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The Impact of Zakat as a Financial Inclusion Instrument for Sustainable Agriculture

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ABSTRACT

Zakat fund can be utilized as a zakat-based financing facility that empower smallholder farmer to practice sustainable agriculture. This study aims to measure the impact of zakat on agricultural productivity and smallholder farmer's welfare by using productivity analysis, general poverty index as well as BAZNAS Welfare Index (BWI) which focus on the examination of sustainable agriculture project funded by BAZNAS since 2018. The results of this study indicate that the income of farmers is almost double from the conventional agriculture because the production cost of organic rice is 75% lower than the production of non-organic rice without subsidies and 59.4% lower than non-organic rice production with subsidies. The level of organic rice production also increase in the second and third seasons which are 4.65 and 4.32 tons/hectare or almost equivalent to productivity with conventional cultivation method. With this program, the number of underprivileged farmers measure by headcount index is decreasing based on poverty line standard and had kifayah. The impact of this program also shows good results with the BWI value of 0.78 when using poverty line standard and 0.53 based on had kifayah standard.

Keywords: Zakat, Sustainable, Agriculture, Productivity

INTRODUCTION

Despite of its high importance, agricultural financing is quite complicated. International Finance Corporation (2013) states that agricultural sector is the main livelihood for 86% of rural people and 2.5 billion household in agricultural sector are struggling for in financing. They are mostly smallholder farmer with low production capacity who live in poverty and financially illiterate (Varangis, Buchenau, & Ono, 2018). Hence, most of the time they get financing from informal lender rather than formal financial institutions that require adequate collateral or guarantee.

The formal financial institutions also reluctant to finance this sector due to ineffective policies, high transaction cost to reach rural communities, inadequate risk instruments and some other factors (World Bank, 2020). Moreover, the inherent risk of agricultural business such as natural disaster, pests and price volatility adds complexity to the agricultural financing for rural population (IFAD, 2009). Further, the farmer's group that allow technology adoption to boost the productivity still needs to be enhanced (Nuryanti & Swastika, 2011).

Several studies have scrutinized the impact of Islamic banks in agricultural financing. A study by Beik and Aprianti (2016) from 2004 to 2010 shows that Indonesia Sharia Certificates (SBIS), conventional rate of Bank Indonesia (SBI) certificate, equivalent rate of financing, and equivalent rate of return on deposit (third party fund) positively significantly affect agricultural financing in the long run.

However, the increase of third-party funds does not directly increase the Islamic financing proportion for agricultural projects. A further development between 2014 to 2016 shows that the third-party funds in Islamic banks are significant and positive with agricultural financing (Lestari, 2019). However, Meutıa and Adam (2019) find that there is no significant difference between conventional and Islamic bank's financing in affecting productivity in agricultural projects.

The complicated nature of agricultural financing by Islamic banks, emphasizes the role of Islamic social finance like zakat and waqf to become a financial inclusion instrument for poverty alleviation. Shaikh (2016) argues that potential collectible zakat funds may eradicate poverty in OIC countries. Hassan (2010) states that combination of zakat, awqaf, and microfinance can be an integrated solution for poverty alleviation. Further, Hossain, et. al. (2019) proposes that zakah-based salam forward contract may benefit smallholder farmer by bringing financial inclusion, interest free working capital, collective bargaining power in factor market and reduce income uncertainty for the rural smallholders.

Hence, this study is aimed to discuss the model of zakat-based financing facility that empower smallholder farmer to practice sustainable agriculture. It also aims to measure the impact of zakat on agricultural productivity and smallholder farmer's welfare. This study will focus the examination on one of sustainable agriculture project funded by BAZNAS since 2018.

This paper is divided into six sections. Following the introduction, a discourse of literature review on zakat and agriculture is provided prior discussing the methodology. Afterward, this paper will examine the model of zakat-based agricultural program and show the impact of zakat on productivity and welfare. Lastly, there will be some conclusions and recommendations provided.

LITERATURE REVIEW

The literature on zakat and agriculture can be divided into two broad categories which are zakat applications on the collection and disbursement side. On the collection side, there are studies that concerning on the sharia discussion of agriculture zakat. For instance, Rahman, et. al. (2019) find that there is a non-uniformity estimation of agricultural zakah occurred due to the varied interpretation enriching the Islamic legal tradition by different schools of juristic thought. Moreover, Hamat (2014) argues that the assessment of zakat on agricultural income should allow the deduction of plantation cost as nowadays most of the agricuture project are done commercially.

Further, some studies scrutinize determinant for paying agriculture zakat. Syn, Ali, and Hafidhuddin (2018) identify that the comprehension on zakat, faith, rewards, Islamic study, and frequency of worship are determinant factors for farmers in their decision-making process on dispensing plantage-product zakat. Similarly, Hapsari & Amrullah (2014) states that the lack of understanding on zakat affect the fishery farm entrepreneur in paying zakat. Further, Pratama and Yuni (2020) conduct a study that estimating and mapping the potential of zakat on agriculture and profession in Indonesia.

On the disbursement side, there are several studies that applying *Zakat Village Index* to assess the eligibility of people a certain area to receive zakat-based program. Agricultural activities are common to become the main intervention for rural population. Areas like Bedono Village, Beruntung Jaya Village, and Cemplang Village have been assessed using *Zakat Village Index* and are eligible to receive poverty alleviation funded by

zakat fund (Farikhatusholikhah, Novianti, & Ali, 2018; Maulida, Rizali, & Rahmatullah, 2018; Khairunnajah, Beik, & Sartono, 2019).

Moreover, there are quite many research that discussing zakat for agricultural financing using qualitative method. Hossain, et. al. (2019) propose zakah-based salam contract to smallholder's farmers. Similarly, Riwanto (2017) develops zakat distribution method for fisherman. Moreover, Puspitasari, Fauziyyah, and Salam (2016) construct a zakat distribution model through takaful institution to mitigate risk in agricultural business to increase mustahik's welfare. Further, Saripudin, Djamil, and Rodoni (2020) try to integrate several empowerment model for farmer using Islamic economic principles.

However, the empirical research using quantitative analysis on agricultural financing is limited if not scarce. A study by Taufiq, Kusnendi, and Nurasyiah (2018) reveals that productive zakat and business experience have a positive and significant effect on farmers' income in Cibaeud Village, Tasikmalaya. However, this study cannot evaluate whether the zakat fund has increase the farmer's incomr above the poverty line or had kifayah standard. Moreover, there is not any study yet, in author's observation, that evaluate the productivity of sustainable agricultural practice over several planting terms. Hence, it is urgent to conduct a study concerning the impact zakat on agricultural productivity and farmer's welfare over several planting terms.

METHODOLOGY

Data Collection

This study is conducted upon 23 farmers who are member of Sari Alam farmer's group. This group cultivates 7.85 Ha of paddy field located in Sukabumi, West Java, Indonesia. This research collects primary data by interviewing farmers who have joining the Lumbung Pangan program for at least six (6) months since July 2018. Then the data is processed to measure the impact of the zakat on productivity and farmer's welfare. Meanwhile, the secondary data is derived to obtain information regarding poverty line (PL) and had kifayah standard (HK).

Productivity Analysis

The productivity analysis is conducted by comparing the total input and total output over four planting terms. The first planting term is the baseline measurement that still applying conventional (non-organic) agriculture practice. Meanwhile, the second up to the fourth planting terms already conducting sustainable (organic) farming practices. The total input is represented by the total cost of production and the total output is measured by total rice production and the total revenue.

The total cost consists of the provision for seeds, fertilizers, pesticides, and activator. The total cost also considers operational cost such as land cultivation, planting, weeding, fertilizing, harvesting and post-harvesting activities. Meanwhile, total revenue is the total sales of rice produce in each planting term. Hence, the income is the gap between the total revenue and the total cost. In addition, this research also conducts quality analysis to check the residual pesticide in the end product.

General Poverty Indicator (GPI)

General Poverty Indicator is used to evaluate poverty conditions under certain territorial. There are 5 (five) indicators that are used to evaluate the poverty condition in this research namely headcount index (H), income gap ratio (I), poverty gap (P1), Sen index (P2) and FGT index (P3) (Haughton & Khandker, 2009). The This research also evaluates the time needed for the participant to escape poverty using time taken to exit poverty formula (Morduch, 1998)**.** The following discourse illustrates how to measure it.

$$t_g^j = \frac{1}{N}\sum_{i=1}^{q} \frac{ln\ ln\ (z) - ln\ ln\ (y_j)}{g}$$

where:

z : poverty line
y : income
g : income growth
i : total person in a population
q : total person with income *y* that is under the poverty line

BAZNAS Prosperity Index

BAZNAS Prosperity Index (BPI) is a part of the score for the National Zakat Index and consists of three other indices, which are CIBEST Prosperity Index (Beik & Arsyianti, 2016), modified human development index, and independence index (Center of Strategic Studies BAZNAS, 2019). If BPI is closer to 1, it means the impact of distributed zakat is better.

RESULT AND DISCUSSION

Lumbung Pangan BAZNAS: A sustainable agriculture practice

BAZNAS runs a zakat-based farmer empowerment program, called Lumbung Pangan. It is implemented in three different stages: preparation, implementation, and monitoring & evaluation. There are two main activities in the preparation stage, namely assessment and program socialization to the targeted participant. Assessment is conducted to meticulously choose the right participant based on the asnaf and the commitment to join the program. Meanwhile, the socialization process is obtained to ensure that the candidates are well aware of the program regulation and ready for the consequence if they are joining.

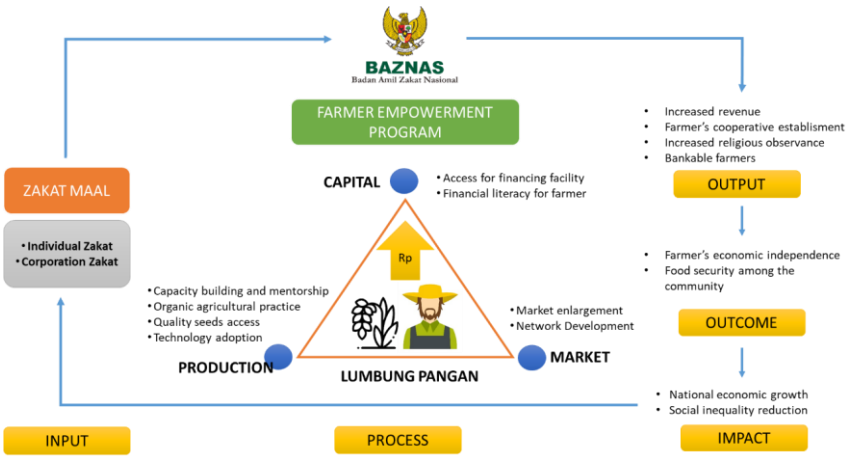

Figure 1. Farmer Empowerment Intervention Model

There are three main interventions in the implementation stage. First, the capital assistance intervention. In this regard, the farmers gain access to free-interest capital using zakat funds for provisioning seeds, fertilizer, pesticide, farming tools, etc. The funds also can be allocated for the operational cost such as planting, weeding, fertilizing, harvesting, and post-harvesting activities. They will also have financial literary mentorship, so that they can have a better financial management capacity.

The second intervention is the production enhancement. In this regard, the farmer's group will be trained to conduct a sustainable farming cultivation technique to produce organic rice. The farmer's group will be introduced to practical agricultural technology and access to quality seeds to increase their production. They will also get organization and leadership training to strengthen the farmer's group organization.

Moreover, farmers also receive spiritual guidance during the mentoring period.

The last one is market intervention. The farmers will be helped to enlarge their market. They will be connected with prospective buyers, government agencies, and associations to develop their network. The farmers are expected to form cooperative so that they can access a bigger financial product from other financial institutions.

The three interventions above are expected to assist financial inclusion for farmers, increase their production capacity and income, and have a more sustainable livelihood. BAZNAS always meticulously runs monitoring and evaluation program so that in the long run, this program is expected to trigger economic independence and food security in the villages which will also contribute to national economic growth.

Productivity Improvement Analysis

The observation shows that there is a fluctuation in rice production during the four planting terms. There is a production decline between Term 1 and Term 2 for about 20.9% from 4.49 ton/ha to 3.55 ton/ha. The decline is happened because it was a transition phase between conventional to organic agricultural practice. In this period, the farmers were not quite consistent yet in giving the organic fertilizer and natural pesticide to boost production and control pest. However, the rice productions were getting higher afterward. At this point, the farmers were already aware about the urgency of applying organic fertilizer and pesticide. The rice production reached the peak production in Term 3 with production level at 4.65 ton/ha. The production level in Term 4 was slightly declined due to weather disruption as shown in the following figure.

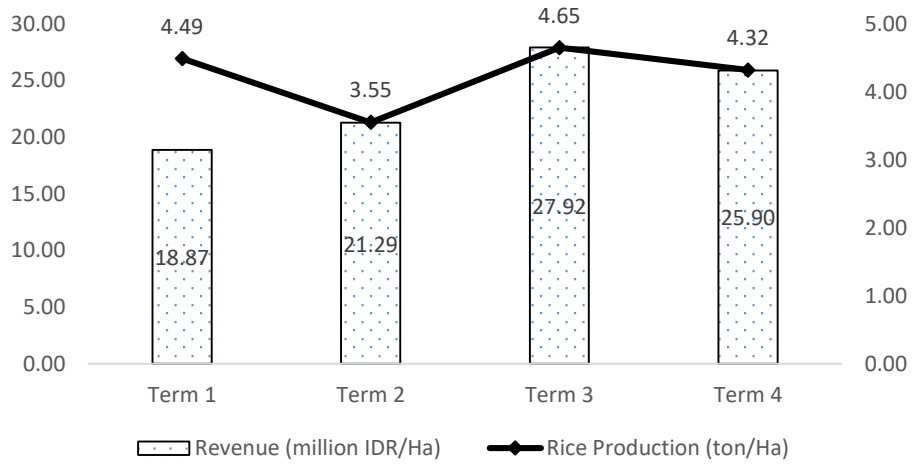

Figure 2. Total Revenue and Rice Production

The total revenue signals an upward trend during the first three planting terms and slightly declined in Term 4. Despite the lower production rate in Term 2, it has higher total revenue than Term 1. It is because the price of organic is higher than the conventional one for the same amount of weight. The lowest price of conventional dried grain is about IDR 4,200,-/kg meanwhile the lowest price of organic dried grain can reach about IDR 6,000,-/kg. The total revenue reached 27.92 million IDR/ha in Term 3 or about 48% higher than the initial agricultural practice in Term 1. Nonetheless, the production decline in Term 4 is slightly reduced farmer's total revenue for about 7.23%.

There is a significant cost difference between conventional and organic agricultural practice. There is 15.7% of cost reduction between Term 1 and Term 2 from IDR 8,335,000,-. to IDR 7,025,000,-. The cost reduction is driven by the substitution of chemical fertilizer and pesticide to the organic one. Previously, farmers must buy the chemical fertilizer and pesticide in conventional agricultural practice. Meanwhile, they can produce their own organic fertilizer and pesticide in organic agricultural practice which cause the significant cost reduction. Afterward, the cost remained the same at IDR 7,025,000,- as shown in the following figure.

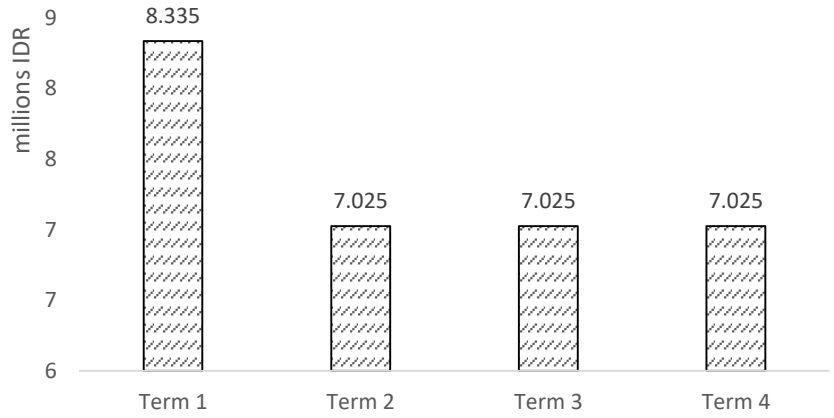

Figure 3. Total Cost of Production

Having both information of total revenue and cost over four planting terms, we can calculate the margin and the productivity ratio. The following table shows that the increase in total revenue and the cost reduction induce the margin increases over time, except in Term 4. In Term 4, the margin is slightly drop due to production reduction. The peak margin is in Term 3, where the margin is IDR 20,901,397,- or nearly double the margin in Term 1. Moreover, the productivity rate is also increasing from Term 1 to Term 3. It shows that the program has successfully increasing the farmer's productivity.

Table 1. Margin and Productivity Ratio

Planting Term	Total Revenue (IDR/Ha)	Total Cost (IDR/Ha)	Margin (TR-TC)	Productivity (TR/TC)
Term 1 (Conventional)	18,868,712	8,335,000	10,533,712	2.26
Term 2 (Organic)	21,286,132	7,025,000	14,261,132	3.03
Term 3 (Organic)	27,926,397	7,025,000	20,901,397	3.98
Term 4 (Organic)	25,906,277	7,025,000	18,881,277	3.69

Source: Authors Analysis (2020)

In addition, the quality analysis upon rice produce during the observation shows that rice from organic agricultural practice does not contain chemical pesticide residual. The organochlorine and organophosphate that are usually found in regular rice, are not found in the organic rice in the observation. In addition, the organic rice has a brighter color that the regular one. The complete quality analysis can be found in appendix.

Welfare Improvement Analysis

The welfare improvement analysis is conducted using the General Poverty Indicator and BAZNAS Welfare Index.

Meanwhile, there are two poverty standards in this research. First, the poverty line standard at IDR 440,538 per capita per month based on Statistic Indonesia standard in September 2019 (Badan Pusat Statistik, 2020). Second, the had kifayah standard at IDR 772,088 per capita per month (Center of Strategic Studies BAZNAS, 2018).

The GPI calculation shows that the total headcount of poor people (H) is declining after the farmer joined the Lumbung Pangan program. This result is consistent at both poverty standards. They decline at the rate of 16% at the poverty line and 21% at the had kifayah standard. Hence, it is observed that the zakat-based agricultural financing can escape the farmer from poverty.

Moreover, the income gap calculation (I) at the had kifayah standard is declining for 2%. However, the income gap at the poverty line standard is increasing for 17%. It is happened because the incremental income of the observed participant that is far under poverty line is lower than the observed participant that are near the poverty line. Moreover, there are more participants who live far under the poverty line than the participants who live near the poverty line. This aligns with the increase of Poverty Gap (P1) and FGT Index (P3) value at the poverty line.

However, the poverty gap (P1) is narrower at the had kifayah standard. In addition, the Sen Index (P2) show a decrease value at both standards by 6% and 13%. Similarly, FGT Index (P3) at had kifayah standard also decrease for 3%. They indicate that zakat has shallowing the poverty depth among the observed participants. The General Poverty Indicator (GPI) estimation result is shown in the following table.

Table 2. General Poverty Indicator

General Poverty Indicator		Poverty Line	Had Kifayah
H	**Before**	0,32	0,74
	After	0,16	0,53
	Δ	-0,16	-0,21
I	**Before**	0,16	0,36
	After	0,33	0,33
	Δ	0,17	-0,02
P1	**Before**	280.902	1.098.888
	After	586.735	1.030.502
	Δ	305.833	(68.386)
P2	**Before**	0,15	0,44
	After	0,09	0,31
	Δ	-0,06	-0,13
P3	**Before**	0,01	0,12
	After	0,03	0,09
	Δ	0,02	-0,03

Source: Authors Analysis (2020)

The time taken to exit poverty calculation shows that the program has shortened the time for the participants to escape poverty across the standards applied, as shown in the Table 3.

Table 3. Time Taken to Exit Poverty Lumbung Pangan

Time Taken to Exit Poverty	Poverty Line	Had Kifayah
Without Zakat	1,17	7,42
With Zakat	1,63	5,40

Source: Authors Analysis (2020)

The welfare improvement analysis is also conducted using the BAZNAS Welfare Index. It consists of CIBEST Welfare Index, modified human development index, and independence index. The BAZNAS Welfare Index at the poverty line and had kifayah standard are 0.78 (Good) and 0.53 (Fair), respectively. It means that zakat has a good impact on participant's welfare below the poverty line and fairly good for participants under the had kifayah threshold. The detailed calculation is shown in the following table.

Table 4. BAZNAS Welfare Index at Poverty Line and Had Kifayah

Measurements		**Poverty Line**	**Had Kifayah**
BAZNAS Welfare Index		**0.78**	**0.53**
CIBEST Welfare Index		**1.00**	**0.50**
Quadrant*)	Quadrant I	84,21%	47,37%
	Quadrant II	15,79%	52,63%
	Quadrant III	0,00%	0,00%
	Quadrant IV	0,00%	0,00%
Modified HDI		**0,50**	
Index	Health	0,48	
	Education	0,40	
Independence Index		**0,59**	
Variable*)	Regular income	100,00%	
	Non regular income	0,00%	
	Leased asset	0,00%	
	Savings	36,84%	

Source: Authors Analusis (2020) *) the percentage of samples

Based on the table above, it can be seen that the overall BWI value based on the poverty line is 0.78 (Good) with details of the CIBEST score of 1 (Very Good). A total of 84.21% of mustahik households are in quadrant I which is categorized as a materially and spiritually prosperous family. Meanwhile, 15.79% are in quadrant II, which is still materially poor, but there are no mustahik households categorized in quadrants III and IV. In addition, the number of mustahik households that are in quadrant I (prosperous families) in the calculation based on had kifayah is 47.37% while the rest are still in quadrant II which are materially poor but have been able to fulfill their spiritual welfare.

Meanwhile, the value obtained for the modified HDI index is 0.50 (Fair). This value consists of a health index value of 0.48 and an education index of 0.40. The last component of BWI is the independence index with the value of 0.59 (Fair). Based on this independence index, it is known that all of the mustahik in the Lumbung Pangan program have already had a regular income but the mustahik who have savings have not reached half or only reached 36.84%. In addition, there is not a single person from the farmers in the Lumbung Pangan program who has non-routine income or income from leased assets. However, in general, the condition of mustahik's independence in the Lumbung Pangan program is fairly good.

Mustahik's independence is very important, therefore the Lumbung Pangan program also examines some aspects that need to be built in order to foster mustahik's independence so that this program can be sustainable which can bring positive aspects both for farmers and for the surrounding environment. One of the aspects that has been done to establish farmer independence is through the formation of farmer groups (cooperative) so that farmers can carry out wider economic transactions. This is done

because the existence of a legal entity at the farmer level will increase the convenience for farmers if they want to cooperate with third parties. BAZNAS helped Sari Alam farmer's group to acquired legal entity from the ministry of law and human rights with the number AHU - 0001323.AH.01.26.Tahun 2019 concerning the Establishment of the "Koperasi Lumbung Pangan" on September 13th, 2019. Having this legal standing provides many benefits for Sari Alam farmers, such as easy access to more boarder markets, ease of accessing to larger capital, increasing public trust in their business activities, and ease of applying for business development assistance and obtain programs assistance from local government services. BAZNAS also increased the group's market exposure by linking them with the Sukabumi Agriculture Services, Sukabumi Regency Industry and Trade Cooperative Services, PT. Paiho, PT. Sinar Mutiara Perkasa SUTA (Organic Rice), Rumahku Hijau, Slamet Sukabumi Department Store, and resellers spread across West Java and DKI Jakarta. One example of the collaboration carried out is with BAZNAS for the procurement of zakat fitrah rice. This activity help farmers by opening market access also trains farmers to be able to cooperate with other parties in a professional manner. The results of the farmer satisfaction survey in participating in this activity showed that 82.5% of farmers felt very happy. In addition, most of the farmers are satisfied with the price of grain offered. This is in line with the opinion of most farmers that the most profitable thing for farmers is the purchase price of grain from farmers and involvement in the production process (LPEM, 2020).

Overall, it can be concluded that zakat assistance in the Lumbung Pangan program has a positive impact on the welfare of farmers. This is in line with previous research conducted by BAZNAS (2019) using the Sustainable Livelihoods Impact Assessment (SLIA) method which measures 5 (five) assets, namely natural assets, physical assets, financial assets, human resource assets, as well as spiritual and social assets. The results of this study indicate that there is an increase value in the five assets after receiving zakat assistance when compared to before receiving zakat assistance. The amount of the increase is 0.91 points, which means that the Lumbung Pangan program has an impact on increasing community/community assets, especially for the mustahik (BAZNAS, 2019).

CONCLUSION

This study has shown the Islamic social finance financing model utilizing zakat funds to increase agricultural productivity. This program implements three main interventions such as capital assistance, production enhancement and market access enlargement. It also conducts organic agricultural practice to give added value for the farmer’s livelihood and to preserve nature in the long term.

The productivity analysis shows an overall increased revenue and reduced cost over four planting terms. The highest revenue with IDR 25.9 million per hectare is observed in Term 3 that applying organic agricultural practice. The significant driver for the revenue boost is the organic dried grain price that is far above the regular one. Meanwhile, the production cost has declined for 15.7% after farmers shifted to organic agricultural practice. Hence, the program produces a higher margin and productivity rate than the preliminary condition.

The welfare improvement analysis shows that the total headcount of poor people (H) is declining after the farmer joined the Lumbung Pangan program. This result is consistent at both standard namely poverly line and had kifayah. They decline at the rate of 16% and 21%, respectively. Moreover, the income gap calculation (I) at

the had kifayah standard is declining for 2%. The poverty gap (P1) is narrower at the had kifayah standard. In addition, the Sen Index (P2) show a decrease value at both standards by 6% and 13%. Similarly, FGT Index (P3) at had kifayah standard also decrease for 3%. They indicate that zakat has shallowing the poverty depth among the observed participants and escaping the farmer from poverty.

However, the income gap (I), Poverty Gap (P1) and FGT Index (P3) value at the poverty line standard are higher than before. They are happened because the incremental income of the observed participant that is far under poverty line is lower than the observed participant that are near the poverty line.

The BAZNAS Welfare Index shows the impact of zakat is good at the poverty line with score 0.78 and it is fairly good at had kifayah standard with score 0.53. The CIBEST Welfare Index at poverty line and had kifayah are 1.00 and 0.5, respectively. In addition, the modified HDI is fairly good with 0.50 and the independence index is 0.59 (good).

RECOMMENDATION

This study can offer three main recommendations. First, the productivity and welfare improvement analysis provided in this research shows that it is worth to duplicate this zakat-based agricultural financing. This model can be adopted by other zakat institution to enlarge the financial inclusion for farmers. Second, integration with waqf instrument may benefit this program by reducing the operational cost for poor farmers who do not own any field. Third, it is essential to build a wider network with other stakeholder such as government agencies, buyers and association to widen the impact of this program.

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APPENDIX

Rice Quality Analysis Report

Certificate No. 03950/DBBPAN
Date: January 30, 2020

SUCOFINDO

Issuing Office:
Jl. Arteri Tol Cibitung No. 1, Cibitung Bekasi 17520, Indonesia
Phone/Facs: +62 21 88321176/88321166
Email: cs.cbt@sucofindo.co.id

REPORT OF ANALYSIS

The following sample (s) was submitted and identified by the client as :

CLIENT	:	YOGI DWIYANTONO Kp. Pasir Kaliki RT. 002 RW. 007 Kel. Jagabaya, Kec. Cimaung Kab. Bandung – Jawa Barat
TYPE OF SAMPLE	:	BERAS RAOS
DATE RECEIVED	:	January 15, 2020
DATE OF ANALYSIS	:	January 15 to 28, 2020
TESTED FOR	:	Description, Foreign Matter, Heavy Metals, Residue Pesticide Organochlorine and Residue Pesticide Organophosphate
DESCRIPTION OF SAMPLE	:	Form : Grain Packing : Unsealed plastic bag Weight : 1 kg 1 (One) Sample
SAMPLE IDENTIFICATION	:	Code : BR-02
YOUR REFERENCE	:	-

The Attachment available is an integral part of this certificate.

This test result (s) related to the sample (s) submitted only and the report / certificate cannot be reproduced in any way, except in full context and with the prior approval in writing from Sucofindo Laboratory
This Certificate/report is issued under our General Terms and Conditions, copy of which is available upon request or may be accessed at www.sucofindo.co.id

SBU Laboratorium

Mohammad Musa

CBT100038620.1020

3455770

Attachment
To Certificate No. 03950/DBBPAN
Date: January 30, 2020

Page 1 of 1

SUCOFINDO

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Email: cs.cbt@sucofindo.co.id

REPORT OF ANALYSIS

Parameter	Units	Test Results	Methods
Description:			
- Form	-	Kernels	Visual
- Odor	-	Normal	Organoleptics
- Color	-	White	Organoleptics
- Foreign Matter	%	Nil	SNI 6128:2015
Heavy Metals:			
- Lead (Pb)	mg/kg	Below 0.0134	SNI 19-2896-1998
- Copper (Cu)	mg/kg	1.05	SNI 19-2896-1998
- Tin (Sn)	mg/kg	Below 0.0776	SNI 19-2896-1998
- Arsenic (As)	mg/kg	Below 0.001	SNI 01-4866-1998
- Mercury (Hg)	mg/kg	Below 0.0002	SNI 19-2896-1998

Parameter	Units	Test Results	Detection Limit	Methods
Residue Pesticide Organochlorine :				PO/HP/41 (Gas Chromatography)
- α BHC	µg/kg	Not Detected	2.0	
- β BHC	µg/kg	Not Detected	2.0	
- γ BHC	µg/kg	Not Detected	2.0	
- δ BHC	µg/kg	Not Detected	2.0	
- DDD	µg/kg	Not Detected	1.0	
- DDE	µg/kg	Not Detected	1.0	
- DDT	µg/kg	Not Detected	2.0	
- Aldrine	µg/kg	Not Detected	1.0	
- Dieldrine	µg/kg	Not Detected	1.0	
- Endrine	µg/kg	Not Detected	2.0	
- Endrine Aldehide	µg/kg	Not Detected	2.0	
- Endosulfan - 1	µg/kg	Not Detected	1.0	
- Endosulfan - 2	µg/kg	Not Detected	1.0	
- Endosulfan Sulfat	µg/kg	Not Detected	1.0	
- Heptachlor	µg/kg	Not Detected	1.0	
- Heptachlor Epoxide	µg/kg	Not Detected	1.0	
- Methoxychlor	µg/kg	Not Detected	2.0	

Parameter	Units	Test Results	Detection Limit	Method
Residue Pesticide Organophosphate :				GCMSMS
- Dichlorvos	µg/kg	Not Detected	1.0	
- Methacrifos	µg/kg	Not Detected	1.0	
- Diazinon	µg/kg	Not Detected	1.0	
- Etrimfos	µg/kg	Not Detected	1.0	
- Phosphamidon	µg/kg	Not Detected	1.0	
- Chlorpyrifos Methyl	µg/kg	Not Detected	1.0	
- Fenitrothion	µg/kg	Not Detected	1.0	
- Primiphos Methyl	µg/kg	Not Detected	1.0	
- Malathion	µg/kg	Not Detected	1.0	
- Chlorpyrifos	µg/kg	Not Detected	1.0	

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