

# **PARTICIPATORY RESEARCH AT THE LANDSCAPE LEVEL: KUMBHAN WATER TROUGH CASE STUDY**

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## **1. Background**

Since October 1997 the Natural Resources Institute (NRI) and BAIF Development Research Foundation have been collaborating on a research project entitled “Easing Seasonal Fodder Scarcity for Small Ruminants in Semi-Arid India, through a Process of Participatory Research”. During 1998 on-farm trials took place in four villages to examine the effect of feed supplementation during the dry season.

In one of the trial villages (Kumbhan in Bhavnagar District, Gujarat) the livestock-keepers said that seasonal water scarcity is a more serious problem for them than seasonal feed scarcity: mean annual rainfall in Bhavnagar is about 500 mm and is concentrated in the period of July-September. They said that they have to walk long distances during the hot dry season (March-June inclusive), because of a lack of water near their main (communal) grazing area, which obliges them to go elsewhere for drinking water, thereby limiting the amount of time they can spend in the grazing area. The livestock-keepers proposed the construction of a water trough and storage tank near to a privately owned well, in the vicinity of the grazing area, whose owner was agreeable to supplying water to the trough. He was already supplying some water to a channel in his field, but its capacity was small.

Although the research project is focusing on feed scarcity, rather than water scarcity, the researchers decided to support financially the construction of the trough, since water scarcity and feed scarcity appeared to be closely inter-related. First, inadequate water intakes would be expected to have a negative impact on feed intake per se, and hence direct and indirect effects on animal productivity. Second, the longer distances covered by the livestock in search of water would increase their feed requirements; and, third, reducing the time spent walking would increase the amount of time available for grazing.

Once the decision had been made (in November 1998) to proceed with the trough, some more detailed baseline data were collected (in late 1998 and the first quarter of 1999), regarding animal numbers, types, daily activity patterns. The trough was constructed in April 1999, and came into use on 9 May. The researchers involved represent a range of disciplines and experiences. Three NRI staff have contributed – a socioeconomist (project coordinator for NRI), and two livestock nutritionists. Two of the senior BAIF staff (including Dr Rangnekar, project coordinator for BAIF) are veterinarians by training, whereas the field staff’s qualifications are broader (agriculture, rural science). All the BAIF staff have general experience of livestock and rural development, but the field staff’s experience of research was limited.

## **2. Stakeholder Involvement in Problem Identification**

Gujarat is a vegetarian state in which meat production and consumption are socially unacceptable in rural areas. Thus, milk and manure are the main livestock products. There are two groups of goat-keepers in the village: the *Rabaris*, a caste specialising in livestock production (mainly cattle and goats); and the Scheduled Castes (SCs), whose main livelihood enterprise is wage labour or share-cropping, and who keep 2-3 goats to produce milk for subsistence, and as liquid assets. Livestock-herding is the full-time occupation of some male Rabaris, and this group has been keenly interested in the work from the outset, since it addresses the priority livestock production problem that they identified, and since they proposed the construction of the trough.

Initially, the *Rabaris* identified the impact on themselves (i.e. walking considerable distances in the intense heat, with lack of drinking water at times, leading to exhaustion at the end of the day ) as being as important as the effect on their animals. SCs do not experience this problem, as they either pay Rabaris to herd their goats or have different feeding systems. Those SCs who pay the Rabaris said that they expected their goats to benefit directly from the water trough. In a problem tree analysis (see later), the *Rabaris* identified reduced milk production and disease as two specific effects of water scarcity in the dry season, and they expected a general improvement in the performance of their animals due to the saving of energy from the reduction in herding distances.

*2.1 Methods* The water scarcity issue was raised during a semi-structured group interview with Rabari men in late 1997, as part of the initial survey work on livelihood system characterisation and needs assessment. They were asked to identify and rank their main livestock production constraints, which were: 1. water scarcity (dry season); 2. feed scarcity (dry season); and 3. disease. In addition, BAIF has an office in Kumbhan, and is involved in other development activities there, so there is frequent informal contact between its local staff and the villagers. Livestock production constraints - and the relationships between causes, core problem and effects - were further elucidated through a participatory problem tree analysis undertaken by *Rabari* men in November 1998 (see attached note on Participatory Problem Tree Analysis).

### **3. Project Appraisal**

Before a decision was taken on whether to proceed with construction of the water trough, the local BAIF staff collected data that would enable an informed appraisal to be made. Given that the 'project' was small (capital cost about \$300), the appraisal was a simple 'quick and dirty' one. The data included:

- current daily herding routes and distances, and livestock-keepers' estimates of the effect of the trough on these; and
- the number of herders and livestock (by type) expected to use the trough.

*3.1 Financial cost/benefit analysis* A detailed estimate was made by a BAIF consultant of the cost of the trough. This was used by the NRI socio-economist to make a back-of-the-envelope cost/benefit analysis, in which the benefit was expressed in terms of time saved by herders: this suggested that the trough would pay for itself in little more than one dry season.

*3.2 Discussions with different stakeholders* The trough would be situated between Kumbhan and another village, called Anida, so discussions were held with the Anida villagers to ascertain how the trough would affect them, if at all – for example, whether they had any concern that it might enable the Kumbhan livestock-keepers to extend their grazing into areas until then used only by Anida people. Discussions were also held with the farmer who owned the well that would supply the water.

*3.3 Environmental impact assessment* Three potential negative effects of the trough were identified by the researchers, namely on:

- the condition of the land area immediately around it
- the water table and
- the condition of the grazing resource nearby.

Discussions were held with the livestock-keepers and the well-owner about these issues. It was concluded that none of these was likely to occur, and that appears to have been borne out.

#### **4. Stakeholder Involvement in Implementation of Intervention**

The researchers wanted to see evidence of the livestock-keepers' commitment, from the outset, and wanted them to be responsible for the trough in the future. Thus, the following agreement was negotiated with them, and subsequently implemented:

- the project would cover the material and skilled labour costs of constructing the trough;
- the livestock keepers would provide the construction labour voluntarily;
- they would also form a management group that would take full responsibility for the future maintenance of the trough.

#### **5. Monitoring and Evaluation**

The monitoring system has a number of elements. From late March to late June there was monitoring every two weeks of:

- routes and distances covered by herders and their animals;
- the daily activities of the animals (detailed breakdown of time spent on each);
- milk offtake (as an indicator of milk production) of 12 goats and 12 cows; and
- monthly group meetings between researchers and livestock-keepers.

This was a classic case of researchers' data requirements being different from those of farmers, and the design of the monitoring system was researcher-dominated. The Rabaris themselves did not consider it necessary to collect such detailed quantitative data, as they were able to observe the benefits of the trough through normal everyday observations. Finding literate monitors was difficult, even though the project was going to pay them, and schoolboys from other castes were hired and trained to undertake the task. Payment of the monitors caused some resentment among the Rabaris.

##### *5.1 Collective learning*

The monthly group meetings were intended to provide a forum within which the researchers and Rabaris could share their observations of the effect of the trough and can discuss any management issues. They played this role to some extent, but more time appears to have been spent discussing other livestock production issues. This is partly because of the Rabaris' lack of interest in the monitoring data, and partly because the research team were not able to analyse and interpret the monitoring data properly until the monitoring period was over: as a result of the latter, certain trends that could have been usefully discussed in this forum were not. In particular, we were not aware of the fact that milk production of some goats increased after the trough came into use, while that of others was unaffected. These contradictory trends have only just been identified, we do not as yet have any explanation for them, and we are planning to discuss them with the Rabaris in the near future.

In late July three brief and preliminary evaluation meetings were held - with Rabari women, Rabari men and SC men separately - at which they were asked for their views and observations on the impact of the trough, and on matters relating to its use and management. These confirmed that the expected benefits to both animals and herders had been realised. More specific issues, such as the above-mentioned one, will be the subject of more in-depth discussions.

**TABLE Summary of Pros and Cons of the Water Trough as a Case of Participatory NRM Research**

	<b>Pros</b>	<b>Cons</b>
NR problems researched (water & feed scarcity) were identified by Rabaris as their priority livestock production concerns	✓	
Project 'treatment' (trough) proposed by Rabaris	✓	
Livestock-keepers contribute through free construction labour and responsibility for maintenance	✓	
Research aspect of water/feed scarcity relationship only important to researchers		✓
Design of monitoring system researcher-dominated		✓
Monthly joint researcher/livestock-keeper meetings facilitate collective learning	?	
Joint evaluation of water trough impact	✓	

### **METHOD – PARTICIPATORY PROBLEM TREE ANALYSIS**

Problem trees are a very useful diagrammatic tool for analysing problems and gaining a more in-depth understanding of their nature. They also reveal how farmers or livestock-keepers perceive problems and relationships, which may be different from how outsiders see them. They involve identifying a core problem, the factors causing it, and the effects that it has. The core problem is represented as the trunk of the tree, the causes as its roots and the effects as its branches. When explaining the technique to livestock-keepers it is helpful to emphasize the analogy, preferably by pointing to a tree or a picture of one.

One of the advantages of a problem tree is that it shows the **relationships** between different factors, or how livestock-keepers perceive those relationships. This is important for assessing the implications of interventions, since the fact that constraints are often inter-related means that easing one or more can lead to the alleviation or exacerbation of others. The problem tree constructed by the Rabaris of Kumbhan is reproduced as Figure 1. *It incorporates both bio-physical factors (such as, low rainfall and disease) and socioeconomic ones (encroachment<sup>1</sup>, fatigue), and shows how they are inter-related.*

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<sup>1</sup> Encroachment is the illegal privatisation of common lands - in this case grazing land.

**FIGURE 1 PROBLEM TREE CONSTRUCTED BY RABARIS IN KUMBHAN, GUJARAT, SHOWING WATER SCARCITY AS THE CORE PROBLEM**

