Revitalization of food barns in supporting sustainable food security in Central Java

E W Riptanti¹, A Qonita¹ and Suprapti¹

¹Agribusiness Department of Faculty of Agriculture Universitas Sebelas Maret
Corresponding Author Email: erlynawida@staff.uns.ac.id

Abstract. Rice barns have been developed in some areas in Central Java, but several problems seem to appear, leading to nonoptimal functions of nonactive food barns. The present article aims to examine revitalization of food barns through systematic, integrated, and sustainable empowerment. The research design is exploratory research to generate data that are in-depth qualitative and quantitative. Survey was applied in four regencies including Wonogiri, Purworejo, Temanggung, and Batang. Key informants comprise caretakers of food barns, village apparatus, public figures, and Food Security Office apparatus. The research results revealed that the food barns have not been managed in professional manners. Active roles of all members and caretakers, village government, and Food Security Agency are, therefore, required in revitalizing the food barns. In order to perform social functions well, the food barns should be profit-oriented to achieve sustainability.

1. Introduction

According to [1] pointed out that the world is encountering global climate change that leads to the decrease in world's food production. By 2050, cereal production will have dropped by 1% and the world population will have increased by 1%. It is, therefore, crucial to establish food security. The evaluation results of Global Food Security Index released by Economist Intelligence Unit in July 2012 indicated that Indonesia ranked fifth in food security of 7 evaluated ASEAN countries. Top ranks were occupied by Malaysia, Thailand, Vietnam, and the Philippines. For Indonesia, food crisis is a paradox of an agricultural country [2].

On one hand, Central Java province serves as one of provinces with national buffer stocks, and therefore rice productivity is prioritized. In 2015, rice productivity reached 60.99 quintal per hectare with paddy field width of 1.80 million hectares and rice production of 11.00 million tons. Rice productivity in Sukoharjo regency was the highest of all (75.26 quintals per hectare), while that in Pekalongan was found to be the lowest (43.12 quintals per hectare) [3].

On the other hand, despite its position as a province with national buffer stocks, the number of poor population (population living below the poverty line) in March 2016 reached 4.507 million persons (13.27%), indicating an increase of 1.11 thousand persons if compared to the number of poor population in September 2015 which reached 4.506 million persons (13.32%). Although such fact revealed an absolute increase, the percentage of the number of poor population indeed showed a decline of 0.05%.
Food commodities play a greater role in dealing with poverty line than non-food commodities (such as housing, clothing, education, and health). In March 2016, food poverty line contributed 73.00% to poverty line, indicating less significant change compared to that in September 2015 (73.23%) [4].

According [5], poor households, which allocate 60% to 80% of their income to buy food, are more sensitive to food price fluctuation. They do not have any other choice to deal with the rise in food prices unless, except to reduce the quantities of food consumed. The food availability in poor households should be improved by establishing food reserves [6]. Central Java owns a food reserve system set up by either government or community. However, such system in the form of food barns can only be found in 35 regencies/ cities in Central Java. The table below gives an overview of the condition and the number of food barns in Central Java.

| Regency | The number of active government food barns | The number of inactive government food barns | The number of active community food barns | The number of inactive community food barns | The total number of food barns |
|---------|------------------------------------------|-------------------------------------------|----------------------------------------|-----------------------------------------|-------------------------------|
| Purworejo | 31 | 27 | 312 | 93 | 463 |
| Boyolali | 55 | 0 | 0 | 0 | 55 |
| Wonogiri | 48 | 234 | 50 | 19 | 351 |
| Karanganyar | 1 | 0 | 0 | 0 | 1 |
| Rembang | 26 | 240 | 0 | 0 | 266 |
| Temanggung | 9 | 0 | 29 | 167 | 205 |
| Batang | 1 | 61 | 19 | 0 | 81 |
| Tegal | 7 | 0 | 0 | 0 | 7 |
| Total | 178 | 562 | 410 | 279 | 1,429 |

Data source: Ditjen Pemberdayaan Masyarakat dan Desa [7], 2013.

The inactive government food barns were greater in number than the active ones. However, the number of active community food barns exceeded the number of the inactive ones. Such condition is of concern considering that the existence of food barns is marginal. Revitalizing food barns with regards to local conditions and development of an era is a significant way to realize a democratic and sustainable food system. The present tendency indicates that food is no longer regarded as stuff with socio-cultural values, and an important part of human rights, but rather it is a stock-in-trade to gain profits. A food barn is an institution and a symbol of solidarity of farmers and community to meet their own needs of food under the base of local resources [8]. According to the explanation above, the purpose of this study how the revitalization happened in the active and inactive food barn in Central Java.

2. Research Method
2.1. The Basic Method
The design of this study is exploratory research, in which a research aims to obtain description or study on the condition of local food barns in Central Java. Explanatory research seeks explanations to the observes phenomena, problems, or behaviors [9]. Cross-sectional approach was applied, in which a study is carried
out only at a certain time without any treatment or action to object in order to portrait situation at a certain period.

2.2. Types of Data, Sources of Data, and Data Collection
Data include primary and secondary data. Primary data consist of the condition of local food barns seen from the aspects of physical condition, institution and management, factors contributing to the absence of local food barns and the presence of local food barns. The data were obtained from in-depth interview using questionnaires with 42 caretakers of both government and community food barns which every food barn consist of 1 caretaker, as well as the relevant stakeholders and 3 respondents which chosen randomly from house-hold in every location of food barn. Meanwhile, secondary data were obtained from Central Bureau of Statistics, regional and provincial Food Security Agencies, and other relevant institutions.

2.3. Research Location
The research location consisting of regencies having either active or inactive food barns, managed either by government or community was selected using purposive sampling technique. The research was carried out from April to August 2016. Table 2 presents regencies selected with regards to their uniqueness of food barns and the potential to be role models for development of either active or inactive food barns. The research location covers Purworejo, Wonogiri, Temanggung, and Batang regencies.

| No | Regency  | The number of food barns (unit) | The number of inactive food barns (unit) | The number of active food barns (unit) |
|----|----------|--------------------------------|----------------------------------------|----------------------------------------|
| 1  | Wonogiri | 32                             | 4                                      | 7                                      |
| 2  | Purworejo| 27                             | 3                                      | 9                                      |
| 3  | Temanggung| 42                             | 2                                      | 8                                      |
| 4  | Batang   | 14                             | 1                                      | 8                                      |
|    | Total    | 115                            | 10                                     | 32                                     |

Data source: Secondary data of Food Security Agency, 2015

Key informants in this study consist of caretakers of both active and inactive food barns managed by government and community, village apparatus, Food Security Office apparatus, and farmers and households living nearby food barns.

2.4. Data Analysis
The data were analyzed using a method of descriptive analysis to obtain results of research which are able to convey an actual situation. Activities in analysis of qualitative data were performed in interactive and continuous manners until they finished reaching data saturation. Data saturation occurs at time when the added samples or respondents do not provide new information. Activities of data analysis include data reduction, data display, and conclusion drawing/verification [10].

3. Result and Discussion
3.1. Condition of Food Barns
Food barns are closely related to food availability and food reserves. Community has traditionally established food reserve systems of villages and households, one of which is food barn institution. The
importance of food reserves at community level is stipulated in Regulation of Minister No. 30 of 2008 regarding Village Government Food Reserves [11]. Food barns in areas of research location have different conditions. Food barns fall into some categories according to their functions:

**Table 3. Functions of food barns.**

| No. | Category                                  | Regency         | The number of food barns in each regency | Total | Percentage |
|-----|------------------------------------------|-----------------|-----------------------------------------|-------|------------|
| 1   | Unhulled rice saving and credit association | Batang          | 6                                        |       |            |
|     |                                          | Purworejo       | 7                                        |       |            |
|     |                                          | Temanggung      | 7                                        |       |            |
|     |                                          | Wonogiri        | 3                                        |       |            |
|     |                                          | **Total**       | **23**                                   | **7.188** |            |
| 2   | Storage of foodstuff reserves            | Batang          | 2                                        |       |            |
|     |                                          | Purworejo       | 0                                        |       |            |
|     |                                          | Temanggung      | 1                                        |       |            |
|     |                                          | Wonogiri        | 4                                        |       |            |
|     |                                          | **Total**       | **7**                                    | **21.875** |            |
| 3   | Others                                   | Batang          | 0                                        |       |            |
|     |                                          | Purworejo       | 2                                        |       |            |
|     |                                          | Temanggung      | 0                                        |       |            |
|     |                                          | Wonogiri        | 0                                        |       |            |
|     |                                          | **Total**       | **2**                                    | **6.25** |            |
|     |                                          | **TOTAL**       | **32**                                   | **100** |            |

Source: Primary Data Analysis, 2016

Table 3 demonstrates that food barns mostly function as unhulled rice saving and credit association. Members of the association should return the borrowed unhulled rice by giving extra 10% and storing the unhulled rice after harvest. Inactive food barns have experienced a change in function; to store bric-a-brac such as tables, chairs, plates, and glass since most of the members did not return the unhulled rice. For them, food barns had already received supports from government, and therefore they did not need to return what they borrowed.

Not all of the active food barns deserves to be considered a place to store unhulled rice due to poor appearance of unhulled rice. Lusterless unhulled rice is resulted from over-drying or over-heating [12]. Most barns were so stuffy due to poor air circulation that many rats and insects made nests. For that reason, it is important for caretakers of food barns to repair air circulation and find ways to get rid of rats and insects [13].

When managing the function of food barns, approximately 68.75% of caretakers do not receive any incentives or wages. Poor managerial skills cause limitations of food barns to provide incentives/wages to the caretakers [14]. Only caretakers with strong motivation or those who are in urgent situations for nobody can replace their positions are willing to manage food barns.

Top-down dominates the mechanism of food barns, in which government regulate the caretakers and members. This mechanism is commonly not based on the desire of the people getting involved/having interest in food barns, and this, in turns, cause them to have poor relatedness compared to in bottom-up system. The aspect of public self-support is one of keys of successful food barn management. The working mechanisms of bottom-up and top-down are also obvious from the characteristics of society. If the society is compact and highly motivated in managing food barns, the government only need to guide them. However, if the society is not prepared to manage food barn or they require coaching, top-down mechanism should be applied.

One of ways to develop food barns is establishing cooperation with other parties, for instances, food barns in other villages, BULOG (the Indonesian Bureau of Logistics), or other concerned parties. There
are only 4 out of 32 food barns cooperating with other parties. The business is maintained between Food Barns in Pijiharjo, Manyaran, Wonogiri and BULOG of Karangdowo. Other type of cooperative work is also maintained by food barns in Pijiharjo as rice and unhulled rice supplier for BULOG of Karangdowo. This cooperation develops food barns and facilitates the operation.

Table 4. The Whereabouts of Cooperation between Food Barn with Other Food Barn, BULOG, or Stakeholder.

| No.  | Category                                | Total per regency | Total | Percentage |
|------|-----------------------------------------|-------------------|-------|------------|
|      | Regency                                 | Quantity          |       |            |
| 1.   | Maintain cooperative work                | Batang            | 0     | 4          | 12.5%     |
|      |                                        | Purworejo         | 1     |            |           |
|      |                                        | Temanggung        | 0     | 4          | 12.5%     |
|      |                                        | Wonogiri          | 3     |            |           |
| 2.   | Do not maintain cooperative work         | Batang            | 8     | 28         | 87.5%     |
|      |                                        | Purworejo         | 8     |            |           |
|      |                                        | Temanggung        | 8     | 28         | 87.5%     |
|      |                                        | Wonogiri          | 4     |            |           |
| TOTAL|                                        |                   | 32    | 100%       |

Sources: Primary Data Analysis, 2016

Some food barns do not have good mutual aid with other parties because the barns do not meet the requirements or criteria demanded by prospective partner institutions. Furthermore, inactivity of food barn caretakers in establishing cooperation with the third parties is due to relatively poor managerial or negotiating skills.

3.2. Sustainable Food Barn Revitalization

According to [15], food barn needs to be developed and revitalized through systematic, integrated and continuing empowerment process. In the short-term, food barn revitalization needs to be directed to capacity improvement of public food security, among others are through strengthening farmer capital to trigger the development of farmer groups and providing privilege to farmers to set their business priority that will be run based on their own potential. Referring to the condition of food barns in Central Java, revitalization in supporting sustainable food security is carried out by:

3.2.1 Improving institutional capacity building of food barns

Food barn institution has to be reorganized particularly for the aspects of organizational structure, position filling, the article of association and bylaws, as well as management. Slim organizational structure is indeed able to perform all managerial function better than complex organizational structure[16], but it is difficult to operate. People who have certain skills in organizing food barn[17] fill positions for organizational structures. Dual position in organizational structure in a village should be avoided working performance. Food barn caretakers have to improve their technical and managerial skills through technical training or internship program. The article of association and bylaws has to be reviewed and adjusted to food barn visions and missions that are independent and continuing. Food barn flexibility is expanded by optimizing the potential of natural and human resources.
3.2.2 Improving sense of belonging to food barn
Socio-cultural condition today has made a change to members’ behaviors. The growing slash system, savings and credit, and public economics which approaching industry cause the sense of belonging to start fading. Members’ non-performed credits of rice and unhulled rice are resulted from their opinion that the rice is a governmental support that is free of charge. In fact, the rice is intended to stimulate food barns to perform their functions. Members of food barns and society need to improve their motivation to possess deeper relatedness to food barns. Efforts have to be made to revive society and members that food barns ought to be revitalized due to their vital functions in empowering food security.

3.2.3 Improving the physical condition of food barns
The physical condition of food barns is divided into permanent and non-permanent. According to the data below, there are 30 of food barns have permanent building. Food barns with permanent buildings are better able to protect unhulled rice.

| No. | Category   | Regency | Total per regency | Total | Percentage |
|-----|------------|---------|-------------------|-------|------------|
| 1.  | Permanent  | Batang  | 8                 | 30    | 93.75%     |
|     |            | Purworejo | 9             |       |            |
|     |            | Temanggung | 8            |       |            |
|     |            | Wonogiri  | 5              |       |            |
| 2.  | Non-permanent| Batang  | 0                 | 2     | 6.25%      |
|     |            | Purworejo | 0             |       |            |
|     |            | Temanggung | 0            |       |            |
|     |            | Wonogiri  | 2              |       |            |
|     | TOTAL      |         | 32               |       | 100%       |

Source: Primary Data Analysis, 2016

Research results show that the condition of some active food barns is not appropriate to store unhulled rice, and therefore, physical improvement has to be made. This effort requires active participation of all members, village officials of apparatus, and food security board. Adequate food barns can support all their activities and functions.

3.2.4 Optimizing the functions of food barns
Effective food barns have to be able to perform their functions continuously. There are three functions of food barns which have to be accomplished:

a. Social function
This function deals with the capability of food barn to manage public food problems when famine or food shortage happens [18]. The most common problem is that social function gets more priority than other functions so that more than half of the sample food barn in research locations have savings do not continue to develop. Thus, balanced management is required to perform this social function. Strengthening rural food barns were implemented through the process of community development, consisting of: created social conditions conducive, strengthen economic potential, and protect people from his own weaknesses.[10]

b. Price control function
This function is developed through seasonal food storage system [19] and a food credit program [20]. In research locations about 6.25% of the food barns can be advanced by applying warehouse Receipt System. With this system, farmer or owner does not need to sell their commodities when the price drops and they still receive fund supports from food barns through Warehouse Receipt from storage [21].

c. Economic function

Sustainable food barns have the capabilities to generate profits such as selling seeds or other production facilities, and hence, they can finance operational activities and perform their social functions. The managerial skills of food barn maintainers are essential in performing this function because wrong decision made will cause loses to the food barns. The fact, most food barns in Central Java are used for savings and loans where un-hulled rice is stored to control rice availability in the market.

3.2.5 Improving Food barns’ cooperation with other parties

The real life, most of food barn in Central Java particularly in sample region doesn’t have good partnership with any organization or company at every region. The condition is caused by the inability to communicate and negotiate well. Communication and negotiation skills play important roles in succeeding the partnership. Establishing cooperation is important to support the three functions of food barn. Cooperation can be built with farmers, rice barns in other regions, Bulog, grocers, food security office and other business partners. These activities will increase rice barns’ capacities and roles in improving food security in certain areas.

4. Conclusion

Revitalization is a fundamental step in reviving and advancing food barns’ capacities, both governmental and public ones. The efforts are accomplished through the aspects of institutional, human resources and physical condition of food barns. Revitalization entails support from all parties, including central government, local government, and other concerned parties.

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