

Strategy for improving food security through social behaviour and decision-making patterns at the level of paddy farmer households

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Abstract

The objectives of this study were: 1) describe the level of production, level of income, and consumption patterns; 2) Reveal the socio-cultural aspects of households in achieving food security; 3) analyse the role of household members in decision making in achieving household food security. The study uses qualitative and quantitative approaches (mix method), data collection techniques through observation, interviews, and documentation on rice farmer's households. Data analysis uses descriptive qualitative analysis and quantitative analysis. The results found: 1) The average production of rice farming in paddy agroecosystem during the two growing seasons, namely in the planting season I was 8,593 kg ha⁻¹ and in the second growing season 7,553 kg ha⁻¹. The level of household income is included in the low-income category, which is less than IDR 3,132,500 / month, and the consumption pattern of farm household food consumption is less varied. 2) In the life of a farmer's household in the paddy agroecosystem, food is one of the media to express a sense of solidarity, solidarity and fertilisation of social ties. 3) Household food security status in paddy agroecosystem is mostly in the category of "food insecure" 4) The pattern of household decision making tends to show the dominance of women or wives in decision making, especially in kitchen regulation activities and the selection of consumption menus, family financial management and regulating various family needs.

Keywords: Food Security, consumption quality, paddy agro-ecosystem

1 Introduction

Recently, concern on food security and poverty alleviation has increased globally. This is in response to several cases of insecurity and famine in several countries. This effort is stated in the objectives one and two of the 17 SGDs, namely eradicate poverty in all forms everywhere and to stop hunger, achieving better food and nutrition security as well as supporting sustainable agriculture. The majority of the poor people in developing countries are engaged in subsistence farming. They also depend on agriculture both for their incomes and food entitlements. So, agriculture production is the main determinant of food security of the household and that the role of agriculture is crucial to the eradication of poverty and food insecurity in the rural households (Asogwa *et al.*, 2012).

In Indonesia, the definition of food security has been stipulated in Law Number 18 of 2012 concerning food. Furthermore, to achieve the goals in the SDGs, Indonesia has formulated 3 strategies and 7 indicators to cope with the goals and 4 strategies and 4 indicators to overcome the second goal.

Food security at the household level essentially shows the ability of households to meet food sufficiency. This ability is influenced by many very complex factors, but in general it is related to changes in aspects of food production behaviour, consumption and resource allocation in the household. The regional level the status of regional food security is classified as food security, but it is not sufficient to guarantee food security at the household level (Purwantini *et al.*, 2005).

In Indonesia, increasing food security is directed at the independence of the community / farmers based on local resources carried out through programs to increase food production; maintain adequate, safe and halal food availability in each region at all times; and anticipation so that food insecurity does not occur. Efforts to improve the welfare of farmers can be carried out operationally through empowerment of counseling, assistance, business guarantees, protection of grain prices, protection and promotion policies. This is understandable considering that most farmers in Indonesia for the commodity of rice are still classified as subsistence farmers in the

65 sense of acting as producers and consumers of rice. Thus, the amount of rice sold to the market
66 will depend on the household consumption surplus and the price of rice and the price of other
67 goods needed by farmers from other industries (Darwanto, 2005). Studies on food security and its
68 handling efforts have been carried out. Research conducted at Kwara State, North-Central Nigeria
69 shows that 64% of farmers experience food insecurity (Babatunde *et al.*, 2007).

70 Recent research shows that about half of the rural households (49.4%) in Nigeria were food
71 insecure during the post-planting season (Adepoju *et al.*, 2013). Unfortunately, the incidence of
72 farmer household food insecurity is even higher in urban areas (87.56%). The same thing
73 happened to Ghana, about 60% of farming households in the Forest Belt of the Central Region of
74 Ghana were found to be food insecure (Kuwornu *et al.*, 2013) and in Ethiopia almost three quarters
75 of the household (70.7%) had food insecurity (Endale *et al.*, 2014).

76 The structure of the territory of Indonesia is an archipelago with various ecological systems
77 and diverse socio-cultural environments. With different ecological, social, economic and cultural
78 conditions in each region, food policies and interventions must be adapted to regional conditions.
79 This is in line with the opinion that food policy must be based on ecological areas and utilize
80 regional resource diversity, so that it will be more efficient in preparing food programs (Sumarwoto,
81 1994).

82 Agroecosystem can be seen as an ecosystem that is typically human. Humans as one type of
83 living creature is not only a part of a particular ecosystem, but also acts consciously to change and
84 shape the ecosystem in accordance with their wants and needs. This happens when humans enter
85 the "farming phase" (Suryana & Budianto, 1995). Agroecosystem basically has four components,
86 namely: (1) ecosystem; (2) social; (3) economy; and (4) technology. – needs further explication

87 Pinrang Regency, located in South Sulawesi Province is the centre of rice production in this
88 region. However, food insecurity is still experienced by farm households. Agroecosystem in
89 Pinrang Regency is dominated by irrigated paddy fields and rain-fed rice fields, that is, agricultural
90 areas or areas whose farming is based on paddy rice commodities. Food availability, especially
91 staple food (rice) is supplied from within the Pinrang Regency area. The research objectives are: 1)
92 describe the level of production, level of income, and consumption patterns; 2) Reveal the socio-



cultural aspects of households in achieving food security; 3) analyse the role of household members in decision making in achieving household food security.

2 Materials and Methods

2.1 Study Area

This research was conducted in the region of Samaulue Village, Lanrisang District, Pinrang Regency, South Sulawesi. Pinrang Regency has historically been one of the centres of rice production in South Sulawesi. The research was conducted from March 2018 to December 2018.

2.2 Data collection

The population is all farm households in Samaulue Village, Lanrisang District, Pinrang Regency, South Sulawesi. With the following criteria: (1) have a family member consisting of wife, children, and / or other family members, and (2) household members are willing to provide information. The population of farmers in Samaulue Village is 502 households.

The method of determining the sample using a simple random method (simple random sampling). If the population is > 100, then a sample of 10-15% can be taken. The population of farmers in the village of Samaulue amounted to 502 households, so by taking 10%, the number of research samples was 50 households, which were determined as respondents. With the number of respondents expected to be able to describe the general population situation (Arikunto, 2013).

Data sources were obtained from in-depth interviews using a questionnaire, making observations and participating in the respondent's household activities.

2.3 Data Analysis

Data analysis method used in this study is a combination of qualitative and quantitative methods (Mix Method)

1. Descriptive Analysis

Descriptive analysis is used to describe the socio-cultural aspects of respondents in achieving household food security, the role of household members in decision making in achieving household food security.

2. Farm Analysis

To calculate the level of farm production, production analysis is used, which is the amount of production produced by each respondent in one year.

122 To calculate farm household income (PRT) and expenditure using the following formula:

123 Household Income (Rahim & Hastuti, 2007).

124
$$PRT = PUT + PLUT + PART \quad (1)$$

125 Where:

126 Domestic worker = total household income (Rp / month)

127 PUT = income from farming activities

128 PLUT = income from non-farming activities (alternative income)

129 PART = income of household members (domestic worker?)

130

131 Analysis of Household Food Consumption Patterns

132 Analysis of farm household food consumption patterns is determined based on food
133 consumption quality using the Food Diversification Score (SDP) (Bulkis, 2012; Hardinsyah, 2012).

134 Scoring the household's actual consumption score of the amount of food needed per consumer
135 unit for adult men (UK) in each food group (main food, side dishes, vegetables, fruits, and milk).

136 Next presented in the following table:

137 Table 1. Measurement of Household Food Security Based on Food Consumption Quality

Food group	Number of food consumption by male (UK) ²⁾	Score ¹⁾		
Nasi, sereal, ubi-ubian, rice, cereal,	500 g per day?	0	1	2
Lauk Hewani & Nabati animal dan plant	200 g	0	1	2
Vegetables	150 g	0	1	2
Fruits	200 g	0	1	2
Milks	25 g	0	1	2
Total maximum score		10		

138 Information:

139

140 1) 0 = if the portion of factual consumption: <0.5 UK

141 1 = if portion of factual consumption: 0.5 <UK <1

142 2 = if the portion of factual consumption :> 1

143 2) Moderate activity

144 3) 500 g = if the portion of sweet potato <20%, corn <10%

145 600 g = if the portion of sweet potato is 20 - 50%

146 700 = if the portion of sweet potato is > 50%

147

148 3 Results

149 3.1 Characteristics of Respondents

150 The socio-economic characteristics of respondents in Samaulue Village include age,
151 education, knowledge about nutrition and food, farming experience and the number of household
152 members, can be seen in table 2 below.

153 Table 2. Socio-Economic Characteristics of Respondents in Samaulue Village, Lanrisang
154 District Pinrang Regency South Sulawesi Province, 2018.

No.	Description	Number of Respondent (orang)	Percentage (%)
1.	Age (year)		
	• 27 – 46	28	56
	• 47 – 66	22	44
2.	Education		
	• ES – YHS	30	60
	• SHS – Bachelor	20	40
3.	Knowledge of nutrition and food		
	• Low	36	72
	• High	14	28
4.	Experience of cultivation		
	• < 17 tahun	29	58
	• ≥ 17 tahun	21	42
5.	Number of household member		
	• < 3 orang	24	48
	• ≥ 3 orang	26	52

155 Source: Analysis of primary data, 2018

156 Based on the data, the age of most respondents in the range of age 27-46 years (56%); 60%
157 of respondents have an elementary-junior high school education level; 72% have knowledge about
158 nutrition and low food; 58% have <17 years of venture experience; and 52% have a household
159 member ≥ 3 years.

160 3.2 Total Food Production

161 Food availability is one indicator of food security in an area. The amount of production
162 produced by farm households can show the ability of households to provide food. The average
163 production of rice farming produced by respondents during the two growing seasons, namely in the
164 first planting season was 7,033.32 kg with a productivity of 5,410.25 kg / ha. In the second growing

season the production was 7,553.33 and the productivity was 5.964.1 kg / ha. The average production for the two growing seasons is 5,687 kg / ha. The level of production produced by respondents is still in the low category when compared to the average level of district production (50. 325 tons) with a harvest area of 8. 547 Ha or an average of 5,888 kg / ha (Table 3).

Table 3. Average Production and Productivity of Farming Respondents of Rice Crops in the Samaulue Village, Lanrisang District, Pinrang Regency, 2018

No	Planting season	Mean Land area (Ha)	Paddy production (KG)	Productivity (Kg/Ha)
1.	MT. I (Desember s/d Maret)	1,3	7.033,32	6.610,25
2.	MT.II (April s/d Juli)	1,3	7.553,33	5.964,1

Source: Primary Data Analysis, 2018.

3.3 Household Income Level

Household income is the overall income derived from the income of the head of the family as a farmer, income from activities other than as a farmer (alternative work), and income from family members who work. Household income is categorized into high and low categories. High category if household income $\geq$ IDR 3,132,500 / month and low category if $<$ IDR 3,132,500 / month. The data in Table 4 shows that the dominant income of the respondents included in the low-income category as many as 26 people (52.0%). Low incomes indicate limitations in consuming a variety of highly nutritious foods.

Table 4. Respondent Household Income by Category in Samaulue Village, Lanrisang District, Pinrang Regency, 2018

Household Income (Rp)	Criteria	Σ Respondent	Percentage (%)
$<$ 3.132.500	Low	26	52
$\geq$ 3.132.500	High	24	48
Total		50	100

Source: Primary Data Analysis, 2018

3.4 Household Food Consumption Pattern

The purpose of food consumption is to obtain the nutrients the body needs. In general, the types of food consumed by farm households are less varied, namely only 2 types of staple foods (rice / rice and corn), the other main food consumption such as cassava and sweet potato are generally respondents only consume it as a snack. The types of side dishes consumed by

respondents and their families are animal side dishes (fish and eggs) and vegetable side dishes (tofu and tempeh). Furthermore, the types of vegetables consumed by the respondent's household are spinach, kale, long beans and eggplants. There were only two types of fruits consumed by respondents, namely bananas and papaya, and none of the respondents consumed milk as a complement to the four healthy five perfect dishes (Table 5).

Table 5. Average Food Consumption in Respondent Households in Samaulue Village, Lanrisang District, Pinrang Regency, 2018

Type of food	Average of consumption (gram/day)	Average of consumption per person Rata-rata Konsumsi Pangan per orang (gram/person/day)*	Standard (gram/person/day)
Main food rice?	766.10	255.37	500
Fish/meat	684.25	229.74	200
Vegetables	387.09	129.03	150
Fruits	166.59	55.54	200
Milks	0	0	25

Source: Primary Data Analysis, 2018

Notes: * Average number of household members: 3 people

3.5 Food Security Status

Household food security status was analyzed using the Food Diversification Score (SDP) (Hardinsyah, 2012). The SDP is calculated based on Food Consumption Quality (MKP) using the household's actual consumption score for the amount of food needed per consumption unit (UK) in each food group. Household food security assessment criteria are assessed based on the value of the Food Diversification Score.

Based on Table 6, it appears that the food security status of households in Samaulue Village is mostly in the category of "food insecurity" as many as 34 households with a percentage (68.0%), and households belonging to the "food security" category that is 16 households with a percentage (32.0%).

Table 6. Distribution of Farmer Households by Food Security Status in Samaulue Village, Lanrisang District, Pinrang Regency, 2018

No	Status of food security	Number of households	Percentage (%)
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1	Food secure	16	32.00
2	Food insecure	34	68.00
Total		50	100,00

Source. Primary Data Analysis, 2018

3.6 Socio-Cultural Aspects of Households in Realizing Food Security

The pattern of people's behaviour in meeting their needs is influenced by customs or habits. There are times when customs or habits become a barrier to the development and change of culture itself because it is difficult to change. Every social change always includes cultural change, and cultural change include social change. This study showed that household access was relatively low, average of the access was 50%. The highest was barter access (70%) while the lowest access was rice aid from government (30%) (Table 7).

Table 7. Household Access in Obtaining Food Ingredients in Samaulue Village, Lanrisang District, Pinrang Regency. 2019

No	Access Type	Number of Respondent	Percentage (%)
1.	Physical access		
	- Market distance (close)	30	60.0
	- Food availability (complete)	20	40.0
2.	Economic access		
	- Income (low)	26	52.0
	- Income (high)	24	48.0
3.	Social access		
	- Aid (rice aid)	15	30.0
	- Barter (kin, nighbour)	35	70.0

The level of economic access is measured by household income, physical access is assessed from the distance of the market and food availability in the stall. Market distance and the availability of food will support the fulfillment of family supplies and food needs. Social access to food consists of food aid and food barter, where food assistance such as getting assistance from the government in the form of rice assistance or other basic food items, while the intended food barter is to provide food to others and receive food from others (neighbours, and relatives / family).

For some respondents, besides having a primary function, food should also fulfill a secondary function, which is to have a good appearance and taste. Because, however high the nutritional content of a food will be rejected by consumers if the appearance and flavor are not attractive and meet the tastes of consumers. That is why food quality must always be maintained because it is an important factor in determining whether a food ingredient will be accepted or not by consumers.

Food consumption habits are ways in which individuals / groups of people choose, consume and use available foodstuffs based on their socio-cultural background. Eating habits in a community were a culture that has always been maintained and developed from generation to generation. This pattern influences the way to choose materials and types of food that must be produced, processed, distributed, and prepared until served. Types of commodities produced by farmers in rice field agroecosystems was rice, corn, cassava, sweet potato, water spinach, spinach, cowpea, eggplant, banana dan papaya (Table 8).

Table 8. Types of Commodities Produced by Farmers in Rice Field Agroecosystems in Samaulue Village, Lanrisang District, Pinrang Regency, 2018

No	Commodity		
	Food plant	Vegetables	Fruits
1	Rice	Water spinach	Banana
2	Corn	Spinach	Papaya
3	Casava	Cowpea	
4	Sweet potato	Eggplant	

Source: Primary Data Analysis, 2018

The diversity of food consumption is also affected, by the environment, socio-culture, and hereditary eating habits causing diverse tastes. Food consumption patterns of a region's people are generally formed due to the availability of food derived from plants from outside the area that can easily adapt and grow well in the physical condition of the land of the area and is able to produce well.

“Food consumption is not only a food maintaining the health, but also have social values. This have implications for strengthening and expressing social solidarity and strengthening social ties in social life. (MF 1) interview May 26, 2018, 10:30 pm).”

The above statement was supported by another informant. He said that

“Food is one of the media to express a sense of solidarity, brotherhood and source of social cohesion. Food serves as a means to establish social relations. Offering food is offering affection, attention and friendship. (MF 2) interview May 26, 2018, 10:30 pm).”

Receiving the food offered is acknowledging and accepting the feelings expressed and at the same time as a symbol between those who give and those who are given food, that they have established a reciprocal relationship. Mutual reciprocity in giving and receiving food offered both in neighbouring relationships and when holding activities or events is familiar, as the results of the following interview

"In this village (Samaulue Village), the community members have a habit of doing activities such as giving food to neighbours and relatives. If you have excess food or food items, usually share with neighbours or family. In the month of fasting (Ramadhan) the habit of the community to give each other food / snacks to break their fast to neighbours or family, also to the mosque. This has become a tradition in this village." (MF 3) interview May 26, 2018, 10:30 pm).

Someone who on a certain day makes food, then the person concerned always offers to neighbours, relatives or the closest people. Food is also a manifestation of human tolerance, from the processing of raw materials to food, its manifestation, how it is presented and consumed is a tradition. With the interrelated relationships with various aspects that exist in religious life and with various elements that exist in society itself will realize that tolerance.

3.7 The Role of Household Members in Decision Making

The results of the study found that household decision making patterns tended to show the dominance of women or wives in decision making, especially on kitchen management and menu selection (100%), household financial management (90%), and household need management (80%) (Table 9).

Table 9. Role of Household Members in Decision Making, in Rice Field Agroecosystems in Samaulue Village, 2018

No	Activity form	Management pattern (decision making)									
		1	%	2	%	3	%	4	%	5	%
1.	Kitchen management and menu selection	50	100	-	-	-	-	-	-	-	-
2.	Household financial management	45	90	1	2	3	6	-	-	1	2
3.	Household need management	40	80	3	6	7	14	-	-	-	-
4.	Time and social activity management	16	32	4	8	23	46	2	4	5	10
5.	Income earn and job	8	16	1	2	17	34	21	42	3	6
6.	Interaction pattern management	9	18	10	20	29	58	2	4	-	-
7	Management of child education	15	30	10	20	21	42	3	6	1	2

Data of questionnaire was supported by such as the results of the following interview respondents.

“All matters in the household and children are my responsibility and authority. I always make decisions ranging from work in the kitchen, shopping affairs, food affairs, financial affairs, education or school matters to children, home care and maintenance to other needs. In certain matters I also always try to discuss it with my husband first before making a decision (*sipakarajaki mallabineng*) such as children's education costs, buying household equipment or other matters (social interaction) such as family invitations, sick families and others” (FF2) interview 27 May 2018, 3:30 pm)

(Note: *Sipakarajaki mallabineng*: the language of the Bugis tribe in South Sulawesi whose meaning is "mutual respect between husband and wife")

4 Discussion

Strategies to develop food production and availability can be done by increasing and maintaining production capacity, accelerating the production of unconventional food ingredients and developing technology to increase business productivity (Sunyoto, 2004). Optimal food production in addition to meeting household food availability, can also control the level of imports in the food sector. This provides an opportunity for farmers to improve family welfare and support the creation of national food security (Prihatin et al., 2012).

Our study illustrates that the status of household food security in Samaulue Village is mostly in the "food insecurity" category with a percentage (68.0%). This condition feels quite ironic considering that Pinrang Regency is one of the food storage areas, especially rice in South Sulawesi. This is in line with the opinion that although at the regional level food security is guaranteed, it is not enough to guarantee food security at the household level. Food security at the household level basically shows the ability of households to meet their food needs. This ability is influenced by many very complex factors, but in general it is related to changes in aspects of food production behaviour, consumption and resource allocation in the family (Purwatini et al., 2005).

Human life is inseparable from the necessities of life. The culture which is a collection of knowledge systems or systems of ideas, shapes human attitudes and behaviours as members or citizens of their social unity that grows, develops and changes according to the needs of human

311 life. Simply stated Malinowski in (Rahim & Hastuti, 2007), said that the needs of human life can be
312 divided into three broad categories, namely needs related to biological, social and psychological.

313 Household food security is linked to the ability of families to meet the demands of all its members
314 (Usfar, 2012). This implies physical and economic access to food that is sufficient in quantity and
315 quality of nutrition as well as safety, and acceptability to local culture to meet the needs of every
316 family member. Household access to food is a strategy for getting food from various sources. Food
317 for the household can come from several sources, including: by producing themselves, buying, or
318 from gifts. Individual access to achieve food needs is strongly influenced by purchasing power,
319 income levels, food prices, food distribution processes, institutions at the local level and other
320 social factors. In meeting the family's food needs, farmers in the rice agroecosystem make use of
321 their own production, but if they want to consume other types of food that are not produced
322 themselves, they buy it from markets or stalls in the surrounding environment.

323 The patterns and habits of eating consumption are generally related to economic aspects, namely
324 the level of income. Income is the main factor in determining the quality and quantity of food
325 ingredients. Higher income level of households tends to choose better quality and quantity foods
326 those of bellow standard. The latter were generally less able to meet their food needs (Ayiek,
327 2008). This condition makes some farming households in rice farming agroecosystems have a low
328 income to choose cheap and easily available for consumption food.

329 Through a theoretical approach to the distribution of power, patterns of decision making in several
330 aspects of household life include; production, consumption, formation and formation of the family
331 and social activities carried out by the husband, and wife in the family (Levy, 1991).

332 Power is defined as the ability to influence others who can be spread with the same value (the
333 same) and not the same value (not the same). Based on these thoughts, five types of decision
334 making are explained, namely (Pujiwati, 1987):

- 335 1. Decision making is done by the wife herself
- 336 2. Made together, but the wife is more influential or dominant
- 337 3. Joint and equal decision making
- 338 4. Made together, but the husband is more influential or dominant
- 339 5. Decision-making is done by the husband himself.

340 In the case of this study, husband and wife decision making refers to the thoughts of Pujiwati
341 (Prihatin et al., 2012) as mentioned above, covering 7 (seven) main areas, namely: 1) Managing
342 kitchen matters, 2) Managing family finances, 3) Manage various needs, 4) Manage time and
343 activities outside the home, 5) Live, 6) Manage interaction patterns and 7) Manage children's
344 education.

345 According to Bulqis (2012) (Endale et al., 2014), there is a tendency for appropriateness factors to
346 influence decisions in the field of social activities. At ceremonial events such as weddings, wives or
347 female household members help more, because the activities carried out relate to what is often
348 done by women such as cooking, preparing dishes and arranging food menus. This study
349 concluded that the average production of rice farming in paddy agroecosystem during the two
350 growing seasons, namely in the first planting season was 8,593.33 kg, in the second growing
351 season the production was 7,553.33 kg/ha. The level of household income is included in the low-
352 income category, which is <IDR. 3,132,500/month, and the pattern of farm household food
353 consumption is less varied. In the life of a farmer's household in the paddy agroecosystem, food is
354 one of the media to express a sense of solidarity, solidarity and fertilization of social ties. Status of
355 household food security in paddy agroecosystem is mostly in the category of "food insecurity". The
356 pattern of household decision making tends to show the dominance of women or wives in decision
357 making, especially in the activities of regulating the kitchen and choosing the consumption menu,
358 managing family finances and managing various family needs.

359 This discussion should end with a clear statement of the main conclusions of the research, and a
360 clear explanation of their importance and relevance for management or policy.

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