

# ASSESSMENT OF BEE DISEASES AND PESTS USING PARTICIPATORY EPIDEMIOLOGICAL TECHNIQUES

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## Introduction

*Participatory epidemiological (PE) techniques or Participatory rural appraisal (PRA)* is a qualitative intelligence gathering approach designed to rapidly achieve a best-bet understanding of a situation as a basis for an action plan. It is a decision-oriented information collection and analysis process. A multi-disciplinary team of experts usually implements participatory rural appraisals.

## The Participatory epidemiological (PE) techniques

PE method provides a toolkit of techniques and activities that facilitate the exchange of information. The process is open-ended in that it allows the beneficiaries to provide direction to the information gathering process. This has been referred to as discovery and is based on the assumption that the appraisal team cannot and should not assume that they can anticipate all the issues and information that is important to understanding the situation. The process is participatory since the informants actually benefit from the information collection process.

First, the data collection tools provide an opportunity for community self-realization through better visualization of their life and livelihood situations. Secondly, the information obtained through PE or PRA is information for action that should result in interventions directly benefiting those who provided the data.

The method of sampling in PE or PRA studies is based on the principal of key informants rather than randomisation. The study actively seeks individuals who are likely to have specialized knowledge or a uniquely informative perspective on the issues under study.

In the case PE, the study team actively seeks out livestock owners and traditional healers who are respected for their ability relative to animal health. Other types of key informants are traditional elders and community leaders who are directly involved in decision making processes and have some authority to speak for the group. Finally, veterinary professional, international experts and individuals with expert knowledge about the sociology of the groups under study are frequently consulted.

The way qualitative data is assessed and validated is fundamentally different from quantitative data. In the quantitative world, statistics are used to calculate the probability that randomized information and associations are valid. Validation in the qualitative approach is based on weighing of evidence from diverse sources. This may include information derived from quantitative or laboratory-based testing. But PRA can make use of broader forms of experiential knowledge and information such as oral testimony and observations from samples of non-random key informants.

The tools of participatory epidemiology utilize the PRA toolkit of methods. These methods may be grouped as secondary sources, direct observation, interview techniques, visualization techniques and methods of ranking and scoring.

## Secondary sources

Secondary sources refer to existing literature, reports, maps and databases on the communities and issues under study. All good PRA studies begin with an inventory of secondary sources and a review of these sources.

## **Direct observation**

The techniques of direct observation refer to observing the environment and daily activities of livestock owners. One of the simplest starting points is to get out and walk through the village or cattle camp and surrounding pasture. Observe the condition of the people, livestock, housing and pasture. Note what plants are present. Try to be present for production activities like milking and note who is carrying-out the tasks and how they are completed.

## **Semi-structured interviews**

One of the main tools of participatory epidemiology is the semi-structured interview. In semi-structured interviews, a checklist of subjects to be covered is used as a point of reference rather than a questionnaire. The interview team makes use of open-ended questions to allow participants the opportunity to introduce topics and issues. For example, after introductions, an opening question might be "What are the problems with your livestock?" As the participants introduce topics, probing questions are asked to obtain more detail and check information for internal consistency.

## **Visualisation techniques**

The visualisation techniques include approaches such as map, Venn diagram, timeline and seasonal calendar construction. Mapping usually involves clearing an area of sand and sketching with sticks the relative location of key resource and strategies used by the community. This includes things such as grazing areas, cultivation areas, water sources, salt sources, woodlands, wild foods, wildlife, habitat of insect vectors of disease, friendly and unfriendly neighbours, trade routes, seasonal movements, and emergency movements. Using this approach, the appraisal team can very quickly obtain an overview of the area and the spatial distribution of key resources. In epidemiology, the spatial relationship between communities, their social relations and movement patterns go a long way towards determining livestock contact patterns and are key to understanding the epidemiology of infectious disease. Timelines and seasonal calendars are very powerful tools for describing the temporal patterns of disease in a location.

## **Ranking and scoring methods**

Ranking and scoring refers to a group of techniques used to prioritise information or provide semi-quantitative estimates of the relative size or impact of categories as perceived by the participants. In ranking, the respondents are asked to place items in their order of priority. For example, if 5 diseases have been mentioned as problems, the interviewer requests that they be listed in order of importance. A more systematic alternative is pair-wise ranking where the respondents are asked to identify which is the more important disease of each possible combination of two diseases from the list.

Proportional piling is a very flexible technique in which respondents are asked to divide 100 objects such as seeds or stones into piles of sizes representing the relative size or importance of different categories. The number of objects in each pile is then counted to give a score. These exercises can be repeated in subsequent interviews and the results analysed statistically.

## **Data validation and analysis**

In the process of data collection, the use of probing questions is an important quality control tool to assess the internal consistency of reports. Once a body of information is obtained from a series of interviews and data collection exercises, the information can be assessed through the process of triangulation. The term triangulation simply means comparing information obtained from multiple informants and multiple methods to look for patterns. If the information suggests a uniform

conclusion then the interpretation is relatively straightforward. Occasionally, different groups of key informants may provide conflicting information. The study team must then consider how the differing perspectives of the informants impact the information obtained.

An important advantage of PE that provides a high degree of flexibility is iterative analysis. As the data is gathered, the study team can review the information available and refine the study hypotheses. They have the opportunity to include new questions or data collection exercises as a result of information discovered during the PRA process. A further form of analysis is participatory analysis. Once the study team feels they have a reasonable best-bet scenario that describes the situation, they can present that scenario back to the participants. The participants can then add, subtract or clarify information in the best-bet scenario.

### **Applications of participatory epidemiology**

As was mentioned in the introduction, PE was first developed as a project needs assessment tool. It has also found application in animal health project monitoring and evaluation. The techniques can be used to track changes in disease impact over time as well as to collect the perceptions of beneficiaries and other stakeholders on the impact of the project, weaknesses and possible ways to improve performance.

Perhaps more importantly, PE has important applications as an epidemiologic surveillance tool in its own right. Participatory epidemiology has been adapted as a very successful method of targeted surveillance for rinderpest. In fact, a few low cost and relative short-term PE studies have dramatically altered the conventional wisdom regarding the mechanisms of endemicity and spatial distribution of rinderpest in East Africa. This approach has been termed participatory disease searching (PDS).

### **Participatory disease searching (PDS)**

In PDS, the disease search team is interested in information on a specific disease but takes precautions not to communicate this interest to respondents. Questions are asked about general animal health concerns. If the target disease is identified as a problem, probing questions can be asked about the target disease in combination with other subjects. The investigation seeks to establish the history of the disease in a community and trace reports forwards and backwards in time. Often, herders guide the disease search team to active cases of disease that can then be confirmed by laboratory diagnostic methods.

Another promising application of PE is in the general disease surveillance. Community-based animal health programmes are in place in a number of countries and in some countries more than one thousand community-based animal health workers (CAHWs) are active. These programmes are important animal health information networks. Programme monitors debrief and re-supply CAHWs on a more or less monthly basis. The CAHWs are aware of major disease outbreaks and are a source of information about trends in endemic disease.

Several appropriate techniques of sample collection such as dried blood on filter paper have been developed for both serological and genetic analysis. At present national disease surveillance systems have yet to create a framework to adequately utilize this important and sensitive source of disease information. Efforts are now underway to combine participatory epidemiological approaches with more conventional forms of analytical epidemiology. To this end, the Community-based Animal Health and Participatory Epidemiology (CAPE) Unit has been supporting the use of PE as a method of collecting expert opinion for use in infectious disease modelling. Also, studies have been completed by the PAVE Project to validate existing veterinary knowledge as a form of epidemiologic data. The results of this work suggest that combinations of both participatory and analytic techniques yield an extremely powerful approach to the study of epidemiology.

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