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Small-Scale Farming, forest based-activities and deforestation in the Tridom transboundary landscape : A multilevel spatial analysis

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Slash-and-burn agriculture and forest based-activities are major livelihood suppliers to millions of rural people around the world. About 78% of the indigenous and local communities in the Dja-Odzala-Minkebe transboundary landscape (Tridom-Congo Basin) spanning Cameroon, Congo and Gabon depend on Small-scale farming (40,9%), Cash-cropping (19,6%), Hunting-Gathering bushmeat and NTFP (14,8%) and Traditional gold-mining (3%) as predominant livelihood activities. The related unsustainable practices have led to 85,45% of household's deforestation during the last two decades. The remaining household's deforestation being engendered by administration workers, artisans and miscillanous.

Despite a low population density (less than 4 inhabitants/km²), local households are less likely to practice optimal crop rotation as they can clear large area of land with poor productivity (for instance 0,12t/ha of cocoa production). As a result of this, secondary forest is progressively replaced by corkwood whose carbon storage potential is very low. Few research have investigated the relation between livelihood production and deforestation at household's level in the Tridom landscape. However, the unsustainable practices are not favourable to the intended objectives of the "Tridom Agreement" that was transboundary biodiversity conservation and sustainable livelihood for poverty alleviation.

This research seeks to investigate the relation between livelihood production and deforestation in the Tridom Landscape. Firstly, it aims to evaluate the livelihood assets provides by small-scale farming and forest-based activities. Secondly, it assess the factors driving small-scale deforestation, as well as the responsibility of agriculture and forest-based activities.

Our study uses multidimensional statistics on cross-sectional data from our recent 8 months stratified and random survey with 1035 household heads in 108 villages of the landscape to evaluate and compare the livelihood from the various activities. Afterward, a multilevel spatial econometrics model is estimated by maximum likelihood procedure to investigate the drivers of small-scale deforestation. This method allows accounting for socio-economic drivers, as well as Spatial spillover effects and Neighborhood Peer Effects on households deforestation. Preliminary results show that the spatial autocorrelation coefficient is positive and significant. Suggesting that households tend to imitate deforestation decisions of their neighbors. This phenomenon contributes to increase deforestation in the landscape. Furthermore, gender, education level, household size, traditional gold-mining, cash-cropping, small-farming are the main variables that underlie deforestation.

Precisely, households headed by women deforest 1.12ha less than men. Poor educated household heads deforest additional 0.91ha. Compare to hunting-gathering responsible of 2.3ha deforestation per household, cash-cropping and small-scale framing provoke additional 3.7ha and 1.7ha of forest conversion. The higher demand for the two last activities can be justified by the need of maintaining a certain level of livelihood. Households closed to the Nkom National Park in the Djoum Sub-division (Cameroun) deforest 0.42ha more than the remaining households. The household heads living in the Oveng, Mvangan and Yokadouma subdivisions in Cameroun use additional 7ha as compared to those living in Mvhadi, Makébé Bakwaka, Batouala and Makokou subdivisions in Gabon.

The results after thorough analysis, will point out the key factors to be taken into consideration that will undoubtedly help reduce small-scale deforestation and insure local and indigenous communities welfare.