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ADAPTING PARTICIPATORY APPRAISAL (PA) FOR THE VETERINARY EPIDEMIOLOGIST: PA TOOLS FOR USE IN LIVESTOCK DISEASE DATA COLLECTION

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In the early 1970s it was recognised that formal systems of inquiry were of limited value when working with rural communities in developing countries. Over-use of questionnaire surveys, "rural development tourism" and poor cost-effectiveness were identified as some of the key problems with formal methods of data collection, particularly questionnaire surveys (Chambers, 1983). In response to these problems, a system called Rapid Rural Appraisal (RRA) was developed in the 1980s (McCracken et al., 1988). Rather than attempting to collect quantitative data on problems identified by researchers, RRA focused on farmers' perceptions of priority problems and was characterised by a reliance on qualitative data and avoidance of statistical analysis.

In the late 1980s RRA evolved into Participatory Rural Appraisal (PRA). PRA facilitated the participation of communities in the analysis and solving of problems, and encouraged project beneficiaries to plan and take action. Definitions and levels of "participation" within the context of sustainable agricultural development are discussed by Pretty (1994), with self-mobilisation representing the ultimate level of participation. RRA and PRA now form part of a family of approaches including Participatory Learning and Action (PLA), Rapid Assessments Procedures (RAP) and Rapid Rural Systems Analysis (RRSA). As a key feature of all these systems is participation, this paper uses the term "Participatory Appraisal" which relates to data collection tools which might be used in any of the above systems.

Participatory methods are now widely used by development projects in both rural and urban areas of the Third World and some workers are investigating ways of combining participatory and formal approaches (Turton et al., 1996), including quantification and statistical analysis of data generated by PRA tools (de Villiers, 1996). In developed countries there is also interest in participatory approaches as exemplified by the use of RRA in forestry programmes (Inglis and Lussignea, 1995) and human health work in Scotland (Murray et al., 1994).

Initial interest in participatory approaches in the livestock sector included a review of informal survey methods in relation to community participation (Leyland, 1991) and later, a description of rapid appraisal methodologies (Ghirotti, 1993). During the early 1990s PA was

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widely used by community-based animal health projects (Kirsopp-Reed, 1994) and pastoral development projects (Waters-Bayer and Bayer, 1994). These projects had close links with project beneficiaries and could demonstrate understanding of local veterinary knowledge, skills and perceptions, often called "ethnoveterinary medicine". In contrast, the use of PA in bilateral or multilateral-funded veterinary aid programmes and government veterinary services has been limited. The reluctance to use participatory data collection methods is often related to claims that PA is not "scientific" and does not produce data which can be analysed statistically.

Formal methods such as questionnaire surveys have been widely used by government services and researchers for collecting data from livestock owners. Work in Zambia (McCauley et al., 1983), Sudan (Perry et al., 1984) and Afghanistan (Schreuder et al., 1996) indicated that although livestock owners could provide useful information on disease incidence, mortality or production losses, the questionnaire methodology was time-consuming and based on the researchers' priorities rather than those of the respondents. Attention to enumerator bias was limited in these studies.

PA has been used to good effect by community-based animal health projects and consequently, there is now potential for incorporating these methods into conventional animal health data collection systems. This paper aims to outline PA tools which are relevant to veterinary epidemiology and discuss the role of qualitative data in formal surveys. Methodologies and results of two PA tools are described in more detail in order to show how the tools might be adapted in order to yield quantitative data for statistical analysis.

PA TRAINING FOR VETERINARY EPIDEMIOLOGISTS

The PA tools outlined below include tools which can be modified by veterinary epidemiologists to yield numerical data. However, before readers attempt to adapt or standardise PA tools, they should gain practical experience of participatory methods and essentially, receive training in PA. A typical PA training course would include the following topics:

- Introduction to the background, development and approach of PA.
- Attitudinal aspects of PA.
- Understanding bias and rural development tourism.
- Communication skills: listening skills and non-verbal communication and behaviour.
- Identification of social groups and informants, including key informants.
- Managing group interviews (group dynamics, dominant talkers, non-verbal communication/behaviour)
- Use of secondary data sources and direct field observation.

PA TOOLS

PA collects information using a "toolkit" comprising diagramming, mapping, scoring, ranking and interviewing methods. Some PA tools which have been used by veterinarians in developing countries are shown in Table 1. In a typical PA survey, the combination of tools allows cross-checking or "triangulation" of results while researchers are still in the field. Results are also cross-checked by working with both men and women, and using informants with varying experience, skills, age, social status or wealth . When investigating subjects such as livestock disease, local "experts" can be identified who are respected by their communities for possessing specialist knowledge. PA calls these experts "key informants".

Table 1. Some PA tools for use in veterinary epidemiology and economics

Information required	PA tools and methods[a]
System boundary	Natural resource maps
Social organisation	Social mapping, venn diagram
Wealth groups	Wealth ranking
Relative livestock ownership	Proportional piling
Role of livestock in household economy	Livelihood analysis
Preferred types of livestock reared	Livestock species scoring
Income from livestock	Proportional piling
Marketing structure	Flow diagrams, service maps
Veterinary services	Service map, Venn diagrams
Animal husbandry	Seasonal calendars[b], mobility maps[c]
Resources available to livestock	Natural resource maps
History of livestock diseases	Timelines
Priority livestock diseases	Livestock disease scoring
Seasonal variations in livestock disease	Seasonal calendars
Relative mortality rates	Proportional piling
Livestock productivity	Progeny histories, seasonal calendars

[a]Semi-structured interviews can provide information on all topics
[b]Particularly useful for showing breeding management and feeding management
[c]To show livestock movements in pastoral and agropastoral systems

To date, most PA tools have been used to produce qualitative not quantitative data and PA survey results are presented in a descriptive (e.g. interviews, direct observation, diagrams) rather than numerical (e.g. tables, graphs, statistics) form. However, virtually any qualitative data can be transformed into numbers. If this transformation occurs at an early stage in the data collection process, descriptive information is summarised in numerical form and subsequent analysis is governed by statistical rules (Moris and Copestake,1993). In the PA toolkit, some tools require informants to score items or illustrate proportional relationships between items. In other words, these tools produce numbers.

Scoring tools

In livestock surveys, scoring tools can be used to compare and prioritise items such as livestock species or livestock diseases. The tools provide information on preferences and encourage informants to not only state opinions, but also explain the reasoning behind their decisions.

Method: Scoring tools involve three main stages. The methodology outlined below is described in much greater detail in account of a tool called livestock-disease scoring (Catley and Mohammed, 1996).

Stage 1 - Identification of items to be scored. Ask the informants to name the items under investigation. For example, if investigating preferences for species of livestock reared ask the question, "Which types of livestock do you keep?". If investigating animal health problems, the researcher can limit the number of items by questions such as "What are the six most important livestock diseases in your animals throughout the year?" Write the items named by the informants on to separate pieces of card using the local language. Check that at least one informant is literate. If all informants are illiterate use different objects to represent each named item e.g. when investigating livestock species a stone could represent a cow, a leaf could represent a goat, and so on.

Stage 2 - Pair-wise comparison of the named items. First, choose two items (represented as name cards or objects) and ask the question "Which of these two is most important and why?" The informants will prioritise the items and provide reasons for their decision. Record the response and repeat the question until each item has been compared with every other item. At the end of the pair-wise comparison the researchers should have recorded a list of "indicators" or factors used by the informants to compare the different items.

Stage 3 - Scoring of items verses indicators. Place the name cards or objects in a row on the ground. Collect a pile of stones using 5 stones per item as a guide to the number of stones needed e.g. if 6 items are being scored, 30 stones are required. Remind the informants of the first indicator mentioned during the pair-wise comparison; ask them to distribute the stones according to degree of relationship between this indicator and each of the items represented by the name cards or objects. All stones must be used. After the stones have been allocated to each item, check the scoring with the informants and allow them to alter the scoring if they wish. Record the final number of stones allocated to each item, collect the stones and then repeat the scoring for each of the indicators.

<u>Examples of results:</u> Figure 1 shows how livestock species were scored by a group of three herders in northern Somalia. These informants mentioned 43 indicators during the pair-wise comparison of 5 livestock species and each indicator was scored using 25 stones. The indicators included both positive and negative attributes of livestock. Livestock species scoring is best conducted at an early stage in a survey as local perceptions of the role and relative importance of livestock types can assist researchers to cross-check information on animal health problems.

Figure 2 shows the results of a livestock-disease scoring which was based on the question "What were the 6 most important livestock diseases in your area during the last year?" The informants were a group of 5 herders in northern Somalia and each indicator was scored using 30 stones. The results include local perceptions of disease causality, epidemiology, production losses and economics. Seasonal bias of the results can be cross-checked using seasonal calendars (see later).

<u>Variations in the method:</u> Like most PA tools, scoring tools are flexible and can adapted by the researchers to suit particular needs. Obvious variations include altering the number of items to be scored, altering the number of stones used, or adding the researchers' own indicators to those of the informants. An overall score for each item can be obtained from the informants or by adding all the scores for each item. If the latter method is used, the scores of indicators which reflect problems or unfavourable aspects of a particular item should be given a negative value. For example, in Fig.1 indicators 7, 11, 14-16, 22-24, 27, 33-37 and 40 would be recorded as negative values if the scores for each livestock type were summed.

<u>Standardisation of scoring tools:</u> Scoring tools might be standardised by defining the number of items to be scored and the number of stones to be used for the scoring of indicators. Specific indicators could be defined by the researchers and added to those produced by the informants. Replication of a standardised scoring tool would allow statistical analysis of results using using tests for non-parametric data such as Kruskal-Wallis followed by Dunns Multiple Comparisons Test.

<u>Seasonal calendars</u>

Seasonal calendars are diagrams constructed by informants which illustrate seasonal variations of events under investigation. A number of different events can shown on a single diagram e.g. livestock breeding management, incidence of important livestock diseases, feeding management and livestock sales. If a survey is focused on animal health problems, a seasonal calendar showing the incidence of livestock diseases is useful for cross-checking the results of livestock-disease scoring.

<u>Method:</u> In order to use seasonal calendars the researchers should understand and use local descriptions of seasons and months.

Stage 1 - Draw a horizontal line on the ground to represent 1 year. The line should be at least 1 metre in length. Divide the line according to local definitions of month and season.

Stage 2 - It is useful (though not essential) to choose rainfall as the first event to be illustrated on the calendar. Take a stick of around 30cm in length and explain to the informants that the stick represents the month which receives the most rain in a year. Ask the informants to place the stick against the month which receives the most rain.

Stage 3 - Take a second stick of around 30cm in length. Explain to the informants that the stick represents the month which receives the second most rain in a year. Ask them to break the stick according to the amount of rain received in the second wettest month, and place the stick against the appropriate month. At this stage the informants will often compare the length of the second stick with the first, and break the second stick accordingly. Repeat this procedure until rainfall throughout the year has been illustrated using sticks. An alternative method uses piles or rows of stones to illustrate rainfall.

Stage 4 - Ask the informants to illustrate on the diagram the occurrence of the events under investigation. Events might be the livestock diseases identified during a livestock-disease scoring. The informants can simply draw on the ground to show the events or use sticks, stones or other natural materials.

Examples of results: Examples of seasonal calendars are shown in Figure 3 and Figure 4. In Fig.3, stones were used by informants to show rainfall, livestock births, disease incidents and livestock sales. The diagram was constructed by a group of 11 pastoralists in northern Somalia. Figure 4 shows seasonal tick infestation of livestock as perceived by informants in one area in northern Somalia. Sticks have been used to illustrate rainfall and piles of stones indicate seasonal variations in infestation by different types of ticks. In this example, the number of stones used was not specified by the researchers.

Standardisation of seasonal calendars: Seasonal calendars which use piles of stones to show the timing of events are similar to scoring tools and therefore some standardisation is possible. Note that the low number of stones (maximum 3 stones per item) used in Fig.3 may have limited the sensitivity of the tool because only scores or ranks of 0,1,2, or 3 were possible. In Fig.4, up to 18 stones per item (type of tick) were used. If the number of stones and seasons was fixed, results from repeated seasonal calendars could be analysed using Kruskal-Wallis tests and Dunns Multiple Comparison Test.

When sticks are used to show rainfall a "qualitative bar chart" such as that shown in Fig.4. can result. This diagram indicates trends in rainfall and was copied on to paper by measuring the sticks and producing a scaled drawing. Initially, local names and definitions of months and seasons should be used but later these can be altered to the Gregorian calendar as necessary. The events which are scored according to season can be defined and standardised by the researchers.

CONCLUSIONS

The use of PA is increasing in a range of sectors in both the developing and developed world. PA methods continue to evolve, including specialised PA tools which are adapted to meet the needs of particular disciplines. Regarding surveys in developing countries which rely on data derived from livestock owners, PA has numerous advantages over questionnaires. The design of conventional questionnaire formats and interview protocols can be a lengthy and difficult process (Putt et al., 1988) whereas PA tools involve simple checklists of key words. PA tools are flexible and can be modified in the field, and triangulation allows cross-checking of results at the research site. In terms of quality of data, perhaps the most important aspect of PA is that it creates good rapport and trust between interviewers and informants. Unlike questionnaire surveys during which informants may be either suspicious or bored, livestock surveys using PA tend to be lively and enjoyable events which rely on livestock owners actively teaching outsiders about local problems and practices. The relative costs of questionnaire and PA surveys have not yet been determined.

Within the field of veterinary epidemiology and economics there are opportunities for using PA methods, particularly in developing countries. Although unmodified PA tools generate qualitative data, this data can compliment more formal systems of inquiry and may be acquired with limited resources. The use of standardised PA tools which produce quantitative data is another option for veterinary epidemiologists, although training in general PA approaches and methods is recommended before existing tools are modified. This paper provides a very brief overview of PA and presents results of PA tools from only one country. For further information on participatory methods, readers are advised to consult literature produced by the Sustainable Agriculture Programme of the International Institute for Environment and Development, London.

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Figure 1 **Example of livestock species scoring, northern Somalia**
(Source: Ahmed Aden and Catley, 1993)

Indicators provided by informants	camel	sheep	goat	cattle	donkey
1. Resistant to drought	11	6	4	1	3
2. Can travel long distances	15	2	3	2	3
3. Availability of milk	13	2	4	6	0
4. Breeding not controlled	3	3	13	3	3
5. Use for blood money compensation	25	0	0	0	0
6. Paying dowry	14	4	2	5	0
7. Difficult for women to look after	9	3	3	9	1
8. Only men can benefit	12	6	2	4	1
9. Easy to sell	2	16	4	3	0
10.Convenient food for hospitality	0	17	8	0	0
11.Used to assist newly married man	0	16	9	0	0
12.Rapid growth (to maturity)	2	7	11	5	0
13.Quality of milk (taste)	9	2	6	8	0
14.Susceptibility to disease	1	8	2	7	7
15.Frequency of watering needed	1	2	4	11	7
16.Susceptibility to cold	1	2	13	7	2
17.Sale value	10	4	1	7	3
18.Animal power (for ploughing)	3	0	0	15	7
19.Ghee production	0	3	7	15	0
20.Use of hides and skins	6	3	2	14	0
21.Use as burden animal	18	0	0	0	7
22.Cause of disputes (between herders)	14	3	1	7	0
23.Ownership is a security risk	20	1	0	4	0
24.Bad effect on herder literacy	14	2	8	1	0
25.Good effect on religious life	1	18	3	3	0
26.Requires forest area	11	0	10	4	0
27.Bad affect on marriage prospects	13	1	4	7	0
28.Quantity of meat	12	2	4	7	0
29.Quality of meat (taste)	5	5	13	2	0
30."Meat keeps us full"	15	3	1	6	0
31.Used for earning additional income	10	0	0	9	6
32.Used for domestic tasks	8	0	0	0	17
33.Noisy	2	0	0	0	23
34.Farts a lot	2	3	10	3	7
35.Produces bad dung	0	0	0	0	25
36.Dirty/unclean animal	0	0	0	0	25
37.Cause of injury to herder	5	0	5	10	5
38.Amount of fat	5	12	2	6	0
39.Able to live on open plains	9	14	0	0	2
40.Special timing of watering needed	3	3	9	8	3
41.Overall score for meat	7	10	5	3	0
42.Nutritional value of milk	10	3	4	8	0
43.Overall score for milk	14	1	3	7	0

Figure 2 Example of livestock-disease scoring, northern Somalia (Source: Catley and Mohammed, 1996)

Indicators provided by informants	DISEASES Nairobi sheep disease	respiratory disease in camels	intestinal helminthiasis all species	surra	ulcerative balanoposthitis in sheep	camel pox, sheep and goat pox
Importance indicators						
reduced local sale value	0	4	4	5	7	10
reduced export sale value	0	0	0	0	11	19
disease causes poverty	19	0	3	0	0	8
disease causes death	15	0	6	0	0	9
disease causes recumbency	7	0	23	0	0	0
disease causes emaciation	0	0	17	13	0	0
disease causes abortion	0	24	0	0	0	6
disease damages skin	0	0	0	0	0	30
disease is spread by ticks	30	0	0	0	0	0
disease affects different species	0	0	0	0	0	30
disease reduces milk yield	0	12	6	12	0	0
disease makes meat inedible	4	0	8	0	0	18
disease cannot be treated	0	0	0	15	0	15
overall importance scoring	9	0	5	3	3	10
Difference indicators						
disease occurs in hot weather	10	0	0	0	0	20
disease is contagious	0	11	0	2	4	13
disease is spread by worms	0	0	30	0	0	0
disease affects mainly sheep	22	0	0	0	8	0
disease causes subcut. oedema	0	0	16	0	6	8
disease causes diarrhoea	8	0	22	0	0	0
disease causes bloody diarrhoea	9	0	21	0	0	0
disease causes coughing	11	19	0	0	0	0
reduced breeding potential	0	0	0	0	30	0
black lymph nodes, post mortem	21	0	0	0	0	9
thin watery blood, post mortem	0	6	6	11	0	7
congested meat, post mortem	15	0	15	0	0	0
can vaccinate against disease	0	0	0	0	0	30