



Fishermen and Market Gardens in Sénégal: Implications for Integrated Conservation and Development Projects

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In the delta of the Senegal River in Senegal, West Africa, resource managers have drastically curtailed fishing activities in the Djoudj National Bird Sanctuary (*Parc National des Oiseaux du Djoudj*, PNOD hereafter) impacting small-scale fishermen who inhabit the region since before the protected area

was established. Fishing resources in this biosphere reserve is the primary source of food for African and Eurasian migratory birds, and the primary source of livelihood for a significant number of local people. Since 1994, as part of Integrative Conservation and Development Projects (ICDPs), environmental NGOs

have mostly looked to ecotourism, to provide an alternative source of revenue for these fishermen with the goal to alleviate poverty and reduce the pressure on fishing resources. However, these ICDPs, have yet to deliver impactful and positive results for the livelihood of the fishermen and for resource conservation. Fish stocks have declined over the years, negatively impacting the population of migratory birds, while fishermen continue to struggle in the search of sustainable livelihoods.

The case of PNOD and its local communities supports an important question that has long been on the radar of conservationists: Are externally conceived models of ICDPs congruent with the local conditions of West Africa? Here, I refer to externally conceived models of ICDPs, as projects that have been elaborated by actors, mainly western-based, that are not representative of any social group in local communities. Ecotourism is central to ICDPs, among other market-based schemes that seldom complement traditional livelihoods. There is now significant evidence that ecotourism is not the ideal conservation tool in West Africa because of its low tourism potential (compared to Eastern and Southern Africa) and that weak market institutions among other political economic conditions impede the success of ICDPs^{1,2,3}. This latter argument combined with my observations during my field study in villages in proximity to PNOD led me to think of the following point: What if, instead of focusing on externally conceived models of ICDPs to provide alternative sources of revenue, resource managers start paying more attention to and build on the livelihoods strategies that rural households craft themselves in the face of resource fluctuations? To support my contention, I use the cases of Diadième and Rone, two villages in proximity to PNOD where fishermen are increasingly adopting market gardens as a seasonal livelihood diversification strategy.

The broader goal of this paper is to demonstrate that, when faced with resource fluctuations, rural households have the capacity to conceive and implement livelihood strategies that, under the right conditions, meet their socio-economic needs while leading to sustainable exploitation of natural resources^{4,5}. However, the people who design ICDPs often

overlook the latter key aspect. Therefore, I invite project designers to think of alternative models of ICDPs in which the focus shifts from poverty alleviation to livelihoods as a whole, in which the economic activity being promoted is context-specific, and builds on the assets and the capacity of rural households to adapt their livelihoods as conditions dictate.

In this essay I examine the adoption of market gardens among fishermen in the two villages as a seasonal livelihood diversification strategy. I also explain how this livelihood strategy can potentially lead to better conservation outcomes than the ICDPs that are currently in place, and the social and economic benefits of market gardens. Finally, I explain how the adoption of market gardens among fishermen in Senegal calls into question the “standardization” of externally conceived ICDPs that is often reflected in the economic activities that are being implemented.

Why Market Gardens?

A market garden (MG hereafter) is a horticultural activity focused on the production of fruits and vegetables, typically on a 1-hectare or smaller plot of land, to be sold at nearby markets or within communities. If well managed, MG can be a lucrative venture for producers. I became interested in MG activities in Diadième and Rone during my preliminary study in Senegal. I was first interested in evaluating ICDPs, but during informal conversations with villagers I found that they were more excited when discussing their MG projects. In fact, when I decided to look further into these MG, I felt that I had finally gained the attention and support of the villagers. I had the honor of being escorted by the village chief of Diadième, to visit all of the garden plots that were being exploited under the arduous sun of the Sahel. I started receiving the voluntary phone calls of a community leader from Rone every time he obtained information on their MG that he thought could be of interest to my study. I was even called upon to take photographs of harvesting events. All of this showing the great interest and pride that these folks attached to the projects that came about as a result of their agency and efforts that these gardens represent for them.

The adoption of MG by fishermen in Diadième and Rone

Similarly to many rural communities in West Africa, MGs originated in Diadième and Rone at a much smaller scale as fruits and vegetables were grown mainly for household consumption. It was an activity that was delegated to women as part of their household assignment to provide items to complement the daily meals. Women had very little opportunity to sell their produces for extra cash. Men worked collectively as fishermen, both for subsistence and for income generation to meet livelihood needs. However, today, the commercialization of fish is taking place at a larger scale with improved access to markets.

When the park was established in 1971, people who lived within the protected parameters were expelled and relocated in settlements at the periphery. Diadième and Rone are part of those settlements and have grown to now represent villages with all of their constituents. Each newly relocated village had a perimeter dedicated for small-scale cultivation activities. Fortunately for Diadième and Rone, their borders were located on the banks of multiple lakes with some of the most fertile soils in the region, which are ideal conditions for gardening. Women took advantage of this opportunity to expand their gardening operations and started to sell their products to nearby villages, as they were now able to produce more.

In 1986 the Diama Dam was built and national economic policy was put in place to transform the delta of the Senegal River into an irrigated agricultural region dedicated to the production of rice. As a result, in the late 1980s and throughout the 1990s, portions of arable land in Diadième and Rone became subsidized for rice production. During this time, fishermen had an opportunity to supplement their revenue from fishing activities. The cultivation of rice offered an alternative source of revenue to fishermen during seasons when fishing resources were low. However, today villagers explain that since the early 2000s the production of rice is no longer as profitable as it used to be and that in more recent years many of them fell into serious debt as a result of poor government policies. Consequently, many of them found themselves

looking for alternative economic activities during the low fishing seasons. A few men decided to try their hands at this horticultural activity that was delegated to women.

For reasons related to issues of gender^A, these men had more opportunities to expand their initial gardening operations into market gardens. Many of these fishermen/gardeners hire workers from the southern and central region of the country for their expertise in MG operations to produce fruits and vegetables for much larger markets at the national level. Over the past decades, MGs have taken a more central role in the income diversification process of fishermen, surpassing rice production for many. This trend is in fact valid for several small-scale fishing communities in the delta of the Senegal River covering the countries of Senegal and Mauritania. During my interviews, the fishermen explained that over the past decade MG have become a more lucrative business than rice production. Most importantly, they also explain that the harvesting season usually starts in conjunction with the low seasons for fishing resources, precisely when an alternative source of revenue is most needed.

Since 2008, the numbers of MG plots that are exploited in Diadième and Rone have increased by an average of 80% and there are currently 33 parcels (~0.6 hectares exploited/parcel) that are exploited in Rone and 21 parcels (~0.5 hectares exploited/parcel) in Diadième. This growth in MG operations prompted village leaders to begin a more formalized land tenure system. Before, it was on a “first come, first serve” basis, whereby the parcel belonged to the first person to clear the small portion of land. There was no legal document to show ownership of the parcels. Today, every household has been given a parcel (whether they plan to cultivate the land or not) formally recognized by the village and legally documented at the local government level.

Can market gardens lead to better conservation outcomes than current ICDPs in Diadième and Rone?

ICDPs implemented for PNOD and its local communities, include ecotourism



Above. The issues of fisheries and market gardens encapsulate a vast ecosystem, all of which are in some way subject to the dynamics of local water sources for ecological function and human wellbeing.

activities and the production and sales of arts and crafts. However, the success of these projects remains elusive as fish stocks continue to decline and fishermen are still struggling to build viable livelihoods. The tourism season takes place between October and May. Therefore, no ecotourism revenues are generated from May to October, the low fishing season. Additionally, profits from ecotourism are procured by a small group of individuals leaving the rest of the villagers with limited benefits. Without a sustainable ecotourism industry that benefits locals or viable low season alternatives to fishing, NGOs and resource managers of PNOD need to pay more attention to market gardens as potential ICDPs.

Fishermen in inland African lakes tend to diversify their income portfolio as part of their own strategy to sustainably manage fishing resources and build livelihood security⁴. The fishermen in our case, as it is in many other small-scale fishing communities, deliberately engage in complementary activities that allow them to continue fishing as a specialization and yet mitigate the risk on their livelihoods associated with their primary activity⁶. However, some maintain that conservation programs with development component, too often seek to replace their primary activity rather than complement it, which can turn out to be counterproductive from a social and ecological standpoint⁷. Further, the diversification of livelihood sources can take the pressure off of sensitive resources and provide alternative options while fish stocks recover^{6,8}. In Diadième and Rone, the adoption of rice cultivation as a complementary activity among fishermen used to be a pillar in the diversification process. Today, MG are rapidly taking an important position in the livelihood portfolios while potentially facilitating the restrictive management of fishing resources in the park. This is partially attributed to the MG seasons starting as early as February, with fishermen able to collect revenues starting in April and continuing through July. Throughout these months, MG provide an alternative source of income to fishermen during the fisheries low season, thereby giving fish stocks an opportunity to recover.

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Although further research is needed to examine the impacts of MG on fishing practices and efforts in Diadieme and Rone, the accounts that I received from fishermen not just in those two villages but also during my visits in other fishing communities in Senegal and Mauritania, provide some insights in this direction. According to an elder fishermen in the village of Tagrediet in Mauritania, where MG is well developed^B:

“We are first fishermen, however during the time fish resources are low, it is not profitable to fish; the fish are too small to sell, so we have to find other activities. We tried market gardening and it worked so well and now almost every one has a market garden [...] When the fishing season starts again you will notice that the fish have all grown and there are a lot more of them.”

Based on this testimony, it can be argued that MG has played a strategic role in securing their livelihoods and their fishing resources. I received similar accounts throughout the villages I visited in Mauritania, and other regions of Senegal where small-scale agriculture was practiced among fishermen.

Economic and Social Benefits of Market Gardens

Based on my interviews and conversations with local villagers in Diadième and Rone, there are economic, health, and social aspects of MG that make this horticultural activity worth pursuing: In terms of economic benefits, based on data collected over my preliminary study from April to August, in Rone the average revenue generated from the production of onions alone was 750,000 West African Francs (CFA) (~ \$1,500) on an average of 0.6 hectares exploited per parcels. The highest revenue generated was 1,568,000 CFA (~ \$3200). In Diadième, the average was estimated at 850,000 CFA (~ \$ 1700) on an average of 0.5 hectares exploited per parcels. As I outlined earlier, each household was given a parcel of one hectare, but because of a lack of capacity, only about half of it is exploited. Additionally, this only accounts for the production of onions and doesn't take into account other important produce such as tomatoes, carrots and cabbages that are grown during different periods within the season. Nevertheless, onion remains the single most important production currently taking place.



As for the health benefits gained from MG, they are a substantial source of nutritional supplementation and provide essential dietary staples. For instance, Diadième and Rone are relatively isolated and access to the market for produces is limited to people who have cars or motorcycles (which very few people do). Therefore, many villagers often walk to the MG parcels to seek fresh vegetables and fruits. During the harvesting time, women offer their assistance in exchange for a bag of onions, cabbage, carrots and other produces. As a villager explained to me once:

“If it was not for the MG in this village some of us would not have all the nutritional ingredients we need for our meal...it would be just plain rice and fish...not everyone has the means to go out to Ross Béthio [nearest town located 18 km away] to shop for our meals”

Market gardens also has positive impacts on issues related to property rights; in fact MG helps secure property right by turning those unexploited land into cultivated ones at a relatively lower cost. In rural communities of Senegal, agricultural land is allocated to villagers, however the state has the right to take it back if it remains uncultivated for too long. In other words, the only way to secure property rights is to turn an idle land into a productive one. In Rone, I heard several accounts where head of households lent their MG parcels to relatives mainly to keep the land productive – regardless of the beneficiary – for fear of losing their land. In Diadième on the other hand, there were many more parcels that remained unexploited for reasons that are beyond the scope of this paper. As a result, given the increasing demand for land by private agricultural companies in that region, villagers are beginning to fear that they will lose their parcels if they remain unproductive for too long.

More than socio-economic benefits, securing land rights for rural communities can also lead to positive environmental outcomes. Sub-Saharan Africa's access to land is central to the livelihood diversification process⁶. Landless households tend to rely more on common pool or open access resources thus accelerating the rate of exploitation⁹



Above. A perspective of community members as they transition from their fisheries to the tending and harvesting of their market gardens.

Access to land is particularly important for fishing communities in the African inland communities, since research shows that fishermen engage in agricultural activities during the reproductive season^{5,6}. Thus, in this case, securing land rights through MG can lead to positive environmental outcomes in the long term because it gives the opportunity for fishermen to engage in seasonal agricultural activities while fish stock recover. Given the very limited opportunities for non-farm income in the delta region of the Senegal River, fishermen who have lost their land to cultivate will more likely continue to fish during the off season in order to meet their daily household needs.

Implications for Integrated Conservation and Development Projects

ICDPs are a popular mechanism for reconciling rural development and conservation goals but the results of such programs remain elusive. In a world in which policy makers and resource managers are heavily informed and influenced by cookie cutter models, this often time shapes the design of ICDPs. As a result, income generating activities that are conceived by external actors and often unconnected to traditional livelihoods are central to these programs. I believe that it is time for project managers to pay more attention to livelihood strategies that emerge from within the communities as a response to resource fluctuations. Whether or not these strategies, like income diversification through the adoption of complementary activities, are sustainable, research show that they have become an important attribute of rural livelihood. Therefore, recognizing this phenomenon and analyzing the factors that support or constrain its sustainability, both social and environmental, would be more productive in the direction for future natural resource management and economic development projects.

The case study of Diadième and Rone illustrate how the adoption of an activity, as a livelihood strategy, has the potential to be more effective and more accepted than ICDPs that are centered on ecotourism, socially, economically and environmentally. While further research needs to be carried to validate

the suggested social and environmental outcomes of the diversification process presented in this paper, MG are gaining a foothold in the transboundary delta region of the Senegal River, and calls for an evaluation from project managers. This evaluation will inform them on how to integrate MG with ICDPs currently in place to maximize livelihood security and conservation outcomes. 

Notes

A. If, like myself, you are interested in further understanding issues of gender associated with the adoption of market gardens or any emerging economic activity in rural Africa, I propose an insightful and well written account by anthropologist S. Wooten, Ph.D. in the following article: S. Wooten (2003). Women, men, and market gardens: gender relations and income generation in rural Mali. *Human Organization*, 62(2): 166-177.

B. I had the opportunity to visit Mauritania and other regions of Senegal only towards the end of my field study. Travelling to those regions was not part of my plan at first, but I felt compelled to find out more as villagers in Diadième and Rone made several references to those places as “model” of seasonal diversification through MG. The villages that I visited in Mauritania are also at the periphery of a protected area, Parc National du Diawling (sharing the same transboundary biosphere reserve as PNOD), but with very different management style which has arguably impacted the development of MG around the park.

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