

Living with or beside the river : Control of Brahmaputra's hydrological dynamics v/s peasant mobility

Vivre avec ou à l'écart du fleuve : contrôle des dynamiques hydrologiques du Brahmapoutre v/s mobilité des communautés paysannes

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ABSTRACT

In North-East India, every year during the monsoon season, the level of the Brahmaputra rises and floods cover the plain with silt and sandy sediments. The Brahmaputra undergoes extreme changes with regards its channel configurations, involving the erosion of cultivated and village lands. To prevent these phenomena, the territorial authorities have built embankments along the riverbanks in order to improve land use and to protect human settlements. Nevertheless, the Mising tribe has been used to coping with floods for a long time. They practise different types of paddy cultivation and grow varieties that can adjust to the various ecosystems. They also used to move their settlements according to how the river channels shift. However, nowadays, communities can barely transfer their dwelling-places when their villages are washed away because land records restrict their movements. Protected by embankments, villagers are no longer used to having to face floods. Consequently, they are not prepared when the river suddenly breaches embankments. Families find themselves landless and have to adjust their livelihoods. This paper focus on how the government is managing river dynamics, such as flood and erosion and how the riverside inhabitants adjust their livelihoods to newly created conditions. We question whether embankments effectively protect people or contribute to increase risks.

RÉSUMÉ

Au Nord-Est de l'Inde, chaque année pendant la mousson, le Brahmapoutre entre en crue et inonde sa plaine, recouvrant alors les terres de limons et de sédiments sableux. Le chenaux du fleuve sont particulièrement dynamiques et provoquent l'érosion de terres cultivées et de villages. Pour éviter ces phénomènes, les collectivités territoriales ont construit des digues le long des rives afin d'améliorer l'utilisation des terres et de protéger les établissements humains. Les Mising, "peuple du fleuve" se sont longtemps adaptés aux aléas hydrologiques. Ils déplaçaient aussi leurs villages suivant le mouvement des chenaux. Ils pratiquent toujours différents types de culture du riz et cultivent des variétés qui peuvent s'ajuster avec les différents écosystèmes de la plaine. Cependant, de nos jours, les communautés peuvent à peine transférer leurs demeures quand leurs villages sont emportés car les registres fonciers limitent leurs mouvements. Protégés par des digues, les villageois ne se préparent plus à recevoir les crues et les ruptures de digue ont des conséquences catastrophiques. De nombreuses familles se retrouvent sans terre et adaptent de nouveau leurs moyens de subsistance. Ce papier s'intéresse par conséquent à la façon dont le gouvernement gère la dynamique fluviale, comme les inondations et l'érosion et comment les habitants riverains ajustent leurs moyens de subsistance à des conditions nouvellement créées. Nous nous demandons si les digues protègent efficacement les personnes ou contribuent finalement à augmenter les risques.

KEY WORDS

Adaptation, Brahmapoutre, Erosion, Inondation, Mobility, Resilience

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In North-East India, every year during the monsoon season, the level of the Brahmaputra rises and floods cover the plain with silt and sandy sediments. The Brahmaputra undergoes extreme changes with regards its channel configurations, involving the erosion of cultivated and village land. To prevent these phenomena, the territorial authorities have built embankments along the riverbanks in order to improve land use and to protect human settlements. Nevertheless, the Mising tribe has been used to coping with floods for a long time. They practise different types of paddy cultivation and grow varieties that can adjust to the various ecosystems. They also used to move their settlements according to how the river channels shift.

However, nowadays, communities can barely transfer their dwelling-places when their villages are washed away because land records restrict their movements. Protected by embankments, villagers are no longer used to having to face floods. Consequently, they are not prepared when the river suddenly breaches embankments. Families find themselves landless and have to adjust their livelihoods. This paper focus on how the government is managing river dynamics, such as flood and erosion and how the riverside inhabitants adjust their livelihoods to newly created conditions. We question whether embankments effectively protect people or contribute to increase risks.

Methods/Material

The present study is based on a field survey conducted in Bokakhat, Dhakuakhana and Majuli subdivision, which took place from June to October 2009 and from October 2010 to February 2011. Survey consisted of interviews with different categories of stakeholders (people and peasants flooded villages, elected officials, local governments and non-governmental organizations - NGOs). A GIS project using topographical maps, Landsat and SPOT images was developed to analyse the dynamic changes of river's braided channel from 1970 to 2011, as well as people's mobility toward its banks. Breaches in embankment and related damaged area were recorded through a GPS land survey and verified on Google-earth images.

Result/Discussion

The Brahmaputra River flows through 2880 km. It takes its source in Tibet (China), where the river is known as Tsang-Po, then turns just before entering into the State of Arunachal Pradesh in India. It further flows into the alluvial plain of the State of Assam. In Bangladesh, the Brahmaputra joins the Ganga and both rivers finish their courses together in the Bengal delta (Goswami & al. 1999; Goswami & Das, 2003; Sarma, 2005).

Surrounded by hills and mountains of the Himalayan range, North-East India concentrates 80% of the annual rainfall (2500 mm/year) throughout the monsoon season from mid-June to mid-September. Water discharge in the rivers is directly correlated to the rainfall. Floods occur during the monsoon and the rivers discharge decreases during the dry season. During the rainy season, the Brahmaputra overflows and floods lower lands. The annual floods are beneficial to the plain ecosystems because they bring water to wetlands, promote fish cycles of feeding and breeding, increase soil fertility through silt deposit. However, beyond certain thresholds of duration and water level, floods can damage farms, crops and housing. These thresholds depend on the micro-topography and existing river control facilities. The great Brahmaputra River sculpts a landscape composed of a vast network of active and abandoned channels, sand banks revealed during the dry season and vast wetlands that reflect the past river paths.

The landscape of the Brahmaputra consists in a mosaic of environments shaped by the interaction of hydrological dynamics and human activities. Floods, riverbanks erosion and siltation are recurrent phenomena to which inhabitants of the plain have adapted their livelihood over the centuries. Therefore, agricultural activities depend mostly on hydro-climatological conditions.

In order to intensify agricultural production, to control river dynamics, to protect land and property from floods; embankment is an ancient structural mean. Those structures are constructed since more than 4000 years, at the time of the first "hydraulic civilizations". The Ahom kingdom was the first to introduce this land resource management in Assam. The British succeeded them. After Independence, the government of Assam has built embankments along both sides of the river, following thus the British rule policies. Those embankments are associated to administrative boundaries defined by local authorities that freeze territories and restrict mobility. Villagers therefore adapted their farming

practices to diked areas and are no longer prepared to flood related to breaches in the levees. The embankment, which was protecting the Dhakuakhana subdivision in the North - Lakhimpur district (Fig. 1) has progressively been eroded by the river and broke suddenly in 1998. Consequently, a major flash flood has inundated agricultural lands and villages, destroying much of the rice production. This flood has deposited large amounts of sand, making the land unfertile for several years. Therefore, inhabitants of 89 villages of the Dhakuakhana subdivision have lost their houses, their plots of land and thus, their livelihoods. Even if they are now looking for alternatives, they become increasingly vulnerable to hydro-geomorphological hazards.

Conclusion

The long-standing debate around river embankment is still crucial in Assam. Despite regular breaches local authorities still consider embankments as a way to control the river and protect farmland and villages. Simultaneously, the rural communities of Assam, such as the Mising tribe, have adjusted their livelihood to hydro-geomorphological hazards and to an environment protected by embankments. However, it has been demonstrated that these are temporary solutions that could not guarantee the permanent establishment of territorial and administrative boundaries. In fact, with the case study of Dhakuakhana, and the village of Matmora, we have shown that the river control through embankments instead of protecting people generate risks.

The hydrological capacity of the river Brahmaputra is impressive and the control of its course is a challenge for the state. Constructed as part of a dualistic approach of the relationship between the river and its inhabitants, the embankments recompose and immobilise territories.

The mismatch, between the river management and the hydro-geomorphological dynamics, have led to the increased risk of embankment failures and the occurrence of so-called "natural hazards". Those "natural hazards" are in fact the result of miss management of the river by engineers, headed by the government officers of the water resource department since the British rule. Indeed, the risk exposure is resulting from changes in the interactions between human activities and hydrological processes. The concept of risk comes from a representation of the environment in which there is a dichotomy between nature and society. These infrastructures are built to dominate nature and not to live with it. However, the river takes back ancient channels during floods, and poorly maintained facilities become out-dated and ineffective.

In the same time, traditional modes of spaces appropriation are constrained and regulated by administrative and land divisions. Administrative restrictions on territories limit the mobility of people, who become dependent on river engineering to survive. Landscapes and lifestyles of the plain are now structured by river engineering. Territories are thus in perpetual reconstruction, and communities affected by the process of erosion are forced to look successively for new land. However, the villages cannot be officially shifted, as there is no land available for resettlement. Villagers do not receive compensation for the plot they have lost, as administrative procedures are complicated and villagers still do not have documents to prove their ownership. Thus, the villagers of Matmora become increasingly vulnerable to hydrological risks, due to the lack of consideration of local livelihoods in the land management policies.

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