The limits and failures of existing forest governance standards in semi–arid contexts

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SUMMARY

Dry forests today are managed following the standards of scientific forestry imported in the tropics in the XIXth century by the colonial empires. The model proved efficient to control deforestation and regulate production but its evolution even after decolonization increased the segmentation between forests and agriculture and the lack of consideration for local knowledge by the forest administration. The process of decentralization of forest management that disseminated in the 1990s aimed at bringing back local communities within the formal management of forests. However the results of this process, often restricted to a simple transfer of tools and techniques, have fallen below expectations. If discourses shifted towards a better recognition of local needs, knowledge and constraints, the day-to-day implementation of participatory forest management in the dry lands remains fraught with administrative inefficiencies and a mistrust of local communities. Sustainable management of dry forests is yet to be invented.

Keywords: forest governance, scientific forestry, forestry norms, participatory forest management, dry lands

Limites et échecs des normes de la gestion forestière actuelle dans le contexte de zones semi-arides

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Les forêts sèches sont gérées selon les principes de la foresterie scientifique importés dans le monde tropical au XIXe siècle par les Empires coloniaux. Le modèle s'est avéré efficace pour contrôler la déforestation et réguler la production de bois. Mais son évolution s'est traduite par un cloisonnement grandissant entre la forêt et l'agriculture et une absence de reconnaissance des savoirs locaux par le gestionnaire officiel. La mise en place de gestion décentralisée intervenue depuis les années 1990 cherchait à recentrer la gestion forestière sur les communautés locales. Pourtant, trop souvent limitée à un transfert de techniques, ce processus a peu de résultats à mettre à son crédit. Si le discours a évolué vers une plus grande prise en compte des acteurs locaux, trop souvent sa mise en application reste marquée par des lourdeurs administratives et une méfiance vis-à-vis des populations locales. La gestion durable des forêts sèches reste à inventer.

Los límites y los fracasos de la gobernanza forestal existente estándares en contextos semiáridas

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El manejo forestal con base científica desarrollado por los imperios coloniales rige hoy los bosques de zonas áridas. El modelo demostró su eficacia para frenar el desmonte y regular la producción de madera. Sin embargo, su evolución se ha traducido en una mayor separación entre los sectores del bosque y de la agricultura y una falta de reconocimiento de los saberes locales. El proceso de descentralización iniciado en los 90 ha tratado de integrar de nuevo a las comunidades locales en el manejo del bosque. Pero habiéndose limitado a menudo a un simple traspaso de competencias técnicas, el manejo participativo de los bosques secos ha tenido a menudo resultados decepcionantes. Si la retórica ha cambiado para tomar mejor en cuenta los actores locales, la práctica sigue estando marcada por inercias administrativas y desconfianza hacia las poblaciones locales. El manejo sostenible de los bosques secos está todavía por inventar.

INTRODUCTION

The distribution of tree cover in tropical and subtropical regions reveals the existence of three stable states: (i) forests, (ii) savannas and (iii) tree-less systems. This trimodal distribution makes it evident that tree cover does not respond linearly to changes. There are critical thresholds that, if crossed, will push the system into a different basin of attraction (Hirota *et al.* 2011). These transitions can happen due to natural drivers (fire, drought), or more likely, through complex interactions between direct human intervention and underlying enabling drivers (Geist and Lambin 2002, Sassen *et al.* 2013). These three states seem to co-exist under most ranges of precipitation. It appears it's the probability for a given pixel to be in a given state (forests, savannas and tree-less) that changes with rainfall. At the global scale, there is a smooth transition from treeless to forest as precipitation increases. But locally, the transition happens in discrete steps, with abrupt shifts from treeless to savanna and then from savanna to forest (Hirota *et al.* 2011).

What this suggests, is that the resilience of forests and woodlands, defined as the capacity to recover from perturbation, and estimated by the size of the basin of attraction of these states, changes with rainfall. The probability a forest undergoes a regime shift towards savanna and treeless state increases as rainfall diminishes (Hirota *et al.* 2011).

Of particular interest for this paper is the transition area between the tropical forests and the arid vegetation. Here, semi-arid climates with low erratic rainfall (between 1200 and 400 mm/yr) and periodic droughts are associated to different associations of vegetative cover and soils, that we will define as "dryforests" in this paper. In this transition zone, even small nudges, either natural or man-made, risk pushing the forest ecosystem beyond the tipping point, into other states. And the efforts needed to recover (re-afforestation and plantation programs) will require more energy and have lower chances of success (Hirota *et al.* 2011). These results confirm what forests and managers in semi-arid regions know from experience: managing dry forests is unforgiving.

But managing a resource means above all managing the men and women accessing this resource. In addition to the ecological constraints, the governance of dry forests also deserves examination. The official confidence in local capacities to manage forests is rarely strong around the tropical world and particularly in the drylands (Guha 1990, Peluso 1992, Fairhead and Leach 1996, Castro and Nielsen 2001, Ribot *et al.* 2006, Vandergeest and Peluso 2006b). Local communities and the diverse actors that rely on the woodlands for their livelihood (farmers, woodcutters, charcoal producers, pastoralists, hunters, etc.) are often considered by government officials and academics of the forest and conservation sector alike as not reliable due to their extensive practices and to the supposed lack of relevance of their knowledge for the purpose of establishing sustainable resource management (Ribot 2001b, Wily and Mbaya 2001, Shackleton *et al.* 2002, Lund and Treue 2008). Despite the processes of participatory and later decentralized forest management disseminated at the end of the 1980's in the drylands, the central forest administrations are generally reluctant to transfer their competences of resource management (Saxena 1997, Ribot 1999, Kassibo 2003, Larson 2005, Blomley and Ramadhani 2006, Mustalahti and Lund 2009). As in the humid tropics, the participation of local people in dry forest management is organized not to say imposed through a framework defined by the so-called "scientific forestry". However, while the forestry norms have evolved in the humid tropics due to rising international environmental pressures (Fargeot *et al.* 2004, Karsenty and Gourlet-Fleury 2006, Guariguata *et al.* 2010, Nasi *et al.* 2012), the forest management in the dry land forests have so far received comparatively little attention despite the high local ecological and economic importance (Campbell 1996, Sunderlin *et al.* 2005, Shackleton *et al.* 2007). The persistence of forest standards inherited from the scientific forestry in the dry lands deserves particular attention.

In this paper, we argue that the forest governance standards that are applied today in semi-arid contexts originate from the "scientific forestry" paradigm imported from Europe, adapted to India and then to the other British and European possessions. This paradigm was reinforced after World War II through the professional network of the Food and Agriculture Organization (FAO). These standards show until recently limited consideration of local people knowledge and practices despite a lack of evidence of positive outcomes of scientific forestry applied to dry lands. We will conclude our analysis with the recent attempts at reforming the forest governance standards despite the resistance by national forest administrations.

SCIENTIFIC FORESTRY

Origins and definition

Scientific forestry was imported from Germany and France to India in the middle of the XIXth century. Over a few decades, the overharvesting and ensuing deforestation of the teak (*Tectona grandis*) forests of the Malabar Coast had demonstrated the limits of private management of forest resources and of *laissez-faire*. By 1820, the resource had been depleted and other sources of teak had to be secured (Bryant 1994). Against private, individual interests and the hegemonic economic and political theories of the time, early environmental concerns already linking deforestation and climate change, the fear of timber shortage and the loss of revenue and the reaffirmation of the rights of the State over Nature allowed for a dramatic shift in policy (Barton 2001). In 1855, the Governor General of India issued the "Charter on Indian Forestry" and one year later appointed Dietrich Brandis, a German forester, as superintendent of teak forests in Burma (Bryant 1994). Brandis is now seen as the father of empire forestry, establishing the first scientific working plans for the teak forests of Pegu Yomas, in Burma. Brandis then became the first Inspector General of Forests in India in 1866, two years after the creation of the Imperial Forest Department. The forest rules he designed transformed the state's theoretical control over forests into effective ownership rights, together

with the creation of a viable administration to enforce these rights (Bryant 1994).

The core of the German scientific approach to forest management relied on (i) the simplification of the ecosystem, by creating low diversity forest stands that would simplify calculations, (ii) the maintenance of records and (iii) reliable projections of yield and volumes using allometric curves (Vandergeest and Peluso 2006a). Monospecific, even-aged stands were the cornerstone of scientific forestry, and Sustained Yield its founding principle (Scott 1998).

But the definition of rules and methods for forest management were only a component of the reform. The "Charter of Indian Forestry" also established the principle of state ownership as the default for non-privately owned forests and "waste" land (Barton 2001). Forests were "settled", the State taking absolute property rights, as it will be the case in all the countries were the scientific forestry will be implemented whatever are the colonial master and the ecological biome. This allowed the State to extend its power to virtually all the forests of India (Sivaramakrishnan 1999), effectively putting an end to the open-access nature of forest resources that had prevailed under the laissez-faire administration.

In Burma, the affirmation of the State ownership was met with resistance from the European timber traders but also from local communities, competing against the State for the control of forest resources and forest land.

The process of forest reservation introduced in 1870, and in 1878 in the Indian Forest Act is often described as one that allowed the colonial rulers and the following regime to deprive local communities of their rights (Saravanan 2009). This perception is shared by the latest policy documents in India. The scheduled tribes and other traditional forest dwellers (Recognition of Forest Rights), 2006, mentions the "historical injustice" done to the tribal communities and the forest dwellers through the reservation of forests (Government of India 2006). Settlement, or reservation, did indeed establish the State as the final absolute owner of the lands classified as forests. However, the settlement was also an opportunity to provide the communities with clear defined resources rights and responsibilities (Berkes *et al.* 1998), what is understood today to be a pre-requisite for community engagement and participation in ecosystem management (Sayer *et al.* 2013).

The establishment of Reserve Settlement Commissioners in the late colonial period did enshrine local rights of access and use of land and forest resources. Social memories of these events and attendant documents continue to inform contemporary struggles to retain such rights (Wardell and Lund 2006) (see next section of this article). To a large extent, the process of forest reservation as contemplated by Brandis and the early imperial foresters was a compromise between traditional uses and forest conservation mandates, a way to resolve the delicate balance between protecting the resource from local elites and private interests, ensuring continued delivery of critical goods and services and steady revenue to the State (Barton 2001).

What was to become the empire forestry had by the turn of the 19th century coalesced into a formal body of expertise with all the components in place: (i) a statement of absolute ownership of forest by the State, (ii) a set of methods and techniques to manage these forests derived from temperate forestry, (iii) a capable administration to enforce the rules, (iv) a process of reservation to negotiate with the stakeholders the trades-offs between local needs and global expectations, and (v) as a source revenue to help pay for colonial administration especially after 1900 when colonial budgets were cut.

Empire forestry was not thus merely imported by the British Raj or by the other Colonial Forest administrations. It was adapted to local conditions and realities, and the power struggles between colonial powers, local communities and private entrepreneurs, leading to very different outcomes, in India first (Sivaramakrishnan 1999), but also in the Dutch Indies, in Siam and in Java (Vandergeest and Peluso 2006a). Through professional networks and communication outlets such as the journal Indian Forester, the model of empire forestry was adopted first in South Africa, the Cape engaging in reforms inspired by the Indian precedent (Barton 2001), and then in the other British colonies in East Africa (in 1902), Nigeria and Sierra Leone (in 1911). Beyond the sphere of control of the British Empire, the other colonial powers also extended their control over forests. Even evidences have been raised on the differences in the strength of normative elements, type of management decision-making, type and level of stakeholders' participation between former French- (more top/down, centralized, command and control) and British (less normative, more pragmatic, sometimes chaotic) colonies (Buttoud 1997, Wardell *et al.* 2003), the model of empire forestry remained almost the same everywhere.

In the early 20th century, the production of forestry knowledge was decentralized, with centres like Dehra Dun in India for example training local foresters. Local knowledge merged with ecological theories emanating from North American universities and the traditional European forestry curriculum. But outside of the colonial domains, the impact of European foresters and of the empire forestry was much weaker (Vandergeest and Peluso 2006b). Ecology developed at approximately the same time as the nascent application of 'scientific forestry' in Sub-Saharan Africa, and south-east Asia. Scientific exchanges were possible through networks of botanical gardens, learned societies and, after 1920, 'empire forestry' conferences (Grove 1994, Grove 1995). In 1926 a Standing Committee for empire forestry was established. Concepts in ecological science, thus, became intricately linked with the introduction of empire forestry models and ultimately reinforced the management of the colonial forest estate wherever possible following "…the principles of minimum diversity, the balance-sheet and sustained yield" (Rajan 1998, Rajan 2006). In several timber-rich colonies this approach secured revenues to meet both the costs of the colonial forest administration, and, in some cases, to yield a significant surplus (Barton 2002). Ecology developed as a 'science of empire' (Griffiths and Robin 1997) and was widely used to legitimate colonial state intervention in restoring the balance in what were frequently perceived to be degraded forest ecosystems. It attained its zenith in the decades 1920–1940, a period when forest conservation peaked in the British Empire, as it did in the Gold Coast Colony (Tilley 2003).

After World War II and the fall the empires, professional forestry was institutionalized through postcolonial professional networks dominated by bilateral agencies and by the Food and Agriculture Organization of the United Nations (FAO). The FAO supported "forestry for development" in the post-colonial states, developing the argument that forests could strengthen the economic development of the developing states. Through the resources, conferences, and the capacity building of the FAO, a community of practices emerged, particularly where previous forestry institutions were weak or had lingered on the periphery of the empire forestry. This convergence was, somewhat counter intuitively, much stronger than under the colonial regime (Vandergeest and Peluso 2006b).

The recommendations of the FAO coincided with the objective of the states to increase their revenue and secure control over their borders. Forests, through logging, appeared as a way to fuel the economic development of the newly independent states. This led to an overemphasis on industrial forestry operations, at the expenses of the local uses. And the practices of slash and burn, burnings and grazing were described as destructive and thus targeted as major threats, which will have an important impact on the postcolonial forest policies in the dry lands with their specificities: wild fires, extensive cropping, agro-pastoralism. Such a semantic shift contributed to segregate forestry from agriculture, and excluded all the local forms of hybrid landscape management that we refer today as agroforestry. The FAO activities in the 1950s and 1960s correspond then to increase forest control by the states, an increased marginalization of local forest uses and the creation of watertight compartments of forest and agriculture (Vandergeest and Peluso 2006b).

We propose to analyse how this process unfolded in the case of the dry forests, where the ecological conditions make errors costlier and management more unforgiving.

Scientific forestry in the dry lands

The period after 1885 witnessed significant social, economic, political and environmental changes throughout the dry lands of Sub-Saharan African and parts of south-east Asian as local communities were confronted with increasing demands for labour, commodities and territory. The extension of political control by *i.a.* the French, German, Dutch and British soon raised the issue of ownership, management and access to land and forests. Local resource users were, inevitably, affected by the establishment of colonial states, and institutions such as Forestry and Agriculture Departments, as well as efforts to integrate local production systems into the global economy. However, these forces interacted continuously with long-established patterns of customary land and resource use, labour extraction and migration, social change, and internal trade. Furthermore, change, adaptation, mobility and conflict were already characteristics of local societies before (European) trading and colonial expansion. The encounter with colonial forest conservationism merely intensified these features, at the same time as it created new opportunities. It resulted in what Sara Berry describes as "an era of intensified contestation over custom, power, and property" in Africa (Berry 1993).

Many of the arguments for greater State control over tropical dry forest resources in the colonial era were founded on assumptions about the inherent destructiveness of local resource and land use practices (Fairhead and Leach 1995a). The appropriation of customary lands to establish forest reserves, game controlled areas and national parks was also shaped by narratives over the need to secure timber or wood fuel resources for the nation and over global environmental concerns. African and Asian communities were persistently framed as profligate users of land and resource and encountered the 'empire forestry mix' in different places, and at different times.

Local knowledge systems were often illegible to colonial administrators and technical bureaucrats (Hawkins 2002). In contrast, African farmers, herders, hunters, women shea nut collectors, paramount chiefs, and *ten'danas*[1] alike, all possessed knowledge and capabilities to sustain livelihoods accumulated over generations of living in harsh dry land environments. The inability to read and understand the African landscape was often compounded given the prevalence of acephalous communities, who regard themselves as inseparably part of the forest – "…the forest is the people, in the same way that the ancestors are, in a sense, extensions of the living" (Croll and Parkin 1992). The framing of Africans, and of the African environment by Europeans was an attempt to render them more understandable, and hence, manageable to colonial administrators.

Legacies of empire forestry in dry forests

Empire forestry models applied to dry lands comprised three main elements, viz., the appropriation of lands to create national networks of forest reserves, the establishment of Forestry Departments to oversee the introduction of 'scientific forestry' principles and multi-faceted efforts to regulate and control bushfires, and the production and marketing of wood fuels and other Non Timber Forest Products (NTFPs).

The models assumed that dry forest ecosystems responded to human use in a linear, predictable and manageable fashion, and that human and natural systems could be treated independently. The notion of balance in nature was founded on the conception of ecosystems as isolated and closed biotic systems, and was rooted in the "Cartesian-Newtonian conception of a Nature which obeys laws and is thus predictable and controllable" (Sullivan 1996). Several counter-narratives to constant forest decline emerged later shaped by non-equilibrium theories, the growing understanding that social and ecological

[1] Earth priests, usually descendants of first settlers amongst clan lineages in dryland West Africa who control access to, and use of land.

systems function as strongly linked and dynamic arenas, and that human-induced processes have a significant random element.

The lasting influence of colonial regimes in shaping the contemporary institutional arrangements for the conservation of African dry forests has been described by many researchers (Anderson and Grove 1987, Fairhead and Leach 1995b, Cline-Cole 1997, Ibo and Léonard 1997, Ribot 1999, Becker 2001, Saul *et al.* 2003, Laris and Wardell 2006). Other scholars have used historical data to question forest conservation 'orthodoxies' which often failed to recognise the important roles played by local farmers and the extent to which they were influential in enriching dry forest mosaic landscapes (Richards 1985, Amanor 1996, Leach and Mearns 1996, Baker 2000, Bassett and Crummey 2003).

Customary access and use *rights* to land and resources in formerly cultivated areas were not abandoned when the colonial state gazetted large areas as forest reserves. To the contrary, Reserve Settlement Commissioners (RSC) conducted hearings with chiefs to specify and to protect such rights. However, the lands were not always properly acquired, and consequently land was, and is still owned by the original owners. Periodically, they have been formally denied access to their property. The social memories of land alienation to create forest reserves in the region are vivid. Forest reserves are ubiquitously referred to using a generic name in northern Ghana – "*surveya*" – recalling the central role played by colonial forest surveyors during the process of boundary demarcation. In neighbouring Burkina Faso, the Léla, Mossi and Peuhl ethno-linguistic groups are even more explicit, referring to forest reserves as the "The White Man's Forest" (Hagberg *et al.* 1996).

Memories of the formally-recognised rights of access and use established under colonial rule are, in contrast, less distinct but have become routinely incorporated in day-to-day struggles to sustain livelihoods. In 2002, a draft 'Mini Management Plan' for the Red Volta West Forest Reserve prepared by the Bolgatanga District Forest Office, included a verbatim copy of the Proceedings and Judgement prepared by RSC Peter Myles Riley, which had first appeared in the Supplement to the Gold Coast Gazette in 1956.[2]

Forest reservation in the late colonial period created a complex layered tenure system in the dry forest mosaic landscapes. As an example, throughout the Sudano-Sahelian region, this complex tenure system remains tightly connected to issues of local politics, and produces a continuous redefinition of legality and property rights. The *assumed* illegality of resource use in forest reserves provides contexts for monetary and political rent seeking for political agents when protecting and indulging the exercise of rights granted them by customary authorities. Technical and political authorities in the region have thus, long tolerated that land and resources *within* forest reserves are utilised by local communities (Wardell and Lund 2006).

BOTTLENECKS AND INERTIA OF SCIENTIFIC FORESTRY IN THE DRY LANDS

Bottlenecks

The demarcation of forest management territories

The demarcation of new forest management territories usually overlaps existing territories. A change in the balance of power between stakeholders and governance structures of these areas may occur, with many loopholes existing as a result of the power play and the different ways of implementing the scientific forestry standards stemming from new territorial and social organisations.

In western Africa, southern Africa and Madagascar, customary authorities, local land tenure and existing community rights have often been disregarded in a context marked by partial decentralisation – forest management is a particularly striking example of partial devolution to local people. Current forestry standards generate problems which can escalate into conflict. The demarcation of proposed management plans creates divisions in the land which appear as meaningless and irrelevant from ecological and social perspectives partly due to the fact this demarcation is generally not grounded on any visible boundary in savanna landscapes. This type of forest zoning can lead to the dispossession of land and user rights which in turn leads to institutional arrangements and redistribution of power (Shackleton and Campbell 2001, Hautdidier et al. 2004, Blanc-Pamard and Rakoto Ramiarantsoa 2007).

The transfer of skills but not of ownership

As discussed previously, scientific forestry is based on principles (absolute property rights vested on the state), institutions (a capable administration), a legal framework clarifying rights and responsibilities (Forest laws and the settlement process), and a set of techniques and methods (including calculations, yield and volume projections, records). These methods and techniques form a toolbox that the forest administration, a firm of consultants hired by the government or a NGO can transfer to any group in charge of the forest management. A lot of effort is invested in building the technical capacity of these groups. Sometimes, they are also reinforced in terms of organizational skills.

This transfer raises two issues. Firstly, it generally ignores the local knowledge in terms of forest and tree management (Klooster 2002, Michon *et al.* 2007). There is an implicit belief behind this: the knowledge of peasants is not considered relevant and they are perceived as a threat to the forest not as stewards or "forest gardeners". Conversely, forest management tools are considered as a panacea that will ensure sustainable management for dry forests and woodlands if properly applied.

Secondly, sustainability is not only a matter of environment or economy, but also a matter of social equity (Pretty 2003). Power imbalances and social inequities have been

[2] The Forests Ordinance (Cap. 157) The Forest (Red Volta West Forest Reserve) Order, 1956. Subsidiary Legislation Supplement No. 53. Supplement to the Gold Coast Gazette No. 76, 24th November 1956: 411-414. NAG ADM 60/4/16, Accra.

identified as the recurring factors leading to the failure of forest governance (Mannix 1993, Utting 1993, Kopelman *et al.* 2002). But in many cases in the drylands, the people in charge of the forest management, what we will call the forest stewards, are not the owners of the land who remain generally the State, at least nominally. The stewards are also generally not the holders of customary rights of access to and use of the forest and its resources. Neither do they have the legitimacy conferred by a position in the forest administration, or a diploma. They just draw their legitimacy from the technical skills they may have acquired, by themselves or through capacity building workshops. These skills are not enough to legitimise their authority in terms of forest management in the eyes of all other stakeholders that do possess rights over the forest resources, such as the village leaders as it has been shown in Tanzania (Lund and Treue 2008) or in Mali (Hautdidier *et al.* 2004).

The redefinition of transferred forestry norms

The organisational capacity of the rural communities regularly surprises policy makers. While professional forestry organizations may be persuaded to change their practices to contribute to sustainable management practices that meet norms which are foreign to them, they seldom let themselves be locked into a regulatory system imposed on them, which also seeks to chang their use, access, production and marketing habits. This means that individuals and the groups they belong to reinterpret and adjust the regulations and transform the transfer of skills into an unexpected economic and/or territorial opportunity (Gautier *et al.* 2011). This local redefinition often leads to the creation of strategies that circumvent the forestry norms.

Inertia in forest management norms

Despite convergence about the failures of scientifc forestry in dry forests, and the existence of improvements, with through participatory approaches, decentralisation and forest reforms, the guiding principles for managing dry forests have changed very little in more than a century of implementation.

In west Africa, despite the ongoing process of forest management transfer to local people, foresters still control the sales of woody products. This is mainly due to their strong connections with the urban merchants. Forest administrations still decide where the actors in the industry can fell trees, how many trees they are allowed to harvest, who will be allowed to harvest them and what method should be used (Ribot 2001a). Technical standards, introduced as part of the process to devolve forest operations to the rural populations through cooperatives or professional associations, have remained essentially unchanged for decades (Kaboré 2005, Gautier and Compaoré 2006, Lawali 2006), despite the criticism made of the standards, their applicability and how they are monitored (Intercooperation 2001, Ribot 2001a, Ribot 2001b).

In Senegal after a pre-decentralisation period during which national and then regional services allocated timber harvesting areas to urban merchants and their teams on the basis of the availability of wood and the ecological fragility of the savanna and the soil (Ribot 1993) – forest management plans were drawn up at the rural community level along with cutting rotations, as part of a project funded by the World Bank (PROGEDE 2005). These plans, participatory in principle, have to be approved by the community's rural council and then countersigned by the forestry services, which have authority over the resources. The executive summary on the Senegalese forestry policy indicates areas of potential progress: a need for more consultations, monitoring-evaluation systems to be revisited by all the users of forestry resources, more attention being paid to gender issues (MEPN 2005).

In Burkina Faso, little has changed in Forest Management Sites (*Chantiers d'aménagement forestier,* CAF) since their creation in 1988 *(Aménagement et exploitation des forêts pour le ravitaillement de la ville de Ouagadougou en bois de feu).* The forest management methodology manual for Burkina Faso (DGEF 2002), a landmark publication, has undergone only few changes, despite forest management assessments (Sawadogo 2006, Sawadogo 2007). One of the few changes has been the reduction of the rotation period, which has been shortened from 20 to 15 years. With the excpetion of this technical adjustment, there has been little social progress since the CAF innovation in the 1990s.

In Niger and in Mali, "Household Energy Strategy" (HES) projects have been implemented on a large scale: in Niger, starting in 1989 as part of the World Bank's Energy II project to support the Niger forestry service, and in Mali, as of 1996. Subsequently and despite these innovative projects, the same traditional forestry standards continued to be applied by AMADER[3] in Mali (Nouvellet 2002, AMADER 2003). These included forest demarcation and management plans with felling quotas based on the "forest's possibilities" and the sub-division of forests into management units with 3 to 5-year rotations. However, AMADER, in keeping with the decentralisation process then in place, sought to focus its forest management plans more on the municipality or intermunicipality levels rather than on the village level. The same technical guidelines were recommended for the northern part of Mali in the savanna lands despite them being far less productive than in the Sudanian region (SODIPLAN and AGEFORE 2006). In Niger, forest management standards similar to the rural wood markets standards adopted during the Energy II project (Ichaou 2004) were included in the PAFN project (2001–2006). Forestry standards improved as a result of the cumulative experience acquired through participatory forestry management and the lessons learned from regional experiences (Lawali 2006). For example animal production was included in the design of the village forestry management plans, and non-ligneous forest products were integrated into

[3] Agence Malienne pour la promotion de l'Énergie domestique et de l'électrification Rural (Malian agency for Household energy and rural electrification promotion).

municipal management plans for doum palm *(Hyphaene thebaica)* groves. While forest management principles have not been called into question – namely, demarcation of a management area, exploitation quota, sub-division into plots with rotations and cutting rules – these examples show changes introduced as a result of assessments, an occurrence which is rather unique in the region. Of course, there is still room for improvement (Rives *et al.* 2012).

However, despite these signs of progress, the contribution of local populations to the establishment of the forest management plans, through consultative bodies established by customary and decentralised authorities, remains exceptional throughout the sub-region. The aim of these policies is still to keep at bay the rural populations, seen by the forest administrations as hungry for land and unable to formulate or apply sustainable forest operations techniques. Inside forest areas, strict technical standards are still supposed to be applied although they are usually not enforced by forest agents and are sometimes inapplicable (Ribot 1999, Wurster 2010). Additionally, these standards are generally not well adapted to the perceptions and knowledge of the rural populations which limit the applicability of these standards, making them dependent on forest authorities. The transfer then requires technical capacity-building, an additional source of delays that can be used as an excuse to slow down the transfer of control and management to populations and in some cases even to block the process altogether. An example of this is Mali where the forest administration operates again as a paramilitary power.

Although technical and commercial arguments have been used to justify the application of highly conventional forestry standards, the ultimate effect of these standards has been to concentrate lucrative forestry activities in the hands of an essentially urban elite in league with the forestry service, through species protection and the creation of permit, authorisation and quota systems. This concentration has happened despite progress in decentralisation and the transfer of competences to local population.

In Madagascar, for application of two processes of transfer – [contractual forest management (GCF) governed by a 2001 decree and the so-called GELOSE (secured local management) law of 1996] – forest operations must be carried out according to a management plan that establishes annual cutting volumes and land zoning. In other words, the usual scientific standards. A major distinction between GELOSE and the West African experiences is the relative land tenure security (SFR), although the results are diminished due to resource grabbing by the local elites (Pollini and Lassoie 2011) and an attempt to merge conservation and poverty alleviation. This led to a zero-sum game, an arbitration between goals rather than to the reconciliation of interests in the management contracts (Sarrasin 2010).

Forest governance in India evolved amidst the confrontation of traditional rights of forest users with the British colonial legacy of 'command and control' forestry (Vemuri 2008) that lead to the emergence of the empire forestry as described in section 1. After independence and particularly during the four decades prior to 1988, the Indian Forest Policy was mainly concerned with timber production for commercial purposes (Behera and Engel 2006, Baland *et al.* 2010). In the 1970s and 1980s, a new management paradigm emerged in the form of joint forest management (JFM) based on field experiences from West Bengal, Haryana and Madya Pradesh (Bhattacharya *et al.* 2010). JFM principles were established by the Indian Ministry of Environment and Forests (MoEF) after the 1988 National Forest Policy. This text marked a turning point in the Indian forest policy history by stating as main objective the "environmental stability and maintenance of ecological balance" contrary to the former commercial exploitation of forests for industrial purposes. Forest-dwellers' needs on forest produces were to be satisfied first and the policy acknowledged that "[t]he rights and concessions enjoyed by [tribal people and other poor living and near forests] should be fully protected" (Government of India 1988).

The 1990 guidelines on JFM, revised in 2002, gave operational recommendations to all the State Forest Departments for implementing their new mission. The Forest Departments (FD) had to devolve forest protection, management and development responsibilities to local institutions at the village level (Behera and Engel 2006). The village community would then enter into an agreement with the government represented by the Forest Departments to "jointly protect and manage forestlands adjoining villages and to share responsibilities and benefits" (RUPFOR 2002, Damodaran and Engel 2004).

JFM was foreseen to promote environmental sustainability, to improve the livelihoods of the communities involved, and to empower the poor rural masses inhabiting forest areas (Datta and Sarkar 2010). But in spite of 28 percent of total forest area covered under JFM, rural livelihoods have not shown any tangible improvement over the last decade (Vemuri 2008), the rural poor being net losers (Kumar 2002). Moreover, the implementation of JFM can even be detrimental to the appreciation of the forest and of the Forest Departments by the communities involved in the process (Macura *et al.* 2011).

As the emphasis of forest management continued to be on commercial timber exploitation even after independence most silvicultural research in India so far has been conducted on commercial timber species (Vemuri 2008). However commercial timber species are of less value for the poor, who mainly require short duration firewood and non-timber forest produce to support their immediate livelihood needs (Behera and Engel 2006). Silvicultural technologies and practices that enable the villagers to better meet their needs for products, food security, and services from forest are critical to effective participatory forest management (Miagostovich 2001). Also, the literature indicates a lack of monitoring and evaluation of JFM programmes at the village, State or National level (Murali *et al.* 2003). Even when monitoring activities are conducted on ground, the assessment is done largely from the perspective of the Forest Department, donor agencies and to some extent from NGOs, hardly on locally relevant indicators of change (Garcia and Lescuyer 2008).

In 2006 the Government of India passed the Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act. This Forest Rights Act recognizes and vests rights over forests resources and forest lands to forest

dwellers, including ownership (Macura *et al.* 2011). The act is based upon the understanding that these rights had not been recorded during the process of reservation of the forest by the state, and therefore seeks to redress the "historical injustice [done] to the forest dwelling Scheduled Tribes and other traditional forest dwellings" (Government of India 2006).

There was considerable debate over both the ecological and social impacts of the act. It is expected to help alleviate poverty since it provides rights over state land to forest dwellers (Robbins *et al.* 2009, Springate-Baginski *et al.* 2013). However, the distribution of private individual ownership rights has taken precedence over the community rights, contemplated in the Act, what is seen as a deviation from the spirit of the Act (Upadhyay 2009). So, despite its stated intention, instead of devolving forest management to local communities, the Forest Rights Act seems to have been implemented as a simple acknowledgement of conversion from forest to agriculture.

The resistance of the bureaucracy to accept new management practices is seen as a major hurdle to adopt new and innovative strategies for improving the effectiveness of JFM (Behera and Engel 2006). This administrative resistance carries over today as described during the implementation of the Forest Rights Act, the latest legislative change to forest management in India that aimed at handing over rights over forest lands to tribal communities and other forest dwellers (Springate-Baginski *et al.* 2013). However, a learning curve is evident in the process of devolution of forest management in India since the establishment of the National Forest Policy of 1988 (Balooni 2002).

In Brazil, the *Cerrado* (Brazilian savannah area that covers almost 25% of the country) is used mainly by small family farms for cattle grazing and for gathering timber and NTFP; federally protected reserve areas only cover 1.5% of the land. Since the 1970s–1980s, especially in the central and south states, more than half of the *Cerrado* has been transformed into grazing lands and, to a lesser extent, into farmlands for profit-yielding crops such as soybean. The north of the *Cerrado* was long protected by the lack of access and the low fertility of the soils. These forested lands are however, vital to the local communities who usually do not have official land titles. The deforestation rate is now alarming, as lands are reallocated for ranching and soybean cropping. Although *Cerrado* is the region in Brazil where firewood is consumed the most, providing about 70% of the household fuel, there does not seem to be any major forest management programme for combined wood and livestock production; there are only technical experiments on cutting practices for different tree species and, recently, pilot forest management plans.

Future prospects now seem to include conservation measures aimed at protecting the remaining half of the *Cerrado* which is still covered with natural formations. This is seen as a reaction to the increasing pressure for Amazon conservation and the ensuing of leakage from soybean cultivation, also as a step in preparation for REDD+ [See "The Plan for the Prevention and Control of Deforestation and Forest Fires in Cerrado" (PPCerrado) launched in September, 2010]. (Ribeiro *et al.* 2012).

In 2001, the "Sustainable Management of the Caatinga Vegetation for Firewood Production Project" was launched in the drier Brazilian Caatinga region to improve the management of local trees prized as firewood by local communities. The first stage of the project had a very scientific perspective and was focused on the most appropriate cutting techniques (pruning, pollarding) for the sustainable production of fuelwood by these species. In the next stage, the aim was to develop pilot forest management plans (about 75–150 ha for each small-scale family farm). The project was in synergy with the IBAMA (Brazilian environment agency) project composed of local actions to improve the charcoal kilns and forest management plans with the hope that these plans could be the basis for making decisions on adjustments to draft legislation on forest management (Gariglio *et al.* 2010).

In the Miombos, particularly in Tanzania, experiments of Community Based Forest Management have been conducted, with the same norms than in the other drylands: definition of clear forest boundaries, collective arrangements, drawning up of simple forest management plans and clear definition of resources users (Kajembe *et al.* 2003). This exception aside, in most English-speaking African countries, changes to forest regulations often emphasised conservation, rather than the use of forestry resources by local people. This is mainly pilot and research-action projects that have been carried out at the end of the 1980s, and no large-scale projects. The reform process to transfer management started towards the end of the 1990s, almost a decade later than in French-speaking Africa (Wily 2000). The devolution process of the forest management still reflects a continuation of the central administration control paradigm and negative trade-offs of the devolution process are common (Kowero *et al.* 2003).

OPTIONS FOR SUSTAINABLE MANAGEMENT OF DRY LAND FORESTS

Because forest management in the drylands depends on agricultural, livestock and gathering systems, it need to be considered in the wider framework of a landscape approach – or what French scholars refer to as "approches territoriales" – with ecosystems interacting due to human practices (Gautier *et al.* 2006). Some of the guiding principles of integrated landscape approaches include the need to encompass (i) multiple stakeholders with different, often divergent interests, (ii) multiple uses that stem from the diversity of ecosystems, life forms and livelihood strategies in the landscape, and multiple scales acknowledging that the processes, be they environmental, social or economic, often transcend narrow geographical boundaries (Sayer *et al.* 2013). This landscape approach is slightly emerging in the political agenda, but a lot is still to be done to stimulate interactions and synergies between the technical administrations (agriculture, livestock, and forestry) despite the decentralization processes that has disseminated since the 1990s.

Forest management in the drylands needs to consider several overlapping territories and related rights of access to and use of natural resources and the unintended consequences, including forest degradation, that can emerge from these interactions (Gautier *et al.* 2011). To be successful, a territorial approach of forest management should thus consider all the parties participating in the process of redefining the use of forestlands (regulations, obligations, rights, restrictions, accountability, etc.), and not only a sub-section such as a professional organization of woodcutters which mainly deals with the forest administration to the quasi exclusion of the other villagers and institutions (municipality and customary authorities).

Another guiding principle of the landscape approach is the clarification of rights and responsibilities (Sayer *et al.* 2013). Forest management by and for the communities can only become a reality if there is an effective devolution of power, responsibilities and benefits to local stakeholders. When the rights and obligations of each party are clearly defined, the forest steward must be able to act upon the resource within the boundaries of his rights, without being hindered in his practices by other institutions or actors. This poses a challenge because the forest steward, as any actor, is embedded in a social network framed by power relations, reputation and trust. It is for example difficult for a new migrant recently arrived in the village, to exclude from the forest a person belonging to an original lineage. A taxation system may be too high for a poor charcoal producer, forcing him to enter into asymmetrical relations with money lending urban merchant, or to seek informal arrangements with the representatives of the forest administration.

When empowering local forest managers, the forest stewards must be endowed with legitimacy acknowledged by all the parties, starting with the local community. If the forest stewards are respected by the local society, it is then easier for them to face free-riders (internal or external to the local society) and enforce rules through customary or decentralized institutions.

Finally, forest governance should be as dynamic as the forests themselves, embracing the concept of adaptive management (Tucker 2010). Social and environmental dynamics are closely linked, requiring integrated, holistic consideration for the various elements of the landscape, rather than a segmented approach applied to a limited compartment of a territory. However, this principle is at odds with the principle of legality required to ensure forest management is not arbitrary and discretional. Legality imposes the rules to be pre-existing, clear and public, thus reducing the scope of action of the official steward. We believe this trade-off between the compliance with the principles of good governance and the needed flexibility to cope with surprises in the management of forests with low resilience has not received sufficient attention in the literature.

Finally, advancing scientific knowledge and outcomes that are favourable for the forest users, requires withdrawing from the traditional narrow focus on only timber or woodfuel. The development of new silvicultural systems, that effectively address the issues of NPTF, charcoal and livestock herding in the dry lands still requires further research (Lal 2001). Taking local knowledge seriously will go a long way towards the evolution of efficient management systems (Sinclair and Joshi 2000), at the condition that a special attention is given to the power relationships between all the stakeholders using the forest, to their representativeness and to their accountability.

CONCLUSION

Originating from the "empire forests", scientific forestry has been applied to dry forest and woodlands by both colonial and post-colonial states. This approach to forest management relies on the principles of enclosure and demarcation of the forests, the designation of annual harvest quotas within designated areas with clearly defined rotations and strict silvicultural rules, and the enforcement of such rules by forest stewards. This mode of management that disregards local knowledge and practices has not proved yet its sustainability in the dry lands and there are few scientific evidences of the resilience of the dry forest under its regime. Maybe surprisingly, the process of decentralization and empowerment of local communities that started in the 1990s has not changed that. To begin with, this transfer is often restricted to technical, sometimes organizational skills, without effective power transfer, or concern for local knowledge and uses. The outcome of this partial transfer is that communities reappropriate and adjust the forestry standards to turn them into unexpected territorial and/or economic opportunities. This is very different from what we have heard at times from forest agents, that participation challenges sustainability. Whatever the political perspective under which scientific forestry has been applied in the dry lands from the colonial times to the present, forest standards have remained almost untouched. And there are no more evidences that dry forests have been managed in a more sustainable way under the full control of the central state that under more participatory management.

Considering the extent of deforestation in the dry lands due to the still on-going extensive practices, the urgency to sustainably manage the remaining dry forests and woodlands, and the lack of capacity of the forest administrations to cover and control the very large areas over which dry forests are distributed, participation of communities in forest management is a process that should be self-evident. Acknowledging that, some states have firmly committed themselves to transfer competencies to communities or to a professional group within these communities. However, the foundations of these innovative projects remain the standards inherited from scientific forestry. Adaptations have been observed at the margins but the spirit remains the same. A disruptive change has to be operated that could take its roots in the agroforestry management systems that rely on assisted natural regeneration and that take stock of wider spatial and temporal processes happening in the landscape. The first step of this revolution will be to consider the silvicultural local knowledge, the social relations to land and resources and the power plays between people and between institutions concerning the rights

of access and resource use. At present, to our knowledge, no dry forests and woodlands management takes into consideration these three points. There is an urgency to bridge the gap between the scientific forest standards and the perceptions, knowledge and practices of communities and to take into consideration the power relation between institutions and between stakeholders, to invent and define a sustainable management of dry forest.

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