



**CGIAR Systemwide Program on
Collective Action and Property Rights**



**Secretariat:
International Food Policy Research Institute
2033 K Street, N.W.
Washington, D.C. 20006 U.S.A.**

ENVIRONMENT AND PRODUCTION TECHNOLOGY DIVISION

JUNE 2005

CAPRI Working Paper # 39

Institutional Innovations Towards Gender Equity in Agrobiodiversity Management: Collective Action in Kerala, South India

Martina Aruna Padmanabhan

2033 K Street, NW, Washington, DC 20006-1002 USA • Tel.: +1-202-862-5600 • Fax: +1-202-467-4439 ifpri@cgiar.org
www.ifpri.org

NOTICE: IFPRI CAPRI Working Papers contain preliminary material and research results, and are circulated prior to a full peer review in order to stimulate discussion and critical comment. It is expected that most Discussion Papers will eventually be published in some other form, and that their content may also be revised.

Copyright 2005, International Food Policy Research Institute. All rights reserved. Sections of this material may be reproduced for personal and not-for-profit use without the express written permission of but with acknowledgment to IFPRI. To reproduce the material contained herein for profit or commercial use requires express written permission. To obtain permission, contact the Communications Division at ifpri-copyright@cgiar.org

ABSTRACT

The maintenance of crop diversity on farmers' fields in hot spots of plant genetic diversity is considered a "global life insurance policy" in the Convention on Biological Diversity (CBD 2001:1). This paper provides evidence of the importance of the contribution of poor women farmers to the conservation and utilization of plant genetic resources (PGR) for food and agriculture. As a consequence, its equitable recognition and economic reward is a key issue in the sustainable management of agrobiodiversity. The present investigation into the institutions governing PGR, with special emphasis on gender equity and collective action, focuses on the identification of innovative institutions with special focus on women's interests.

The paper considers empirical evidence from Kerala, a hot spot of biodiversity in India, investigates properties of local biodiversity resources, and the role of collective action in conservation. To help understand conservation and utilization of agrobiodiversity the investigation uses a combination of institutional and gender analysis.

Keywords: gender; agrobiodiversity management; collective action; India; institutional change

TABLE OF CONTENTS

1. Introduction	1
2. Conceptual Framework for Institutional and Gender Analysis	8
3. The Case of Wayanad - The Land of Paddy Fields	13
4. Crafting Diverse Governance Structures	40
References	44
Annex	49

Institutional Innovations Towards Gender Equity in Agrobiodiversity Management: Collective Action in Kerala, South India

Martina Aruna Padmanabhan¹

1. INTRODUCTION

The maintenance of crop diversity on farmers' fields in the hot spots of plant genetic diversity is considered a "global life insurance policy" in the Convention on Biological Diversity (CBD 2001). The vital contribution of poor women farmers to the conservation and utilization of the plant genetic resources (PGR) for food and agriculture has been stated repeatedly (Swaminathan 1998, Kumar-Range 2001). Its equitable recognition and economic reward is a key issue in the sustainable management of agrobiodiversity. The investigation into the institutions governing PGR, with special emphasis on gender equity and participation, focuses on the identification of innovative institutions with special focus on women's interests. The perspective combines an institutional and sociological outlook on common pool resources and gender studies and contributes to the understanding of innovative institutions.²

This paper explores the main issues of institutional and gender analysis in the conservation and utilization of agrobiodiversity. Starting with the question about the

¹ Martina.padmanabhan@agrar.hu-berlin.de. Humboldt University Berlin, Faculty of Agriculture and Horticulture, Department of Agricultural Economics and Social Sciences, Chair of Resource Economics, Luisenstraße 56, D-10099 Berlin, Germany

² This paper draws the generous support of the Deutsche Forschungsgemeinschaft and the Indian National Science Academy for a visit to the M.S.Swaminathan Research Foundation in Chennai, India. I am indebted to my hosts, especially to Mina Swaminathan, M. S. Swaminathan, Meera Devi, Anil Kumar, M. Velayutham, V.Arivudai Nambi, the staff at the Community Agrobiodiversity Centre (CAbC) in Wayanad and at the MSSRF in Chennai for their contributions and support. An earlier version has been presented at the CAPRI-IPGRI workshop in Rome 26.09-03.10.2003 and has profited from the comments of Dindo Campilan and Ruth Meinzen-Dick.

properties of the resource “agrobiodiversity,” it identifies resulting problems and challenges. The analytical approach proposed is based on Hagedorn et al. (2002) “institutions for sustainability” framework. The framework is extended through the explicit focus on different farming-systems in agrobiodiversity management through the term “interface” (Long 2001) and the crucial interplay between men and women farmers through the term “intraface” (Padmanabhan 2002). The paper presents empirical evidence from Kerala, a hot spot of biodiversity in India, to illustrate problem situations and identify first movements towards collective action resulting in innovative institutions.

Although there is no unanimous consent of a definition of ‘agrobiodiversity’ in resource economic terms, a few preliminary thoughts may structure the inquiry. Agrobiodiversity can be considered a result of joint production or co-production, where the consumer participates directly in production (McGinnis 2004). This is unlike regular production, where the consumer purchases the finished product. Production of agrobiodiversity involves a sense of “ownership,” when actors participate in provision and production. Understanding property rights as complex bundles of access, withdrawal, participation in management and transfer, results in multiple stakeholder settings with different rights. Furthermore, it is important to distinguish between the nature of the good and the property rights system. Instead of assuming a one-to-one correspondence between characteristics of public, private, and club goods, and common-pool resources resulting in equivalent property right regimes, the paper describes only physical attributes and related technologies. Whereas private, public, common property, and open access regimes refer to the institutional set up, they can be imposed on different goods and are often linked to specific time horizons. In the case of agrobiodiversity we are confronted with an overlap,

a multifunctionality in the nature of the goods and a severe problem of standardization of transactions related to information problems.

According to the level of analysis, the properties of transactions in agrobiodiversity change as well. As Eyzaguirre and Dennis (2003) state, economists consider crop genetic diversity as an impure public good, with intergenerational and interregional dimensions. While any individual plant seed has the physical characteristics of a private good, the germplasm containing information has the public good characteristic of being “non-rival” - information itself is not diminished by the use of information. Maintaining crop diversity in general produces a public good, with long lasting effects over generations. Since agricultural plant resources are highly adapted to a certain culture and environment and rely on this for their maintenance and development, we can test the hypothesis of agrobiodiversity as a local common-pool resource.

Ostrom’s (1990) characteristics of common-pool resources as subtractable and as jointly produced are not fulfilled for agrobiodiversity, where a variety grown in one person’s fields can be grown on another as well. The resource system of agrobiodiversity nevertheless appears as joint, as all users benefit from the maintenance and development of varieties within a complex ecosystem. With respect to subtractability, agrobiodiversity would seem not to fit the definitions of a common-pool resource. But considering the differentiations of appropriation problems and provision problems, a paradox in agricultural plant genetic diversity emerges. In the case of other common-pool resources, the use of a resource unit subtracts from any other person’s use, and thus requires coordination of access. In the case of agrobiodiversity, the opposite is true. With use, the resource multiplies and is maintained. Resource utilization is the *conditio sine qua non*

for the existence of agrobiodiversity, as it is a resource ultimately linked to the co-evolution between humans and nature. We are confronted with a ‘reverse subtractability’ due to the cultural nature of agricultural diversity. Again, provision problems are confronted when maintaining the resource as a stock, requiring management, investments, and knowledge in line with the definition. With the advent of adverse incentives to agrobiodiversity conservation as subsidies for mainstream products, the efforts to provide agrobiodiversity over time and tackle free-riding problems have gained attention. Following Dalhuisen et al. (2000) agrobiodiversity can be considered a common-pool resource because an infinite amount must be commonly *maintained* (shared) by a variety of users and over geographic areas.

Common-pool resources like pastures and fisheries depreciate the more they are used. On the contrary agrobiodiversity depends on its use for existence. To illustrate the paradox of agrobiodiversity, an analogy to friendship may be proposed: It differs in certain respects to physical resources “...while friendship only strengthens when friends meet, share, talk, and do whatever sustains their friendship. To the contrary, when a friendship is no longer ‘used’, that is, when friends have less and less contact, the value of it depreciates, not with its use” (van Staveren 2002).

On a global and more abstract level, the properties of agrobiodiversity, which relate to the biological diversity of agriculture related species and their wild relatives, are those of a public good or common heritage. The time dimensions and the length and width of spatial diffusion processes stress the PGRs’ common heritage aspects created through historical exchange relationships. Since commingling of genetic material is the goal of reciprocity, it is almost impossible to validate the source of origin. The systemic

character of agrobiodiversity with its complex social and biological linkages requires consideration of whole ecosystems. This paper focuses on *in situ* agrobiodiversity management by traditional cultivators and on the problem of identifying institutional remedies to the dwindling richness of species. Farmers are confronted with international conventions and national laws, new maintenance schemes, and property right regimes, all instituted to prevent further loss, while they are looking for ways to share the costs of conservation efforts. New demands and an increasing interest in conservation ask for new institutional solutions in the field of biodiversity-rich agriculture. The question is, whether collective action may provide a suitable institutional form.

The customary management of crops by farmers can be seen as common pool resource management. Brush (2003) perceives crop genetic resources as the result of collective action over many generations of crops and farming people, who shared knowledge, exchanged seed, and accumulated valuable traits in crop populations. The resulting resources have conventionally been treated as common pool resources that are freely exchanged and not monopolized by any one person or group. Nevertheless we observe a shift towards the establishment of private property rights. Therefore it might be helpful to consider the features that distinguish collective action for crop genetic resources from other common property regimes. Crop resources are highly movable and replicable in contrast to common pastures or irrigation systems. This explains the less explicit rules about access to and management of agrobiodiversity. Unlike other resource user groups, farmers creating and maintaining agrobiodiversity may or may not perceive themselves as a group. This lack of structure is evident in the management of crop genetic resources and their evolution.

Within the endeavor of finding institutional arrangements that can sustain this paradox, which relies on the dependency on human interference, lies another challenge: How to consider men and women's contribution to the existence and maintenance of agricultural species without replicating the disempowerment of women through modern science and administration. If decisionmaking is based on prevailing institutional patterns with respect to property rights or identities, often women will not be defined as actors. Furthermore, consultations may even serve the ends of (continued) social exclusion (Meynen and Doornbos 2004). How is it possible to avoid the perpetuation of women's *de jure* and *de facto* asymmetries in property and rights, while finding institutional solutions for the sustainable management of agrobiodiversity?

Women's responsibilities in and knowledge of biodiversity management is widely documented (Almekinders 2001, Howard 2003), as is their variation among contexts and cultures. What emerges as the common trait of reading women's contribution to agrobiodiversity management is the fact, that most of the selection, storing, pruning, tending, etc., are not considered activities in their own right, but rather an extension of women's reproductive cores. What is actually an intellectual and manual task becomes invisible, when transactions take place away from the market in the realm of another reproductive task. Especially in the case of landless daily wage laborers, the tacit knowledge women apply to their work does not appear as an additional value added to a specific site, but is considered as an extension of "women's nature." The misconceptualization of women's work as their essentialist character and not as a part of their labor is still a powerful tool to dilute women's contributions and respective claims.

Productive tasks and reproductive tasks are necessarily interlinked and constitute a continuum.

Elson and Cagatay (2000) criticize the elimination of the household-economy - women's unpaid reproductive work – from macroeconomic models. They propose the integration of the care-economy – which encompasses the management of agrobiodiversity as well – to stress the importance of gender relations for the economy. Markets and their functional logic are understood as social institutions, which determine economic behavior through social norms and power relations. The care economy is an integral part of the political economy, focusing on the economic and social contribution of women. Beside the private and public economic sectors, Elson integrates the “home-work” and the value NGOs generate into the net-product cycle. The interdependence between the productive and the reproductive sector is described by these interconnected streams and their embeddedness. It is the reproductive economy, which is taken for granted by classical economic analyses, without realizing the interfaces and integration. The subsidy of the formal sector through the informal one has to come into the picture as a relationship. The interconnection and the thus created values of social capital, and security complementarily contribute immensely to the sustainability of economic processes (Padmanabhan 2003).

Considering the importance of the care-economy for the provision of agrobiodiversity, it is important to have a close look at the characteristics of gendered actors who handle the plants in the ecosystem. What are the restrictions for men and women according to caste, class, community, occupation, religion, ethnicity or geography to take part in influencing agrobiodiversity co-ordination? Power relations not only differ

between actor groups, but also within a group. Bargaining power and access to information as well as voice differ greatly between men and women. Decisions made by men regarding crop rotation or species selection may very much influence women's food security and fall back position. The social construction of nature and gender are important ideological devices to perpetuate asymmetries in decisionmaking.

Ignoring women's particular interests and contributions to agrobiodiversity risks to contribute to misinterpretations of institutions and governance structures, which have been responsible for the development of a vast multitude of species in the past (GTZ 2002). Since most transactions are not co-coordinated via the market, but rather fall under the realm of cooperation, the danger to neglect this sphere of agricultural reproduction is virulent. The analysis is concerned with the maintenance and development of agricultural species and highlights it in a gender-sensitive way to improve its sustainability. The failure to consider women's productive agricultural work, taking place in the institutional environment of other female productive responsibilities, may result in the abandonment of these services and the consequent disappearance of agrobiodiversity. Such loss of services is related to the gendered access to and control of common pool resources. These access rights are closely linked to the social construction of gender and nature and may hinder an effective, equal and sustainable management of agrobiodiversity.

2. CONCEPTUAL FRAMEWORK FOR INSTITUTIONAL AND GENDER ANALYSIS

To approach this complex phenomenon, two schools of thought are considered. Standing in the tradition of New Institutional Economics, the "Institutions of

Sustainability” concept in Hagedorn et al. (2002) offers a way to dissect the linkage between the good and its managers. To capture the aspect of differences in power and interests, property rights, and resulting negotiations, the sociological concept of interfaces (Long 2001) and intrafaces (Padmanabhan 2002) is introduced. The key question is: What institutions are necessary to coordinate *in situ* conservation and utilization of agrobiodiversity in an equitable and effective way? According to the “Institutions of Sustainability” framework of Hagedorn et al., four dimensions influence the institutional arrangements in resource management at the community level:

1. Properties of transactions: Paradox character of the resource. The decisions over activities resulting in the provision of agrobiodiversity are complex. These decisionmaking processes are influenced by crop ecology, available production factors, market supply and demand, and knowledge and interests of farmers (Bellon 1996), which differ between genders (Lachenmann 2001). The interaction between determinants is often unclear and might even appear contradictory. The characteristics of the good ‘agrobiodiversity’ are central here, as they influence properties of transactions. In the case of local management, agrobiodiversity appears as a common pool resource.

2. Characteristics of actors: Social construction of nature and gender. Agrobiodiversity is the result of the interplay of identifiable actors, resting on a care-economy (Elson 1998). Poor men and women farmers, commercial farmers, agribusiness, the local government, NGOs, and public research organizations are local players with different power, values, perspectives, and time horizons. The social construction of nature and gender (Shiva 1989) is interlinked.

3. Property rights to nature components: Access to and control of resources.

Property rights institutionalize cost and benefit streams (McKean 2000). The practice, enforceability and clarity of property rights determine their appropriateness. Considering ‘agrobiodiversity’ as a common pool resource requiring joint management, common property rights appear more feasible than private ones (Birner and Gunaweera 2002). Common property may improve women’s access and control and may enhance their bargaining position (Meinzen-Dick et al. 1997).

4. Governance structures for agrobiodiversity relations: Cooperation.

Co-ordination mechanisms for collective action (Ostrom 1994) with a high participatory involvement promises advantages over markets or hierarchies because of reduced transaction costs and increased motivation for agrobiodiversity management. Cooperation considers the institutional situation of women (Biesecker et al. 2000) and the nature of agro-environmental problems best (Hagedorn et al. 2002).

The linkage of institutional and gender analysis proposes insights into the conservation and utilization of agrobiodiversity. Gender promises to be a useful variable since the institutional environment differs by gender, as women have different property rights and power, work and responsibilities, and knowledge and values. Considering women’s perspectives beyond the household is crucial for an analysis of agrobiodiversity management, and indispensable to derive recommendations that will be relevant to female actors as well.

Interfaces and intrafaces are additional analytical terms that highlight the importance of situated actors with overlapping identities. From a sociological point of view they help to fully capture the conflicting and coercive interests in agrobiodiversity.

A social interface is a critical point of intersection between life-worlds, social fields or levels of social organization where social discontinuities, based upon discrepancies in values, interests, knowledge, and power, are most likely to be located. ... “Interfaces must be analyzed as part of ongoing processes of negotiation, adaptation, and transformation of meaning” (Long 2001). Interfaces in a study on agrobiodiversity management appear during encounters between farming systems or rather cultures. Interfaces are a metaphor for the places where knowledge about identity and the world is contested and altered. All elements of concern – coordination, gendered actors and negotiations over property rights and governance structures– can be integrated into this concept.

In order to capture the gender dimension of negotiations over biodiversity management, the term *intraface* is introduced. Since the negotiations concerned take place between genders within a shared life-world, “*intraface*” is a succinct concept for describing both the situation of cultural, ethnic, and life-world sameness, and the gendered differences. It is important to distinguish *intrafaces*, in which cooperation coexists along open and subtle conflicts within a single life-world, from *interfaces*. The *intraface* is concerned with negotiations and power issues between actors sharing a common life-world. Male and female farmers use the same local knowledge system for their orientation, but encounter different realities because of their gender. The term *intraface* covers the simultaneity of the commonly perceived framework of an ethnic group and the distinct room for maneuver according to the respective gender. This extension of the concept of *interfaces* concurs with Long’s definition of *interface* as a

critical point where different normative values and interests between entities of social groups occur (Long 1993), but stresses the process within a group.

The sociological concept of interface highlights the interaction between farming systems of differing richness in biodiversity, while the term intraface incorporates the gender dimension into the institutional analysis. The focus is on situations where different perceptions encounter each other and on the subsequent processes of negotiation. Merging the sociological perspective with the institutional approach allows to overcome altruistic and reductionist assumptions on the household (Waller and Jennings 1990) and to differentiate the process of negotiation on the grounds of power, property rights and co-ordination.

To analyze the link between agrobiodiversity management and gender issues, the interaction between the environment and the institutions of agrobiodiversity co-ordination have to be considered for their relevance to men and women. To grasp the human handling of nature, we need to take into account women's non-marketable transaction and maintenance work. The differences in people handling agrobiodiversity are not only determined by resources, information and knowledge, values and beliefs, but are very much shaped by the social construction of nature and gender, which influences possible options or denies options of action. Institutions of agrobiodiversity coordination may limit women's stake in biodiversity management through particular property rights institutions or grant them access through common pool titles. With the advent of national legislation in the realm of the Biological Diversity Act and Farmer's Rights in India, the question of women's involvement in formalized governance structures has to be questioned.

The analytical framework to understand collective action as an institutional innovation in biodiversity management, is applied to the case of Wayanad, a biodiversity hot spot in the Western Ghats of South India. Following a general description of the area, four cases on specific management situations are presented. These cases demonstrate the variety of issues with a gender perspective and point to problem areas and open discussion.

3. THE CASE OF WAYANAD - THE LAND OF PADDY FIELDS

To test the hypotheses and the usefulness of the analytical framework, a pre-study was conducted in Kerala, India in April 2003. With a methodological mix of group discussions, expert interviews, literature review, and document analysis, four cases were investigated through the lens of the framework: One concerning the management of biodiversity, the second involving social constructions, the third on access and control of resources and the last on structures of cooperation.

The district Wayanad in the South-Indian State of Kerala is nestled amidst the majestic mountains of the Western Ghats at the height of 700 to 2100 m above sea level. The landscape is distinct because of its deep valleys, leading to a multitude of climatic and ecological conditions. Until 150 years ago, the rich forests were only populated by tribals or *Adivasis*.³ Due to the severe danger of malaria infections Wayanad was once remote and inaccessible. With means to fight the parasite, people from the plains moved into the region to earn their living as small scale farmers. The British introduced the

³ In local language, tribals are referred to as *Adivasis*.

cultivation of tea and other cash crops by opening up the plateaus, simultaneously constructing roads across the mountainous profile. This infrastructure allowed settlers to in-migrate and turn virgin forest into cash crop estates. Though Véron (2000) states, that the topography of Kerala has hindered the wide expansion of environmentally unsustainable green revolution technologies, environmental problems exist and are caused by deforestation, ongoing paddy conversions and disruption of waterbodies. Of growing concern are also the “chemicization” of agriculture, and water and soil pollution. There has been a recent shift to highly intensive cash crop agriculture that has simplified the heterogeneity of the landscape to a significant extent resulting in the loss of flora and fauna (MSSRF 2001).

The hilly district of Wayanad is considered one of the richest “hot spots” in biodiversity in India (Rengalakshmi 2002). Relevant transactions occur around the cultivation of paddy landraces, which are threatened by conversion into banana and arecanut plantations, while the forest is replaced by tea and coffee estates. The actors involved are of diverse tribal populations, small scale farmers, agriculture and forest departments and NGOs promoting the value of biodiversity. With respect to property rights, land inheritance is a crucial factor that influences the decisionmaking capacity of women (Agrarwal 1994). *De jure* governance structures, established through the Protection of Plant Varieties Bill 2001 (MSSRF/FAO 2002), allow representation of women, but *de facto* participation needs still to be established.

Naryan (2003) describes the political struggles for and against rice cultivation as a larger resource conflict over environmental issues and land use patterns. Kerala experienced a fifty percent decline in rice-cultivated area in the last twenty-five years.

Rice cultivation is the most traditional land use and the main economic variable that historically shaped social relations. It is grown in valley portions, mostly wetlands that are of fluvial origin. Cultivation of rice helps conserve the wetland character of the landscape. However, in recent years, rice cultivation has become the least economically productive agricultural option. The debate about whether or not to continue this activity is now being raised by farmers.

Officially the state has banned the conversion of rice lands, but farmers do not comply to the regulations, insisting on their individual right to opt for the crops of their choice. In 1980 Kuttanad, the 'rice bowl of Kerala', experienced its first "Save the rice field protest," where agricultural laborers destroyed crops and assets in converted rice fields. The unorganized group of small farmers who bear the cost of low-productive rice cultivation cannot come together as an interest group because of multiple identities and part-time character of their occupation. The agricultural laborers on the other hand, with their strong labor institutions and a left-wing government that was sympathetic to their demands, argue for continuation of this activity, given that rice cultivation is labor intensive. The trade unions support the high labor absorbing activity of rice cultivation and invoke the laborers 'right to work', and environmental and food security arguments to stop the conservation of rice lands.

Agriculture is the mainstay of the districts economy and the rich cash crop plantations of pepper, cardamom, coffee, tea, and other spices have made Wayanad the largest foreign exchange earner in Kerala. Paddy rice used to be the dominant crop in the area, some varieties having medical and particular dietetic value, but today it covers only fifteen percent of the total cultivated area (Girigian 2003). A good road infrastructure, a

high literacy rate, a politically articulated population, and strong unions frame the conditions of agrobiodiversity management in the area. The trend of turning multifunctional paddy fields into monoculture banana plantations has economic, cultural, and ecological consequences. Moreover, there is evidence that the extent of the loss of agrobiodiversity is accelerating and is accompanied by diminishing food security.

The problem situation of agrobiodiversity coordination in Wayanad is highlighted by four case studies each specific in the interactions between plant genetic resources, their managers, and the institutional set up. The first empirical explorative study aims at testing the value of the central analytical concepts of “institutions of sustainability,” interfaces, and intrafaces. The kind of biodiversity, which is at the centre of conservation and utilization efforts varies from wild foods gathered in forests, to cultivated and wild medicinal herbs, complex rice farming *cum* water-harvesting systems, and integrated organic farming. Table 1 presents ‘sketches’ of the problem situation: it describes the actors, their property right relations, and relative governance structures. Different cases highlight different aspects like access rights, decisionmaking capacity, land rights, and collective action. The cases vary in their complexity of transactions. The first two are concerned with certain varieties and species, collected or cultivated, which function as a common-pool resource according to our definition. The multifunctional and organic farms could be considered as a club good regime, granting access to a specific kind of agrobiodiversity. Nevertheless we have to keep in mind the general public good characteristics for agrobiodiversity when considering longer time-horizons.

Table 1--Sketches in agrobiodiversity management

Sketches in Agrobiodiversity Management				
	Properties of transaction	Actors	Property rights	Governance structures
1. Wild food	Collection of wild food, management and expert knowledge of wild species	Kattunaikka* Hunters and gatherers	Commons forest and formerly interior forest	Headman No seat in Panchayat
2. Medicinal herbs	Collection, cultivation and processing of medicinal plants	Women self help groups among Christian Settlers	Own home garden and commons	Marketing limited due to missing certification
3. Multifunctional farms	Paddy field system including water harvesting	Kurichias* Matrilinear	Joint family holding family plot spouses plot	Tendency to nuclear family
4. Organic farmers group	Integrated agriculture	Wayanadan Chetty* Small scale farmers	Own land (less 1 acre)	Farmers group founded an 'Organic growers collective'

* = community and tribe names

CASE 1: COLLECTING WILD FOOD - RESOURCE AND KNOWLEDGE MANAGER UNDER PRESSURE

Seventeen percent of the population in Wayanad belongs to the *Adivasis* or tribal communities. The Kattunaikka tribe people are traditional gatherers of wild food from the forests (MRSSF 2003a). Through their collection activities and use of wild species, they manage their knowledge and relative genetic resources, something that is just starting to be documented (Narayana et al. 2004). The Kattunaikka people live in the forests as gatherers and hunters in small groups of around 25 families, and are lead by a headman

and his wife in an egalitarian institutional set-up. The women enjoy a rather equal status to men because of their crucial position in supplying for the family.

Transactions occur around the publicly managed state forest and in the diverse landscape of paddy fields. With their highly specific human capital Kattunaikka people maintain and utilize the public good of a bio-diverse forest. The wild food management practices of tribal communities rests on key knowledge holders, both men and women. Their specialized knowledge concerns different wild species, their names, parts used, modes of utilization, nutritive values, as well as seasonal and locational abundance or rarity. It also includes knowledge on the extent of domestication, and collection and consumption patterns. Gender differences are observable in collection and processing as well as in the preferences for one species over another. Knowledge encompasses medicinal plants, spices, food plants, and ornamental plants. Their local and differentiated knowledge on plants allows them to identify 177 edible species, which reduces their dependence on open landscapes.⁴ They guard exclusive knowledge on 16 forest species, which are not consumed by any other tribal group. This diversification in the management of wild food avoids overexploitation (Narayana et al. 2004). In this tribe, men and women are equally engaged in collecting and processing wild food, which requires patience and is time consuming. We observe a highly asset specific, site specific, and especially group-specific human capital, which is applied within the realm of a protected forest reserve to the public good of biodiversity. The low separability applies equally to the resources and to the knowledge holders, who possess the skills to conserve

⁴ Note, that the Kattunaikka have literacy rate of 8 percent much lower than the average literacy level of 31 percent among scheduled tribes in Kerala.

and utilize these resources. The frequency of transactions vis-a-vis collection is high, allowing for a learning process and a close monitoring of the state of the resource. The uncertainty due to ecological variation is mitigated through long term strategies of sustainable exploitation rates. While before forest protection regulations were introduced the arrangements within the small community, paradoxically, fit a situation of open access and low competition, nowadays the added complexity invites opportunistic behavior.

The actors are characterized by their tribal name Kattunaikka, originating from *kadu* meaning forest and *naickan* connoting a leader or headman, which points to their characteristic social hierarchical structure, small group size and distributed decisionmaking power in the environment of the forest. They live inside the forest, which results in political as well as social marginalization. In terms of subsistence, game used to be a welcomed addition to the staple cereals of rice and *ragi*, supplemented with roots and tubers.

Their low grade of organization and stratification appears to be a result of a highly secluded lifestyle in the forest interior and is now increasingly challenged by new institutions. Hunting represents a violation of forest laws. In addition, slash and burn cultivation of finger millet and of an upland drought tolerant rice variety called “Karuthan” is also banned. As a consequence their own institutions, which created a wealth of knowledge and management practices, are endangered and related activities have become risky. Moreover, while their internal management rules have proven to secure their survival, they are no longer able to react to new issues like intertribal

competition. One major problem is that state regulations do not take adequately into account the heterogeneity of the different tribal communities.

With the advent of new environmental policies, property rights changed and the Kattunaikka people lost their customary access rights to the commons. Their traditional livelihood has turned into a National Park between the states of Tamil Nadu, Karnataka and Kerala. The right of access is in the hands of the forest departments and tribal movements are restricted, cutting off traditional seasonal collection and hunting grounds. The politically sensitive issue of property rights and access to the commons, especially for marginalized groups like the Kattunaikka tribal people, in an environment of corporate tea, coffee, and spice plantations has brought to the forefront the discussion of reclamation of ancestral land (Bijoy 2002). Forest officers confiscate their hunting and fishing gear, while settlers who hold land titles are allowed to hunt. The deterioration of Kattunaikka's nutritional status is not so much related to reduced game in their diet, but to the strong market demand for honey. Honey once contributed to a vast extent to their diet, ensuring their well-being. With an increasing market demand, today most of the wild honey is sold, reducing their food security and honeys with medical qualities are no longer available with the increased demand for Ayurvedic medicines.

Nellikka (*Emblica officinalis*) is the most widely collected non-forest product and an important income source (Narayana et al. 2004). Kattunaikka men and women are involved and sell the harvested fruit to a tribal cooperative society in the forest sanctuary, who markets the Nellikka. Control over the extracted products is handed over to a tribal cooperative, which acts as intermediary. The fruit is carefully picked from the branches, leaving the tree intact. However, other communities do not hesitate to cut down a fruit

laden branch. Similarly, bamboo seeds, honey, crabs, and fish form an important aspect of the diet of the Kattuanikka and selected species entered into a competition with upcoming markets. The development of markets has increased the value on many forest products, and has brought growing competition between communities for harvesting. In sum, their livelihood is endangered by protection and conservation policies, while their conservation practices and their knowledge is not valued nor recognized.

This indicates that the governance of environmental resources and related knowledge is suboptimal. In this institutional environment and Kattunaikka have lost their access and use rights in the name of environmental protection. Environmental policy has turned against the traditional managers of the forests. Being a minority among the tribal population itself, with a low degree of internal organization and no outside representation, since they are too small in number to become eligible for a seat in the local panchayat, governance structures are weak and the Kattunaikka remain voiceless. With increasing food insecurity, the danger of losing their valuable knowledge seems eminent.

In this case study, interfaces appear where the livelihood strategies of the Kattunaikka collide with environmental policies and their enforcers. The conflict with conservationists and their institutions regulating the public good of forests, does not feature prominently, since the Kattunaikka's political voice is marginal. However, with threatened food security, starvation among the tribal population has led to uprisings (Bijoy 2002). Interfaces appear even between tribal groups, where social hierarchy is connected to non-consumption of wild food. The low esteem of gathered food represents one major barrier for younger generations of Kattunaikka to maintain their knowledge

and practices. Local knowledge transmission is absent in formal education, and boarding schools for tribal children ignore it. Nevertheless, the advent of local markets for collected items has also a positive effect on the perception of young people towards wild food. Social values and gender roles are decisive for use and esteem of wild food. Normative views change and alter the legitimacy of claims. In the face of legal forest reserves and even when confronted with organizations like the tribal sanctuary, the Kattunaikka's current institutions lack information processing skills and surplus resources to name and challenge the interference into their customary collective goods from the side of the public reserve.

Intrafaces appear where conflict over a resource occurs between gender groups sharing the same life-world. This concept helps identify knowledge differences between men and women, different tasks they perform and the various responsibilities they have in collecting, processing and managing wild foods. Additionally it highlights the egalitarian structure among the collectors and the prestige women entertain through their key role in securing food. The term intraface is useful to understand the internal shift in power that is occurring due to the recent trend of Kattunaika men getting involved in cash crop production through government schemes. As a consequence the collection of wild food tends to be left to women. Men's increased mobility and their control of cash resources, increased their decisionmaking power, leaving the women marginalized within their own community.

What emerges is the need for institutional innovation to coordinate forest extraction activities between communities. Balancing conservation, use, overexploitation and marketing is difficult, and requires new mechanisms of resource monitoring, of

access, control, and conflict resolution. Institutional innovation, coordination and scaling up of collective action institutions is required to strengthen the links with other tribal groups and improve the management of agrobiodiversity in the forest.

Our framework highlights the close linkage between people, resources, and transactions and advocates the adoption of a long term perspective with respect to governance structure that can foster collective action. As Balakrishnan et al. (2003) pointed out, it is important to recognize the management of germplasm in the viewpoint of farmers' rights. For example, *Dioscorea* is an important food crop for the poor, the wild relatives and landraces are valuable for breeding along with the knowledge of the people who conserve such species. Since the "Farmer's Rights Act" of 2001 not only recognizes the impact of cultivation on agrobiodiversity, but also the rights of those who add value to crops and their wild relatives, the Kattunaikkas knowledge, its maintenance, and transmission establishes them as legitimate cultivators with specific rights.

CASE 2: PROCESSING MEDICINAL HERBS: COLLECTIVE ACTION WITHOUT REWARDS?

The common feature of all Kerala houses is the nearby home garden. Whether the household is engaged in agriculture (more than 85 percent in the district Wayanad are) or people follow other occupations, each and every house features a homestead-garden of an average size of 0,68 ha. People grow vegetables for home consumption, run nurseries, or grow spices. Home gardens could be perceived as a substitute for wild food collection. The fact that home garden farming has evolved over hundreds of years in Kerala has great significance from the point of conservation, consumption and management of biodiversity. Collectively all home gardens maintain and even improve biodiversity in a

sustainable manner. Kerala home gardens combine a very high level of cropping intensity with multi-storied cultivation integrating different factors of production. The utilization of vertical as well as horizontal levels of soil and atmosphere depends on the resources and requirements of the family (Pushkaran 2002). These methods provide favorable conditions for the conservation of plant genetic resources, which can only be achieved if and when genetic diversity is utilized (Engels 2002).

Home gardens represent a special place between forest and fields, being important centers of experimentation, plant introduction and crop improvement as well as refuges for unique genetic diversity. Following a holistic conservation approach, the home garden appears as the most favorable site for *in situ* conservation, since this has always been one of its roles. The close relationship between crop evolution and the role of the individual actor is key to understanding diversity management and development. Home gardens are the place, where this interaction is most intensive because of frequent transactions and the embeddedness in a wider network.

In this environment an NGO in Wayanad initiated the formation among Christian settlers of women self-help groups (SHG) concerned with the preparation of herbal medicines (MSSRF 2003B). The aim of this intervention is twofold: To promote the sustainable use of medicinal plants and to revitalize the primary health care traditions through training of women members. The products are intended to strengthen local knowledge on the processing and use of herbal medicines.

In this case the main transactions involve medicinal herbs and health care related knowledge, which bring to the forefront the issue of intellectual property of healing practices. These plant genetic resources are medicinal herbs growing in an open access

situation of the agricultural and forest landscape. We cannot speak of actual commons, since this concept is not covered by the current legal situation. Nevertheless the resource appears to be a common pool resource, which is collected by the members of the SHG for processing or transplantation into home gardens and subsequent multiplication in nurseries. The herbs appear as abundant, since competition in use is very low due to the vanishing knowledge about effects and preparation of herbal medicines and the higher status of allopathic medicine. The utilization of the medicinal plants becomes only possible in combination with the site specific and highly group-specific and exclusive human capital of a local healer, a *swami* of indigenous health practices. He is the source of knowledge for identification of the plants, their harvest or cultivation, and finally their processing into different ointments, pastes and pills.

The production of herbal medicines as an income generation strategy for women results in several by-products. The frequency of transactions of both collecting plants and receiving instructions by the *swami* forms a long term arrangement that induces learning. Though the plant domestication takes place in private home gardens, knowledge transfer is targeted at a group instead of single individuals. The group knowledge can only be applied collectively, since it requires division of labor and thus specialization. Furthermore, transplanting provides a link between gardens and nature, and home gardens serve as experimentation centre to test qualities and characteristics of herbal plants and their requirements for cultivation.

The characteristic of the two important actors are somewhat contrasting, as the collective action of the women's group depends on the restricted and controlled access to the recipes of the *swami*. While the healer might gain respect and rewards through the

increasing interest in traditional healing practices, the knowledge and learning process does not reach beyond the women's management of their home gardens. The knowledge management practice of the *swami* of restricting access to the ancient body health care practices, raises the issue of intellectual property. Similarly to the *swami*, many traditional Ayurvedic physicians have a rich collection of medicinal plants (Pushkaran 2002), product of their indigenous knowledge interwoven with genetic and cultural diversity. It is estimated that over 600 species are used in indigenous systems of medicine (Narayana et al. 2004).

Calling themselves "bio-health"- group, the SHG strength comes from well organized collective action among members from a homogenous social group of Christian settlers. The group devised internal conflict resolution strategies and, being partly literate, also established record keeping practices. The cost of collective action appears to vary for the members, according to the tasks they perform. Meeting at the private home of the most affluent member perpetuates existing hierarchies in status among the women, leaving tedious manual labor to the less affluent members.

As long as the production aims at the community level, no problems have been encountered with lack of supply through collection. However, the logical place for production of medicinal herbs that are applied fresh or consumed only in small quantities but regularly is the home garden. It is an important place for species often neglected by research and underutilized in economic terms. While the women realize a reduction of health care costs through supplementing allopathic medicines with herbal ones, the selling of products within their marketing networks is not sufficient to secure returns to the investments in additional ingredients and labor.

On the other hand, possible scaling-up of the “Bio-health” group activities poses severe threats to its sustainability and consequently to the conservation of genetic diversity. Since each woman takes the responsibility to grow different herbs required for the medicines, the diversity at the variety level within one garden might be low, but is high if we take all gardens together. Given the strong links between culinary and botanical diversity and the key role of women in managing gardens, utilizing its produce in the kitchen or selling it, the garden appears as the cultural area around the homestead, where agrobiodiversity gets established, maintained and possibly lost.

The preconditions for management of medicinal herbs by a women SHG are: the existence of the home gardens; women’s access; and their considerable control over these. Besides plant genetic resources and relevant knowledge, access to land via the home garden is crucial for these women. Property rights regulating the cost and benefit streams are handed down in the male line, women holding secondary usufruct rights to the gardens. Thus secure long term usufruct rights, seem necessary, especially to improve the legal situation for women in the case of male migration. Nevertheless, even in the absence of legal entitlements, they are in a position to introduce medicinal plants in the gardens as a contribution towards the SHG. However, since there is competition over land for intensive spice cultivation by the male members of the family, women’s use rights, especially for experimenting and cultivating medicinal herbs appear as inferior to established practices of land use and dependent upon the decisionmaking of the official title holder. When women collect herbs in the surroundings, they access a common-pool resource. They harvest the plants in a sustainable manner, echoing a forgotten practice of commons management. Taking samplings to the home garden, they turn them into private

goods, but the connection to the exchange network through collective action of the SHG is still present. In other words, women manage the diversity as custodians, ready to release the plants again.

The governance structure of the endeavor of utilizing medicinal plants is given by the legal form of a registered Self-Help Group (SHG). Initiated by an NGO, it encouraged women of the Christian Settler community to meet, start collecting, cultivating and processing local medicinal plants for herbal medicine use. 200 women from rural backgrounds joined this scheme. Having established working rules and conflict resolution mechanisms, today the challenge is marketing the products beyond informal channels, in other words, scaling up. Currently the discussion revolves around a possible strategic cooperation with other groups within an NGO network. The crucial issue is whether, in the process of upgrading and professionalization of activities, men will join the group and on what terms. It seems important to form strategic alliances with knowledge holders and gain access to credit, without sacrificing the autonomy and control of the enterprise. Under their current institutional arrangements, the SHG has touched a ceiling in marketing opportunities and has to look for innovation to improve its performance.

Interfaces in this case exist between the collective action within the SHG and formal institutions. While the internal governance structure with equal sharing of profits, good bookkeeping and conflict management works to everyone's satisfaction, the SHG faces difficulties with expansion and up-scaling of the business. Certification is needed to enter the formal market and be able to sell herbal drugs. The NGO made efforts towards increased value added and the development of additional herbal products, and to bridge

the interface between collective action and the market. The NGO aims at forming a medicinal plant cultivators' society to facilitate exchange among small-scale farmers. The challenge is to merge the women SHG into evolving institutional settings, including a registered society for large-scale cultivation of medicinal plants formed by 165 farmers (MSSRF 2003b). The women aim to achieve legal security through the institution of a cooperative. We see an interface arise, where an informal situation shifts into a formal set-up.

On the other hand, an intraface appears between the women group and the traditional healer. With the advice of a traditional healer the women were able to revitalize and utilize customary local knowledge. Nevertheless, the *swami* will guard his highly elaborate family heritage as a club good, with access restricted to members, privileged by birth into respective families. Also, given the pharmaceutical interest in genetic plant materials, the danger of extraction without reward is eminent. To counteract this possibility, joint forces of collective action could provide a strong means to organize and strengthen local conservation and utilization, privileging economic returns within the local area. Here a broader intraface arises between women managers of genetic diversity, the *swami* as the expert knowledge holder and possible upgrading through cooperation with male-dominated groups. This requires fair patterns of control and benefit sharing, since conflict between resource users tends to be underestimated (Véron 2001). While the home gardens act as an entry point into economic ventures, the question is whether existing institutions will be able to secure the management of medicinal plants in the future.

CASE 3: PRESERVING AND CONVERSING MULTIFUNCTIONAL FARMS – A COLLECTIVE UNDER THREAT

The land under paddy cultivation in the district of Wayanad has reduced from 21,770 ha in 1990 to 8,725 ha in the year 2000 (Narayanan et al. 2004). Along with the reduction of self sufficiency in food, the decline has consequences for the ecological function of the landscape and its ability to store and release water regulating the heavy rainfalls in the region. Paddy cultivation in the low lying areas of the valleys in Wayanad collects and retains large quantities of water for plants, animals and humans alike. The conversion of land to perennial crops cultivation or more recently banana cultivation, limits the storage capacity of the “sponge” character of land, leading to water shortages in wells during the dry season and floods during the rainy season. The tribal people at the centre of this case study are the Kurichyas, famous for their elaborate rice-farming systems and water management practice (Girigian 2003).

The agrobiodiversity of rice is closely connected to the characteristics of land resources for paddy cultivation and integrated water management systems. Properties of transactions are determined by two different sets of institutional arrangements around the cultivation and conversion of paddy farms: the Kurichya tribe’s common land holdings, and the private land of so-called ‘settler’ community. Even though most environmental resources are under private control, the paddy agro-ecological systems have both public good and private good characteristics. The concepts of land rights fail to capture the physical entity of a watershed and the social reality of differentiated access to natural resources and conflicting individual and group interests (Véron 2001). The complexity invites opportunistic behavior and it is therefore adequate to consider the interrelated water system as a common pool resource.

The current case illustrates the importance of assets, and site specific and group-specific human capital. Although the Kurichyas as well as the settlers are not aboriginal people, their migration into the uplands of Wayanad lies 100 years back. The Kurichyas are the first agricultural tribe from the plains of Malabar who colonized Wayanad (Pramod et al. 2003) before the Green Revolution. The name ‘Kurichya’ is interpreted as denoting hill people (‘Kuri’ meaning hill, and ‘chian’ people). The so-called “settlers” are Christians from Travancore area of South Kerala (Narayana 2004), who moved into Wayanad between the 50s and the 70s. They brought along their banana cultivation management practices, which were developed under different ecological conditions in the lowlands.

The central agrobiodiversity is represented by the varieties of paddy landraces. Market prices for rice have long been undercutting production costs, inducing (mostly illegal) shifts to other, more profitable crops. In 1989 the left-coalition government initiated “group farming” of rice to improve agricultural growth and food self-sufficiency in Kerala. Group farming was expected to reduce production costs and raise productivity of paddy cultivation, thus preventing paddy conversions. However, collective farming operations beside the joint purchase of farm inputs failed in most cases (Véron 2001). While this would induce to consider paddy cultivation as a single private good, the low separability of its production from a complex environment, speaks for targeting groups instead of individuals. In contrast, the Kurichyas still cultivate paddy for their subsistence and not for the market. The production unit is the extended family which secures long term arrangements and a high frequency of transactions. The conservation strategies of

the Kurichyas and the conversion strategies of the Settlers acquire their legitimacy through their different normative views on food security and on commercial viability.

Other characteristics distinguish these actors. The settlers are capitalist farmers with patrilocal⁵ residence and patrilinear inheritance patterns. As Christians they represent the single largest religious group (25 percent) (Narayana et al. 2004). In contrast, Kurichyas follow a rigid matrilineal system. They form the largest tribal community of Wayanad district and occupy the highest social status among tribes of Wayanad. Though the matrilineal tradition was legally abolished in Kerala with the Marumakkathayam Act in the 1930⁶, informal rules of descent along the female line continue to organize family groups. They live in large extended families of 50 people or more and cultivate a vast spectrum of crops, including different local traditional rice varieties, under the guidance of the eldest husband. The joint family lives in a single house with separate rooms for each woman, into which the respective husbands move in.

The Kurichya have a rich tradition of medicine and religion, and are also excellent agriculturalists (Pramod et al. 2003). Paddy rice forms their staple food, is regarded as the mother plant and plays an important role in purification and puberty rites. They conserve a large number of plants in their home gardens, especially the ones required for religious purposes, many of them crop plants. Sacred groves conserve more than 100 different species and destruction is avoided through sacred taboos and beliefs. The Kurichya cultivate paddy rice on the commonly held land under the guide of the “Pittan,” the headman, to achieve food-security. The land is not divided into individual fields. Only

⁵ Patrilocal: residential pattern, where the bride/wife moves into the house of the groom/husband, in opposition to matrilocal or neolocal (new site) patterns

⁶ I owe Mina Swaminathan my gratitude to draw my attention to this point.

seldom do women ask for a separate plot on the family holding to build a house for their nuclear family. The farming system aims at the survival of the collective. Kurichya women play a crucial role in paddy cultivation, since neither mechanization nor outside labor is used. The Kurichya believe that the application of chemical fertilizers and pesticides will affect soil fertility negatively. A clear cut division of labor exists and most efforts and time consuming activities of transplanting and weeding are left to the women (Girigian 2003). Swaminathan (MSSRF/FAO 2000) summarizes the Kurichyas situation, as one where the "...custodians of genetic wealth are increasingly confronted with severe economic problems that are rendering the maintenance of their traditional conservation ethics difficult."

The settler communities are far more integrated into mainstream society and undertake agriculture as a business on private holdings. Their conversion of paddy fields into more lucrative cash crop plantations (e.g. banana) affects the district severely, because of the size of land under banana cultivation. If they follow a pattern of three years of banana, followed by one year of tapioca and two more years of paddy, the rotation is still reversible, if the irrigation system is kept intact. Where banana plantations are maintained for longer periods, the loss of soil texture and of ecological functions becomes irreversible. The drainage required for banana plantations in the low valleys changes the field structure and after four years only perennials can be cultivated. Alongside with the paddy fields, the elaborate water storage mechanisms are abandoned and the carrying capacity of water is drastically reduced in the whole farming system. The transition of paddy fields to banana plantations takes place in a policy environment characterized by subsidies for commercial agriculture. At the same time pesticides and

herbicides leak into the groundwater and local drinking wells and cause environmental harm. Due to the reduced water carrying capacity of the landscape, landslides are increasing as well. In this case institutional failure of natural resource management creates severe conflicts and interfaces arise.

Property right institutions framing agricultural activities differ between actor groups. Among the Kurichyas, the most senior husband has the right to sell, mortgage or lease property (Menon 1996), while the headman decides the crops to be planted in the common fields and insists on planting paddy for home consumption, providing food security (Anil Kumar et al. 2003). Beside the common fields, there are “private” fields for the spouses, which are held in the name of the wife and are cultivated according to the gendered division of labor between husband and wife. Presently, banana plants are only at the fringes of the irrigated fields close to the forest and do not interfere with the paddy fields. The possibility of converting the paddy fields to banana plantations has been discussed by the younger men, the next generation of decisionmakers.

The joint family acts as an informal institution governing the use of family land. Within this joint family system the rights of the women are maintained by valuing collective food security more than individual short-term income strategies. The viability of the joint family as a multifunctional farming system with strong effects on equality among group members is questioned by the younger generation, especially by young men. The joint family landholdings are endangered by tempting possibilities of private cash crop production that would transform them into private property, leaving the women with no work, no food and no support network. However, the headman is still interested in keeping hands occupied and mouths fed. Strong institutions are needed to avoid future

disintegration, to strengthen the joint family institution and its services for agrobiodiversity management. The tendency towards the nuclear family is accompanied by loss in biodiversity. As Hagedorn (2003) indicates “the family farm system could serve as an integrating institution also for the reinforcement of jointness between commodities and non-commodities....” In order to understand the implications for gender equity the strong plea in favor of an integrated perspective has to be accompanied by an analysis of the interfaces between women and men farmers.

Overarching governance structures, which could tackle the issue of landscape degradation are missing to date. Administration, research, and extension have engaged with the interests of capitalist and modern farmers like the settlers. Adverse incentives, as subsidies, result in pressure on low input systems like the Kurichyas, which affects plant genetic diversity and water systems. This institutional failure requires innovation and market driven changes like niche markets could be a prospective means for agrobiodiversity conservation and collective action a means to maintain the watershed. Véron (2000) reports of paddy farmers taking action against wetland conversions upstream, which has affected water availability on their fields, highlighting the interconnectedness of the ecosystem.

In this case study the settler communities represent a capitalistic mode of agricultural production in contrast to the holistic agrarian culture of the Kurichyas. Here we observe a classical interface situation, where different values, means and strategies encounter each other. Until now no open conflict has arisen between the tribal community and the settlers over the conditions of the state of the environment, since this is not yet perceived as a common good. With the prominent role of livelihood issues for

the Kurichyas the time for collective action beyond one's community has come.

Institutional innovation is needed to bring all farmers on the boat of sustainable land use, sharing costs and benefits.

Within the Kurichya community a tremendous social shift is induced by the threatening conversion of paddy fields to banana plantations. The intraface appears in the division of labor, which changes drastically for women, when it comes to banana cultivation. While they played a prominent role in paddy cultivation, female workers are not involved in banana cultivation. Besides losing their work on the paddy fields, the possibility of additional benefits from the rice fields like catching crabs and fish vanishes. When paddy fields get converted into banana plantations, working women are deprived of their job and their agricultural knowledge of local paddy varieties becomes redundant. Women would like to keep the paddy fields for employment, direct food security and to support their moral claims to surpluses. The change in crop and cultivation practices has long lasting effects on the status of women, now being deprived of direct contributions to survival.

This case study is not solely concerned with the management of certain species and varieties by with an entire ecosystem. Even concentrating only two cultivator groups, it is evident that to stop the loss of agrobiodiversity of rice landraces, new institutions that can tackle these multifaceted problems need to be established. Paddy cultivation and water storage are linked through collective action and constitute a common-pool resource with immediate consequences on agrobiodiversity.

CASE 4: ORGANIC FARMS – ORGANIZING FOR COLLECTIVE ACTION

Organic farming as an agricultural strategy has gained momentum in Kerala. The concept for the practice is supported by the Catholic Church, the Chamber of Commerce and Industry, several government agencies, and NGOs. The emergence of the first Indian certification agency *indocert*, launched by an NGO, documents the demand for certification and the creation of a national or even international niche market. Especially spices like vanilla realize increasing prices on the world market. With a countrywide movement promoting organic farming, marginal farmers' hope for acknowledgement of sustainable production and maintenance of agrobiodiversity– through normative valuation and fiscal prices.

The properties of transactions concentrate on the change of rules for Wayanadan Chetties traditional agriculture, once they have achieved certification as organic farmers. Meanwhile they continue with their integrated cultivation practices, which appear to be very close to organic farming systems. Their aim is to continue with adapted cultivation practices and to secure their livelihood via higher prices on nice markets. Therefore, 200 small-scale farmers gathered at a one-day seminar, conducted by an NGO and the State Agricultural Department, to learn about organic farming. Meeting with expert knowledge holders and local political leaders, they used the opportunity to exchange experiences about low input agriculture and realized the need for collective action. Being accustomed to exchange of species and varieties, as a means to improve cultivation practices, they realized the advantages of coordination of interests and knowledge. Since agrobiodiversity is the result of gene flow and species exchange, in opposition to other common-pool resources where systems of control are paramount, the transformation of a

'reverse' common-pool resource into a sort of club good appears feasible. Though free-riding, especially on agrobiodiversity conservation, might not be hindered, the stock of knowledge and cultivation practices is only available to club members as will be the marketing channels, given the certification requirements. Although identification of the true origin of varieties complicate benefit sharing self organization and local initiatives targeting conservation and utilization seem viable.

The Wayanadan Chetties are small holder agriculturalists, working their small private land fields of less than one acre. Besides working the family fields, daily wage labor is an important source of income for women. At the seminar on organic farming, about one quarter of the attendees were women. With the danger of shrinking traditional farming practices, they are faced with possible loss of control within family farms and outside, if paddy cultivation continues to decline. Women are interested in influencing conservation and further development of agrobiodiversity rich agriculture to secure their control over income opportunities. To avoid short-term strategies, a collective search for niche markets and better prices has begun.

Starting as private actors, the Wayanadan Chetties are about to craft institutional rules that will make them eligible to join the existing institution of certification for organic products. With defining procedures for management and production of organic food, the thus differentiated result becomes the property of the collective. Though the public good character of the genetic information persists, actors create a label through the definition of the production process. Though this might be followed by transaction costs of surveillance, the site specific knowledge within this group acts as a protection.

Organic farming as a way to create institutions for the governance of agrobiodiversity appears a promising indirect means to ‘professionalize’ its management. Until now the conservation of varieties depended on the individual decision of the farmer, of growing or not growing a plant as a private good, bearing costs and risks. As a collective of farmers with the same perceived interests, the coordination of conservation as well as the improvement of varieties is possible. Since organic farming relies on locally adapted landraces, the joint endeavor of management practices of Wayanadan Chetties today is not dissimilar to the joined production of agrobiodiversity and organic products. Meanwhile the Government of Kerala is lobbying the Central Government to locate the proposed National Institute of Organic Farming within the State.

In this case the interface appears between the traditional agriculturalists and the logic of an NGO, spreading the gospel of organic farming without having to bear any of the risk. The differences in goals lead to differences in use of tools. With the aim to achieve certification, rules of book- and recordkeeping will have to be followed, creating interfaces in the styles of knowledge processing. Finally, the costs for establishing collective action and of approaching necessary institutions are a further obstacle.

The intraface is prominent, since women strongly articulate their interest in maintaining labor opportunities. The women have three objectives in getting involved into the formation of an organic farmers group:

- 1) They want to collect information to improve and sustain their livelihood,
- 2) influence further directions,
- 3) and have an equal share in the framing of the institutions managing the organic agricultural resources.

Their interest in employment and food is supported when applying for certification of organic marketing. Their involvement in the foundation of an organic farm cooperative is closely linked to the recognition of these women farmers as managers, preservers, and knowledge holders in low input agriculture. Women get actively involved at the intrafaces to engage in encounters at the interfaces of collective action. The founding of a farmers group to organize collective action for organic farming is the first step to institutionalize the care-economy of agrobiodiversity. The beginnings of organic farming in Wayanad can be understood as the process of political negotiation and the formation of a pressure group. At the same time they join the evolving governance structure for organic farming.

4. CRAFTING DIVERSE GOVERNANCE STRUCTURES

To test the usefulness of the analytical framework, the results concerning agrobiodiversity, collective action and equity are considered. In all four cases biodiversity is more or less related to agriculture and to cultivation efforts of certain groups. With the fluctuating borders of forests, home gardens and fields in mind, this flow contributes to the development and distribution of plant genetic resources. The actors entertain specific interests and therefore engage in the management of agrobiodiversity. Conservation for the purpose of conservation appears as an alien concept. What appears as pure conservation strategies are culturally embedded activities, making sense for the actors only from a livelihood perspective. While the activities of the Kattuaikka involve, among others, the delicate treatment and taxonomic differentiation on yam germplasm of the *Dioscorea* family, the women in the SHG processing herbal

medicines do not rely on this for survival. Accordingly their knowledge stock has a gradient. Nevertheless, both forms of collective action conserve and utilize selected species and varieties in an explicit way. The Kurichyas maintain water storage systems and paddy cultivation, and among landraces the *njavara* with medical qualities. The Wayanadan Chetties want to consolidate their integrated cultivation, including finger millet, by attaining the status of organic farmers. In the last two cases the wide range of agrobiodiversity conservation appears as a side-product of a farming ideology. This points to the fact that patterns of collective action in the case of complex common pool resources have to be equally sensitive to long term and conflicting goals. The specific species are conserved through their utilization, which is ultimately linked to a lifestyle and a concept of human –nature relationship.

The collective action encountered in these cases falls under the overarching governance structure created by the Indian legislation of the Biodiversity Act (2002) and the “Protection of Plant Varieties and Farmer’s Rights”(PPVFR) Act of 2001 (MSSRF 2002, MSSRF/FAO 2002). Here an interface appears, since the legal situation frames many issues relevant for the managers of agrobiodiversity. The Government of India is currently working on the implementation rules related to these acts. The understanding of the terms “farmer” and “community” are central to the impact these rules and regulations may have on conservation efforts with respect to gender and tribal equality.

In the Farmer’s Rights Act it is clearly stated that not the holding of a land title, but the managing and handling of the cultivation turns someone into a farmer, and makes him or her eligible for possible benefit streams. This includes all farmers with insecure property rights to land and puts management aspects at the center. Besides the definition

of the farmer, the definition of “community” is a key issue in the National Biodiversity Act. Not only is the National Biodiversity Authority able to act on behalf of the community, but we have to ask who belongs to “the” community in the first place? How “community” is defined will affect future benefit streams. The term “community” can blur hierarchies and inequalities and needs to be treated carefully. The very same applies to heritage sites, which can be sacred groves or other places of high diversity. The focus on conservation tends to separate the sites from the people who have cared and maintained these very sites. Excluding the former guardians from site conservation means penalizing those that have created them. Heritage cannot be viewed separately from the culture and lifestyle of people (MSSRF 2003c).

With respect to equity and intrafaces, the four sketches of agrobiodiversity management through wild food, medical herb collection, multifunctional and organic farms, point to the importance of property rights and decisionmaking power of women farmers. There is not only a demand to develop governance structures to coordinate the maintenance and utilization of agrobiodiversity, but a need to involve women actors into these very structures. Women are players in the field and they might not only be good team players, but a winning team, if the rules of the game would consider them as equal partners. With promising institutional innovations underway to coordinate agrobiodiversity, considerations must entail the question of which of the rules are more effective and equal. An interesting line of pursuit is, whether women are able to voice their concerns and pursue their interests in agricultural decisionmaking better in mixed or same gender groups. The claim, that heterogeneity in a group can be overcome though

good institutional design (Varughese and Ostrom 2001) is a challenge in the case of mixed gender groups.

For better local conservation of genetic resources, women need to be represented, vested with property rights, and actively endowed with decisionmaking power in terms of managing organic agriculture. Women should be included as spouses or inheritors in case of widowhood. Legal literacy is also crucial, as with increased stakeholder capability to understand the law and use it to one's advantage, legislation starts working (Bala Ravi and Padmanabhan 2003). Women farmers, their knowledge and respective needs have to be considered in their own right. Still a woman's claims on succession rights depend on existing inheritance laws, on the social legitimacy of her claim, her educational status, her access to the administration, and her alternatives of survival outside the support system provided by competing claimants (Parthasarathy 2003).

Successful policy design must be able to create an enabling environment and to allow for the formulation of interests within a larger group. The consequence for local level conservation is: Social diversity in the co-ordination of agrobiodiversity is a precondition for biological diversity.

REFERENCES

- Agrarwal, B. 1994. *A field of one's own. Gender and land rights in South Asia*. Cambridge: Cambridge South Asian Studies.
- Almekinders, C. 2001. *Management of crop genetic diversity at community level*. GTZ. Eschborn.
- Anil Kumar, N., Girigan, G., Nambi, V Arivudai 2003. Vayals (paddy fields) in Wayanad, Kerala: Traditional classification of agricultural landscapes. Unpublished paper .
- Balakrishnan, V., M. Narayanan, K. Ratheesh, and N. Anil Kumar. 2003. Ethnotaxonomy of Dioscorea among the Kattunaikka people of Wayanad District, Kerala. *IPGRI NewsLetter* 135: 24-32.
- Bala Ravi, S., Padmanabhan, S. 2003. Protection of plant varieties and farmers right's act: what are farmer's rights and Why are they important. In MSSRF 2003. Farmer's rights and biodiversity: A gender and community perspective. Chennai.
- Bellon, M.R. 1996. The dynamics of crop infraspecific diversity: A conceptual framework at the farmer level. *Economic Botany* 50 (1): 26-39.
- Biesecker, Adelheid., Mathes, Maike., Schön, Susanne, Scurrrell, Babette eds. 2000. *Vorsorgendes Wirtschaften. Auf dem Weg zu einer Ökonomie des guten Lebens*. Bielefeld: Kleine.
- Bijoy, C.R. 2002. Indigenous people's rights in Kerala, India, Paper presented at the Indian confederation of Indigenous and Tribal People, New Delhi, 11-13.03.2002
- Birner, R. and H. Gunaweera 2002. Between market failure, policy failure, and "community failure: Crop-livestock conflicts and technology adoption in Sri Lanka. In *Innovation in natural resource management. The role of property rights and collective action in developing countries*, ed. Meinzen-Dick, R., A. Knox, F. Place and B. Swallow. Baltimore, MD, USA: The John Hopkins University Press.
- Brush, Stephen 2003. Farmer's rights and protection of traditional agricultural knowledge. Paper presented at the CAPRI-IPGRI International Workshop on Property Rights, Collective Action and Local Conservation of Genetic Resource, Rome, September 29 – October 2, 2003.
- Convention on Biological Diversity (CBD) 2001. Global biodiversity outlook. www.biodiv.org/gbo/chap-06.asp (accessed 01.05.2004).

- Dalhuisen, Jasper, De Groot, Henri and Nijkamp, Peter 2000. The economics of water: A Survey of issues. *International Journal of Development Planning Literature* 15 (1): 4.
- Elson, Diane, Cagatay, Nilüfer 2000. The social content of macroeconomic policies. *World Development*. 28. (7): 1347-1364.
- Engels, J. 2002. Home gardens – a genetic resource perspective. In Proceedings of the Second International Home Gardens Workshop: Contributions of home gardens to in situ conservation of plant genetic resources in farming systems, Watson, J. and W. Eyzaguirre. July 17 – 19, 2001. Witzenhausen. Federal Republic of Germany. International Plant Genetic Resource Institute. Rome. p.3 - 9.
- Eyzaguirre, P. and D. Evan 2003. The impacts of collective action and property rights on plant genetic resources. Paper presented at the CAPRI-IPGRI International Workshop on Property Rights, Collective Action and Local Conservation of Genetic Resource, Rome, 29.09 – 2.10, 2003
- Girigian, G 2003. Gender dimensions in household food security. A case study of Kuruchias of Wayanad. Unpublished paper.
- GTZ 2002. The convention on biological diversity: Ensuring gender-sensitive implementation. Gesellschaft für Technische Zusammenarbeit. Eschborn.
- Hagedorn, K., K. Arzt and U. Peters 2002. Institutional arrangements for environmental co-operatives: A conceptual framework. In *Environmental cooperation and institutional change*, ed. K. Hagedorn. Edward Elgar. Glos. 3-25.
- Hagedorn K. 2003. Rethinking the theory of agricultural change in an institution of sustainability perspective. In *Importance of policies and institutions for agriculture*, ed. van Huylenbroeck, G., W. Verbeke, L. Lauwers, Ivanslembrouck, M.D'Haese. Gent: Academia Press.
- Howard, P. (ed) 2003. Women & plants. Gender relations in biodiversity management & conservation. London: Zed Books.
- Kumar-Range, S. 2001. Like paddy in rock. Local institutions and gender roles in Kolli Hills. M.S. Swaminathan Foundation. Chennai.
- Lachenmann, G. 2001. Geschlechtsspezifische Einbettung der Wirtschaft. In *Die geschlechtsspezifische Einbettung der Ökonomie*, ed. Lachenmann, G. and P. Dannecker. LIT. Münster. 15-36.
- Long, N 1993. An actor-oriented paradigm. In *Battlefield of knowledge. The interlocking of theory and practice in social research and development*, Long, N. and A. Long. London: Routledge.
- Long, N. 2001. *Development sociology. Actor perspectives*. Routledge. London.

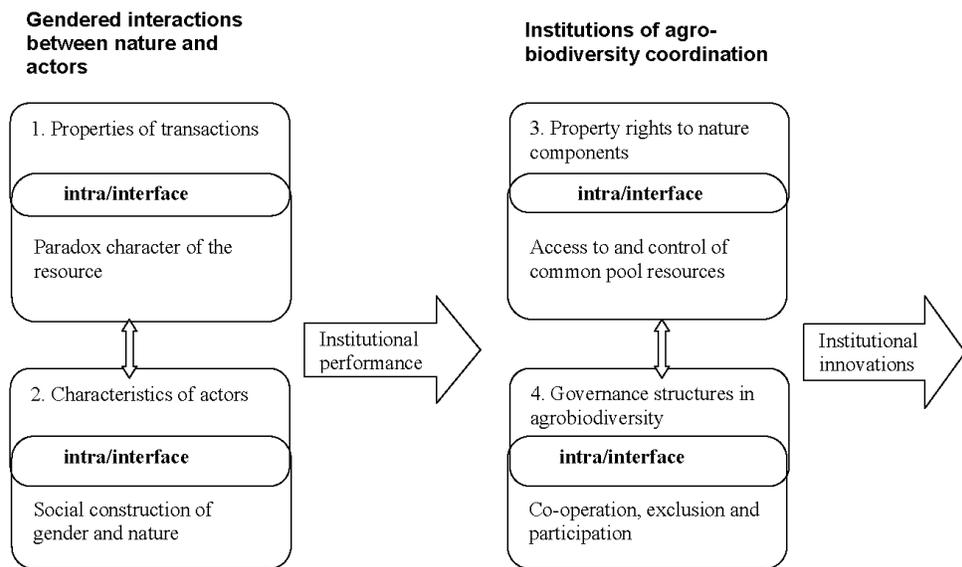
- McGinnis, Michael 2004. Overview of the workshop approach to institutional analysis. Presentation at the Seminar on Public Policy, Humboldt-University 12.11.2004.
- McKean, M.A. 2000. Common property: What is it, what is it good for, and what makes it work? In *People and forests. Communities, institutions, and governance*, ed. Gibson, C.C., M.A. McKean, and E. Ostrom. Chicago, IL: MIT Press.
- Meinzen-Dick, R., L. Brown, H.S. Feldstein, A.R. Quisumbing. 1997. *Gender, property rights, and natural resources*. FCND Discussion Paper 29. Washington, DC: International Food Policy Research Institute.
- Menon, M. T. 1996. Encyclopaedia of Dravidian Tribes. Kerala, India: The International School of Dravidian Linguists.
- Meynen, W., Doornbos, M. 2004. Decentralising natural resource management: a recipe for sustainability and equity? *European Journal of Development Research*, 16 (1): 235-254.
- MSSRF 2001. *Agrobiodiversity crops: Catalysts of a community agrobiodiversity movement*. Chennai: MSSRF.
- MSSRF 2002. *Rural and tribal woman in agrobiodiversity conservation. An Indian case study.*, Bangkok, Thailand: FAO Regional Office for Asia and the Pacific
- MSSRF 2003a. A Study on Ethnobotany and Gender Dimensions of Wild Food Management in Wayanad. Kerala: M. S. Swaminathan Research Foundation.
- MSSRF 2003b. Thirteenth annual report. Chennai: M. S. Swaminathan Research Foundation.
- MSSRF 2003c. Farmer's rights and biodiversity: A gender and community perspective. Chennai: S. Swaminathan Research Foundation.
- MSSRF/FAO 2000. *Gender dimensions in biodiversity management and food security: Policy and programme Strategies for Asia*.
- MSSRF/FAO 2002. *Implementing farmer's rights for conservation and utilization of plant genetic resources in the Asia-Pacific region: From legislation to action*. MSSRF-FAO Expert Consultation. Chennai: M.S. Swaminathan Research Foundation.
- .Narayana, Ratheesh M. K., Swapna, P. M., Anil Kumar, N. 2004. *Gender dimensions of wild food management in Wayanad, Kerala*. Community Agrobiodiversity Centre, MSSRF, unpublished manuscript.
- Naryan, N.C. 2003. *For and against the Grain: Politics of rice in Kerala, India*. Working Papers Series No. 376. Institute of Social Studies, The Hague.

- Ostrom, E. 1994. Institutional analysis and common-pool resources. In *Rules, games, and common-pool resources*, ed. Ostrom, E., R. Gardner and J. Walker. The University of Michigan Press. Ann Arbor.
- Ostrom, E. 1990. *Governing the Commons: The evolution of institutions for collective action*. Cambridge: Cambridge University Press.
- Padmanabhan, M.A. 2002. Trying to grow. Gender relations and agricultural innovations in Northern Ghana. Lit. Münster.
- Padmanabhan, M.A. 2003. Frauenökonomie und Vorsorgendes Wirtschaften. Konzepte zur geschlechtsspezifischen Analyse ökonomischen Handelns. In *Zeitschrift für Wirtschafts- und Unternehmensethik*. 41: 56-66.
- Parthasarathy, M. 2003. A gendered critique of the plant varieties protection and farmers' right act, draft rules and related legislation. In *Farmer's Rights and Biodiversity: A Gender and Community Perspective*. Chennai: M.S. Swaminathan Research Foundation.
- Pramod, C., Sivadasan, M, Anil Kumar, N. 2003. Ethnobotany of religious and supernatural beliefs of Kurichya of Wayanad District, Kerala, India. *Ethnobotany* 15. 11-19.
- Pushkaran, K. 2002. Home gardens in Kerala as an efficient agroecosystem for conservation and sustainable management of biodiversity. In *Proceedings of the Second International Home Gardens Workshop: Contributions of home gardens to in situ conservation of plant genetic resources in farming systems*, ed. Watson, J. and W. Eyazaguirre. July 17-19. Witzenhausen. Federal Republik of Germany. Rome: International Plant Genetic Resource Institute.
- Rengalakshmi, R. 2002. *Rural and tribal women in agrobiodiversity conservation. An Indian case study*. 8. Bangkok: FAO Regional Office for Asia and the Pacific/ M.S. Swaminathan Research Foundation. RAP Publications.
- Shiva, V. 1989. *Staying alive. Women, ecology and development*. Zed Books. London.
- Swaminathan, M.S. 1998. *Gender dimensions in biodiversity management*. Konark Publishers. Delhi.
- van Staveren, I. 2002. *Social capital: What is in it for feminist economics?* ISS Working Paper 368.
- Varughese, G., Ostrom, E. 2001. The contested role of heterogeneity in collective action: Some evidence from community forestry in Nepal. *World Development* 29 (5): 747-765
- Véron, R 2000. Sustainability and the Kerala model. In *Kerala: The development experience*, ed. Parayil, G. London: Zed.

- Véron, R. 2001. The “new“ Kerala model: Lessons for sustainable development. *World Development* 29 (84): 601-617.
- Waller, W., Jennings A. 1990. On the possibility of a feminist economics: The convergence of institutional and feminist methodology. *Journal of Economic Issues* 24 (2) 613-622.

ANNEX

Figure 1--Conceptual framework for institutional and gender analysis adapted from Hagedorn et.al (2002:6)



CAPRI WORKING PAPERS

List of CAPRI Working Papers

- 01 Property Rights, Collective Action and Technologies for Natural Resource Management: A Conceptual Framework, by Anna Knox, Ruth Meinzen-Dick, and Peter Hazell, October 1998.
- 02 Assessing the Relationships Between Property Rights and Technology Adoption in Smallholder Agriculture: A Review of Issues and Empirical Methods, by Frank Place and Brent Swallow, April 2000.
- 03 Impact of Land Tenure and Socioeconomic Factors on Mountain Terrace Maintenance in Yemen, by A. Aw-Hassan, M. Alsanabani and A. Bamatraf, July 2000.
- 04 Land Tenurial Systems and the Adoption of a Mucuna Planted Fallow in the Derived Savannas of West Africa, by Victor M. Manyong and Victorin A. Houndékon, July 2000.
- 05 Collective Action in Space: Assessing How Collective Action Varies Across an African Landscape, by Brent M. Swallow, Justine Wangila, Woudyalew Mulatu, Onyango Okello, and Nancy McCarthy, July 2000.
- 06 Land Tenure and the Adoption of Agricultural Technology in Haiti, by Glenn R. Smucker, T. Anderson White, and Michael Bannister, October 2000.
- 07 Collective Action in Ant Control, by Helle Munk Ravnborg, Ana Milena de la Cruz, María Del Pilar Guerrero, and Olaf Westermann, October 2000.
- 08 CAPRI Technical Workshop on Watershed Management Institutions: A Summary Paper, by Anna Knox and Subodh Gupta, October 2000.
- 09 The Role of Tenure in the Management of Trees at the Community Level: Theoretical and Empirical Analyses from Uganda and Malawi, by Frank Place and Keijiro Otsuka November 2000.
- 10 Collective Action and the Intensification of Cattle-Feeding Techniques a Village Case Study in Kenya's Coast Province, by Kimberly Swallow, November 2000.
- 11 Collective Action, Property Rights, and Devolution of Natural Resource Management: Exchange of Knowledge and Implications for Policy, by Anna Knox and Ruth Meinzen-Dick, January 2001.

CAPRI WORKING PAPERS

- 12 Land Dispute Resolution in Mozambique: Evidence and Institutions of Agroforestry Technology Adoption, by John Unruh, January 2001.
- 13 Between Market Failure, Policy Failure, and “Community Failure”: Property Rights, Crop-Livestock Conflicts and the Adoption of Sustainable Land Use Practices in the Dry Area of Sri Lanka, by Regina Birner and Hasantha Gunaweera, March 2001.
- 14 Land Inheritance and Schooling in Matrilineal Societies: Evidence from Sumatra, by Agnes Quisumbing and Keijuro Otsuka, May 2001.
- 15 Tribes, State, and Technology Adoption in Arid Land Management, Syria, by Rae, J, Arab, G., Nordblom, T., Jani, K., and Gintzburger, G., June 2001.
- 16 The Effects of Scales, Flows, and Filters on Property Rights and Collective Action in Watershed Management, by Brent M. Swallow, Dennis P. Garrity, and Meine van Noordwijk, July 2001.
- 17 Evaluating Watershed Management Projects, by John Kerr and Kimberly Chung, August 2001.
- 18 Rethinking Rehabilitation: Socio-Ecology of Tanks and Water Harvesting in Rajasthan, North-West India, by Tushaar Shah and K.V.Raju, September 2001.
- 19 User Participation in Watershed Management and Research, by Nancy Johnson, Helle Munk Ravnborg, Olaf Westermann, and Kirsten Probst, September 2001.
- 20 Collective Action for Water Harvesting Irrigation in the Lerman-Chapala Basin, Mexico, by Christopher A. Scott and Paul Silva-Ochoa, October 2001.
- 21 Land Redistribution, Tenure Insecurity, and Intensity of Production: A Study of Farm Households in Southern Ethiopia, by Stein Holden and Hailu Yohannes, October 2001.
- 22 Legal Pluralism and Dynamic Property Rights, by Ruth Meinzen-Dick and Rajendra Pradhan, January 2002.
- 23 International Conference on Policy and Institutional Options for the Management of Rangelands in Dry Areas, by Tidiane Ngaido, Nancy McCarthy, and Monica Di Gregorio, January 2002.

CAPRI WORKING PAPERS

- 24 Climatic Variability and Cooperation in Rangeland Management: A Case Study From Niger, by Nancy McCarthy and Jean-Paul Vanderlinden, September 2002.
- 25 Assessing the Factors Underlying the Differences in Group Performance: Methodological Issues and Empirical Findings from the Highlands of Central Kenya, by Frank Place, Gatarwa Kariuki, Justine Wangila, Patti Kristjanson, Adolf Makauki, and Jessica Ndubi, November 2002.
- 26 The Importance of Social Capital in Colombian Rural Agro-Enterprises, by Nancy Johnson, Ruth Suarez, and Mark Lundy, November 2002.
- 27 Cooperation, Collective Action and Natural Resources Management in Burkina Faso: A Methodological Note, by Nancy McCarthy, Céline Dutilly-Diané, and Boureima Drabo, December 2002.
- 28 Understanding, Measuring and Utilizing Social Capital: Clarifying Concepts and Presenting a Field Application from India, by Anirudh Krishna, January 2003.
- 29 In Pursuit Of Comparable Concepts And Data, About Collective Action, by Amy Poteete And Elinor Ostrom, March 2003.
- 30 Methods of Consensus Building for Community Based Fisheries Management in Bangladesh and the Mekong Delta, by Parvin Sultana and Paul Thompson, May 2003.
- 31 Formal And Informal Systems In Support Of Farmer Management Of Agrobiodiversity: Some Policy Challenges To Consolidate Lessons Learned, by Marie Byström, March 2004.
- 32 What Do People Bring Into the Game: Experiments in the Field About Cooperation in the Commons, by Juan-Camilo Cárdenas and Elinor Ostrom, June 2004.
- 33 Methods for Studying Collective Action in Rural Development, by Ruth Meinzen-Dick, Monica Di Gregorio, and Nancy McCarthy, July 2004.
- 34 The Relationship between Collective Action and Intensification of Livestock Production: The Case of Northeastern Burkina Faso, by Nancy McCarthy, August 2004.
- 35 The Transformation of Property Rights in Kenya's Maasailand: Triggers and Motivations by Esther Mwangi, January 2005.

CAPRI WORKING PAPERS

- 36 Farmers' Rights and Protection of Traditional Agricultural Knowledge, by Stephen B. Brush, January 2005.
- 37 Between Conservationism, Eco-Populism and Developmentalism – Discourses in Biodiversity Policy in Thailand and Indonesia, by Heidi Wittmer and Regina Birner, January 2005.
- 38 Collective Action for the Conservation of On-Farm Genetic Diversity in a Center of Crop Diversity: An Assessment of the Role of Traditional Farmers' Networks, by Lone B. Badstue, Mauricio R. Bellon, Julien Berthaud, Alejandro Ramírez, Dagoberto Flores, Xóchitl Juárez, and Fabiola Ramírez, May 2005.