

**Selling Environmental Services – Challenges and Opportunities for Sustaining Local  
Resource Management: Lessons from Joint Forest Management Experience in Tamil  
Nadu, India**

*Jagannadha Rao Matta<sup>1</sup> and John Kerr<sup>2</sup>*

Abstract

Community based forest resource management institutions, commonly known as Village Forest Committees (VFCs), are increasingly being established under Government of India's Joint Forest Management (JFM) policy all over the country to help restore the nation's degraded forests. The VFCs, besides having a direct and active role in protection and management of these forests, are entitled to various timber and other forest products for their services rendered in restoring these areas.

While some VFCs are functioning well in certain situations, in a majority of places, they do not last long. This poor sustainability situation of the VFCs is threatening the whole concept of JFM that paved the way for the emergence (resurgence) of community-based forest resource governance in a revolutionary manner. A major reason for such a decline is lack of enough incentives for local people for them to be really enthusiastic about forest management. This is particularly so when JFM is introduced in highly degraded forests that offer no immediate tangible forest benefits to the local people involved.

Unfortunately, the current JFM strategy is primarily built on the notion that local communities can manage forests if their costs involved in undertaking this task are compensated with resultant forest produce such as fuel, fodder, timber, and NTFP. Accordingly, most state statutes on JFM elaborately talk of sharing arrangements for these benefits. There is however, hardly ever any discussion on compensating the forest fringe communities for the environmental services rendered by them through improved forest protection and ecological restoration entailed in JFM. The need for such a pay off becomes particularly significant when these communities are helping restore highly degraded forests but receive no perceivable benefit under the current JFM policies that closely tied the incentives available in JFM just to forest produce.

Strongly attesting the above observation, an empirical study of a JFM program in Tamil Nadu, India, not only highlights the significance of the environmental service benefit aspect of this forest restoration, but also shows some potential for making the functioning of VFCs financially viable, availing this service. It is endeavored to give an overview of these opportunities and circumstances in this paper, based on an in depth analysis of the efforts of Forest Department and villagers involved in selling the message of enhanced water supplies made available through JFM in order to ensure the sustainability of these local resource governance systems.

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<sup>1</sup> Post-Doctoral Associate, School of Forest Resources and Conservation, University of Florida, USA

<sup>2</sup> Assistant Professor, Department of Resource Development, Michigan State University, USA.

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**1. Introduction**

With over half a million community groups established for managing various common pool resources like fish, forests, watersheds, and wildlife, community-based resource governance is increasingly being recognized as a major resource management strategy world over (Petty 2003). Empirical studies that demonstrate the ability of local communities in collaboratively managing their natural resources abound literature (Wade 1988, Ostrom 1992, Ostrom 1994, Baland and Platteau 1996). These developments have particularly led to the active promotion of common pool resource management across the world by various governments and organizations through various innovative policies and programs.

India, as one of the largest and poorest developing countries in the world and home to significant biodiversity, has a particularly strong challenge in managing its forests. In 1990, in response to the continued decline in forest cover, India undertook a major reform that allowed a pivotal role for local communities in managing state forests. Since then, this policy of “democratization” (Corbridge and Jewitt 1997) of India’s forest governance, popularly referred to as joint forest management (JFM), has been a major subject of interest to policy makers, foresters, planners, and donors. The JFM approach, having received considerable impetus in recent years, covers around 14 mi. ha or about 18% of the total forest area in India (WII 2002), and is recognized as one of the largest such programs in the world (Kumar 2002). The number of Village Forest Councils (VFCs), or the forest resource management bodies that manage JFM at the community level exceeds 60,000. Thus JFM provides an interesting example of both the rationale for and the challenges involved in ensuring the sustainability of such community-based natural resource management regimes.

Despite JFM’s popularity as a policy with potential ecological and social benefits and noted successes (Dhar 1994, Bahuguna 1994, TERI 1998, Datta and Varalakshmi 1999, Rangachari and Mukherji 2000), concerns are now increasingly being expressed over the sustainability of this approach (Saxena et al. 1997, Lele 2000). The performance of this policy in

practice has been found to be varying, especially when applied in wider scale and broader contexts (Jeffery and Sundar 1999, Vira 1999, Ghate 2000).

Most literature on JFM that analysed communities' incentives in collectively managing forests and its relation to the success and sustainability of this policy concentrated on tangible forest based benefits available to villagers (Kant and Nautiyal 1994, Dutta and Varalaxmi 1999). A few other studies have attributed lack of tenurial rights in respect of these resources to local communities as a major hurdle to the progress of JFM (Singh 1991, Ghate 2000). While communities' contribution to forest protection and management in JFM provides a variety of environmental services, there is no study that explored the challenges and opportunities involved in availing this aspect of JFM as a potential incentive to communities for their role in JFM.

Hence the objective of this paper is to provide an assessment of the nature and magnitude of the environmental service benefits of JFM and discuss some of the issues and challenges entailed in availing these benefits in sustaining local resource governance systems. An in depth analysis of JFM initiative in Tamil Nadu, India provides the basis this for the observations made in this paper.

This paper draws on the insights gained from the dissertation research conducted by the first author on JFM implementation in Tamil Nadu in 2002. Data collection methods included in depth field observations in five forest divisions, interviews with 28 forest officials of various ranks, a survey of 278 villagers and discussions with 24 key VFC functionaries including VFC five presidents and other in five JFM villages, and archival search of a number of documents and correspondence related to JFM in the state.

## **2. Incentives to Local Communities in Collective Resource Management**

In a collective action, the cohesiveness of a group is significantly determined by the benefit each member perceives to gain (Andersen 1995). Characteristics of a natural resource, particularly its potential for biological growth so as to compensate the transaction costs involved strongly influence the success of a collective resource management strategy (Pretty 2003). "Few organizations, committees, or cooperatives will evolve in a voluntary manner before it is known what will be gained by joining," argues Andersen (1995). Reaching a common understanding often requires introduction of new procedures and incentives to facilitate attitudinal changes (Rastogi 1999). The involvement of local people and sustaining their interest in managing a

resource is more complicated when the benefits are not high, immediate or widely distributed (Kerr 2002a). Sinha (1999) observes villagers' anticipation of high economic returns to justify their investment of time and labor in JFM. Similarly, Lise (2000) and Varughese (2000) observe significant positive association between local collective action and good forest condition. On the other hand, low tangible forest benefit flow to the community owing to poor productivity of the forests was identified as one of the reasons for past failures in collaborative forest management (Sreedharan and Sarakar 1998). These studies highlight the positive relationship between the incentives available to villagers in managing a resource, and the success and sustainability of collective action entailed in such an effort.

The JFM strategy in India is built on the notion that local communities can regenerate and protect degraded forests if they are suitably compensated for their costs (Datta and Varalakshmi 1999). In a typical JFM set up, the Forest Department (FD) undertakes constitution of a village level organization such as the Village Forest Committee (VFC) and enters into a partnership agreement with that body. Under that agreement, the VFC cooperates with the FD in protection and management of designated forests and receives in return, sustainable benefits that arise out of these restored forests (GoI 1990). Thus the basic thrust of the JFM program, and the dominant philosophy that guided its implementation so far has been provision of forest products such as fodder and fuel, and NTFP to the local communities for their services rendered in JFM. Several JFM success cases such as Arabari, Harda (Bahuguna et al. 1994) and Buldana (Ghate 2000) also attest the idea that the interest of local people in JFM can be sustained through the provision of such incentives.

As per the guidelines of government of India (GoI 1990), and as has been largely applied in the field<sup>3</sup>, the JFM approach is basically meant for regeneration of degraded forests. Thus, most JFM eligible areas, unlike their counterparts where JFM successes are reported, represent relatively poor soil and species conditions that hardly allow harvest of large quantities of forest produce in relatively short durations. These areas, however, are significant in terms of their ecological value to the overall landscape. The implication of JFM when introduced in the improvement of such degraded forests that offer no immediate tangible benefit to the participating local people has however largely remained unanalyzed.

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<sup>3</sup> Khare et al (2000) indicate that some states such as Haryana have not restricted application of JFM to degraded forests. Government of India has recently indicated extension of JFM to better-stocked forests (GoI 2000).

Forest restoration and improvement provides, besides direct benefits such as fuel, fodder and NTFP, several associated environmental benefits such as climate regulation and watershed protection. Thus, JFM, in a sense provides a positive externality to the society. While there is literature on this aspect in other natural resource management contexts (Sanders et al. 1999), developing institutional arrangements for forest-based environmental services is still a new field of study (Pagiola et al. 2002). Although JFM got worldwide attention, discussion on compensating local people for providing such an externality through their efforts in JFM remains absent and this represents a major gap in the literature.

### **3. JFM in Tamil Nadu**

Forests constitute about 17.4% of the total geographical area of Tamil Nadu as against the national average of 23.4%. The per capita forest area is a meager 0.04 ha, half that of the national figure. From an ecological point of view, however, these forests are of immense value to the state, which is located in a rain shadow region. The average rainfall is about 860 mm and droughts are of recurrent occurrence. Forests function as critical catchments for a majority of the 32 river systems, 11 major water reservoirs, and 38,863 water tanks in the state. The dependence on ground water resources for drinking and agricultural uses is one of the highest in the country.

In recent years however, these forests are exposed to severe degradation. With an estimated 100,000 villagers entering into them for various consumptive uses, and about a million cattle and other domestic animals grazing inside unrestrictedly, the biotic pressure on these forests is immense. These areas are also exposed to regular forest fires, intentionally set by cattle herders to get fresh growth of grass. Heavy removal of young vegetation for green manure and occasional encroachments for agriculture along village margins are a few other causes of forest degradation. As a result of these pressures alone, about 25,000 ha are estimated to be getting degraded every year (TNFD 1997). Degrading catchments have resulted in acute drought conditions depriving people even drinking water in several places. Ground water tables have gone down steeply and about half of the state is in “absolute water scarcity” (TERI 1998), the highest water scarcity condition in the country. A 50% increase in current fallow<sup>4</sup> lands between 1970 and 1990 has also been reported, supposedly, due to the recurrent drought conditions prevailing in the state.

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<sup>4</sup> Fallowing refers to keeping the cultivated land free of agricultural activity to accumulate (recoup) moisture and nutrients for the next crop.

It is under these circumstances, JFM was initiated in Tamil Nadu, with a theme of “save the forests to save the water”, as part of the Overseas Economic Co-operation Funded (OECF<sup>5</sup>) \$100 million project in 1997. Of the 3000 villages abutting the 7000 sq km of forests that were identified as severely degraded<sup>6</sup>, JFM was introduced in about 1000 villages spanning over five years. Watershed development through large-scale afforestation and water harvest activities undertaken on micro-watershed basis with the active involvement and cooperation of local communities formed the core component of JFM.

### **3.1 Incentives for Local Communities for Their Involvement in JFM**

The unit of management in JFM is a village and an abutting government forest area delineated on a watershed basis. In each identified village, the Village Forest Council (VFC) consisting of a male and a female member of all willing households functioned as the people’s representative body for the JFM (GoTN 1997). The VFC has authority over regulating access to forests, resolving intra-village conflicts, and ensuring an equitable distribution of JFM benefits.

Tamil Nadu JFM, like many other JFM initiatives in the country, provides forest products as the major incentive to the participating villagers. All the forest produce such as fuel, fodder, green manure, and NTFP that could be harvested from the restored forests on a sustainable yield basis goes to the VFC members free of cost (with a priority to the poor and landless). Any surplus produce can be sold by the VFC, and the sale proceeds of thus obtained are to be distributed equally among the VFC members after remitting 25% of it to a specially constituted fund called Village Development Fund (VDF) (GoTN 1997, TNFD 2002a).

The VDF is meant to meet the transaction costs incurred by the VFCs in managing the JFM and to undertake general village development activities to benefit the village. Village-level developmental activities include laying roads, provision of drinking water facilities, and construction of community halls etc., in the villages. About 70% of the VDF is also spent on individuals or small groups to compensate those individuals or groups who were dependent on forests but lost access to them due to restrictions on grazing etc. after the onset of JFM. Similar individual incentives are also provided to some community members who are interested to work for JFM to compensate their time and effort, even if they were not previously forest-dependent.

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<sup>5</sup> Previously known as Japan Bank for International Cooperation (JBIC).

<sup>6</sup> A crown density of 0.4 and less, compared to a good quality forest area with a crown density of 1.0.

The individual benefit component generally included activities such as establishment of self-help groups, provision of micro-credit and vocational training etc.

While the Forest Department fully provides the money for afforestation and water harvesting from the project funds, the VFC needs to take care of the latter- the village development and individual help component with the VDF. In addition to the sale proceeds of the forest produce, other sources of money for the VDF include VFC membership fees, fines and penalties, taxes, and general contributions of the VFC members (monetary or labor). In view of the long-gestation period involved in harvesting any substantial forest products out of JFM, the program provided a seed money of Rs 300,000, 200,000, and 100,000 (1 Rupee = \$ 45 approx) successively during the first three years of JFM to the VFCs.

#### **4. JFM Outcomes**

JFM undertaken in the state between 1997 and 2002 with a strong emphasis on watershed development has resulted in significant ecological and socio-economic benefits. Independent scientific studies and media reports on how this particular activity of JFM helped increase the vegetative cover and moisture levels abound in local literature. Large-scale soil and moisture conservation activities undertaken during the project have not only checked erosion and impounded water, but also revived many natural springs, despite harsh agro-climatic conditions prevailing in the project areas (Sivanappan 2002). In 20 of the sample watersheds where hydrological observations were made, an increase of 3.8% to 14.2% in ground water table was recorded (Sreedharan 2002). With the increased moisture, barren areas were put into productive purposes, and positive changes were observed in the agricultural yield and cropping pattern in several project areas (Neelakantan 2000). Heavy investments made in forestry and active cooperation of villagers harnessed through JFM in protection of plantations are attributed as the major reasons for the success. Significant reductions in goat population, cattle grazing, wildfire occurrence, and forest encroachments were also recorded in almost all the JFM villages (TNFDb). As many FD officials and VFC presidents recall, villagers came in hundreds to put off forest fires in JFM areas. The support of local leaders for forest protection, sometimes braving several political and economic hardships in the villages, was extensively evidenced.

Enhanced environmental services, particularly the water protection and supply benefit generated as a result of the conservation action, not only occur at the site of action but also all around its zone of influence. For example, the conservation benefits of watershed protection in

Sukhomajri, India are being felt in significant measure in places such as Chandigarh city located 15 km downstream (Kerr 2000b). The JFM areas in Tamil Nadu, as already mentioned earlier, are critical catchments for major rivers, reservoirs, and irrigation tanks in the state. For example, the industrial city of Coimbatore is fully dependent on the Siruvani river for its municipal water supplies, and the forests of Coimbatore division form its vital catchment. Similarly, the Krishnagiri Reservoir, which is the life support system for farmers in Dharmapuri district, mainly draws its water from innumerable forest streams that flow through the forests of Hosur division. The JFM efforts not only help increase water supplies but in many instances, reduce the risk of siltation of several lakes and reservoirs. Thus the catchment improvement efforts entailed in JFM produce environmental service benefits at two levels. The first one is at the local JFM village level and the other at the far downstream communities' level.

#### ***4.1 Impact on Local Resource Management Institutions - the VFCs***

Enabling the environmental service discussed above, however, imposed certain costs on JFM villages. These occurred at two levels. One, the transaction cost, i.e., the costs involved in ensuring compliance with the forest protection obligation on part of the community. The other cost is the hardship incurred by the existing forest users such as cattle grazers and fuel wood collectors who were required to restrict their access to JFM forests in order to help restore them. Poor and landless, particularly the women engaged in these activities as their primary source of livelihood were significantly affected.

The incentive available to the VFCs, as already mentioned in section 3, either to meet its transaction costs or to compensate the individuals who were affected by JFM is primarily the forest produce and its sale proceeds maintained as the VDF. However, in almost all the cases, despite the resurgence of vegetation, the degraded forests failed to produce any forest produce in notable quantities to be harvested by the VFCs. The areas under JFM are characterized by very little topsoil, low nutrient availability, and severe soil compaction caused due to decades of cattle movement. Thus, although the JFM program document (GoTN 1997) elaborately talked of estimating and distributing forest benefits to VFCs, no forest benefits come out of forests in significant quantities anywhere in the state. The total estimated value of forest produce taken in kind by the VFC members during 2000-01 in the entire state, for example, is a meager sum of Rs.7, 93,465 (RUPFOR 2002).



Seed money provided to the VFCs (discussed in section 3) for village development, on the other hand, in the absence of any direct forest benefits, proved to be a major attraction to the villagers. Compared to other areas in the state, the villages situated in and around forests historically lagged in several basic necessities and development assistance and the onset of JFM provided a major opportunity for local leaders to help remedy this situation. Several villages came forward to take up the onerous task of protecting the forests through JFM, anticipating some developmental assistance made available in the form of seed money. Further, catering to local communities' long pending concerns helped in attracting influential people in the villages, rendering much visibility and popularity to the program among the local people. There were cases of state level political functionaries seeking selection of villages of their choice for JFM and local leaders taking the issue of election of VFC president to the highest court in the state. These instances indicate the kind of enthusiasm and interest JFM has generated among the people.

#### **5. Selling Environmental Services for Sustaining VFCs**

The availability of seed money to the villages in the program, however, was restricted to the first three years, which is very low compared to the long gestation period involved in the JFM for it to yield any substantial forest produce. As the non-existence of promised incentives became apparent, the interest and involvement of the local villagers in JFM has drastically declined after the 3<sup>rd</sup> year of the project. At the end of three years, the death and disappearance of these local management institutions became imminent, greatly undermining the concept of JFM that paved the way for local resource management in a radical manner in the country. Some VFCs, realizing the potential of the JFM in improving the water situation in the villages, tried innovative ideas to augment the resources of VFCs and thus to sustain the interest of people in JFM. These included levying of some tax on the farmers farming near the water structures constructed under JFM for their use of enhanced water supply and selling of silt obtained from the water tanks in forest areas. All these measures to make money from forests however met with little success. The challenges involved include problems associated with devising proper pricing mechanisms, general reluctance of the people to pay for anything from forest, poor institutional enforcement, and almost no extension/ outreach efforts undertaken to highlight the water service benefit realized. These issues are discussed below.

### **5.1 Challenges:**

As mentioned earlier, the initiation of water augmentation activities, while entailing sure benefits to some villagers, impose some costs to certain other sections of the people such as cattle grazers using the forest catchment. This necessitates certain measures to compensate those adversely affected and tax those benefiting. This taxation structure was thought of for two purposes, according to some VFCs. One, to have some money to the VFCs to meet their transaction costs, and second, to ensure that there is no ill feeling in the village that some people are getting benefits and some are not in JFM. But unlike surface water, since the increased moisture resulted in ground water, it became difficult to apportion its use and introduce a tax rate.

Further, the water harvest structures are placed in and around forest areas according to the terrain and technical requirements of the area and not according to the needs or interest of the individuals who might receive the benefit out of them. So, for the people farming nearby, this increased water could be construed as an accidental benefit rather than something that is born out of their active interest or involvement in JFM. Moreover, once the structure is constructed, the farmer is bound to get the benefit irrespective of his/ her interest or involvement in JFM.

Opening up of JFM to all willing households in a village led to the recruitment of a large number of villages belonging to various groups and sections into the program, anticipating various development benefits. Managing such a heterogeneous group led to high transaction costs entailed in negotiating and enforcing contractual agreements. Moreover, in several places, the watershed boundaries did not tally with that of the traditional village/ hamlet boundaries. Although social fencing<sup>7</sup> is supposed to be the forest protection norm in JFM covering distant and scattered habitations in such instances required engaging watchers for forest protection by the VFCs. With no resources to pay for these watchers, forest protection came to a standstill after 3 years in many places. Although there is a provision to help the affected forest dependants, lack of enough resources compounded the compensation scenario. In such instances, erstwhile forests users showed a potential not to abide by the JFM agreements.

The Forest Department and local community leaders provided most of the leadership in forming VFCs and developing institutional mechanisms in JFM. While villagers were mostly engaged in village development and forest protection, the FD undertook watershed development.

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<sup>7</sup> Social fencing refers to the concept where villagers trust each other and commit to the community agreements on forest protection.

In many instances, these two activities ran isolated from each other. There were also no explicit mechanisms to make the linkage between the watershed management and increased water availability visible to the public. Facilitating public participation in forest management is new to the FD (Matta and Kerr 2002) and it had very limited resources and expertise in undertaking any such extension activity. Further, the FD kept detailed records of hydrological changes occurring in the project areas to itself and largely assumed that the benefits would become automatically apparent to the local public. Most villagers viewed the seed money provided for the village development as yet another 'rural development' - 'social welfare' type top-down delivery support. Consequently, for many villagers, the link between watershed protection efforts and increased groundwater levels was not apparent, though local media and general public in far-flung places praised such efforts. Even if some villagers perceived the link, they did not play a bigger role in the VFCs. Thus failure to strongly attribute the water benefits produced to the watershed protection significantly affected the sustainability of VFCs and in turn that of JFM.

### **5.2 Opportunities:**

The overall analysis of JFM in Tamil Nadu indicates that the assumption implied in government orders that improvement of degraded forests can generate enough forest produce to make it a self-sustaining scheme in JFM villages failed to work in practice. The efforts of local resource management institutions remain less compensated when compared to the costs they are incurring.

Another significant outcome of the institutional development and local resource management through VFCs is that the forests were no more treated as open access resources. The VFC's control rendered the forests the status of a property. The regulations on the use of forest resources through peoples' institutions brought in a general feeling in the villages that forests are of some 'value' and not free for all, unlike the previous situation. Further, the political processes and the interactions among the villagers after the onset of JFM in villages has not only led to the development of an opportunity for discussion and debate over forest uses or abuses but also to substantial collective action in the villages resulting in forest protection. Formation of self-help groups, strengthening micro-credit and income generation institutions, and ensuring women's participation and capacity building, led to considerable community mobilization and organization. Thus, the costs to the society in the event of failure of these VFCs are very high

when one takes into consideration the unseen benefits the VFCs are producing to the general environmental health and quality of life in the state.

Making the functioning of these local resource management institutions appears to be a financially viable proposition if the offsite benefits rendered by the VFCs are taken into account. As mentioned in section 4 on JFM outcomes, VFCs efforts in JFM render enhanced water supplies and reduce reservoir siltation possibilities downstream and hence they deserve compensation for this positive externality. It appears that several conservation interested individuals and organizations have already noticed such a need and came forward to help the VFCs in isolated pockets. The cash and kind support of the TVS group of companies, a major industrial house in Tamil Nadu, for watershed rehabilitation in the state can be cited as an environmental service payment by a corporate house (TERI 2002). Several religious and philanthropic organizations have also evinced keen interest in forest protection and rehabilitation in several places after the onset of JFM. What is needed is concerted efforts to galvanize these interests and develop appropriate institutional mechanisms to make functioning of VFCs sustainable. A major hurdle in such effort that is often cited in literature is the difficulty involved in specifying the water service benefit accrued and arriving at appropriate rate from the payer. These observations typically approach the upstream-downstream relationship from a demand (payer) point of view. Discussions with JFM program managers and VFC functionaries however indicate that the issue can be approached from the supply (service provider) side also. Based on the overall experience of the functioning various VFCs since the onset of JFM, these functionaries confidently indicate that the working of VFCs can be made viable by providing them as little as Rs.100, 000 per year. They also say that such a payment mechanism can be linked to the quality of forest protection afforded by the VFCs. Since the relationship between enhanced forest protection and environmental service is well established, there is no need for establishing sophisticated moisture measurement devices, these participants indicate. In view of the high awareness and concern the people of the state have for water, finding appropriate organizations and institutions (downstream utilities, industries, local governments, hydro-electric power projects, and the state of Tamil Nadu as a whole) to fund VFCs as indicate above and adopt them on long-term basis, doesn't seem to be that difficult.

## **6. Conclusions**

JFM has indeed halted the degradation of forests (Kumar 2002). The problem, however, seems to be in ensuring the sustainability of the program in the absence of some immediate and perceived benefits to the local people involved. This paper endeavored to provide some insights on availing the environmental service benefits entailed in JFM as a potential incentive for local communities. This paper also exposed the limitations of “one size fits all” approach of the current JFM that offers only the forest produce benefit to the villagers. Besides the need to compensate the villagers for the insufficient forest produce, non-forest incentives seem to be necessary as the local people actually are in need of them. Especially in water-starved states such as Tamil Nadu, the guiding principle for long-term planning seems to be to concentrate on supplying long-term environmental services rather than on providing some immediate forest usufructs to the participating communities. The experiences of some eco-development projects in India (Pandey and Wells 1997, Chopra 1998, Mishra 1999) and others elsewhere (see Brown et al. 2002) suggest that it is a viable venture. We hope this paper will set a new trend in the JFM thinking and pave the way for developing innovative mechanisms for selling environmental services and thus sustaining local resource management institutions.

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