

METHODS & TOOLS BRIEFS

Getting Inputs Right: Experimental Evidence on Agricultural Data in Nigeria



50x2030
DATA-SMART AGRICULTURE

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Nigeria. / Photo by Tope J. Asokere via Pexels.

BACKGROUND:

Accurate measurement of agricultural input use—such as labor and fertilizer—is essential for understanding productivity and informing policy, yet standard survey approaches often rely on end-of-season recall that can introduce systematic bias. This brief draws on a randomized survey experiment in Nigeria that tests a mixed-mode approach—combining in-person interviews with high-frequency phone check-ins during the agricultural season—to assess how data collection design affects reported input use.

KEY POINTS:

- **Survey design strongly shapes reported input use:**

The mixed-mode approach produces substantially higher reporting of both labor and non-labor inputs, highlighting the extent to which standard recall-based surveys may undercount key agricultural activities.

- **Recall-based surveys may mask who contributes to farming:**

More frequent, in-season data collection captures a broader set of workers—particularly women and children—who are often missed in end-of-season recall surveys.

- **A feasible and cost-effective alternative for national surveys:**

Combining low-cost phone interviews with traditional survey visits offers a practical way to improve the timeliness and granularity of agricultural data while remaining operationally viable in national statistical systems.



Photo by Sebastian Duijndam
via Aktion Gegen den Hunger.

THE PROBLEM:

A SEASON OF WORK, COMPRESSED INTO A SINGLE INTERVIEW

Accurate data on agricultural inputs, including how much labor farmers and their household members supply, and how much fertilizer, herbicide, and pesticide they apply, is foundational to understanding farm productivity, designing effective policies, and tracking progress toward food security goals. Yet the surveys that generate these data have a critical challenge: they ask farmers to recall, at the end of a growing season, everything they did over months of planting, tending, and harvesting. This is a heavy cognitive burden, and the evidence suggests it produces systematically biased estimates.

Measuring agricultural labor on smallholder farms is difficult because labor is multidimensional, irregular over the season, frequently unpaid, and not directly observable.

Measuring agricultural labor on smallholder farms is difficult because labor is multidimensional, irregular over the season, frequently unpaid, and not directly observable (Carletto et al., 2021). As a result, most household surveys rely on end-of-season recall to collect plot-level information on days and hours worked (Gaddis et al., 2021), despite extensive evidence that long recall periods generate systematic measurement error. Recall-based surveys tend to overstate labor intensity by relying on heuristics about “typical” work patterns, while simultaneously undercounting the number of workers and plots involved—especially for irregular, unpaid, and nonmarket labor, which disproportionately affects women’s contributions (Arthi et al., 2018; Wollburg et al., 2021). Even person-plot data remain vulnerable to omission of secondary or intermittent workers, and while more disaggregated data improve analytical potential, they also

increase respondent burden without fully resolving recall bias (Beegle, Carletto, and Himelein, 2012; Gaddis et al., 2021). Overall, the literature consistently shows that longer recall windows exacerbate misreporting, motivating calls for higher frequency and more granular data collection strategies (Wollburg et al., 2021; Dillon et al., 2025).

THE EXPERIMENT:

ASKING FARMERS DURING THE SEASON, NOT AFTER

A new study tests whether a mixed-mode survey design, combining in-person interviews with short, regular phone check-ins during the agricultural season, produces systematically different estimates of agricultural input use compared to standard end-of-season recall. The study draws on a randomized experiment embedded in [Nigeria’s General Household Survey–Panel \(GHS–Panel\), Wave 5](#), conducted by the National Bureau of Statistics in collaboration with the World Bank’s Living Standards Measurement Study (LSMS) program and the 50x2030 Initiative.

The experimental design assigned 106 enumeration areas to either a standard end-of-season recall survey (the control group) or a mixed-mode approach (the treatment group). Households in the treatment group received mobile phones and were contacted approximately every two weeks during the agricultural season to report on current or very recent farming activities. This high-frequency, in-season approach shortens the recall window by asking farmers about what they did last week, not what they did over the past six months. Table 1 summarizes the study design.

Table 1: Experimental Design

FEATURE	CONTROL GROUP	MIXED-MODE GROUP
Post-planting visit	Yes (in-person)	Yes (in-person)
During season check-ins	None	4 phone interviews
Post-harvest visit	Yes (in-person recall)	Yes (in-person recall)
Recall burden	Full season recalled at harvest	Distributed across season with a month recall each interview

WHAT THE DATA SHOW:

LARGE AND SYSTEMATIC DIFFERENCES IN REPORTED INPUTS

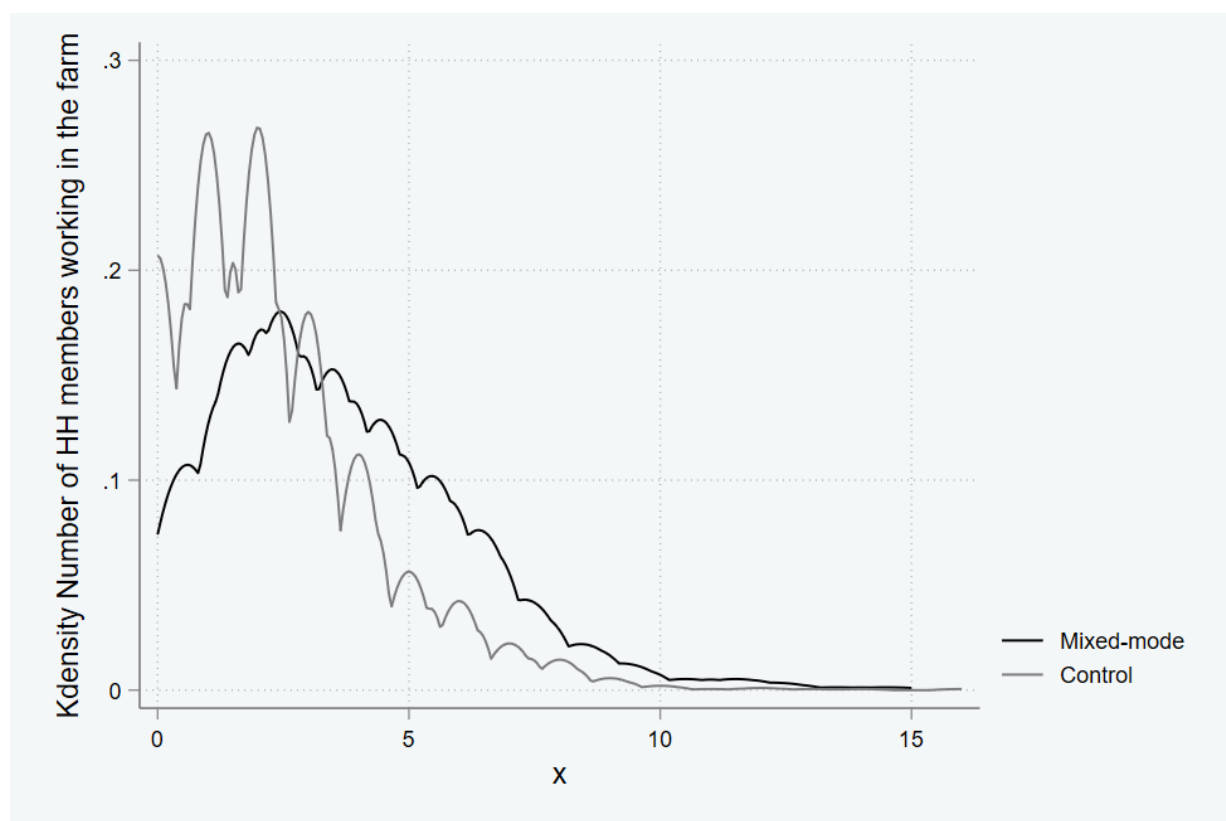
Finding 1: The mixed-mode approach is associated with substantially more reported work.

At the individual-plot level, the mixed-mode group was 93% more likely to record any labor participation than the standard recall group – a difference of 40 percentage points over the control mean. At the plot level, the number of household members reported as working more than doubled (+102%). Figure 1 shows the distribution of the number of household members reported to be working on plots for the two types of households (control group and mixed-mode group). The figure reveals that this is not just a shift in the average, it is a shift in the shape of the distribution.

102%

At the plot level, the number of household members reported as working more than doubled

FIGURE 1 – Kernel density plot of the number of household members reported working on plots. Source: Contreras et al., forthcoming)

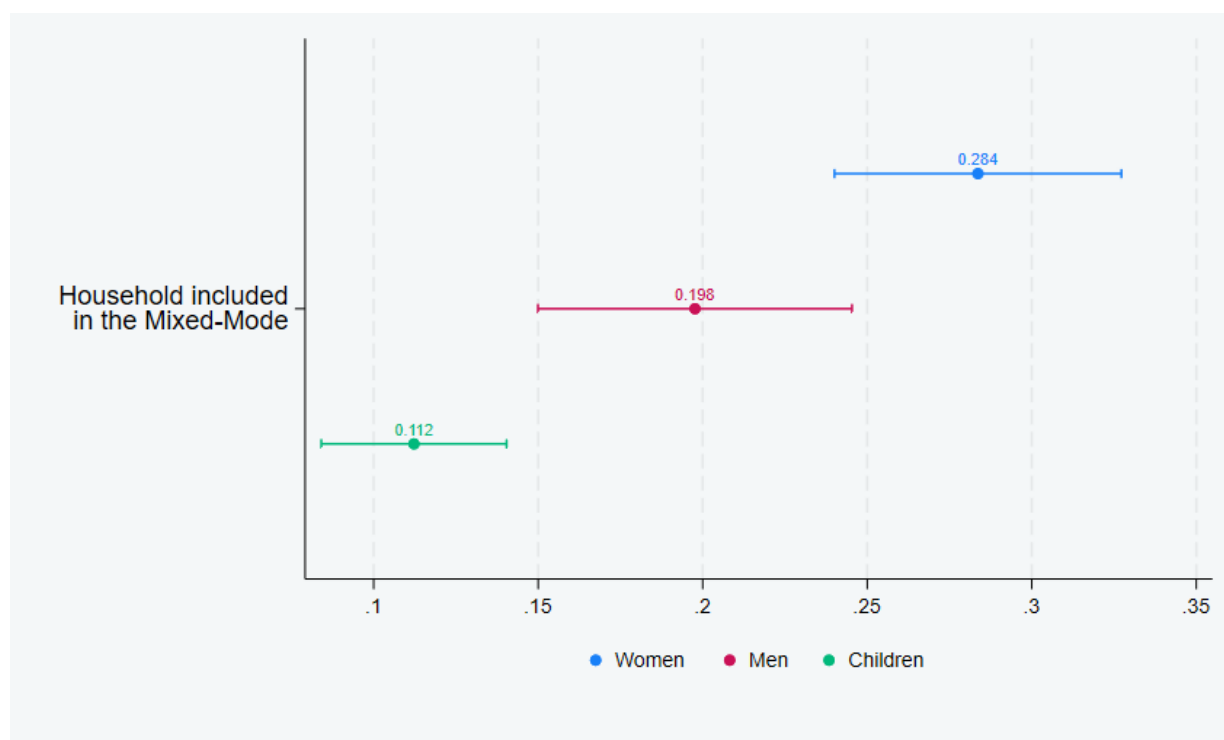


Finding 2: The workers being missed are disproportionately women and children.

The Figure 2 shows the estimated effect of the mixed-mode approach on the number of hired workers reported, separately for women, men, and children. All three effects are positive and statistically significant, meaning that households in the mixed-mode group reported more hired labor of every type. Specifically, the mixed-mode approach is associated with 0.29 additional hired women reported per plot – a 147.9% increase relative to the standard recall group. For hired men, the difference is 0.20 additional workers (a 40.1% increase), and for hired children, 0.11 additional workers (a 267.6% increase). While the absolute difference is smallest for children, the proportional gap is by far the largest, pointing to hired children’s labor as the category most systematically missed by end-of-season recall.

FIGURE 2 – Household members reporting work at the plot and household level.

Source: Contreras et al., forthcoming.



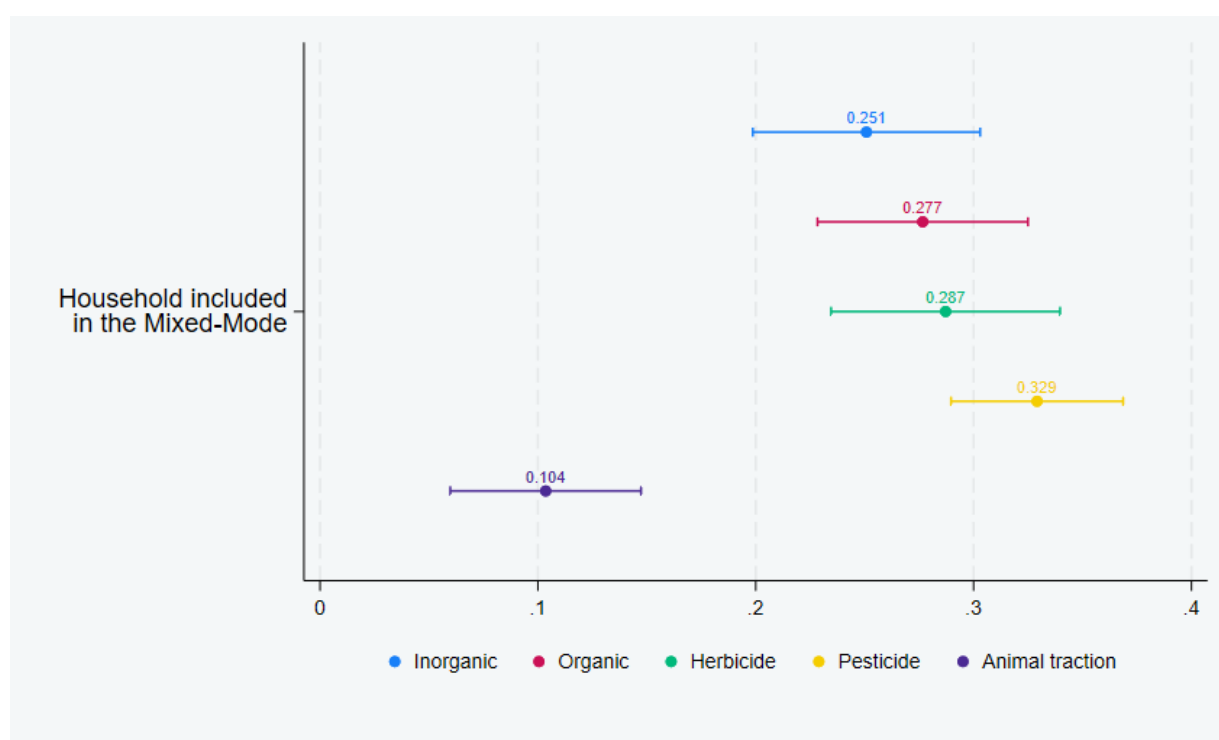
Finding 3: More workers, but fewer hours each.

While the mixed-mode approach records more workers, it records fewer hours per worker. Reported hours worked per individual per plot were 29% lower under the mixed-mode design, and reported days were 32% lower. This apparent paradox is consistent with a well-documented cognitive mechanism: when asked to recall labor over a long season, respondents who forget many workers may unconsciously attribute the full labor burden to the few they do remember, inflating individual hour estimates.

Finding 4: The mixed-mode group reported higher non-labor input use and larger quantities.

The mixed-mode group was 65.3% more likely to report using inorganic fertilizer (0.25pp increase in the likelihood of reporting it), 110.2% more likely to report organic fertilizer (0.28pp), 76.9% more likely to report herbicide use (0.29pp), and 175.9% more likely to report pesticide use (0.33pp). Crucially, unlike labor, non-labor inputs show the same direction of difference on both margins. Among those who did report use, the quantities recorded were also substantially higher: inorganic fertilizer +117%, organic fertilizer +150%, herbicides +198%, and pesticides +117%.

FIGURE 3 — Input use at the plot and household level. Source: Contreras et al., forthcoming.



WHY THIS MATTERS FOR POLICY AND SURVEY PRACTICE

The findings from this study have important implications for both agricultural policy and the design of national survey systems — not because they establish which approach is more accurate, but because they demonstrate that the mixed-mode approach profoundly shapes the resulting data, and therefore the conclusions that policymakers and researchers draw from it.

From a **policy perspective**, the differences produced by the mixed-mode approach are large enough to affect estimates of agricultural productivity, input adoption rates, and the gendered distribution of farm labor. Analyses based on standard end-of-season

recall and those using the mixed-mode approach could reach fundamentally different conclusions about how inputs are used, who does the farming, and how productive agriculture is. Analysts and policymakers need to be aware that the numbers they rely on are sensitive to how and when data are collected.

From a **survey design perspective**, the study shows that the decision to adopt a mixed-mode approach is not just an operational one – it is a substantive choice with consequences for what gets measured and who gets counted. The widespread availability of mobile phones in rural sub-Saharan Africa makes such designs increasingly feasible and cost-effective.

THE COST OF THE MIXED-MODE APPROACH

A natural question for any National Statistical Office considering a mixed-mode design is whether the additional data collection rounds are affordable within typical survey budgets. The cost comparison is striking. Each phone interview in this experiment cost approximately \$9.39, compared to \$183 for a standard in-person visit. With four phone interview rounds conducted during the agricultural season, the total additional cost per household under the mixed-mode design amounts to roughly \$37.56. This makes the mixed-mode approach a cost-effective alternative to high-frequency in-person data collection, which is generally considered too expensive to implement at scale in nationally representative surveys.

The operational results from the experiment further support its feasibility. Despite being conducted in enumeration areas that were classified as mainly agricultural, 86.7% of participating households were successfully reached for both in-person visits and all four rounds of phone interviews, a completion rate that compares favorably with standard survey protocols. The widespread availability of mobile phones in the sample area (93.3% of households already owned at least one) also suggests that the infrastructure requirements for scaling this approach are already largely in place across much of sub-Saharan Africa.

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Learn more:

Stay tuned for publication of the working paper that delves deeper into the study and results presented above – **Improving Input Measurement in Agriculture: Evidence from a Mixed-Mode Survey Experiment in Nigeria** (Contreras et al., forthcoming).

Until then, see the related resources below:

- [The effect of survey mode on data quality: Experimental evidence from Nigeria](#) (Markhof et al., 2026)
- [From necessity to opportunity: lessons for integrating phone and in-person data collection](#) (Zezza et al., 2023)
- [Recall length and measurement error in agricultural surveys](#) (Wollburg, Tiberti, & Zezza, 2021)

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