

Forest Reserve Policies and Indigenous Natural Resource Management Practices of a Forest Fringe Farming Community in Wassa East District of Ghana

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Abstract- Ghana's forest cover is diminishing at an alarming rate, a situation that has been blamed on fringe communities' use of farm land, logging and illegal mining. This situation has prompted pre and post- independence governments to enact policies to protect the country's forests from further degradation. Ghana's forest policy has prevented fringe communities that have culturally owned access, use and management rights to forests resources, from exercising such rights and this has had implications for sustained livelihoods. This study explores a forest fringe community's use of indigenous knowledge based on community cosmovisions and belief systems to protect and regenerate secondary forest cover in an effort to ensure that farming activities and therefore livelihoods are sustained. It uses a qualitative research design to generate and analyze data. In particular indepth interviews were held with community elders and leaders and focus group discussions were held with some community members. The study found that the community's land tenurial arrangements and farming system buttressed with religious beliefs and taboos help members to interact positively with their environment. I argue therefore that the success of the country's western based forest protection policies will depend on the extent to which indigenous knowledge systems of protecting and regenerating forest cover are incorporated.

Index Terms- forest degradation, forest policy, livelihoods, cosmovisions, indigenous knowledge

I. INTRODUCTION

The incorporation of developing countries into a global system of capitalist production has turned locally owned and operated commons resources into state-run territories. This means that local resource owners have in the process been disenfranchised and marginalized to make their livelihoods vulnerable. Both the colonial and post-colonial policies of demarcating forest areas as reserves have helped to alienate farmers and encourage an uninterrupted exploitation of forest resources. Dominant narratives premised on notions of human interference in so called pristine environments have reflected neo-malthusian and neo-marxist as well as a rebuttal of both positions. The neo-malthusian position on degradation of natural resources presents a pessimistic view of

human-environment relations, explaining environmental degradation in terms of high population density, over cultivation of land, soil exhaustion and short fallow periods and fuelwood harvesting in commercial quantities [1]--[5].

One narrative has come from Neo-malthusians who present small farmers and land managers not as active agents of deforestation but as victims [3], [4]. This discourse sees the poor as reluctant to degrade the very resources on which their future depends and therefore they do not sacrifice long term concerns in favour of short-term gains. For such advocates, the poor would only degrade the environment when they have no other choice. Another narrative has also come from Neo-marxists who blame the activities of transnational corporations as they prioritize the accumulation of capital at the expense of resources and the natural environment [1], [5]. Hardin (1968), in his 'the tragedy of the commons' has also argued that natural resources that have open access are degraded because a great part of the cost of degradation by individual users is passed on to other users while benefits accrue exclusively to individual users[6]. Individuals would therefore increase the utility of an open access resource in so far as they do not bear the full cost of degradation and in the absence of any social control. In this narrative, humans are seen to be victims of an impulse which leads them to maximise benefits in the face of declining resources and diminishing social controls. It is however suggested that when resources are common pool and thus have open unregulated access without well defined property rights, there is an element of free-riding. This is not the case with common resources that have property rights [2], [7].

Contestations to the above narratives have come from empirical studies in developing countries [8], [9], [2], [10]—[12]. These studies have used indigenous knowledge or ethnoscience of the societies studied to question whether the introduction of new crop and tree species within farming systems should be characterized as degradation, deforestation or development. In this context, the studies have suggested that the ethnoscience of indigenous people points to their varied methods of exploration and detection and the lack of commensurability between their concepts and those employed by modern science. This point is emphasised by Leach and Fairhead (2002) in their study of hunting and environmental policy in West Africa and the Caribbean in which state agencies and hunter groups used different methodologies to arrive at contesting causes of wildlife depletion [10]. The point is also made in Zimmerer's (2004)

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account of narratives of soil erosion in Bolivia where he examines how international agencies and the state blame land users as causing soil erosion, while land users and their trade unions present three different perspectives of the causes of soil erosion: dishonouring of mother earth and society, the effect of crazy rains and winds and a historical past of reinventing resource rights [9]. In addition, studies by Carswell (2004) in the Kissidougou and Ziamia regions in Guinea, and Tiffen, Mortimore & Gichuki (1994), in the Machokot district in Kenya also highlight the roles of a people's social and political histories in regenerating forest growth and sharply contradict deforestation discourses [2], [12]. Such indigenous knowledge is grounded in a society's cosmovisions, their philosophy and religious beliefs that help them to understand the interaction between the social, natural and spiritual worlds [13].

The country's forest cover is fast disappearing [14]--[16]. Whereas Opoku (2006) observes that in Ghana 80% of the country's forest cover has already been lost, Adusei & Dunyah (2016) note that the country lost 33.7% of its forest cover in two decades from 1990 to 2010 [14], [15]. However, the main driver of the country's deforestation has been identified as the timber industry in which logging still proceeds at the rate of 4 million m³ per year, four times the sustainable rate [15], chain saw operations i.e cut timber and perhaps the illegal small-scale mining known locally as 'galamsey'. The recognition of this threat of deforestation had earlier pushed the colonial British administration and later post-independence governments to legislate on the country's forests. Thus, the British promulgated a number of Acts, Bills and Ordinances between 1894 and 1948 in an attempt to protect the country's forests [17], [18]. The state machinery in the years following independence in 1957 was also used to appropriate large tracts of land in the rural areas towards the nation's development effort. This led to increased centralization of land and natural resource administration in the state and neither the community in which the land was situated nor the wider public was consulted in any way or offered an opportunity to express a position on the necessity or desirability of the proposed acquisition [15], [19]. Successive post-independence governments continued to enact some Acts and Policies that empowered different actors to manage and control forests, minerals and the revenue accruing from them. They denied farmers and communities rights to farmland and of access to the resources of the reserves as they ensured that reserves were subject to admitted rights and were to be managed for the benefit of such communities. Forest fringe communities thus could not engage in any activity within the reserves without prior written permission from the Forestry Department. They saw such regulation as a removal of their rights and benefits and an expropriation of their land and forests. In the 1980s and early 1990s, a restructuring of the country's forestry sector under the structural adjustment programme expanded the harvesting of timber on farmlands and further alienated rural farmers from the forestry sector. This restructuring culminated in two policies - the 1994 Forest and Wildlife Policy that dealt with dwindling forest resource, inadequate revenue and weak institutions and the 1995 Interim Measures

to Control Illegal Felling [18], [20].

Boonzaaijer and Apusigah (2008) suggest that the African cosmovision includes their philosophical and religious systems and largely dictates how natural resources are viewed and used as well as how decisions are taken and problems are solved [13]. Within the cosmovision of the African is a hierarchy of divine beings (gods), spiritual beings (especially the ancestors), and natural forces (such as floods, climate, diseases). The recognition of these has given rise to a social organization that is intertwined with rituals and sacrifices to the gods and spirits in which the elders, priests, soothsayers and spiritual leaders play a prominent role. Cosmovisions are enshrined in a societies belief systems and religion and to a large extent have contributed to sustainable land-use, conservation, and wise management of resources by dictating the use of resources such as land, water, plants and animals, as well as how decisions are taken and problems are solved [21], [22].

Forest fringe communities therefore have had a special relationship with forests for centuries, depending on forests for their economic production, social organization, religion and identity [15]. For instance, their livelihoods are based on the availability, access and use of forest lands and other non-timber forest products. These communities farm, collect fuelwood, hunt game, log, and harvest snails, medicinal herbs, bamboos, chewsticks, ropes and many more from both primary and secondary forests. Thus, within the country forestry provides livelihood for 15% of the population and accounts for 2% of the GDP [23]. Therefore in the wake of forest reservation policies, fringe communities have had their livelihoods interfered with and made unsustainable. The destruction of forests and community exclusion from access to them have disorganized these fringe communities. Attempts to include communities as stakeholders in the management of some forest reserves in the country have failed as community members expect to be provided with protective gear as well as given some honorarium [24]. This paper brings to the fore indigenous knowledge systems within forest communities that have been culturally used to manage forest resources and therefore questions whether such indigenous forest management systems could be integrated into mainstream western conservation thought or kept separate from it to serve a dual purpose of conservation as well as sustaining livelihoods.

II. STUDY DISTRICT AND COMMUNITY

The Wassa East District lies in the extreme south eastern corner of the Western Region of Ghana. It is bounded to the North East and South East by Twifo-Hemang Lower Denkyira, Twifo Atti Mokwa, and Komenda Edina Eguafobrem Districts, all in the Central Region. The District is also bounded in the North West by the Prestea Huni Valley District and in the South by the Mpohor and Shama District in the Western Region. The study district is estimated to have a population of about 94,507 comprising 52.5% males and 47.5% females [25].

The Bonsa Ben forest reserve lies between latitudes 5° 30' and 5° 50' North and longitudes 1° 35' and 1° 55' West and is

located within the Study District. The reserve occupies a total area of 155.40 km² (15,540ha) and shares boundaries with the Minta, Ben East and Ben West reserves. The Osenso community is strategically located at the fringe of the Bonsa Ben forest reserve. The study community falls within the tropical climate zone. The mean annual rainfall is 1500mm and ranges from 1300 to 2000mm. The wet period in the district is between March and July while November to January is dry. The vegetation is tropical rainforest type [26]

Agriculture is the mainstay of the economy of the study district. Subsistence and large-scale agriculture employs 71.5% of the workforce. Crop farming is the major activity undertaken by households and this is followed by livestock (chicken, goats and sheep). The major staple food crops produced in the district include cassava, plantain, maize, cocoyam and vegetables. These crops are produced by farmers who rely on traditional methods of farming such as slash and burn, simple farm tools (hoe, cutlass) and relying on natural climate conditions for cropping [25]. The predominant cash crops are cocoa, oil palm and coffee in some cases. These are usually cultivated in small to medium sized plantations, mostly by settler farmers. Corporations such as Benso Oil Palm Plantations (BOPP), NORPALM and Ayiem Oil Mills also cultivate oil palm on large scale. Non-traditional crops like black pepper, pineapple, citrus, cashew and banana are increasing being cultivated as cash crops in the district. Within the study community however, food crops for subsistence and the local markets as well as cash crops such as cocoa and oil palm are cultivated. The community also harvests non-timber forest products (NTFPs) such as canes, ropes, spices, bamboos, snails, herbs, leafy vegetables and chew sticks for sale to supplement incomes from their farming activities [24].

III. METHODS AND DATA

This study has used a qualitative methodology to explore community environmental awareness and understanding as well as the use of indigenous knowledge in managing resources of the secondary forest in which farming takes place in Osenso, the study community. The study has relied on both secondary and primary sources of data. Primary data were generated through indepth interviews of by community elders and leaders as well as focus group discussions among community members. A total of ten indepth interviews and two focus group discussions were organized. The focus groups comprised twelve all male and twelve all female participants. The data collected covered issues such as awareness and understanding of their natural environment as well as application of indigenous knowledge in protecting the natural environment. The data generated were analysed to reveal the community-environment relations. These have been buttressed by the voices of the respondents.

IV. RESULTS

The results of the study are presented under two categories. I begin by presenting community members' awareness and

understanding of their natural environment and follow it up with their natural resource conservation practices as well as beliefs that have supported the practices.

A. Environmental Awareness and Understanding

Community members have a great awareness and understanding of the environment on which their livelihood depends. The nature of such awareness and understanding is presented below under environmental perception by gender, worldviews and environmental awareness, awareness of benefits of environmental resources and awareness of degradation activities.

Environmental perception by gender

Members of the fringe communities perceived their immediate natural environment in different ways. This is because they used different aspects of the environment for their livelihoods. One significant difference though is perception by gender. A count of resources taken from both the secondary forest used as farm land indicated that males knew of more resources than females. Men could count as many as eleven timber species (that concessionaires usually fell) and name most tree species used for carving mortars and pestles as well as for making chew sticks. This is because apart from the fact that they used these in carving, they were also contracted by women to cut ropes and canes which were then processed by the women for sale. Both men and women harvested non-timber forest produce such as leafy vegetables, ropes, canes, snails and spices from the secondary forest. Within their farms and fallow lands however, women knew the layout better than men and could identify which areas non-timber forest products (NTFPs) could be obtained. Women were therefore aware of their immediate environment, the one closer to them and that which they interacted with on a daily basis while men interacted with all sections of the environment irrespective of distance given their work patterns which covered both the immediate and external environments. Within the fringe communities therefore men had a different awareness and knowledge of the environment than women. There is no doubt from the study that women depended more on forest resources than their male counterparts but the extraction of these resources was done indirectly by the men. Knowledge about what type of resources abound, their use and where they may be harvested was shared knowledge and handed down generationally. This finding is in tune with the work of Gururani (2002) when she expressed the position that women's knowledge about the environment had been obtained through discussions with men and not because of their roles. However, the finding here on gender and environmental perception is at odds with political ecology positions on gender, environment and development in which women are identified more with the environment as a result of their experiential expertise obtained from their reproductive roles [27]. It however confirms some positions within this school that women do not experience the environment in the same way globally, experiences being mediated by variables such as geographical location, class, age and ethnicity [28].

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Worldviews and environmental awareness

The study community's perceptions of the environment were also shaped by their worldviews, beliefs and the common social and religious activities in which it is a part. Within the worldview of the community is the Bonsa river and other streams inhabited by lesser gods. Annual rituals are performed that include the pouring of libation and slaughtering of sheep at the stream sites. Women in their menses were forbidden to fetch water from the streams because they were unclean and would desecrate the water bodies which were the habitats of gods and spirits. The ritual sites together with adjoining land are demarcated as sacred groves and community members are forbidden to go to those sites for fear of desecrating them. Other sites of spiritual significance to community members were the royal cemeteries. These have large timber trees and cleared undergrowth. These royal cemeteries also have airs of reverence around them and were demarcated together with the sacred groves as special environmental sites within the study community.

Awareness of benefits of environmental resources

Members were also aware of the benefits derived from environmental resources. The benefits of trees in the reserve and off-reserve areas were clear to members. Together with the undergrowth, the forest acted as a buffer to shield their settlements from storms. It also provided the much needed rain that helped their crops to grow. They depended on NTFPs as an alternative source of livelihood and relied on timber on their farms as an insurance against contingencies. With permission from their chiefs, community members fell such timber to construct new houses or repair old ones and sold some as boards and beams to meet medical bills. Hence, leaving tree species standing as part of the farming system ensured that contingencies were met effectively. It was emphasised that all valuable timber species within farms had been harvested by concessionaires and so the ones felled by farmers with permission from the chiefs were not valuable to the loggers. Participants also indicated that they benefited from trees standing on their farms in other ways. Trees provided shade for farmers and the young seedlings and plants while their roots tended to prevent soil erosion by binding the soil. As a male focus group discussant observed: *The forest protects us from storms and strong winds.*

Dead branches could also be used as fuel wood at home while dead leaves dropped to manure the soil. Community members were also aware of the negative effects that logging had on the physical environment. Apart from the complaints of destruction to farm crops, they also discussed and knew that logging negatively affected rainfall amounts and patterns as well as removed any wind break protection that they may be enjoying at present. They were also aware that logging destroyed the NTFPs they relied on. The sound of the chain saw, they claimed, drove fast game deep into the reserve where it was more difficult to hunt and trap. There appeared to be very little difference in the knowledge of community members as to the benefits derived from the physical

environment and this accounted for their common stance against concessionaires, canoe builders and illegal loggers operating within their environment in spite of the fact that some were beneficiaries in terms of employment.

Community members also had a good knowledge of traditional medicines and the use of specific plants, herbs, seeds, roots or barks to cure such ailments as piles (*koko*), whitlow, stomach ache, eye and ear problems, snake bites and menstrual pains. Roots and barks were usually preserved in alcoholic beverages and drunk as both medicines and aphrodisiac while leaves were either ground and administered onto the problem spot or boiled and drunk. Both men and women possessed such knowledge as it was shared and usually used as first aid before visiting local health clinics. Traditional ecological knowledge for curing ill health was so widespread within the study communities such that there were no professional traditional healers in them.

Awareness of extent and causes of degradation

Community members were also aware of the extent of degradation to the physical environment and the causes of such degradation. They were aware that over cultivation of farm land left the soil infertile and led to low crop yields. For them this happened when the soil 'loses its fat'. Farm lands that had become infertile had been abandoned and these had become colonised by what was locally called *bushia* or *akyeampong*.

Men were particularly aware of the farm practices that served both to encourage farming activities as well as destroy the physical environment. They knew the benefits of bush burning during land preparation but cautioned that if this was not done properly, bush fire could be started and this would destroy the environment. Bush burning was always done in groups so that the fire could be controlled.

Fire is set during the dry season and during mid-day when the wind strength is low so it does not create problems. Before the fire is set, a boundary is cleared to prevent it from travelling to other farms. (Male FGD member)

Again, members were apprehensive about the possibility of gold mining in their community in the near future. A gold prospecting company had already done feasibility studies and had pegged some farmlands for possible pay-off and mining within them. Members indicated that though monies promised was huge, they were not prepared to sacrifice long term livelihoods for short term gains not to mention the extent of degradation that would be caused to the physical environment.

I want to say that mining here will bring untold hardship to us. Already we do not have land to farm on. (Female FGD member,)

Our cocoa farms will be destroyed. No amount of compensation will help us to live. It is always better to live every day and pass on your property to your children and

grandchildren than to collect a lump sum of money which will not last. (Indepth interview, male community elder aged 79 years,)

B. Traditional Community Natural Resource Management Systems

Communities have long recognised that resources within their environments are not finite and have put in structures, principles and techniques to ensure that such resources are judiciously used by both the present generation and posterity. These have drawn on their stock of indigenous knowledge to provide them with a sense of survival. The evolution of indigenous resource management systems has been done within the framework of community worldviews in accordance with their ethics, norms and beliefs. Such systems have relied upon building reciprocal relationships among families and communities to redistribute risk and to strengthen social obligations [30]. They ensured equity and provided checks and balances within the use of resources. Before the creation of the Bonga Ben reserve, community laws, taboos and indigenous knowledge regulated the use of environmental resources. Traditional resource management practices, which are a manifestation of the application of knowledge by the communities, thus challenge some theoretical and empirical positions on communal use of resources. Application of community knowledge nevertheless support the counter positions that there are differences in the use of resources on open access basis in which there is the element of free riding and those used based on common property rights. Traditional land and other natural resources management practices identified below have contested western science narratives on natural resource degradation with ethnoscience [9], [31], [32].

Land Tenure Systems

As land for farming is the most widely used resource, a system of control and use has been evolved in the form of tenurial arrangements that define the manner in which land resources may be obtained and the conditions subject to which they may be used. Land tenure systems clearly distinguish between rights of access to land resources and the loci of power of control over their use. This arrangement has evolved from patterns of ancestral settlements on the land. Land ownership is therefore predominantly communal and its control or administration is vested in the leader or his/her appointee such as a family head while community chiefs hold land fiduciary for the whole community. Lineage members who require land to farm approach the head and this reverts back to the lineage upon the member's demise. The vesting of the control function in a family head or chief guarantees security of opportunity for all those with access rights to the resource [29]. It also ensures equity between and across generations. Thus the control function determines the rate of expansion or contraction of membership in the unit by means other than by birth and the distribution or redistribution of access rights in response to increased demand for land. The control function also determines important land use decisions such as specific land usages in particular areas of the

community territory eg. weeding, planting and harvesting times, the duration of fallow periods and the nature of resource preservation where these required collective action by the community [29].

Land tenurial arrangements vary in the study community but the most common are outright sale and share cropping with tenants. Discussions with participants however indicated that for settler farmers the preference in land acquisition is outright sale. This gives them security to land titles and enjoins them to respect customary laws and principles attached to their use. The share cropping tenurial arrangement benefits both the land owner or farmer and the tenant farmer or share cropper who acts as a care taker farmer. The profits from the sale of crops are shared in varied proportions in accordance with the tenurial agreement between the former and share cropper. In spite of the variations in the tenure system, land continues to be regarded as belonging to lineage groups, the dead, living and the unborn and must be preserved as such.

Community Farming System

The communities share a farming system based on their belief system that tends to ensure that land is preserved for posterity. Not all land acquired is farmed in one cycle. Parcels of land are left to fallow and to be cropped at a later date. This has the advantage of allowing land to rest and regenerate its fertility before it is cropped again. In recent years the community members indicate that the fallow period has shortened from six to three years because land is increasingly becoming scarce to the extent that farm sizes have reduced. Mixed cropping and rotation of crops are also practiced. Here, a number of crops – vegetables, maize, root crops that take up different soil nutrients are cultivated on different portions of the same piece of land. The crops are rotated in subsequent planting seasons. This farming system ensures the restoration of soil fertility, and allows regeneration of secondary vegetation and increase in fauna.

C. Culture and Belief Systems in Natural Resource Management

In addition to the control and redistribution of land in an effort to manage land resources, the study community also uses culture and belief systems to conserve environmental resources both for present and future generations. Sacred groves at the stream and river sites and the royal burial grounds have spiritual and religious significance for the community. Taboos on entry and desecration of the sites have been instituted to create a rich flora and fauna in those sites. These have become important sites for medicinal plants and herbs and one can only take such plants with permission from the chief and elders and in particular the fetish priest who supervises the sites. The huge timber and tree species that grow there particularly at the stream sites have helped to protect the water from drying up and created their own eco-systems and micro-climates.

In addition, the institution of taboo days for farming in the study community ensures that land is not extensively farmed

and that it is sufficiently rested. In the community *Adimfie*, is a day for purifying the traditional stools of the land and in which community members are also banned from going to till the land. It is believed that members who flout this taboo day will be accosted by spirits on the farm and such fear prevents them from flouting the taboo. There is also prohibition on the felling of certain tree species because of their spiritual and medicinal significance. The bark of the mahogany tree is potent medicinally for the cure of a number of ailments. As such, community members are forbidden to cut down the tree. There is also *ahoma bosom* and others that have spiritual connotations and used medicinally but these are found in the reserve. *Ahoma bosom* is so revered that anyone who goes in to take a part of it is expected either to place an egg beneath the tree or to strip naked before harvesting. Fourth, customary and community laws prohibit the killing of pregnant game in the off-reserve areas. As such, hunting is banned between August and March when most animals are gestating.

V. DISCUSSION

The farming community, like its counterparts in other parts of the country, is environmentally aware and has a sensitive knowledge of soils, fertility, and degradation as well as a thorough knowledge of vegetation, crops, climate and appropriate methods of cultivation. The forest fringe community also has an indepth knowledge of the geography and resources available and is aware that its very livelihood depends on the continuous availability of fertile land and non-timber forest resources. The above findings and discussions have implications for Ghana's forestry policy. Earlier studies in the area indicated strong resistance to the reservation policy and the forest management programme for a number of reasons. These included cultural rights to the reserve which is a livelihood source and mistrust for the intensions of the Forestry Commission's attempt to set up Community Forest Management Committees to protect forest reserves [33].

Forest fringe communities have long recognised that resources within their environments are not finite and have put in structures, principles and techniques to ensure that such resources are judiciously used by both the present and future generations. These have drawn on their stock of indigenous knowledge to provide them with a sense of survival, to be in harmony both with the spiritual and natural worlds. The evolution of indigenous resource management systems has been done within the framework of community worldviews in accordance with their ethics, norms and beliefs. The community operates a farming system that involves the use of bush burning during the preparation of farmland. This does not only help in clearing the land but also acts to fertilize the soil. The group burning and delineation of a boundary ensures that other parts of the forestland are protected from bush fires. In addition, the system of fallowing, shifting cultivation and crop rotation all cooperate to sustain soil fertility and to curb wanton destruction of forests and game. Field-Juma, (1996) further indicates that indigenous farming systems have relied upon building reciprocal relationships among families and communities to redistribute risk and to strengthen social

obligations as well as ensuring equity and providing checks and balances within the use of resources [30]. The community's use of culture and taboos to control farm days and protect water resources, have also acted to regulate the use of such resources – land, stream, medicinal plants, game and many more. Traditional resource management practices of the community, which are a manifestation of the application of knowledge by the community indicate that such resources, although open access, are socially controlled. Hence it is possible to get this community and others like it deeply involved in managing the resources within their environment. The Forest Commission of Ghana must continue to engage some forest fringe communities and tap into their indigenous management systems. More importantly, these indigenous knowledge systems can be integrated into the formal science of forestry to effectively address the problems of forest depletion and to address current threats to livelihoods of local communities. Such a drive will ensure community ownership of the policy and effective participation in the management of forest resources. Chiefs, elders and community leaders may be used as focal points to disseminate policy information as well as enforce and protect by-laws distilled from the worldviews in relation to sustaining the land and all that is within it –streams, fauna, flora and minerals.

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