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Impact of Potato Crop Cultivation to Local Biodiversity in Musanze Province, Rwanda

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Abstract

Agricultural intensification influences ecosystem status and biodiversity of the environment. The Virunga volcanoes area, where parts of it are situated in northern Rwanda, is a biodiversity hot spot in Africa. The system is challenged by increasing human activities to guarantee food security. Food security and biodiversity are dependent to each other in terms of e.g. biomass production. The objective of this study was to reveal differences in plant and insect diversity and to identify distinctions in vegetation structure between two determined treatments, the buffer zone of the volcano national park, which implicit the natural ecosystem and the potato crop area. Two methods were used to quantify different biodiversity values and to characterise the impact of potato crop cultivation on biodiversity at Musanze province in Rwanda.

The method of vegetation mapping was applied, which offers, multi-usable information about vegetation structure and plant diversity. These indirect bio-indicators provide basic information on environmental status. The surrounding biotopes of the potato crop area and the buffer zone were mapped. By using barber-traps insect occurrence was analysed. Due to the catches the indicator species *Pterostychus*, a carabid beetle and the ant species *Pheidole megacephala* were defined. Out of their abundance it was possible to conclude about environmental status and soil condition. 56 insect species and 80 plant species were detected in the buffer zone compared to 40 insect species and 62 plant species in the potato area. The mean plant and insect abundance were also higher there. The measured structure coefficient was also higher in the buffer zone. In terms of the Vision 2020, Rwanda wants to intensify their agricultural production. It is questionable how conservation and intensification targets can be balanced. Every species provide important ecosystem services to e.g. produce biomass. Plant structures with a high diversity are unique resources for pollen or nesting sites and highly diverse ecosystems are more stable to pests and they are necessary to receive stable yields. It must be detected how the system can be intensified, with integrated pest management, artificial influences or a mix of them and how biodiversity with its ecosystem function benefit the agricultural system.

Keywords: Biodiversity, insect indicator species, potato-crop system, vegetation analysis, Virunga volcanoes

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