Assessing the effectiveness of joint forest management in Southern Burkina Faso: A SWOT-AHP analysis

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A B S T R A C T

We analyzed the perceptions of resource persons from three stakeholder groups on the benefits, challenges and opportunities offered by joint forest management (JFM) in the Ziro province of Southern Burkina Faso. In other words, a strength, weaknesses, opportunities, and threats (SWOT) approach in combination with an analytic hierarchy process (AHP) was applied. Results reveal that resource persons of the three stakeholder groups perceive the positive aspects of JFM to outweigh the negative aspects. In addition, favorable institutional setup received the highest overall factor score for strength. Inadequate enforcement of the management plans is the weakness with the highest score and the overall priority score for weaknesses was highest for resource persons from the Ministry of Environment and Sustainable Development (MESD). On the other hand, better community relations received the highest overall factor for opportunities while uncertainty in decision making at higher levels was perceived as the most important threat to JFM in the Ziro province of Southern Burkina Faso. Therefore, differences in views and addressing realities on the ground requires the participation of all stakeholders in the design, implementation and follow-up of JFM to arrive at a consensus that is capable of delivering the twin challenges of environmental protection and rural development.

1. Introduction

Joint forest management (JFM) gained importance among policy makers, scientists and development practitioners in the 1980s as an approach that is capable of delivering the twin objectives of conservation and development (Brechin et al., 2002). The emergence of this approach was to address the gap of marginalization and in some cases the exclusion of local people from participating and benefiting from natural resources due to the top-down protectorist approach (Brown and Lassoie, 2010; Bhattacharya et al., 2010; Kamoto et al., 2013). Also, the attempt to exclude local people from designated forest reserves (Adams and Hulme, 2001), has caused leakages in some communities and thereby increasing the rate of deforestation and the loss of biodiversity (Guthiga, 2008). Involvement of local communities in collaboration with the government in forest management was considered the way forward for addressing the needs of the people while managing the forest sustainably (Mohanty, 2004; Brown and Lassoie, 2010). With the potentials of JFM to deliver the above twin objectives, many developing countries started pursuing it with the aim of making forest management more effective, efficient and responsive to local needs (Larson and Ribot, 2004; Mohanty, 2004; Sandker et al., 2009). Burkina Faso embraced this initiative with initial JFM plans being implemented in the 1980s with the aim of supplying fuelwood to the major cities such as Ouagadougou, Koudougou and Bobo-Dioulasso (Coulibaly-Lingani et al., 2009). This initiative led to the creation of Forest Management Units (FMUs) managed by Forest Management Groups (FMGs). The FMGs are made up of community members and field staff from the Ministry of Forestry and the Ministry of Environment and Sustainable Development (MESD). An FMU is divided into fifteen parcels based on a fifteen-year-rotation period with a parcel expected to be logged once during the rotation cycle. This forest management model is expected to be effective and to guarantee supply of wood energy. However, there are some speculations from members of the technical department of the FMGs to increase the rotation period from fifteen to twenty years.

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Increasing the rotation period of parcels within a FMU does not guarantee the effectiveness of JFM by default. Several factors have been identified to influence the performance of JFM programs in Ghana (Appiah, 2001) and India (Kumar, 2007). Sunderlin (2006) mentioned cooperation among stakeholders as one of such factors. However, it goes beyond cooperation and ignoring these factors sometimes might cause the program to fail (Singh et al., 2011). Two studies in Africa and Latin America indicated that the challenges associated with JFM have led to unsatisfactory results (Oyono, 2004; Stearman, 2006). Some of the key challenges relates to incompatibility of the technical, managerial and institutional requirements with local realities (Pokorny and Johnson, 2008). Furthermore, the cultural milieu of the area, opportunities to generate off-farm employment and economic activities, community capacity to undertake management responsibilities, and policy and institutional uncertainties have been identified to influence stakeholder’s perceptions and involvement in JFM (Masozera et al., 2006; Singh et al., 2011; Dyer et al., 2014).

Although there have been some studies on factors influencing participation and performance in JFM in Burkina Faso (Hagberg, 2001; Yelkouni, 2004; Sawadogo, 2006; Coulibaly-Lingani et al., 2011; Coulibaly-Lingani et al., 2014), knowledge gaps still exist with respect to stakeholders’ assessment of strengths, weaknesses, opportunities and threats (SWOT) as they pertain to JFM. Therefore, the objective of the current study is to assess the strengths, weaknesses, opportunities and threats of JFM. This is analyzed using an established SWOT analysis approach in combination with analytic hierarchy process (AHP) in the Ziro province, southern Burkina Faso as perceived by representatives of three stakeholder groups. To the best of our knowledge, this study is the first to verify the benefits, challenges and opportunities of JFM based on SWOT analysis and the analytic hierarchy process (AHP) in parts of the Ziro province of Burkina Faso.

2. Study area and methods

2.1. The study area

Participatory forest management programs were initiated in Burkina Faso in 1986. It started with assistance from a joint UNDP/FAO project with a focus on engaging local people in collaboration with the government to manage forest areas in the communities (Ribot, 1999). Joint forest management programs (Chantier d’Aménagement Forestier; CAF) were created in seven locations in the country. The Cassou zone located in the Ziro province is one of the seven JFM units that were created and is the focus of this study (Fig. 1). The Cassou zone was selected because of the presence of active FMGs, better opportunity to bring resource persons in since it is the provincial capital of the Ziro province and documented failures in different monitoring approaches. This province is found in southern Burkina Faso and is located 150 km from the capital city (Ouagadougou) and has an estimated area of 5291 km². The region falls within the south-Sudanian phytogeographical zone and is characterized by low relief with an average altitude of 300 m above sea level. Annual rainfall ranges between 800 and 1000 mm with temperatures of between 30 and 35 °C. The main soil types are silt-clay cambisols, sandy lixisols, and loamy ferric luvisols (Driessen et al., 2001). These soils and the climate support tree growth and agriculture with very little inputs. In addition, the average population density in the region is estimated at 28 inhabitants/km² (INSD, 2007).

The population consists of autochthon/non-migrant (Gourounsi) and migrant ethnic groups (Mossi and Fulani). The Mossi originate from the central plateau while the Fulani from the north of the country. Given that the biophysical setting of the country exposes the central and northern region to recurrent droughts, migration of these two groups to the southern region has become a coping strategy. This is because approximate 70% of the country’s population is rural and depend on agriculture and livestock for their livelihood. Subsistence traditional farming systems of cereal cultivation dominate the landscape together with cash crop cultivation (cotton and cashew) alongside fuelwood extraction and ranching. Woodfuels, mainly firewood and charcoal are harvested from community forests, woodlots, fallows and plantations and remains an important source of household energy in the country (Ouedraogo et al., 2015; Arevalo, 2016). Cattle herding is the main activity of the Fulani and agropastoral systems are common practices in this region and other parts of the country (FIP, 2012).

2.2. SWOT-AHP methodology

The SWOT-AHP enhances systematic thinking and comprehensive diagnosis of factors relating to a new product, technology, management, or planning (Kurttila et al., 2000). This method has been considered invaluable in strategic planning with the advantage that all factors influencing the operational environment are diagnosed with greater detail (Hill and Westbrook, 1997; Shrestha et al., 2004). In addition, it provides an opportunity to categorize factors into internal (strengths, weaknesses) and external (opportunities, threats) in relation to a decision and thereby enabling the comparison of opportunities and threats with strengths and weaknesses. A major limitation of the method is that the importance of each factor in decision-making cannot be measured quantitatively, thereby making it difficult to assess which factor influences the strategic decision most (Pesonen et al., 2000).

However, when used in combination with analytic hierarchy process (AHP), the SWOT approach can provide a quantitative measure of importance of each factor in decision-making (Saaty and Vargas, 2001; Ananda and Herath, 2003). The AHP method is flexible and enables decision makers to assign a relative priority to each factor through pair-wise comparison (Kurttila et al., 2000; Pesonen et al., 2000). The use of pair-wise comparison implies the application of the SWOT-AHP method is preferred on small sample sizes of individuals or groups that are knowledgeable with the issue under investigation (Kurttila et al., 2000; Ananda and Herath, 2003). Kurttila et al. (2000) suggested three steps in conducting a SWOT-AHP analysis which were also applied in our study. The first step is for participants/stakeholder to identify key factors that influence the decision (see Fig. 2 for list of factors relating to JFM). It is suggested to keep < 10 factors within each SWOT group for pair-wise comparisons to be manageable. In step two, pair-wise comparison of factors within each SWOT group is conducted (see Fig. 3 indicating portions of the questionnaires used for pair-wise comparison). The main objective at this stage is to know which factor is more important and by how much based on a scale ranging from 1 to 9 (Saaty, 1996; Güksel and Doğdeviren, 2007). As such, pair-wise comparisons will be conducted separately for all factors and a priority value for each factor is computed using the eigenvalue method (see Appendix A for a detail procedure). The factor with the highest priority value under each SWOT group will be brought forward for further comparisons. Finally, the third step involves pair-wise comparison of four factors that are brought forward and computation of a scaling factor for each factor. The scaling factors and priority values are used to calculate the overall priority of each factor as follows:

$$\text{Overall priority of factor}_j = \frac{\text{priority value of } k_j \times \text{scaling factor of group}_j}{\sum_{j=1}^{4} \text{overall priority of factor}}$$

where $j = 4$ (strength, weakness, opportunity, and threat). The overall score of all factors across groups sum to one and each score indicates the relative importance of each factor in decision.

2.3. Implementing the SWOT-AHP

We adopted the strengths, weaknesses, opportunities, and threats (SWOT) approach in combination with analytical hierarchy process (AHP) to achieve this task. SWOT analysis uses a diagnostic approach to identify key factors determining the success or failure of a plan or
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