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Abstract:

Data from two closely related questions in a survey on rabbits is analyzed in order to determine whether results from these two groups of questions would yield similar results about numbers of rabbits kept by a household. One question seeks a straightforward answer about numbers of rabbits kept while the other group of questions breaks the question into several questions seeking numbers of rabbits disaggregated by sex and age. This is prompted by the fact that record keeping is not a very common undertaking in a small holder agricultural setting in Kenya and that in their absence, farmers may not recall precisely how many rabbits they own unless a headcount is performed. A paired sample t test is implemented to detect any significant underreporting of rabbit numbers based on numbers from the straightforward question which we hypothesize would yield numbers far less than what is on the farm. The results show that such underreporting is not serious enough. The conclusion is that between the two question modes implemented in the survey, the straightforward question is suitable as it is time saving when the survey data required does not include numbers disaggregated by sex or age of rabbits.

Introduction

Data collection methods through the use of questionnaires during surveys are an important tool utilized by many researchers[1]. In Kenya, many surveys are hardly self administered and are usually designed to collect a set of data within very limited time and financial budgets. Such face-to-face interviews have been utilized in the collection of household level data with respect to farm operations, consumption among a host of other household level variables. Under time and budget constraints, researchers would normally rather have as much data as they can just in case the need for instrumental variables arises, as it usually does. Researchers have also made note that during surveys requiring households to state the number of small stock such as poultry kept, many usually underestimate the number often counting only adult birds and leaving out chicks in the flock. In spite of this researchers still tend to develop extensive survey instruments with a host of uses in mind, and even in specialist surveys it is not unusual to find a few questions thrown in which may not have a very direct relevance to the immediate objectives of the survey. This they do to piggy ride on other surveys and collect data for other uses.

Under these circumstances, and in order to ensure that quality data is assembled, it is important to identify upfront any deficiencies that can be brought about by the use of a defective survey instrument. These biases such as recall bias in consumption expenditure have been examined by Scott and Amenuvegbe, (1991) and more recently, by Beegle *et.al.,* 2011. The latter authors examined recall bias in Kenya, Rwanda and Malawi concluding that recall decay was not identifiable in agricultural crop data from single visits over several months. It is usually assumed that the length of the recall period has a positive effect on recall loss making respondents

[1] There are however many other different information gathering approaches such as self administered mail surveys, participant observation etc but the questionnaire involving face-to-face interaction between interviewer and interviewees appears to be the most commonly used in SSA.

underestimate magnitudes that occur further into the distant past. Such results have not been very common on data related to livestock such as numbers, incomes from milk sales motivating the present analysis albeit on a different aspect of data quality; the validity of a survey instrument.

Within a questionnaire a question could be designed as one requiring a straightforward answer or can be split into different questions which conceptually all add up to the same answer. The need to split these questions can increase the time necessary for a survey and may also be bothersome for some respondents to answer a string of questions. This can also be counterproductive if these questions are asked in place of others which could add to the richness of data collected. Researchers resort to this split when such disaggregation is part of the data requirements or when they wish to guide respondents to think through their answers, hoping that this makes the resultant data more accurate. For the purposes of this paper, we are interested in identifying any systematic errors that can be attributable to questionnaire design. We explore any systematic under/over-reporting by type of question posed to the respondent. We examine whether reporting changes between interviews conducted with one single question about rabbit numbers and those completed with a set of questions about numbers split by age of rabbits and their sexes.

Materials and methods

The main purpose of this study was to obtain basic information about rabbit keeping among farmers within important rabbit keeping communities in Kenya, information which would provide a background of the rabbit industry at the farm level. Conceptualized as a multi-topic[2] household survey, a questionnaire was designed from previous livestock modules of Living

[2] By topic, here we mean different aspects of the production practices and/or constraints of rabbit production on the farm

Standards Measurement Study (LSMS) type questionnaires with a maximum recall period of 12 months for a number of items. The choice of this format was to gather data which ultimately might be comparable with questions from other LSMS-ISA (LSMS-Integrated Surveys on Agriculture type surveys in other countries such as the Tanzanian National Panel Survey and Uganda national Panel Survey 209/10 surveys currently underway. The information gathered on the questionnaire included general livestock details on the farm, production on the farm, rabbit numbers and breed types, rabbit housing structures and equipments , feeds and feeding practices, diseases, consumption and marketing, constraints and suggestions appertaining to rabbit production and marketing. Many questions took a close ended format but were also interspersed with open ended questions so as to break the monotony associated with the former. The flow of questions was designed to aid the interviewer and interviewee with some order, so that one question in a section lead naturally to the next and those related to one aspect such as housing or diseases were be grouped together in their respective sections. This questionnaire was pretested in Ngong and later adjusted to take account of interview length while some questions were reformulated based on observations from the pretest and tested again in Naivasha and Nakuru. Some questions were added to act as an aid to check for consistency of responses. It was subsequently implemented by enumerators who were assisted by an interview manual constructed to accompany the questionnaire. This team was composed of one MSc student and three experienced interview clerks affiliated to the Egerton University Tegemeo Institute while the core team of researchers assumed full-time responsibility for data collection. Minimum selection criteria for the selected interviewers included holders of a university degree, demonstrated experience in agriculture related questionnaire administration as well as fluency in both Kiswahili and English languages. The selected enumerators underwent a one day workshop

during August 2011 to share the objectives of the entire project, review the final questionnaire and make final changes to the survey instrument as well as the interviewer's manual and agree on logistical arrangements for interviewers. For additional quality control, questionnaires filled during the first week of data collection were scrutinized for completeness and any inconsistencies noted and flagged with the supervisors. Ministry of Livestock officers on the ground provided logistical support to the interviewers and identified respondents; a quarter whom were non-rabbit keeping households. In all, a total of 400 respondents were targeted from the counties viz; Nakuru, Kiambu, Taita Taveta, Nyeri and Meru/Tharaka Nithi between August and September 2011. The interviewers took about 50 minutes with each respondent keeping rabbits during the first week (and 15 minutes for non-rabbit keepers) which went down to 45 minutes during the remainder of the interviews which was accomplished after the review of the survey questionnaire from the pilot stage. The data were keyed into MS access and the statistical package (SAS V9.0) used to analyze the data.

The survey questions of interest in this paper were:

i) a simple 'How many [rabbits] of all ages are owned by your household at present?' and the expected answer was a number indicating what the respondent thought was the number of rabbits present in the homestead while

ii) a more detailed question on the household's rabbit portfolio where all rabbits of different sexes and ages were recorded.

While answering the latter questions, interviewers had been instructed to visit the rabbit hutch and from here a manual count of rabbits was possible. For this reason, we assume that the answer

to this latter set of questions is closer to the true number of rabbits owned since the interviewer was able to confirm and record this number. We sought to find out if the difference between these two responses would be significantly different from zero. Households whose answer to the two sets of questions matched were grouped together (hereinafter referred to as group 1) while the comparative group (hereinafter referred to as group 2) comprised of those respondents whose answers to these two sets of questions differed. A paired t test was used to examine any differences in the responses.

Survey limitations

The period between development of the survey instrument, hiring and training of interviewers was short and it is likely that many of the interviewers had not read the whole manual by the time data collection commenced[3]. This was further confounded by the fact that the instructions were not placed alongside the questions to which they related to but were placed in a separate interviewer manual to rid the questionnaire of too much clutter. In Voi (Taita Taveta), there was the difficulty in tracing households that kept rabbits because a then on-going drought had forced many of the farmers out of rabbit rearing. In addition, the use of MS-Access was a new experience for the data entry clerk and some problems were noted. Descriptive statistics were derived from the data to describe rabbit production practices such as average numbers of rabbits and breeds kept by the farmer; including breeding practices, rabbit housing structures and equipments, rabbit feeds and feeding practices, rabbit diseases, rabbit consumption and marketing, and closing remarks for both the rabbit and non rabbit farmers.

Results and discussion

The famers whose responses did not match comprised 9% of the sample while 91% of the respondents were able to match their answers correctly. A description of these two groups is presented on table 1 below. The data revealed that data from a single question about numbers of rabbits kept got an average of 20.67 (sd 62.82) while the same figure was computed from the series of questions from 91% of the respondents. However, for those whose responses were at variance, the mean number of rabbits from the single question was 15 rabbits (sd=13.36) while from the computed numbers derived from the series of questions yielded an average of 13.15 (sd=17.43) both of which are less than the average numbers cited by those who had an exact match in these two questions. This suggests that with a single question, respondents might under estimate the number of rabbits they have. The bias may possibly be due to respondents only being able to correctly tell how many adult rabbits were present but omit the number of kits especially the very young ones. To test whether this conclusion is true, a paired sample t test was implemented to test whether this difference was significant. The t test revealed that this difference was not statistically significant (p=0.1384). Thus the error was insignificant and the two questions would yield the same result.

A chi square test was implemented to test for any association between this 'error' and determine if it was purely random or whether it was associated with whether the respondent kept records for the rabbit enterprise or whether this was related in any way with the respondent's characteristics such as education or age.

Table 1: Descriptive statistics between two groups of responses

	Group 1 (n=275)		Group2 (26)	
	Mean	Std deviation	Mean	Std deviation
A) How many rabbits of all ages are owned by your household at present?	20.67	62.82	13.15	17.43
B) How many [kits <1 mo.], [immature 1-4 mo.], [adult >4 mo.] rabbits are you presently keeping?	20.67	62.82	15.00	13.36
Difference A-B			-1.597	4.44
Lower CI			-3.718	3.35
Upper CI			0.5604	6.56
T			1.55	
Df			18	
Pr>| t |			0.1384	

Level of significance 5%

From the data, it emerged that most of the rabbit keepers (69%) did not maintain any written records (figure1) and that the proportion of farmers maintaining records differed by county. For instance, in Taita Taveta, 85% of the rabbit keepers did not maintain any records while in Nyeri, this proportion was about 68%. For these two counties the difference between the proportions of record keeping households and those not maintaining records was significant (Table 2). The most frequently mentioned records were mating records cited by 27% of the rabbit keepers followed

by birth records at 26%. The other records included sales records which were kept by 8 percent of the farmers while health and feeds/feeding records where the least cited records kept by only 5% and 3% of the farmers respectively. A chi square test was performed and the results showed that there was no significant association between whether the household belonged to group 2 and whether they did or did not maintain any records on the rabbit enterprise ($\chi 2=2.212$, $p=0.1369$). To test whether the observed difference might have been systematic deriving from the different enumerators, or the education level and gender of the respondents, a series of chi square tests were performed. The results showed that neither education ($\chi 2=3.671$, $p=0.4523$), gender ($\chi 2=1.4602$, $p=0.2269$) or age of the respondent ($\chi 2=1.5012$, $p=0.8264$) or the interviewer ($\chi 2=4.0857$, $p=0.2524$) showed any association with this difference further strengthening the conclusion that this difference was purely a random error.

Table 2: Record keeping among rabbit keepers in seven counties

	Nakuru	Kiambu	Tharaka	Taita Taveta	Nyeri	Meru	Kirinyaga
Percent keeping records	22.41	39.66	50.00	14.29	32.00	43.48	50
Percent without records	77.59	60.34	50.00	85.71	68.00	56.52	50
Chi square	17.655	2.4828	0.00	28.5714	6.48	0.7826	0.00
Pr > Chisq	<.0001	0.1151	1.00	<.0001	0.0109	0.3763	1.00
n	58	58	12	56	50	46	12

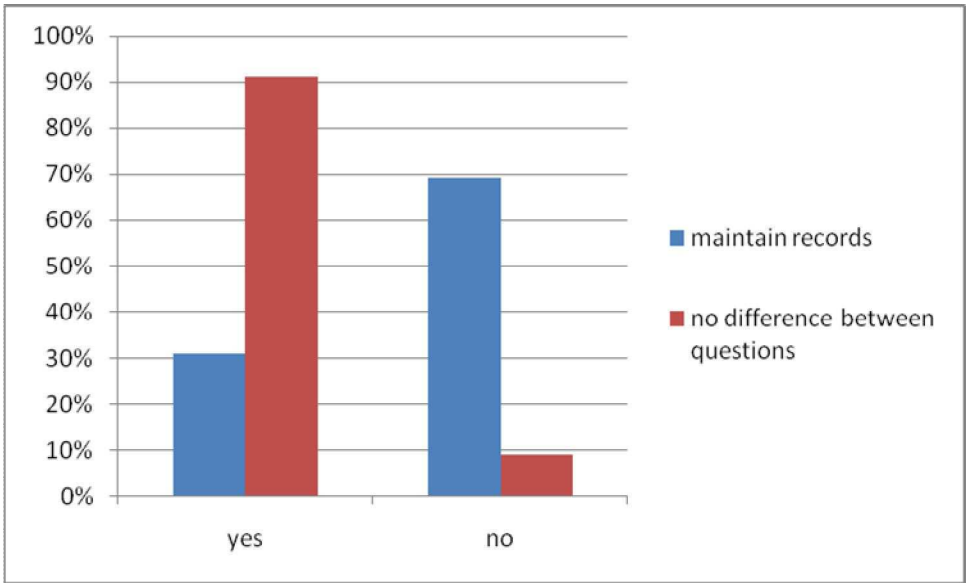

Figure 1: Distribution of different categories (Percentage) of respondents (base =300)

Conclusion:

The results of this analysis have a bearing on the design of questionnaires aimed at collecting data from households on the number of rabbits (and possibly other small livestock) on their farms. The implcation is that during survey execution a straight forward question does just as well as a series of questions aimed at extracting information about rabbit numbers on a farm, even where a record of such is not available. This will bear on the amount of time spent on similar studies. The evidence may not be conclusive since this study only considered rabbits, a rather rare livestock species and the results may or may not be applicable with a more common species such as poultry. Our recommendation is that a similar carefully designed study preferably using a more common small stock like poultry be carried out to confirm or disprove this conclusion.

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