Reliability of Recall in Agricultural Data

By Kathleen Beegle, Calogero Carletto and Kristen Himelein

Farming is an income-generating activity where a range of important actions – such as plot preparation, input application, weeding, harvest and selling – take place over several months of each season. The ideal data collection effort would thus entail repeated visits to farmers across an agricultural season in order to collect information as close to the timing of the actual event as possible. Specialized farm surveys are often designed to visit farmers at multiple times, in some cases engaging resident enumerators who may be agricultural extension agents or other Ministry of Agriculture staff. However, for many household survey efforts, this type of implementation is not feasible in practice. Cost and logistical considerations often dictate a single visit to the household in which the farmer is asked to recall a range of details about the last completed agricultural season, which can occasionally encompass two or more separate harvests. Depending on the timing of the survey, the interview will not necessarily have the most propitious timing for a single visit, immediately after the harvest. With such approaches, the concern is that the data will suffer from recall bias, as farmers may forget the details. The level of recall bias is expected to be related to the salience of the information reported, with more salient events reported with greater accuracy. Moreover, it is expected that some traits of the farm household (e.g., education, land holdings) may impact the extent of bias.

Data and Methodology
The objective of this study is to investigate the extent of recall bias with respect to several important agricultural input and harvest measures. Using the variation in recall period and random assignment of households to month of interview (and, therefore, recall period), these indicators are examined within three nationally representative multi-topic household surveys from sub-Saharan Africa: the 2004/2005 Malawi Integrated Household Survey, the 2005/2006 Kenya Integrated Household Budget Survey, and the 2001 Rwanda Enquête Intégrale sur les Conditions de Vie des Ménages. These surveys were chosen because of their 12-month fieldwork calendar and because interview locations were randomized across regions throughout the data collection. The study explores several important aspects of smallholder farming: the harvest amounts, the level of cash crop sales, labor inputs, and fertilizer application. The analysis looks for patterns in reporting driven by the number of months from the interview of the household back to the actual month that these different events took place.

Results: Harvest Quantity
Seven different country-crop combinations are examined, reflecting the major annual staple and cash crops produced in each country. Staple crops include maize in Malawi, Rwanda and Kenya, as well as sorghum in Rwanda, and cash crops include coffee in Kenya and Rwanda and tobacco in Malawi. Across both countries and crops, the results consistently reject the presence of large recall bias in harvested quantities.

Results: Cash Crop Sales Value
One hypothesis tested in this paper was that farmers would report the value of cash crop sales more accurately than quantities, as the income would be highly salient for rural agricultural households. In fact, there is only minor evidence of recall effects, limited to tobacco sales in Malawi. The direction of the bias, however, goes against the initial intuition: farmers report higher
sales for longer recall periods. Further analysis suggests that this recall bias among tobacco farmers in Malawi is largely being driven by smaller landholders.

**Results: Hired Labor**

Hiring labor is proposed to be an event of high salience, especially for low-income smallholders for whom some payment (cash or in-kind) is necessary to hire laborers. As such, recall effects are expected to be smaller than for other farming details. On the other hand, if hiring labor is not uncommon but is not intensive (that is, few days of hired labor, particularly in relation to the household’s own labor on the farm), it might be a decision of low salience and hence one would expect recall bias in reporting. There is some evidence of recall bias in reporting for maize farming in Kenya and Malawi, but with different signs. The findings suggest over-reporting in Kenya and under-reporting in Malawi with longer recall durations. In the case of Malawi, further analysis indicates that this recall decay for maize farming in Malawi is offset by the education level of the head, but increases for larger landholders. There are generally no significant recall effects for sorghum and coffee in Rwanda, although coffee farmers with smaller landholdings underreport as the recall period lengthens. There is a small effect for female heads hiring labor for maize plots in Malawi, where the level of hired labor declines with longer recall.

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<th>Recall Bias in Reporting Hired Farm Labor</th>
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<td>Kenya maize farmers</td>
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<td>Malawi maize farmers</td>
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<td>Change in probability of reporting any hired labor if farmer is interviewed more than 8 months after harvest (percentage points)</td>
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**Results: Fertilizer Usage**

Fertilizer usage is the main expenditure outlay during the farm season for many smallholders in these countries. In light of the prohibitive costs of fertilizers and high poverty of most farm households in the three countries, the lack of recall bias in financially taxing events such as fertilizer purchase and application is not surprising. For fertilizer use, there is no evidence of a substantial recall bias for fertilizer usage, which is consistent with fertilizer application being a decision of high salience for farmers. A notable exception to these findings is by gender of the head in Malawi. There are recall effects for fertilizer use on maize plots for female-headed households and on tobacco plots for male-headed households, with underestimation of use when the household is interviewed further from the harvest. For maize, overall fertilizer use levels decline with increases in recall duration, although the results are not consistently statistically significant. This recall decay is more concentrated among female farmers and is offset with the education of the head and smaller landholdings.

**Conclusions**

The findings suggest that farmers’ reports of harvest, crop sales, and input use are not significantly affected by a longer recall period. Although this is not evidence that agricultural data are not of poor quality in general, it does address at least one aspect of data collection – length of recall period – which could compromise data quality. There is some modest indication that more salient events are less subject to recall decay. Overall, the results seem to indicate the majority of agricultural data collected through single visits over several months do not suffer from the large recall decay initially hypothesized. This finding allays some concerns about the quality of data collected through recall over lengthy periods, at least for the types of events and in the contexts studied here.


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Or contact:

Kathleen Beegle, World Bank
kbeegle@worldbank.org

Calogero Carletto, World Bank
gcarletto@worldbank.org

Kristen Himelein, World Bank
khimelein@worldbank.org