# Maps, Numbers, Text, and Context: Mixing Methods in Feminist Political Ecology*

**Dianne Rocheleau**
*Clark University*

Feminist post-structuralist theory, feminist empiricism, and field practice can all contribute to insights on the value of quantitative and qualitative methods in feminist geographical research. A political ecology study of gendered interests in a social forestry program in the Dominican Republic illustrates the methodological dilemmas and potentials of feminist research on environmental change. The study combined qualitative and quantitative data collection and analytical techniques. Examples from the case study address three methodological questions in feminist geography: (1) Should identity or affinity be the basis for situating ourselves and the subjects of our research? (2) How can we reconcile multiple subjectivities and quantitative methods in the quest for objectivity? and (3) Can we combine traditional positivist methods with participatory mapping and oral histories? The paper draws on theoretical literature as well as field experience to answer these questions. **Key Words: feminist, gender, qualitative methods, political ecology.**

## Research Method and Feminist Post-Structuralist Science

Is there a feminist poststructuralist science, and if so, is there a distinctive methodology that can enrich the practice of feminist research? This essay applies feminist theory to the question of research design and the development of flexible yet coherent combinations of qualitative and quantitative methods in feminist geographical research, specifically in political ecology. To this end I discuss the relevance of theoretical and practical insights from recent feminist work to the complex methodological challenges of a social forestry field study with a peasant federation (the Rural Federation of Zambrana-Chacuey) and an international nongovernmental organization (ENDA-Caribe) in the Dominican Republic. I present three key insights from the works of feminist post-structuralists and empiricists and apply each to a particular facet of fieldwork in the case study.

To address the current epistemological and methodological debates in feminist geography (as summarized by Mattingly and Falconer in this volume) and to guide my own research, I draw primarily upon feminist post-structuralist critiques of science (Haraway 1991; Harding 1986, 1987) as well as examples of alternative research methods in feminist studies (Geiger 1986; Behar 1993; Benmayor 1991; Fortmann, forthcoming). My own work is embedded within feminist geography and political ecology, both of which have turned toward methodological pluralism and beyond, toward the transformation of scientific paradigms. Many feminist geographers (Hanson and Pratt 1994; Katz 1993; Momsen 1993; Townsend 1993) and political ecologists (Blaikie and Brookfield 1987; Schroeder 1993; Carney 1993; Schmink and Wood 1992) work in a boundary zone between positivist and critical paradigms, consciously combining critical theory, empirical fieldwork, and quantitative and qualitative analysis. Through the three points presented below and the case study example that follows, I examine the use of quantitative methods in feminist research and explore the possibilities of multi-perspective methodologies implied by feminist post-structuralist critiques.

The first point focuses on the important distinction between identity and affinity as a basis for framing and pursuing research ques-

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tions on gender, class, and other dimensions of difference. This is relevant to decisions about who does the counting, whose realities are counted, and which social and institutional context constitutes the sampled universe for a given group. While much of the earlier feminist research in geography took for granted the identity of women as a group, feminist post-structuralists encourage us to expand our respective partial and situated knowledges through a politics and a science that go beyond identity to affinities (Haraway 1991), then work from affinities to coalitions (Harding 1986). They suggest that scientists can then construct shared bodies of knowledge derived from very distinct experiences. However, the recognition of multiple, fluid, and complex affinities and coalitions creates a new logistical and methodological problem: how to define and navigate across the boundaries of the groups involved in research endeavors, in whatever capacity. Affinities—based on affiliation and shared views or interests—are not fixed and change over time and from one context to another. The easy politics of women studying women gives way to complex—but still gendered—questions about who counts, who is counted, and in what context.

The second point considers the role of both qualitative and quantitative methods in the quest for objectivity. Feminist empiricists have made clear the importance of making women, their interests, and their contributions visible through the use of quantitative measures widely recognized as objective. Yet, post-structuralist and feminist critics of science have turned a critical eye on the nature of objectivity and the categories used for counting. Haraway (1991) has called our attention to the possibility of "partial yet powerful objectivities." Harding (1986) appeals to a higher level of objectivity that recognizes difference and the necessity to build a broader, shared understanding within an explicitly social (and political) context. The acceptance of partial objectivities obviates the need to choose between multiple and irreconcilable subjectivities or the single objectivity of an omniscient gaze. Rather, it challenges scientists to revalue the subjective, then stretch and combine it into something that can be verified and validated through a variety of methods (including quantitative measures) within an ever widening circle of shared experience.

A third contribution from feminist theory, particularly post-structural and postmodern thought, is the use of visual imagery and stories as sources of integrative insights into the separate realities of diverse groups of people, based on the situated interpretations of both "narrators" and "readers." The work of interpretative scholars and the "turn toward discourse" (Peet and Watts 1993) have opened a new epistemological space for the combination of traditional positivist methods—such as resource mapping from remotely sensed data and questionnaire surveys about resource use and management—with personal life histories, oral histories, text analysis, landscape interpretation, and participatory mapping methods.

The reintroduction of pictures and stories changes the terms of reference for field research on gendered land use and landscape change. There is scope to treat visual imagery and narratives as sources of empirical data and as method to elicit specific information within a coherent context. The freedom of inquiry created by these developments led us to the practical interface between numbers, pictures, maps, and stories and challenged us to develop our field research methods in Zambrana Chacuey within that methodological boundary zone.

## Learning About Women, Men, Gender, and Forests: A Case Study

The experience of the women and men of the rural Federation of Zambrana-Chacuey provides an example of gender relations within rural households and communities and their articulation with environmental and economic change at local, national, and international levels. The Federation—consisting of approximately 800 members from 500 households organized into roughly 60 local farmers', women's, and youth associations in 30 communities—collaborated with ENDA Caribe, and international environment and development organization, for more than ten years on a forestry and agricultural initiative. The joint program mixed commercial timber production, tree nurseries, soil conservation, and gardening as related activities with distinctly gendered "target groups." By 1993, over 85% of the Federation households had planted *Acacia mangium* trees with the forestry project, based on the performance and profitability of this

"miracle tree," which produced timber within six to eight years. Tied to the widespread adoption of Acacia as a timber cash crop, the Federation and ENDA formed a wood producer's association and constructed a community-based sawmill (Rocheleau and Ross, forthcoming).

The case study project examined both the successes and the failures of this initiative, at different points in its history and among different publics (differentiated by gender, class, locality, and occupation) within the Federation. We traced the introduction of new tree species and land use practices through the Federation and its membership organizations to the diverse household economies of its members, focusing on the gendered nature of resulting changes in livelihood systems and landscape patterns. We documented the experience of people within specific smallholder households, to demonstrate the diversity of actors and the complex economies and ecologies in which both farmers and trees were embedded.

Methodologically, we explored the potentials of stories and maps of gendered space, resources, labor, and knowledge to guide the development of smallholder forestry and agricultural production alternatives. Through this approach we sought to make visible the many people and places not yet represented in the summary numbers and the regional maps of forestry-as-usual. The research team and participating residents explored the possible futures of women and men within the gendered landscapes and livelihoods in the region and suggested specific changes in organization, technology, and tenure arrangements in the Forestry Enterprise Project to better serve the interests of smallholders, with special attention to near-landless households and women across classes (Rocheleau and Ross, forthcoming; Rocheleau et al. 1995b).

Our research plan consisted of a multimethod approach combining several data collection activities: attendance at formal meetings; group interviews; focus groups; key informant interviews; oral histories of households, communities, rural organizations, and environmental change; personal life histories; labor calendars; participatory mapping and feltboard exercises; walking tours of fields and forests, with mapping; and a forma questionnaire survey of a random sample drawn from the adult members of the Federation. We traveled to most of the 30 member communities and met with 31 of the 60 member associations.

Three questions that arose in the course of the study mirror the broader theoretical and methodological points presented above and illustrate the practical application of feminist perspectives to the political ecology of forestry and agriculture. (1) *"Who counts?"* This refers to both who does the counting and whose lives and landscapes are counted, and raises the issue of identity as a methodological concern. (2) *"Why and when should we count?"* That is, as both feminists and land use analysts, when should we use quantitative versus qualitative methods, in pursuit of greater visibility for women and "partial yet powerful objectivities." Finally, (3) *"How can we fully integrate the gendered insights of stories and pictures with the rigor and comparative value of quantitative methods?"* This presents a challenge to combine very distinct ways of knowing and to reclaim vision within a feminist practice of science. The answers to these questions—as noted in the examples below—brought us to a synthesis of empiricist and interpretative approaches combining qualitative and quantitative methods in a diverse repertoire of collaborative activities with Federation members and ENDA staff.

## Who Counts? Identity, Affinity and the Context for Counting

At the outset of the field research, our first challenge was to identify the group to be studied and to negotiate the terms of our collaboration. The choice was largely between women as residents, all residents, women as members of the Federation, and all Federation members. We opted to work from the Federation as a base, with special emphasis on women key informants to situate women within the Federation and vice versa. We drew the random sample for the final survey from the membership of the Farmers' and Women's Associations, respectively, with the Federation constituting the universe for the sample.

To explore gender and class in context, we structured a series of surveys to reach both women and men in various settings: alone, in women's and men's respective organizations, in households, at work, and in mixed men's

and women's groups. The study also addressed men and women as both individuals and as household members. The randomly chosen respondents in the final questionnaire survey represented themselves as individuals and members of the Federation in opinion questions and provided information as members of households in response to "factual" questions about land use.

As noted above, a focus on affinity (in this case the various formal associations and constituencies of the Federation), rather than on identity (women), leaves room for complex and shifting affiliations and simultaneous membership in a number of overlapping groups. The research team worked through the Federation with the Women's Associations and Farmers' Associations in order to address women within the context in which they had already organized and affiliated themselves. We privileged women's experience and that of the poor and near-landless to the extent that we selected our initial informants, structured our questions, chose our methods, and designed our methodology to be sure to discover and incorporate their concerns and the categories of species, spaces, products, and labor processes that mattered to them. We did not exclude men or wealthier farmers, but rather took extra steps to include people whose presence, concerns, and interests had been rendered invisible and uncounted in standard analyses.

The methodological strategy based on affinity rather than identity extended to the composition and daily practice of the research team, which consisted of two Dominican men (a forestry professor and a history graduate) and two North American women (both geographers, one a professor and the other a graduate student). We worked together as one team for some events, with two women only for other types of meetings, and sometimes singly in informal discussions or key informant interviews. For the final survey, we worked in pairs (one Dominican man and one North American woman). One person recorded information on the questionnaire answer sheet and one sketched, both asking questions as needed to proceed through the various open-ended topics, specific questions, and mapping exercise in two hours.

Rather than limit our study to women interviewing women, we chose to form a team of women and men to study gender dimensions of land use change in the lives of both men and women. We sought to avoid the "women-and" orientation which can make women more visible, yet detaches them from both the social and ecological contexts that sustain their lives. The study also aimed to clarify and strengthen the position of women as a constituency within the Federation and in emerging development organizations within the region, rather than postulating a separate agenda for women.

## Why and When Should We Count in Feminist Research?

The case study project incorporated gendered counting as a crucial visual aid for policy and technology research on forestry and agriculture. It rendered visible the existence as well as the magnitude and distribution of gender-differentiated problems, opportunities, and aspirations in landscapes, livelihood systems, and ecosystems. As Sprague and Zimmerman (1993) note, "feminist research is connected in principle to feminist struggle" and social change requires evidence for the pervasiveness and distribution of the problem, not just the nature or the seriousness of it. Numbers then are invoked as tools of empowerment or as necessary tools in struggles against power.

Yet counting can also pose certain dangers. Facile quantification based on standard categories and problem definitions derived from bureaucratic and technocratic institutions may serve to further obscure or distort the interests of women and other "invisible" groups. Nancy Fraser (1989) and Emery Roe (1989) have pointed out the importance of constructing "the problem" from below, or rather from within social movements, rather than expending precious intellectual and political energy on detailed debate on refutation of "facts" in the terms of the dominant discourse.

With these potential pitfalls in mind, the lack of information on gendered labor, property, and organization compelled us to gather quantitative data about the context, process, and results of the Forestry Enterprise Project. First, there was a need to quantify the very fact of gender differences and gendered participation in this domain, to get the attention of policy makers and to make visible and intelligible the differences that had been rendered

invisible, misinterpreted, or dismissed. Second, there was a further need to describe and quantify the gendered interests in distinct forest policy scenarios as they relate to the regional, community, household and individual levels.

Policy makers, researchers, and planners in regional, national, and international agencies lacked adequate knowledge about the nature, the extent, and the distribution of gender differences in this forestry initiative. Given that ENDA was about to expand this pilot project and to replicate it nationally, the research team chose to document the gendered contributions to and gendered consequences of change in forest use, management, and regulation. The case study provided quantitative measures of the relative importance of tree species, of particular kinds of forests, and of forest management rules and practices to various groups of men and women. We also used quantitative summaries to clarify the broader social, economic, and ecological context for and the consequences of timber cash crop expansion.

Against all instincts to the contrary, we decided—somewhat cynically—to devote over half of our limited four months of field time to a formal questionnaire survey administered to a stratified random sample of the Federation membership. The research team expected to gain the greatest insight, and to reach the most significant conclusions, from the initial and final phases of qualitative research in close collaboration with the members of the Federation. We assumed that the formal questionnaire survey would simply confirm our results and make them real to natural resource managers and biological scientists. However, the quantitative data, as well as the random sample itself, yielded important new insights for the research team as well as the expected numbers to verify the results of our qualitative interviews.

The gendered structure of household linkages to the Federation constitutes one example of the insights that may be attained through gender-informed "counting." None of the participating institutions in the Forest Enterprise Project was fully aware of the gendered structure of the Federation membership, household linkages to the Federation, and participation in agricultural and forestry production and resource management. These key points of information for any land use change project or program were invisible to the state forestry agency (DGF/Foresta), to ENDA, to the Federation, and, initially, to us. The prevailing image of the Federation at the community level was of a Farmers' Association with a mirror-image "Housewives" or Women's Association consisting of the wives of the male members of the farmers' group.

By stratified random sampling of individual Federation members, and subsequent analysis of other household links to the organization, we found that 20% of the Federation-affiliated households were connected solely by women, through Women's Associations. Although all of the women in this subset of the sample were married, many of their husbands worked as wage laborers, farmworkers, and traders rather than as farmers. Viewed from the perspective of women as a constituency, over 60% of the women members of the Federation were the sole representative of their household to the organization (Rocheleau and Ross, forthcoming).

One-fifth of all Federation households would thus not be served by forestry extension activities meant to reach all households through the predominantly male Farmers' Associations or the regional Wood Producers' Association. Presumably, the majority of women Federation members and their households (particularly those connected exclusively through women) would best be served by direct forestry project collaboration with their women's groups. The membership data also revealed that 85% of all households were planting timber trees, yet less than 60% were represented in the Wood Producers' Association, a predominantly men's group that grew out of the Farmers' Associations. Most of the households either not planting or planting without the support of the Wood Producers were the households affiliated to the Federation exclusively through women.

The gendered demographic data directly contradicts the image of all women in the Federation as wives of Farmers' Association members, and it further dispels the notion that the Women's Associations function as auxiliary groups to the men's organizations. The gendered structure of organizational affiliation, once made visible through the survey numbers, had important implications for the timber project and related programs, as well as for

women Federation members and for the households represented solely by women members (Ross 1995).

The example of gendered linkages to the Federation demonstrates that who counts, what we count, and how we count are as important as the choice to count or not. What we do beyond counting also substantially shapes our ability to ask relevant questions and to interpret the results. Participant observation, key informant interviews, and life histories informed the questions of the original survey and our additional observations at the homes of survey respondents. The broader contextual knowledge of people and place, and the review of results with participants, also allowed us to interpret the apparently simple data on Federation membership and to shed light on the complex relationships among women, their households, the Federation, and the timber project. Conversely, the insights from the quantitative membership data influenced the content and interpretation of subsequent quantitative analyses and provided a basis for further qualitative analysis of gender relations within the Federation and the household, as well as the connection between them.

## Gendered Maps and Gendered Projections—Pictures and Stories in Empirical Research

> [T]he particularity and embodiment of all vision . . . allows us to construct a usable, but not innocent, doctrine of objectivity. . . . Feminist objectivity is about limited location and situated knowledge, not about transcendence and splitting of subject and object. (Haraway 1991, 189–90)

Maps, sketches, feltboard exercises, and life stories conveyed important insights about class and gender differentiated visions of the changing landscape of Zambrana-Chacuey. The use of these methods reflects a turn toward imagery and narrative in feminist field research and theory, particularly in post-structural and standpoint approaches. Donna Haraway (1991) urges feminist scholars to reclaim the sense of vision and to use it for research, learning, and communication about gendered understandings of "nature." She acknowledges the perversion of the sense of vision and notes that the gaze from space of remote sensing technology has allowed for a new level of distance and apparent objectivity that "sees everything from nowhere." Rather than abandon the use of imagery, however, she encourages feminist scholars to reclaim vision and imagery, to project the multiple perspectives of situated subjects, and to engage in an explicitly social project of scientific understanding.

This point speaks directly to the uses and misuses of visual data and representation in environmental research. While much of the literature on land use change and environmental degradation has relied on counting, the images driving that counting exercise, and the interpretation of the results, have been based on two-dimensional constructs of space. The maps and pictures of government agencies have tended to privilege "dominant" land use and land cover categories at the expense of "secondary" or minor uses and rights. They have also portrayed one-dimensional notions of property with single points of control and ownership—almost exclusively male heads of household—that have obscured women's lands, resources, products, and activities nested within men's property in rural landscapes (Rocheleau et al. 1995a).

Maps-as-usual can erase or obscure women, their lands, their resources, their products, and the traces of their meanings inscribed in the landscape. This is more than a matter of scale. The choice of scale can make more or less possible the facile detection of gender differences if one is looking for them. If not, even a life-sized diorama will not make clear the gendered relations of power, the gender division of resources, knowledge, work, authority, and the products of labor in any given land use system. However, when the gaze begins from space, and when the gaze-from-space is uninformed by the logic of gendered livelihoods and landscapes, then the erasure of women's place in the mapped spaces is all but certain.

Our response to this dilemma in the case study has been to use maps based on top-down imagery (literally and figuratively) to locate study sites with respect to the usual categories and to situate the issues to the mainstream environment and development discourse. We then worked to create "counter-maps" (Peluso, forthcoming) from the bottom up that represent a variety of gendered and otherwise differentiated perspectives on land, resources, and

the possible futures of people and the ecosystems that they both create and inhabit. These maps consisted of land use and cover, with livestock, trees, crops, and medicinal plants pictured in detail, and were accompanied by commentary on the uses, values, and individual control over each plot, species, and product. The images placed rural people and their homes at the center, then radiated out to the edges of their lands and included small sketches of other outlying properties on the reverse side (Rocheleau et al. 1995a).

The counter-maps also depicted the logic of gendered sharing and division that is embodied in individual practice and in household and community property regimes. Once made visible, the shape of the multiple and overlapping domains of resource use and management can be named, categorized, and mapped as a fact, as an ideal, or as a norm. Perhaps more importantly, these modes of gendered livelihoods, and landscapes can be mapped as a point of departure to consider any changes in land use, property regimes, livelihoods, and land management. The resulting images can serve as a template against which to evaluate the possible changes in the terms of resource sharing and division within the separate realities and the shared lives of women and men (Rocheleau et al. 1995a,b).

Counter-mapping played an important role in all stages of our field research. There is a sense in which the sketching activity provided a time-compressed surrogate for participant observation. This was possible only because of insights and carefully framed questions based on prior key informant interviews, focus group discussions, personal histories, day-long mapping exercises, and landscape walks.

The final survey combined a questionnaire with sketching of the household lands, which in turn yielded many codable responses to survey questions. The researchers drew pictures based on direct observation and (simultaneously) on a narrative recounted by each randomly chosen "respondent" (men and women Federation members interviewed at their homes). The drawing proceeded in response to prompts and questions as necessary to complete the picture and fill in a list of species and land use information on the questionnaire. The sketch took shape on a blank sheet on a table between the researcher and the participant, which made clear the researchers' vision of the farm landscape and its contents. This allowed the participants to correct and complete the image, in response to their own omissions as well as to errors on the part of the researcher. The resulting image was thus an interpretive construct derived from interpolation between two knowers. One person described the landscape, named the trees, crops, and animals, and told stories of land use change while a second person rendered that narrative and their own direct observation into visual form. Finally, both negotiated to arrive at an acceptable and complete picture.

The realism and the complexity of the image, combined with the amateurish informality of style, allowed us to work in a relaxed manner to locate crop, tree, and medicinal species, as well as livestock, on a given household's lands. The maps not only named the tree and crop species, but also depicted their patterns of association with each other and within particular land use units and landscape features. The narrative provided both specific points of information and contextual knowledge about the significance of each species, product, land use unit, and landscape feature, for the household and for men and women.

The picture provided a concrete point of departure and the drawing of it provided ample background and vocabulary to discuss the gender division of labor and responsibilities, as well as resource access, use, and control. The maps helped to focus discussions of gendered knowledge and values associated with particular plants, animals, places, products, and processes. The resulting images facilitated further coding and quantification of species diversity within particular categories of land use and cover.

As a result of this approach, we noted that women's patio gardens, of all the land use units in the landscape, scored highest in the diversity of tree species, even when compared with remnant riverine forests. These findings have profound implications for predicting and ameliorating the impact of various development strategies on both women's livelihoods and biodiversity. The results suggest that both women's patio gardens and the diversity of the tree species in the farmlands of Zambrana-Chacuey warrant protection from the encroachment of monocrop timber woodlots.

The detailed inventory of trees conducted in the process of sketch mapping also revealed a potential solution—maps and interview notes identified several other species of timber tress that can coexist with the diverse assemblages of trees and crops in patio gardens and other multi-species plots (Rocheleau et al. 1995b).

As a result of the multi-method approach to the final survey, the research team could elicit and interpret—in both words and pictures—the complex answers to such seemingly simple questions as whose forests? whose trees? whose products? whose science? whose decisions? The explanations were embedded in finely patterned relations of gender, class, life cycle, family composition, and life history as well as the popular social movement that had spawned the Federation. The potential solutions to the dilemmas encountered by the forestry project in the landscapes of Zambrana-Chacuey will be likewise embedded in the complex social relations that define people's interactions with each other and with their surroundings.

## Conclusion

The methodology in the Zambrana-Chacuey study was built on the careful triangulation of quantitative, qualitative, and visual research methods. The field study combined several distinct activities into new composite tools for data collection, analysis, and interpretation. Rather than "adding women" to standard methods of empirical research it was possible to include gender as a subject of study, to incorporate a feminist post-structuralist perspective into the research design, and to apply it to an analysis of social and environmental change within the region. The study also went beyond critique to address questions of gender and forestry policy in local, national, and international organizations.

The encounter of feminist post-structuralist theories and hybrid quantitative/qualitative methods with the Forest Enterprise Project suggests that combined empirical and interpretive approaches can enrich feminist geographical research in political ecology. Such a methodology can also serve the interests of rural women and men whose resources are at stake in complex landscapes subjected to rapid and dramatic change by sustainable development initiatives. In this case the flexible combination of qualitative and quantitative methods revealed the gendered structure of households and their linkages to the Federation, the gendered landscape pattern of biodiversity and resource management, and the significance of both for women's stake in future forestry policy. The experience in Zambrana-Chacuey suggests not only that women should count and be counted, but that both men and women should make sure that the gendered stories and visions of rural people are counted (literally and figuratively) in the resource management decisions that affect them from the local to the international level. ■

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DIANNE E. ROCHELEAU (Ph.D., University of Florida) is Assistant Professor in the Graduate School of Geography at Clark University, 950 Main Street, Worcester, MA 01610. Her research interests include feminist political ecology, social forestry, land use, and ecological change.