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# Economy and political ecology perspective of Indonesian food security at South Sulawesi

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**Abstract.** The purposes of this study are: firstly, to demonstrate the relations of agro-ecological function, agricultural innovation system, social-ecological system and political ecology to encourage production for Indonesian Food Security Program (PKP) in South Sulawesi. Secondly, to identify the most influential and interested stakeholders in the success of PKP program. The study conducted by applying an interdisciplinary analysis of triangulation method. The result showed, the success of PKP in South Sulawesi with the achievement of 2 million rice overstock mainly impacted by the application of agro-ecological concept, agricultural innovation system, and political ecology while disregarding the concept of social agroecology.

## 1. Introduction

Food security defined as the situation when people have physical and economical access to food that is sufficient, safe, and nutritious to support an active and healthy lifestyle [1, 2, 3]. Many factors in food security taken into consideration namely: climate, geography, socio-economic system, and political structure. Other than those factors, the food crisis in developing countries such as Indonesia impacted by other variables such as agroecology, agricultural innovation, social ecology system, and political ecology.

In Indonesia, rice is the staple food commodity and South Sulawesi province as the primary food buffer has been able to produce an overstock rice between 2-2.5 million tons per year within the last five years [4]. Even though in macro (provincial) level South Sulawesi has rice overstock, at the mezzo (regency/city) level may have food insecurity, or even food scarcity at the micro (district, sub-district or village) level. At this condition, the roles and influence of the stakeholders who are involved in the food security program are very crucial.

This study aims to identify the most influential stakeholders in supporting the success of Indonesia food security program at South Sulawesi province. The roles of stakeholders will then relate to the agro-ecological function, agricultural innovation system, social-ecology system, and political ecology to determine the functions of stakeholders in strengthening the program in the province of South Sulawesi.



## 2. Literature Review

A study by Ranis *et al.* [5] proof the relationship between human development and economic growth; stated that success in human development has a significant contribution to economic growth which cannot sustainable without improvement in human development. Furthermore, few important aspects of stakeholders in food security program that should be considered are agriculture innovation system [6, 7], agro-ecological [8], socio-ecological system [9], agriculture innovation [10], social ecology system [9], and political ecology [11, 12].

However, the success or failure of food security program in South Sulawesi not solely influenced by the role and positive relation between those aspects, but power and contestation of interests among actors and stakeholders involved in the program determined its successful. Thus, economic activities always involved means and focus on power that inherent to interpersonal networking between actors, and influenced by interest as the fundamental force that society defined.

## 3. Methodology

This study was conducted using interdisciplinary method of triangulation. The data were analysed qualitatively by describing the results of in-depth interviews of focus group discussion, as well as the secondary data from Statistical Bureau, RPJMD (Regional Medium-Term Development Plan) and other sources such as Poor Households Data from Department of Social Services 2013, Statistical Data of Agriculture of Ministry of Agriculture 2013, and Agricultural Census 2013.

All 24 regencies and cities in the province of South Sulawesi chosen as the location of this study. The scale used to measure the influence and interests of stakeholders in this study is a score of 1 to 5, by asking five questions to determine the level of interest and five questions to measure the degree of influence.

## 4. Results and Discussion

The principal components analysed to find out the role of the regencies and the city in achieving food security in South Sulawesi are rice production, people's access to food and rice distribution as well as their relation to agro-economy, agricultural innovation system, social ecology system, and political ecology referring to table 1.

**Table 1** The role of the district and the city in achieving food security in South Sulawesi, 2004-2013

Regency/City	Avg. Production (Ton)	Avg. Increase of Rice Production (%)	Avg. Rice Need (Ton)	Avg. Surplus/Deficit (Ton)	Percentage of Surplus/Deficit (%)	Subsidised Rice Allocation (%)
Selayar	5,787.53	42.8	11,061	(5,273)	(48)	13.9
Parepare	3,846.43	55.1	11,218	(7,371)	(66)	7.0
Sidrap	248,364.21	14.0	23,912	224,452	939	7.7
Pinrang	275,120.31	3.0	32,356	242,764	750	9.9
South Sulawesi	2,483,394.13	5.3	738,100.44	1,745,293.69	236	11.1

There are couple of regencies and a city with more than 20% of average production rate during the selected period namely Selayar and Parepare. However, even with high production rate, both regencies could not contribute to the food security program in South Sulawesi due to their limited resources and land area. Meanwhile, such regencies as Sidrap and Pinrang, despite their production far below 20%, but they contributed more than 300% to South Sulawesi food surplus. Even more, they had even provided nearly 1000%.

### 4.1. The Relation between Production, Agroecology, and Innovation.

Considering the relation between the rice production factors and agroecology, it would be reliable to say that farmers from such as Sidrap, Pinrang, and a few other selected regencies had acquired science

and social practice on rice production. The result of this research showed that high production rate of some regencies (table 1) had been the outcome of applying agricultural system based on the agro-ecological concept using mechanical, commercial, and high output agricultural system combined with organic substance inputs to keep the ecosystem in check. At the same time, farmers also had used institutional reformation to increase the ratio of both internal and external inputs – they have a good awareness and upholding the local wisdom, biodiversity, innovation capacity on water and soil management, agricultural design, as well as other related functions especially those belonging to the traditional agricultural ecosystem.

Most farmers and other agriculture stakeholders in South Sulawesi had previously very limited amount of innovations. Agricultural innovation systems emergence in South Sulawesi had been more to respond the lack of technology framework transfer to the farmers due to knowledge or technology perceived as the exclusive right of scientists, then handed over to intermediaries or end users. Whereas farmers and other stakeholders who involved in agriculture totally aware that innovation can increase individual and organisational capacities to put science into social or economic agriculture practices. Moreover, creative social network of regencies had participated in encouraging faster social and economic innovations, either through farmer organisation or other valuable channels. Thus, a framework of innovation system directed the agricultural practices to capture and utilise different types of knowledge to achieve common goals.

#### *4.2. The Relation between Production, Social, and Political Ecology*

According to the Indonesian Statistical Bureau [13], the average rice production in four selected regencies increased from 1994-2003 which are Sidrap (15.1%), Soppeng (4.9%), Wajo (21.1%), and Pinrang (3.7%). Compared to the data from 2004-2013, the average rice production from those selected regencies are 14%, 4.7%, 20.4%, and 3% respectively. This data shows the decreased in the average of rice production for the past 20 years.

Even though Sidrap, Soppeng, Pinrang, and Wajo regencies have high production rates, they have not optimally overcome the problem – or changed and maintained the role of the control and function – of the structure. The capacity to regulate itself internally is also low, so that, the food production in those regencies are expected to be stagnant or decline in the future because they do not strengthen the capacity to learn and adapt. Here the problem of ecological imbalance found, also as the evidence that social ecology is tightly linked with the production factors.

The methods of social ecology are the systems based on the procedures of management of ecology and ecosystem, they also included the discussion of the theory of food security and vulnerability. The system of social ecology has a significant role in the process of environmental changes, particularly in the medium and long-term consequences of human activities on the future. Differ from this view, the concept of political ecology reviews the relationship between food security and power, politics, policy, and justice. There are, at least, two aspects observed in this study related to the political ecology, namely human ecology and critical discourse analysis.

Stakeholders running the food security program, especially the governments (of regencies or province) as actors or entities that have the power to determine policy, tend to be influenced by the interest to maintain or expand their power. The form of the expansion of power and maintain of control are awarding “gift” in the form of food security program to certain communities of a particular government, ruling family, or fellow ethnic and regional origin. Usually the process of awarding done in the form of social assistance or grants, such as the government supply some agricultural inputs like seeds, fertilizers, farm tools or machinery, and infrastructure for the agriculture sector. Out of such a pattern, the food security program in South Sulawesi was dominated by policies based on political ecology system.

#### *4.3. Stakeholders/Actors Interest Analysis*

Stakeholders involved in the food security program in the province of South Sulawesi have different level of interests and influences. The difference level of each stakeholder influenced by the form of

participation, benefits, commitment, network relationships, and their role in the food security program. Table 2 indicates that the stakeholders with the highest level of interest are the farmers, as the target of the food security program. Farmers are not just acting as producers, but at the same time, also as consumers working to increase the household income and to improve the food security program itself. The rice farmers, traders, consumers, and office of food security are the stakeholders with the high score of support to the food security program; as well as the ones that benefited the most.

**Table 2** Stakeholder Level of Interest

Stakeholder	Score Questions					Total
	I	II	III	IV	V	
Governor	2	3	4	3	4	16
Regent/Mayor	3	3	4	4	4	18
Provincial Office of Planning ( <i>Bappeda</i> )	3	1	4	1	1	11
Regency/City Office of Planning ( <i>Bappeda</i> )	3	2	4	3	1	13
Provincial Office of Food Security Affairs	4	3	5	3	4	19
Regency/City Office of Food Security Affairs	4	3	5	3	4	19
Rice Traders (Represent the market)	3	5	5	3	4	20
Farmer	3	4	5	4	4	21
Consumer	3	5	3	3	5	19

The level of influence of stakeholders is measured using an identification scoring based on total value of each stakeholder. Table 3 shows the governor and the regent score the highest level of influence with 22 and 23 points, respectively. It means that both of them have the power and huge influence to determine the direction of food security program policy; started from preparation, execution, growth, and development, up to evaluation of the program. Paradoxically, the stakeholders with the highest interests such as farmers, traders, and consumers have no influence and authority at all to determine the policy of the program, even though they are beneficiaries from the program, and continually participate in every stage of the program.

**Table 3** Stakeholder Level of Influence

Stakeholder	Score Questions					Total
	I	II	III	IV	V	
Governor	5	5	4	5	4	23
Regent/Mayor	4	5	4	4	4	22
Provincial Office of Planning ( <i>Bappeda</i> )	3	1	1	3	3	11
Regency/City Office of Planning ( <i>Bappeda</i> )	3	2	2	3	4	14
Provincial Office of Food Security Affairs	3	4	2	3	4	16
Regency/City Office of Food Security Affairs	2	5	2	4	4	17
Rice Traders (Represent the market)	3	1	2	2	1	9
Farmer & Informal Leaders	2	1	1	1	2	7
Consumer	3	1	1	1	1	7

This research clearly shows that the food security program in South Sulawesi province can be considered as very successful, especially when considering the capacity of rice production because the province has a very high stock of rice, *i.e.* an average of 1,735,293 tons during the year of 2004 to 2012. This success, however, is not followed by the market capacity (private sector) which responsible for *opening access to the public, to obtain food*. The same thing happen to weak distribution capacity that supposed to be controlled by the government. This indicates that boosting free market competition [14] is another potential route to stabilize food security. This is a reason why the government should prioritize the revitalization of agricultural and rural development [15] for food security system, or rural food barn [16]. In addition, training and development of leadership potency to increase capability in recognizing and solving problems of food diversification and understanding on nutrition and food is needed [17].

## 5. Conclusion

The success and failure of food security program primarily determined by three main things: production, distribution, and accessibility of food. The food security program in South Sulawesi shown a very high result in the aspect of production, but experienced the failure in the distribution and the access of food. It is because the stakeholders of the program do not carry out the concepts of agro-ecosystem, agricultural innovation, social and political ecology during the development of South Sulawesi food security program. The most influential stakeholders to determine the direction of food security program policies in South Sulawesi are the governor and regent. While stakeholders with the highest level of interest are the farmers, traders, and consumers. However, having a high rate of interest does not mean have any level to influence to determine the policies of food security program. Therefore, the most influential stakeholders must encourage the involvement of all stakeholders to have more influence and roles in this program through an agreement, discussion, and general consent. An actively contribution of all stakeholders to the fair market system will surely solve the distribution and accessibility problems.

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