



CAMEROON: INTEGRATED FLOOD MANAGEMENT IN RIVER LOGONE FLOOD-PLAIN

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Abstract. The case study provides information on how the reduction of the floods and the irrigation system and protection works have both contributed to affect the traditional flood management practices of the ecological systems of the flood plain. It should be noted that this is only a first draft and that additional material would be provided by the author to address in particular the issue of IFM.

1. Location

The area of the case study lies within a province of Cameroon located in the northern extreme of that country, and is covered by a very large plain that extends almost to the Lake Chad in the North. It forms part of a vast geomorphological unit, which is found also in Nigeria, Niger and Chad. Also known as Yaéré (which in local language means a plain periodically flooded), this plain includes a sector of the Waza National Park, an international protected reserve.

2. Nature of floods

The flood plain of Logone (Yaéré) and its impact zone are populated since centuries ago by a multitude of ethnic and cultural communities that lived initially from the exploitation of the natural resources production systems in the flood plains (fisheries, livestock, agriculture), both during the floods and after the recession of the waters. In addition, nomad peasants come from the different countries of the region to have their cattle graze on the plain during the dry season. The population directly concerned by this ecosystem could be estimated at present by some 700,000 inhabitants. A large extension of the Yaéré plain (8,000 km²) is periodically flooded by the overflows of the Logone River.

The natural hydrological flooding process in the Yaéré happens in three steps: at the beginning of the rainy season (May to July) the clays which form the essential part of the soils in the plain swell and become impervious. If rains are abundant they fill the wetlands and produce the first inundation in the lower parts of the plain. Then the runoff coming from the Mandara mountains, highly loaded with limestone, come immediately after to conclude this operation. The overflows of the Logone, which contribute the largest volume of the water, normally start at the beginning of September. Thus, water with a depth of 0.7 to 1.2 meters will cover the plain during 3 to 4 months. When the dry season starts a part of the floodwater returns to the river, but a large part is also lost by evaporation and the rest flows into the Chad Lake.

As with the rest of the Sahel, since the 1970s the region of Lake Chad, of which the Yaéré forms part, has been suffering a persistent drought. The Logone river follows the deficit sequence observed in the rainfall since that year; the reduction of the floods, which follows the same tendency, has as a consequence a reduction of the volume of the overflows or even their total absence during very dry years.

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3. Flood management and mitigation measures

In order to protect the population and the irrigated rice areas along the river, dykes were constructed between 1950 and 1970 on both margins of the Logone river so as to control the floods of the river. These activities continued until 1979, when they were completed on the Cameroon side with the construction of the Maga Storage Dam and the last 20 km of dykes. As a result of these, the hydrological system of the flood plain was profoundly altered; taking into account that these works were constructed during the period of persistent drought, these works accentuated even more the reduction of the flood volumes.

Studies undertaken in the 1990s have shown that the absence of floods recorded in the plain area are a result of the combined effects of the drought situation during the last 30 years and of the flood protection works. This has resulted in a reduction of the flooded surfaces in the order of 60%, as well as in the retention in the dam of the water highly loaded with limestone and other minerals, which plays a very important role regarding the fertility of plain soils.

All this has had a negative effect on the survival of the population in this region, where the flooded lands are very much used for the agriculture and grazing activities, while fishing depends on the duration and extension of the floods. The induced losses are in general very difficult to compensate by the advantages of the irrigation systems, where the performances are very often very mediocre. At the same time, the capability of sustaining the wildlife has considerably been reduced in the different national parks of the region.

In view of the seriousness of the situation, a number of studies were undertaken at the beginning of the 1990s to assess the possibility of re-instating the flooding process of the plain without affecting the irrigation systems. The first results have shown that the reopening of one of the main effluents of the Logone, closed in 1979, can lead to a re-establishment of the flooding dynamics and to the restoration of the floods in a very important part of the plain.

Finally, the influence of the climate change during the last decades on the "impoverishment" of the water resources in the whole Chad Basin does not leave any doubt. In addition, the combined effect of this climatic situation and the irrigation projects in Cameroon and Nigeria have caused a spectacular reduction of the level and surface of the Lake Chad. Of a surface of 23 000 km² and an average depth of 5.2 meters in 1962, it has gone down to 3,000 km² and 3.6 meters in 1985.

4. Flood and water management instruments

On the legal plan, there are a number of recent laws related to the environment and to the use of water resources, which have been promulgated after 1990. The legal frame of Cameroon for an efficient management of the environment is understood as "the total living and interdependent physical media" composed of air, soil and underground, the animal and vegetable world, as well as the human settlements.

5. Institutions responsible for flood management

From the institutional point of view, currently there are neither institutions nor administrative services responsible in Cameroon for the management of flood-related problems. However, there are a number of ministries in charge of issues related with the conservation of the natural environment in general and of water resources in particular. These are the Ministries of the *Environment and Forests* and of *Mines, Water and Energy*, which deal with institutional aspects and the management of the water resources; the *Ministry of Agriculture*, which is responsible for issues related to water and agriculture; the *Ministry of Higher Education* and the *Ministry of Scientific and Technical Research*, which have to do with research. This multiplicity of agencies



involved in these fields, with sometimes-conflicting interests, does not allow the development of a global approach of the questions related to sustainable development of water resources.

A Permanent Secretary for the *Management of Natural Disasters* has been established. It is charged with the organisation of protection and mitigation activities in case of catastrophes over the total territory of the country.

A *National Plan for the Management of the Environment* has been prepared and its application has been entrusted to the Permanent Secretary of the Environment of the *Ministry of the Environment and Forests*. Conceived as an organ of conception, management and control, this institution is responsible, amongst others, for:

- The establishment of the diagnosis of the state of the environment, including the changes which affect the various ecosystems;
- The elaboration of the national policy in the field of the environment, which includes the strategies of sustainable management of the natural resources;
- The participation in prevention and management of natural catastrophes and risks;
- The sensitisation of the population and environmental education; and
- The management of the environmental information system.

5. Main lessons learned

- In the context of the drought which affects the Sahelian region since more than 30 years, the accumulated effects of the reduction of the floods of the Logone and the irrigation system and protection works have both contributed to affect the traditional flood management practices of the ecological systems of the flood plain.
- The flood plains of the Sahel are very vulnerable ecosystems, in particular when their hydrological regime is affected. Therefore any intervention, whatever the scale, should be preceded by an impact study and be based on a good knowledge of the mechanisms which underlie the normal functioning of the environment, the interrelations between the natural phenomena, and between the various communities with different and sometimes contradictory interests.