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Analysis of the effectiveness of the community food barn program on food security for farmer families during the Covid-19 pandemic in West Lombok Regency, West Nusa Tenggara

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Abstract. The work of this research was to analyze the effectiveness of the community food barn in terms of the availability and easy access of the community, both farmer members of the barn and other communities in the village to food, and to analyze the comparison of the income levels of farmers who are members of the community food barn with non-members. This research was conducted in West Lombok Regency. This study uses secondary data and primary data. Secondary data were obtained from literature studies. Meanwhile, primary data was obtained from direct observation and interviews by using a questionnaire with 60 respondents. The data in this study were analyzed using descriptive analysis. The results of this study show that the Community Food Barn Program in West Lombok has not been effective. The most tangible benefit from the existence of the Community Food Barn Program is that members can use the Food Barn to store their harvested grain and guarantee the availability of food reserves for members and the entire family because they are allowed to borrow grain.

1. Introduction

Since the beginning of 2020, there has been a covid-19 pandemic in Indonesia which has had a pretty great impact on various sectors in Indonesia. One of them is the impact on changes in the global strategic environment, namely the disruption of food supply, decreased demand for agricultural products, the threat of a food crisis and restrictions on global food exports. This of course, interferes with national food security. Disturbances to national food security are caused by the disruption of agricultural production due to restrictions on the movement of people or labor, a decrease in people's purchasing power on demand for agricultural products, disruption of food distribution due to the implementation of large-scale social restrictions (PSBB) and limited area closures, the potential for food crises and threats to the availability of national food stocks sourced from imports such as wheat, sugar, beef, garlic and soybeans.

These disturbances cannot be ignored and must be addressed immediately. The government, in this case, through the ministry of agriculture, seeks to minimize the disruption caused by the covid-19 pandemic to national food security in our country. This is attempted to be minimized by issuing policies and a number of programs to increase the productivity of staple foods, facilitate food distribution, facilitate access to transportation, maintain price stability and develop *buffer stocks* and market interventions.



The government plays an important role in maintaining the stability of food supply and prices. Stable food supply and prices make food access and people's purchasing power maintained. The availability of food must be managed in such a way that food production that is seasonal and spread across regions must be available in sufficient and stable quantities to meet the needs of the community from time to time. In an effort to ensure the availability of sufficient food for the community according to the time and location, it is necessary to manage food reserves that can be used as a source of food, especially during pandemic, crises or during the current covid-19 pandemic. Efforts can be made to anticipate and respond to the occurrence of food supply and price instability in the era of the covid-19 pandemic, it is necessary to strengthen the national food reserve system in layers, not only at the central, provincial, and district/city levels but also at the village level.

One of the programs issued by the government through the ministry of agriculture to strengthen food reserves and logistics systems at the city and village levels is the development of community food barns (food barn community). Food barn community is a food reserve institution in rural areas that has a role in overcoming food scarcity and insecurity in rural communities. The purpose of developing the food barn community is to increase the volume of group food reserves in order to ensure access and adequacy of food for its members and to increase group capital through the development of productive businesses in the food sector. Faqih and Rohayati (2016), based on the results of their research on the relationship between the rice barn program and family food security, state that there is a strong and real relationship between the barn program and family food security [1]. And the higher the level of participation of group members in the food barn community program will be followed by the better food security of the family.

The province of west nusa tenggara (NTB) is one of the provinces with the highest number of food barn communities compared to other provinces. The number of food barn communities in ntb that are still active is 278 food barn communities, but only 187 food barn community buildings that are still in good condition and still active. West lombok regency is one of the regencies in ntb, which is able to produce 70,654.07 tons of rice per year [2]. West lombok regency also recorded that in 2019 the highest percentage of poor households receiving the prosperous rice program (rasta) or non-cash food assistance program (BPNT) was 87.09 percent. The 2019 poverty severity index in West Lombok regency is 0.98 [2]. This poverty severity index can provide an overview of the expenditure of the poor. The higher the index value, the higher the disparity in expenditure among the population. The higher disparity in expenditure among the population and the high percentage of the population receiving the welfare rice program assistance in West Lombok regency is an indicator that many people have difficulty meeting their family's food needs. So that the existence of the food barn community in west Lombok regency is expected to be able to optimally and effectively meet the food needs of the surrounding community. Therefore, West Lombok regency is considered worthy of being the location for this research. Based on the things that have been described, the purpose of this research is to analyze the effectiveness of the community food barn in terms of the availability and ease of access of the community, both the farming community members of the barn and other communities in the village to food all the time.

2. Method

A country's food security is an important thing to realize, especially when the covid 19 pandemic has hit this country. The impact of the covid-19 pandemic on changes in the global strategic environment, namely the disruption of food supply, decreased demand for agricultural products, the threat of a food crisis and restrictions on global food exports. This of course, interferes with national food security. Disturbances to national food security are caused by the disruption of agricultural production due to restrictions on the movement of people or labor, a decrease in people's purchasing power on demand for agricultural products, disruption of food distribution due to the implementation of large-scale social restrictions (PSBB) and limited area closures, the potential for food crises and threats to the availability of national food stocks.

The existence of food barn community in each village is an alternative institution that can support community food security and become an institution that drives the economy in the village. The existence

of grain or rice deposits in food barn community when there is a famine or during the covid 19 pandemic like today will help the community and farmers in facing food difficulties. If the food barn can carry out its role properly, it will create good food security at the village level and at the national level. So, it is necessary to do research on the analysis of the effectiveness of the community food barn program on the food security of family farmers in west lombok regency. In order to determine the effectiveness of the food barn community program in west Lombok regency, as well as the effectiveness of the food barn community program on farmers' income.

The research location was deliberately determined at the community food barn (food barn community) in west lombok regency. The location was chosen because west lombok regency is one of the regencies in ntb, which is able to produce 70,654.07 tons of rice per year [2]. West lombok regency also recorded that in 2019 the highest percentage of poor households receiving the prosperous rice program (rasta) or non-cash food assistance program (BPNT) was 87.09 percent. The 2019 poverty severity index in west lombok regency is 0.98 [2]. This poverty severity index can provide an overview of the expenditure of the poor. The higher the index value, the higher the disparity in expenditure among the poor.

The number of food barn communities in west lombok regency, namely, there are 13 food barn communities that are still active with the capacity to accommodate paddy or food barn community rice, which is 40 tons/food barn community. Sekotong district is the sub-district with the largest area in west lombok regency. The area of the sekotong sub-district is 529.38 km² and is 22.70 km from the district capital. The long distance from the district capital makes it more difficult for residents to access food in urban areas; coupled with the enactment of the psbb, food prices have become more expensive. So that food barn community becomes the hope of the village community to meet their food needs and become a driver of the economy in the village. Coupled with this, the sekotong sub-district is considered appropriate to be used as a research location regarding the analysis of the effectiveness of the food barn community program on the food security of farmer families in west lombok regency. This research was conducted for six months in sekotong district, west lombok regency. The study was conducted in both food barn communities in sekotong district. The food barn communities used as research objects are the food barn community sadar sejati ii in the village of sayong baru and the food barn community longlongan in the hamlet mulejati, sekotong district. The types of data used in this study are primary data and secondary data. Secondary data were obtained from the ntb provincial food security service, the central statistics agency (bps), journals, and various related literature. While the primary data was sourced from observations and interviews using a questionnaire with farmers who are members of the food barn community and farmers who are not members of food barn community as a comparison. The primary data required is in the form of quantitative data regarding the value and volume of input and output of rice production as well as the value and volume of buying and selling grain or rice.

Respondents in this study were food barn community member farmers and non-member farmers or outside food barn community members. The selection of respondents from rice farmers as members of each food barn community is to make 15 members the object of research. Food barn community member farmers will be classified into two, namely farmers with an average land area of less than 0.40 ha, and member farmers with a land area of more than 0.4 ha. The selection of respondents from rice farmers outside of the food barn community members who were used as research objects was carried out using a *stratified random sampling technique*, namely by separating non-member farmers into two strata. Strata i are rice farmers with a land area of less than 0.4 ha, while strata ii are rice farmers with a land area of more than 0.4 ha. The number of respondents for each stratum was chosen *purposively*, adjusting to the number of food barn community farmers in each stratum after conducting field research. Primary and secondary data were analyzed qualitatively and quantitatively. Qualitative analysis was carried out by describing the fulfillment of rice needs by food barn community members through community food barns. Meanwhile, quantitative analysis was conducted to compare the income of food barn community member farmers with non-member farmers or outside food barn communities. Data processing is done by using *Microsoft Excel*.

Rice farming income is obtained by calculating revenues minus expenses. The calculation of income includes the components of the sale of rice and rice consumed by the family. Expenditure calculations used include cash disbursements and calculated expenses. Cash disbursements are expenses that are paid in cash. While the calculated expenses are used to calculate the value of family work. The analysis used to determine the income of rice farming using the formula [3], mathematically can be formulated as follows:

$$Pd = TR - TC$$

$$TR = Y \cdot Py$$

$$TC = FC + VC$$

Information:

Pd = farm income

TR= total revenue

TC= total cost

Fc= fixed cost

VC= variable cost

Y= production obtained on a farm

Py = price Y

3. Result

Sekotong District is a dry area, with low rainfall, with the most rainfall in March and it does not rain every month in this area. So that the main water source for agriculture in this area utilizes reservoirs or rice fields with a rain-fed irrigation system. Only areas whose rice fields are close to springs can continue planting without having to wait for rain. Most farmers in Sekotong sub-district only plant rice once a year. The area of paddy fields in Sekotong District is 3040.73 with non-technical irrigation sources as much as 706.73 and the rest with a rain-fed system [2]. Respondents in this study amounted to 60 people. Respondents are farmers in sekotong sub-district who come from 15 members of food barn community sadar sejati ii, 15 people are members of food barn community longlongan, then the rest are not food barn community members but are members of farmer groups consisting of 15 members of farmer groups around the food barn community conscious sejati ii area. And 15 others are also members of farmer groups around the longlongan food barn community area. Based on the results of interviews using questionnaires, data regarding the characteristics of respondents in this research data are obtained, which are presented in full in Table 1. The fixed values that were issued in this study only included the value of equipment depreciation (NPA) and the value of land and building tax which is paid annually by farmers.

Table 1. Distribution of the characteristics of research respondents.

Characteristics of respondents	Number of people	Percentage (%)
Gender		
Man	52	86.67
Woman	8	13.33
Age		
Late adulthood (60 years and over 60 years)	2	3.33
Middle adulthood II (50-59 years)	13	21.67
Middle adult I (40-49 years)	31	51.67
Early adulthood II (30-39 years)	14	23.33
Early adulthood I (18-29 years)	0	0
Education		
No school	0	0
0-6 years old/elementary school level	33	55
7-9 years old/junior high school level	11	18.33
10-12 years old/high school level	13	21.67

13-16 years old/ Diploma/Bachelor level	3	5
Marital status		
Married	60	100
Not married yet	0	0
Number of dependents of family members		
0-5 people	59	98.33
6-10 people	1	1.67
Been a farmer		
1-5 years	0	0
6-10 years	6	10
11-15 years old	7	11.67
16-20 years old	23	38.33
>20 years	24	40
Agricultural Land Area		
0.50 - 1.00	58	96.67
1.01 – 1.51	0	0
1.52 – 2.02	2	3.03
source of capital		
Alone	35	58.33
Loan	5	8.33
Own and loan	20	33.33

3.1. Effectiveness of the community food barn program in Sekotong District

The Community Food Barn (food barn community) is a means for storing staple foods in order to create public food reserves to anticipate famine, price fluctuations and natural disasters. Development of Community Food Barns in the form of activities to develop community food reserves from food insecurity by facilitating the physical construction of barns, replenishing food reserves and strengthening institutions. The support facilities provided in addition to financial assistance for the construction of barns and filling food reserves are also provided with training and coaching facilities at the provincial level and support for mentoring and coaching facilities at the district level. The success of food barn community development activities can be seen from the achievement of *output indicators* seen from the distribution and utilization of government assistance funds and the implementation of the provision of food reserves and business activities. Productive economy groups in the food sector. Then the *outcome indicators* are seen from the availability and development of food reserves belonging to the group in a sustainable manner and the increase in group capital through productive group economic business activities in the food sector. Furthermore, another indicator used to determine the success of the food barn community program is the *benefit indicator*, which is seen from the development of community food reserve management that is independent and sustainable; and the establishment of group productive economic enterprises in the sustainable food sector. And the last indicator is the *impact indicator*, which is seen from the sufficiency of the food needs of group members as long as time and increasing the income of members of the barn group.

Based on the results of interviews with each of the 15 respondents who are members of the food barn community sadar sejati ii and food barn community longlongan in sekotong district, it can be seen what indicators have been successfully met and have not been successfully met in assessing the success of the food barn community program that has been built since 2019 in the district. Such a bag. Further explanation is described as follows:

3.1.1. Output indicator. The indicators for the distribution and utilization of Government Aid Funds have been implemented well. The government assistance funds provided have been channeled and received by the two food barn community groups, and the funds have been used to build barns that can be used by members to store harvested grain. Furthermore, indicators for the implementation of the provision of food reserves and business activities productive economies of groups in the food sector have also been implemented but are not sustainable. There was a problem when filling the warehouse

stock with rice, then because it was stored in the warehouse for too long, and not many members and the community around the warehouse bought rice at the food barn community Longlongan, eventually causing their rice to be cursed and damaged. Likewise with the food barn community Sadar Sejati II, where the current condition of the barn is not stocked with food stock for members, but is only used as a temporary storage place for members' harvested grain before being sold. The failure to achieve the output indicators is due to the lack of professionalism of the management in managing the LPM. The same thing was also stated by Sari, et al (2021) in their research on the management strategy of the Warehouse Receipt System (WRS) in West Lombok Regency [4]. The WRS in West Lombok Regency is no longer running until now, and if you want the WRS to run again, you need a professional warehouse manager who has strong entrepreneurial characteristics.

3.1.2. Outcome indicator. Indicators of the availability and development of food reserves belonging to the group in a sustainable manner. It has also not been implemented because the rice selling business activities of food barn community Sadar Sejati II are currently on hiatus, due to problems with their previous customers, and the brilink agent who is their customer no longer buys rice from them because there is a rice trader competitor from Central Lombok who sells rice with better quality and lower price. So, they can't compete. So, it is important to provide assistance so that they can help food barn community members if they experience such problems when running their business. And there needs to support from related officials or the government to help improve the quality and production of rice in Sekotong District. So that the results of rice production in Sekotong District are not less competitive with rice/grain yields from other regions. The next indicator is the increase in group capital through productive group economic business activities in the food sector. This also has not been implemented properly.

3.1.3. Benefit indicator. Indicators for the development of community food reserve management independent and sustainable and indicators of the development of group productive economic enterprises in sustainable food. It has not been implemented well in both food barn community's.

3.1.4. Impact indicator. Sufficient food needs of group members throughout the time have been fulfilled at the food barn community longongan because there are still grain reserves stored in the food barn community to be loaned out to member farmers if they find it difficult to get food to meet their family's food needs. However, in the food barn community sadar sejati ii, this has not happened because the contents of food barn community sadar sejati ii are grain owned by one of the members. Furthermore, the indicator of increasing the income of the members of the food barn group has not been realized because based on the comparison of cost and income analysis of lowland rice farming between food barn community members and non-food barn community members, there is no significant difference in terms of productivity. The difference in the value of income between member and non-member farmers occurs due to differences in land area. The average land area of non-member farmers is more than food barn community member farmers.

3.2. Analysis of cost and income of paddy farming for food barn community members

Calculation of farm cost and income analysis includes the calculation of fixed costs, and variable costs. The calculation of fixed costs includes land and building taxes, and depreciation costs for equipment such as hoes, sickles and sprayers. While the calculation of variable costs includes the calculation of the cost of fertilizers, pesticides, labor, tractor rental, and the use of seeds and sacks for farmers' grain containers. The results of the recapitulation of the calculation of the average cost and income analysis per hectare of food barn community member respondent farmers in Sekotong District, West Lombok Regency, can be seen in Table 2.

Table 2. Analysis of costs and average income per hectare of food barn community respondent farmers in Sekotong District, West Lombok Regency.

Description	Average value (IDR)
Revenue (TR) = Y . P	
A. Production (Y) (KG)	4033.33
B. Price (P) (IDR)	4200
Total Revenue (TR)	16940000
Cost	
A. Variable cost (VC)	
Total Labor	517333.33
Fertilizer	
Urea	587916.67
NPK	106500
KCl	468600
Pesticide	
Insecticide	30000
Herbicide	97000
Cost	
tractor rent cost	955000
Seeds	211000
Bag	201666.67
Total Variable cost (TVC)	3175016.67
B. Total Fix Cost	
Tax	24750
Equipment decrease	
Mattock	86333.33
Sickle	73044.44
Sprayer	186138.89
Total Fix Cost (TFC)	370266.67
Total Cost (TC)	
A. Variable Cost (VC)	3175016.67
B. Fix Cost (FC)	370266.67
Total Production Cost	3545283.33
Revenue (PD) = TR – TC	13394716.67

3.3. Cost analysis

Fixed costs are costs that are always the same even though the amount of production varies. Fixed costs are costs that do not affect production and continue to be issued even though the product obtained is large or small and even though there is no production. The fixed costs incurred by the respondents in this study are the depreciation value of the tools (NPA) owned by the farmers. The depreciation value of the equipment is obtained by reducing the price of the item by estimating the residual price if the item is resold divided by the useful life of the item. Then the results of these calculations are multiplied by the number of tools owned. The average value of depreciation of tools per hectare/year of 30 respondents can be seen in Table 2. The average value of depreciation of the hoe is IDR. 86333.33, the average value of depreciation of the sickle is Rp. 73044.44, and the average value of depreciation of the sprayer is IDR. 186138.89. Furthermore, the calculation of the average land and building tax paid by respondents per hectare/year is Rp. 24,750 (Table 2).

Variable costs are all costs incurred by respondent farmers for the purchase of fertilizers, seeds, pesticides, payment of labor wages, the purchase of sacks as a container for storing crops and the cost of renting a tractor. The overall average value of the calculation results of variable costs can be seen in Table 2. The average cost of labor used, namely labor for cultivating the land such as tidying the edges of the fields, labor for seeding, planting, fertilizing and harvesting. The total average of all workers used is IDR. 517333.33. Furthermore, the calculation of the tractor rental paid by the farmer includes the operator's fee for the tractor machine and the cost of diesel used. The total value of the average tractor rental per hectare is IDR. 955,000. The average purchase cost for insecticides is IDR. 30,000, and herbicides are IDR. 97,000. Another variable cost that is taken into account is the cost of seeds. The average number of seeds used per hectare is 21.1kg. With an average cost of IDR. 211,000. Then the variable costs for purchasing 50kg sacks to store the harvested grain. The average cost of buying a sack is IDR. 3175016.67. Based on the results of the recapitulation in Table 2. It is known that the average total value of revenue (TR) is IDR. 16,940,000, the average total fixed cost (TFC) is IDR. 370,266 and the total average variable cost (TVC) is IDR. 317,016. So that the average total income received by the respondent farmers is IDR. 13,394,716. So, it can be concluded that lowland rice farming carried out by respondent farmers is profitable.

3.4. Analysis of cost and income of paddy farming for non-food barn community members

Calculation of farm cost and income analysis includes the calculation of fixed costs, variable costs. The calculation of fixed costs includes land and building taxes, and depreciation costs for equipment such as hoes, sickles and sprayers. While the calculation of variable costs includes the calculation of the cost of fertilizers, pesticides, labor, tractor rental, and the use of seeds and sacks for farmers' grain containers. The results of the recapitulation of the calculation of the average cost and income analysis per hectare of non-food barn community respondent farmers in Sekotong District, West Lombok Regency can be seen in Table 3.

Table 3. Analysis of Costs and Average Income per hectare of respondent farmers who are not food barn community members in Sekotong District, West Lombok Regency.

Description	Average value (IDR)
Revenue (TR) = Y . P	
A. Production (Y) (KG)	5000
B. Production (P) (Rp)	4200
Total Revenue (TR)	21000000
Cost	
A. Variable Cost (VC)	
Total Labor	1051911.111
Fertilizer	
· Urea	1970430.556
· NPK	341550
· KCL	1502820
Pesticide	
· Insecticide	34200
· Herbicide	120000
· Tractor rent cost	1200000
· Seed	672700
· Sack	250000
Total Variable Cost (TVC)	7143611.667
B. Total Fixed Cost	
tax	31500
Equipment decreases	
· Mattock	100527.7778
· Sickle	99083.33333
· Sprayer	167638.8889
Total Fix Cost (TFC)	398750
Total Cost (TC)	
A. Variable Cost (VC)	7143611.667
B. Fix Cost (FC)	398750
Total Production Cost	7542361.667
Revenue (PD) = TR - TC	13457638.33

3.5. Cost analysis

Fixed costs are costs that are always the same even though the amount of production varies. Fixed costs are costs that do not affect production and continue to be issued even though the product obtained is large or small and even though there is no production. The fixed costs incurred by the respondents in this study are the depreciation value of the tools (NPA) owned by the farmers. The depreciation value of the equipment is obtained by reducing the price of the item by estimating the residual price if the item is resold divided by the useful life of the item. Then the results of these calculations are multiplied by the number of tools owned. The average value of depreciation of tools per hectare/year from 30 respondents can be seen in Table 3. The average value of depreciation of the hoe is IDR. 100,527.78, the average value of depreciation of the sickle is IDR. 99,083.33 and the average value of depreciation of the sprayer is IDR. 167,638,89 Furthermore, the calculation of the average land and building tax paid by respondents per hectare/year is IDR. 31,500 (Table 3).

Variable costs are all costs incurred by the respondent farmers for the purchase of fertilizers, seeds, pesticides, payment of labor wages, the purchase of sacks as a container for storing crops and the cost of renting a tractor. The overall average value of the calculation results of variable costs can be seen in Table 3. The average cost of labor used, namely labor for cultivating the land such as tidying the edges of rice fields, labor for seeding, planting, fertilizing and harvesting. The total average of all workers used is IDR. 1,051,911.11. Furthermore, the calculation of the tractor rental paid by the farmer includes the operator's fee for the tractor machine and the cost of diesel used. The total value of the average tractor rental per hectare is IDR. 1,200,000. Another variable cost that is taken into account is the cost of seeds. The average number of seeds used per hectare is 67.27 kg. With an average cost of IDR. 672,700. Furthermore, the variable costs for purchasing 50 kg sacks to store the harvested grain. The average cost of buying a sack is IDR. 250,000.

Based on the results of the recapitulation in Table 3. It is known that the average total value of revenue (TR) is IDR. 21,000,000, the average total fixed cost (TFC) is IDR. 398,750 and the total average variable cost (TVC) is IDR. 7,143,611. So that the average total income received by respondent farmers is IDR. 13,457,638.33 per hectare/planting season. Most of the farmers in Sekotong District only plant rice once a year. If the total average income is divided by twelve months, then the average income of farmers per month from the results of planting rice is IDR. 1,121,469. This amount is used to support farmers and their dependent family members. If you only rely on income from planting rice once a year, it certainly cannot meet all the needs of farmer households. So respondent farmers try to fulfill all their household needs by growing tobacco and cassava.

4. Conclusion

Based on the research results that have been described, it can be concluded that the food barn community program in sekotong sub-district has not been effective and has not succeeded in providing benefits in increasing the income of food barn community members farmers. The results of the calculation of the analysis of costs and income of lowland rice farming for food barn community members and non-food barn community members indeed have differences and the results of the calculations show that non-member farmers' incomes are higher. The difference in results occurred because the average land area of member farmers was wider than that of food barn community member farmers. So that it cannot be used as a basis for concluding that the income of non-food barn community members is higher than that of food barn community-member farmers. However, these results can be used as a basis for concluding that there has been no benefit in the form of increased income felt by food barn community members. The most tangible benefits from the existence of the food barn community are that members can use the food barn community building to store their harvested grain and ensure the availability of food reserves for members and the entire food barn community family because they are allowed to borrow rice/grain (depending on availability at food barn community) for their consumption when food reserves are in stock. They run out and have no money to buy rice/grain. They can return the amount of rice/grain they borrowed in the next growing season after they harvest.

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