not easy. Therefore, in the short term, the government should provide targeted households with crash programs such as a revolving fund for household-level business activities. With good planning and appropriate market assessment, this kind of program can encourage households and give them confidence that they are capable of increasing their income, similar to the practice Oostendorp et al. (2009) finds in Vietnam. Another crash program that has been implemented in Indonesia since the Asian financial crisis is an unconditional direct cash transfer for targeted groups called Bantuan Langsung Tunai (BLT). However, the implementation of the BLT program should be improved, as this program is still weak in determining targeting and socialization (Rosfadhila et al., 2013). The BLT also should be made “conditionally” as some success story of direct cash transfer programs (De Janvry and Sadoulet, 2006; Moss and Young, 2009), so that targeted groups do not always rely only on government handouts (Hastuti et al., 2005). For farm households, ensuring that farming infrastructures, facilities and technologies are adequate and affordable is crucial to sustaining the production process. Moreover, marketing channels should also be reformed, so that farm households can obtain a fair price for their produce.

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Further reading


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