

More than just “small-scale forest management”

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Introduction

Managing trees and forest resources is an integral component of most rural livelihoods and agricultural activities in the world. This management has largely contributed to shape large tracks of forests all over the planet including in so-called “pristine” or “virgin” forests (Posey and Balée, 1992; Fairhead and Leach, 1996; Peters 2000). However, the historical divide between agriculture and forestry, as well as the long-established focus on large-scale timber production for industrial purposes in forest management have completely concealed the reality of this rural forest management and led to global misinterpretation of its importance and characteristics.

Restoring the interest of managers and academic research in “small-scale forest management” or agroforestry is certainly essential but is it enough? Does it allow fully addressing and understanding the specific relationships that have historically evolved between rural people and the forests they have shaped? Does it help distinguishing these rural forests from other types of forest based land-use and management?

Managed for intensive production, sometimes planted or managed for extensive gathering harvesting, the management of these rural forests is based on local knowledge and practices rarely if ever considered by research in a comprehensive, systemic approach. They are regulated through local rights systems that largely differ from existing national forestry regulatory frameworks and that are seldom considered in national forest management regimes. They constitute an integral part of the economy of domestic units under a diversified production system to provide a whole range of goods and services (timber is seldom the major production aim). They constitute the support of local social relationship systems. Finally, they appear as a major structuring component of most rural landscapes.

We will highlight how and why “small-scale forest management” does not allow to fully restituting the originality of these rural forests, and we suggest that the concept of “domestication” is more appropriate to qualify their specificity and qualities. We suggest using “domestic forests” to differentiate these forests from other land use types.

This paper is derived from an on-going research program¹ looking at various examples of rural forests across the globe, trying to evaluate their specificity and exploring the importance of the interaction between local knowledge and “global” policies in their historical and present evolution. It draws also on long-term research experience in France, Southeast Asia and Africa on forests managed by “farmers” looking at local practices and underlying science, including social, political and symbolic components.

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Rural forest landscapes: domesticating the original forest?

Many forests in the world have been shaped by and for local people for hundreds of years. This is obvious in northern Europe where various forms of fragmented forest patches constitute a common component of rural landscapes (Balent 1996): mosaics of woodlots intertwined with agricultural plots, isolated trees in the middle of fields or pastures, tree orchards like chestnut or “linear forests” (hedges) that border grass fields in *bocage* countries (Pointerau et Coulon 2006).

This might not be as obvious in areas with relatively continuous forest landscapes like in tropical forests or in rangelands of semi-arid or arid countries (bush land in Mediterranean areas, wooded savannas and steppes in Africa). In the many places where the local livelihood systems have used the wooded component for production and reproduction, these forest landscapes have been largely shaped by the interactions with rural populations, but this interaction remains either largely invisible or denied (see however Posey and Balée, 1989 and Fairhead and Leach, 1996 as counter examples). The “dehesa” system in Spain seems to be the only system where intentional management for specific tree production has been universally acknowledged, documented and praised (Joffre *et al.* 1988, 1999). Elsewhere, when the interaction between forest and people is acknowledged, the rural forests are still largely described as “secondary” or “degraded” forms of the original pristine forests, and are therefore not considered as interesting to serve global conservation objectives or sustainable production goals.

These rural forests are not managed in a “classical forestry” perspective. They are an integral part of the local livelihood system (Du Bus de Warnaffe *et al.* 2007). Their existence relies on specific practices targeting trees or ecosystem structure. Their design incorporates strong human and social dimensions. We proposed to use the concept of “domestication” to define these local forests (Michon 2005, Michon *et al.* 2007) even though domestication here does not follow conventional patterns of tree selection and ecosystem artificialization which characterize domestication in horticulture or in industrial forestry. Domestication here operates through an individual treatment of plants (as opposed to mass-treatment of standardized populations in industrial forest culture or agriculture). It values more variety and quality than uniform quantity. It uses the complexity of natural structures (as opposed to artificial simplification) and makes full profit of natural vegetation dynamics and retains original ecosystem’s qualities, including the basic principles of natural silvigenetic succession and of forest production.

The term “domestic forest” is proposed as a unifying paradigm that points to the specificity of forest management by local users in the context of tropical forestry. This paradigm acknowledges -beyond diversity- the universality of the relationship between forest-dependant groups and the forest itself. The multiplicity of local variations reveals the complexity and richness of this relationship. It also relates to the complexity and richness of the social and political relationship established between people themselves regarding forest-related matters, and particularly between local forest managers and professional foresters.

Domesticating trees

“Gardening” practices targeting individual trees range from light manipulations (selective clearing or fostering natural regeneration) to strong interventions (giving specific shapes to trees through repeated pruning, planting seeds or transplanting seedlings in specific places,

selecting phenotypes or grafting selected varieties). These practices concern selected species, sometimes selected individuals of these species but they do shape and modify the original, natural tree component. After centuries of such practices, can we still consider that targeted tree species are “wild”? Indeed, many tree species are affected by these gardening practices to the point where their phenotype or even their genotype, is deeply modified compared to “natural” individuals. However, maintaining this specificity implies a continuous human intervention: if the practice is abandoned, the affected trees will lose their specific shapes or production potentials.

Example: Tree manipulation: Argan forest in Morocco

The argan (*Argania spinosa*) forest in southwestern Morocco (covering about 800,000 hectares in densely populated arid and semiarid zones) has supported traditional silvo-pastoral systems for hundreds of years, with argan trees providing edible oil, fodder for cattle, and wood material for domestic purposes. The forest is generally presented as “natural” and the role of rural populations in domesticating this forest is usually not acknowledged. Interactions are analyzed from in an “impact of human activities on the ecosystem” perspective, emphasising overgrazing and overexploitation as an explanation of the argan forest today’s crisis. The high variety of the argan tree shape from venerable and majestic trees in flat lands to several-stemmed, torturous treelets on slopes or even rock-like bushes in heavily grazed areas is generally attributed to the combination of natural conditions (soil, water, and slope) and tree responses to grazing. However, detailed research in several areas (Simenel 2007) showed how this variety is intentionally designed and maintained by local people with different local names existing for each tree shape. Simenel showed how the venerable argan trees preserved in barley fields would never have become trees without the careful and continuous pruning practices carried-out by the owners of the land including in some areas, true variety selection and planting practices. Left alone, argan trees will turn into a several-stemmed bush. In grazing lands, trees are shaped through selective pruning or branch curving with stones to either facilitate or prevent grazing by goats. Along paths, trees are pruned, shaped and intertwined in order to constitute living edges preventing goats from entering barley fields. Overgrazed trees are not considered as “degraded trees” but as a sleeping tree bank, which can revert to a real tree as soon as the grazing pressure is relieved.

A comparison could be drawn with other intensely managed parklands in the world, like the *dehesa*, (the rural oak forest in southwestern Iberian Peninsula, where oak trees, often selected varieties with sweet acorns, are preserved or planted, managed, and regularly pruned in grazing lands (Linares 2007) or *nééré* (*Parkia biglobosa*) and *karité* (*Vitellaria paradoxa*) parklands in Africa (Boffa 1999).

Example: Tree domestication: fruit forests in Indonesia, chestnut in Europe

Tree domestication in local forests can aim at controlling the reproduction of desirable tree qualities but remains original compared to tree domestication in horticulture or conventional forestry as it does not focus on the selection of single-purpose genotypes but target the maintenance of a high level of genetic diversity.

Some remarkably diversified fruit forests can be found in the island of Borneo, Indonesia. They look like old-growth natural forests but are rich with several tens of local fruit species² selected over centuries by the local forest people (Seibert 1989).

In Southern Europe (France, Italy, Spain), chestnut is certainly the less “natural” of all forest trees, though still looking like a large, wild forest tree. It has been domesticated since the Middle Ages through careful selection of the best varieties perpetuated through grafting (Pitte 1986). One single village in the chestnut-producing areas may hold dozens of local varieties. Planted trees are regularly pruned in order to maintain a favorable shape, foster production, and control pests. Venerable trees (several centuries old) have got names and histories are linked to them. In that respect, they really enter the “domestic” circle of village families and are the depositories of the collective memory (Dupré 2002).

Domesticating the ecosystem

Along with these manipulations that clearly result in the domestication of individual plant species, forest domestication also relies on specific processes targeting ecosystem design, constituting a remarkable strategy of “ecosystem domestication”. We have therefore more than just “forest management” and are far from conventional, oversimplified forest plantations (Evans 1992). Local “domesticated” forests (even though managed and transformed for several centuries) exhibit a strong “forest preference” (Michon and de Foresta 1999): a clear continuity with the natural forest, expressed in ecological as well as economic terms. The processes which sustain them, while often favoring a selected production, intentionally emphasize heterogeneity and respect (or restore) global forest structures, functions and services - including soil protection, regulation of water flows and conservation of high levels of biodiversity- over space and time. Management and design practices include a mix of *intention* and *intervention* (planting, clearing, pruning) and “*respectful friendship*” (Haudricourt 1943) or “*connivance*” (Henry 1987) (integrating these intervention practices into natural processes –like planting trees in small gaps- in order to take full advantage of them) with a touch of “*laisser-faire*” (letting things happen as long as they are not considered as harmful or aggressive for the socio-ecological system).

Example: agroforests in Indonesia

The “forest preference” may also incorporate the idea of “ecosystem development” as exemplified in Indonesian agroforests where local people build highly complex forest systems. The manipulation of the silvigenetic processes combined with a high degree of mimicry of natural succession patterns allows establishing and maintaining a forest plantation over indefinite periods of time (Michon and de Foresta 1999). These agroforests originate from the slashing and burning of original forests with the planting of tree seedlings in the swiddens. They evolve through gradual forest reconstruction involving plantation, protection, selection and facilitation of natural regeneration processes. Once developed, these planted forests reproduce themselves without disruption in structural or functional patterns over the long run with minimal input, thanks to a balanced combination of anticipated replacement of decaying individuals, mimetic gap planting, and respect of natural dynamics. These practices allow further diversification through the colonization by many forest species inside the cultivated stand. After several decades, the forest plantation is structurally close to an old-

² More than 20 species of mango (*Mangifera*), 9 species of durian (*Durio*), 14 species of *Baccaurea*, 10 species of *Artocarpus* (jackfruit relatives), 3 longan (*Dimocarpus*) and more 13 rambutan (*Nephelium*) species, 6 illipe-nut species (*Shorea*)

growth forest with a high canopy, dense undergrowth, high levels of biodiversity, and a perennial structure, with the global ecological features of a diversified forest ecosystem. Some of these agroforests, like the *damar* agroforests (Michon *et al.* 2000), developed in the South of Sumatra since the beginning of the 20th century for resin production, nowadays cover some tens of thousands of hectares. The forest preference therefore constitutes the ecological foundation of short- and long-term flexibility and reversibility, but also of multi-functionality, which are nowadays considered as the three fundamental qualities of any sustainable resource management.

Entering the human dimension of domestication

Forest domestication is not restricted to technical aspects but also includes a strong immaterial component, which relates a particular forest area to a human group, its history and its domestic units. This immaterial component of forest domestication includes five dimensions: symbolical, historical, social, economic and political.

The symbolic dimension:

The symbolic dimension of domestication concerns the way humanity, kinship and domesticity are vested in the forest. Mental processes that sustain it consist of ideologies and representations and are expressed through myths, beliefs and rules. In defining which elements of the forest relate, or not, to the human group, which kind of relation every category of this group establishes with these elements, and why it is so (Descola 1986), these processes set the principles of interaction between the group and forest elements. This clearly contrasts with the principles orienting professional forest management, where nature is considered as an object external to the social, religious or political spheres and treated according to technical norms considered as neutral.

The historical dimension

As anthropologists claim, “there is no virgin forest” (Bahuchet *et al.* 2001): all over the world, forests have been shaped by ages of interaction with local human groups. In most areas the domestic space of local groups is an ancient forest transformed century after century, sometimes totally removed, but more often progressively re-designed according to human needs. The environmental history of local forests is one of fluxes and refluxes, as shown for the argan forest in southwestern Morocco (Simenel 2007), the chestnut woodlands in Corsica (GAL 2005) or agroforests in Indonesia (Michon and de Foresta 1999), with a clear link between forest and population fluxes: forest history is clearly incorporated into the local social and political histories, and, vice-versa, people are part of the natural history of forests. This long-term interaction between forest and people is clearly overlooked, especially in tropical forest areas where the historical impact of local forest management systems (combining slash-and-burn cultivation with tree domestication and forest harvesting) is often totally misinterpreted (see Fairhead and Leach, 1996 for a striking example).

The social dimension:

Domestication includes the definition of access principles and resulting property rights. This consists in formal and non-formal norms, rules and regulations which specify who is allowed to do what in which part of the forest, or with which resource. It is framed by religious, kinship, class or other internal socio-political logics. This comes in contrast with the various models of “community forestry” and other types of devolution processes to local groups, brought from outside with imported visions of “forest”, “community” and “management”, and

often achieves an integrated balance between the rights and needs of the domestic units and those of the whole group. This association between “individual” and collective rights results in the piling up of social spaces in the forest. As a result the appropriation regime is neither totally private nor common property but a multiple-use/multiple-user set of principles including, for example, the dissociation between land property and rights on trees (in Corsica, Morocco, Indonesia). This organic bond between individual and collective action and interests contrasts with the divide between the individual/private and the collective/public spheres that often characterizes conventional forestry (even community based).

These local rights systems have often been over-ruled by the State definition of forest rights, which entails conflicts between local groups and representatives of the forest authority (Peluso 1990, Fay and Michon 2005), with, too often, resource degradation.

The economic dimension

Appropriated forest stands constitute the material foundation of domestic units as they sustain their livelihood through the provision of subsistence and cash benefits for consumption or distribution. Beyond this basic economic function, they also represent the necessary condition of their social reproduction: they constitute a buffer against unpredictable risk, a reserve for emergency expenses, and a transferable “patrimony”. The same holds true at the group’s level as documented in Indonesia (Michon 2005) or Tanzania (Verdeaux 2003) with some forest resources within the appropriated forest being considered as a common property and the forest itself as a collective heritage. Forest domestication therefore links the biological sustainability of a forest-based productive system both to the reproduction of the social system and to the economic sustainability of the embedded domestic units. Creating and maintaining this link is not usually the concern of conventional forest management.

The political dimension

The construction of this “domestic forest” is strategic in establishing the difference between a given human group and others, at micro-local scale as well as larger scales. The forest transformation process creates geographically and historically delineated structures and spaces that can easily be recognized by outsiders and are associated with easy to express property rights and other locally-specific social attributes. It therefore represents a major contribution in the definition and the perpetuation of a “territory”: a portion of appropriated land belonging to a specific group, which is acknowledged by neighbouring groups. As it constitutes the economic and social foundation of the domestic units, the domestic forest also represents a major element in defining the identity of the whole group (some authors refer to “the chestnut civilization -Pitte 1986-, or to the argan civilization –Nouaim 2005-). Identity reinforces the emergence, the validation or the reproduction of the territory.

The policy landscape: Forest or agriculture?

If “small-scale forest management” refers mainly to the scale of forest activities, the idea of a “domestic forest” specifically linked (historically and spatially) to farmers’ practices introduces a new vision in forestry. At the international and national levels, forests are considered for either environmental reasons (biodiversity conservation, climate change mitigation, watershed preservation) or production (timber, fibre, land resource...) purposes. We have argued that in those areas where forests and agriculture are not segregated, and where forests and people necessarily live together, the domestic forest represents a model for

sustainable forest development. However, in spite of a strong move for more local participation in forest management (especially in the tropics) and more consideration for local forest management, the reality of the existing domestic forests is not considered. Classical forest management plans do not give a proper role to these domestic forests generally regarded as being too “secondary” or too “degraded” to serve global conservation objectives or sustainable production goals. Moreover, public policies usually draw a sharp line between agriculture and forestry. All over the world, the forestry domain is generally more regulated and restricted than the agrarian domain. This regulation of land use in order to protect forest functions is deemed by government as necessary and is justified.

This framework is not favorable to the full development of domestic forests, which are historically and organically linked to “agriculture”: they do articulate forest activities with field culture or cattle grazing, and they did develop and succeed precisely because of their close articulation and complementarities with “agriculture”. Ignoring this articulation means, at best, that farmer’ economic options for managing their forests are reduced, at worse, when local people have no official rights to “state land”, farmers are deprived of much of their land-resource base. In nearly every case, it means limiting the community potential to increase forest production or protection and income and to improve its livelihood. It might also prevent people from engaging into planting trees, as observed in argan forests (Simenel 2007), or in sandalwood forests of western Timor (Michon 2005) or for teak in Java (Michon and Fay 2000).

What does forest management in general misses in ignoring the specificity of these domestic forests?

In Indonesia, agroforests and other domestic forests cover several million hectares (Michon and de Foresta 1999). They sustain the livelihoods of millions of rural people and produce a large amount of internationally marketed “minor forest products” (including rattan, resins, rubber and spices) while constituting a valuable shelter for forest biodiversity but they are not recognized as an original, valuable forest category. They belong to the national forest estate, and are classified as either “primary forest”, “secondary forest” or “degraded land”. Their organic relation with farming activities, particularly with swidden agriculture is totally overlooked. Foresters have often denied that forest plantation can be profitable at the smallholder’s scale in the tropics (Dove 1992, Evans 1992). Indonesia domestic forests prove the contrary. Moreover, they represent an original and successful example of intensification of “agricultural” production systems. This intensification is achieved by a smooth adaptation of practices, without any painful crisis or profound change in the farming system. This has important social consequences, as it avoids the marginalization and impoverishment of a whole class of farmers. Moreover, it allows securing land appropriation and capital accumulation, a patrimony which can be transferred to the next generation (Michon *et al.* 2000). In this sense, it constitutes the very sustainable basis of the foundation of the domestic group. The large areas covered with parklands in sub-Saharan Africa, which sustain the livelihood of millions, constitute a similar example of the silvicultural success of local farmers in the drier regions of the Tropics (Boffa 1999).

The argan forest in Morocco covers 800.000ha. Though it holds a special status in the Moroccan forestry framework (i.e. a “state forest” with recognized local uses and rights), public policies coming from the forestry sector contradict those coming from the agricultural sector. Agricultural services claim all the “major” products coming from the argan forest are related to farm management (argan oil, goat and barley) and therefore claim the control of the resource base, whereas the forestry sector sees it as a producer of charcoal and timber, and

want to maintain their prerogatives. Outside their fields, farmers are reluctant in taking good care of the argan trees and the stands are degrading.

Domestic forests have remarkably survived through a long history of adverse forest and land-use policies. They did not disappear with the repeated the conflicts between foresters and farmers; they survived agricultural intensification and modernization. The present transformation of rural lands allows it to regenerate. Understanding and accepting these complementarities between farmer forestry and agriculture could help repairing the unproductive historical divide that has been established between forestry and agriculture. There is an urgent need for revisiting the global norms, standards and methods of forest management and for redefining forest policies and regulations in order to accommodate this neglected but widespread aspect of forest management and to fully integrate its benefits for the society at large.

Conclusion: How can science and policies help?

The present time of globalization and injunctions for sustainable development may represent a favourable context for further development and acknowledgement of domestic forests.

A first move comes from the scientific approaches. Foresters and biologists have often seen the forest as an autonomous and natural system, away from the historical reality of societies who have used and transformed it. They have consistently considered humans as invaders and predators of the ecosystem and concentrated on ‘impact’ studies more than on ‘interaction’ or co-construction analyses. The conceptual framework of ‘socio-ecological systems’ (Berkes *et al.* 2003) and of ‘adaptive management’ opens new grounds for a better analyzing the interactions between forests and local people in more positive terms, emphasizing co-evolution more than just ‘impact’, highlighting the project and investment dimension of local forest domestication.

As far as policies are concerned, the new paradigm, promoting a sustainable development gives new perspectives for the development of domestic forests which do exhibit the basic qualities of sustainability. Though domestic forests are neither biodiversity hotspots, nor highly productive forest systems, or a model for equitable sharing of rights and benefits, they exhibit qualities in all these domains (Asbjorsen *et al.* 2004). They represent an outstanding component of local economy that incorporates of ecological and social fundamentals. The new imperatives of social justice and equity, the integration of governance and environmental values into production activities, and the common allegation that indigenous people are legitimate and experienced forest stewards can bring new perspectives for these forests. Examples of reinforcement of the legitimacy or of the profitability of these forests are multiplying: in the argan forest with the internationally supported valorisation of the argan oil, in southern France with locally-born initiatives for chestnut rehabilitation, in Indonesia with the acknowledgement of local rights on agroforests. The ideology of sustainable development may allow these original forests to confirm their importance between biodiversity sanctuaries and intensive timber production areas. In order to achieve this brilliant future, we just need a switch in sectoral policies that might allow domestic forest to fully develop their potential and develop not against policies, but supported by them.

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