

Traditional Fisheries of Rainforest Rivers in the Campo-Ma'an Area of Southern Cameroon

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This article presents a different type of bushmeat – aquatic bushmeat. The authors describe traditional fisheries in rivers of rainforest ecosystems. The case of the Campo-Ma'an Area of Southern Cameroon is analysed to illustrate that the aquatic animal resources of rainforests are important targets of community activity.

Forest waterways are important fishery resources that have underutilised potential to contribute to the livelihoods of forest dwellers and those beyond. Typical of these systems are fisheries in Lower Guinea rainforest rivers (and the forested part of the Congo Basin) that are comprised of two main exploitation systems corresponding to commercial and traditional fisheries. The commercial gill-net fishery target primarily catfish during low-water fishing seasons and are generally operated by men, including full-time and seasonal fishers. Fish caught in this activity is often smoked and stored prior to marketing, providing seasonal food and income for the fisher family. On average, men fish about 144 days per year, capturing an average of 330 kg of fish, for a catch per unit of effort (CPUE) of 1.8 kg/fisher/fishing day. Fishery productivity in the Nyong River, just to the north of the Campo-Ma'an area, has been estimated at 1.3 tons/km² or 13 kg/ha of watershed (Brummett et al. in press). This is similar to the 16 kg/ha of watershed reported for the upper Cross River (Mdaihli et al. 2003).

The traditional fishery in the Lower Guinea, is dominated by women who focus their efforts on the thousands of kilometers of smaller first and second order streams that permeate the rainforest. Basket traps and small dams (alok) are used to capture a wide range of small fish and crustaceans that are consumed directly by the family, contributing to household food security. The harvest, however, is small. In 16 aloks observed over the course of a year, the average weight of fish harvested per alok was 5.14 kg per 280 meters of stream, distributed among an average of 23 people, for a return of 220g per person. With an average investment of 5 working hours per alok (including dam construction), each fisher receives 40g fish per hour of work (Figure 1).

Figure 1. Apportioning a typical alok harvest among the fishers (photo RE Brummett).



Due to low quality carbon and phosphorus inputs from the forest, low alkalinity and low levels of sunlight, the productivity of rainforest streams is generally low (Farjalla 2002, Davies et al. 2008). In the small streams sampled in the Campo-Ma'an area, the fish and crustacean standing stock is 26 g/linear meter. Extrapolated to the 6,610 km of the 1096 low-order watercourses in the Campo-Ma'an National Park and buffer zone, the harvestable fish standing stock can be estimated at 172 tons.

According to local people interviewed, these streams are

harvested on an average every three months, throughout the year. In an attempt to determine the effect of this level of fishing pressure, a study was undertaken on the Bikobikone River. Assuming that the villagers are correct and that these streams can be harvested every three months without significantly reducing the total fish biomass over time, the total annual harvestable production is a bit less than 700 tons. This has a local retail value of about \$700,000. Calculated per hectare of watershed, the total of 0.9 kg/ha is only 6% of the 13-16 kg/ha estimated from annual catch rates in the main rivers of the Nyong

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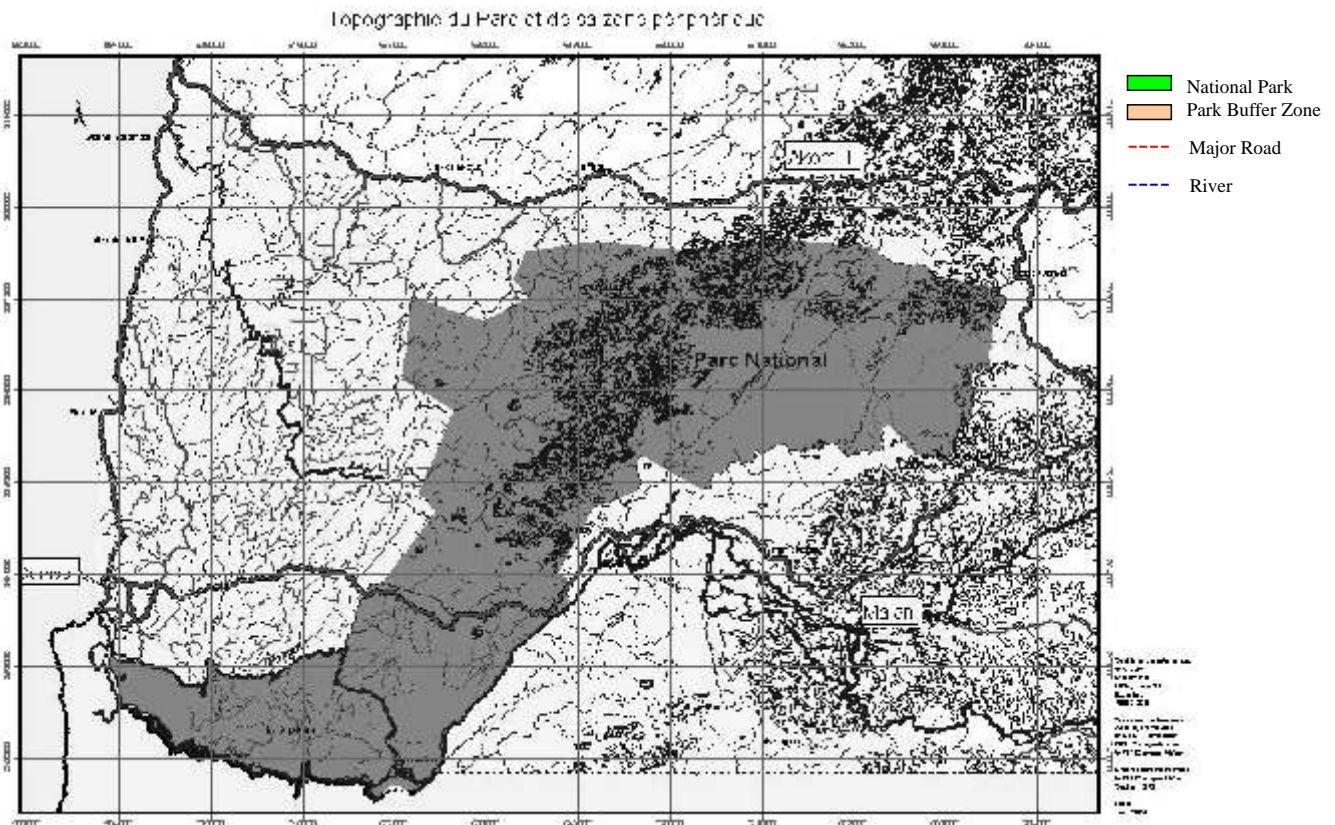
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(Brummett et al. in press) and the upper Cross River watersheds (Mdaihli et al. 2003). To the extent that these estimates are reliable, the vast majority of the biomass in these systems seems to be accumulated downstream in larger order rivers.

The Campo-Ma'an Area of Southern Cameroon: The Lower Guinea Rainforest extends over 500 000 km² along the Gulf of Guinea from the Cross River nearly to the Congo; including some 50 major and minor rivers (Mahé & Olivry 1999). The Campo-Ma'an area of South-Central Cameroon (Figure 2) is typical of the Lower Guinea rainforest ecosystem. The Campo-Ma'an National Park and its buffer zone occupy an area of 7,762 km². Within the buffer zone are two active logging concessions and two agro-industrial estates (hévea and oil palm). Most of the zone is secondary rainforest having once been logged. New economic developments include two new deepwater ports and an iron mine planned in the area west of the Lobé (WWF, Personal Communication, May 2008). In the park and buffer zone are found at least 1,500 plant species, 390 species of macro-invertebraes (excluding the Arthropoda which have not been enumerated), 249 fish species (in three river basins), 302 species of bird, 122 species of reptile and 80 large and medium-sized mammals, including endangered forest elephant (*Loxodonta africana cyclotis*), forest buffalo (*Synerus caffer nanus*), lowland gorilla (*Gorilla gorilla*), chimpanzee (*Pan troglodytes*), mandrill (*Mandrillus sphinx*), leopard (*Panthera pardus*) and giant Pangolin (*Manis gigantea*) (MINFOF 2002). Endemism in the area is high. Also in the area are some 60,000 people living in 120 villages and 22 pygmy camps. The average population density in the area is 7.3 persons/km², but over a third of the people (24,000) live and work in the two agro-industrial estates, leaving large parts of the area completely uninhabited.

Figure 2. South-Central Cameroon including the Campo-Ma'an National Park and its buffer zone. Main areas of project activity are circled (MINFOF 2005).



As with fish biomass, fish species diversity and richness tend to increase as one moves downstream from a swamp, to first-order forest streams and to medium-sized tributaries to the main channel. This is due primarily to the addition of species rather than through replacement (Géry 1965, Welcomme & de Merona 1988, Kamdem-Toham & Teugels 1998). Reflecting this trend, catch rates at Nkoelon (downstream) averaged 42 g/linear m (29 species) of stream, as compared to 19 g upstream.

The basket-trap fishery is dominated by the freshwater decapod crustaceans *Macrobrachium* spp. and *Atya* spp., locally referred to as "crevettes". Although less important in headwater areas, "crevettes" are of major economic interest in the lower reaches, near the towns of Campo and Kribi. At between \$2.00 and \$6.00 per kg, they are 2-6

times as valuable as other fish. Interviews indicate that there are some 3400 women who actively fish and market freshwater prawns ("crevettes") in the Campo-Ma'an buffer zone. At present, the estimated total revenue accruing to people in the area is about \$3.4 million per year for a volume of approximately 1,140 tons. The vast majority of the crustaceans caught and traded is *Macrobrachium vollehovenii*, the largest crustacean species in the area. It is clear that the aquatic animal resources of rainforests are already important for forest communities, although their significance could possibly be even greater. There is a need to better understand the biological and socioeconomic dynamics of these resources to develop strategies for optimal sustainable management to the benefit of all.

Acknowledgements

This work was supported in part by the Conservation Trust of the National Geographic Society.

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⁵ out of a total female population of approximately 28,000 (MINFOF 2005).