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Farmers and Pastoralists Participation in the Elaboration and Implementation of Sustainable Agro-pastoral Resources Management Plans in Northern Benin

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

Benin like many other West African countries has its economy mainly based on agriculture and livestock. These activities development depend heavily on natural resources in these countries. In the extreme northern part of Benin in Karimama district, farmers and pastoralists are constrained by the presence of the W park and the Niger river that occupy most of the grazing and arable lands. In order to sustainably manage these resources, the district and the W park management authorities decided to set up these resources' management plans. This study investigated the involvement of farmers and pastoralists in the elaboration and implementation of the agro-pastoral resources management plans for their sustainable use. Therefore, 40 farmers and 40 pastoralists randomly selected in two villages of the Karimama district and several authorities were surveyed. Results show that both farmers and pastoralists recognized that Karimama district still has agro-pastoral

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resources for farming and livestock. However, they mostly stressed that they were not sufficiently involved neither in the elaboration nor in the implementation of their management plans. They also perceived negatively the plans set up because according to them beside their low implication, the facilities necessary for a good management of the buffer zones of the park and the Birds Island are not put in place, they are still unfairly arrested and fined and the areas delimited for their activities is insufficient for them. The study concludes that the main challenge in the elaboration and implementation of agro-pastoral resources management plans is the genuine involvement of the different stakeholder categories in the process.

Keywords: *Participation; agro-pastoral resources; management plan; farmers; pastoralists; Karimama; Benin.*

1. INTRODUCTION

The economy of West African countries is mainly based on agriculture and livestock [1]. The populations of these countries make most of their income from economical activities related to animals and crops production, which put more pressure on natural resources. For this purpose, agricultural and livestock development policies are designed by these states to provide favourable conditions for their stakeholders [2].

Benin's agricultural and animal breeding development policy is mainly based on the promotion of agricultural sectors with cotton as the major export crop produced. The production of cotton has in recent decades required the use of improved means of production such as animal traction or even modern tools (agricultural mechanization). These practices have favoured the conquest of vast natural areas for agricultural purposes, often to the detriment of protected areas and grazing areas [3]. In the absence of a pastoral code and a code of animal husbandry, Benin has developed and implemented, on one hand, projects and programs for livestock development based on food and veterinary care of livestock and, in the secondly hand, enacted decrees and inter-ministerial policies for the prevention and management of conflicts during transhumance. They were expected to promote better management of agro-pastoral resources by involves key players.

Farmers and herders use the same space for their activities and this requires the co-management of their resources to avoid conflicts inherent in cohabitation [4]. Farmers and herders' competition for natural resources requires these local actors to consult, negotiate and collaborate in order to define norms, rules and laws for the sustainable use of these resources. The lack of

tacit rules of access and use of these resources exacerbates conflicts between different users [5].

Decentralization gives local authorities responsibilities relating to the management of common resources such as renewable resources, infrastructure and collecting taxes on the resources in their territory [6]. Since then, the municipality are allowed to endow themselves with a policy that regulates agro-pastoral resources management inspired by the orientations from the government. However, the success of these policies depends on the participation of the public [7]. This study aimed thus at understanding how policies in the sustainable management of the agro-pastoral resources could be established and implemented to resulted in reducing conflicts among the stakeholders. Conflicts between farmers and herders in Karimama district are conflicts of access to and use of agro-pastoral resources [8]. Conflict occurs when at least one person loses something because of another [9]. The absence of rules and norms of resource management leads to their anarchic use and their degradation [10,11].

The study was carried out in Karimama district endowed with important agro-pastoral resources, which spatial distribution represents an enormous constraint for the farmers and pastoralists and are sources of many conflicts. This district is also a door for the entrance of several herders coming from Niger and Burkina Faso every year for grazing during the dry seasons. The present study investigated the involvement of the stakeholders in the planning and implementation of the sustainable management of agro-pastoral resources in Karimama district. It focused on the roles of stakeholders in the development and implementation of these participatory management plans.

2. PARTICIPATORY APPROACH IN MANAGING NATURAL RESOURCES

The participation of local populations in the management of natural resources has become a central focus of resource sustainability, to the extent that international institutions give it strong consideration [12]. Sustainable management of agro-pastoral resources requires norms and rules applicable to users. These norms and rules should be elaborated by all the stakeholders concerned by the sustainability of these resources, taking into account their needs, their concerns and their different usages of these resources. They should be implemented through institutional arrangements put in place by the actors on the basis of consensus while respecting the principle of equity and justice. The involvement of users of a resource in the development of a policy and its implementation makes the use of the notion of participatory governance [13]. Governance emphasizes the multiple interventions of actors responding to different logics and driven by different interests often conflicting that should be reconciled [14]. The issue of representativeness and stakeholder participation during the dialogue remains fundamental. Froger, et al. [15] distinguish three forms of participatory governance corresponding to three levels of stakeholders' involvement in the policy implementation: passive participation, active participation and responsible participation.

Passive participation characterized by a process of stakeholders' consultation in form of collecting their opinions on the state of the situation and eventually the actions to be undertaken. This form of participation does not guaranty obviously that these opinions stated will be taken into account in the final decision. Active participation pushes the level of participation further. It involves stakeholders representatives real participation in the planning and implementation of the project. However, the question of the nature of the representatives and their real representativeness still remains. Those who are chosen are elected and don't often give feedback. Responsible participation goes more further in the involvement by transferring the authority in the management of the resources. The project is therefore built in a partnership between the government and the local communities or more precisely their representatives. This partnership is based on the trust that local communities have the capacity to manage, what frees the state from some

functions and activities and suppose an advance decentralization.

However, the involvement of users in the management of agro-pastoral resources is complex in that they seek to maximize their profit to the detriment of the resources. In the face of the degradation of agro-pastoral resources, models of joint management of natural resources have been envisaged, focusing on the question of common property and private property. Hardin [16] finds two solutions to go against "the tragedy of the common goods". He proposes the management of resources by the state and or by the private sector. These two forms of natural resource management have presented their limits. This is why Ostrom [17], in his review of the tragedy of the commons, proposed a three-way approach to collective action in the management of common resources. Collective action in the management of common resources requires the respect of certain principles because it favours the participation of all users in the development of standards and rules for access and use of these resources.

The issue of taking into account local realities and empowering grassroots communities is at the heart of all natural resource management policies nowadays [10]. Ongoing development policies in several southern countries, particularly those in sub-Saharan Africa, began a new shift from the late 1980s onwards. Community involvement at the grassroots level becomes important in the development process and the implementation of development policies. Natural resource management policies, whatever they are, aim at maintaining a certain sustainability of the resources by avoiding their over-exploitation, which is traditionally called the "tragedy of the commons" [18]. These policies are developed and implemented with the participation of all stakeholders using the agro-pastoral resources. One of the main tools of participatory natural resource management is the consultation framework [7]. Actors' participation is perceptible in the dialogues around the resource. Consultations must be held at each stage of the policy development and implementation process.

3. METHODOLOGY

3.1 Study Area

Data for this study were collected in the district of Karimama located in the department of Alibori in northwestern Benin. Karimama is the north-

western top of Benin and part of the borders with both Niger and Burkina Faso. Data were collected in two (2) villages named Petchinga and Kofouno, which are respectively a border village of the W park for Petchinga and a border village of the Niger River and located in Birds Island for Kofouno. These villages are characterized by their proximity respectively to the W Park and the Niger River, which represent the borders of Benin with Burkina Faso and Niger and which are important pastoral resources area. This area is also one of the most important entry points each year for herders coming from Niger, Burkina-Faso and Mali looking for grazing areas.

3.2 Data Collection and Analysis Method

Data for this study were collected during two (02) months in the villages of Petchinga and Kofouno from local authorities and users of agro-pastoral resources. Farmers and herders in the two villages were equally selected randomly and interviewed. Local authorities from the district of Karimama and technical staff from the National Centre for the Management of Fauna Reserves (Centre National de Gestion des Réserves de Faunes: CENAGREF), the decentralized public administrations of the State in charge of the development and implementation of policies for the sustainable management of agro-pastoral resources in the district were also interviewed. Among the users of these resources, individual interviews were conducted with twenty (20) farmers and twenty (20) herders per village for a total of eighty (80) stakeholders of the natural resources in the two (02) villages.

Data collected were analysed with descriptive statistics such as means, standard of deviations and frequencies and contents analysis methods.

4. FINDINGS OF THE STUDY

4.1 Sociodemographic Characteristics of the Respondents

The stakeholders surveyed during this study were mostly Beninese (84.2%). However, there are others from Nigeria and Burkina Faso representing respectively 8.4% and 7.4%. They belong to different ethnic groups of which the dominant ones are Fulani (38.9%) followed by Gourmatché (22.10%), Dendi (20%) and Djerma (16.80%). The religion most practiced by them is Islam (87.4%) followed by Christianity (10%) and Animism (2.10%).

These stakeholders interviewed mainly practice agriculture and / or livestock farming. Three categories were distinguished within the stakeholders based on their main activity: farmers (50.60%), pastoralists (11.50%) and agro-pastoralists (37.90%). The average, minimum and maximum size of their farms and herds are shown in Table 1. Pastoralists surveyed have 86 cattle per herd in average, with a minimum of 17 heads for the smallest herd and 174 heads for the largest herd whereas the majority of farmers have an average of 4.4 ha of cultivated land with a minimum of 0.5 ha and a maximum of 22 ha. Most of the stakeholders surveyed cultivate cereals and the main crops in the order of priority are sorghum (39%), millet (32.5%), maize (14.3%), cotton (10.4%), legumes (1.3%) and rice (2.6%).

4.2 Availability of Agro-pastoral Resources and their Challenges in Karimama District

Figure 1 provides farmers and pastoralists' appreciations of the availability of agro-pastoral resources in the buffer zone of the W park and the Birds Island.

Both the farmers and the pastoralists surveyed recognize that Karimama district is full of important resources for agriculture with its fertile and floodable arable lands good for agriculture all over the year (for 100% of farmers and 31.25% of pastoralists), for its grazing lands in the W Park rich in fodder (for 100% of the pastoralists and 6.25% of the farmers) and its ponds which also make it possible to water cows and at the same time be used for vegetable production (for 100% of farmers and 37.50% of farmers). However, due to the scarcity of land and agro-pastoral resources, farmers believe that this area is more suitable for agriculture than pastoralism while it is the opposite for pastoralists who think that it should be reserved to pastoralism instead of farming.

In fact, the lack of arable land and pasture areas is the major problem for the development of agriculture and livestock farming in the district. In response to this problem, CENAGREF has delimited five (05) kilometres land on the buffer of Park W for the development of economic activities such as agriculture, livestock farming and plants gathering. This zone called buffer zone, is exploited by farmers, pastoralists and traditional healers and it is divided into three (03) different bands for the three categories of

stakeholders. These bands are separated so that each category of stakeholders operates within the limits of the space that is attributed to him.

But the absence of a development plan in the district precisely separating these areas of agricultural production, pastoralism and housing makes that at different times of the year, conflicts arose between the different users of the resources. The banks of the Niger River and the lowlands should be considered primarily as pastoralism areas and at the same time for agriculture. But the lack of corridors to reach the river and areas defined for grazing and access to water resources provoke frequent conflicts between farmers and pastoralists around these resources.

4.3 Agro-pastoral Resource Management Plans Development Processes

The district of Karimama has significant potential for agro-pastoral resources. However, those subject to management plans are the W Park's buffer zone and the Birds Island. Norms and rules for access and use of these resources are established and implemented with the support of several stakeholders. In the process of developing these plans, the concerns, needs and practices of the users of these resources should be taken into account in the formulation of their management plans. So, the question of the participation and the representativeness of the actors during the different meetings leading to their elaboration are fundamental. The following paragraphs describe the process of developing agro-pastoral resource management plans for the buffer zone and the access to the Bird Island (Ile aux Oiseaux).

4.3.1 Case of the park W buffer zone

The participatory management plan of the W Transboundary Biosphere Reserve built in 2008 created the Park W buffer zone. This zone was attributed to the local populations in Park W following a forum held in the district of Karimama in 2009. This forum brought together all the local elected representatives, the officials of the district as well as at departmental and national levels who are in charge of conservation and protection of natural resources and protected areas, representatives of herders, farmers and fishermen. It was at this occasion that the policy of delimitating a buffer zone was presented. According to the first president of the village associations of fauna reserves management

(Association Villageoise de Gestion des Réserves de Faunes: AVIGREF), the representatives of the users of these resources have endorsed this idea that comes to solve a problem of lack of arable land and grazing space. However, the conditions of access and use of this area had not been deeply discussed since they were less urgent compared to the problem of insufficient of land and pasture areas that was urgent at the moment. Nevertheless, the fees to be paid before having access to them had been fixed to five thousand (5000) FCFA¹ francs per hectare with the condition that no one could have more than five (05) hectares for farmers and five hundred (500) FCFA francs per cow and two hundred and fifty (250) FCFA francs per sheep for the pastoralist. All these taxes had not been discussed during the forum. The same is true for offenses and the types of penalties and fines to apply in case they are committed.

At the beginning of the delimitation activities of the buffer zone and the bands to be allocated to the various categories of actors, 94.7% of the actors who took part in this study acknowledge being associated in this operation but their opinions were of very little importance. Their participation had no influence on the delimitation activity. The norms and rules of usage defined for the exploitation of the resources in the buffer zone were spread by the AVIGREF comity members in the villages but the local populations did not have any opportunity to voice their concerns, their needs and their usages in the development of these norms and rules.

All the farmers and pastoralists interviewed during this study were unanimous on the fact that the delimitation of the bands by sector of activity is unclear and creates confusions with regards to their limits. They also raised the fact that the activities carried out within each band are done with no control of the forest officers, leads to the encroachment of actors from one band in another what triggers conflicts among the different users' categories. Forest officers react only when users go beyond the buffer zone and enter the park.

In summary, the buffer zone was delimited to reduce the pressure of the local communities' activities on the Park W. However, the norms and operating rules of the buffer zone have however been elaborated without taking into account the propositions of the local communities.

¹ 1 EUR = 655,957 FCFA

4.3.2 The birds island (Ile aux Oiseaux) case

The Birds Island is an island surrounded by the Niger River. It is shared by the villages of Belle-Tounga, Toundikoaria and Birni-Lafia. This island is flooded twice a year: the white flood during the rainy season in October and the black flood during the dry season in February. It is full of ponds called in local language Dendi "bangou", very rich in fish. This area is full of important green fodder at any season of the year and very rich in humus for agriculture. So, the island is of great importance both for farmers and for pastoralists. In June 2008, the CENAGREF in its strategy to reduce the local communities' pressure on the Park W commissioned a study on servicing of the Birds Island, which was financed by the European Union. The results of this study showed that farmers, pastoralist and fishermen could start their activities without entering the Park W since fodder for livestock, fish ponds and fertile lands are available on the island.

Since 2009, the district of Karimama has fixed various fees before any access and use of the resources in the island. The process of elaboration of the norms and rules of access consisted in introducing a communication in session of district council by the mayor to regulate the access and use of the resources on the island. The communication did not get the approval of all the elected representatives especially those of the village of Birni-Lafia for whom the purpose of this communication is to allot the Birds Island only to pastoralists for grazing. However, the council has deliberated and the decree was signed and enacted. The management committee of the island was set up but the relevant heads of division and some of the actors supposedly involved are not informed of their membership in this committee. Only the representatives of the pastoralists welcomed the initiative, although they were not involved beforehand in the decision-making and the various consultations that led to the definition of these norms and rules for the management of the resources on the island. What has been good for them is the fees to pay for access and use of the resources on the island. These fees are ten thousand (10,000) FCFA francs for local herds and twenty thousand (20,000) FCFA francs for foreign herds. All the pastoralists are able to pay these fees.

The development of the norms and rules for the management of agro-pastoral resources on the

Iles aux Oiseaux has not been the subject of any prior consultation with the stakeholders. The district council has used its power by imposing to the actors the conditions of access and use of agro-pastoral resources on the island what favours the pastoralists and excludes farmers. The objective of the district council is to increase the taxes they will collect because for the very first campaign, the district council got about five million (5,000,000) FCFA francs. However, the decision did not plan any strategy for the sustainable management of the resources of the island.

4.4 Stakeholders' Participation in the Development and Implementation of Agro-pastoral Resource Management Plans

Farmers and pastoralists surveyed expressed their involvement in the development and implementation of agro-pastoral resource management plans in Karimama district. Fig. 2 shows the opinions of these stakeholders on their involvement in the development and implementation of sustainable management plans for the W Park buffer zone.

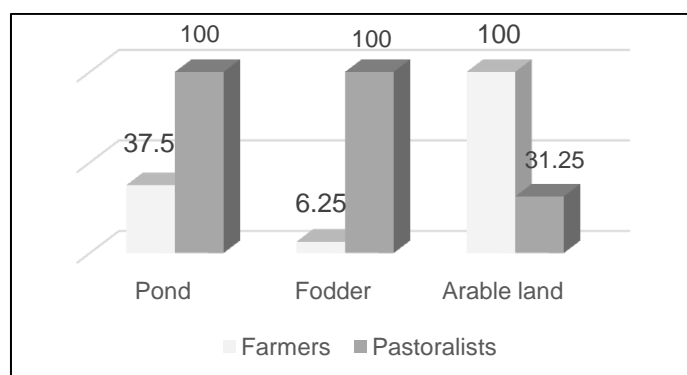
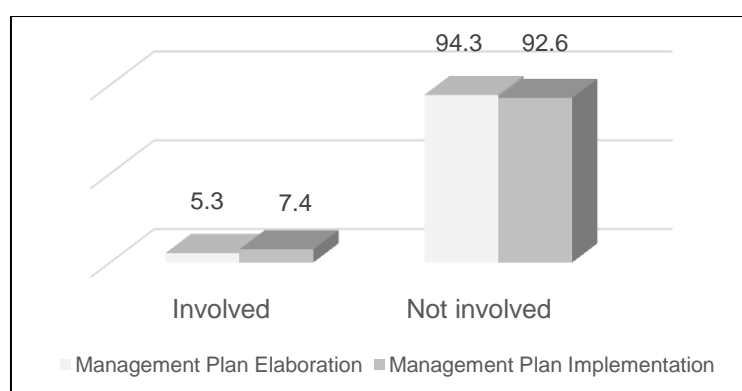
The Fig. 2 shows that farmers, pastoralists and agro-pastoralists were not involved in the development and implementation of the park W buffer zone management plan respectively according to 94.70% and 92.60% of the respondents.

With regard to the implementation of the agro-pastoral resource management plan in the buffer zone, according to the approach of the CENAGREF, the public institution in charge of managing the park W, the AVIGREF were associated in the implementation of the norms and rules set up in the plan of the management of the park W and its buffer zone. But in reality, the forest guards working for the CENAGREF operate in the park W and its buffer zone without associating the AVIGREF members. The AVIGREF no longer consider themselves in the role of representing and defending the interests of their villages and in general the users of the park resources. They also do not understand the arbitrary arrests of the users and the systematic slaughter of pastoralists herds in the buffer zone by the forest guards. Also, members of the AVIGREF do not know either the limits of the buffer zone nor the limits between the different bands allocated to the different categories of actors for their economic activities.

Table 1. Herd and farm sizes of the stakeholders surveyed

	Minimum	Maximum	Average	Standard
Herd size	17	174	85.91	45.8
Farm size (ha)	0.5	22	4.4	3.86

Source: Survey, September-October 2018

**Fig. 1. Availability of agro-pastoral resources in the buffer zone and on the Birds Island****Fig. 2. Participation of stakeholders in the elaboration and implementation of agro-pastoral resource management plan**

In sum, with regard to the Birds Island, 100% of the respondents acknowledged that they were not involved in the design and implementation of the island's management plan. They see this plan as a unilateral decision of the district council. Almost all of the respondents also consider that the development and implementation of the management plan set up for the park W buffer zone are also unilateral decision and actions undertaken by the CENAGREF.

4.5 Stakeholders' Perceptions of the Agro-pastoral Resource Management Plans

The users of the agro-pastoral resources have different perceptions about the agro-pastoral resources management plans set up in the

district of Karimama. These perceptions are grouped according to whether they are good or bad for the actors surveyed. Thus, as shown in the Fig. 3, 75.80% of the users have bad perception of the agro-pastoral resource management plans, 20% have good perceptions and 4.2% are indifferent.

The interviewees explained the reasons for their bad perceptions of the agro-pastoral resources management plans in Karimama district by the terms presented below in Fig. 4.

4.5.1 Arranging the buffer zone for agro-pastoral activities

Among the respondents, 95% of the farmers and 100% of the pastoralists said that the buffer zone is delimited without constructing facilities that

help in the exploitation of the agro-pastoral resources. They consider that the boundaries of the buffer zone are not clearly materialized, as well as the limits of the bands allocated to each category of actors to carry out their economic activities. There is no corridor for herds in the buffer zone as well as water points outside the pools that dry up very quickly every year. There is no clear materialization of the limits of the different bands what makes the activities of the actors of a band overflowing in the others' bands. The limits are shown by simple paintings on trees. This form of marks disappears with time. The lack of materialization of boundaries, passageways and permanent water points makes the development of livestock very difficult and collaboration between actors is compromised in the buffer zone. Farmers and pastoralists think that the development of the buffer zone is not appropriate for the development of the economic activities of the Park W users.

4.5.2 Cohabitation of farmers and pastoralists in the buffer zone

The proximity of the farmers and pastoralists bands is often a source of conflict in the buffer because of the frequent straying of the animals in the farmers' fields according to 40% of the farmers and 42.50% of the pastoralists. They think that it is this proximity of the different bands which is at the basis of the damages caused by the herds in the farmers' fields, what leads to flights between farmers and pastoralists. They illustrate these perceptions by the fact that the farmers' fields are overflowing on the band allocated to the pastoralists, which favours the

straying of the animals in these areas considered as grazing area for pastoralists. These different practices of the farmers and pastoralists make their cohabitation in the buffer zone very difficult. They also think that this same space cannot be exploited by both farmers and pastoralists.

4.5.3 Involvement of the stakeholders in the development and implementation of the management plan

The norms and rules for the management of agro-pastoral resources in the buffer zone are developed without the involvement of the users. Thus, 60% of the farmers and 67.50% of the pastoralists surveyed think that it is difficult for farmers and the pastoralists to respect the norms and the rules for which they did not participate in the elaboration. They believe that these norms and rules are developed against them and they suffer the effects of their application. These norms and rules are imposed on them.

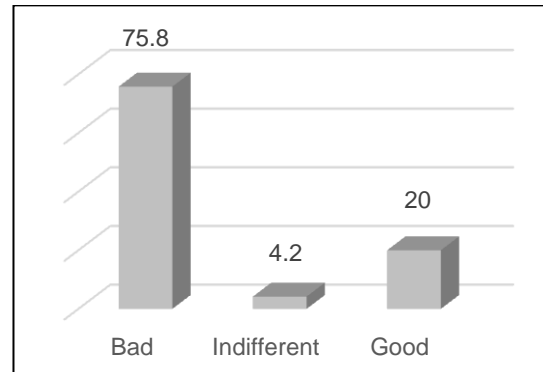


Fig. 3. Perceptions of stakeholders on agro-pastoral resources management plans

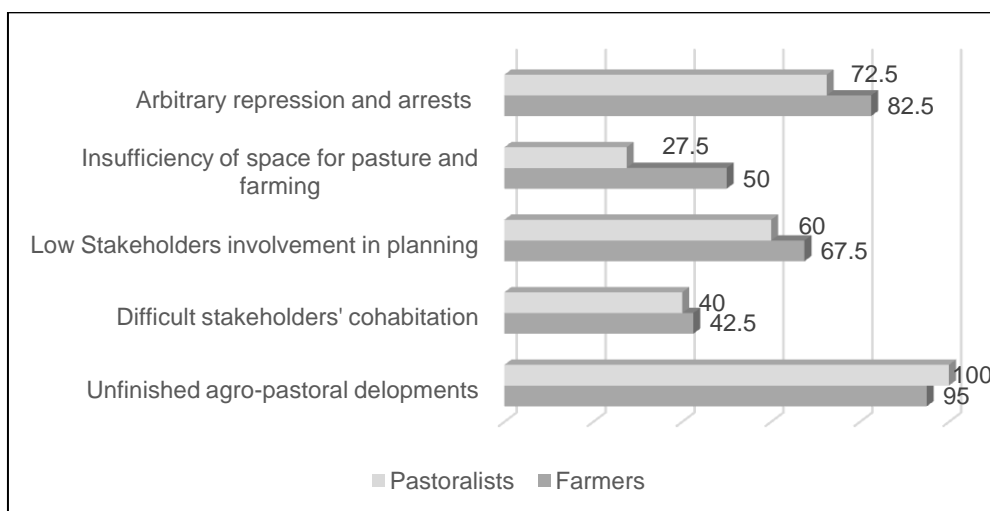


Fig. 4. Poor perceptions of management plans by farmers pastoralists

4.5.4 Availability of crop and livestock areas in the buffer zone

With regards to the area dedicated to cropping and grazing in the buffer zone for park users, 27.50% of farmers and 50% of pastoralists believe that the resources available for them and the space freed for their activities are still insufficient despite the availability of land and pasture in this buffer zone. They stated this perception in the following utterance that summarize it "it is impossible for farmers to expand the areas of their farms in the buffer zone. In the same way pastoralists do not have the possibility of crossing the limits of the buffer zone towards the central core." They think that the delimitation of the buffer zone does not allow the development of their economic activities of the users. This area is very short according to them to contain both the farming and livestock raising. CENAGREF should therefore think at separating the farmers' band from the pastoralists' band to avoid conflicts.

4.5.5 Repression and arbitrary arrests of the stakeholders

The buffer zone has been released to users to enable them to carry out their economic activities. However, 72.50% of the farmers and 82.50% of the pastoralists believe that the norms and rules of agro-pastoral resource management in the buffer zone are binding because of many prohibitions. They justify this by the systematically slaughtering of their animals as soon as they cross the boundaries of the buffer zone and the Park W. The stakeholders also consider their stays in the buffer zone as a period of suffering due mainly to the arbitrary arrests of farmers and pastoralists as soon as they cross the boundaries of the buffer zone.

4.5.6 Good perceptions of some stakeholders on agro-pastoral resource management plans

Among the stakeholders surveyed, 20% have a good perception of agro-pastoral resource management plan set up. They believe that the delimitation of the buffer zone favours the development of the activities of farmers, pastoralists and traditional healers who used some herbs from the park. They believe that this policy reduces the pressure on the W park and ensures the protection of natural resources. They also believe that this space promotes coexistence between farmers and pastoralists

and helps to reduce conflicts between them. Farmers benefit from animal dung for soil fertilization and herders in turn benefit from crop residues in farmers' fields.

The access and use of agro-pastoral resources in the Birds Island only by herders are also beneficial for them even though some fees are asked for that. In fact, the fees fixed by the town hall are not high and each herder is able to pay them to get the feeding of his flock. The stay of the herders and their flocks on the island is not at all binding anymore. There is less damage and in case of conflict a management committee is responsible for a peaceful settlement.

5. DISCUSSION AND CONCLUSION

The management of agro-pastoral resources is a real challenge for the development of agriculture and especially livestock farming in the countries of West Africa. In Benin and specifically in the northern part such as Karimama district, agro-pastoral resources were freely accessible in the buffer zone and on the island of birds. But after decades, the lack or shortage of arable and grazing land associated to the total degradation of agro-pastoral resources therefore hinder the development of agriculture and livestock breeding [16,17,18]. The challenge for this municipality has become the sustainable management of its agro-pastoral resources. However, there was no policy of occupation and management of space in this district that defines rules in allocation of land to each sector of activity. This situation has led to the anarchic use of agro-pastoral resources with the emergence of conflicts between users. CENAGREF and the town hall have decided to endow this municipality with plans that can lead to better management of these resources and guarantee their sustainability.

Most farmers and herders using the natural resources in the study location admitted that they were not involved in the development and implementation of the agro-pastoral resource management plans for the buffer zone and the Birds Island. As the participation of local people in natural resource management has become a central focus of resources sustainability, international institutions have given it strong consideration [12,19]. However, the approach used by the CENAGREF and even the city council did not favour the participation of all stakeholders in decision-making and the taking into account of the needs and concerns of the

users of these agro-pastoral resources. This meeting of the actors at grassroots level, direct users of the resources concerned with the policy made it possible to identify their needs, their preoccupations, their representations in relation to the resources, their different uses and especially stimulated their willingness to adhere to the sustainable management of these resources [20,21] as not been really taken into account in designing and implementing neither the management plan of the buffer zone nor in the management rules of the Birds Island.

Most stakeholders using agro-pastoral resources in Karimama district are unanimous that the management approach used in the buffer zone is bad. This is explained by the non-involvement of these users in the development and implementation of agro-pastoral resource management plans. The non-participation of their representatives in the development and implementation of agro-pastoral resource management plans in the district of Karimama justifies the bad perceptions of the stakeholders on these policies [15]. Therefore, to avoid cases of conflicts, a better adapted approach favouring consultation with all stakeholders' categories concerned with the management of the agro-pastoral resources should be used [21,22,20,23].

The major constraint in the development and implementation of agro-pastoral resources management policies is methodological [21,22,20]. In the context of Karimama district, plans / policies were developed without prior consultation with stakeholders concerned with the use of these resources. One of the main tools of participatory management of natural resources is the consultation framework [7].

DISCLAIMER

The products used for this research are commonly and predominantly use products in our area of research and country. There is absolutely no conflict of interest between the authors and producers of the products because we do not intend to use these products as an avenue for any litigation but for the advancement of knowledge. Also, the research was not funded by the producing company rather it was funded by personal efforts of the authors.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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