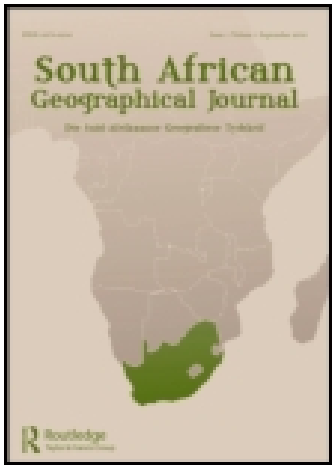

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INTEGRATING RURAL COMMUNITY AND EXPERT KNOWLEDGE THROUGH APPLIED PARTICIPATORY RURAL APPRAISAL IN THE KAT RIVER VALLEY, SOUTH AFRICA

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ABSTRACT

Applied rural development research requires new and innovative research methodologies which can yield results of benefit to both the researcher and the community in question. Participatory Rural Appraisal (PRA) is advocated as a method which has the potential to help address socio-economic conditions in rural Africa. This paper details an applied PRA exercise which led to the improvement in the quality of water supply in a South African rural community. The case-study integrated expert and community knowledge in order to assist the community to identify potential opportunities and threats in relation to their domestic water supply. This has enabled the community to better manage their resource. The paper provides an insight into the potential of PRA to facilitate locally appropriate, pro-active development and, in so-doing, to help contribute to community well-being.

Introduction

South African academics have, increasingly, been confronted with the challenge to try and ensure that their research goes beyond the pursuit of academic excellence and contributes to the greater good of the society in which they live. Though desirable ends, they are often difficult to achieve in practise. This particular paper examines a case in which the researchers have attempted to achieve both objectives in a rural setting. In a quest for greater relevance researchers in many parts of the world are increasingly adopting Participatory Rural Appraisal (PRA) methodologies in the applied research which they undertake within rural communities. Given the high levels of poverty and depravation which exist in Africa, there is a moral imperative for researchers to try and assist in the improvement of human conditions and it is argued here that such PRA approaches, which can have an applied dimension, need to be a key focus in rural development studies (Binns *et al.,* 1997). High levels of poverty, unemployment and environmental degradation, coupled with the frequent incapacity of governments to intervene, creates the opportunity for researchers to become active participants in catalysing rural development. In order to attain these ideals researchers need to adopt innovative research methods which lay a foundation for improving the socio-economic base of the community with whom they are interacting.

PRA is deemed to be one of the most innovative and applied research methodology available to meet the above research and development objectives (Chambers, 1983, 1999). In this paper, through the use of an example that blends research and practical development assistance, the potential of PRA is illustrated. The paper seeks to illustrate how scientific skills, community knowledge and appropriate, community-sensitive research methodologies can contribute to an improvement in rural living conditions.

The research discussed in this article was grounded in the perceived need to integrate PRA research with local and external technical and scientific knowledge, in such a fashion that direct gains could be derived by the host community. As the paper is based on experience gathered in a specific case-study, it is both an investigation of the application of methods and a comment on the specific methodologies employed. In this article, the authors briefly outline what PRA entails, the nature of a water-resource problem identified by the rural community living in the Kat River valley, South Africa, the integration of PRA and expert knowledge, and the identification of viable part-solutions which the community have since adopted. Key findings are analysed and PRA methodologies are reflected upon.

Participatory Rural Appraisal (PRA)

Top-down rural development strategies in Africa have generally not succeeded in raising living standards among the rural poor. It is argued that inappropriate development strategies have stemmed from methodologies which failed to appreciate the whole picture in rural communities and which ignored local people's perceptions, needs and understanding (Shepperd, 1998). A positive trend in recent years has been a shift in the focus of rural development strategies, from the 'top-down' approaches of the past to locally based and more democratic 'bottom-up' strategies. One of the key reasons for this paradigmatic swing is undoubtedly due to the development of new, more enlightened and sensitive rural research methodologies, most notably an array of methods known collectively as 'Participatory Rural Appraisal' (PRA) (Chambers, 1994, 1999). At one level PRA can be seen as a reaction to previous econometric approaches, which frequently ignored 'people', and the critical role which indigenous knowledge and coping systems are now acknowledged as playing.

PRA is an applied research strategy which attempts to involve "local people as active partners in all aspects of the research development process" (Scoones and Thompson, 1994, p.2). A key objective is that of enabling "local people to share, enhance and analyse their knowledge of life and conditions, to plan and to act" (Chambers, 1994, p.1). PRA research does not seek to acquire knowledge based on a predetermined set of criteria, which may or may not be relevant to a community, such as an externally designed questionnaire, but rather to learn, in an inductive fashion, from the host community. This involves spending extended periods of time in a community, observing and participating in their activities and allowing them to reveal what is important in their life-worlds (Binns, *et al.,* 1997; Blackburn and Holland, 1998).

According to Chambers (1994, p.1), PRA is "a growing family of approaches and methods to enable local people to share, enhance and analyse their knowledge of life and conditions, to plan and to act". Some of the key PRA techniques include:

- direct observation, and 'do it yourself',
- discussion with key informants,
- case-studies and stories,
- group-discussions,
- participatory mapping and modelling,
- transect walks,
- time-lines and trend and change analysis,
- seasonal calendars,
- daily time use analysis,
- wealth ranking, and
- matrix scoring and ranking.

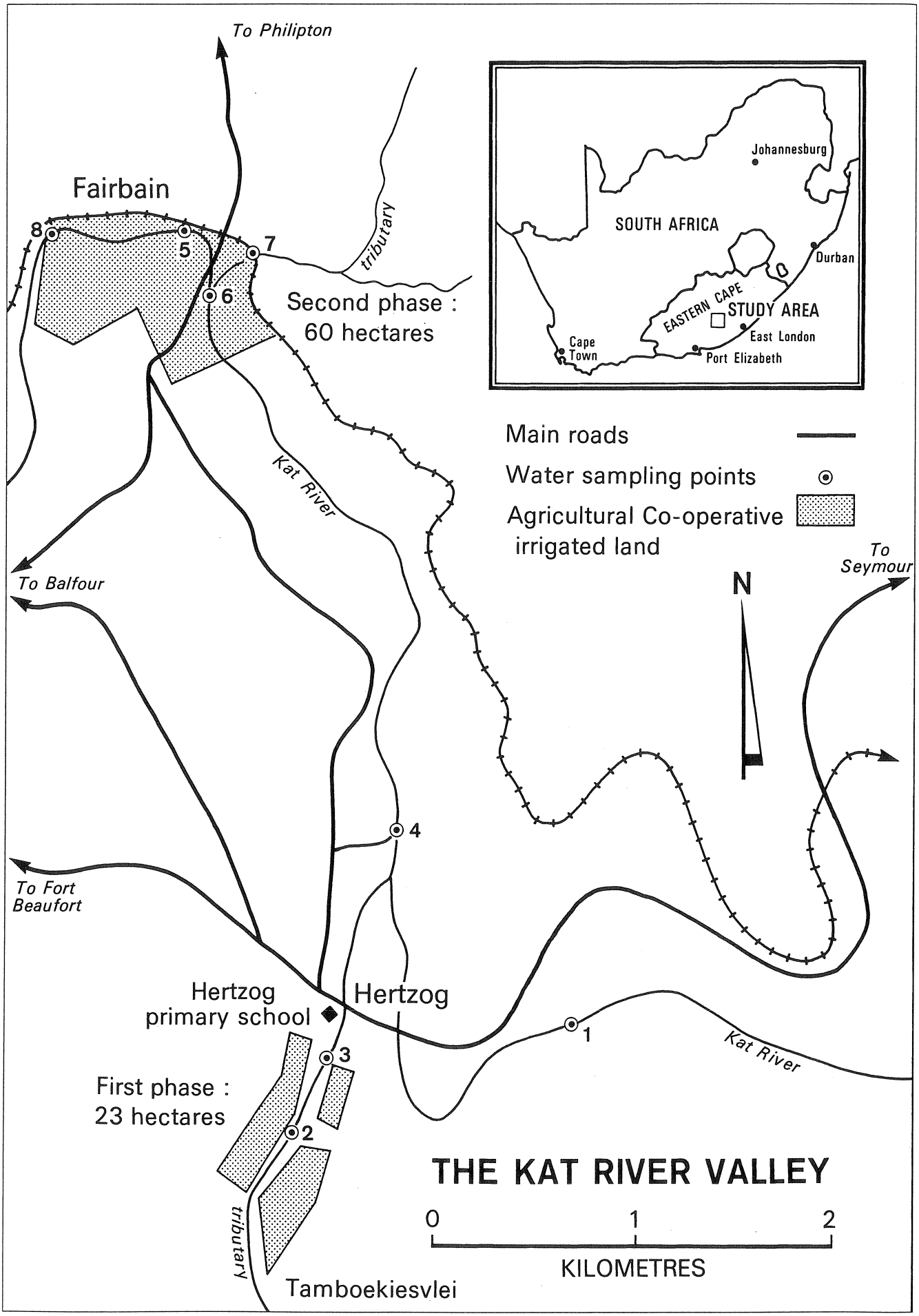

FIGURE 1: Study Area and Sampling Sites, Kat River Valley, South Africa

The authors agree that the process of PRA should be seen as a vehicle for undertaking applied research, co-constructing a shared knowledge base and identifying tangible steps to achieve rural upliftment. As a result, in this study PRA is regarded as more than merely the acquisition of knowledge on the part of either or both the researcher and the researched. A key feature of PRA is its holistic outlook, in which the interaction between different elements in people-environment relationships is considered. This holistic perspective, and the emphasis placed on people-environment relationships have also, traditionally, been important features of much geographical study.

Despite the noble intentions of PRA, the authors contend that the ability to improve conditions in the host community is often limited. Possible reasons for this include the fact that even though a community might become better conscientised to their difficulties through PRA, this seldom leads to the solving of these difficulties. This problem can arise where researchers, seeking to improve rural conditions, may lack the adequate knowledge to effect, recommend or empower the community to take necessary steps for upliftment. It can thus be argued that PRA facilitates the joint recognition of problems and the acquisition of knowledge, but does not always lead to the identification and implementation of possible solutions. If there are no tangible gains and community improvements both the researcher and the process can lose credibility. As far as is possible research must contribute to both knowledge and development.

Other practical problems that can arise at the conclusion of a PRA study include the lack of financial support to communicate findings back to the community, and the fact that researchers often move on to other projects and 'abandon' the community which they studied. This reality is borne out by the findings of detailed interviews with previously 'researched' communities in KwaZulu-Natal (Maphanga, 1997). The view has been expressed that ". . .many people who posed as researchers and developers have come to the village in the past, they discussed matters and went away never to return" (van Vlaenderen and Nkwinti, 1993, p. 218). These considerations need to be borne in mind by any researchers active in rural areas. The issues raised in the last two paragraphs feature prominently in the study discussed below.

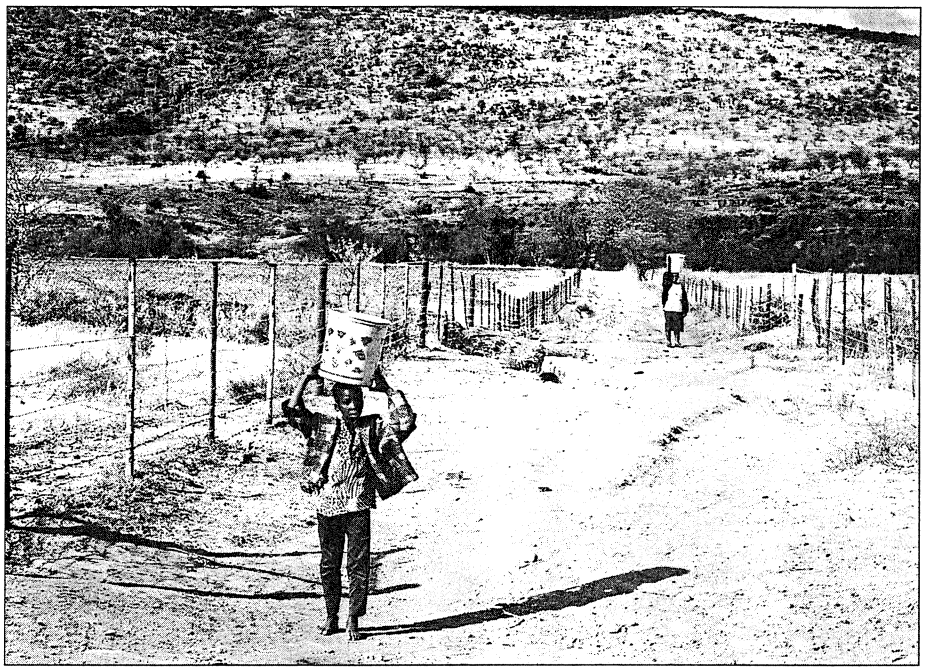

PLATE 1: School-children collecting water in the Kat River Valley.

Setting the Scene

Water is a limited resource in South Africa and, it is essential that adequate supplies of acceptable quality are secured for both domestic and agricultural users. High levels of water quality are necessary for the prevention of waterborne diseases and improving the quality of life.

Rural Black people in South Africa were the prime victims of apartheid discrimination and disempowerment. Key restrictive measures such as the 1913 and 1936 Land Acts and the 1959 Bantu Self-Government Act ensured the confinement of Black people to over-crowded, degraded reserves (the so-called Black 'Homeland' states) (Christopher, 1994). In these areas the absence of basic infrastructural provision, such as water supply, has forced millions of people to rely upon traditional methods of water-collection from sources which are often inadequate, unsafe and unreliable. Although the new, post-apartheid government is gradually addressing this backlog, the task is immense and many communities will remain without basic provision for a considerable period of time.

In many ways the Kat River settlement in the former Ciskei Homeland of South Africa is a microcosm of the above-mentioned conditions. Following the involvement of the team of researchers in initial fieldwork in the general area (Binns, *et al.*, 1997), and follow-up consultation with the resident community, the need to improve the quality and supply of domestic water was recognised.

At present there are several hundred people resident in the reach of the river valley from Hertzog to Fairbairn (see Figure 1) which was the focus of this investigation. The only source of domestic water is the Kat River and two first-order tributaries which enter the river in the valley. Water collection is predominantly undertaken by children and women members of the households (see Plate 1). This is time-consuming and physically demanding, with people often having to walk up to two kilometres on each return trip. They collect between 15-25 litres of water in plastic containers per trip.

Frequent trips to the river result in path erosion, increased and intensified surface run-off, loss of top-soil and stabilising vegetation. At points of collection one encounters bank erosion and instability, which can result in increased sediment load at the points of collection. Furthermore, the river is used for the watering of domestic livestock, washing and bathing, washing of vehicles and clothes and for irrigation. Irrigation of the surrounding small-scale subsistence fields leads to a return-flow of water directly back into the river via seepage points. All of this has a detrimental effect on water quality which deteriorates the further downstream one proceeds.

During focus group meetings with some of the valley's residents it became clear that the community was concerned about their water supply and the effect that water collection, irrigation and domestic stock watering had on water quality. Statements such as, `people are often getting sick, we think

the water is bad' (Peter, pers. com., 1996) showed that an awareness of the threat of polluted water and that a solution to the 'bad' water was necessary. As a result of discussions between the researchers and local leaders there was agreement on the need to undertake a joint investigation, incorporating PRA techniques, which could help to improve local water supply and quality.

The Research Process

It was appreciated from the outset by the researchers that the assessment of water quality would require expert, 'scientific' input. This input would take the form of water quality and bacteriological analysis, aspects of which needed to be undertaken in a laboratory. In addition, basic testing would be done in the field with water-collectors. After analysis results would be communicated back to the community in a usable form. This required the careful blending of both PRA and scientific research methods, which actively incorporated the community and identified practical and acceptable solutions. In adopting this approach the difficulties associated with more conventional top-down approaches were avoided (Nel and Hill, 1996). It was agreed that results would be presented to community leaders and used as a means of teaching school-children, the primary water-collectors, about water quality. The selected methodology evolved in two distinct phases, namely:

Phase 1

Data Acquisition

On the basis of discussions with community leaders, it was decided to place a trained research assistant in the area who would live with the community for several weeks in order to develop rapport and gain credibility. Given the fact that school children are the primary collectors of water, it was soon appreciated that the researcher should concentrate on this group. She attending classes at the local primary school where she gained the trust of the pupils achieved this. Thereafter detailed information on water collection, stock watering and water quality in the valley was obtained through the use of various PRA techniques. These included mental mapping, transect walks, life histories, role-plays and the use of puppet-shows to gain the children's' trust and to elicit information. Plate 2 displays the researcher and a school child noting details on a mental map of the river. Information was verified through detailed, semi-structured, open-ended interviews with 55 adult members of the community, many of whom were parents of children at the school or collectors of water themselves. The 55 were selected on the basis on being a 10% sample of the residents in the valley. The interviews were supplemented with transect walks along the course of the river undertaken with community members (and a scientist) in order to identify other water points, places of erosion and pollution in the valley.

Results

One of the key results of the interviews was the identification of the primary points of water- collection and stock-watering and perceived variations in water quality within the valley. This information served as a basis for subsequent scientific research.

The water-usage points are indicated in the numerical sequence from 1 to 8 as noted on Figure 1. Water usages at the various points are indicated in Table 1. As the table shows, the community has clearly assigned different usages to the different points, in the case of points 6 and 7 obvious value judgements have been made.

The interviews with 55 community members revealed that the river, and the quality of water derived from it, is viewed as key considerations in the lives of the valley residents. Several respondents referred to the poor quality of water in the Kat River and the fact that "you don't get pure water" (Respondent no.18: 1996). In total, 54 respondents were aware that their behaviour and that of people up-stream could impinge on the quality of the water. Twenty-three identified litter as a problem, 11 noted that the

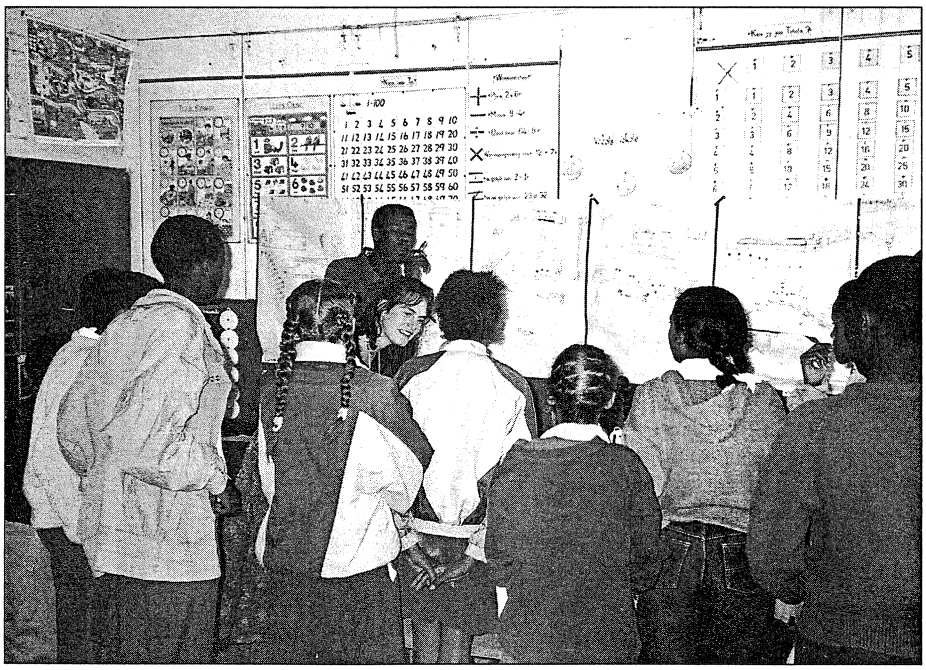

PLATE 2: A Mental Map of Water Sources being developed.

TABLE 1: Water Points and Water Usage

Point Number	Site Description	Water Usage
1	Top of valley reach	Human consumption
2	Tributary and surrounded by irrigation fields	Human and domestic consumption
3	Dammed tributary	Recreation and washing of clothes
4	Middle reach of main channel	Human and stock consumption
5	Weir on the main channel and surrounded by irrigation fields	Washing of clothes and domestic stock watering
6	Main channel	Human consumption (regarded by the community as the best site)
7	Tributary	Domestic stock watering only (regarded as polluted)
8	End of valley reach and surrounded by irrigation fields	Human consumption and recreation

sharing of the river with animals was detrimental, five referred to the washing of clothes and two felt that using the river for bathing could affect its quality. Significantly, 16 felt that cutting trees on riverbanks or tramping paths could induce erosion and hence increase sediment into the river. These concerns clearly indicate that local people do have a strong sense of environmental awareness, which correlates with the identified usage of different water points for different purposes. However, only one respondent identified the potential harm of less obvious forms of pollution, when he noted that fertilisers entering the system could be a serious problem (Respondent no.29: 1996). What also emerged from the surveys was a clear sense of the need to regulate the usage of the river. "There are no rules from the community, but for me it will be wise to have rules, maybe at our areas soil erosion can decrease" (Respondent no.36: 1996) and "No one have instructed people how to use the river, that's why people don't take care of the river" (Respondent no.40: 1996). These considerations helped to guide the researchers, confirming the need to offer the community defined guidelines on where to collect water and also to engage in a training programme amongst the water-collectors.

Phase 2

Data Acquisition

The second phase of the research involved the collection of water samples at the points identified above under Phase 1.

Samples were collected and the following laboratory tests were conducted: pH, conductivity, total alkalinity, suspended solids, total dissolved solids, ammonia, nitrate and nitrite, phosphates, dissolved oxygen and chloride. These physical water tests were conducted and analysed using standard water-quality procedures (American Public Health Association [APHA], 1985; Dallas and Day, 1993; Water Pollution Control Federation, 1985). In assessing the suitability of water samples the South African water standards were adopted (Department of Water Affairs, 1993a, b, c).

Dilutions of bacterial cultures were also prepared and spread plates of each dilution were then made on both nutrient agar and MacConkey agar plates (Qhobela, 1993). Analytical Profile Index (API) tests were conducted in order to identify Gram-negative bacteria (Brock and Madigan, 1991). The results were then converted into a numerical coding system and analysed with the help of a computer programme to identify the characteristics of all the potential isolates. The API system was read with the aid of the API Profile Recognition Programme, which correlated the test results with the characteristics of known organisms to provide an identification (Ketchum, 1988).

These tests thus permitted the quantification of water quality and the identification of the possible presence of particular bacteria. These findings were analysed and reported back to the community in the form of a detailed report on water quality at individual sites (see below). Furthermore, the broad results, in conjunction with the school-based programme, were used as a basis for developing an interactive environmental education training programme.

Results

From the eight sites tested, only at one site (Point 1) was the water deemed safe for domestic use without any form of treatment. At five sites the water was unacceptable for consumption without stringent disinfection and at two the water should not be consumed under any conditions.

Back to the Community

After the completion of the scientific tests, the findings were taken back to the community. In the first instance, the results were presented to community leaders in the form of a report, tables, a map of water sites and the researchers' recommendations. In order to ensure that the results and recommendations were understood, time was spent talking through the issues with community leaders. It is apparent that the leaders welcomed the findings and suggestions that they deemed to be of great practical assistance to the community. This is reflected in the statement by the community chairperson Mr E. Nykae (pers. com., 1997), ". . . we will tell our people where to get their water from" and these results are "definitely going to help". In addition, it is apparent that the results will enable the community to make informed choices in future discussions with water engineers when a proposed domestic water reticulation system is discussed.

The next phase was to go back to the water-collectors themselves, namely the school children. Discussion of the simplified results was held with them in the classroom. This was augmented through a practical demonstration of how tests were conducted using, in this instance, simplified water kits which have been developed for use in and by rural communities (supplied by the Umgeni Water Board, Pietermaritzburg). The two kits that were deemed appropriate were the 'Catchment Action Starter Kit' (for water quality) and the 'E.Coli Water Test Kit' (for water pollution).

Thereafter, school children were taken to a point on the river that they had previously identified as a water source.

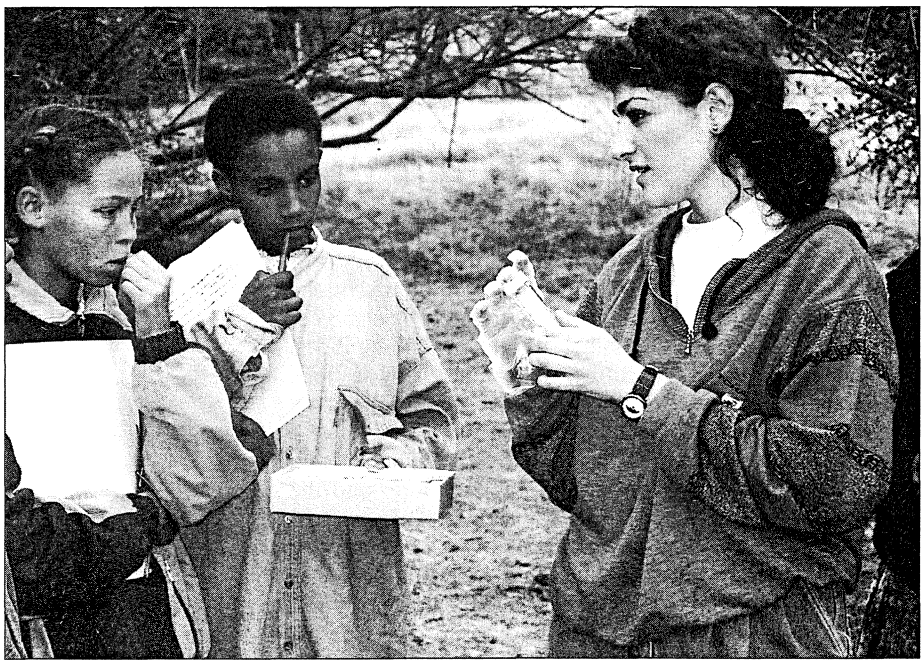

PLATE 3: Demonstration of water-kits.

The children were shown how to do the basic tests as provided in the two water kits (see Plate 3). They learnt that as a result of the seasonality of water flow and resultant changes in water quality, there is a need to collect water at different points. It was hoped that through the use of the kits, the children would recognise not only how to identify water problems, but also the need for a division between sources of water collection for domestic use and stock watering. The purpose of the exercise was to enable the children to make informed decisions about water quality and the optimum sites to use. Kits were left with the school so that the children could undertake further tests. Contact is being maintained with the school and the kits will be replenished when necessary.

Although it cannot be claimed that the community will be willing or able to follow through with all of the suggested findings, follow-up research revealed positive results. In a community meeting held one year after the initial research took place, a community leader, Mr Aba (1997) stated:

> We have gained a lot from the project and there were things which we did not know at first . . . We thank you people for that and now we can see the difference between the clean and the bad water. We also thank you, ever since you came here there has been a decrease in sickness, for instance stomach-ache. Because we also as the community discuss what you are teaching us. We are trying to improve but it is difficult because some people are lazy.

Discussion and Conclusion

The PRA exercise clearly indicates that expert/scientific and community knowledge can be integrated. In this instance, PRA allowed a rural community to take ownership of the findings of a research process that they had initiated and co-constructed with the researchers. In order to promote sustainable development in rural areas such as this one, it is apparent that PRA can ". . .provide a vital approach in appreciating the views and skills of rural people and in formulating locally appropriate development strategies" (Binns, *et al.,* 1997, p. 3). In order to attain its ideals, results must be presented in a form that is 'community-friendly', does not intimidate the recipients and is of practical use to them.

The openness of the community to the researchers, with whom they have developed good rapport, and their sense that gains could be derived from joint research is illustrated in the above section and by the claim of Mr. Meyer (pers.com., 1996) that, '. . . at this stage the river is seen for survival . . . our people are very open and prepared to learn'. The researchers believe that the joint research with the community has proven to be a valuable learning experience which is of benefit to both parties.

The applied research process and the improved community knowledge that resulted endorse the process of PRA and permits reflection on key components of the method itself. Chambers (1992) recognises the existence of three foundations to PRA, namely behaviour and attitudes, methods and sharing. He further states that of these three sharing is becoming an increasingly important dimension. The authors of this paper contend that there should be a fourth foundation, namely pro-active involvement from both sides leading to community empowerment and the practical solution of an identified problem. This concurs with van Vlaenderen's contention that ". . .information sharing and (the) educational aspect is as important as solving the problem at hand" (van Vlaenderen, 1995, p. 5). It is apparent that if PRA is to succeed it must ". . .offer an inter-sectoral approach for engaging people in the process of developing their own community" (Thomas-Slayter, 1992, p.142). PRA can undoubtedly assist in delivering benefits, if it lives up to its ideals and does not take knowledge away from a rural community, but rather creates an atmosphere for the co-construction and sharing of knowledge which ultimately benefits community and researchers. It is apparent that researchers have a key role to play through such methodologies in the active promotion of empowerment and upliftment in rural Africa.

Acknowledgements

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