Use of rapid rural appraisal and cross-sectional studies in the assessment of constraints in smallholder cattle production systems in the western Kenya highlands

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ABSTRACT

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Assessment of livestock production constraints in the smallholder dairy systems in the western Kenya highlands was carried out using both qualitative and quantitative epidemiological methods. Rapid rural appraisals (qualitative) were conducted in rural and peri-urban areas. A cross-sectional survey (quantitative) was then conducted on a random sample of farms in the study area. Diseases, poor communication, lack of marketing of livestock produce, lack of artificial insemination services, and feed and water shortages during the dry season were identified as the major constraints to cattle production in both areas. Tick borne diseases (especially East Coast fever) were identified as the major constraint to cattle production. Qualitative methods were found to be more flexible and cheaper than the quantitative methods by a ratio of between 2.19–2.0. The two methods were found to complement each other. Qualitative studies could be applied in preliminary studies before initiating more specific follow up quantitative studies.

Keywords: Assessment, cattle production system, constraints, cross-sectional, rapid rural appraisal

INTRODUCTION

In veterinary epidemiology, it has been found through experience that information users have a limited understanding of quantitative procedures and a vague perception of qualitative techniques (Crueller 1994). Quantitative investigations involve measurement and therefore expression and analysis of numerical values. Quantitative investigations include surveys, monitoring and surveillance, studies and modelling. In epidemiology, studies usually involve comparisons and include experimental, cross-sectional, case-control and cohort types (Thrussfield 1986). Qualitative approaches concentrate on words and observations to express reality and attempts to describe various items in natural or field situations (Thrussfield 1986; Crueller 1994). Important qualitative procedures that have been used in constraint identification of livestock include rapid and rural appraisals (Leyland 1991; Ghirotti 1993; Kirsopp-Reed 1994; Waters-Bayer & Bayer 1994; Catley & Ahmed Aden 1996; Catley & Mohammed 1996).

It has been argued that quantitative measurements are quantitatively accurate whilst qualitative evaluations are always subject to the errors of human judgement (LaPierre 1934). It has been argued that qualitative data are typically welcomed by decision makers because the results are presented in a concrete and understandable manner unlike quantita-

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tive data which have a complexity that is met with suspicion (Alkin, Daily & White 1970). It is also suggested that the discomfort with quantitative data explain why decision makers find qualitative data to be more useful than other research (Van de All, Cheryl & Kang 1976). Apart from the above arguments researchers are recognising the benefits of combining qualitative and quantitative procedures, resulting in greater methodological mixes that strengthen the research design (Crueller 1994).

The qualitative method used in this study was a rapid rural appraisal (RRA). Rapid appraisal tools were developed from socio-anthropological techniques in an attempt to overcome some of the inadequacies of farming systems research and encourage local participation in development projects (Leyland 1991; Ghirotti 1993). It is defined as a family of approaches and methods to enable rural people to share, enhance and analyse their knowledge and conditions to plan and to act (Chambers 1992). A discussion with communities using RRA tools to design animal health programmes has been used to prioritise livestock health programmes (ITDG 1996; Orito 1996; Catley & Ahmed 1996).

The rapid appraisal method as discussed in this paper, is in the context of applied research where the aim is not to solve theoretical puzzles contributing to the generation and verification of social or economic theory, but to facilitate a more rational decision-making process in real-life circumstances as indicated by Kumar (1993). The quantitative method used in this study was a cross-sectional type, that technically provides a snapshot of events at a particular time (Schwabe, Riemann & Franti 1977; Thrussfield 1986; Martin, Meek & Willeberg 1987).

The objectives of the study were to identify and assess constraints to livestock production as perceived by the local smallholder farming community and to compare the results of two different methodologies employed to assess productivity constraints in smallholder cattle production systems. This paper gives the results obtained from two areas (a peri-urban and a rural area).

MATERIALS AND METHODS

Study site

The study area, Uasin Gishu district, is located in the Kenyan highlands of the Rift Valley Province, Kenya. The district has an area of about 3 218 km² and a 1989 census determined the human population to be 445 530 within 91 945 households, sug-

gesting a population density of about 138 persons per km².

Most of the district is situated on the Uasin Gishu plateau, that ranges from 1 900–2 700 m above sea level. Maximum temperatures range from 19–24 and 13–16 °C at the two altitudes. Rainfall is sufficient for arable farming in most places, the annual average ranging from 900–1 400 mm. The rainfall distribution is nearly unimodal, with a peak in April and a second one in August. The district can be broadly classified into three agro-ecological zones: the upper midlands, i.e. sunflower-maize in the western and north-western parts of the district; the lower highlands i.e. wheat-barley in the central parts, and upper highlands, i.e. sheep-dairy, pyrethrum-wheat in the south-eastern parts of the district (Jaetzold & Schmidt 1983).

Data collection methods

Rapid rural appraisals

The first phase of the studies was done using RRA tools (Chambers 1992; Kirsopp-Reed 1992; Kumar 1993). These tools were: secondary data collection, key informant interviews, semi-structured interviews (community) guided by a check list, transect walks, seasonal calendars, matrix scoring and ranking, and direct observations. Secondary data from the district annual animal production, veterinary and tick control reports were assembled and summarised. From the information gathered from the secondary data, one-page checklist was developed to guide the facilitators during the RRA interviews with the community.

The community groups were selected in two administrative divisions in the study area so as to elicit the rural and peri-urban differences. Two community group interviews were held (rural and peri-urban area). The number of farmers in the group interviews was 28 and 48 in the peri-urban and the rural areas respectively. The community groups consisted of both men and women and the team conducting discussions consisted of the author, three extension officers and a recording clerk.

Transect walks were also held in the same areas but at different times. This was done to probe, triangulate and confirm some of the unclear issues from the discussions.

Cross-sectional studies

The second phase of the constraint identification was in the form of a cross-sectional study (Thruss-

field 1986). This was carried out 2 months after the RRA studies. The study farms were selected by means of a three-stage stratified random sampling procedure. All the sub-locations in the selected divisions were listed. A sub-location was randomly selected from each of the selected divisions. All the land registration units (LRU), i.e. smaller sub-divisions of the sub-locations, were then listed. Three LRUs were randomly selected from the sub-location. Thirty farms were randomly selected from each LRU, giving a total of 90 farms for the rural area. Three locations were randomly selected from a total of four locations in the peri-urban area. Thirty farms were randomly selected from each of the three locations. A total of 90 farmers were recruited from this area.

The farmers were informed in advance of the nature of the study in the form of a letter through the district veterinary officer. The author accompanied by two technical assistants then administered a questionnaire. Questions that were asked covered general information on the farms, i.e. current production levels, management practices (farm size and type, livestock kept and other non-livestock enterprises), constraints, diseases and their control measures, nutrition, delivery of animal health services and marketing of produce.

Analysis of data

Rapid rural appraisals

During RRA studies, cost estimates were done on fuel for commutation, stationery used, personnel emoluments (staff costs) and time taken.

Cross-sectional studies

Data were entered, stored and analysed in PANACEA (Pan Livestock Services Ltd.). Using the results from the farmers' ranking of constraints, each response to constraint identification was given scores as follows:

1st constraint = 6 points
2nd constraint = 5 points
3rd constraint = 4 points
4th constraint = 3 points
5th constraint = 2 points
6th constraint = 1 point

Only the first six constraints were ranked. The same scoring system was done for disease:

1st constraint = 2 points
2nd constraint = 1 point

This allowed quantitative ranking of both constraints in general and the disease constraints.

The same cost items as used as for the RRA were used to cost the cross sectional studies.

RESULTS

Farming system

In the RRAs, the mean area of farms was estimated at 15 and 4 acres for smallholder farms for the rural and peri-urban areas, respectively. The mean farm area from the cross-sectional studies was estimated as 16.25 and 5.42 acres for the rural and the peri-urban areas, respectively. Approximately 90 % of the farmers in both the areas practise mixed farming.

Time taken and cost of studies

The RRAs and cross-sectional surveys took a total of 4 and 10 days for the rural and peri-urban areas respectively. The cost of the various items used in the studies in Kenya shillings (Kshs) is shown in Table 1.

The total cost for the cross-sectional survey was 2.20 and 2.19 Kshs more expensive during the cross-sectional studies compared to the RRAs in the peri-urban and rural areas, respectively. The major costs in both methodologies were the personnel per staff emoluments, that represented 61 % (6700/10 976) and 77 % (18 700/24 208) of the total cost for the RRA and cross-sectional studies respectively in the peri-urban area. For the rural area, it costs 61 % (6700/11 840) and 72 % (18 700/25 968) of the total cost for the RRA and cross-sectional studies respectively.

Constraint ranking

Farmer constraint ranking in the peri-urban

Livestock diseases were ranked as the major and most important constraint by both methodologies. Rapid rural appraisal studies ranked cattle theft as the second most important constraint compared to lack of artificial insemination (AI) services in cross-sectional studies. Poor transport and marketing of milk were the next most important constraints in the qualitative and quantitative surveys respectively. Other constraint rankings are as indicated in Table 2.

Farmer constraint ranking in the rural area

Rapid rural appraisal findings identified lack of veterinary extension, marketing and diseases as the

TABLE 1 Rapid rural appraisal and cross-sectional methodologies in constraint identification in Uasin Gishu District, Kenya

| Cost | Amount in Kenya shillings | | | |
| | Peri-urban | | Rural area | |
	RRA	CSS	RRA	CSS
Personnel costs	6 700	18 700	6 700	18 700
Fuel costs	2 336	3 168	3 200	4 928
Refreshments	650	0	650	0
Stationery	1 290	2 290	1 290	2 290
Total	10 976	24 208	11 840	25 968
Ratio CSS/RRA	2.2		2.19	

CSS = Cross-sectional studies
RRA = Rapid rural appraisal

TABLE 2 Constraint ranking of cattle production constraints as percieved by farmers in the rural and peri-urban areas using rapid rural appraisal and cross-sectional methodologies in constraint identification in Uasin Gishu District, Kenya

| Constraint | Rapid rural appraisal | | Cross-sectional | |
	Rural	Peri-urban	Rural	Peri-urban
Diseases	3	1	1	1
Marketing	2	–	5	3
Communication	4	3	–	–
Lack of extension (especially veterinary)	1	5	7	8
Water shortages	5	–	2	4
Lack of AI services	6	4	3	2
Feed shortages	7	6	4	6
Labour	–	8	6	5
Finance	–	7	–	7

– = Not mentioned

TABLE 3 Disease constraint identification and ranking as percieved by farmers in the rural and peri-urban areas using rapid rural appraisal and cross-sectional methodologies in constraint identification in Uasin Gishu District, Kenya

| Disease constraint | Rapid rural appraisal | | Cross-sectional | |
	Rural	Peri-urban	Rural	Peri-urban
Tick-borne diseases (mainly East Coast fever)	1	1	1	1
Lumpy skin disease	8	–	5	4
Blackquarter	9	6	6	9
Foot and mouth disease	4	–	2	9
Mastitits	6	3	4	2
Infertility	10	–	–	5
Helminthosis	2	2	3	3
Eye infection	3	5	–	5
Milk fever	11	7	–	8
Pneumonia	–	4	9	9
Retained after birth	–	–	5	5
Foot rot	8	8	–	–
Leptospirosis	9	9	–	–

– = Not mentioned

most important constraints in this area. Cross-sectional study findings identified diseases, water shortages and lack of AI as the most important constraints in the area. There was a big contrast in the ranking of veterinary extension and feed shortages by the two methodologies as indicated in Table 3.

Disease ranking

Tick-borne diseases including East Coast fever (ECF), anaplasmosis, babesiosis and heartwater, were identified as the most important disease constraint that limits smallholder cattle production in the two areas of study. The most important single disease constraint was ECF, while important diseases in the other two areas were mastitis and helminthoses. Other diseases ranked by farmers are indicated in Tables 4 and 5.

DISCUSSION

Uasin Gishu district is basically an agricultural district and most of the smallholder farmers are resource-poor. The district's population growth rate in 1995 was 3.7% and was higher than the national average at 3.35%. The major constraints identified in this study, i.e. tick-borne diseases, lack AI services and poor veterinary services agreed with those found in other studies in Uasin Gishu district (Onchoke 1993; DPP 1997). Milk is the largest income earner in the district (DDP 1994; 1997). Thus there is need to identify constraints to cattle production, so that quick prioritised interventions can be undertaken. From the study, rapid appraisals seem to be the most cost-effective appropriate method to apply for determining which intervention were required. The risks involved at less accurate results were also limited in this study as the target farmers were involved at every stage. This agrees with Kumar (1993), who also indicated that rapid appraisal methods are more flexible and capable of exploring new ideas and issues that may have not been anticipated. One such issue is security problems in the periurban area. The time saved in achieving the results would be greatly appreciated by the resource-poor smallholder farmers, especially if followed by timely interventions on the identified production constraints.

Rapid rural appraisal studies indicated that farmers in the two areas considered the breakdown of tick control and the resulting high prevalence of ECF as the most important constraints to cattle production. There are some differences in the ranking of constraints and diseases as obtained by the rapid appraisals and the structured questionnaire surveys.

For example, lack of AI, and feed and water shortages were ranked as more serious constraints in the structured surveys than in the RRAs.

The structured survey was more expensive than the RRA. This supports the view of Chambers (1983), who noted that formal data collection methods (particularly questionnaire surveys) do not generate cost-effective data. The structured questionnaire survey was more time-consuming than the RRA which also added to the overall cost. McCauley, Tayeb & Majid (1983) in Sudan and Perry, Mwanaumo, Schels, Eicher & Zaman (1984) in Zambia reported similar results. From the results obtained, it was realised that qualitative methods could precede quantitative ones. In this study the community group discussions provided clues on problems that constrain development of the livestock industry in the western Kenya highlands and thus need special attention. From the studies it was realised that the qualitative procedures enables the investigator to fully interact with the farmers and to discover how the farmer manages his resources in the phase of risk. Qualitative studies are also important in the development of confidence between farmers and researchers, and continuity of commitment by everyone involved in the project which is in agreement with the findings of Krueger (1994) and Cook (1995).

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