

Evaluation of biodiversity offset implementation in selected Lake Victoria range natural forests in Uganda

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Abstract

Biodiversity offset is one of the tools that can be used to mitigate the negative impacts of development projects on biodiversity. The aim of biodiversity offset is to compensate for biodiversity losses at the project impact site with an equivalent biodiversity at the offset site. This study examined the ecological equivalence between the project impact sites and biodiversity offset sites for the power transmission line in Gangu and Mabira Forest reserves. It assessed the composition and diversity of woody species, bird species and soil physical and chemical properties that influence forest ecosystem health often affected by development as well as stakeholder perspectives of biodiversity offset. Data were collected from 12 (20 m x 50 m) sample plots and analysed in R version 3.4.4. Species richness and evenness were computed in Vegan package. Bird community composition and diversity were assessed using fixed-radius point counts. Chemical and physical properties of soil obtained from the impact and biodiversity offset sites were determined.

A structured questionnaire was administered to collect data on stakeholder perspectives on biodiversity offset in Uganda and the responses were subjected to thematic analysis. The results revealed significant differences in woody species composition and diversity between project impact sites and biodiversity offset sites. There were also differences in bird species composition between the impact and offset sites and a higher number of forest specialists was recorded at the impact sites while forest generalists dominated the offset sites. There were differences in the soil physical and chemical properties between the impact and offset sites. Stakeholders observed that biodiversity offsets in Uganda are characterized by weak law enforcement, poor governance, lack of baselines, limited local community consultation, unclear financial sustainability and inadequate capacity of institutions to enforce offsets regulations.

It is recommended that avoidance, rather application of biodiversity offset, is a better option for conserving woody and avian species diversity and should be prioritized in the Environment and Social Impact Assessment (ESIA). Offset sites should be managed to create and maintain a habitat that is favorable for forest specialist to counter-balance the species composition and diversity between the impact and offset sites. Future studies of species composition, richness and diversity at the impact and offset sites should include additional taxa such as butterflies, primates and small mammals. Soil analysis should include biological properties to broaden practical knowledge and scope of ecological equivalence.

Keywords: Biodiversity offsets; ecological equivalence, woody species, bird species, soil properties, sustainability