

# Credit Access, Demand, and Repayment among Smallholder Farmers in Nigeria: A Follow-up Analysis

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Access to credit can be important for improving the performance of smallholders, as it enables farmers to purchase inputs while sustaining their livelihoods. In rural Nigeria, however, access to credit—particularly from formal financial institutions—is limited. As a result, farmers often have little to no choice but to depend on alternative credit sources, including informal lending. Smallholder agricultural households often turn to friends and family, or local money lenders and other informal and semi-formal sources to meet their credit needs (EFInA, 2020).

Credit can be given to a borrower in the form of a cash loan (i.e., providing the borrower with liquidity to invest in anything they like) or in the form of agricultural inputs given in advance of payment. As initially documented in Ambler et al. (2024), we partnered with Crop2Cash, a digital financial technology startup company operating in Nigeria, to test take-up for these two forms of credit offered as an additional top-up loan among a sample of smallholder farmers who were already receiving an input loan from Crop2Cash. Analysis of that project revealed the following four findings:

1. While many farmers state interest in an additional cash loan to help cover additional expenditures associated with agricultural production, the take-up rate of the additional cash

loan offer was lower than the take-up rate of the additional input loan offer. Additionally, when given a (hypothetical) choice between both types of loans (an additional cash loan or an additional input loan), most farmers choose the additional input loan.

2. Although we find higher take-up rates with the additional input loan than with the additional cash loan, we do observe a 40 percent take-up rate for the additional cash loan, suggesting that there is meaningful demand for cash loans among smallholder farmers in our pilot study.
3. The primary stated reason for declining the additional input loan offer was that the farmer did not need the provided inputs.
4. The repayment rate of the loans was low. As measured in administrative data provided by Crop2Cash, more than a year after loan repayment began, only 38% farmers had repaid the loan in full.

In this project note, we characterize Crop2Cash loan recipients in comparison to other Dry Season, mostly maize-producing farmers in Kaduna state, Nigeria, and more deeply explore the experimental results to better understand the factors that represent a source of the low repayment rates of the loans. To do this we present data and analysis based on a follow-up survey, administered after the wet agricultural season during November and December 2024, and administrative data on loan repayments provided by Crop2Cash, in which we aim to explore and understand the factors explaining credit access, demand, and repayment of loans among smallholder farmers in rural Nigeria. After briefly summarizing the design of our pilot study, we present descriptive findings from a larger sample of farmers to explore factors that may influence the loan repayment and financial behavior more broadly in the setting of the pilot study. We then present additional experimental results assessing repayment and agricultural input use between the treatment groups and the control group with the farmers in our pilot study.

## **Top-up Loan Study**

We implemented a small experiment in the dry agricultural season beginning in December 2023 (Ambler et al., 2023). The experimental design includes two treatment groups and a control group, defined as follows:

- ▶ Treatment group 1 (T1): Receives a 10 percent cash loan offer in addition to their needs assessment-based input loan.
- ▶ Treatment group 2 (T2): Receives a 10 percent input loan offer in addition to their needs assessment-based input loan.
- ▶ Control group (C): Receives no additional loan offer, only a needs assessment-based input loan.

Randomization into the treatment and control groups is at the individual (i.e., farmer) level. Our goal was for each treatment arm to be limited to roughly 100 farmers, but in practice, T1 includes 95 farmers, T2 includes 94 farmers, and the control group includes 97 farmers, giving us a total sample size of 286 farmers. This experimental design enables us to estimate the effect of receiving either an additional cash loan offer or an additional input loan offer by simply comparing outcomes between each of the treatment groups relative to the control group. The sample size is small, as the intent was to demonstrate proof of concept for take up and repayment.

Results from the study show that take-up of the additional cash loan was much lower than take-up of the additional input loan. This was a surprising result given the reported need for an additional cash loan component of the Crop2Cash input loan program. Notably, a 40 percent take-up rate for the additional cash loan in the study does suggest that there is meaningful demand for cash loans, while also revealing that there might be important heterogeneity in demand for specific types of loan products.

Additionally, the repayment rate of the loans measured at the end of the loan period was low. 109 out of 286 farmers (38%) had repaid the loan in full as of May 2025. A situation that contrasts with historical loan performance in the study region (i.e., preliminary discussions with Crop2Cash revealed that typically between 80 and 90 percent of loan recipients repaid the loan on time). We can, however, rule out that the additional loan offers provided as part of the study influenced these repayment rates.

## **Follow-up Survey**

In November and December of 2024, we implemented a follow-up survey, near the end of the subsequent wet agricultural season after our dry season study. The objective of this survey was

to investigate and understand the results from our small study. The sample for the survey included the sample of farmers from the experiment, along with an additional set of farmers who live in villages in the same area as the farmers from the study and participated in dry season farming. Ultimately, of the 286 farmers included in the study, we were able to interview 222 farmers when conducting this follow-up survey. The 64 farmers (22 percent) who we could not find are equally distributed across treatment groups and did not show a significant difference in loan repayment performance based on the administrative data available from Crop2Cash in September 2024. The remaining sample in the follow-up survey includes 710 farmers that we were able to identify via a village-level listing exercise. These additional farmers allow us to study a wider set of smallholder farmers compared to the narrower set of farmers who were part of the study.

In the following analysis, we first present a set of descriptive results that use both the sample of farmers from the experimental study and the sample of other neighboring farmers to assess questions about how different experimental study farmers are from other farmers and about the experience of a wider set of farmers accessing and repaying loans in the 2024 dry agricultural season. Next, we present a set of experimental results that use the random assignment from the experimental study to examine variables collected by Crop2Cash and in the follow-up survey. Results on loan repayment include all 286 farmers who participated in our study using the administrative data provided by Crop2Cash, while results on agricultural outcomes include the 222 farmers who participated in the follow-up survey.

## **Comparison with Neighbors**

We begin our analysis with our follow-up survey data including both farmers from the experimental study and the other neighboring farmers to report on a series of descriptive results. It is important to keep in mind that the sampling strategies used to select initial study farmers, and the neighboring farmers are distinct. So, readers should not draw causal conclusions from the results presented in this section. Neighboring farmers are selected via selection from a list generated via a listing exercise conducted within villages. In contrast to the neighboring farmers, experimental study farmers are selected into the study because of their interest and willingness to participate in Crop2Cash's agricultural input credit program.

**Table 1: Household and Demographic Characteristics**

	(1) Experimental sample	(2) Neighboring	(3) Difference
Household size	10.88	11.33	-0.45
Female (prop.)	0.07	0.00	0.07***
Age	41.38	40.01	1.37*
No schooling (prop.)	0.17	0.23	-0.06*
Completed primary (prop.)	0.79	0.69	0.10***
Completed secondary (prop.)	0.50	0.44	0.06
Completed tertiary (prop.)	0.12	0.15	-0.03

Notes: Statistical significance indicated as p-value < 0.1 \*, p-value < 0.05 \*\*, and p-value < 0.01 \*\*\*.

We start first by describing demographic characteristics of the households and then move on to describing financial access. Table 1 shows that both the experimental study sample of farmers and the neighboring farmers have similar household sizes, with about 11 people per household across the two groups. The experimental group is about 7 percent female, while all the neighboring farmers are male. The experimental group farmers are slightly older than neighboring farmers. In addition, we observe that experimental study farmers have significantly higher primary education completion rates.

**Table 2: Farm characteristics**

	(1) Experimental sample	(2) Neighboring	(3) Difference
Obtained an input loan (not from C2C)	0.16	0.08	0.08***
Total area (has.)	1.58	1.80	-0.22*
Self-reported soil fertility (5 is Best)	3.81	3.61	0.20**
Planted maize	0.67	0.10	0.57***
Planted tomato	0.34	0.52	-0.17***
Planted onion	0.03	0.13	-0.09***
Planted pepper	0.05	0.29	-0.24***
Planted sugar cane	0.01	0.22	-0.22***

Notes: Statistical significance indicated as p-value < 0.1 \*, p-value < 0.05 \*\*, and p-value < 0.01 \*\*\*.

Table 2 shows that experimental study farmers tend to have slightly smaller farms (1.58 hectares vs 1.80 hectares), though this difference is only marginally significant. Experimental study farmers report better soil quality. In terms of crop preference, we find that majority of experimental study farmers cultivate maize (about 7 out of 10) with few of them cultivating other crops such as tomato (about 3 out of 10) in the dry season. Tomato farming is more common among neighboring farmers with at least 5 out of 10 of these farmers cultivating tomato. Other crops that are cultivated by neighboring farmers include pepper (about 3 out of 10 farmers) and sugarcane (about 1 out of 10 farmers). The notable differences observed in types of crops grown between

experimental study farmers and neighboring farmers suggest that Crop2Cash’s business model and services may be oriented towards maize production with specialized services for this crop.

Table 3 shows the farm costs and revenue among our experimental study farmer group and the neighboring farmer group. We find that all input costs are lower for study farmers compared to neighboring farmers. Particularly, we find that irrigation expenses are 24 percent lower for study farmers and the difference is statistically significant. Seed expenses are 22 percent lower. Additionally, study farmers spend just about half of neighboring farmers’ expenses on fertilizer. Pesticide expenses are 38 percent lower. Herbicide expenses are 27 percent lower, though only marginally significant. Finally, labor expenses are 16 percent lower, but not statistically significant.

Our analysis of farm revenue, however, reveals substantially lower revenue among our experimental study farmer group compared to neighboring farmers. This lower revenue for study farmers is particularly noteworthy given their lower input costs which could be related to their crop selection. Experimental study farmers primarily grow maize, while neighboring farmers grow more diverse, potentially higher-value crops like tomatoes, peppers, and sugar cane. Another plausible reason for this could be the scale of operations. The study farmers operate smaller farms, but the revenue gap appears to remain disproportionately large.

**Table 3: Farm costs and revenue (in Naira)**

	(1) Pilot sample	(2) Neighboring	(3) Difference
Irrigation expenses	249,387.98	328,653.80	-79,265.82**
Seed expenses	26,691.28	34,412.33	-7,721.05**
Fertilizer expenses	189,060.83	369,852.85	-180,792.02***
Pesticide expenses	15,223.64	24,712.04	-9,488.40***
Herbicide expenses	10,330.62	14,178.74	-3,848.12*
Labor expenses	18,138.27	21,574.97	-3,436.70
Revenue from crop sales	1,207,179.84	3,319,832.32	-2,112,652.48***

Notes: Statistical significance indicated as p-value < 0.1 \*, p-value < 0.05 \*\*, and p-value < 0.01 \*\*\*.

In Table 4, we observe a statistically significant difference in access to formal banking and insurance services between the experimental study farmer group and neighboring farmers. 76 percent of the experimental study farmers have a bank account compared to about 56 percent of neighboring farmers. The main barrier to bank account use among study farmers is not having

enough money, while among neighboring farmers the main barrier is lack of proximity and distrust.

**Table 4: Bank account use**

	(1) Experimental sample	(2) Neighboring	(3) Difference
Has bank account	0.76	0.56	0.20***
Why not: No bank nearby	0.13	0.22	-0.09
Why not: Don't trust banks	0.05	0.13	-0.08*
Why not: Don't have enough money	0.68	0.42	0.26***

Notes: Statistical significance indicated as p-value < 0.1 \*, p-value < 0.05 \*\*, and p-value < 0.01 \*\*\*.

In Table 5, we find that 9 out of 10 farmers in the study group have access to credit compared to just about 1 in 10 neighboring farmers. This observation is almost certainly because the pilot study farmers are all clients of Crop2Cash, an organization that primarily provides credit access to farmers. We observe similar loan denial rates between groups. The reasons for loan denial, however, differ significantly between the two groups. Neighboring farmers face more collateral issues than study farmers, highlighting the crucial role lack of collateral play in constraining farmers to credit, a situation which is largely relaxed among experimental study farmers who can gain access to credit via a group guaranteeing system, allowing them to obtain loans without providing collateral. Interestingly, we find that most denials have “no reason given” across the two groups of farmers at 73 and 54 percent respectively.

**Table 5: Access to credit**

	(1) Experimental sample	(2) Neighboring	(3) Difference
Taken a loan	0.91	0.12	0.78***
Denied a loan	0.13	0.14	-0.02
Why denied: Inadequate collateral	0.00	0.11	-0.11**
Why denied: Lack of guarantor	0.09	0.22	-0.12
Why denied: Suspected credit worthiness	0.03	0.00	0.03*
Why denied: Bad debt record	0.09	0.00	0.09**
Why denied: Inadequate purpose	0.03	0.09	-0.06
Why denied: Social/cultural factor	0.03	0.05	-0.02
Why denied: No reason given	0.73	0.54	0.19*
Can borrow: All that is needed	0.50	0.38	0.12***
Can borrow: Most of what is needed	0.09	0.10	-0.00
Can borrow: Only a little of what is needed	0.20	0.15	0.05*
Can borrow: None of what is needed	0.21	0.37	-0.16***

Notes: Statistical significance indicated as p-value < 0.1 \*, p-value < 0.05 \*\*, and p-value < 0.01 \*\*\*.

In terms of the borrowing capacity, among study farmers 50 percent can borrow all they need compared with 38 percent of neighboring farmers. Only 21 percent of study farmers cannot borrow anything vs 37 percent of neighboring farmers.

In conclusion, we compared statistics describing household and demographic characteristics, features of agricultural production, and various measures indicating access to and use of financial services. This analysis generates the following insights:

1. Our experimental study sample of farmers tend to cultivate a different mix of crops relative to a sample of neighboring farmers. Farmers in our experimental sample mostly produce maize while neighboring farmers produce a more diversified range of products (i.e., tomato, onion, pepper, and sugar cane).
2. Neighboring farmers appear to operate slightly larger farms in terms of the physical farm size, and more economically dynamic farms with higher expenses and revenue than our experimental study sample of farmers. This leads neighboring farmers to be more profitable (i.e., measured in terms of reported revenue minus reported expenses) than our study sample of farmers.
3. Study farmers seem to be slightly more likely to be able to access a bank account and credit than neighboring farmers. Additionally, farms in our pilot sample are more likely to report being able to access all the credit that they need.
4. Although over 90 percent of the study sample has taken a loan, only 50 percent report that they can borrow all that they need. This result highlights a lack of credit access even among a specifically selected group of farmers that already have access to a limited level of credit via Crop2Cash.

## **Additional Experimental Results**

The first set of experimental results investigates loan repayment at the end of the subsequent rainy season. More than a year after the loan repayment period began, 6 out of 10 farmers had not finished repaying their loan, and nearly half of these farmers who were still in debt had made no loan payments at all. Repayment, whether partial or full, did not vary based on treatment assignment in our study.

Table 6 reports these results. In column (1) we find that 69 percent of farmers in the control group of our study have started repaying the input loan provided by Crop2Cash, and column (2)

shows 41 percent of farmers in this group have been able to clear their debt. Interestingly, we find the share of farmers who have started repaying their loan is about 5 percentage points higher for the (extra) input loan offer group and 8 percentage points higher for the cash loan offer group, although the difference is not statistically significant. Contrary to what representatives from commercial banks and Crop2Cash itself believed, providing an additional cash (or input) loan does not increase the risk of default by smallholder farmers.<sup>1</sup> In Column (3) we find that the repayment amount in the control group of our study was about ₦121,485. Since the input loan provided by Crop2Cash to all farmers in our pilot study was ₦200,000 and the interest and fees amounted to ₦30,000 the average farmer in the control group reported paying back about 53 percent of their debt to Crop2Cash. Column (3) also shows that this repayment amount does not differ by treatment status in our study. Column (4) reports the percentage of the loan repaid, which also does not differ by treatment status.

**Table 6: Treatment Effects on Loan Repayment (as of May 2025)**

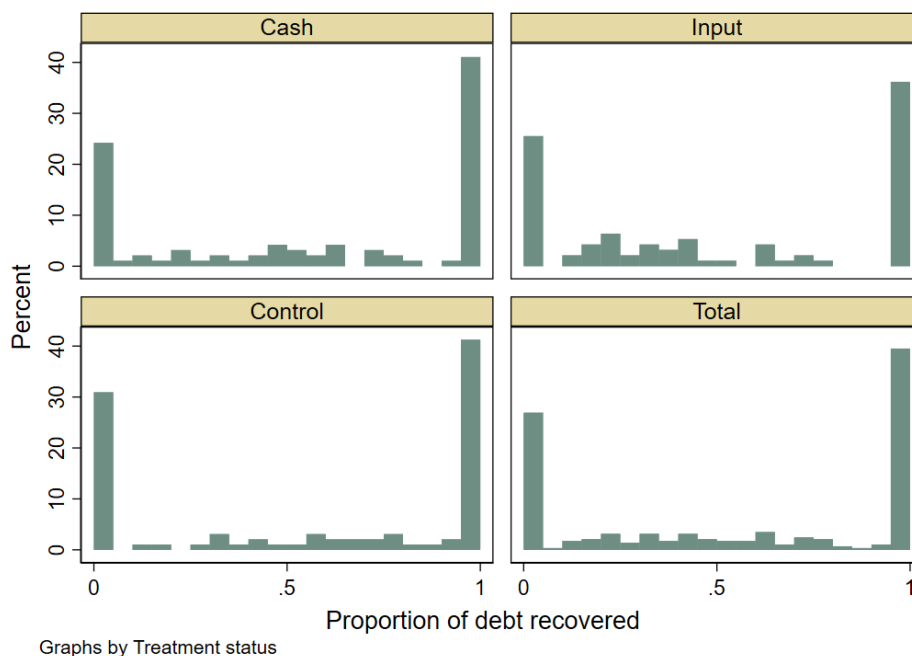
	(1) Started repayment	(2) Cleared debt	(3) Repayment amount	(4) Percent repaid
T1: Cash loan offer	0.078 (0.064)	-0.002 (0.071)	6,943.89 (13,330.96)	0.007 (0.062)
T2: Input loan offer	0.054 (0.065)	-0.093 (0.070)	-8,134.54 (13,373.61)	-0.064 (0.062)
Observations	286	286	286	286
R-squared	0.006	0.008	0.004	0.006
Control mean	0.691	0.412	121,484.50	0.570

Notes: Statistical significance indicated as p-value < 0.1 \*, p-value < 0.05 \*\*, and p-value < 0.01 \*\*\*.

Next, we look at the distribution of the percentage of the loan that has been repaid by treatment status, shown in Figure 1. A distribution of payments resembling a unimodal function would suggest that farmers are homogenous, share a similar economic and productive environment, and therefore are likely to repay at a similar rate. However, the results in Figure 1 show that half of the sample or more is located at either tail of the distribution. For instance, 27 percent of all the farmers in our study have not made any payments on their loan, while 38 percent have cleared their debt.

<sup>1</sup> Treatment on the treated effects obtained by estimating the effect of take-up of each type of loan offer instrumented with the treatment assignment yields similar results, with no significant differences in the repayment amounts by type of loan offer, but with a higher share (19 and 9 percentage points more for the cash and input loan offer groups, respectively) of farmers starting repayment of their input loan when taking up either treatment.

The bimodal distribution of repayment performance in Figure 1 suggests that improving the eligibility criteria and credit assessment processes to target the loans to the upper end of this distribution could result in a significant risk reduction when offering credit to smallholders. Comparing the means of different survey variables for farmers at both ends of the loan repayment distribution (i.e., those who have made no payments at all and those who have paid their loan in full)<sup>2</sup> we observe that those who have cleared their debt are more educated (66% vs 49% primary completion rate), have more farm land (1.42 vs 0.95 has), report higher soil fertility (3.2 vs 2.6 on a scale from 1 to 5, 5 being best), are more likely to have planted maize (79% vs 54%), spend more on fertilizers (188,405 vs 98,474 Naira), and have higher revenues from crop sales (1,317,245 vs 721,421 Naira). While challenging, it should be feasible to collect some of this information and incorporate it in the eligibility criteria for loan applicants when conducting risk assessments of farmers.

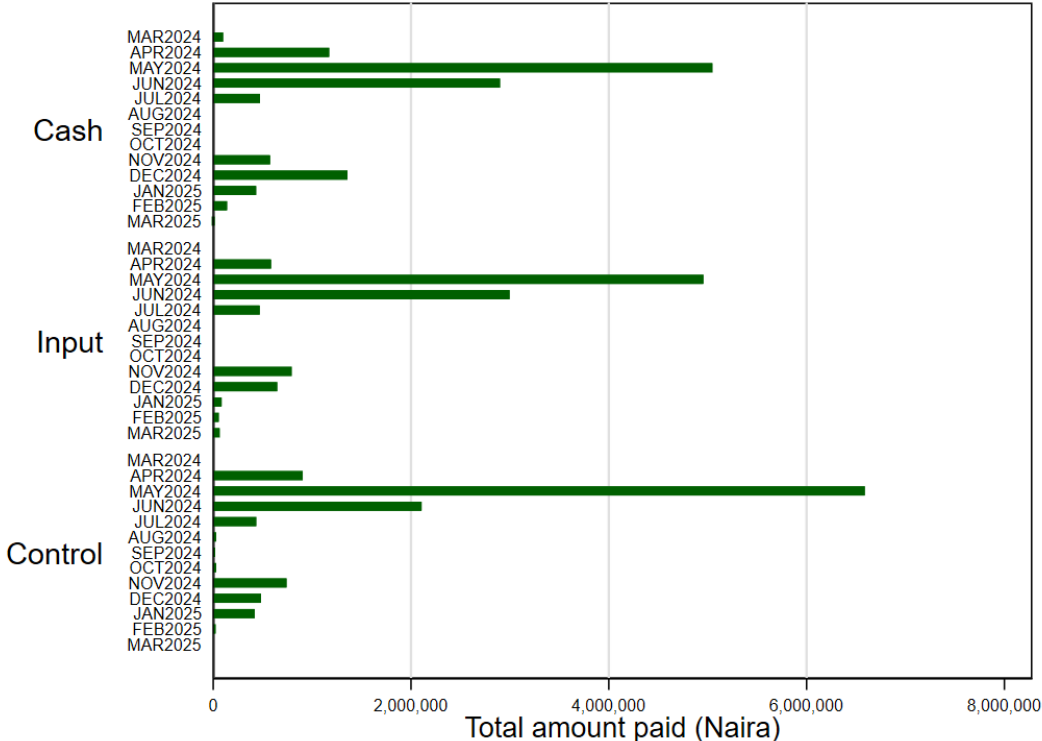


**Figure 1. Distribution of the proportion of the debt recovered by treatment status**

Figure 2 illustrates the monthly evolution of total loan repayments collected by Crop2Cash by treatment status (summed over all farmers in each treatment). As expected, we observe the highest loan recovery months immediately after the end of the dry season, beginning in March

<sup>2</sup> It should be noted that these results should be interpreted with caution given the difference in attrition rates by loan repayment performance, with the attrition rate being 34% for farmers who did not make any loan payments, 20% for those who have made any payments, and 17% for those who have paid back their loan in full.

2024 and reaching its peak in May, and dwindling out by July. However continued recovery efforts by Crop2Cash resulted in a significant portion of the debt being recovered after the wet season, between the months of November 2024 and March 2025. This highlights the need to design loan repayment conditions that match recovery efforts with the peak income periods from harvesting and sale of produce and offer deferments for planting, land preparation, or fallow periods.



**Figure 2. Total loan amount recovered by month and treatment status**

We now turn to Table 7, which reports estimates of the effect of our treatments on agricultural input use as reported in our follow-up survey. As noted in Ambler et al. (2023), one of the primary motivating factors for our study was the testimony of Crop2Cash loan clients who told us that an additional cash loan, rather than a loan including specific agricultural inputs, would be helpful in allowing them to purchase the additional agricultural inputs they need to successfully cultivate their agricultural plots. The first four columns of Table 7 show that the treatments did not influence farmers’ decisions on how many plots and how much land to cultivate, nor what to cultivate (most farmers in the sample cultivated maize, tomatoes, or both). In columns 5, 6, and 7 of Table 2, we examine the effect of our treatment on variables that indicate the number of plots the farmer used fertilizer, pesticide, or herbicide on during the 2024 dry agricultural season. Among

farmers in the control group, just over one plot received fertilizer and pesticide, and less than one plot received herbicide. Notably, these indicators of the number of plots farmers report using fertilizer, pesticide, or herbicide do not vary based on assignment to either of the treatment groups. The last two columns in Table 7 report variables indicating whether the farmer hired either male or female labor during the 2024 dry agricultural season. Among farmers in the control group, about 84 percent of farmers report hiring male labor and 42 percent report hiring female labor. Despite the testimony by farmers in focus group interviews that an additional cash loan would help them hire labor, we do not find any evidence to suggest that farmers who received an additional cash loan offer used the additional cash to hire farm labor. If anything, we observe a 14 percentage point reduction in the number of farmers in treatment group 1 that hired female labor.<sup>3</sup>

**Table 7: Treatment Effects on Agricultural Input Use**

	(1) Plots cultivated	(2) Cultivated area (has.)	(3) Cultivated maize	(4) Cultivated tomato	(5) Fertilizer	(6) Pesticide	(7) Herbicide	(8) Hired male labor	(9) Hired female labor
T1: Cash loan offer	-0.029 (0.58)	-0.243 (0.172)	0.023 (0.079)	0.031 (0.077)	-0.029 (0.58)	-0.001 (0.066)	0.008 (0.083)	0.017 (0.091)	-0.143* (0.082)
T2: Input loan offer	0.003 (0.066)	-0.185 (0.176)	0.059 (0.078)	0.106 (0.080)	0.003 (0.066)	0.029 (0.072)	0.062 (0.095)	0.121 (0.092)	-0.002 (0.095)
Observations	222	222	222	222	222	222	222	222	222
R-squared	0.0016	0.0097	0.0026	0.0085	0.0016	0.0012	0.0026	0.0095	0.0952
Control mean	1.10	1.05	0.64	0.31	1.10	1.05	0.72	0.84	0.42

Notes: Statistical significance indicated as p-value < 0.1 \*, p-value < 0.05 \*\*, and p-value < 0.01 \*\*\*.

## Concluding Thoughts: What Factors Drive Low Loan Repayment?

Taken together, these descriptive and additional experimental results lead us to two interrelated insights about credit access and loan repayment among smallholder farmers in Kaduna, Nigeria.

1. The descriptive results highlight a general lack of access to credit among both the pilot farmers and neighboring farmers in our data. This is particularly noteworthy because the pilot farmers are all Crop2Cash clients and are currently receiving loans.
2. The additional experimental results demonstrate that pilot farmers struggle to repay loans, at least during the 2024 dry agricultural season. Although the additional input or cash

<sup>3</sup> Treatment on the treated effects for Table 2 show no significant impact of the treatment effects on any of the outcome variables.

loans did not lead to worse loan repayment rates, these additional loans also did not seem to lead to measurable changes in agricultural input use.

The observed low rate of repayment is one possibly leading explanation for the general lack of access to credit among reported by farmers in the data. Without external funding support guaranteeing these loans, particularly in the context of high prevailing inflation rates, the sustainability of these loans is not financially viable. Thus, by way of concluding, we discuss the various factors that might explain the low repayment rates among Crop2Cash farmers in this study.

As noted in Ambler et al. (2024), inflation rates were relatively high in Nigeria during the time of the study—peaking at 43 percent. This contributed to an increased cost of production for farmers. To name just one example, gasoline tripled in price in the aftermath of the removal of the government’s fuel subsidy and represents a key input for irrigation among dry season farmers. Additionally, below-average agricultural production in the 2024 dry agricultural season likely played an important role for some farmers in the study. Over 20 percent of the farmers in the study reported that drought-like conditions negatively affected their agricultural production in the 2024 dry agricultural season, and nearly 40 percent list insufficient income from agricultural activities as a primary factor that influences their ability to repay outstanding loans. Therefore, a challenging macro-economic environment and an underperforming agricultural season are two leading candidates of factors that drive the low loan repayment rates in the study.

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