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Land Tenure, Access to Credit, and Agricultural Performance of Agrarian Reform Beneficiaries, Farmer-beneficiaries, and Other Rural Workers

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PIDS

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Philippine Institute for Development Studies
Surian sa mga Pag-aaral Pangkaunlaran ng Pilipinas

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List of Acronyms

ACPC	Agricultural Credit Policy Council
APCP	Agricultural Production and Credit Program
AFMA	Agriculture and Fisheries Modernization Act
AMCFP	Agro-industry Modernization Credit and Financing Program
AOI	Agriculture Orientation Index
APCP	Agrarian Production Credit Program
ARBs	agrarian reform beneficiaries
ARBO	agrarian reform beneficiary organization
ARC	agrarian reform community
BIR	Bureau of Internal Revenue
CDA	Cooperative Development Authority
CLOA	Certificate of Land Ownership Award
ConVERGE	Convergence on Value Chain Enhancement for Rural Growth and Empowerment
DA	Department of Agriculture
DAR	Department of Agrarian Reform
DBM	Department of Budget and Management
DBP	Development Bank of the Philippines
DOLE	Department of Labor and Employment
FAO	Food and Agriculture Organization
GFI	government financial institutions
IFAD	International Fund for Agricultural Development
LBP	Land Bank of the Philippines
MFI	microfinance institution
MMDC	Multi-Sectoral Management and Development Corporation
MPCs	multipurpose cooperatives

NSM	National Strategy for Microfinance
PFI	private financial institutions
PSA	Philippine Statistics Authority
PSRTI	Philippine Statistical Research and Training Institute
RSBSA	Registry System of Basic Sectors of Agriculture
SEC	Securities and Exchange Commission

Abstract

Credit programs have been long viewed as salient means to develop the Philippine agriculture sector, especially small-farm agriculture. From subsidized-directed, credit programs in the country have become more market-oriented in recent years. However, there have been little to no studies examining how access to credit affects the agricultural performance of poor agricultural producers, including the beneficiaries of the agrarian reform program. This policy study utilizes primary data from the Department of Agrarian Reform's Baseline Survey on Project Convergence on Value Chain Enhancement for Rural Growth and Empowerment (ConVERGE) to analyze borrowing incidence among Agrarian Reform Beneficiary Organization (ARBO) member households, particularly those engaged in farm production. The results show that (1) borrowing ARBO agricultural households are better off than the nonborrowing ones in terms of housing characteristics and agricultural performance; (2) farmer associations and cooperatives are among the top sources of agricultural credit in the countryside aside from microfinance institutions; (3) and Certificate of Land Ownership Award (CLOA)-holding ARBO agricultural households have higher borrowing incidence than the average ARBO agricultural households. Strengthening credit retailers' leadership and management capacity through training is needed to further improve their lending performance and widen their reach in the countryside.

Introduction

Policymakers and international donors have long viewed credit programs as a salient means to develop the Philippine agriculture sector, especially small-farm agriculture. Credit programs in the country have evolved from subsidized directed to a more market-based approach. There is vast literature looking at different credit programs for smallholders in the country. They mainly present the eligibility of borrowers, purpose of loans, terms and conditions, program performance, and capacity-building component, if any. Such studies, however, often evaluate program effectiveness based only on borrowing incidence—that is, whether or not there is an increase in the number of borrowers over the total target population.

There have been little to no studies that examine how access to credit affects the performance of poor agricultural producers, especially those who are also agrarian reform beneficiaries (ARBs). ARBs usually form a group called agrarian reform beneficiary organization (ARBO), where other rural workers and farmer-beneficiaries also join. By being part of a farmer's organization or cooperative, individual farmers and other workers can access government programs and private sector-led initiatives, such as agricultural workshops and training, input and technological support, market linkage, and credit facilitation, among others.

This study aims to shed light on the borrowing patterns and effects of borrowing on the performance of agricultural households in the country, particularly those who are ARBO members. It also intends to answer important questions such as:

1. Who are the borrowers and nonborrowers?
2. Where do they usually source their credit? Is it from informal or formal lenders?
3. How does access to credit help agricultural households improve their performance?
4. If income level is an important factor in credit access, do poor agricultural households have a different borrowing behavior or preference from nonpoor agricultural households?

Objectives

The general objective of this study is to shed light on the borrowing patterns and the effects of borrowing on the performance of agricultural households, particularly those who are ARBO members. The specific objectives of the study are to:

1. provide a brief background on the country's agricultural credit demand and supply based on the existing literature;
2. investigate the agricultural performance (i.e., agricultural net income) and the overall household income of various types of borrowers and nonborrowers; and
3. explore potential correlations or other relationships between access to credit and agricultural performance of borrowers and nonborrowers.

Review of Literature

Shift from subsidized credit to market-based credit. Policymakers and international donors have long viewed credit programs as a salient means to develop the Philippine agriculture sector, especially small-farm agriculture (Meyer and Nagarajan 1999; 2003 as cited in Geron et al. 2016). Governments of Asian nations earlier thought that farmers needed to have an elastic supply of funds at more reasonable interest rates than available from informal sources to maximize the potentials of the Green Revolution. This was the main reason for the provision of targeted and subsidized agricultural credit programs, together with other support mechanisms, to encourage the adoption of Green Revolution technologies. This strategy was adopted by the Bimas project in Indonesia in 1967 and the *Masagana* 99 in the Philippines in 1973. Both projects showered farmers with highly subsidized loans so that they would agree to try out new agricultural technologies but were not sustained and eventually collapsed due to unpaid loans (Meyer and Nagarajan 1999).

During the 1990s, governments and donors realized that subsidized directed credits were not sustainable in the long run. Since then, not only the extent or degree of outreach had been used as a measure of rural financial systems' efficiency and effectiveness, but also their self-sustainability factor (Geron et al. 2016).

With policy reforms adopted in rural financial systems, such as the National Strategy for Microfinance (NSM), the country's microfinance industry started to grow. NSM espoused the following principles: "(1) greater role of the private sector/microfinance institutions (MFIs) in the provision of financial services; (2) an enabling policy environment that will facilitate the increased participation of the private sector in microfinance; (3) market-oriented financial and credit policies, e.g., market-oriented interest rates on loans and deposits; and (4) nonparticipation of government line agencies in the implementation of credit/guarantee programs".[1] In addition to this, the entry of rural banks as retailers was advanced through the further mainstreaming of microfinance in the banking sector (i.e., General Banking Law amendments that recognize microfinance's distinct features) (Conning and Udry 2005; Llanto 2005; Micu 2010; Meyer 2011 as cited in Geron et al. 2016).

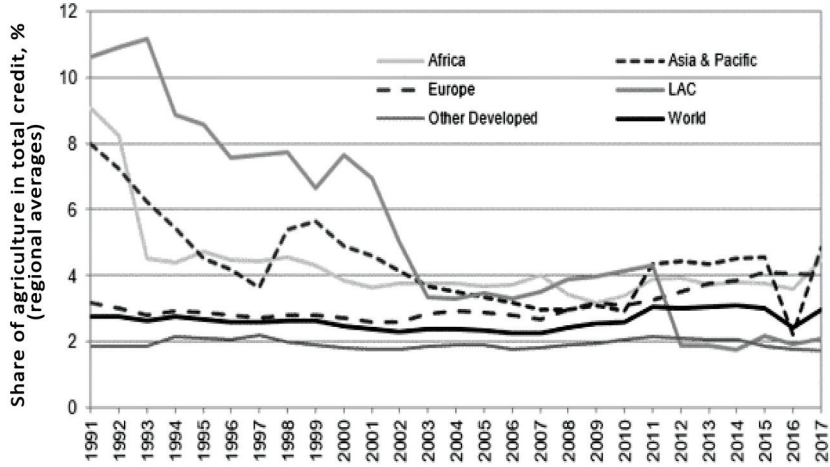
Market-oriented principles were reinforced in the agriculture sector through the Agriculture and Fisheries Modernization Act (AFMA). With the passing of this law, subsidized directed credit programs were officially phased out and replaced with market-based credit programs. Government nonfinancial agencies were also prohibited from implementing agricultural credit programs. Funds for these defunct credit programs were redirected to the Agro-industry Modernization Credit and Financing Program (AMCFP), whose objective was to provide for the financial needs of small farmers and fisherfolk. From the AMCFP, the funds were transferred to the government financial institutions (GFIs) and qualified cooperative banks, which served as wholesalers of credit. These institutions unloaded funds to retailers of credit—the private financial institutions (PFIs). Through these PFIs, which implemented market-based credit policies, small farmers and fisherfolk accessed credit to meet their financing needs (Meyer 2011 as cited in Geron et al. 2016).

Agricultural commercial credit by region. Figure 1 shows the share of agricultural credit in total commercial credit globally and by region. The trend in Asia and the Pacific is represented by the shorter dashed line. Except in 2016, the region's share was consistently above the world average, characterized by the solid black line. The downward trend had continued until the food price crisis from 2007 to 2008. Thereafter,

[1] The NSM was released in 1997 to provide the majority of poor households and microenterprises with access to financial services by 2005 (Source: http://www.gdrc.org/icm/govern/strategy-philippines.html).

agricultural credit started to increase not only in Asia and the Pacific region but also in Africa and Europe. The world average share of agricultural credit in total credit was between 3 and 4 percent over the period 1991 to 2017. In 2017 alone, the agricultural credit share was 5 percent in Asia and the Pacific and 2.9 percent globally. The world trend appeared to follow that of Europe and those of advanced countries due to their massive share in the global credit flows.

Figure 1. Share of agriculture in total credit flow to economy by region, 1991–2017



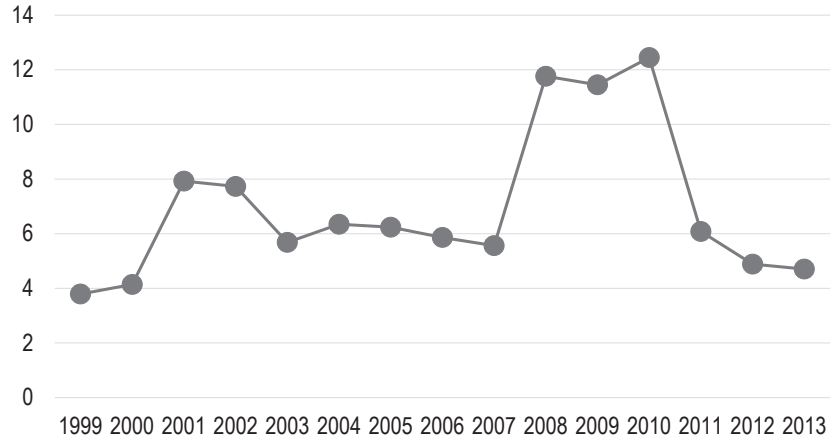
Source: FAO (2018)

Agricultural Orientation Index for credit. To gauge the importance placed by commercial banks on financing the agriculture sector, one may look at the Agriculture Orientation Index (AOI), which is computed by taking the ratio of the share of agricultural credit in all credits and the share of gross value added of the agriculture sector in the overall economy (i.e., gross domestic product). An AOI less than 1 indicates that the agriculture sector obtains a credit share less than its actual contribution to the economy. On the other hand, an AOI greater than 1 shows that the credit share of the agriculture sector is greater than its economic contribution. Developed countries tend to have an AOI greater than 1 compared with developing countries. This suggests that the agriculture sectors in advanced countries have (1) many large producers, (2) commercial production orientation, (3) numerous agribusinesses,

(4) higher degrees of mechanization, and (5) greater capacity to provide collateral.

Agricultural credit in the Philippines. Based on Food and Agriculture Organization (FAO) data from 1999 to 2013, the average share of agricultural credit in total commercial credit was at 7 percent (Figure 2). Consistent with Asia and the Pacific trend, the share in the Philippines was higher than the world average (3% to 4%). For the same period (1999–2013), the contribution of agriculture, fisheries, and forestry sectors to the total economy of the Philippines was 13 percent.

Figure 2. Philippines: Share of agriculture credit in total commercial credit, in percent, 1999–2013



Source of basic data: FAO (2018)

Taking the ratio of 7 percent share in total commercial credit and 13 percent in the overall economy, the computed AOI was 0.5. This number indicates that the agriculture sector in the Philippines received a credit share less than its economic contribution during the said period.

Official domestic data revealed that the biggest source of agricultural credit in the Philippines was the private sector. In 2018, the total amount of agricultural loans granted to farmers and fisherfolk was PHP 596 billion (PSA 2019). Eighty-four percent of which (amounting to PHP 502 billion) was used for agricultural production purposes. More than 80 percent of this amount came from private banks and

20 percent from government banks. Government banks that offer credit to farmers and fisherfolk are Land Bank of the Philippines (LBP) and Development Bank of the Philippines (DBP), with 62 percent and 38 percent shares, respectively.

Formal lenders of agricultural credit in the Philippines. Based on the Cuevas and Sumalde (2015) study about agricultural credit borrowers and lenders, private banks had the biggest loanable fund among formal creditors with an average of PHP 130 million. This was followed by rural banks with PHP 57.5 million. Banks offer loans to a bigger market covering wider locations (mostly within a province) compared with formal lending investors.[2] Rural banks and private banks have the most number of borrowers, with an average of 1,930 and 730 borrowers, respectively.

Formal lenders give credit to individual borrowers, cooperatives, associations, and group borrowers (comprising 5 to 6 people). However, only cooperatives and lending investors cater to group borrowers, with an average of 68 and 20 group borrowers, respectively. Interestingly, only LBP offers loans to cooperatives (Cuevas and Sumalde 2015).

Most of the lenders (72%) in the study's sample provided loans for rice. In addition, 24 percent and 22 percent of the lenders offered loans for swine and corn commodities, respectively (Cuevas and Sumalde 2015).

In another study, Geron et al. (2016) did a process and outcome evaluation of various rural credit programs in the Philippines where they interviewed small farmers and credit lenders (e.g., rural banks) through focus group discussions.

Rural banks are supposed to allocate 10 percent of their loans to ARBs and small farmers in the countryside under the Agri-Agra Law. Collateral is required by rural banks before lending to small farmers. Given the inability of ARBs to provide readily transferrable collaterals (since Certificate of Land Ownership Award [CLOA] cannot be sold or transferred to non-ARBs within 10 years after its award), rural banks and other formal credit sources often refuse to give them credit or would refer them to cooperatives. One rural bank reported having imposed an age limit of 60 years old as an eligibility requirement for farm credit. Instead of complying with the 10-percent loan allocation, these banks

[2] The data gathered about lenders were based on the responses of 20 cooperatives, 17 rural banks, 7 nongovernment organizations, 5 lending investors, 2 private banks, 2 cooperative banks, and the Land Bank.

preferred to just pay the penalties and cater to large farmer borrowers with much larger agricultural projects (Geron et al. 2016).

Cooperatives as conduits of formal credit in rural areas. Apart from providing guarantee funds to rural banks, the government also uses cooperatives as conduits of formal credit to widen their reach in the countryside. In 2015, the Agricultural Credit Policy Council (ACPC), an attached agency of the DA, which evaluates the economic soundness and oversees the implementation of agricultural credit policies and programs, commissioned the Multi-Sectoral Management and Development Corporation (MMDC) to do a study on the capacity of cooperatives to serve as conduits of credit. The study provided a general profile of cooperatives in the country, which totaled 23,672 in 2013. Multipurpose cooperatives (MPCs) and credit cooperatives comprised 62 percent and 13 percent, respectively. Other cooperative types, which corresponded to the remaining 25 percent, included marketing cooperatives, consumer cooperatives, service cooperatives, and others (MMDC 2015). Based on the ACPC website, the total number of registered cooperatives increased to 28,784 by 2018.

Based on their study's findings, MPCs and credit cooperatives generally had the same membership requirements. Most of them also complied with government documentary and tax requirements (i.e., Cooperative Development Authority [CDA] and Bureau of Internal Revenue [BIR]).

The CDA, which was created in 1990 under Republic Act 6939, is in charge of cooperative registration and regulation in the country. The MMDC (2015) study noted the following issues with the CDA's regulatory functions:

- The CDA did not provide developmental assistance to cooperatives. It was the cooperatives that had to pay for training fees conducted by service providers of the CDA. Cooperatives interviewed in the study suggested that the CDA should provide the training itself to help cooperatives cut their costs.
- Part of the CDA's function is to monitor the cooperatives, which involves the submission of numerous reports. Cooperatives, however, reported that the volume of reports was too much for them to handle.

The potential of cooperatives as lenders to small farmers and fisherfolk who need credit to support their production activities is huge, as most of them are not members of cooperatives and do not have access to formal credit sources. Sample cooperatives in the study expressed their willingness to relax membership requirements to encourage more farmers and fisherfolk to join them. However, they noted that as cooperatives grow bigger, their membership requirements also tend to become more complicated and, thus, more difficult to comply with. Furthermore, the study found that many of the micro and small cooperatives that had limited internal funds and difficulty securing funds from government financial institutions like LBP were not able to cater to the credit needs of their members.

Cooperatives can absorb additional credit funds, according to MMDC (2015). Cooperatives have trained staff to implement lending activities and set up their credit policies, systems, and procedures. However, the study noted that additional training (on leadership and credit management) and trained staff are needed to improve the lending performance of cooperatives.

The study suggested to include capacity building in the ACPC's functions to improve the sustainability of its lending program. It also has to continue its coaching and mentoring approach. The CDA, on the other hand, should be stricter in assessing the registration of cooperatives such that only those with trained and capable officers will be registered.

ARBOs as conduits of credit. One of the intervention delivery modalities that the Department of Agrarian Reform (DAR) implements to reach a wider set of small farmers is through the agrarian reform communities (ARCs) network. Each ARC covers a number of ARBOs, whose members include ARBs, farmer-beneficiaries, and other rural workers. Complementing packages of development interventions are developed and delivered to ARCs to have bigger impacts and achieve more sustainable results.

In partnership with DA and LBP, DAR implements the Agricultural Production and Credit Program or APCP, which engendered the streamlining of documentary requirements to access credit in banks. ARBOs serve as a conduit of credit to their members. The ARBO also provides support to its members to help them access credit from other formal sources (Geron et al. 2016).

Conceptual Framework

Agricultural credit for small-scale farmers differs from the usual credit extended to nonfarmers in terms of the level of risk and borrower's creditworthiness. Agricultural credit is riskier due to the (1) risky nature of agriculture as a business venture (e.g., natural risks, such as typhoons and pests) and (2) characteristics of farmer borrowers who do not have credit history and collateral.

Agricultural credit demand

On the demand side, farmers need cash to support farming operations, such as the purchase of inputs and other materials for production, and household operations, such as food expenses and costs of sending their children to school.

Farm-related expenditures are driven by many factors, such as farm size and the type of crop planted. The bigger the farm size, the larger the expenses needed for inputs and labor (Elias et al. 2015). Likewise, the type of crop can affect the level of cost and need for cash. If the crop planted is labor-intensive, like vegetables, then labor costs tend to go up (Djoumessi et al. 2018). Moreover, the level of farm expenses depends on whether or not the crop requires high levels of fertilizer and other chemicals.

On the level of household expenses, the need for cash varies on the size of the household and number of dependents. The bigger the household size, the bigger the spending on food, utilities, and education, among others. However, if the household has fewer dependents against the number of income-earners, then the need for cash is reduced since it can easily be satisfied by available income.

Given their fungibility, farm expenses and household expenses are hardly taken separately. The greater the combined farm and household expenses, the greater the household's need for cash, which is mainly derived from the members' income. If income is not enough, households need to find other sources of cash.

With the seasonality of agricultural production, some farmers are unable to fully support their farms and household operations because they rely solely on their income. The inflow of cash only occurs during

the sale of the harvest, which is toward the end of the production cycle. The gap in the timing of cash inflow and cash outflow can be addressed if households have any of the following liquid sources: (1) current income of other household members, (2) savings from earnings during the previous production season, (3) money from the sale of nonfinancial assets[3], and (4) access to credit. By having adequate cash savings and financial and/or nonfinancial assets, a household's need for cash is reduced. Consequently, demand for credit is also reduced.

In the absence of savings or other liquid assets, the demand for credit increases. Credit can either come from formal or informal sources. In the case of formal credit, land titles are usually used as collateral. Past studies found that owning a title for a parcel of land made it easier for farmers to access credit (Tenaw et al. 2009; World Bank 2009). With greater access to credit, farmers can invest in durables and apply inputs more intensively, resulting in higher agricultural productivity (Platteau 1993 as cited in Tenaw et al. 2009).

On the other hand, small-scale farmers who do not own any land find it difficult to access credit from formal lenders (e.g., rural banks). Apart from not having sufficient assets to serve as collateral, the tedious process and paperwork involved in credit applications turn farmers off.[4] Moreover, farmers who have preexisting past due to their loans with banks are discouraged from borrowing again. Some farmers fear not paying off the loan within the repayment period or pay due to force majeure. Other reasons include the inaccessibility of banks in

[3] Nonfinancial assets refer to durable assets, infrastructure, and housing characteristics. These assets are often used to create an index of household wealth, which ultimately gives a sense of the household's socioeconomic status (Vu et al. 2011; Poirier et al. 2020). In most cases, access to water and sanitation is included in the wealth index. However, several studies pointed out that the inclusion of water and sanitation access in the wealth index should be revisited as it could potentially confound the analysis on the distribution of water and sanitation outcomes (Rheingans et al. 2014; Poirier et al. 2020). For instance, households with poor sanitation are more likely to be categorized as poor but will be reclassified as less poor in subsequent surveys when they experience improvement in sanitation. The reclassification of households affects the measurement of improved coverage for the poor (Poirier et al. 2020).

[4] Cuevas and Sumalde (2015) argued that the government could reduce these transaction costs by (1) lessening the number of requirements and (2) shortening the approval time of loans. A good example of this is the *Sikat-Saka* credit program of the Department of Agriculture (DA), a component of the agency's Food Staples and Sufficiency Program. In 2013, more smallholder farmers availed themselves of the credit program after DA expanded the list of collateral and relaxed the eligibility requirements.

far-flung areas and having no information on bank lending program procedures (Geron et al. 2016).

Even if informal credit sources (e.g., traders) apply higher interest rates than formal lenders, farmers still borrow from them due to the convenience and expedient release of loans. However, assuming that access to formal credit is not an issue, demand for credit tends to increase as the interest rate goes down.

Agricultural credit supply

Credit supply is driven by the level of interest rate. When the interest rate is higher, formal lenders (e.g., rural banks) tend to offer more credit. Aside from the level of interest rate, however, other reasons affect credit supply. Formal lenders tend to reject loan applications from farmers due to the following reasons:

1. Lenders perceive farmers as high-risk borrowers and incapable of complying with minimum loan requirements (e.g., collateral) (Onumah 2003 as cited in Awodite et al. 2015).
2. Agricultural farming is seen as a risky venture. The seasonal nature of the crop production schedule results in a shortage in credit funding and labor in some months of the year. Farmers are exposed to economic and environmental shocks (Geron et al. 2016). Untoward events in farms, such as a typhoon or pest wreaking havoc on the plots, often result in a significantly lower output level, thereby increasing the probability that farmers would not be able to pay off their loans (Ezike 1984; Nweke and Onyia 2001; Kodieche 2002 as cited in Badiru 2010).
3. With the lack of credit history, formal lenders face imperfect and asymmetric information. Creditors may have access to information that allows them to directly discriminate among potential borrowers. Another means to discriminate is to apply terms and conditions, i.e., adjust documentary requirements, loan maturity, and payment terms. It is likely for informal creditors to rely more on direct information on borrowers, especially within neighborhoods and communities or among kin, whereas formal credits rely relatively on terms and conditions.

Increasing the probability of accessing formal credit

Given the problems faced by formal lenders, especially on farmers' inability to present collateral and information asymmetry, other channels are used to reach small-holder farmers. In the Philippines, farmer cooperatives usually serve as a conduit of credit from rural banks to individuals or small-scale farmers (Geron et al. 2016). Crop insurance could be used as a substitute for land as collateral (Briones 2007; Geron et al. 2016). With regard to information asymmetry, farmer cooperatives are better positioned than rural banks to assess farmers' creditworthiness since they are more familiar with the borrowers' background and social networks (e.g., family ties and farmer colleagues that could be tapped in case of a loan default). In Viet Nam, social capital and social networks are considered by credit providers in the absence of collateral (Linh et al. 2019).

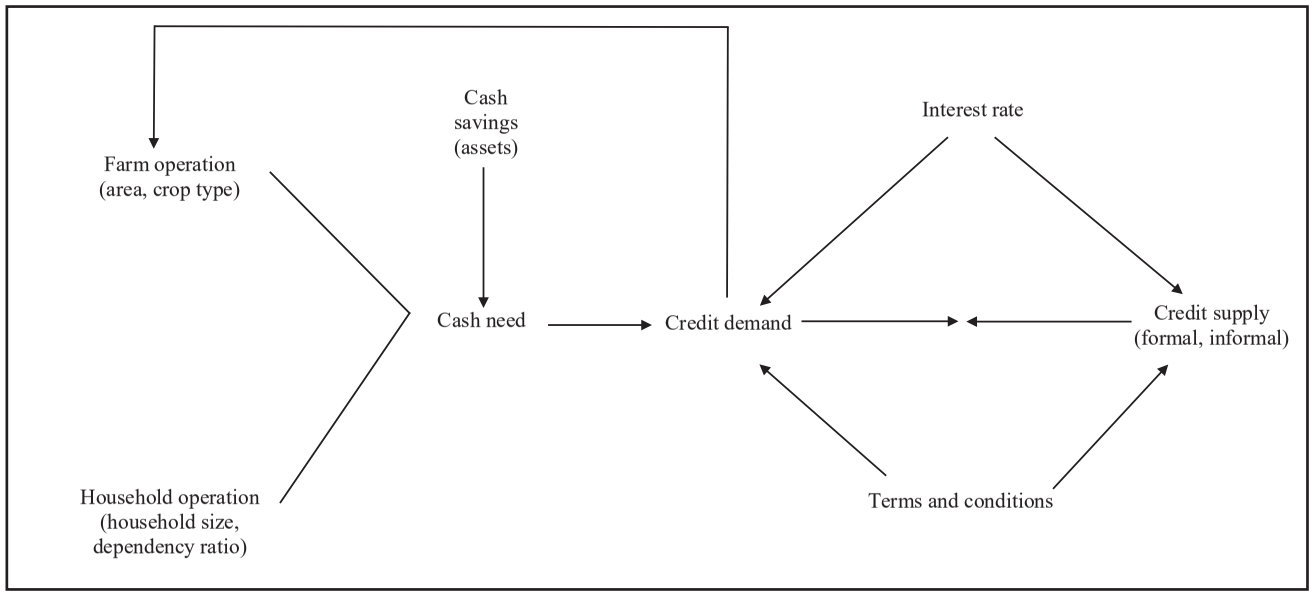
Effect of borrowing constraints on poor farmers' household consumption and production decisions

Consumption smoothing and production improvement are among the benefits that poor households experience when given access to credit (Zeller et al. 1997; Robinson 2001; Armendariz and Morduch 2005; Conning and Udry 2005; Swain et al. 2008 as cited in Awodite et al. 2015). Apart from influencing consumption levels, credit constraints can also affect poor households' health and education investments (Kumar et al. 2013).

In the absence of access to credit, farmers who do not have sufficient liquid assets are likely to apply lower levels of production inputs (Feder et al. 1989; Petrick 2004 as cited in Awodite et al. 2015). In addition, farmers would prefer less risky production choices (e.g., safer varieties over riskier but high-yielding varieties). This also means that farming households with borrowing constraints would not pursue the adoption of agricultural technologies and innovations. The underutilization of inputs and risk-mitigation strategies result in a lower level of output, which also means lower income (Morduch 1995).

In addition to production-related decisions of farming households with credit constraints, they also smoothen their income by diversifying plots and their income sources—that is, a greater likelihood for other household members to engage in off-farm employment. Figure 3 summarizes the different factors affecting credit demand and supply.

Figure 3. Schematic diagram of credit demand and supply



Source: Author's illustration

By bridging the gap between the need for cash and the availability of cash—regardless of the level of interest rate and terms and conditions from formal or informal sources—farmers and fisherfolk can finance their usual production operations, adopt better technologies, and increase their output and production volume, which, in turn, can increase their income from agricultural activities.

Data and Analysis Method

Scope of the study. This study focuses on ARBO members. What sets them apart from typical smallholder farmers is their membership in a farmers' organization, which means that they are organized and have access to information and other forms of support from the government and private sector.

Project ConVERGE Baseline Study. Since this policy paper is part of the Project ConVERGE by the DAR, with funding from the International Fund for Agricultural Development (IFAD), it used available primary survey data from the project conducted in 2019. The author analyzed the borrowing incidence and other borrowing patterns among ARBO member households while highlighting those engaged in farm production.

A set of questions related to credit access (with reference period from June 2018 to May 2019) were included in the baseline survey questionnaire. However, owing to the length and complexity of the whole survey instrument, which was designed to capture farm-level and household-level income and expenditures, the questions on credit were limited to the following:

1. What were the credit sources of households that tried to get a loan during the reference period?
2. What were the credit source categories (e.g., relatives, neighbors, *sari-sari* [variety] store, government banks, private or commercial banks)?
3. Which of the credit sources made the household incur the largest debt during the reference period?[5]
    a. Where was the creditor located?

[5] By limiting the questions related to the largest debt, the borrowing incidence and patterns were distinguished with respect to the "most important" creditor.

b. How much was the largest debt the household ever incurred?
c. What was the interest rate charged by the creditor?
d. How much time was allowed for paying off the debt?
e. What was the status of the loan that the household borrowed from the creditor?

The baseline survey dataset had a total of 1,144 sample households. Among these households, 80 percent could be classified as agricultural households—defined in this study as households with at least one member reported having done primary production activities as operators (e.g., *palay* or corn farming, raising livestock and/or poultry). This does not mean that these agricultural households solely depend on agriculture for their income. Their household members could still be engaged in nonfarm businesses or employment. The remaining 20 percent of the full sample were engaged in agri-based and nonagricultural business and employment.

Analysis. The analysis is centered on agricultural households since the study's ultimate goal is to determine the relationship of credit access with agricultural performance. In addition to this, results were also disaggregated by the type of main commodity and poverty status. Agricultural households in the dataset were grouped into their main commodity based on gross revenue. For instance, a farming household planted palay, corn, and coconut during the reference period. If the household's gross revenue from palay was the highest among the three crops, then it would be classified as a palay household. Regarding poverty status, households were classified as poor or nonpoor using the Philippine Statistics Authority (PSA)'s poverty thresholds for 2018. It was observed in the sample that 51 percent of ARBO agricultural households were poor.

The analysis mainly relied on summary data comparisons (using frequency [freq.] count and statistical averages). Basic statistical tests (i.e., chi-square test and t-test[6]) were also implemented to confirm a possible relationship between the borrowing dummy variable and other variables.

[6] For the chi-square test of independence, the default assumption (also known as null hypothesis) is that the two categorical variables are independent. This means that there is no relationship between the two categorical variables. For the t-test, the null hypothesis is that the two groups being compared are equal. This means that there is no significant difference in the means observed between the two groups.

Limitations in the analysis. With limited variables in this cross-section dataset, the causal relationship between credit access and agricultural performance could not be established yet.

Results and Discussion

The results and discussion are presented for each element of the conceptual framework: (1) credit supply, (2) crop type, (3) household characteristics, (4) farm area and land tenure, and (5) assets.

Credit supply

Borrowing incidence among full sample and agricultural households
Based on the dataset, 428 households were able to access any type of credit during the reference period (Table 1). Borrowing incidence among the full sample was at 37 percent. Frequencies for agricultural ARBO households are also presented in the same table. The borrowing incidence among agricultural households was higher at 39 percent.

Table 1. Number of households that borrowed and did not borrow a loan

	All ARBO HHs	Agricultural ARBO HHs
Nonborrowing	716	560
Borrowing	428	356
Formal loans only	308	258
Informal loans only	85	65
Both formal and informal	35	33
Total	1,144	916
Borrowing Incidence (%)	37.41	38.86

ARBO = agrarian reform beneficiary organization; HHs = households
Source: Author's calculations

Of those that borrowed, 73 percent relied on formal loans, while 18 percent accessed only informal loans. A small share at 9 percent reported that they accessed both formal and informal loans during the reference period. The notion that farmers and rural folk were mostly dependent on informal credit was strongly rejected in the sample consisting of ARBO member households. If they borrowed at all, they more often borrowed from formal sources. As mentioned in the

earlier section, ARBO farmers were more able to access information and government assistance, especially in terms of training and credit facilitation, than average farmers (most of whom were not part of any organization).

Sources of largest credit among full sample and agricultural households

Table 2 identifies the formal and informal sources of credit among borrowing ARBO households. The most common source of the largest loan (37%) was microfinance institutions (MFIs). The second most common (about 25%) was cooperatives/farmer associations. Another 13 percent accessed private/commercial bank loans. On the other hand, the common notion that farmers often borrow from their traders does not seem to hold among ARBO members. Only 3 percent of the ARBO households reported having borrowed their largest credit from traders. Grouping creditors into formal and informal creditors, the share of formal sources of the largest loan was 79 percent, while the share of informal credit sources was 21 percent.

Table 2. Sources of credit

	Full Sample		Agri HH	
	Freq.	**%**	**Freq.**	**%**
Relatives	19	4.44	15	4.21
Neighbors/friends	23	5.37	19	5.34
Sari-sari store	18	4.21	11	3.09
Local money lenders	16	3.74	11	3.09
Input supplier	1	0.23	1	0.28
Trader/buyer	13	3.04	12	3.37
Directly from government*	16	3.74	13	3.65
Private/commercial bank*	57	13.32	49	13.76
Cooperatives/farmer associations*	105	24.53	93	26.12
Microfinance institutions*	158	36.92	130	36.52
Others	2	0.47	2	0.56
Total	**428**	**100.00**	**356**	**100.00**

Freq. = frequency; Agri HH = agricultural household
*Considered as "formal" source of credit.
Source: Author's calculations

Among borrowing agricultural households, the pattern was even more prominent. The top source of largest credit was MFIs (37%),

followed by cooperatives/farmer associations (26%). The share of formal sources of credit was slightly higher than the full sample at 80 percent, while the share of informal sources was 20 percent.

Location of creditor among full sample and agricultural households

Among all borrowing ARBO households (n=428). A large share of informal creditors was located within the *barangay* (village) (61%). On the other hand, formal creditors were dispersed within the province, with 38 percent located within the barangay, 41 percent outside the barangay but still within the municipality/city, and 19 percent outside the municipality/city but still within the province.

Among all borrowing agricultural ARBO households (n=356). The same pattern was observed among agricultural households. Informal creditors were mostly within the barangay (58%), while formal creditors were located much farther (i.e., 39% within the barangay, 40% outside barangay but within municipality/city, and 20% outside municipality/city but within the province). A big factor in the patronage of informal credit was proximity, as banks and other formal sources (except for cooperatives) were located farther from the typical ARBO members, whether from the agricultural operator or otherwise. Nonetheless, formal creditors were still the most common sources of credit.

Largest loan payment terms among full sample and agricultural households

Among all borrowing ARBO households (n=428). Eighty-five percent of the largest loans were paid by cash payment (capital plus interest), while 10 percent were also paid by cash payment but without interest. Only 3 percent of the largest loans were paid based on a purchase agreement (wherein the creditor is arranged to be the buyer of farm produce).

Formal credit sources were mostly paid in cash with interest (95%). Shares for other payment terms were small—2 percent for cash payment without interest and 2 percent for purchase agreement.

Informal credit sources, on the other hand, were paid in various payment terms. Forty-eight percent were paid by cash payment with interest, 39 percent by cash payment without interest, and 8 percent under purchase agreement.

Among all borrowing agricultural ARBO households (n=356). The same pattern was observed among borrowing agricultural households (Table 3).

Table 3. Payment terms among agricultural ARBO households

	Informal Credit Source		Formal Credit Source		All Credit Source	
	Freq.	%	Freq.	%	Freq.	%
Share in production	3	4.23		0.00	3	0.84
Arrangement to be the buyer of farm produce	7	9.86	6	2.11	13	3.65
Cash payment (capital plus interest)	35	49.30	271	95.09	306	85.96
Combination of cash and produce	2	2.82	4	1.40	6	1.69
Cash payment (no interest)	24	33.80	4	1.40	28	7.87
Total	**71**	**100.00**	**285**	**100.00**	**356**	**100.00**

ARBO = agrarian reform beneficiary organization; Freq. = frequency
Source: Author's calculations

Considering all credit sources, the average share for cash payment with interest was 86 percent, while cash payment without interest was only 8 percent, and purchase agreement was 4 percent.

As to formal credit sources, 95 percent had to be paid by cash payment with interest, while other payment terms comprised 5 percent. For informal credit sources, the share of cash payment with interest was just 49 percent, while cash payment without interest was at 34 percent. Only 10 percent was under purchase agreement.

Amount of largest loan and interest rate among full sample and agricultural households

As discussed in the earlier section, not all debts were recorded during the data collection period. Only the information on the amount of the largest debt ever incurred with the creditor during the reference period was recorded. For cash payment with interest terms of payment, the corresponding annual interest rate was also asked to the survey respondents.

All borrowing ARBO households whose loan payment term was cash payment with interest (n=364). Among borrowing households whose loan payment term was cash payment with interest (n=364), the average amount of informal credit and formal credit were PHP 13,618 (average interest rate: 42.6%) and PHP 46,523 (average interest rate: 23.8%),

respectively. The median amounts of informal credit and formal credit were PHP 5,500 (median interest rate: 19%) and PHP 15,000 (median interest rate: 18%), respectively. Hence, on average, loan sizes were larger, and interest rates were lower for formal credit.

All borrowing agricultural ARBO households whose loan payment term was cash payment with interest (n=306). Among borrowing agricultural households whose loan payment term was cash payment with interest (n=306), the average amount of informal credit and formal credit were PHP 14,419 (average interest rate: 45.7%) and PHP 41,195 (average interest rate: 23.8%), respectively (Table 4). The median amount of informal credit and formal credit were PHP 8,000 (median interest rate: 18%) and PHP 18,000 (median interest rate: 18%), respectively. For agricultural operators, informal loans were smaller, but interest rates were the same compared with formal loans (i.e., they were more likely to get "friendly" rates from their informal creditors).

Table 4. Average amount of largest credit by payment terms among agricultural ARBO households

	Informal Credit Source		Formal Credit Source		All Credit Source	
	Obs.	Average Amt.	Obs.	Average Amt.	Obs.	Average Amt.
Share in production	3	8,333			3	8,333
Arrangement to be the buyer of farm produce	7	14,000	6	43,667	13	27,692
Cash payment (capital plus interest)	35	14,419	271	41,195	306	38,132
Combination of cash and produce	2	15,000	4	48,500	6	37,333
Cash payment (no interest)	24	6,163	4	35,287	28	10,323
Total	**71**		**285**		**356**	

ARBO = agrarian reform beneficiary organization; Obs. = observation; Amt = amount
Source: Author's calculations

Status of largest credit among full sample and agricultural households

Among all borrowing ARBO households (n=428). At the time of the survey, 49 percent of households that borrowed from informal sources (n=92)

had paid their loans in full. Others have started paying the amortization (22%), have delayed payment (23%), have restructured payment terms (2%), and have not paid any amortization (4%).

With respect to formal loans (n=336), only 17 percent of the households had paid their loans in full. Many of them have started paying the amortization (65%). Others have delayed payment (14%), have restructured payment terms (2%), and have not paid any amortization (3%).

Among all borrowing agricultural ARBO households (n=356). At the time of the survey, 46 percent of agricultural households that borrowed from informal sources (n=71) have already paid their loans in full. Others have started paying the amortization (20%), have delayed payment (25%), have restructured payment terms (3%), and have not paid any amortization (6%) (Table 5).

Table 5. Status of loan among agricultural ARBO households

	Informal Credit Source		Formal Credit Source		All Credit Source	
Status of loan	**Freq.**	**%**	**Freq.**	**%**	**Freq.**	**%**
Started amortization/ on-time payment	14	19.72	188	65.96	202	56.74
Fully paid	33	46.48	48	16.84	81	22.75
Delayed payment	18	25.35	35	12.28	53	14.89
Restructured	2	2.82	6	2.11	8	2.25
Not paid any amortization	4	5.63	8	2.81	12	3.37
Total	**71**	**100.00**	**285**	**100.00**	**356**	**100.00**

ARBO = agrarian reform beneficiary organization; Freq. = frequency
Source: Author's calculations

As regards formal loans (n=285), only 17 percent of the households had paid their loans in full. Many of them have already started paying the amortization (66%). Others have delayed payment (12%), have restructured payment terms (2%), and have not paid any amortization (3%). For both formal and informal sources, repayment delays were widespread, but a behavior conducive to loan default was rare.

Furthermore, the table above shows that most of the loans from informal creditors were already paid in full compared with that of loans from formal creditors. This difference may be due to two reasons—the

magnitude of the loan and the length of time for repayment. The amount of informal loans was smaller than that of formal loans. Even if the interest rate payment was considered, the total credit payment was still smaller for informal loans. Meanwhile, the time for repayment was shorter for informal loans compared with formal loans. The average repayment period was 20 weeks for informal loans and 40 weeks for formal loans.

Crop type

Borrowing incidence by crop

Table 6 shows that almost one-fifth of the agricultural households in the sample have livestock and poultry as their main commodity, while palay households and corn households comprised 20 percent and 17 percent, respectively. Among the borrowing agricultural households, about 30 percent were palay households, while 20 percent were livestock and

Table 6. Number of Borrowing HH and Nonborrowing HH by main commodity

	Nonborrowing		Borrowing		Total	Borrowing Incidence
	Freq.	%	Freq.	%	Freq.	%
Palay	76	13.57	99	27.81	175	56.57
Corn	107	19.11	47	13.20	154	30.52
Vegetables and fruits (temporary crops)	13	2.32	14	3.93	27	51.85
Other temporary crops	24	4.29	10	2.81	34	29.41
Coconut	72	12.86	51	14.33	123	41.46
Banana	81	14.46	35	9.83	116	30.17
Other permanent crops	48	8.57	24	6.74	72	33.33
Livestock and poultry	129	23.04	70	19.66	119	35.18
Other agriculture, fishing, and forestry Activities	10	1.79	6	1.69	16	37.50
Total	**560**	**100.00**	**356**	**100.00**	**916**	**38.86**
		0		**0**		

HH = household; Freq. = frequency
Source: Author's calculations

poultry households. Among the nonborrowing agricultural households, 23 percent were livestock and poultry households, while 19 percent were corn households.

On average, the borrowing incidence among agricultural households was 38.9 percent. As to borrowing incidence by commodity, the highest was incurred by palay households with 57 percent. Focusing on crops alone, the borrowing incidence among temporary crop households was higher than permanent crop households.

This is consistent with the hypothesis that more cash-intensive types of crops are associated with more borrowing on the part of farmers. According to PSA's data on cost and returns in 2019, the share of cash costs in total costs was 92 percent for temporary crops, while the share was lower at 82 percent for permanent crops. Furthermore, temporary crops had higher average cash costs per hectare than permanent crops. Cash costs of temporary crops amounted to PHP 76,012 per hectare, while that of permanent crops amounted to PHP 57,364 per hectare (PSA 2019).

Source of largest credit by crop

Households whose main commodity was a temporary crop borrowed their largest formal credit from cooperatives/farmer associations more than MFIs (Table 7). Among palay households, the share of loans from cooperatives/farmer associations was 29 percent, while 22 percent of the loans came from MFIs. For households whose main commodity was corn, 43 percent of the largest loans were from cooperatives/farmer associations, while the share of MFIs was 26 percent.

Table 7. Number of formal loan borrowers by source of largest credit and by major crop type

	Temporary Crop HH		Permanent Crop HH	
	Freq.	%	Freq.	%
Directly from government banks	6	4.58	6	6.82
Private/commercial bank	24	18.32	17	19.32
Cooperatives/farmer associations	61	46.56	18	20.45
Microfinance institutions (MFI)	40	30.53	47	53.41
Total	**131**	**100.00**	**88**	**100.00**

HH = household; Freq. = frequency
Source: Author's calculations

On the other hand, households whose main commodity was a permanent crop borrowed mostly from MFIs. Households with coconut as their main commodity sourced their largest loans from MFIs (37%) and cooperatives/farmer associations (18%). Banana households also got most of their largest loans from MFIs (49%) than cooperatives/farmer associations (9%).

Temporary crop households tend to borrow more from cooperatives/farmer associations than MFIs. The opposite was true for permanent crop households. A plausible reason for this was that cooperatives were more dependent on shorter cash turnover compared with MFIs. Since MFIs lend to a wider set of borrowers (different sources of income, location, and payment schedule) and have more diverse sources of funds (savings deposits, other banks, etc.), they are able to manage their cash flows better than smaller cooperatives/farmer associations that often cater to a similar type of borrowers (e.g., farmers cultivating similar crops with synchronous seasonality).

Location of formal credit source by crop

In the case of households whose main commodity was a temporary crop (n=131), their formal creditors were located mostly within the barangay (47%), which was much higher than the average share, considering all agricultural commodities (Table 8). Other formal creditors were located outside the barangay but within the municipality/city (35%) and outside the municipality/city but within the province (18%).

Table 8. Number of borrowers by location of formal creditor and by crop

	Temporary Crop HH		Permanent Crop HH	
	Freq.	**%**	**Freq.**	**%**
Within the *barangay*	62	47.33	27	30.68
Outside the *barangay*, but within the municipality/city	46	35.11	41	46.59
Outside the municipality/city, within the province	23	17.56	18	20.45
Outside the province	0	0.00	2	2.27
Total	**131**	**100.00**	**88**	**100.00**

HH = household; Freq. = frequency
Source: Author's calculations

Those households with permanent crops as main commodity (n=88) sourced their formal loans mostly outside the barangay but within the municipality/city (47%). Only 31 percent of their formal creditors were located within the barangay, while 20 percent were outside the municipality/city but within the province.

It is shown in Table 9 that most MFIs are located outside the barangay. Cooperatives/farmer associations, meanwhile, are located mostly within the barangay.

Table 9. Location of cooperatives/farmer associations and MFIs by crop

	Temporary Crop HH		Permanent Crop HH	
	Coop/FA (%)	MFI (%)	Coop/FA (%)	MFI (%)
Within the *barangay*	75.41	18.75	50.00	31.91
Outside the *barangay*, but within the municipality/city	16.39	65.63	33.33	51.06
Outside the municipality/city, within the province	8.20	15.63	16.67	14.89
Outside the province	0.00	0.00	0.00	2.13
Total	**100.00**	**100.00**	**100.00**	**100.00**

MFI = microfinance institution; Coop/FA = cooperative/farmer associations
Source: Author's calculations

Household characteristics

Household size

Table 10 shows that borrowing households have more members than nonborrowing households in terms of household size. After subjecting these variables under a statistical test called t-test[7], it was found that the difference in the means between nonborrowing and borrowing agricultural households in terms of household size was significant (Annex B). Considering formal loans only, the difference in average household size was still significant (Annex D). This is consistent with the hypothesis that larger households require more cash outflow, which leads to more borrowing.

[7] Significance level is alpha=0.10.

Table 10. Household size by borrowing category

	Obs.	Mean	Median
Nonborrowing HH	560	4.93	4
Borrowing HH	356	5.31	5

HH = household; Obs. = observation
Note: All credit sources were considered.
Source: Author's calculation

Dependency ratio

Dependency based on age of household members. As shown in Table 11, the dependency ratio of nonborrowing agricultural households was 0.4, which was higher than the 0.3 ratio of borrowing agricultural households. Based on the t-test results, it was found that the difference in the means between nonborrowing and borrowing agricultural households in terms of dependency ratio was not significant (Annex B).

Table 11. Dependency ratio by borrowing category

	Obs.	Mean	Median
Nonborrowing HH	560	0.4	0.3
Borrowing HH	356	0.3	0.3

HH = household; Obs. = observation
Notes:
(1) Dependents are HH members whose ages are below 15 and above 64.
(2) All credit sources were considered.

Dependency based on age of working status of household members. If the dependency ratio based on household members' working status was to be analyzed, the difference in means was small (-0.01) (Table 12). Based on t-test results (Annex B), this means the difference between nonborrowing and borrowing agricultural households was not significant. The dependency ratio is not a good indicator of need for credit in this sample, perhaps because of other confounding factors.

Table 12. Nonworking dependency ratio by borrowing category

	Obs.	Mean	Median
Nonborrowing HH	560	0.5	0.5
Borrowing HH	356	0.5	0.5

HH = household; Obs. = observation
Notes:
(1) Nonworking dependency ratio = nonworking HH members over the total number of HH members.
(2) All credit sources were considered.

House characteristics

Type of building/house. Comparing nonborrowing and borrowing agricultural households based on their house type, no significant difference was observed based on mere count and percentages (Table 13). Upon checking the association between two categorical variables (which are borrowing category [1 if HH borrowed and 0 if HH did not borrow] and house type [1 if single house, 2 if duplex, and 3 if other types] using chi-square test), it was found that these variables were independent, thus, no significant relationship was detected.

Table 13. Type of building/house by borrowing category

	Nonborrowing		Borrowing	
	Frequency	%	Frequency	%
Single house	548	97.86	354	99.44
Duplex	11	1.96	2	0.56
Commercial/industrial/agricultural building	1	0.18		0.00
Total	**560**	**100.00**	**356**	**100.00**

Note: All credit sources were considered.
Source: Author's calculation

Type of roof. Unlike the housing type above, the distribution of households by type of roof between nonborrowing and borrowing agricultural households seems different (Table 14). Next to "galvanized iron/aluminum", many of the nonborrowing agricultural households (13%) had "half galvanized iron and half concrete" as roof material, compared with only 3 percent among borrowing agricultural households for the same roof material type. Chi-square test results show that, indeed, the type of roof and borrowing category had a significant relationship.

If galvanized iron/aluminum and concrete/clay tile roof materials would be grouped and referred to as "strong roof materials", while the rest of the other materials are referred to collectively as "weak roof materials", the borrowing incidence among agricultural households with strong materials (42%) is higher than those with weak materials (20%).

Type of outer wall. The distribution by type of outer wall between nonborrowing and borrowing agricultural households also appeared different, as observed in Table 15. Many nonborrowing agricultural households (18%) had "bamboo/*sawali*/cogon/nipa" as outer wall

Table 14. Type of roof by borrowing category

	Nonborrowing		Borrowing	
	Frequency	%	Frequency	%
Galvanized iron/aluminum	451	80.54	327	91.85
Concrete/clay tile	2	0.36	2	0.56
Half galvanized iron and half concrete	74	13.21	9	2.53
Bamboo/cogon/nipa/anahaw	27	4.82	15	4.21
Asbestos	1	0.18		0.00
Makeshift/salvaged/improvised materials	5	0.89	3	0.84
Total	**560**	**100.00**	**356**	**100.00**

Note: All credit sources were considered.
Source: Author's calculation

Table 15. Type of outer wall by borrowing category

	Nonborrowing		Borrowing	
	Freq.	%	Freq.	%
Concrete/brick/stone	162	28.93	97	27.25
Wood	144	25.71	120	33.71
Half concrete/brick/stone and half wood	148	26.43	106	29.78
Galvanized iron/aluminum	3	0.54		0.00
Bamboo/*sawali*/cogon/nipa	100	17.86	30	8.43
Makeshift/salvaged/improvised materials	3	0.54	1	0.28
Others		0.00	2	0.56
Total	**560**	**100.00**	**356**	**100.00**

Freq. = frequency
Note: All credit sources were considered.
Source: Author's calculation

material, compared with only 8 percent among borrowing agricultural households for the same outer wall material type. Chi-square test results showed that, indeed, the type of outer wall and borrowing category had a significant relationship.

Assuming concrete/brick/stone type would be referred to as "strong outer wall materials", while the rest of the other materials would be referred to collectively as "weak outer wall materials", the borrowing

incidence among agricultural households with weak outer wall materials (39%) was higher than those with strong outer wall materials (37%).

Tenure status of housing. Most of the borrowing agricultural households (71%) owned their house and lot, while the share for the same category was only 61 percent among nonborrowing agricultural households (Table 16). Many of the nonborrowing agricultural households (32%) had "own house, rent-free lot with consent of owner" as tenure status, compared with only 24 percent among borrowing agricultural households for the same tenure type. Chi-square test results showed that, indeed, the tenure status of house and borrowing category had a significant relationship.

Table 16. Tenure status by borrowing category

	Nonborrowing		Borrowing	
	Freq.	%	Freq.	%
Own or owner-like possession of house	341	60.89	252	70.79
Rent house or room including lot	3	0.54	1	0.28
Own house, rent lot	8	1.43	3	0.84
Own house, rent-free lot with consent of owner	181	32.32	87	24.44
Own house, rent-free lot without consent of owner	8	1.43	4	1.12
Rent-free house and lot with consent of owner	19	3.39	9	2.53
Total	**560**	**100.00**	**356**	**100.00**

Freq. = frequency
Note: All credit sources were considered.
Source: Author's calculation

Interestingly, the borrowing incidence among agricultural households with "secure housing tenure", which refers to "own/owner-like possession of house and lot" was higher than those with "less secure housing tenure", which refers to the remaining housing tenure categories.

Household access to water and sanitation

Source of water supply for drinking and cooking. The top source for drinking water was "own use faucet, community water system" for

both nonborrowing and borrowing agricultural households (Table 17). Looking at potable drinking water alone, one-third of the borrowing agricultural households got their drinking water from water refilling stations. This percentage was higher than that of the nonborrowing agricultural households, which was at 20 percent. However, in terms of improved drinking water sources, which included piped and nonpiped drinking water sources8, nonborrowing agricultural households had greater access than borrowing agricultural households. Based on chi-square test results, the source of drinking water and borrowing category had a significant relationship.

Table 17. Source of water supply for drinking by borrowing category

	Nonborrowing		Borrowing	
	Freq.	%	Freq.	%
Own use faucet, community water system	201	35.89	116	32.58
Shared faucet, community water system	135	24.11	51	14.33
Own use tubed/piped deep well	10	1.79	7	1.97
Shared tubed/piped deep well	11	1.96	4	1.12
Tubed/piped shallow well	4	0.71	3	0.84
Protected well	22	3.93	15	4.21
Unprotected well	7	1.25	7	1.97
Protected spring	43	7.68	31	8.71
Unprotected spring	13	2.32	7	1.97
Rainwater	1	0.18	5	1.40
Surface water (river, dam, lake, pond)		0.00	1	0.28
Peddler		0.00	1	0.28
Water refilling station	113	20.18	108	30.34
Total	**560**	**100.00**	**356**	**100.00**

Freq. = frequency
Note: All credit sources were considered.
Source: Author's calculation

[8] Improved drinking water sources include (1) piped water into dwelling, piped into yard/plot or neighbor, and public tap/stand pipe and (2) nonpiped drinking water sources like tube well/borehole, protected well and spring, rainwater, tanker truck/cart with small tank, water refilling station, and bottled/sachet water (https://businessmirror.com.ph/2018/05/22/more-poor-filipinos-buy-bottled-water-psa-poll/).

Table 18 shows that for both nonborrowing and borrowing agricultural households, the top source of water for cooking was "own use faucet, community water system". A big chunk of borrowing agricultural households used "shared faucet, community water system" and "unprotected well" for cooking, at 14 percent and 12 percent, respectively. Nonborrowing agricultural households' top two sources were "shared faucet, community water system" with a 24-percent share. The relationship between the source of water for cooking and borrowing category was significant based on the chi-square test.

Table 18. Source of water supply for cooking by borrowing category

	Nonborrowing		Borrowing	
	Freq.	%	Freq.	%
Own use faucet, community water system	249	44.46	148	41.57
Shared faucet, community water system	148	26.43	49	13.76
Own use tubed/piped deep well	15	2.68	7	1.97
Shared tubed/piped deep well	16	2.86	7	1.97
Tubed/piped shallow well	6	1.07	8	2.25
Protected well	32	5.71	25	7.02
Unprotected well	23	4.11	43	12.08
Protected spring	40	7.14	34	9.55
Unprotected spring	13	2.32	7	1.97
Rainwater	7	1.25	12	3.37
Surface water (river, dam, lake, pond)	3	0.54	11	3.09
Peddler		0.00	1	0.28
Water refilling station	7	1.25	4	1.12
Others	1	0.18		0.00
Total	**560**	**100.00**	**356**	**100.00**

Freq. = frequency
Note: All credit sources were considered.
Source: Author's calculation

The results for water access both for drinking and for cooking were consistent with the author's hypothesis that those with better access to improved drinking water sources were less likely to borrow (which

means that they had a smaller borrowing incidence at 36%) than those with poorer sources of water (i.e., unprotected well, spring and surface water) at 61 percent.

Toilet facility. More than 70 percent of the agricultural households (both nonborrowing and borrowing) answered that they had "flush or pour-flush toilet: flush to septic tank" type of toilet. The distribution across different types of toilet facilities differs a bit between the nonborrowing and borrowing households (Table 19). Based on chi-square test results, the toilet facility and borrowing category had a significant relationship.

Table 19. Toilet facility by borrowing category

	Nonborrowing		Borrowing	
	Freq.	**%**	**Freq.**	**%**
Flush or pour-flush toilet: Flush to piped to sewer	24	4.29	5	1.40
Flush or pour-flush toilet: Flush to septic tank	406	72.50	251	70.51
Flush or pour-flush toilet: Flush to pit latrine	100	17.86	91	25.56
Flush or pour flush toilet: Flush to open drain	2	0.36	2	0.56
Pit latrine: Pit latrine and slab	23	4.11	3	0.84
Pit latrine: Pit latrine without slab/open	1	0.18		0.00
Composting toilet	1	0.18	2	0.56
No facility/bush/field	3	0.54	2	0.56
Total	**560**	**100**	**356**	**100**

Freq. = frequency
Note: All credit sources were considered.
Source: Author's calculation

Farm area

Area harvested

Table 20 shows the difference in area harvested between borrowing and nonborrowing households. It appeared that borrowing households had bigger area harvested than nonborrowing households, which was consistent with the author's hypothesis and other studies (Elias et al. 2015; Djoumessi et al. 2018). However, the difference was significant only if formal borrowing was considered.

Table 20. Differences in farm size between nonborrowing and borrowing households

	Average Agricultural Land Area (Nonborrowing HH) - Average Agricultural Land Area (Borrowing HH)	t value	Pr(T < t)	Interpretation
Any loan	-0.20	-1.18	0.12	Not significant
Formal loan	-0.26	-1.43	0.08	Significant

HH = household
Note: All credit sources were considered.

Land tenure

Based on the dataset, there were 690 agricultural households with at least one owned agricultural land, while 226 did not have their own agricultural land. The proportions of borrowers and nonborrowers among those with and without own agricultural land appeared the same (Table 21). The chi-square test results showed that, indeed, there was no significant relationship between agricultural land ownership and borrowing category.

Table 21. Agricultural land ownership by borrowing category

	HH without Owned Agricultural Land		HH with at Least One (1) Agricultural Land Owned	
	Frequency	%	Frequency	%
Nonborrowing	140	61.95	420	60.87
Borrowing	86	38.05	270	39.13
Total	**226**	**100.00**	**690**	**100.00**

HH = household; Agri = agricultural
Note: All credit sources were considered.
Source: Author's calculation

Ownership of land could be through inheritance, purchase, or government award (e.g., CLOA). The CLOA may be given to an individual or a group. Based on Table 22, among the individual CLOA holders, only 47 percent were borrowing, while among collective CLOA holders, the share of those who borrow was only 41 percent. The last column refers to households with either individual CLOA or collective CLOA or both.

Table 22. CLOA ownership by borrowing category

	Individual CLOA HH		Collective CLOA HH		CLOA HH	
	Frequency	%	Frequency	%	Frequency	%
Nonborrowing	68	53.13	27	58.70	96	54.24
Borrowing	60	46.88	19	41.30	81	45.76
Total	**128**	**100.00**	**46**	**100.00**	**177**	**100.00**

CLOA = Certificate of Land Ownership Award; HH = household
Note: All credit sources were considered.
Source: Author's calculation

Table 23 juxtaposes the borrowing incidence of (1) households with at least one agricultural land owned, (2) households with individual CLOA, and (3) households with collective CLOA against the borrowing incidence of households without at least one own agricultural land. Based on chi-square test, there is no significant relationship between the following dummy variables:

1. Ownership of agricultural land (1 if household owns at least 1 agricultural land, 0 if no owned agricultural land) and borrowing status (1 if borrower, 0 if nonborrower)
2. Individual CLOA households (1 if individual CLOA household, 0 if no owned agricultural land) and borrowing status (1 if borrower, 0 if nonborrower)
3. Collective CLOA households (1 if collective CLOA household, 0 if no owned agricultural land) and borrowing status (1 if borrower, 0 if nonborrower)

Table 23. Comparing borrowing incidence of households by agricultural land ownership and CLOA holding

	Borrowing Incidence (%)	Borrowing Incidence among HH without Owned Agricultural Land (%)	Difference	Chi-square Test Results
HH with at least one (1) agricultural land owned	39.13	38.05	1.08	Not significant
Individual CLOA HH	46.88	38.05	8.82	Not significant
Collective CLOA HH	41.30	38.05	3.25	Not significant

CLOA = Certificate of Land Ownership Award; HH = household
Note: All credit sources were considered.
Source: Author's calculation

However, when formal credit is considered (Table 24), the chi-square test result for the following dummy variables becomes significant: Individual CLOA households (1 if individual CLOA household, 0 if no owned agricultural land) and borrowing status (1 if formal loan borrower, 0 if nonborrower of formal loan). This implies that the importance of individual CLOA is evident only for formal loans because individual CLOAs may be used as collateral as opposed to collective CLOAs, which are hardly recognized as acceptable types of collateral.

Table 24. Comparing formal borrowing incidence of households by agricultural land ownership and CLOA holding

	Formal Borrowing Incidence (%)	Borrowing Incidence among HH without Owned Agricultural Land (%)	Difference	Chi-square Test Results
HH with at least one (1) agricultural land owned	31.59	29.65	1.95	Not significant
Individual CLOA HH	40.63	29.65	10.98	Significant
Collective CLOA HH	39.13	29.65	9.48	Not significant

CLOA = Certificate of Land Ownership Award; HH = household
Source: Author's calculation

Among CLOA households

Source of largest credit. Table 25 shows the sources of largest credit among CLOA households (both individual and collective CLOA households). Out of 81 CLOA households, 36 percent borrowed from cooperatives/farmer associations, while 30 percent and 17 percent borrowed from MFIs and private/commercial banks, respectively. Most of them borrowed from formal credit sources (89%).

The average amount of the largest loan borrowed by CLOA households was PHP 51,535 from formal sources and PHP 10,156 from informal credit sources.

Location of formal credit (n=72). Forty-four percent of formal creditors were within the barangay, while those outside the barangay but within the municipality/city comprised 31 percent, and those located outside the municipality/city but within the province were 22 percent.

Table 25. Sources of largest credit among agricultural households and CLOA households

	Agricultural HH		CLOA HH	
	Freq.	%	Freq.	%
Relatives	15	4.21	2	2.47
Neighbors/friends	19	5.34	1	1.23
Sari-sari store	11	3.09	2	2.47
Local money lenders	11	3.09	2	2.47
Input supplier	1	0.28	1	1.23
Trader/buyer	12	3.37	1	1.23
Directly from government*	13	1.97	5	2.47
Private/commercial bank*	49	13.76	14	17.28
Cooperatives/farmer associations*	93	26.12	29	35.80
Microfinance institutions*	130	36.52	24	29.63
Others	2	0.56	0	0.00
Total	**356**	**100.00**	**81**	**100.00**

CLOA = Certificate of Land Ownership Award; Freq. = frequency; HH = household
*Considered as "formal" sources of credit.
Source: Author's calculation

Payment terms of formal credit (n=72). As expected, the payment terms of formal credit were mostly cash payments with interest (93%). Other payment terms were purchase agreements (6%) and cash payments without interest (1%).

Amount and interest rate of formal credit under cash payment with interest payment terms (n=67). Under the cash payment with interest payment scheme, the average amount of loan borrowed from formal creditors was PHP 53,187, while the interest rate was 23.74 percent.

Status of formal loan (n=72). Only 13 percent of the formal loans have been fully paid, but 68 percent have already started paying the amortization. Fourteen percent have delayed payment while restructured payment and those who have not paid any amortization have 3 percent shares each.

Agricultural performance

The indicator for agricultural performance used in this study was net agricultural income. On average, the total net income from agricultural

activities was higher for borrowing agricultural households than for nonborrowing agricultural households by PHP 14,666. The difference in mean net income from agriculture between nonborrowing and borrowing households was significant based on t-test results. If borrowing was limited to formal borrowing, the difference would be much bigger and still significant per t-test result, which is at PHP 24,721.

Assets

Nonborrowing households in the above analyses include both (1) households that did not need credit so they did not borrow and (2) households with unmet credit demand (those who needed credit but were not successful in getting it). By using the "poverty status" variable, nonborrowers who needed the credit could be isolated from those who did not need it in the first place. The author used PSA's Family Income and Expenditure Survey (FIES) 2018 poverty thresholds to classify households into poor and nonpoor categories. Out of 916 agricultural households, about 51 percent were classified as poor households.

Apart from isolating nonborrowers needing credit from those without need, poverty status could also be used as a proxy for the level of asset. Households classified as poor had fewer assets than the nonpoor ones, thereby increasing poor households' demand for credit.

Borrowing incidence among poor and nonpoor agricultural households

The breakdown of borrowing households and nonborrowing households among poor and nonpoor agricultural households is displayed in Table 26. It shows that borrowing incidence among nonpoor was greater than in poor households. This may be explained in terms of the conceptual framework as follows: poor households may have greater cash needs (and greater credit demand), but supply tends to be restricted (e.g., the poor are less able to comply with lender's terms and conditions or satisfy lenders' expectations about repayment.)

Source of largest credit among poor and nonpoor agricultural households

Among the poor agricultural households who borrowed any type of loan (n=167), the main sources of largest credit were also MFIs (33%) and cooperatives/farmer associations (27%) (Table 27). This

Table 26. Number of borrowing and nonborrowing households among poor and nonpoor households

	Nonborrowing	Borrowing	Total	% in Total	Borrowing Incidence (%)
Nonpoor	261	189	450	49.13	42.00
Poor	299	167	466	50.87	35.84
Total	**560**	**356**	**916**	**100.00**	**38.86**

Source: Author's calculation

Table 27. Sources of largest credit among poor and nonpoor households

	Agri HH		Poor HH		Nonpoor HH	
	Freq.	%	Freq.	%	Freq.	%
Relatives	15	4.21	11	6.59	4	2.12
Neighbors/friends	19	5.34	13	7.78	6	3.17
Sari-sari store	11	3.09	5	2.99	6	3.17
Local money lenders	11	3.09	5	2.99	6	3.17
Input supplier	1	0.28	0	0.00	1	0.53
Trader/buyer	12	3.37	8	4.79	4	2.12
Directly from government*	13	1.97	5	1.20	8	2.65
Private/commercial bank*	49	13.76	18	10.78	31	16.40
Cooperatives/farmer associations*	93	26.12	45	26.95	48	25.40
Microfinance institutions*	130	36.52	55	32.93	75	39.68
Others	2	0.56	2	1.20	0	0.00
Total	**356**	**100.00**	**167**	**100.00**	**189**	**100.00**

HH = household; Freq. = frequency
*Considered as "formal" sources of credit.
Source: Author's calculations

implies that poor households were able to borrow their largest loan from formal credit (74%). Only 26 percent sourced their credit from informal sources (e.g., family and friends). The average amount of the largest credit borrowed by poor households from formal sources was PHP 23,964.

Nonpoor agricultural households (n=189) also borrowed from MFIs (40%) and cooperatives/farmer associations (25%), but the share of formal sources was much bigger at 86 percent. This means that only 14 percent of the nonpoor agricultural households got loans from informal sources.

The notion that the poor are excluded from formal credit sources is strongly rejected by the survey data. Nevertheless, they are still at a disadvantage in accessing formal loans compared with nonpoor borrowers and more dependent on informal credit.

Location of creditor among poor and nonpoor agricultural households

Among the poor agricultural households who borrowed any type of loan (n=167), formal creditors were located mostly within the barangay (42%), while another chunk was located outside the barangay but within the municipality/city (43%). Only 13 percent of the formal creditors were located outside the municipality/city but within the province.

Nonpoor agricultural households (n=189) were able to borrow from creditors in much farther places. In fact, 25 percent of their formal credit sources were found outside the municipality/city but still within the province, while 38 percent were located outside the barangay but within the municipality/city. Only 36 percent of their formal creditors were located in the barangay. Hence, nonpoor agricultural households had greater wherewithal to travel and transact with more distant formal institutions (e.g., MFIs) compared with poor agricultural households.

Largest loan payment terms among poor and nonpoor agricultural households

Among poor agricultural households, 82 percent of all types of loans were supposed to be paid by cash payment with interest, 11 percent by cash payment without interest, and 4 percent paid under a purchase agreement. For informal credit alone, 50 percent must be paid by cash payment with interest, 34 percent by cash payment without interest, and 7 percent under a purchase agreement. Formal credit sources were mostly paid by cash with interest (93%).

Unsurprisingly, most of the loans of nonpoor agricultural households had to be paid by cash payment with interest (89%). Especially for formal creditors, the share of cash payment with interest was at 96 percent. Of the informal loans, only 48 percent had to be paid in cash with interest, and about 15 percent needed to be paid under a purchase agreement.

Amount of largest loan and interest rate among poor and nonpoor agricultural households

In the case of poor borrowing agricultural households whose loan payment term was cash payment with interest (n=137), the average amount of informal credit and formal credit were PHP 12,666 (average interest rate: 52.3%) and PHP 23,088 (average interest rate: 21.6%), respectively. The median amount of informal credit and formal credit was PHP 8,000 (median interest rate: 22%) and PHP 14,000 (median interest rate: 18%), respectively. Based on this, the amount of loans from informal credit sources was much lower for poor agricultural households, while the interest rate was higher compared with average agricultural households. On the other hand, the amounts of formal loans and interest rates were smaller for poor agricultural households than the average agricultural households.

The average amount borrowed by nonpoor borrowing agricultural households whose loan payment term was cash payment with interest (n=169) from informal and formal credit sources was PHP 17,385 (average interest rate: 34.3%) and PHP 54,579 (average interest rate: 25.4%), respectively. The median amount of informal credit and formal credit was PHP 8,000 (median interest rate: 22%) and PHP 20,000 (median interest rate: 18%), respectively. This is consistent with the framework, which predicts that poor agricultural households have smaller cash requirements than the average household.

Status of largest credit among poor and nonpoor agricultural households

Forty-eight percent of poor agricultural households that borrowed from informal sources (n=44) have already paid their loans in full. Others have started paying the amortization (20%), delayed payment (23%), restructured payment terms (2%), and have not paid any amortization (7%).

In terms of formal loans (n=123), only 18 percent of the poor agricultural households have already paid their loans in full. Many of them have already started paying the amortization (60%). Others have delayed payment (15%), restructured payment terms (2%), and have not paid any amortization (5%).

It seemed that nonpoor agricultural households had more trouble paying their debt from informal sources than those nonpoor agricultural

households who got their loans from formal sources. Although 44 percent of agricultural households that borrowed from informal sources (n=44) have already paid their loans in full, 30 percent of them have delayed payment. Others have started paying the amortization (19%), have restructured payment terms (4%), and have not paid any amortization (4%).

As for formal loans (n=162), only 16 percent of nonpoor agricultural households have already paid their loans in full. Many of them have already started paying the amortization (70%). Others have delayed payment (10%), have restructured payment terms (2%), and have not paid any amortization (1%).

Among poor agricultural households

Household size. Borrowing households have more members than nonborrowing households (Table 28). After subjecting these variables under a statistical test called t-test[9], it was found that the difference in the means between the household size of nonborrowing and borrowing poor agricultural households was significant (Annex B).

Table 28. Household size by borrowing category among poor agricultural households

	Obs.	Mean	Median
Nonborrowing HH	299	5.04	5
Borrowing HH	167	5.55	5

HH = household; Obs. = observation
Source: Author's calculations

Dependency ratio

Dependency ratio based on age of household members. As shown in Table 29, the dependency ratio of nonborrowing agricultural households was 0.39, higher than the 0.38 ratio of borrowing agricultural households. Based on the t-test results, it was found that the difference in the means between the dependency ratio of poor nonborrowing and borrowing agricultural households was not significant.

[9] Significance level is alpha=0.10.

Table 29. Dependency ratio by borrowing category among poor agricultural households

	Obs.	Mean	Median
Nonborrowing HH	299	0.39	0.4
Borrowing HH	167	0.38	0.4

HH = household; Obs. = observation
Notes:
(1) Dependents are those HH members whose ages are below 15 and above 64.
(2) All credit sources were considered.

Dependency based on working status of household members. If dependency ratio based on the working status of household members is to be analyzed, the difference in means is very small (0.001) (Table 30). The t-test results showed that the difference between poor nonborrowing and borrowing agricultural households in this aspect was not significant.

Table 30. Nonworking dependency ratio by borrowing category among poor agricultural households

	Obs.	Mean	Median
Nonborrowing HH	299	0.554	0.6
Borrowing HH	167	0.551	0.6

HH = household; Obs. = observation
Notes:
(1) Nonworking dependency ratio = nonworking HH members over total number of HH members.
(2) All credit sources were considered.

House characteristics

Type of building/house. Comparing poor nonborrowing and borrowing agricultural households based on their house type, there was no significant difference based on mere count and percentages (Table 31). Based on chi-square test, it was found that these variables were independent, thus, no significant relationship was detected.

Type of roof. Unlike the housing type above, the distribution of households by type of roof between poor nonborrowing and borrowing agricultural households appears to be different (Table 32). Many nonborrowing agricultural households (15%) had "half galvanized iron and half concrete" as roof material, compared with only 2 percent among borrowing agricultural households for the same roof material type. Chi-square test results showed that, indeed, the type of roof and borrowing category had a significant relationship.

Table 31. Type of building/house by borrowing category among poor agricultural households

	Nonborrowing		Borrowing	
	Frequency	%	Frequency	%
Single house	294	98.33	166	99.40
Duplex	4	1.34	1	0.60
Commercial/industrial/agricultural building	1	0.33		0.00
Total	**299**	**100.00**	**167**	**100.00**

Source: Author's calculations

Table 32. Type of roof by borrowing category among poor agricultural households

	Nonborrowing		Borrowing	
	Frequency	%	Frequency	%
Galvanized iron/aluminum	230	76.92	151	90.42
Concrete/clay tile		0.00	1	0.60
Half galvanized iron and half concrete	44	14.72	3	1.80
Bamboo/cogon/nipa/anahaw	19	6.35	10	5.99
Asbestos	1	0.33		0.00
Makeshift/salvaged/improvised materials	5	1.67	2	1.20
Total	**299**	**100.00**	**167**	**100.00**

Source: Author's calculations

Type of outer wall. The distribution by type of outer wall between poor nonborrowing and borrowing agricultural households also appeared different, as observed in Table 33. Many nonborrowing agricultural households (22%) have "bamboo/*sawali*/cogon/nipa" as outer wall material, compared with only 13 percent among borrowing agricultural households for the same outer wall material type. Chi-square test results show that, indeed, the type of outer wall and the borrowing category have a significant relationship.

Tenure status of house. In terms of tenure status of housing, most of the borrowing agricultural households (65%) own their house and lot, while the share for the same category was only 56 percent among

Table 33. Type of outer wall by borrowing category among poor agricultural households

	Nonborrowing		Borrowing	
	Frequency	%	Frequency	%
Concrete/brick/stone	58	19.40	26	15.57
Wood	89	29.77	71	42.51
Half concrete/brick/stone and half wood	84	28.09	46	27.54
Galvanized iron/aluminum	2	0.67		0.00
Bamboo/*sawali*/cogon/nipa	65	21.74	21	12.57
Makeshift/salvaged/improvised materials	1	0.33	1	0.60
Others		0.00	2	1.20
Total	**299**	**100.00**	**167**	**100.00**

Source: Author's calculations

nonborrowing agricultural households. Many of the nonborrowing agricultural households (35%) had "own house, rent-free lot with consent of owner" as tenure status, compared with only 28 percent among borrowing agricultural households for the same tenure type (Table 34). Chi-square test results showed that the tenure status of house and borrowing category did not have a significant relationship.

Table 34. Tenure status by borrowing category among poor agricultural households

	Nonborrowing		Borrowing	
	Frequency	%	Frequency	%
Own or owner-like possession of house	167	55.85	109	65.27
Rent house or room including lot	2	0.67	1	0.60
Own house, rent lot	5	1.67	2	1.20
Own house, rent-free lot with consent of owner	105	35.12	46	27.54
Own house, rent-free lot without consent	7	2.34	4	2.40
Rent-free house and lot with consent	13	4.35	5	2.99
Total	**299**	**100.00**	**167**	**100.00**

Source: Author's calculations

Household access to water and sanitation

Source of water supply for drinking and cooking. The top sources of drinking water were "own use faucet, community water system" for poor borrowing agricultural households and "shared faucet, community water system" for poor nonborrowing agricultural households (Table 35). More than a quarter of poor borrowing agricultural households got their drinking water from "water refilling station", while the share of this category among poor nonborrowing agricultural households was only 16 percent. Based on chi-square test results, the source of drinking water and the borrowing category have a significant relationship.

Table 35. Source of water supply for drinking by borrowing category among poor agricultural households

	Nonborrowing		Borrowing	
	Frequency	%	Frequency	%
Own use faucet, community water system	92	30.77	44	26.35
Shared faucet, community water system	93	31.10	35	20.96
Own use tubed/piped deep well	5	1.67	2	1.20
Shared tubed/piped deep well	7	2.34	2	1.20
Tubed/piped shallow well	3	1.00	1	0.60
Protected well	13	4.35	9	5.39
Unprotected well	4	1.34	7	4.19
Protected spring	29	9.70	15	8.98
Unprotected spring	5	1.67	4	2.40
Rainwater	1	0.33	4	2.40
Surface water (river, dam, lake, pond)		0.00		0.00
Peddler		0.00	1	0.60
Water refilling station	47	15.72	43	25.75
Total	**299**	**100.00**	**167**	**100.00**

Source: Author's calculations

For both poor nonborrowing and borrowing agricultural households, the top source of water for cooking was "own use faucet, community water system" (Table 36). A big chunk of poor borrowing

Table 36. Source of water supply for cooking by borrowing category among poor agricultural households

	Nonborrowing		Borrowing	
	Frequency	%	Frequency	%
Own use faucet, community water system	107	35.8	55	32.9
Shared faucet, community water system	98	32.8	33	19.8
Own use tubed/piped deep well	8	2.7	1	0.6
Shared tubed/piped deep well	9	3.0	4	2.4
Tubed/piped shallow well	4	1.3	2	1.2
Protected well	17	5.7	16	9.6
Unprotected well	16	5.4	22	13.2
Protected spring	28	9.4	17	10.2
Unprotected spring	6	2.0	5	3.0
Rainwater	2	0.7	3	1.8
Surface water (river, dam, lake, pond)	2	0.7	8	4.8
Peddler		0.0	1	0.6
Water refilling station	2	0.7		0.0
Others		0.0		0.0
Total	**299**	**100.0**	**167**	**100.0**

Source: Author's calculations

agricultural households used "shared faucet, community water system" and "unprotected well" for cooking, with 20 percent and 13 percent, respectively. Poor nonborrowing agricultural households' top two sources are "shared faucet, community water system" with a 33-percent share. The relationship between the source of water for cooking and borrowing category was significant based on chi-square test.

Toilet facility. About 80 percent of the poor borrowing agricultural households answered that they had "flush or pour-flush toilet: flush to septic tank" type of toilet, while only 66 percent of poor nonborrowing agricultural households had access to this type of toilet facility (see Table 37). With the apparent difference in the distribution across

Table 37. Toilet facility by borrowing category among poor agricultural households

	Nonborrowing		Borrowing	
	Frequency	%	Frequency	%
Flush or pour-flush toilet: Flush to piped to sewer	10	3.34	4	2.12
Flush or pour-flush toilet: Flush to septic tank	196	65.55	152	80.42
Flush or pour-flush toilet: Flush to pit latrine	73	24.41	29	15.34
Flush or pour-flush toilet: Flush to open drain	1	0.33	1	0.53
Pit latrine: Pit latrine and slab	17	5.69	2	1.06
Pit latrine: Pit latrine without slab/open		0.00		0.00
Composting toilet	1	0.33		0.00
No facility/bush/field	1	0.33	1	0.53
Total	**299**	**100.00**	**189**	**100.00**

Source: Author's calculations

types of toilet facility, Chi-square test results confirmed the observation that toilet facility and borrowing category had a significant relationship.

Agricultural performance of poor agricultural households

The total net income from agricultural activities was higher for poor borrowing agricultural households than for poor nonborrowing agricultural households by PHP 14,109, on average. The difference in average net income from agriculture between nonborrowing and borrowing was significant based on t-test results.

For formal credit, the difference was smaller at PHP 10,577 and was no longer significant. One possible explanation for this was that the poor badly needed cash, and the source, whether from formal or informal credit, did not matter that much. What matters to them is that they can meet their need for a sufficient cash pool.

Results Validation: Comparison with Related Studies[10]

How do ARBO agricultural households (in Project ConVERGE Baseline Study sites) fare against average ARB households (in terms of poverty incidence and access to credit)? Poverty incidence among Project ConVERGE Baseline Survey respondents was 50.8 percent. Earlier figures on poverty incidence among ARB households were 46 percent and 45 percent in 2000 and 2006, respectively (PSRTI 2015). The high poverty incidence implies the continuing relevance of Project ConVERGE in alleviating poverty in project area sites.

Regarding access to credit, PSRTI found that 33 percent and 29 percent of ARBs were able to access **any size of** credit from cooperatives/farmer associations and MFIs, respectively. Eleven percent of their sample households (n=857) (both ARB and non-ARB) accessed at least one formal credit. Around 40 percent of those who accessed formal credit had already paid the availed credit.

Project ConVERGE ARBO households who borrowed had more access to MFIs (37%) than cooperatives/farmer organizations (25%). Twenty-five percent of the sample households (n=1,144) had access to formal credit. Among those who accessed formal credit, 20 percent reported that they had paid their loan in full.

Among all of the largest loans borrowed by Project ConVERGE agricultural households, 80 percent came from formal credit sources. It was observed that among temporary crop households, their top credit sources were cooperatives/farmer associations, while the permanent crop households' top credit sources were MFIs.

How do ARBO agricultural households (in Project ConVERGE Baseline Study sites) fare against the average small farmers and fisherfolk (in terms of access to credit)? In the study of Cuevas and Sumalde (2015), small farmers and fisherfolk were said to have a borrowing incidence of 80 percent, while the share of borrowing ARBO agricultural households in the Project ConVERGE Baseline Study was only around 39 percent (Table 38).

[10] Caution needs to be taken in comparing the figures computed in this policy paper with other studies. A simple comparison cannot be readily done due to differences in definitions and/or reference periods.

Table 38. Borrowing incidence comparing the DA-ACPC study and Project ConVERGE Baseline Study

	Nonborrowing	Borrowing	Borrowing Incidence (%)
DA-ACPC Study*	127	519	80.34
Project ConVERGE Baseline Study	560	356	38.86

DA-ACPC = Department of Agriculture-Agricultural Credit Policy Council;
ConVERGE = Convergence on Value Chain Enhancement for Rural Growth and Empowerment
*Refers to Cuevas and Sumalde (2015).
Source: Author's calculations

Further inspection of the data revealed that most of the loans referred to in Cuevas and Sumalde (2015) were from informal sources of credit. Table 39 shows that 81 percent of those small farmers and fisherfolk borrowed from informal sources while only 20 percent for ARBO agricultural households.

Table 39. Source of loan comparing the DA-ACPC study and Project ConVERGE Baseline Study

	No. of Borrowers			
	DA-ACPC Study*		Project ConVERGE Baseline	
Source of Loan	Freq.	%	Freq.	%
Informal Sources	421	81.12	71	19.94
Formal Sources	98	18.88	285	80.06
Total	**519**	**100.00**	**356**	**100.00**

DA-ACPC = Department of Agriculture-Agricultural Credit Policy Council;
ConVERGE = Convergence on Value Chain Enhancement for Rural Growth and Empowerment;
Freq. = frequency
*Refers to Cuevas and Sumalde (2015).
Source: Author's calculations

Therefore, after recomputing the borrowing incidence to include formal borrowing only, small farmers and fisherfolk appeared to borrow less than ARBO agricultural households, at 15 percent and 31 percent, respectively (Table 40). The sample data in this paper do not represent the average small farmer in the country. This fact will have policy implications, as discussed in the next section.

Table 40. Recomputed borrowing incidence comparing the DA-ACPC study and Project ConVERGE Baseline Study

Source of Loan	Nonborrowing	Borrowing	Total	Borrowing Incidence (%)	Formal Borrowing	Formal Borrowing Incidence (%)
DA-ACPC Study*	127	519	646	80.34	98	15.17
Project ConVERGE Baseline Study	560	356	916	38.86	285	31.11

DA-ACPC = Department of Agriculture-Agricultural Credit Policy Council;
ConVERGE = Convergence on Value Chain Enhancement for Rural Growth and Empowerment;
Freq. = frequency
*Refers to Cuevas and Sumalde (2015).
Source: Author's calculations

Summary

Policymakers and donors have long viewed credit programs as salient means to develop the Philippine agriculture sector, especially small-farm agriculture. As a result, credit programs in the country have evolved from subsidized directed to a more market-based approach. There is vast literature looking at different credit programs for smallholders. They mainly present the eligibility of borrowers, the purpose of loans, terms and conditions, program performance, and capacity-building component (if any). Such studies often evaluate program effectiveness based only on borrowing incidence—that is, whether or not the number of borrowers over the total target population increased.

There have been little to no studies examining poor agricultural producers' access to credit and how it affects agricultural performance in the context of ARBO members, which could be ARBs, farmer-beneficiaries, and other rural workers. By being part of a farmer's organization or cooperative, individual farmers and other workers can access government programs and private sector-led initiatives, such as agricultural workshops and trainings, input and technological support, market linkage, and credit facilitation, among others.

This study utilized primary data (Baseline Survey of Project ConVERGE) to analyze the borrowing incidence among ARBO households and agricultural households (further grouped by main commodity and poverty level). Based on the data, 428 of 1,144 households accessed any credit during the reference period. Most of the ARBO household

borrowers (37%) got loans from MFIs, while about 25 percent sourced their loans from cooperatives/farmer associations. Thirteen percent accessed private/commercial bank loans. A third of the ARBO households were able to access formal credit.

Agricultural households comprised 80 percent (916 households) of the sample. Regarding poverty status, the author used PSA's Family FIES 2018 poverty thresholds to classify whether a household is poor or not. Of the 916 agricultural households, about 51 percent were classified as poor. Based on the results presented in the previous section, borrowing incidence was greater among agricultural households with (1) weaker type of outer wall materials, (2) poorer source of drinking water, and (3) less sanitary toilet facility. This is consistent with the hypothesis that those with greater assets are less likely to demand credit. However, it is worth noting that by inspecting the shares among borrowing agricultural households, it could be observed that the large percentages (1) have strong wall and outer wall materials for their housing, (2) get potable water from water refilling station, (3) have access to "flush to septic" type of toilet facility, and (4) have "own/owner-like possession of house and lot".

Among those ARBO households who borrowed (from any credit source), the top credit source of their largest credit was MFIs (37%). Seventy-nine percent of the loans borrowed by respondents came from formal creditors. As to the location of creditors, among agricultural households, 58 percent of informal creditors were located within the barangay. Formal creditors were located farther (39% within the barangay, 40% outside the barangay, but within the municipality/city, and 20% outside the municipality/city but still within the province).

Households whose main commodity was a temporary crop had borrowed their largest credit from cooperatives/farmer associations more than MFIs. The opposite was true among households whose main commodity was a permanent crop.

Even poor ARBO households were able to access formal credit (from cooperatives/farmer associations and MFIs). The borrowing incidence when it comes to formal credit and any credit were 27 percent and 37 percent, respectively. Among the poor agricultural households who borrowed (n=167), the main sources of largest credit were MFIs (33%) and cooperatives/farmer associations (27%). This implies that poor

households were able to borrow their largest loan from formal credit (74%). Only 26 percent sourced their credit from informal sources (e.g., family and friends). The average amount of the largest credit borrowed by poor households from formal sources was PHP 23,964.

CLOA-holding ARBO agricultural households had a higher borrowing incidence than the average ARBO agricultural households. Focusing on borrowing households that were also CLOA holders (n=81), most of them were able to borrow from formal credit sources (89%). This is much higher than the average for the whole sample at 79 percent. Out of 81, 35.8 percent borrowed from cooperatives/farmer associations, while 30 percent and 17 percent borrowed from MFIs and private/commercial banks, respectively.

Borrowing ARBO agricultural households earned higher net income from agricultural activities than nonborrowing ARBO agricultural households. The results of the study show that borrowing households are better off than nonborrowing households in terms of housing characteristics and agricultural performance indicators (i.e., net income from agriculture). Net income from agriculture of borrowing agricultural households was significantly greater than nonborrowing agricultural households, with a difference of PHP 14,666. The difference is slightly smaller but significant among poor agricultural households at PHP 14,109.

Using a stricter definition of borrowing (i.e., borrowing from formal credit), the difference in net income from agriculture between borrowing and nonborrowing agricultural households was much greater than the figure above and significant at PHP 24,721. On the other hand, among poor agricultural households, the difference between borrowing and nonborrowing was smaller at PHP10,577 but no longer significant.

As regards formal credit, the borrowing incidence of ARBO members (using 2019 data) was higher than that of smallholder farmers and fisherfolk (using 2015 data). It seems that ARBO membership improves small farmers' access to formal credit. ARBOs, just like other cooperatives, can be effective conduits of credit in rural areas. Strengthening the capacity of these credit retailers through trainings, especially in leadership and credit management, is needed to further improve their lending performance.

Policy Implications and Directions for Further Research

1. Based on comparisons with the average small farmer and fisherfolk, being a member of an ARBO implies better access to formal credit. Policies directed toward organizing farmers may help increase their access to formal credit.
2. Individual CLOA households tend to have higher formal loan borrowing incidence than households without agricultural land ownership. The study found a significant relationship between (formal) borrowing status and holding of an individual CLOA. On the other hand, no significant relationship between (formal) borrowing status and holding of a collective CLOA was found. With this finding, it seems that the acceleration of the parcelization of collective CLOA households can also contribute to the enhancement of borrowing incidence among farmers.
3. Echoing the policy recommendations of Geron et al. (2016), the government should look into ways of reducing the (1) cost of lending (such as through the use of farmer cooperatives/associations as conduits and use of mobile technology/digital finance) and (2) risks related to small farmer lending (strengthening of market linkage of farmer producer organizations, fast-tracking of the payout of crop insurance claims, and instituting mechanisms for the provision of guarantee for cooperatives).

With the availability of additional variables in a cross-section or even time-series data set, a causal relationship between credit access and agricultural performance among ARBO households could be explored and established. Future data collection activities should therefore include the following information:

- Reasons for nonborrowing (to establish the need for cash)
- Availability of liquid assets
- Crop insurance
- Cash versus noncash costs that should be disaggregated
- Other variables measuring the risk profile of borrowers
- Barangay-level or municipal-level information on the availability of credit supply (both from formal and informal sources)

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Annexes

Annex A. Results of chi-square test (any loan borrowed)

		Agricultural HHs			Poor Agricultural HHs		
		Pearson chi^2	Probability	If alpha=0.10	Pearson chi^2	Probability	If alpha=0.10
Borrow dummy	Type of building/house	3.707	0.157	no rel	1.116	0.572	no rel
Borrow dummy	Type of roof	31.738	0.000	nignificant rel	22.652	0.000	significant rel
Borrow dummy	Type of outer wall	24.936	0.000	significant rel	15.704	0.015	significant rel
Borrow dummy	Tenure status of house	9.546	0.089	significant rel	4.179	0.524	no rel
Borrow dummy	Source of water for drinking	30.602	0.002	significant rel	21.728	0.027	significant rel
Borrow dummy	Source of water for cooking	57.495	0.000	significant rel	32.774	0.001	significant rel
Borrow dummy	Toilet facility	22.018	0.003	significant rel	18.831	0.004	significant rel
Borrow dummy	Ownership of other residential, commercial, aside from the one presently occupied	1.948	0.163	no rel	2.915	0.088	significant rel
Borrow dummy	Main commodity	37.378	0.000	significant rel	22.330	0.004	significant rel
Borrow dummy	Ownership of at least one agricultural land	0.083	0.773	no rel	0.022	0.882	no rel
Borrow dummy	Ownership of individual CLOA	4.609	0.032	significant rel	0.885	0.347	no rel
Borrow dummy	Ownership of collective CLOA	0.347	0.556	no rel	1.328	0.249	no rel
Borrow dummy	Ownership of any CLOA	4.394	0.036	significant rel	1.706	0.192	no rel
Borrow dummy	Proxy for liquid asset: Receivables (e.g., dividend, interest, rent)	0.0169	0.896	no rel	0.204	0.652	no rel

HH = household; CLOA = Certificate of Land Ownership Award; rel = relationship
Note: Chi-square test is a test of independence between categorical variables. Borrow dummy takes a value of 1 if the household borrowed a loan in 2019, while the value is 0 if the household did not borrow a loan.
Source: Author's calculation

Annex B. Results of t-test (any loan borrowed)

		Mean (Nonborrowing HH)-Mean (Borrowing HH)	t value	Pr(T < t)	Significance of the Difference Between the Means
Land area	Agricultural HHs	-0.20	-1.18	0.12	not significant
	Poor agricultural HHs	-0.41	-2.27	0.01	significant
	Agricultural HHs with at least one agricultural land owned	-0.32	-1.52	0.07	significant
	Poor agricultural HHs with at least one agricultural land owned	-0.63	-2.87	0.00	significant
HH size	Agricultural HHs	-0.37	-2.29	0.01	significant
	Poor agricultural HHs	-0.51	-2.32	0.01	significant
Dependency ratio	Agricultural HHs	0.02	1.39	0.92	not significant
	Poor agricultural HHs	0.02	0.69	0.75	not significant
Nonworking dependency ratio	Agricultural HHs	-0.00	-0.82	0.21	not significant
	Poor agricultural HHs	0.00	0.17	0.57	not significant
Total net income from agriculture	Agricultural HHs	-14,665.98	-1.30	0.10	significant
	Poor agricultural HHs	-14,109.22	-1.29	0.10	significant
Total gross income	Agricultural HHs	-36,593.00	-1.22	0.11	not significant
	Poor agricultural HHs	-11,469.61	-0.47	0.32	not significant
Total net income	Agricultural HHs	-45,992.77	-2.56	0.01	significant
	Poor agricultural HHs	-21,069.61	-1.98	0.02	significant

HH = household
Note: Alpha=0.10
Source: Author's calculation

Annex C. Results of chi-square test (formal loan borrowed)

		Agricultural HHs			Poor Agricultural HHs		
		Pearson chi²	Probability	If alpha=0.10	Pearson chi²	Probability	If alpha=0.10
Formal dummy	Type of building/house	3.837	0.147	no rel	0.468	0.791	no rel
Formal dummy	Type of roof	19.028	0.002	significant rel	13.835	0.017	significant rel
Formal dummy	Type of outer wall	20.673	0.002	significant rel	13.525	0.035	significant rel
Formal dummy	Tenure status of house	13.479	0.019	significant rel	8.448	0.133	no rel
Formal dummy	Source of water for drinking	23.732	0.022	significant rel	17.889	0.084	significant rel
Formal dummy	Source of water for cooking	49.657	0.000	significant rel	29.061	0.004	significant rel
Formal dummy	Toilet facility	16.290	0.023	significant rel	12.567	0.050	significant rel
Formal dummy	Ownership of other residential, commercial, aside from the one presently occupied	1.228	0.268	no rel	2.754	0.097	significant rel
Formal dummy	Main commodity	21.287	0.011	significant rel	14.570	0.068	significant rel
Formal dummy	Ownership of at least one agricultural land	0.302	0.583	no rel	0.184	0.668	no rel
Formal dummy	Ownership of individual CLOA	7.287	0.007	significant rel	4.538	0.033	significant rel
Formal dummy	Ownership of collective CLOA	2.274	0.132	no rel	3.068	0.080	significant rel
Formal dummy	Ownership of any CLOA	9.364	0.002	significant rel	7.021	0.008	significant rel
Formal dummy	Proxy for liquid asset: Receivables (e.g., dividend, interest, rent)	2.1086	0.146	no rel	1.8452	0.174	no rel

HHs = households; CLOA = Certificate of Land Ownership Award; rel = relationship
Note: Chi-square test is a test of independence between categorical variables. Borrow dummy takes a value of 1 if the household borrowed a loan in 2019, while the value is 0 if the household did not borrow a loan.
Source: Author's calculation

Annex D. Results of t-test (formal loan borrowed)

		Mean (Nonborrowing HH)-Mean (Borrowing HH)	t value	Pr(T < t)	Significance of the Difference Between the Means
Land area	Agricultural HHs	-0.26	-1.43	0.08	significant
	Poor agricultural HHs	-0.37	-1.85	0.03	significant
	Agricultural HHs with at least one agricultural land owned	-0.41	-1.86	0.03	significant
	Poor agricultural HHs with at least one agricultural land owned	-0.48	-2.04	0.02	significant
HH size	Agricultural HHs	-0.43	-2.52	0.01	significant
	Poor agricultural HHs	-0.67	-2.80	0.00	significant
Dependency ratio	Agricultural HHs	4.29	2.33	0.02	significant
	Poor agricultural HHs	2.72	1.03	0.30	not significant
Nonworking dependency ratio	Agricultural HHs	-0.36	-0.22	0.41	not significant
	Poor agricultural HHs	0.21	0.09	0.93	not significant
Total net income from agriculture	Agricultural HHs	-24,721.01	-2.09	0.02	significant
	Poor agricultural HHs	-10,577.40	-0.89	0.19	not significant
Total gross income	Agricultural HHs	-73,872.96	-2.37	0.01	significant
	Poor agricultural HHs	-16,740.33	-0.64	0.26	not significant
Total net income	Agricultural HHs	-75,833.63	-4.03	0.00	significant
	Poor agricultural HHs	-21,875.91	-1.89	0.03	significant

HH = household
Note: Alpha=0.10
Source: Author's calculation

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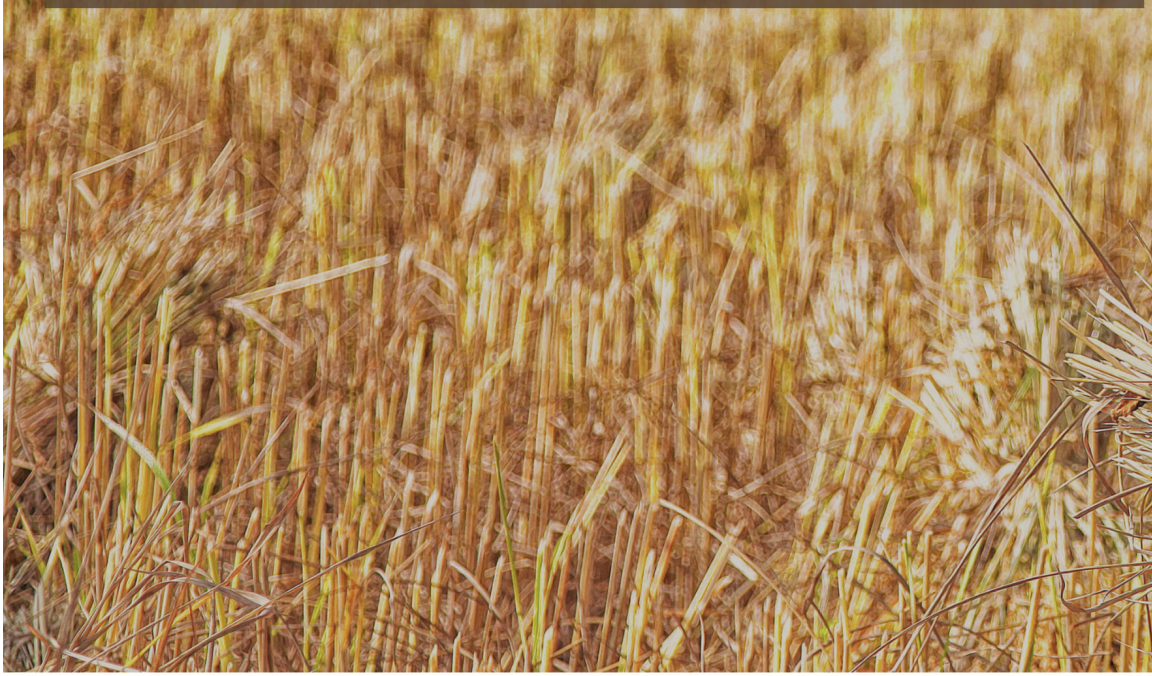
Credit programs have been long viewed as salient means to develop the Philippine agriculture sector, especially small-farm agriculture. From subsidized directed, credit programs in the country have become more market-oriented in recent years. However, there have been little to no studies examining how access to credit affects the agricultural performance of poor agricultural producers, including the beneficiaries of the agrarian reform program. Using primary data from the Department of Agrarian Reform's Baseline Survey on Project Convergence on Value Chain Enhancement for Rural Growth and Empowerment, this study analyzes the borrowing incidence among Agrarian Reform Beneficiary Organization (ARBO) member households, particularly those engaged in farm production. The results show that (1) borrowing ARBO agricultural households are better off than the nonborrowing ones in terms of housing characteristics and agricultural performance; (2) farmer associations and cooperatives are among the top sources of agricultural credit in the countryside aside from microfinance institutions; (3) and Certificate of Land Ownership Award (CLOA)-holding ARBO agricultural households have higher borrowing incidence than the average ARBO agricultural households. Thus, to further improve credit retailers' lending performance and reach in the countryside, the study recommends giving leadership and management capacity training.



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