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Floodplain rehabilitation and the future of conservation & development : adaptive management of success in Waza-Logone, Cameroon

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Floodplain Rehabilitation and the Future of 'Conservation & Development'

A PHOTOGRAPHIC OUTLINE



This story of Waza-Logone is long and has loops and many details. The following photographs and their captions illustrate the essential aspects of the story. They touch upon each of the chapters in the same sequence as the text.

PART I – Introduction

The ecological background of the floodplain



The Adamaoua mountains, situated 500 km south of Waza-Logone, are the main catchment area of the Logone River.

The Mandara mountains, 100 km south-west of Waza-Logone, no longer drain directly into the Waza-Logone floodplain.



The dam and embankments of Lake Maga, built in 1979 for irrigated rice cultivation, block flooding of the Logone river and from streams of the Mandara Mountains into the southern Logone floodplain.



Within weeks of the floods receding, the area changes from a carpet of green lush grass into scorched earth.

The annual cycle of flood and drought characterises African floodplains. This thesis examines the ecological effects of this annual cycle, and what happens when it is no longer occurs and when it is reinstated again. The reinstatement of the annual flood and drought cycle is what is meant by 'reflooding'.





Acacia seyal shrubland borders the floodplain. It is not only an important source of food for wildlife, but also provides Arabic gum and firewood to local communities



The rocks near Waza town tower above *Sclerocarya birrea* woodland that dominates the sandier, slightly elevated parts of the western Waza-Logone area. Here wildlife concentrates during the rainy and flooding seasons.



Three species of vultures with Giraffes near a waterhole in the western part of Waza NP. The importance of Waza NP was recognised in its designation as an UNESCO-Man and Biosphere Reserve.

Concentrations of waterbirds and Kob in the eastern floodplain part of Waza NP. The national park and floodplain were selected as Important Bird Area and presented as the first Ramsar Site of Cameroon.



Lion escaping the heat. Spectacular wildlife such as Elephant and Lion attracts more tourists to Waza NP than to any other protected area in Central Africa.

The floodplain people and the resources they use



Ramparts of Zina, a Kotoko town in the centre of the floodplain. For centuries, the Kotoko used to be the rulers of the floodplain, which has a long history of conflicts over floodplain resources.

The Kotoko used to be the exclusive owners of fish canals. This unique fishing technique drains depressions towards the main watercourses at the end of the flooding season. At the end of each canal the fisherman places his nets and traps almost the entire fish population that lived the previous season on the floodplain.



Fish canals from the air, taking receding waters towards the Logomatya, a branch of the Logone River that can be seen in the background.



Dieguéré, a Musgum village on the edge of Waza NP. The Musgum are generalists who cultivate, fish and keep livestock. Most of them settled in the floodplain in the early 1900s.



Fishing on the plains near Zwang at the onset of the floods.



Sorting fish. In Waza-Logone, fisheries are second only to grazing in its economic importance.





Andirni, an agropastoral village created in 1917 because of the proximity of several pools. Many FulBe and Arab agropastoralists settled in villages like Andirni south of Waza NP after the droughts of the 1970s.



Inside the house of Fannie, wife of Moussa Barka, a park guide living in Andirni. On the left the decorated bed, showing the family's transhumant roots. For years, Moussa and Fannie were our wonderful hosts.



Young men herd the cattle of the agropastoralists.



FulBe and Arab transhumants move with their families. This harsh life is increasingly being abandoned for life in villages and towns with health, marketing and schooling facilities.

The ecological impact of the Maga dam



Deserted quarter of Mahé, in the north-east corner of Waza NP. After the Maga dam construction approximately one third of the sedentary and mobile population of the floodplain left.

Dead Giraffe in Talabal waterhole.

Dead Kob antelope. Following the Maga dam construction the Kob population crashed from 20 000 to 5 000. Its population further declined to 2000 by the end of the 1985 drought. Rinderpest hit the Kob hard during those years as well.





Since the completion of the Maga dam, waterholes are filled by tankers towards the end of the long dry seasons to help keep wildlife alive.



The only *Vetiveria nigriflora* left in the western floodplain, where prior to the Maga dam this tussock grass used to be dominant. It is not the lack of water but especially the drop in perennial grass production that has caused the ecological catastrophe following the dam construction.

The lead-up to the reflooding and the first water coming through



The Maga rice scheme with large parts of its area left fallow. In the early 1990s, it had become increasingly clear that the Maga dam was an ecological as well as economic failure. The continuing import of Asian rice, available in the whole of northern Cameroon, testifies the failure of the Maga irrigated rice cultivation scheme. With the start of the Waza-Logone Project in 1992, the issue of reflooding was no longer a taboo.



Consultation of local people showed unanimous support for the reflooding. Local communities had never been consulted before and were hostile to the Maga dam.



Breaching of the embankment in 1994.



View from the Logone at the reopened 'Petit Goroma' in flooding, with on the left the remaining embankment. From September 1994 onwards, 20 000 litres water per second flowed additionally onto the floodplain for three months of the year.



Car stuck near Andirni

The Waza-Logone project has put much effort in monitoring the impact of the (pilot) reflooding to prepare large-scale reflooding. Transport conditions were often difficult, it took one day to travel by car and boat to Zina, the centre of the floodplain. From there it was another two days by canoe or foot to the furthest monitoring sites.

Tracks become navigable for canoes during the flooding season.



Following the monitoring transect from Zina to Waza NP on foot.

PART II – The Impact of Reflooding in Waza-Logone

Impact of the reflooding on vegetation dynamics



Installation of a monitoring grid, in the heart of the reflooded area where flooding and vegetation dynamics were intensively monitored. In 1994, prior to the reflooding, the grid was largely covered by *Sorghum arundinaceum*, a stout annual grass that invaded the floodplain during the absence of flooding in the mid-1980s.

Sorghum arundinaceum survived several years of flooding but it ultimately disappeared from the reflooded area. With its hard-to-digest reed-like stems containing few nutrients, it is of limited grazing value.

Aerial view of the eastern part of Waza NP. In 1996 *Sorghum arundinaceum* still covered large stretches of the floodplain, especially around waterholes, such as at Tchikam. (the woody vegetation is dark green, the shorter mostly biannual grasses, are clear green, whereas the stout Sorghum can be recognised by its beige-greenish colour).





The transect running from Zina into the heart of Waza National Park was installed in 1984 by students of Leiden University. Covering always flooded, reflooded since 1994, and desiccated floodplain since the Maga dam, the transect was an important base for (qualitative) vegetation monitoring.

The typical perennial floodplain vegetation, with the rhizomatous perennial grasses wild rice (*Oryza longistaminata*) and *Echinochloa pyramidalis*. The cover of perennial grasses increased between 1993 and 1999 from 41 to 75% of the area affected by the reflooding. In 2003, almost the entire reflooded area was covered with perennial grasses again.



In the foreground (bi-) annual vegetation with its large open spaces, which allowed a recolonisation by the perennial floodplain grasses through lateral rhizomatous growth (from the background).



Vetiveria nigritana, a tussock grass, has not been able to recover in the reflooded area despite its good condition elsewhere in the floodplain. We attribute this set-back to the changed direction of flooding, with a lower quantity of sediments it carries.

Impact of the reflooding on vegetation production



This study clarified the link between maximum flood depth and vegetation production. With a 20cm rise in maximum waterlevel through reflooding, above-ground biomass increased with approximately one third.



Measuring dry season regrowth following fire. Regrowth, important because of its high quality and availability in the dry season, is expected to increase only after several years when sufficient rhizome biomass has been accumulated.



Kob antelopes gathering in area with fresh regrowth after burning.

Impact of the reflooding on waterbirds



Foraging crane family on perennial floodplain grassland. Estimated numbers of Black-crowned Crane dropped from over 10.000 in the early 1970s to 2000-2500 during the 1990s. The latter number still represents one sixth of the world population of the western subspecies of the threatened Black-crowned Crane. Black-crowned Cranes are present in Waza-Logone during the entire year and strongly depend on flooding for both breeding and foraging.



Black-crowned Crane nest built on an inundated *Vetiveria nigritana* tussock, the grass species that showed a dramatic decline after the Maga dam construction and has not yet shown any recovery.



Waterbird counting team of the Garoua Wildlife College and Waza-Logone project. Total numbers of observed waterbirds increased between 1992 and 2000 from 60 000 to 105 000. A combination of factors was found to be responsible for this increase, including improved rainfall (especially ducks and geese), floodplain rehabilitation (omnivorous storks and herons) and protection measures (some locally breeding storks and herons).



White-faced Whistling Duck. The increase in ducks and geese in Waza-Logone corresponds to their recovery over most of West Africa following the droughts in the 1980s.



The increase of Black-headed Heron (an omnivorous heron) was attributed to a combination of floodplain rehabilitation and colony protection.



Black-headed Heron colony in Andirni. Because of protection by the village and floodplain rehabilitation, this colony has increased from 750 in 1993 to the exceptional size of 2500 nests from 1999 onwards.



Large fish-eating birds such as Yellow-billed Storks did not benefit from the reflooding because of repeated destruction of their colonies. Young birds are increasingly taken for consumption, not hindered by fishermen who believe that fish-eating birds reduce their own catch.



Destroyed Marabou Stork colony at Halé in 1997. Afterwards Marabou Storks moved to Kalya in the centre of Waza NP where the colony increased to more than 500 nests but was destroyed again in 2002.

Impact of the reflooding on antelopes



Park guard counting animals at Gobe waterhole in Waza NP. At the end of the dry season, only a handful of water points remain, allowing fairly accurate counts of animals that drink daily, such as most antelopes.



Kob antelopes. The initial increase in number of Kob after the reflooding did not continue beyond 1997, possibly because of competition from increasing numbers of livestock.



Red-fronted Gazelle, a Sahelian species, the only species that has benefited from the drying out of the floodplain.

The responses of pastoralists to the reflooding



Discussions with agropastoralists from Fadaré. Responses of mobile pastoralists to the floodplain rehabilitation programme were assessed through interviews with leaders of over 100 pastoral camps, which were held at the end of each grazing season from 1993 to 1999.

Park warden questioning a herder inside Waza NP. One of the goals of the reflooding was to stop the incursions of pastoralists into the park to reduce the competition between wildlife and livestock for dry season grazing.





Signing of the contract between the Fadaré pastoralists, Waza NP authorities and Waza-Logone project (December 1997). This formalised the verbal commitment of Yerima, a respected pastoral leader, that he and his followers would not longer send their herds into Waza NP.



Grazing intensity tripled from 1993 to 1999 due to a sharp increase in number of pastoralists migrating onto the floodplain each year. Because of this increase in livestock numbers, the condition of individual cattle has hardly improved. This leaves few incentives for pastoralists to refrain from grazing the good pastures inside Waza NP.

PART III – Enhancing Conservation – Development Integration by Management Planning and Training

The risks of a Conservation & Development project that is too successful



Lougouma, village on the border of Waza NP. If the park was really completely closed for the exploitation of natural resources such as wood, thatch grasses and pastures, the 15 villages surrounding it would not be able to stay where they are.

Newly built quarter at Lougouma village hosting people arriving after the improved flooding.



The Sultan of Logone Birni in front of his palace. Traditional authorities have lost much of their power and no longer control settlements in 'their' area. It is in the interest of village chiefs to allow an increase in population, as it gives them more power and financial means. As also the government has little control over these settlements, there is a need for developing alternative local management structures.



Fishermen returning from fishing in Waza NP. After the reflooding, the number of fishermen increased by a third, whereas the number of seasonal fishermen increased even more.



Kalamaloué National Park, where the disappearance of wildlife due to human encroachment is a bleak perspective for nearby Waza NP.

The difference that management planning can make



Practising a new fire policy in Waza NP. Traditionally, management plans focus on technical and ecological issues, which were also included in the Waza Management Plan.

Removing mud out of the waterhole at Kalya, in the centre of Waza NP. As long as the flooding remains inferior to the pre-dam period, the maintenance of waterholes will be an essential management activity in Waza NP.



Elephant poached inside Waza NP. Also with increased local community involvement in conservation, anti-poaching remains an important activity because of the continuing presence of well-armed commercial poachers.



Triggered by Participatory Rural Appraisals in each of the villages around Waza National Park, a dialogue was started between local communities and national park authorities. This was an integral part of the Waza management planning, building consensus on sensitive issues such as demarcation of the national park and the exploitation of resources such as straw and Arabic gum in the park.



Meeting of the Waza NP committee, with representatives of park villages and transhumant pastoralists. One of the most significant results of the Waza management plan was this platform where local communities are consulted on park management issues.



Building the new village of Halé, outside the national park. Whereas decades of oppression towards Baram, the village in Waza NP, only caused frustration, the new more balanced policy of the 'carrot and stick' resulted in the voluntary movement of more than half of its population to Halé.

Water pump that was installed at Halé with the support of the Waza-Logone project.



A new future.

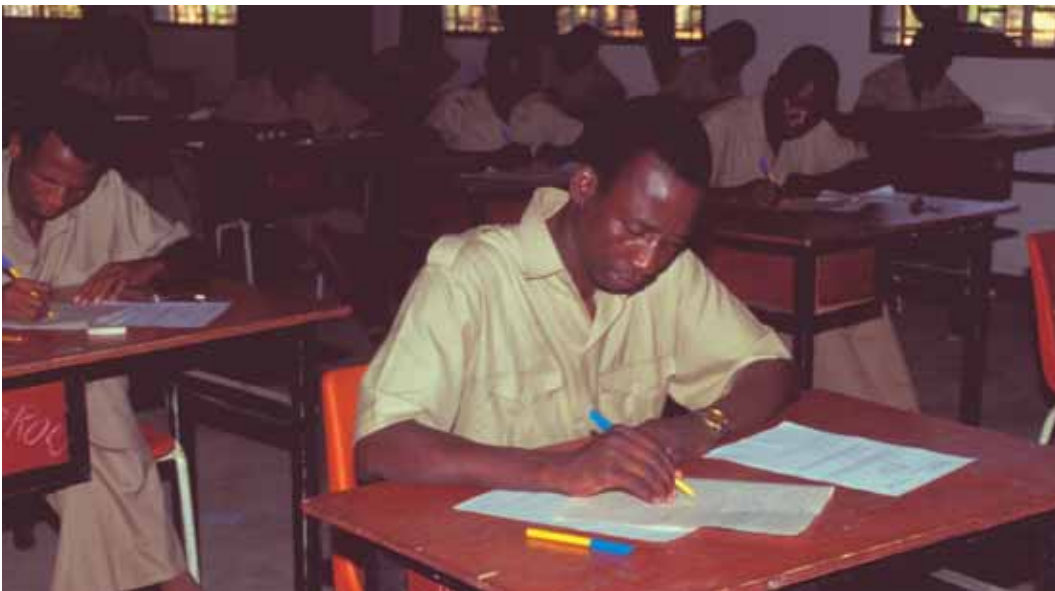


View of Halé village

The importance of developing capacities of protected area managers



Mweca wildlife college. The three African regional wildlife colleges together have trained more than 4000 protected area managers many of who are presently in charge of protected areas. Protected area managers generally have little input in protected area planning and community conservation. Their lack of capacity in these disciplines was not unique to Waza-Logone but was also identified as a major constraint for Integrated Conservation & Development Programmes elsewhere in Africa.



Examination at the Garoua Wildlife College. This francophone college has trained protected area personnel from over 20 West and Central African countries since 1970. Its curriculum was outdated however. A new curriculum was therefore developed and implemented in the late 1990s. Our study analyses the factors that influenced this curriculum reform in the college's endeavour to respond to new developments in African wildlife management.



Trainees expressed their interest in field trips and exercises as the most effective type of training, addressing skills and complementary to the predominantly knowledge-based classroom training.



Field training, counting wildlife in a protected area. Planning and financial problems are the main reasons why field trips rarely cover the quarter of the training time they are programmed to occupy.



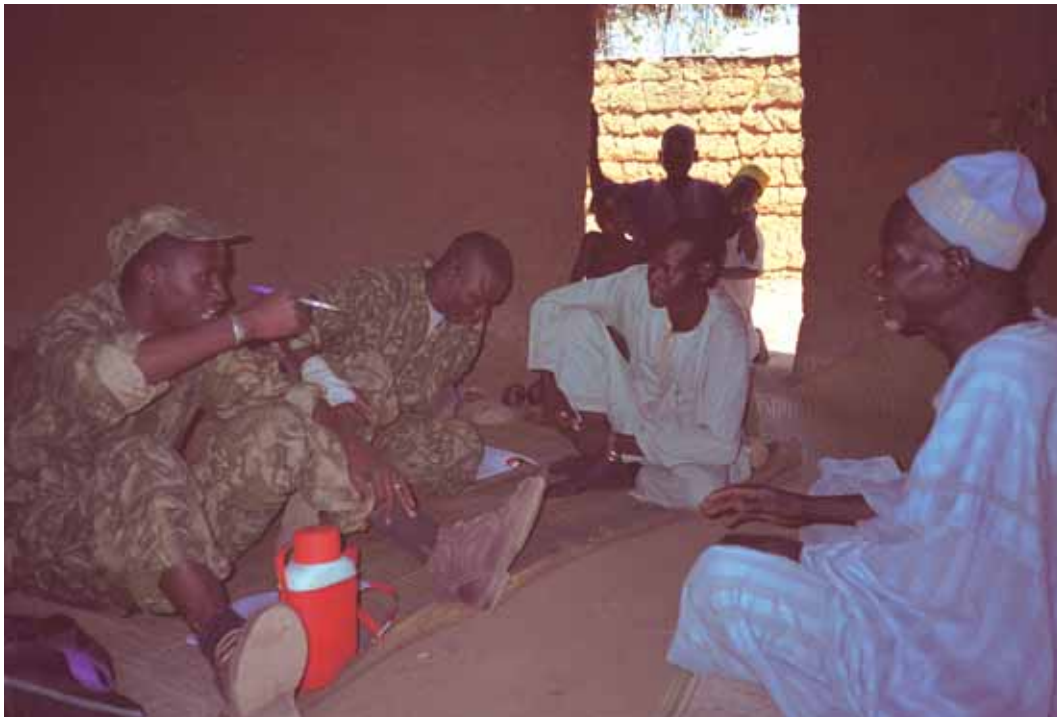
Botanical field training.



Computer exercises at the Southern African Wildlife College. After some initial hesitation, computer science has become an integral part of the wildlife curricula at the three African wildlife colleges.



Anti-poaching training for Waza National Park Guards. This was their first training for over a decade in these essential skills.



Garoua students practising Participatory Rural Appraisal, a field exercise in the newly developed Community Conservation course. This study reviews the trainees' evaluations of this course to appreciate its relevance and support its further development. Their reactions suggest that protected area personnel are not 'attitude limited' as often suggested. Their constraints to develop a more people-oriented work style lie largely in the areas of knowledge and skills. These findings motivate increased efforts to implement training for protected area personnel in community conservation.



Exhausted after monitoring the transect from Zina to Tchikam and continuing to Waza town (with Moussa Barka, October 1997). This three-day trip by foot during the flooding season was my last with the Waza-Logone project.