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Perception of Farmers of Vulnerability and Resilience of Agroforestry Systems to Climate Change in Benin

Isidore Gnonlonfoun[1], Achille Assogbadjo[2], Paul Cesaire Gnangle[3], Romain Glèlè Kakaï[4]

[1] *Laboratory of Biomathematics and Forest Estimations/university of Abomey-calavi, Department of Natural Resources Management, Benin*
[2] *University of Abomey-Calavi (FSA/UAC), Lab. of Applied Ecology (LEA), Benin*
[3] *National Institute of Agricultural Research (INRAB), Laboratory of Soil and Water Sciences, Benin*
[4] *Laboratory of Biomathematics and Forest Estimations/University of Abomey-Calavi, Department of natural resources management , Benin*

Abstract

Climate change leads to serious threats to ecosystems including traditional agroforestry parklands. Assessing the level of susceptibility and resilience of any ecosystem to climate change is important for sustainable adaptation. We assessed farmers' perceptions of the vulnerability of agroforestry systems to climate change in Benin. The objectives of the study were to (i) assess the main indicators of vulnerability of agroforestry systems to climate change and (ii) analyse agroforestry and cropping systems' resilience to climate change. We hypothesised that some agroforestry systems are more resilient to climate change than others. A total of 233 household heads and seven agroforestry systems were studied. Data collected were components, indicators of vulnerability and the level of resilience of agroforestry systems. Descriptive statistics based on the percentage of arborescent population and density of tree were used to characterise the agroforestry systems. A canonical factorial discriminant analysis was performed to differentiate agroforestry systems with regard to vulnerability indicators. The resilience of agroforestry and cropping systems was evaluated through four levels of resilience. Results showed that the vulnerability to climate change of *Anacardium occidentale* and *Citrus sensis* parks was especially determined by the number of components damaged in the system. Age and density of Vitellaria paradoxa parks and mixed parks (*Vitellaria paradoxa-Parkia biglobosa*) were indicators that determined their sensibility to climate damage according to local people. All agroforestry systems were perceived to be resilient to climate change but at different degrees. *Manihot esculenta* was reported as the most resilient crops to climate damage. Our findings are novel with respect to specific ecological indicators of the vulnerability of agroforestry systems to climate change. Our results support calls for considering indicators of the vulnerability of agroforestry systems, as well as their resilience when developing agroforestry adaptation strategies.

Keywords: Agroforestry systems, climate change, ecosystem services, food security, traditional ecological knowledge

Contact Address: Isidore Gnonlonfoun, Laboratory of Biomathematics and Forest Estimations/university of Abomey-calavi, Department of Natural Resources Management, Rie1, 04 BP 1525 Abomey-calavi, Benin, e-mail: isidoregnonlonfoun@gmail.com