

FIELD REPORT

AUDIO RECORDING OF HOUSEHOLD INTERVIEWS TO ENSURE DATA QUALITY[†]

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Abstract: The use of audio recording technology in the collection of quantitative household survey data in developing countries offers many benefits at a low cost. The benefits include ensuring that interviews take place, training and supervision of enumerators, assuring data quality, secure data storage, and easy data sharing, among others. This paper describes the use of audio recording by a research project that collected household level data in rural western Kenya in 2011–2012. I discuss the benefits of audio recording, both anticipated and encountered, as well as the costs and the applicability of this method in other research settings. Copyright © 2013 John Wiley & Sons, Ltd.

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1 INTRODUCTION

The use of audio recording in the collection of household survey data in developing countries can offer many benefits at a low cost. These benefits include ensuring that interviews take place, quality control in the training and supervision of enumerators, and assuring the quality of data collected, among others. These are relevant to both ‘paper and pencil’ interviewing and computer-aided personal interviewing. This paper describes the use of audio recording by a research project that collected household level data in western Kenya between September 2011 and May 2012. The main objectives of the project were to improve our understanding of

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household agricultural practices regarding on-farm biological resources (biomass) availability and management, to study how such practices affect soil fertility and crop productivity, and to analyse the effects of biomass management through time and across rural households.

The idea of recording household interviews originated in the need to make sure that interviews actually occurred and to ensure the consistency and quality of the data collected. As the project unfolded, other unanticipated benefits of audio recording were discovered. They are discussed in this paper. The following section briefly describes the research project and its methods with regard to audio recording. Section 3 discusses the main benefits of audio recording household interviews with examples from the project. Section 4 concludes with the discussion of costs and the applicability of audio recording in other research settings.

2 PROJECT DESCRIPTION

With the focus on smallholder farmers, their agricultural production practices and use of biomass, the project collected both quantitative socioeconomic data and biophysical measurements in 15 villages in the Nyando and Yala river basins of western Kenya. The household survey was conducted during two cropping seasons—the ‘long rains’ and ‘short rains’ of 2011. It covered a wide range of standard Living Standards Measurement Survey (LSMS) topics, as well as a detailed inventory of biomass and residential energy sources and uses. Each household visit lasted about 2–3 h. The respondents’ answers were recorded by hand on the hard-copy questionnaires provided and also audio recorded.

Prior to starting the interview, the households were asked to sign a consent form that explained the goals of the project, the voluntary nature of their participation, and confidentiality of the data collected. The consent form also asked for respondents’ permission to audio record interviews and explained that audio recording would be used for research purposes only. Participation in the study did not depend on the agreement to have interviews audio recorded. In the end, all but one in the sample of almost 350 households consented to the use of audio recorders.¹

Almost universal consent to audio recording is not surprising given the recent spread of mobile phone technologies. According to the World Development Indicators, there were 67.5 mobile cellular subscriptions per 100 people in 2011 in Kenya. The average subscription rate per 100 people in 2011 was 53.3 for sub-Saharan Africa and 80 for low- and middle-income countries worldwide (World Bank, 2013). In our final sample, over 83% of households owned mobile phones, with two phones per household on average. Thus, the great majority of the households surveyed were at least basically familiar with electronic communications technology.

Our digital recorders were small in size and resembled standard mobile phones. The project used Olympus VN-8100PC Digital Voice Recorders.² Interviews were recorded in MP3 format and, every 2–3 days, downloaded to a personal computer by the project director. Enumerators were instructed to monitor battery usage, and we changed the batteries as soon as the battery indicator on a recorder fell below 50%.³ The downloaded data were saved on a

¹The final sample size was 317 households; the interview was field tested with additional 30 households.

²The Olympus V-8100PC is a compact device (1.5 × 0.7 × 4.3 in.), weighing 7.2 oz. It requires two AAA alkaline batteries and features 2 GB of internal memory and up to 800 h of recording time. It records and plays back in MP3 and WMA formats and allows file transfer via USB connectivity.

³Data download and battery charging did not have to happen as often as it did. However, despite some additional time requirements, our precautionary frequent data download and battery switching ensured that no data were lost during the project, and on all but one occasion, the digital recorders functioned properly. One of the interviews was only partially recorded as a result of battery failure.

field laptop and then transferred to a field office desktop computer and copied to DVDs. In addition, the project used hand-held global positioning system (GPS) units to collect spatial data (primarily area of land holdings and georeferenced points to locate each household's farm on a remote sensing image). An additional staff member (with a university degree and high proficiency in several languages) was hired to work with audio transcripts and assist the project director with the data checking and quality assurance.

Audio recorders were very useful as a check against gaps in the data, error correction and quality control in general. All household surveys in the project were checked for errors twice (three times including the enumerator's own check). The first check happened in the end of the household visit and was performed by a field technician (a second enumerator) who accompanied the leading enumerator during the visit and collected biophysical information. Having this first check prior to leaving the household allowed for filling in any missing information or for correcting any inconsistencies with the help of the respondent, as well as correcting sloppy or unreadable handwriting. The second check was performed within several days of the household visit by the project director. If any concerns were identified (e.g. missing values), we checked them against the audio files. On occasion, we had to revise the responses in the paper surveys; most often, the changes had to do with incorrect interpretation of the respondents' answers or simple mistakes in recording. If audio transcripts did not clarify the problematic area identified during the second check, we either called or revisited the household in question.⁴

3 AUDIO RECORDING THE INTERVIEWS: MAIN BENEFITS

3.1 Ensuring That Interviews Take Place

The idea of audio recording household interviews originated in the desire to alleviate a common concern in field surveys—making sure that interviews actually take place, as some evidence suggests that on occasion interviewers may falsify interview responses or even entire questionnaires (Lyberg and Kasprzyk, 1991). Some initial reservations about the potential impacts of audio recording on the respondents' behaviour and answers were addressed during the field-testing period. We consulted with farmers, local village authorities, and other researchers. As long as the reason for audio recording was stated clearly and we explained the data confidentiality procedures and asked for households' permission to audio record the interviews, there were no objections. As noted above, only one household in the sample of almost 350 did not allow audio recording. We did not notice any difference in the quality of responses and the respondents' behaviour with and without audio recording.⁵

The audio files served as an undeniable proof of authenticity of household visits. The files indicated the date, time and length of each interview. Listening to audio files provided confirmation that the interviews did take place, with the required households, and that all sections were asked correctly. Of course, a rogue enumerator could have recorded an interview with friends at a local bar or other venues. However, the project's use of GPS technology provided evidence on the location of each interview (the GPS units record

⁴Collecting mobile phone numbers and timely second checks were extremely important. As the team interviewed in each village for several days, if the concerns were raised early, we could easily revisit households without mobile phones and make necessary corrections in the data recordings.

⁵Of course, this statement could be evaluated more rigorously. Testing the impact of audio recording could be achieved with a randomized experiment.

the date and time of each waypoint and track taken). Our use of digital audio recording and GPS technology provided the exact date, time, audio transcript, and location of each visit, alleviating any potential concerns about household visits' authenticity.

3.2 Supervision and Performance Monitoring

Enumerators in household surveys can have an important effect on the answers to the questions they ask. To standardize survey questions and elicit accurate and unbiased responses, enumerators are expected to read questions exactly as written, use nondirective probing if follow-up questions are necessary, record the answers without their own interpretation or editing, and maintain neutral and professional conduct during the entire project (Fowler and Mangione, 1990). However, each enumerator inevitably brings a number of personal characteristics to the interview that might affect the respondents' answers, thus introducing enumerator-related error to the data. Differences across enumerators (e.g. pace of interviews, tact and patience exercised) and differences in enumerator behaviour throughout the duration of the project (e.g. acting hurried or tired, anticipating the respondents' sentences, and skipping questions altogether after several weeks or months of interviewing) can introduce bias to data analysis.

One of the main strategies for reducing enumerator-related error in surveys is to control enumerator behaviour through supervision. Random field visits, announced or unannounced, by project directors help evaluate the enumerators' performance: methods of asking questions, adherence to the questions' order, enumerators' behaviour and respondents' reactions, etc. However, poor infrastructure in remote areas of developing countries can impose high costs (in terms of both time and money) and numerous difficulties to supervision of the enumerators on site. Audio recording the surveys could aid (or altogether replace) the costly field visits by project directors in supervising and monitoring performance in order to ensure data integrity.

Having audio records of all interviews allowed our project to monitor the data collection for inconsistencies and to introduce corrections where appropriate. First of all, the requirement of audio recording likely changed the enumerators' behaviour (not that of respondents), inducing their best performance across all visits. Moreover, audio recordings were used as evaluation tools making sure that all interviews followed the same procedures and no enumerator allowed individual style or behaviour to substantially affect the interviews.⁶

3.3 Data Quality Assurance

Rigorous field testing and/or piloting help define the exhaustive response categories in precoded surveys.⁷ Training of the survey personnel is meant to ensure the correct interpretation of all questions. However, field testing and training are often limited to several days or a couple of weeks to minimise the research costs, and it is not always clear at the outset

⁶I tested for potential enumerator idiosyncrasies in the final data set by regressing several 'gateway question' variables on a set of dummy variables representing specific interviewers and interview months. 'Gateway questions' (e.g. the number of plots or household members) are the questions, answers to which trigger additional or new sections to be completed, potentially influencing the enumerator's behaviour if seeking to minimise interviewing time. The R^2 values from these regressions (with number of plots, household size and several other variables as dependent variables) are all less than 0.05.

⁷Precoded questions refer to survey items for which instead of recording the respondent's full answer *verbatim*, enumerators are asked to match each given answer to a set of precoded responses.

which questions may become difficult to understand or to answer. Moreover, simple mistakes in recording the respondents' answers, whether on paper or computer, cannot be ruled out. In these situations, audio transcripts can be invaluable in correcting errors.

The ability to listen to the audio transcript of each interview proved to be the most valuable use of the recordings in our project. The audio files helped identify and correct any concerns with the data—missing values, illogical or inconsistent values (e.g. more than seven days in a week, greater amounts of crops sold than harvested, etc.), out-of-range responses, outliers in total or relative values, etc. They saved us time by significantly decreasing the number of phone calls to farmers or return visits necessary to correct mistakes. Moreover, the ability to listen to the actual interviews as they happened allowed us to preserve the respondents' original interpretation of our questions and their answers.⁸ Random checking of audio transcripts in early stages of the data collection also helped the project identify and correct several problematic questions and inconsistencies that did not come up during the field-testing and enumerator training period. Our use of audio files to correct errors prior to data entry also reduced the time needed for data cleaning. In the end, the entire resulting data set had no observations for which answers were missing or did not make sense.

3.4 Training Tool

The project started audio recording interviews during the field-testing period in part to assess the impact of audio recording on respondents' behaviour. However, our first audio transcripts allowed for more meaningful field-testing and training experiences.

During the first few days of field testing, our fieldwork team came together to listen to the audio transcripts on several occasions. This group listening exercise helped refine the questions and adapt them to the local socioeconomic and agroecological conditions. In many instances, it helped fine-tune response categories for precoded questions (e.g. the list of potential land ownership documents, local measurement units, or village authority figures). Going through early audio transcripts, the field team could also agree on the interpretation of each question, its exact wording, and the need for translation into one of the local languages where necessary. We listened to audio transcripts corresponding to different enumerators to offer constructive feedback to each team member and learn from each other. The use of audio transcripts during the training period helped identify any problematic areas of the questionnaire, which in the end led to greater consistency of the data collected.

3.5 Data Storage, Archiving and Sharing

Audio transcripts also provided an additional and secure method of the collected data storage, archiving, and sharing. Although audio files can be big in size (50–150 MB), the cost of data storage, whether on external hard drives, DVDs or online, is low and decreasing. Having access to the Internet is also becoming more widespread even in the most remote parts of rural areas. Smart phones and Internet USB modems are standard and affordable in most developing countries. Online data storage can be more secure and allows for easy archiving

⁸Data collected during return visits can differ from the original answers for several reasons: the respondent may adjust an answer if recollection is problematic, or to please the researchers; the original respondent cannot be found, and the new answers are given by other household members; etc.

and data sharing. For example, audio transcripts from field testing or early interviews can be uploaded online and shared with collaborating researchers overseas. They can also help overcome long time lags to enter, evaluate and process the data collected, as well as potential loss of hard-copy questionnaires, in paper and pencil interviewing.

4 CONCLUSION

Ensuring that interviews take place, improving the training of enumerators and their supervision, assuring better data quality, and facilitating secure data storage and data sharing are among the benefits of audio recording the household surveys. Although audio computer-assisted self-interviewing methodologies have been used in the collection of data, a review of the literature on quantitative field research methods in developing countries demonstrates that the use of audio recording is rare. Yet, given our project's experiences described in this paper, the benefits are many, while the costs are low.

The direct cost of audio recording household interviews is minimal: it includes the cost of digital recorders and batteries to power them. Our 9-month long project spent \$236 in total: \$156 for three digital voice recorders and an additional \$80 for several sets of rechargeable batteries and a battery charger. We had access to electricity in the field office in Kisumu, a major city in western Kenya. However, if electricity were not available, a diesel generator to charge AAA batteries could be an alternative low-cost solution.⁹ As for data download and storage, most field projects are already equipped with computers. Downloading and listening to audio transcripts could become a task for field team supervisors or project directors. For projects that require an additional hire, the cost of audio recording would have to include one more monthly salary. The addition of hand-held GPS units that also bear relatively low price (starting at \$120) would provide indisputable proof of the authenticity of household visits. When these expenses are accounted for in budget proposals, the total costs of audio recording (and GPS units) are a small price to pay for the collection of consistent high-quality data and the many potential pitfalls avoided, even in small fieldwork projects.

Audio recording can also help overcome several disadvantages associated with paper and pencil interviewing, such as long time lags needed to enter, evaluate and process data; the potential loss of hard copies of data; and data entry errors associated with poor handwriting or enumerator error. Although computer-aided personal interviewing may decrease the incidence of mistakes in data entry, it will not decrease the number of mistakes associated with the interpretation of answers and proper recording in precoded questionnaires. That is why an addition of audio recording capabilities to any computer-aided methods is also desirable. Audio transcripts can directly correspond to the answers entered in computer-assisted personal interviewing software, allowing one to easily cross-reference the relevant sections for data checking.¹⁰ Although our project did not encounter any difficulties with audio recording, there may be topics or locations where audio recording could be inappropriate.¹¹ A rigorous study of

⁹Generators are already in widespread use in many developing countries to provide for mobile phone charging, grain milling, water pumping and many other tasks that require power in remote areas off the electrical grid.

¹⁰The same cross-referencing can be achieved in paper and pencil interviewing by noting the time at the start of each section of the hard-copy questionnaire.

¹¹Audio recording of interviews may be inappropriate if an audio recorder makes a respondent anxious and uneasy (e.g. regarding sensitive topics related to gender, health, etc.) or for 'elite interviewing'—politicians, union organizers, etc. (Hertel *et al.*, 2009), where absolute confidentiality may need to be assured.

the impact of audio recording on respondents' behaviour and answers to survey questions will be important for this data collection tool to be widely accepted and practiced.

REFERENCES

- World Bank. 2013. *World Development Indicators (WDI)*. The World Bank: Washington, D.C.
- Lyberg L, Kasprzyk D. 1991. Data collection methods and measurement errors: an overview. In *Measurement errors in surveys*, Biemer PP, Groves RM, Lyberg LE, Mathiowetz NA, Sudman S (eds). Wiley-Interscience: New York.
- Fowler FJ, Mangione TW. 1990. *Standardized survey interviewing; minimizing interviewer-related error*. Sage Publications: Newbury Park, CA.
- Hertel S, Singer MM, Cott DLV. 2009. Field Research in Developing Countries: Hitting the Road Running. *PS: Political Science and Politics* **42**: 305–309.