

Research Article

Innovation in Forest Management in Burkina Faso: Analyzing the Dynamics of the Actor-Network in Cassou

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Abstract

The challenges of sustainable forest preservation led Burkina Faso to implement participatory forest management projects in the mid-80s. These projects led to the creation of Forest Management Sites including the one at Cassou. This innovative approach focusses on the active participation of the local communities. It raised high hopes for sustainable forest management. This presents paper traces the process and analyze the outcome derived from the participatory forest management. The Actor-network theory was used as to analyze the implementation process of the CAF model. In doing so, qualitative approach was used through key experts' and stakeholders' interviews and focus groups discussions to understand the trajectory and to evaluate the process of implementing the given model. The results show that the dynamic that prevailed at the beginning of the process has eroded over time to the point that after more than three decades of implementation, the model has not yet reached its phase of stabilization or irreversibility. Actors no longer seem to refer to the roles assigned to them, and they are not respecting their commitments. In part, factors such as population renewal and growth, decentralized development management (which were not taken into account at the outset) call for new forms of negotiations between stakeholders to regain control of the process for the sack of the Cassou managed forest.

Keywords

Innovation, Participatory, Forest Management, Cassou

1. Introduction

Forest management has always been a concern for mankind, and the signals about our planet's climate crisis show that things will not change. According to FAO [7], forests are a source of food, medicine and energy for over a billion people worldwide. Added to this, it is the relatively high carbon sequestration potential of the ecosystem. Forests are therefore a vital resource for humanity. So, the question is, how can we

sustainably manage this natural resource that is so important for mankind? Since then, Hardin [10], proposes his paradigm on the "Tragedy of commons" to put forward solutions such as privatization and state management in an attempt to solve the problem of the ruin of natural resources. In tropical forests, the experimentation with these models involved the application of the classified forest system, which excluded local

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populations from forest management on their lands. These models ended in failure. It was in this context, and especially with the Rio Summit in 1992, that the international community made the participation of local populations in forest management an imperative. Acclaimed by the international community, this approach places particular emphasis on the involvement of local populations in the management of their natural resources [20]. Within this general dynamic, Burkina Faso, decided to implement participatory forest management projects. These projects began in earnest in 1986 with the financing of United Nations Development Programme (UNDP) "Forest management and exploitation for the supply of firewood to the city of Ouagadougou" project (PNUD/FAO/BKF/85/011), with Food and Agriculture Organization (FAO) involvement [21]. This led to the creation of the Forest Management Sites (FMS, CAF in French) including the one at Cassou. This new approach broke with the protectionist and repressive management policies adopted until the late 1970s. According to Breemer and al., [3], these policies were characterised by the organisation of forests into reserves, which were frequently removed from the territories of local societies and where the local population was considered an intruder and had to be kept out. With the CAF model, local populations are organised into Forest Management Groups (FMG or GGF in French) and participate in the management and exploitation of the resource; their activities are coordinated by the Union of Forest Management Groups (UFMG). The economic benefits are shared between the village operators (members of the FMG), forest maintenance, support for local development and the payment of taxes to the State. From an ecological point of view, timber harvesting is subject to technical criteria and standards that encourage forest renewal and reduce the impact of degradation factors such as fires and overgrazing. A whole range of innovative forest management practices have therefore been developed in the CAF model. The implementation of this management model also involves a process of negotiation between a variety of stakeholders. This is the reason why, Bertrand and al., [1] note that: "Managing a forest is first and foremost a matter of negotiating the rules for its management and use between all the stakeholders concerned". The CAF model is therefore an innovation in forest management in Burkina Faso. But these innovations in forest management have not been enough to reassure people that the model is viable. The forest stock in the Cassou site continues to erode each year and the resource remains threatened by poor agricultural practices, uncontrolled logging, uncontrolled bush fires and poor pastoral systems [15]. This situation, coupled with population growth and droughts, makes the existence of this resource problematic. First of all, despite the (active) participation of the local populations, they do not seem to be satisfied with the management of the resource. This has led some villagers to demand that part of the protected forest be returned to them. According to some CAF officials, around 15,000 hectares of forest have been returned to the local population over the last

decade. It is clear that if this fragmentation continues, it will eventually lead to the disappearance of the natural asset, according to the island biogeography theory of MacArthur & Wilson [13]. The situation at the Cassou's CAF therefore raises questions about the management of the structure itself and also about the nature of the relationships between the actors. It's true that we can't talk about the failure of the model, but we can ask ourselves whether the intended change and positive modification in the situation of beneficiaries has been achieved. About forests management, studies and works have certainly focused on the management of CAFs in Burkina Faso, but most of them have focused on governance, ecological and economic management, highlighting limitations and obstacles [2, 15, 19]. Few, if not any, studies have approached the issue of forest management from the angle of a network made up of stakeholders in relation to each other and where the contribution of each type of stakeholder is necessary for sustainable forest conservation. Moreover, we spoke earlier of negotiations between stakeholders in the implementation of the CAF model. Consequently, its management can be analysed in terms as a network to stabilise the project. This article therefore attempts to describe the actor-network of the system by focusing the analysis on the different phases of implementation of the model in order to understand whether the process has resulted in a good reconciliation of the interests of the stakeholders.

2. Theoretical and Methodological Approach

2.1. The Concept of Forest Management

In their article entitled "*For a new definition of forest management as an engineering discipline*", Laroussinie and Bergonzini [12] describe the origins of the concept in two ways. The first is attributed to Baudrillart (1823), for whom forest management is synonymous with "exploiting and transporting timber for supply". A second connection relates to the idea of heritage preservation by the head of household (father). But one of the very first definitions of the concept comes from Baudrillard (ibid). According to him, forest management "is the art of dividing a forest into successive cuts, or of regulating the extent or age of the cuts in the best interests of forest conservation, consumption in general and the owner". Although forest management in this context was aimed at maintaining the productive capacity of the forest, i.e. sustainability; the pre-eminence of timber production was the central idea. Over time, however, the concept of forest management evolved, especially onwards, the 1980s to become an instrument for implementing sustainable forest management (Eba'A Atayi, 2001) [6]. Also, the same auteur [6] notes that forest management is the most important approach of forest preservation and defines it as "a study and document on which the sustainable management of a forest is based; on the basis

of an in-depth analysis of the natural environment and the economic and social context, forest management sets long-term and medium-term objectives and determines all desirable interventions... at the end of which it will be replaced by a new forest management plan". In our view, forest management is therefore a multi-stage process (see Table 1) that applies to a forest area organised and managed on the basis of a management plan defining the techniques and methods of exploitation and management and, above all, the roles of the stakeholders and the way in which interactions

must be established in order to sustainably preserve the commercial and non-commercial functions of the forest. In Burkina Faso, the adoption of forest management dates back to the early 80s, with the "Natural forest management project covering a radius of 150 km around the town of Ouagadougou" to supply the town with firewood, which began in 1986 [11, 18]. It was this project that led to the establishment of the Forest Management Site (FMS). In Burkina Faso, the areas concerned are called managed forests or protected forests."

Table 1. Stages of forest management.

Stages	Sub-stages	Expected results
Planning	1. Analysis and synthesis	Development plan circulated and approved Management plans Operation plan
	Biophysical environment	
	Socio-economic environment	
	2. Determination of parameters	
Implementation and monitoring of plans	3. Drawing up plans	Improved forest management Data available for planning
	Administrative control and monitoring	
	Technical control and monitoring	
	Scientific monitoring	

Source: [6]

2.2. The Actor-Network Theory to Understand a Description of a Process

Actor Network Theory (ANT) is a relevant method for describing a process of adopting an innovative project and the relationships between the actors (human and non-human) involved. Its relevance lies in the fact that it makes it possible to retrace the phases and negotiations that took place between the actors in the translation process, the strengths and weaknesses, while analysing the conditions for stabilising the innovation. According to Callon [4], any translation process includes the following stages: *problematization, interest, enlistment and mobilization*.

Problematization is the stage at which the process is set in motion around a provisional, minimum project, encompassing the interests of each of the entities involved. This is where the project initiators demonstrate to the stakeholders identified and concerned that they must go through the defined program and "a set of obligatory points of passage" [9], in order to achieve their personal objectives. It is in the dynamic group that the answer to the problematization can be obtained. The second moment is made up of interest and the alliances that are formed. Once the stakeholders have been identified, they must be interested, i.e. they must accept the problematization proposed by the translator (project initiator) in accordance

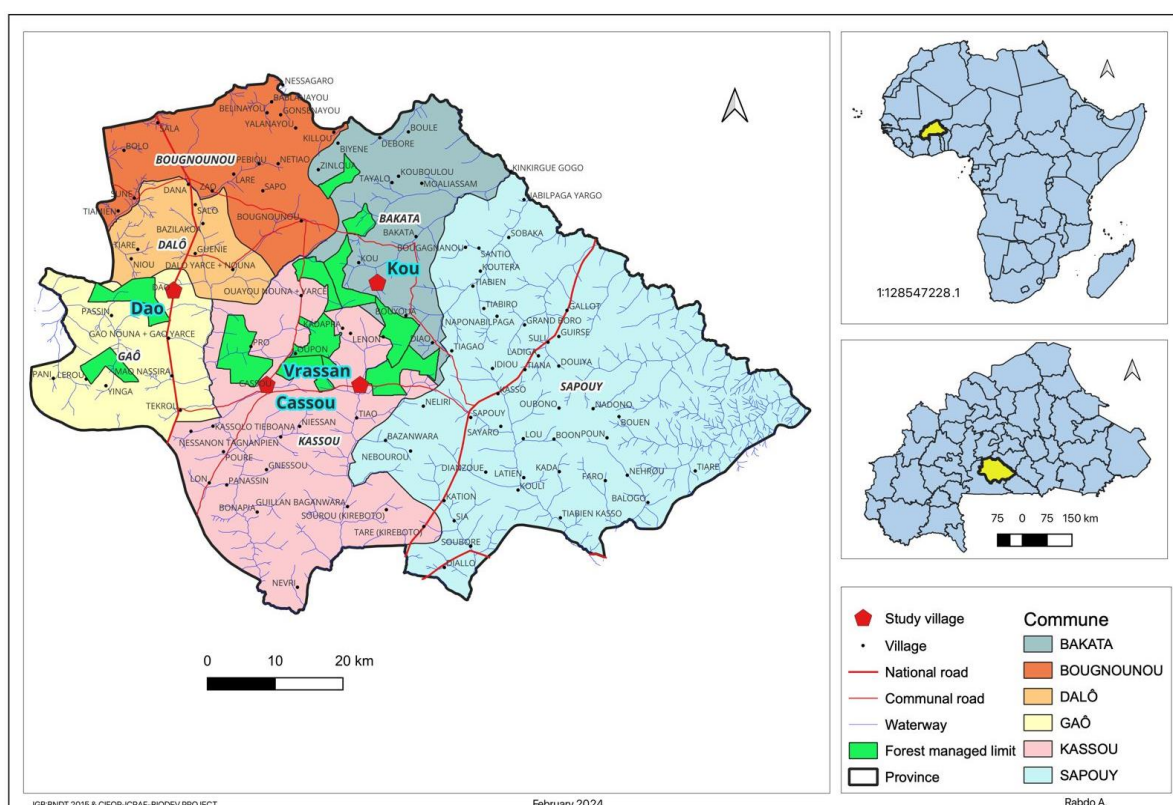
with their own logic, expectations and needs. According to Callon [4], various mechanisms of interest must be developed to block external influences, so as not to destroy the alliances that are being formed. Successful involvement must confirm the validity of the problematization. If it is successful, it will lay the foundations for aligning the identified stakeholders, with a view to consolidating the network. The problematization describes a system of alliances between entities, whose identity it defines, as well as the problems that stand between them and what they want. However, to form the alliances, all the actors must be interested in the project. Involving the actors means enlisting them [4], i.e. defining and assigning precise functions to each stakeholder, who must accept them. The actors therefore construct their role as a division of tasks that will enable them to join forces, consolidate the network and root the ties that bind them within the network. Just as successful interest confirms the validity of the problematization, so enrolment is a successful interest [4]. Describing enrolment, then, means describing the negotiations, the power struggles and the tricks that accompany and enable the success of incentive. The final stage concerns the mobilisation. At this stage, each actor chooses representatives or spokespeople, who are mobilised and carry out their roles. It is during this phase that the network consolidates or weakens, depending on the power struggles involved. These are identified through the various controversies that mark the network.

Controversies and compromises are markers for identifying the dynamics of the network and the evolution of its convergence or divergence [14]. But for the precursors of the theory, the process is not linear or sequential. There may be, and usually is, displacements due to a questioning of one or more stages of the translation by the actors when they do not find themselves in the "story". This gives rise to what Callon [4] describes as dissidence or controversy. Ultimately, this analysis highlights the strengths and weaknesses of the network, a situation that leads the translator (or project leader) to transform the incentive arrangements for dissident actors and to set up other types of actors [8]. This is necessary in the process because the notion of translation emphasises the permanence

of displacements and it is the successive displacements that lead to the implementation of a more or less irreversible quality innovation. In our research, we have identified two phases that characterise the process of implementing Cassou's CAF model. These phases are described and analysed after the presentation of the methodological approach.

2.3. Study Site and Data Collection

The work concerned four (4) villages bordering the Cassou managed forest, Ziro province in the Centre-West region of Burkina Faso (see map below).



Source: Technical Direction of the Cassou CAF

Figure 1. Map of the Cassou's forest management site and location of the study villages.

Our data collection method was essentially based on a qualitative approach and a consultation of grey literature consisting of general documents and articles on forest management and specific papers on forest management sites in Burkina Faso (balance sheets, monitoring reports, etc.). For this grey literature, we focused on documents published after 1980, since it was from this date that participatory management projects in sub-Saharan Africa began to have a prominent place in forest management policies. With regard to the qualitative approach, we conducted semi-directive interviews

with the staff of the Technical Directorate of the Cassou CAF, members of the UFMG office, researchers from INERA and CIFOR (Center For International Forestry Research), who are experts in forest management and who have carried out activities in the Cassou CAF, departmental services in charge of forest management and other people in order to understand certain generalities about CAFs.

As for the local populations, they were met in four (4) focus groups, in the villages of Cassou, Kou, Dao and Vrassan (see table 2).

Table 2. Focus group interviews.

Date of the interview	Identity of interviewees	Number of participants	Duration of the interview
29/07/2022	Focus Vrassan	13	7h- 8h30
30/07/2022	Focus Kou	9	16h30-18h
31/07/2022	Focus Dao	11	16h-17h30
31/07/2022	Focus Cassou	11	16h40-18h

The series of questions addressed to them aimed to review the trajectory and implementation of the CAF model and the controversies that may have arisen or still exist today.

3. Results: Description of the Implementation Stages and Expression of Controversies

3.1. Context and Problematization in the Cassou CAF Model Implementation

Facing of the failure of the protectionist, repressive and centralised forest management policies adopted up to the end of the 1970s, the government of Burkina Faso decided to innovate in this area by adopting the CAF model, which involves forest-dwelling populations. The idea of developing this model was presented by the State, the project's "primus movens", according to Callon [4], to financial backers to request their support. This led to the creation of the project "*Management and exploitation of forests to supply the city of Ouagadougou with firewood*", known as UNDP/FAO/BKF/85/011, financed by the UNDP with FAO technical involvement. This project is the forerunner and benchmark for natural forest management in Burkina Faso [22]. It was carried out in three phases. During the first phase, from 1986 to 1990, the Nazinon classified forest was managed. Cassou and Bougnounou forests were managed during the second phase, from 1990 to 1994. The third phase, from 1994 to 1998, saw the Pouni-Zawara forests managed. Its implementation consisted of participatory forest management based on the cutting and selling of wood for energy purposes.

This new management approach should contribute to the rational and sustainable exploitation of forest resources under the control of the forestry administration. Local village communities, organised into Forest Management Groups (FMG), are also involved and participate. They harvest the timber and sell it to wholesale transporters, who in turn mar-

ket it in urban centres. The economic benefits are shared between the actors and contribute to local and national economic development. The active and voluntary participation of local communities in forest management becomes the key to achieving sustainable forest conservation. Unlike management systems that marginalise local forest populations, the CAF model is unique in that it is conceived as an organisation that operates on three levels: technical-administrative, economic and ecological, involving different parties making up a network of stakeholders and pursuing the common objective of sustainable management of natural assets.

In technical-administrative management, the managed forest of Cassou has been conceded to the Cassou Union of Forest Management Groups (UFMG) since 19 December 2001, in accordance with the provisions of Articles 39, 68 and 69 of Law N°006/97/ADP of 31 January 1997 on the Forestry Code in Burkina Faso [19]. Under this concession, a management contract is signed between the UFMG of Cassou and the Forest administration representing the State. The UFMG is technically and administratively responsible for implementing the management plan for the managed forest, under the supervision of the environmental department. The site is managed by a Technical Director with the participation of the office of representatives of the village forest management groups. The Technical Director is responsible to the Environment Department and the office of group representatives for implementing the annual work program. The office of group representatives meets once a year at a General Assembly to review the previous year's activities, the situation of the groups and the broad outlines of the following year's work program.

Concerning the economic management, the income from the sale of wood is managed in such a way as to contribute to increasing local incomes, financing immediate forest management activities and the State budget. The resources derived from the wood sold are distributed among the stakeholders as shown in the table below.

Table 3. Distribution key for the price of a stère of wood energy.

Wording of price structure items	Amount (CFA francs) per stère	Percentage of price per stère	Destination
Forest royalties	600	27,3	Forest Management Fund
Village working capital	200	9,1	Collective investment
Forest tax (or cutting permit)	300	13,6	50% to decentralised authorities, 50% to the public treasury
Individual remuneration of the member of the FMG	1 100	50	Increase logger's income
Total	2 200	100,0	

The income distribution is organised by a marketing clerk with the FMG managers, who receive the share due to the group direct producers. The shares of revenue corresponding to the Forest Management Fund (FAF) and forest tax are collected by the CAF accountant for payment into the site's bank account and into the public treasury to finance the local and national economy.

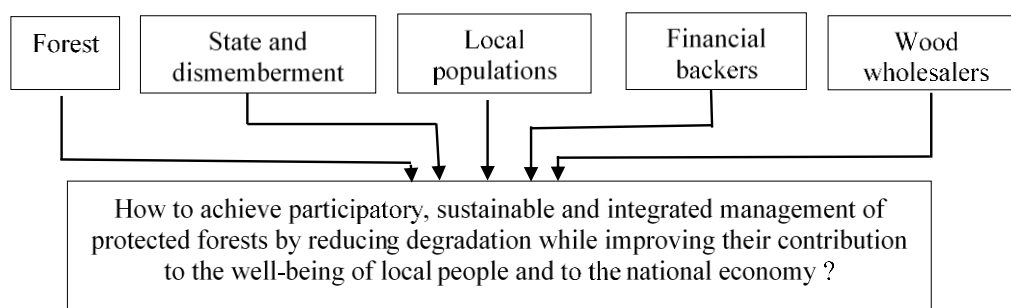
Concerning ecological management, the forest exploitation is based on compliance with ecological parameters (felling standards and criteria) and the implementation of monitoring, surveillance and protection activities to ensure sustainable management of the resource. Forest monitoring, surveillance and maintenance activities (protection and defense against clearing, bushfires and overgrazing) are carried out by the Technical Department staff, with close involvement of the departmental forestry services and members of the FMG.

The CAF model is therefore an innovation in forest management in Burkina Faso. It breaks with all the old management methods, which were characterised by the exclusion of local people from the management of the forests on their land, the questioning of the repressive power of the forestry services, and the fact that local people received little economic benefits. It is also a model which, through the organisation of

administrative and economic management and, above all, the adoption of rational logging techniques, is able to ensure the sustainable exploitation of natural assets. There is no doubt that the stakeholders have an interest in preserving the forest. Like Callon, in his article "*Some elements of a sociology of translation; domestication of the scallops and the fishermen of St Brieuc*," we can ask ourselves how are the different stakeholders affected by the issue of forest degradation?

Forests, wherever they are found, are a vital resource for the people living near them, for the country and indeed for humanity. For the State, the forest is a collective asset to be managed in such a way as to satisfy the needs of the present and those of future generations. For the local populations beset by the poverty, it is necessary to exploit the forest in order to live in acceptable economic conditions, raise animals and heal themselves with the tree in the forest, even if they have to think about their descendants.

This presentation provides an overview of the actors (human and non-human) involved in the management of the forest, their interests, their challenges and the degree of convergence. This shows the need for change in the management of forest resources, i.e. problematization. This can be illustrated in the figure below.

**Figure 2.** Problematization of the CAF model adoption.

This phase is only a presumption that the stakeholders will advance knowledge of resource management, enabling the problem to be resolved in the interests of all. But only the

subsequent phases of the process, i.e. planning and, above all, implementation, will determine whether there is a real convergence of interests between the stakeholders.

3.2. The Planning Phase: Enrolment and Incentive

Once the partners had given their approval, the project implementation phase began. This phase is characterised by the identification and location of the production forest sector [16], itself comprising three major stages. The first stage consisted of defining the boundaries of the village land basis of a cartographic inventory of land use and phyto-ecological survey work, thus constituting the first test relations between the project team and the national services, on the one hand, and the traditional chiefs, notables of the region and leaders of popular structures, on the other. The operations in this phase resulted in a portion of village land estimated at 19,657 hectares (ha) belonging to 15 villages in the eastern sector and 9,858 hectares belonging to 10 villages in the western sector being released for forest management, making 29,515 hectares in total. This cleared area is divided into Forest Management Units and sub-units (FMUs), each managed by one

or more villages, associated according to their affinities. The size of the management units varies from 481 ha for the smallest sub-unit to 4,716 ha for the largest unit [16]. The interview with the group of Cassou on 31 July 2022, explains well this first phase: *"The process began with a meeting between the FAO technicians and the village chiefs and their notables. Following these discussions, a visit was made to the land to be developed, and then villagers were appointed to provide training in forest management in Nazinon, the first forest management site; two (2) people were chosen per village in the commune of Cassou, but only one person was chosen in Cassou. The training was to cover felling techniques, sterring and other management activities. Some people were occupying the areas to be developed, but they were rehoused on other land and compensated. The original idea was to hand the forest back to the local people after 20 years of development. The process began in 1990, with actual management and logging starting in 1991. The figure 3 below summarises the main stages of this phase."*

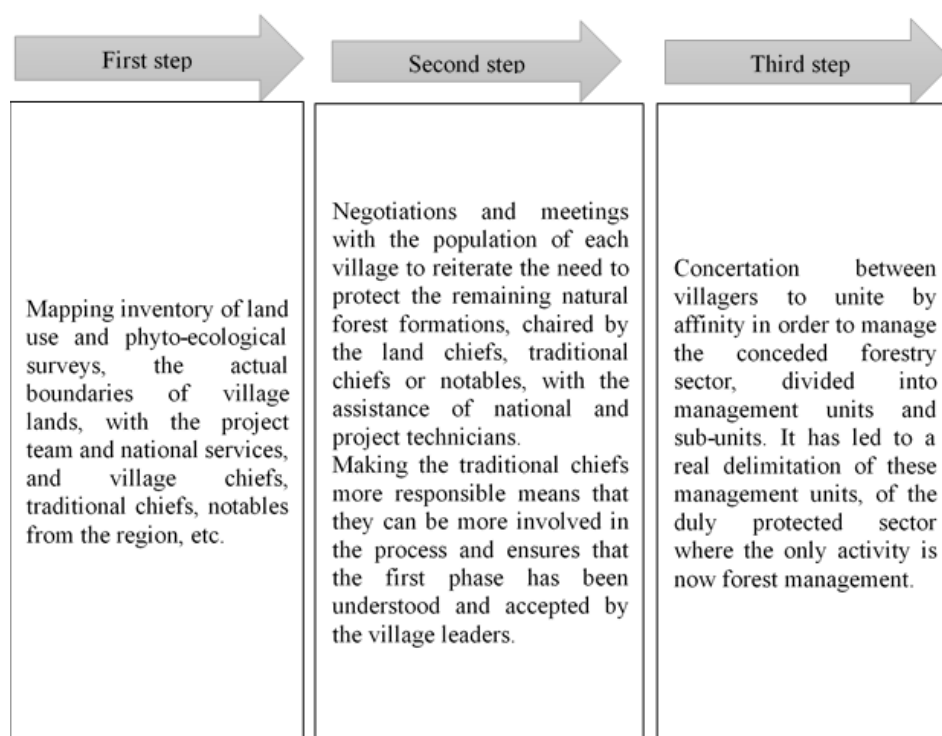


Figure 3. Main stages of the development planning phase.

This phase corresponds to the time when the mechanisms for involving and enlisting of stakeholders are implemented, and all of this is recorded in the Forest Management Plan (FMP or PAG in french). We can see that, it is during this phase the FMGs are created and their members trained in logging techniques, and the rules for managing, operating and exploiting forest have been put in place. The implementation of the FMP is overseen by a Board of Directors, whose main role is to take the major decisions concerning the management of the site.

The description of this phase shows that the local people have accepted the idea of managing their land and have ceded it for this purpose. They have also accepted the roles assigned to them in the implementation of the model. This phase can be seen as an actor-network that combines two (2) negotiation mechanisms: negotiations between the State and the financial backers and between the two first partners and the local populations for the implementation of the management planning activities.

3.3. The Actor-Network in the Operational Phase: Mobilisation and Controversies

The operational phase of the CAF model can be likened to an experimental phase, and enables us to identify the model's achievements and shortcomings. A description of this phase also reveals if the interest and enrolment phases were successful or not. Analysis of the data enabled us to identify three (3) domains in this phase, but whose stakeholders are involved in the network during the implementation phase of the development and management plan. These areas of expertise are technical and administrative management, ecological management and economic management.

3.3.1. Administrative Management

Administrative management concerns the operation of institutional frameworks. The presentation of the model shows the existence of interactions between the stakeholders. The ambition of the CAF model was to concede forest management to local populations through the UFMG. However, as the government felt that the villagers did not have the technical capacity to manage the resource properly, a technical department was set up to coordinate the management of the site and was placed between the UFMG and the FMG. Moreover, in the CAF's organisation chart (which appears in most of the documents on the model), the UFMG has been removed. In practice, according to the President of the UFMG, "the head of the Technical Department manages the site as if he didn't have to report to our office. We are not notified when there are expenditures to be made from the site account, and reports are only made after certain expenditures have been made". Whereas the FMP states that the Technical Director is recruited by the Regional Department in charge of forest management and placed at the disposal of the UFMG, which employs him. The UFMG's presence in the scheme therefore appears to be merely figurative. The words of the President of the UFMG lead us to believe that the latter is distancing itself from the Technical Directorate, which is supposed to guide them in the forest management.

Secondly, the provincial and departmental environmental offices report little involvement in the management of the CAF. Their services are generally called upon to intervene as public forces in cases of repression and eviction of populations illegally occupying areas of the site. They are also not involved in the identification of logging plots, or in the development activities for which their expertise is important. According to them, *"We are not involved in any forest management activities. The CAF operates as if it were accountable to no one. The CAF seems to be a matter for three individuals: the Technical Director, the marketing clerk and the President of the UFMG"* (interview).

The same is true of the departmental technical services for agriculture and livestock. For some of them, *"we only know that there is a structure called 'CAF' which is responsible for managing the managed forest, and nothing else"*. There is no mechanism for bringing the CAF and their departments closer

together. For others, the impression they have is that CAF management is centralised in a core group that is not representative of the community, even though the type of management advocated is participatory. Yet these technical services are generally in direct contact with the socio-professional categories of the village. In fact, these technical services are sceptical about the very survival of the development project, as some people seem to have no interest in it and arable land is becoming increasingly scarce under the weight of demographic pressure. Situations such as these are likely to weaken the network, as they could undermine the incentive and enrolment mechanisms. The reactions of certain actors illustrate their tendency to lose interest and not to align themselves with the CAF's activities and objectives.

3.3.2. Ecological Management

This point addresses the issue of the operating standards and criteria laid down by the model, which the stakeholders must respect or ensure respect for in order to allow the resource to renew itself and be productive in the long term. The stakeholders involved, whether directly or indirectly, in the harvesting activity, point out the difficulties in complying with these criteria and rules, but not without blaming each other and passing the buck. For the members of the village groups and the technical environmental services, the Technical Directorate does not fully play its role of raising awareness, monitoring, supervising and supporting the members of the FMGs as it should. On the other hand, for the Technical Directorate and some FMG managers, loggers are increasingly guided by the need to maximise their profits, and given that profits depend on the quantity of wood exploited, loggers will be led to cut more wood to increase their income, even if this is to the detriment of the application of good logging practices. Moreover, a study conducted by Ouedraogo [17] showed that felling techniques were poorly respected in all the CAFs in the Centre-West region. Loggers also claim that some of them are not complying with logging criteria because the Technical Department is no longer effective in its role of supervising loggers who are members of the FMGs.

Another aspect of ecological management is the lack of partways in the forest and the poor level of maintenance of those that do exist, which is thought to be due to a lack of financial resources. According to the CAF's Technical Department, the Forest Management Fund is not sufficiently consistent to budget for the creation and maintenance of tracks, which require considerable resources, in particular the hire of machinery for the work.

3.3.3. Management of Economic Benefits

According to the distribution key, the economic benefits have four (4) destinations (loggers, village investment fund, forest royalties and forest tax), with a very precise distribution circuit organised by the marketing clerk. In terms of spin-offs, and based on reports from the Cassou CAF, we note that between 1995 (when the yard became autonomous) and 2013,

the yard produced 503,171 steres, i.e. an annual average of 26,483 steres. Total revenue is estimated at 1,106,976,200 CFA francs, divided between the various destinations [9]. While it should be noted that these figures fall short of the forecasts made in the FMP, the loggers, for their part, derive relatively substantial income to improve their socio-economic situation. For the loggers, "some of us can have up to 500,000 francs a year to manage our families. This money enables us to make several types of expenditure for the family, such as building housing, sending children to school, buying plots of land, celebrating weddings, buying means of transport, buying animals and farming tools, etc." (interview). Ouedraogo [17] confirms this in his study "Forest management and the fight against poverty in Burkina Faso" (including the Cassou site). According to his conclusions, the resources received by the loggers contribute to fight against poverty and provide them with a relatively higher standard of living than the other socio-professional categories in the area. This has a positive impact on the economic structure of the locality.

The results of his study show that loggers in managed forest areas are wealthier, with incomes well above the poverty line, and that 70% of their total average annual income comes from

forestry activities, while agricultural income accounts for less than 10%. While it is true that the CAF helps to replenish government coffers, finance local development and, above all, improve the living conditions of loggers, it is also true that the attitudes of those involved make it difficult to control the management of the economic spin-offs.

According to the FMP, distribution should be carried out periodically from the marketing clerk onwards. The circuit is not respected by loggers. They bypass the distribution system and discuss the price of wood directly with the transporters during collection. This behaviour is tantamount to resistance to the rules and the distribution system, which they certainly consider to be to their disadvantage. But whatever the reasons for such practices, they are detrimental to the shared vision of sustainable forest management and will inevitably have a negative impact on the smooth running of the network. As Meier [14] points out, any action taken within the network has an impact on the components of the network. In other words, if the action is good, it will contribute to the progress of the network. If the action is not good, progress will be delayed because, according to Callon [4], it will involve controversy and possibly new negotiations.

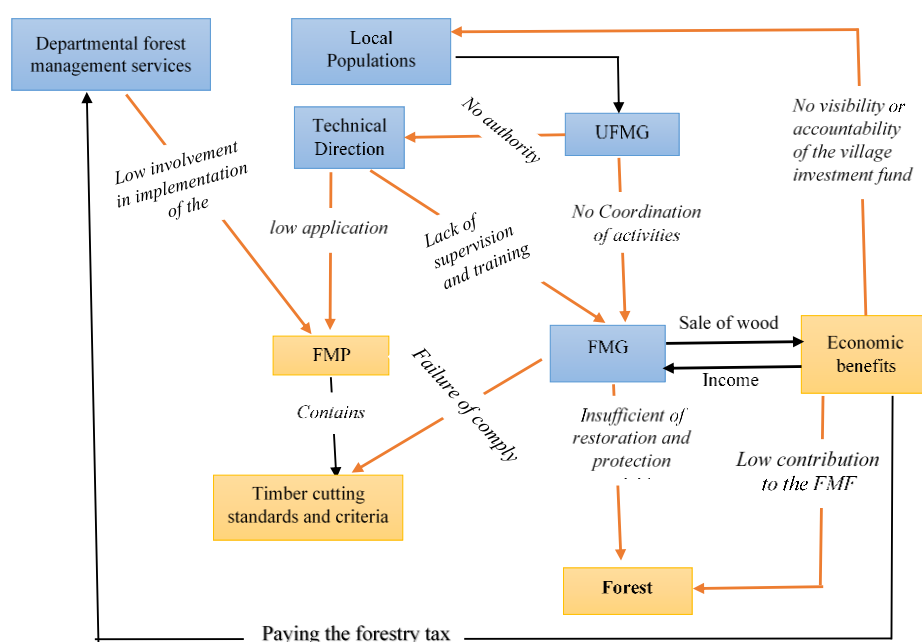


Figure 4. Map of controversies between actors in the implementation of the CAF model.

Source: Author's reflections

Legend

 : Human actors

 : Non-human actors

UFMG: Union of Forest Management Groups

FMP: Forest Management Plan

FMG: Forest Management Group

FMF: Forest Management Fund

The red arrows indicate the direction of controversy between the actors in the model

The second aspect concerns the two funds managed by the Technical Direction, the Forest Management Fund (FAF) and the Village Investment Fund (FIV). The first is used to carry out protection, surveillance and forest restoration activities, as well as to pay the salaries of Technical Management staff. The second is earmarked for socio-economic projects of interest to the villages bordering the forest. But there is a lot of talk about the management of these funds. As far as the FAF is concerned, members of the FMG say that forest surveillance and protection activities have not been carried out for some years now. The Technical Directorate blames this on a lack of resources, given that the Forest Management Fund does not have enough money to cover these activities. But the members of the FMG think differently. On the subject of these funds, they argue that those in charge of the site manage them in an opaque manner and do not keep track of how they are used. In any case, there is a confidence crisis between the parties involved in the management of these funds. But aren't these suspicions due to a failure to take into account certain factors or actors who have entered the system along the way and who could have an impact on the management of the spinoffs?

In fact, over time, the number of beneficiaries of the economic spin-offs has increased, resulting in other expenses and fees that, according to the Technical Director, are not institutionalised or published, but deducted from the development and working capital funds. These include a parking tax of 1,000 CFA francs per load paid to local authorities, and sums of 15,000 CFA francs per month and 25,000 CFA francs per year paid respectively to the environmental services and the traditional chiefs of the villages bordering the forest. According to the Technical Director, between 2008 and 2012, the parking tax cost the Cassou CAF 10,737,000 CFA francs, 2,512,000 CFA francs and 852,000 CFA francs respectively for the three communes in the developed area: Cassou, Gao and Bakata. The description of the implementation of the CAF model and the difficulties encountered by the network show that it is faced with obstacles, whether in administrative, ecological or economic management. As a result, some stakeholders have interests, expectations or needs that have not been taken into account in the process or that are not being met. In particular, relations between the local population and the CAF's technical management are currently characterised by doubt, suspicion and mistrust. We have therefore attempted to draw up a diagram of the actor-network that summarises the difficulties and obstacles in the process of implementing the CAF model; a diagram that we have expressly called a "map of controversies" of the actors in the system (figure 4).

These controversies in the implementation of the CAF model raise questions about its stabilization or successful implementation.

4. Discussion: The Question of the CAF Model Stabilization

The CAF model, implemented by Burkina Faso State and its partners, seemed to have the support of the local populations, who began to exploit the forest according to the proposed model. Prior to this period, the practice had been for local people to participate either passively (watching helplessly) or actively as workers, in the exploitation of the forests on their land by loggers who came, on the basis of a permit issued by the environmental services, to cut the wood and sell it to retailers or direct consumers in town centers. Negotiations therefore enabled the government and its partners to convince local people that the CAF model was the solution to the problems associated with forest management in their area. Under this system, they (the local people) are now at the heart of resource management. They cut the wood to sell it, are paid, finance locale and national economic development (forest tax) and contribute to the reconstitution and conservation of the resource (Forest Management Fund). Thus, with the CAF model, and speaking of course of the forest, we can think, if we consider the trajectory of forest management policies, that we have moved from an era of 'possession' before colonization to an era of 'expropriation' during and after colonization, and then to an era of 'repossession', albeit partial, with the advent of the CAF model. In this configuration of the forest management stakeholder network, it might be thought that local people are more or less involved in the 'affair' and that the stakeholders' interests create a certain 'favorable balance of power' [5]. In fact, since 1993, when implementation of the forest Development and Management Plan began, activities have been carried out on the site, but not without shortcomings in organization and management, as we pointed out earlier. Moreover, during the development phase, the villagers' main interlocutors were the customary chiefs (land chiefs and village chiefs), to whom the other members of the community could not disagree, given the importance and place accorded to them in traditional society. The question then arises as to whether the representation of the village by their land and village chiefs guaranteed the genuine support and acceptance of all the members of the community. This raises the issue of their legitimacy and therefore their relationship with the model proposed by the state and its partners. This was also highlighted in the thesis work of Zougouri [23] who explains how certain members of the community put up silent resistance to the proposed form of management and harvest wood from the managed forest in violation of the management rules. Even if this was not the case, it should be noted that years later, other interlocutors have appeared, the children of landowners who do not necessarily have an idea of the clauses or conditions of the first negotiations and with whom other negotiations should be undertaken. This state of affairs necessarily puts the stabilization of the model on standby. In

addition, the nature and extent of the difficulties, which we describe as controversies, in implementing the model raises questions about the commitment of the actors on the one hand and the viability of the model on the other. While it is true that the model continues to make good progress, it is also true that the protected forest continues to erode. Everyone talks about and benefits from the forest, but without really giving it its rightful place in the network; the forest being the central object in the constitution of the network. Everyone knows that if the forest disappears, the network will also disappear. And in the current context, we cannot say with certainty that after three decades of implementation, the CAF model has reached its phase of irreversibility, of translated change. Indeed, one is tempted to wonder whether the local populations still identify themselves with the CAF model. For some of people in the villages bordering the managed forest, *"the CAF has not succeeded in preserving the forest, it has not done any better than the old management by the customary authorities, the CAF has taught us to monetize the forest to the detriment of other social functions. It has shown us that the forest is some money and everyone has started to look for money in the forest by any means necessary, and today our village no longer has any forest to exploit and make fields. The CAF is responsible for this situation. What's more, the young people who cut the wood have received no training from the Technical Direction, and they know nothing about cutting techniques."* To a certain extent, this shows that the process of translating the CAF model has not yet reached its stabilization phase. In any case, whatever observations are made about the evolution of the CAF model, the main actors have not fulfilled their commitments. Starting with the Technical Directorate, which is supposed to support the local populations and which is not playing its role to the full, and the technical services in charge of the forest, which are perhaps seeing their power reduced in relation to the populations and are voluntarily sidelining themselves (*the environmental services are observing a certain passivity in the forest management: interview*). Then, there are the local people, through the members of their associations, the FMGs, who, dissatisfied, resort to a form of silent mutiny in the exploitation of the forest. The application of criteria and standards is no longer on the agenda, and long-term calculations no longer count. In a context like this, it is unlikely, without further consultation and negotiation, to achieve the convergence necessary for the vitality of the CAF model.

5. Conclusions

Despite all the difficulties we have described, the CAF model has the merit of being a "new way of doing things" in forest management, an innovation. Structures and management procedures have been put in place to enable adaptations to be made. These make it possible to involve the various stakeholders in the implementation process. This is why we may think that even if the change is not entirely "translated",

the cases of dissent or betrayal, as Callon (1986) [5] sees them, only reveal the ineffectiveness of the incentive systems, which can be reviewed and improved. In our opinion, certain difficulties can be attributed to the State. There is a difference between granting management to village groups through the UFMG and managing through a technical department set up by the government. It is clear, therefore, that in this scenario, it is difficult to ask the people living near the forest to find the means to find their way in this "story". The main actors (the state, the technical department and the local population) are accusing each other of playing the wrong roles in the management of the site. Today, the attitudes of the local population towards the CAF model seem to express resistance to what they believe to be a betrayal on the part of the State, *primum movens* and translator in the process. As a result, the situation of the forest still gives cause for concern as to its survival, especially if good and important decisions are not taken promptly. On the other hand, one thing is certain: time passes, years go by, generations come and go. The latter may not feel involved in the initial negotiations at the start of the process. Ideally, awareness-raising campaigns or renegotiations should be undertaken to interest the new generations, as the CAF model's socio-technical network has not yet managed to unite all the heterogeneous players, which is essential if participation and support for the project are to be effective. In any case, even if the CAF is a viable model for most of the stakeholders, it is still a forest management model that needs to be "remodeled" and a better system of interactions between stakeholders put in place.

Finally, the weaknesses that have been identified as a result of the controversies are, as Callon said, part of the normal pattern of a translation process, and this proves the need, in the current situation, to undertake vast campaigns to renegotiate, inform and train local populations about the CAF model. Communication and accountability between the stakeholders in the network must also be given pride of place. Convening a general assembly on forest management in Burkina Faso will not be utopian if it were to better situate and assess the responsibilities of the actors involved. In addition to this, it is imperative to revise the model, in which the UFMG will be the direct interlocutor of local populations with the central administration.

Abbreviations

FAO: Food and Agriculture Organization of United Nations

FMG: Forest Management Groups

FMP: Forest Management Plan

FMS: Forest Management Site

FMU: Forest Management Unit

UFMG: Union of Forest Management Groups

UNDP: United Nations Development Programme

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Conflicts of Interest

The authors declare no conflicts of interest.

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