

Original Article

Household food security status measured by the US-Household Food Security/Hunger Survey Module (US-FSSM) is in line with coping strategy indicators found in urban and rural Indonesia

Avita A Usfar Dr.sc.hum, Umi Fahmida PhD and Judhiastuty Februhartanty MSc

SEAMEO-TROPED Regional Center for Community Nutrition, Universitas Indonesia, Jakarta

The food security assessment used by the United State's Food Security/Hunger Survey Module (US-FSSM) was used in five studies: these were in two urban and four rural areas in Indonesia between February 2004-August 2005. The number of households assessed was 3,704 and consisted of 45% urban and 55% rural. All households had children below five years. This paper aims to assess the applicability of US-FSSM for measuring household food-insecurity in Indonesia. Common coping-strategies discussed are to borrow money from the family, get an additional job, to lessen portion size of food, and to sell small assets. Although households in urban and rural areas were similar in size/number of children and male headed; the urban households were more income-secure, educated, and had better access to electrical appliances. A majority of the households was food-insecure (77% and 84% in urban and rural consecutively). More food-insecure households without and with hunger were found in rural areas. The number of affirmative responses to 17 out of 18 questions in the US-FSSM was more in the rural households, showing less fortunate cases of food-insecurity. For a given coping strategy, as food-security status becomes more severe, the higher the percentage of households employing it. For a given food-security status, percentage of households was higher among lower-degree and less among higher-degree coping. Combining food-security and coping-strategy indicators may help to identify transient-food-secure households. Observing both indicators throughout different time of the year continuously may further identify adaptive mechanism by chronic-food-insecure households. Information on household food diversity could enrich findings on dietary intake modification, hence moving from food-security to nutrition-security.

Key Words: food security, Indonesia, coping strategies, urban and rural setting

Introduction

Food insecurity mapping in Indonesia is recently made available¹ providing meso data from 265 districts in 30 provinces (excluding urban) such as percentage of area affected by flood and land slide, rainfall deviation (transient food insecurity), per capita production of carbohydrate-source foods (food availability) and prevalence of underweight among under-five year old children. The information is important for constructing district-level food policy. However, information on food security condition at the household level is required to identify target households.

A hunger measure developed from qualitative research², which was validated with demographic and dietary characteristic of the households³ was suggested to be used in the United States to assess household- and individual level food insecurity and household with hungry children. Presently, a hunger measure that is used nationally in the United States⁴ was developed to document directly the extent of food insecurity and hunger caused by income limitations.

Since there is no presence of direct household food security measure used nationally in Indonesia, in several surveys carried out by our Center (South East Asian Ministers of Education Organization in Tropical Medicine

(Seameo-Tropmed) Regional Center for Community Nutrition - Universitas Indonesia), the United State's Food Security/Hunger Survey Module (US-FSSM) was used.

This paper analyzed food security outcome of several surveys with the objective of assessing applicability of US-FSSM for measuring household food insecurity in selected area of Indonesia. Rural and urban area was specifically separated in the analyses to anticipate different nature of urban food insecurity. Coping strategy indicators, which are considered more traditional indicators of food insecurity, were compared with food security status obtained from US-FSSM. This paper would complement the National Food Security Atlas of Indonesia in actualizing food policies which requires targeting of households.

Corresponding Author: Dr. Avita A Usfar, SEAMEO-TROPED RCCN-UI. Jl. Salemba Raya 6. Jakarta 10430.

Tel: +(6221) 391 3932; Fax: +(6221) 391 3933

Email: ausfar@cbn.net.id

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Materials and methods

Data was obtained from five studies (Table 1) which took place between the period February 2004 and August 2005. Data were collected from households having children under the age of five. The studies covered a total of six provinces, of which two were urban. Two of the rural provinces were located in the Western part of Indonesia, while the other two were in the Eastern part. The two urban cities (Jakarta and Surabaya) were located in the most populated island of Java and geographically lie between the two rural locations.

Based on National Socio Economic Survey (2004) 57% of Indonesian population live in rural area and out of 93.7 million who have been working 43.3% worked on agricultural sector. In this study, since there were more households from rural area (i.e. 55%), all households were included in the analyses rather than randomly selected for statistical analyses.

The United State's Food Security/Hunger Survey Module was applied to assess food security condition of the households. Households' responses were scored from a total of 18 questions (each scored as '1' for affirmative response and '0' for negative response) and the total scores (range 0-18) were categorized into four food security statuses : food secure (0-2), food insecure without hunger (3-7), food insecure with moderate hunger (8-12) and food insecure with severe hunger (13-18). For statistical analyses urban vs. rural settings were compared in the food security status as the above four categories and two categories (food secure vs. food insecure i.e. the remaining three food security categories)

Although there were two methods suggested in the US-FSSM protocol to deal with incomplete or missing answer, neither one could replace answer directly responded by the respondent. Based on this consideration, households which had incomplete FSSM data (i.e. not interviewed or interviewed but had missing answers for ≥ 1 question) were excluded from the analyses.

Since studies from which the data was obtained had different objectives, some indicators, especially on coping strategies, could only be obtained from some studies. However, only information on coping strategies originating from at least three studies was presented here. In the three studies providing coping strategy indicators (study 2, 3 and 4, Table 1) eight coping indicators were generated: four indicators in both urban and rural, three indicators in urban area only and one indicator in rural area only.

Most of the studies shared similar socio-economic and socio-demographic indicators. When the indicators had different categorization, such as occupation, recoding was done to synchronize them into mutual categories. Socio-economic and socio-demographic characteristics which did not represent the whole five studies were not analyzed in this paper.

Results

The total number of household surveyed from the five studies was 3,704 consisted of 1,662 (45%) from the urban and 2,042 (55%) from the rural areas (Table 1). In terms of household size, number of children and number of children under the age of five was similar between urban and rural areas (Table 2). Median number of household member was five, while median number of children and number of children under the age of five were two and one consecutively. Most of the households were headed by male (97% and 96% in urban and rural areas consecutively). In general, households in urban areas were better-off in terms of monthly income security. The proportion of those having routine income (whether fix or no fix amount) in urban areas were more than double the rural areas (54% and 21% in urban and rural consecutively). Although in both locations percentage of households having non-routine monthly income was highest, the proportion in the rural areas was double (38% in urban and 76% in rural). On the opposite, proportion of households with no income was 5% higher in the urban

Table 1. Characteristics of the study

Type of study	Site (province)	Time of data collection	Inclusion criteria of samples	Setting (n)
1. Survey on nutrition and caring capacity	West and North Sumatra	Feb-Apr 2004	Households with 6-36mo children	Rural (n=149)
	Jakarta	Feb-Apr 2004	Households with 6-36mo children with both parents coming from West/North Sumatra)	Urban (n=46)
2. Food security survey	East Nusa Tenggara	Sept 2004	Households with children under the age of five; local vs. Internally Displaced community	Rural (n=400)
3. Program evaluation	Jakarta & Surabaya	Sept-Oct 2004	Poor households with children under the age of five	Urban (n=1499)
4. Program evaluation	East Nusa Tenggara	Apr 2005	Poor households with children under the age of five	Rural (n=78)
5. Rapid food and nutritional assessment survey	West and East Nusa Tenggara	Jul-Aug 2005	Households having children under the age of five/Woman of Reproductive Age	Rural (n=1415) & Urban (n=117)
				Total urban 1,662. Total rural 2,042

Table 2. Socio-demographic characteristics of the surveyed population

Type of socio-demographic characteristics	Urban	Rural	Total (N)
Household size, median (min, max)	5 (2, 15)	5 (2, 20)	-
Number of children, median (min, max)	2 (1, 7)	2 (1, 11)	-
Number of children <5 yr, median (min, max)	1 (1, 6)	1 (1, 4)	-
Female headed household (%)	55 (3.4)	62 (4.4)	3,030
Monthly income security (%) †			3,265
Routine, fix amount	431 (28.2)	124 (7.1)	-
Routine, no fix amount	401 (26.2)	240 (13.8)	-
Not routine	576 (37.6)	1,318 (76.0)	-
No income	122 (8.0)	53 (3.1)	-
Education of head of household (%) ***			3,645
No schooling	1 (0.1)	259 (12.8)	-
<3 years	73 (4.5)	87 (4.3)	-
3-6 years	550 (34.0)	806 (39.7)	-
6-9 years	380 (23.5)	373 (18.4)	-
9-12 years	572 (35.4)	431 (21.2)	-
>12 years	40 (2.5)	73 (3.6)	-
Ownership of household appliances (%)			
Radio ***	855 (51.5)	658 (32.3)	3,700
Television ***	1,412 (85.0)	565 (27.7)	3,699
VCD/CD/DVD/Karaoke ***	815 (49.1)	329 (16.1)	3,699

† Categorized as follows: Routine fix amount-private and government employee, military, teacher, servant, and factory worker; Routine no fix amount-trader, driver, entrepreneur, home industry, self-employee; not routine-farmer, fisherman, daily wage earner, and someone who works outside the country; and no income-housewife, not employed, and student.

* Significant at p -value <0.05; ** Significant at p -value <0.01; *** Significant at p -value <0.001

areas. The difference in monthly income security was statistically significant (p <0.001). As for education, more of the head of households in the rural areas had no schooling (13%). The proportion of head of households with equal to or more than six years of education was higher in the urban areas (61 and 43% in urban and rural consecutively). The difference in education was statistically significant (p <0.001). Likewise, the ownership of electrical household appliances such as radio, television and VCD/CD/DVD/Karaoke was higher in the urban areas. The differences were statistically significant for all appliances (p <0.001).

Food security status

A majority of the households in the study areas was food insecure. There were more food insecure households in rural than urban areas (84% and 77% consecutively); Table 3. Moreover, a greater proportion of rural households experienced food insecurity with 'moderate hunger', as well as 'severe hunger'. The difference in food security status between urban and rural areas was statistically sig-

nificant (p <0.001).

The 18-items of US-FSSM were analyzed into four kinds of situation i.e. *anxiety*, *quality*, *quantity-adults*, and *quantity-children*, where both urban and rural households responded similarly i.e. mostly to the anxiety and quality components and less to the quantity components. The proportion of households that perceived food budget or supply was inadequate (Q2, Q3) ranged from 74% to 84%. The proportion of households that perceived food eaten by adults or children was inadequate in quality (Q4, Q5, and Q6) ranged from 61% to 82%. The proportion of households reported instances of reduced food intake or consequences of reduced intake for adults (Q8, Q8a, Q9, Q10, Q11, Q12, Q12a) ranged from range 2% to 50%, while proportion of households reported instances of reduced food intake or its consequences for children (Q7, Q13, Q14, Q14a, Q15, Q16) were 2% to 52%.

Further analysis was done to investigate differences between answers given by the urban and rural households to the 18 questions in the core module of the US household food security measure (Table 4). For all questions,

Table 3. Category of food security status in urban and rural areas

Food security status	Site		Total N
	Urban ¹ (%)	Rural ² (%)	
4-degree category (P <0.001)			
Food secure	377 (22.7)	325 (15.9)	702 (19.0)
Food insecure without hunger	734 (44.2)	814 (39.9)	1,548 (41.8)
Food insecure with moderate hunger	444 (26.7)	669 (32.8)	1,113 (30.0)
Food insecure with severe hunger	107 (6.4)	234 (11.5)	341 (9.2)
Total (n)	1,662	2,042	3,704

¹ Included 3 cities in 3 provinces: Jakarta (DKI Jakarta province), Surabaya (East Java province) Kupang (East Nusa Tenggara province).

² Included 4 provinces: North Sumatera, West Sumatera, West Nusa Tenggara, and East Nusa Tenggara

Table 4. Affirmative responses to the US Household Food Security questions (%) in urban and rural settings †

Question number (Q)	Keywords	Urban (n=1662)	Rural (n=2042)
2	Worried food would run out **	80.6	84.3
3	Food bought just didn't last	73.8	75.5
4	Couldn't afford to eat balanced meals ***	61.1	75.7
5	Few kinds of low-cost food for children ***	72.6	81.6
6	Couldn't feed children a balanced meal ***	61.1	74.5
7	Children were not eating enough ***	39.8	52.3
8	Adult(s) cut or skipped meals ***	27.8	49.7
8a	Adult(s) cut or skipped meals, 3+ months ***	19.0	31.9
9	You ate less than felt you should ***	33.2	48.1
10	You were hungry but didn't eat ***	11.3	23.8
11	You lost weight because not enough food ***	18.2	31.1
12	Adult(s) not eat for whole day **	7.5	9.9
12a	Adult(s) not eat for whole day, 3+ months ***	2.1	6.7
13	Cut size of children's meal ***	48.9	25.6
14	Children ever skip meals ***	11.4	16.6
14a	Children skip meals, 3+ months ***	8.6	12.4
15	Children ever hungry **	6.5	9.0
16	Children not eat for whole day	2.4	3.0

† Chi-square test. * Significant at p -value <0.05; ** Significant at p -value <0.01; *** Significant at p -value <0.001

number of affirmative response was higher in the rural households ($p < 0.01$), except for question (Q 13) 'In the last 12 months, did you ever cut the size of any of the children's meals because there wasn't enough money for food?' This study showed that practice of cutting children's meal was more common in the urban areas and that the percentage was almost double than the rural areas (49 and 26% in urban and rural consecutively). On the other hand, practices of children skipping meals (even for more than 3 months within the previous year), presence of hungry children, and children not eating for a whole day was more prevalent in the rural areas. Urban and rural households did not differ in their responses to the following items: Food bought just didn't last (>70% affirmative) and Children not eat for whole day (<5%).

Coping strategies for food insecurity

As food insecurity status becomes more severe, the higher the percentage of coping strategies adopted (Table 5). This finding was consistent for all coping strategies, except for borrowing money in rural i.e. higher percentage among food-insecure without hunger. Within each food insecurity status, percentage of coping strategies performed was also higher in lower-degree coping (e.g. borrow money to buy food) than higher-degree coping (e.g. child labor).

We compared coping strategy done by urban and rural households in the same food-insecurity status. While borrowing money from family was the most performed coping strategy in both urban and rural food insecure households, among households without hunger more rural households took this strategy ($p < 0.001$). On the other hand, among households with *severe hunger* selling small assets such as household appliances was performed by more urban ($p < 0.001$). Eating less and borrowing money from cooperative (non-relative) were also performed by more urban households *both with and without hunger* ($p < 0.01$). In urban, the more severe food insecurity the

more percentage of the households performed child labor (i.e. sending child to work) or took additional job ($p < 0.001$).

In urban areas, the order of coping strategies followed by households without-and with hunger was the same i.e. borrow money from family, lessen portion size, get additional job, and sell small asset. In rural setting, on the other hand, the trend was a bit different. More rural households with hunger seek for additional job as well as employed higher degree of coping such as selling large farm animals. Borrow money and dietary alteration (i.e. cook with whatever food available, borrow food or lessen portion size) were among the first coping strategies in rural areas.

The following coping strategies were more performed by the urban households: send children to work and work in other town (in-country migration). On the other hand, the following coping strategies were more prevalent in the rural households: borrow money from family or cooperatives, find additional job, lessen portion size, and sell small asset. Cooking with whatever ingredients available, borrow food from neighbor, and sell large farm animals were found in rural locations only.

In urban areas, almost half of the households (45%) that were food secure performed coping strategies, while 60% of the food insecure ones did not employ any strategies. In rural areas, the coping strategies information was all originated from food insecure households, therefore, we cannot assess whether some food secure households performed coping or not. From the rural food insecure households, 14% did not employ any coping strategies. Borrowing money, whether to families or cooperatives, seeking for additional job, and lessening portion size were categorized as lower-degree coping. Sell assets, whether small or big, child labor, and in-country migration were categorized as higher-degree coping. In general, as the degree of food insecurity increased, the higher the coping degree employed by the households.

Table 5. Comparison of coping strategies adopted by households having similar food security condition in urban and rural areas

Coping strategies:	Food security condition					
	Without hunger		Moderate hunger		Severe hunger	
	Urban	Rural	Urban	Rural	Urban	Rural
Borrow money from family to buy food	295	63	291	132	78	33
	44.7%	74.1%***	68.5%	67.0%	79.6%	68.8%
Eat less	142	6	207	53	65	20
	21.5%***	7.1%	48.7%***	27.2%	66.3%**	41.7%
Sell small assets	80	5	87	35	42	4
	12.1%	5.9%	20.5%	17.7%	42.9%***	8.3%
Borrow money from cooperative	32	1	35	3	22	0
	4.8%	1.2%	8.2%***	1.6%	22.4%***	0%
Have additional job	125	NA	113	NA	32	NA
	18.9%	NA	26.6%	NA	32.7%	NA
Child labor	33	NA	42	NA	23	NA
	5.0%	NA	9.9%	NA	23.5%	NA
In-country migration	29	NA	20	NA	9	NA
	4.4%	NA	4.7%	NA	9.2%	NA
Eat whatever food available	NA	53	NA	151	NA	33
	NA	62.4%	NA	76.3%	NA	68.8%

** Significant at p -value <0.01 (Pearson Chi-square); *** Significant at p -value <0.001 (Pearson Chi-square); NA not assessed in that particular study

Discussion

The core-module of the US Food Security/Hunger Measure, although not yet directly applied in an Indonesian setting, presented valuable information of household food security status. The present country food security mapping can only pinpoint down to the district level, thus the presence of food insecure households within a food secure district is possible.¹ Furthermore, no data on the urban food security situation can be presented in the atlas. These studies, although not representative of the whole nation, outline the provincial situation within the western and central parts of Indonesia. Validation of the measurement used was not the intention of any of the studies, thus input to the items and scales used could not be further explained. However, the US-FSSM has been validated with the Asians and Pacific Islanders in Hawaii.⁵ Further study covering all socio-economic groups is recommended if the food security situation representative of Indonesia is the primary goal. Additional information on intra-household dynamics representing food insecurity at the micro/individual level would be an advantage to obtain a more comprehensive picture of food security.

According to the US-FSSM guide, the food secure households showed no or minimal evidence of food insecurity, while the food insecure households showed clear evidence of food insecurity in terms of adequacy of food supply and adjustments to household food management.⁴ The guide further explained that in food insecure households without hunger, reduction in quality of food and increased unusual coping patterns can be seen, although little or no reduction in food intake is reported. The food insecure households with moderate hunger, on the other hand, show some reduction of an adult's food intake to the extent that adults have repeatedly experienced the physical sensation of hunger. At the level of the food insecure with severe hunger, children have reduced food intake to an extent indicating that the children have experienced hunger. Our studies confirmed that adults

tended to experience food insecurity first before letting their children to do so (i.e. skipping meals, hungry, not eating for whole day).

Items related to coping strategies that could be extracted and re-categorized were present in only three of the five studies (study 2, 3 and 4). Due to non-food security objectives of some studies, this limitation was inevitable. Although this is the case, coping indicators identified from these studies represent typical coping strategies found in Asian and African countries⁶ and was concurrent with coping strategies identified in three provinces of Indonesia during the economic crisis i.e. job diversification and borrowing money.⁷

We showed with our data that: (1) for a given coping approach, as food security status becomes more severe, the higher the percentage of households employing it, and (2) for a given food security status, percentage of households was also higher among lower-degree and less among higher-degree coping. The affirmative response on 'cut size of children's meal' (Q13) which was higher in urban (unlike the rest of the questions) was also supported by data on coping strategy i.e. eat less where the percentage was higher among urban food-insecure households. Maxwell *et al*⁸ revealed some shortcomings in coping strategy indicators despite the fact that these indicators are best at ruling out cases –that is minimizing the risk of classifying a food-insecure household as food-secure. They developed alternative food-security indicators using coping strategy indicators which were obtained qualitatively (to get information on "what" coping is done) using focus group discussions and individual respondents. The obtained list of alternative indicators was then ranked and weighted also using a focus group approach. This approach had the advantage of accommodating local-specific indicators of food security; on the other hand for a national/big survey especially such as in Indonesia where there are many ethnic as well as geographical groups, developing food insecurity using such qualitative

approach for each specific area may be time consuming. Our use of US-FSSM –which is a more generic instrument-in different locations in our study area revealed that this may be a simple yet promising instrument to be used to measure food insecurity at household level across different ethnic/geographical groups such as Indonesia. Of at least five main islands (out of >13,000 islands) in Indonesia, our study included information from six islands, two of which were the main islands (Sumatra and Java), and at least ten different ethnic groups.

Theoretically, the employment of coping strategies is an immediate short-term response to a decline in food accessibility.⁹ Employing low coping strategies require less effort and lower commitment of domestic resources, while employment of medium and high coping require higher commitment of domestic resources with a greater chance of non-recovery. When the same coping strategies done continuously, then the strategies may be considered as an *adaptive mechanism* to maintain the same food security status overtime. Our data suggested that the application of coping strategies in urban households proved successful in preventing households falling into food insecurity status. However this food secure condition should be considered as transitory. At other time these food secure households may fall into a food insecurity situation. Combining food security and coping strategy indicators may help to identify transient food secure households. In addition, observing coping strategies throughout different times of the year, continuously, may further identify adaptive mechanisms by chronic food insecure households.

Coping strategies were not employed only by food insecure households, but also by almost half of the food secure ones. This phenomenon was true in urban setting, but could not be confirmed in the rural setting because unavailability of data. The aim of coping is to maintain the various objectives of the household, including food consumption, health, status, and livelihood security. A threat to any of the objectives –in this study indicated by the high number (>80%) of households worrying food would run out (Q2) –may force a household to take coping strategies before it came to a difficult food situation.

Information on household food diversity could enrich findings on dietary intake modification as a mean of coping. By knowing the types of food available for consumption, information on food quality could be exposed, hence moving the target of intervention from only food security to nutrition security.

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Original Article

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Avita A Usfar Dr.sc.hum, Umi Fahmida PhD and Judhiastuty Februhartanty MSc

SEAMEO-TROPED Regional Center for Community Nutrition, Universitas Indonesia, Jakarta

印尼城市及鄉村的家戶糧食安全狀況以美國家戶糧食安全/飢餓調查模數(US-FSSM)測量與因應策略指標的發現一致

2004年2月至2005年8月印尼的兩個城市及四個鄉村區域，有五個研究以美國糧食安全/飢餓調查模數(US-FSSM)評估糧食安全。被評估的家戶數目有3,704，由45%的城市及55%的鄉村所組成。所有的家戶均有五歲以下的兒童。本文的目的為評估採用US-FSSM測量印尼家戶糧食不足的適用性。被討論到常見的因應策略有：從家庭借錢、多找一份工作、食物份量變小及販售小部分的資產。雖然在城市以及鄉村的家戶有類似的兒童及男性人數；但城市的家戶收入較有保障、教育程度較高及能使用到較多的家電用品。大部分的家戶有糧食不足(城市及鄉村分別為77%及84%)的情形。在鄉村地區，有較多的糧食不足家戶，不管有無飢餓狀況。在US-FSSM的問題中18題有17題的回答為肯定的，大部分是鄉村家戶，指出有糧食不足的不幸案例。當糧食安全狀況變得更嚴重時，有較高比例的家戶會使用已知的因應政策。在一定的糧食安全狀況下，較高百分比的家戶為低程度，高程度間因應比例較少。合併糧食安全及因應政策指標有助於確認短暫糧食安全家戶。連續觀察兩種指標在同一年的不同時間點的差異，可以進一步確認慢性糧食不足家戶的適應機制。家戶糧食多樣性的資訊可以加強飲食攝取的改變的發現，由糧食安全轉變為營養安全。

關鍵字：糧食安全、印尼、因應策略、城鄉區域。