



Assessing Natural Resource Management Challenges in Senegal Using Data from Participatory Rural Appraisals and Remote Sensing

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Summary. — This study demonstrates that there is a relationship between socioeconomic problems in parts of West Africa and remote-sensing-derived environmental information about the region (normalized difference vegetation index (NDVI), net primary production (NPP), and gridded rainfall data). Further, it finds that using both remotely sensed data and site-specific information from participatory rural appraisal (PRA) reports enables an improved understanding of natural resource management problems in the region. The study uses 100 PRA reports as sources of data on socioeconomic and natural resource management problems in Senegal and The Gambia. Utilizing a binary variable to extract semi-quantitative information from the reports, the study examines 10 PRA tools for their usefulness.

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1. INTRODUCTION

Over the past two decades, the notion of community participation has become an important theme of development practice (Brown, Howes, Hussein, Longley, & Swindell, 2002). Consequently, many governmental and non-governmental organizations (NGOs) have adopted methodologies that incorporate the active participation of the targets of development (Chambers, 1994b).

In this context, participatory rural appraisal (PRA) was initially taken to mean an activity in which the research process was owned and initiated by the community itself, rather than by an outside organization (Pretty, 1994). Currently, however, nearly all rapid appraisal activities are referred to as PRA, which in practice includes such a wide range of activities and a diversity of objectives that the original meaning of the term has been lost (Maxwell, 1998).

Participatory and rapid appraisal methods came together in the 1980s and were termed *rapid rural appraisal* (RRA)—defined collectively as a set of methods for community studies on a variety of topics, but usually oriented to prob-

lem identification and community empowerment toward change (McCracken, Pretty, & Conway, 1988). While the reports used in this study are each termed PRA, it could be argued that the formulaic and extractive approach that was taken by the specific appraisal teams in Senegal is more akin to RRA than to truly participative approaches. Many of the documents used here are labeled according to the current definition and do not reflect the original definition of PRA, but they hold value as sources of information about communities and their problems.

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PRA utilizes specific tools and techniques to gather information about and learn from rural people (Chambers, 1990, 1994a). PRA involves a short (3- to 10-day) visit to a community by a multidisciplinary team of trained facilitators who conduct the appraisal. At the end of this time, a meeting of the participants and the PRA team serves to report the results of the assessment to the community. A written report is then created and submitted to the sponsoring organization. One hundred such PRA reports have been used in this study in an effort to correlate the socioeconomic and natural resource management problems experienced by communities in Senegal with environmental factors measured by satellite remote sensing. This relationship adds a new dimension of understanding to spatially continuous and widely available biophysical data in data-poor West Africa.

Research has been done comparing the results of PRA to more formal farm and household surveys using conventional quantitative social research methods, and no significant differences in outcome between the two approaches have been found (Collinson, 1981; Franzel & Crawford, 1987; Rocheleau, Wachira, Malaret, & Wanjohi, 1989). PRA, however, is not without its critics. Gladwin, Peterson, and Mwale (2002) point to an overwhelming reliance on untested ethnographic observations that are made over brief periods of time. They assert that the conclusions reached using participatory methods frequently ignore individual variation in participant behaviors in order to focus on the similarities among them. Heterogeneous behavior is swept aside in the effort to generalize from too small a sample size.

5. DISCUSSION AND CONCLUSION

Various international organizations have invested heavily in training personnel and using PRA methods in Senegal and in many other countries around the world. Despite this investment, many NGOs that utilize PRA methods do not make use of the reports once they are written, except as documentation for their development programs (Gladwin *et al.*, 2002). PRA documents can be a critical and persuasive source of information on both the strengths of communities and their vulnerability to environmental hazards, economic shocks, and global climate fluctuations. This study applies methodologies that enable PRA documents with varied origins and initial objectives to be used together as a data source that can explicate and elaborate on environmental data, such as that derived by remote sensing, and thus further the understanding of the problems of farmers and their communities in Senegal.

Using the PRA documents as a secondary source of data illustrates that, apart from the development objectives that prompted the sponsoring of the work, the more comprehensive and well written a document is, the more useful it is for this form of analysis. While there are various compositions of multidisciplinary teams with different ratios of gender representation, different numbers of days in the field, varying methods and tools used, and a wide variety of objectives motivating the creation of PRAs, despite these differences, natural resource management problems are so pervasive in these agricultural communities that they come through clearly in all the reports. As the community using participatory methods expands, and the definition of PRA changes, further investment in the education of PRA facilitators, with a focus on rigorous and standardized final PRA documents, will be necessary to ensure the continued usefulness of PRA reports in future analyses such as this one. Clear and comprehensive reports will also benefit the communities that are their subjects, as the funding organization will incorporate the needs and development priorities of each community into their plans more effectively, even if the local community does not adopt the participatory tools as their own (Brown, 1999).

Remote sensing has long been used in Africa to gather spatially and temporally continuous information about the environment in regions with a dearth of long-term records on agricultural production, rainfall, and temperature dynamics. Humanitarian organizations such as USAID's Famine Early Warning System Network (FEWS NET) have invested in collecting remotely sensed rainfall and vegetation data and have used it to provide information on drought and floods that affect food production (Hutchinson, 1998). Interpreting the meaning of these signals, however, has always been a challenge. Climate variations that appear severe to a meteorologist or remote-sensing specialist located in Washington DC may not be as important as high food prices or economic instability due to current social and economic realities in the region (FEWS, 1997).

Using both remote sensing and the results of participatory studies to investigate natural resource management problems, research will be more cost effective and meaningful. Remote sensing can inform the planning and focus of PRA by targeting regions that have experienced long-term reductions in rainfall during the past half-century, increases in year-to-year vegetation variability, and changes in the distribution of rainfall events. Improved targeting can enable development and research programs to be more effective in achieving their goals.