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Enhancing landscape multifunctionality in a biosphere reserve through agroforestry and non-timber forest product domestication

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Abstract

Biosphere Reserves (BR) are a tool to achieve multifunctionality in landscapes, but a policy-implementation gap remains. The Hangzhou Strategic Action Plan as the major guiding document for the next decade of BR development (2026–2035) calls for science-practice partnerships, through demonstration projects and sustainable resource management approaches tailored to the local context that integrate local and scientific knowledge.

This study documents the transdisciplinary research process for species identification for agroforestry and non-timber forest product (NTFP) domestication in Lake Bosomtwe Biosphere Reserve (LBBR), a mosaic landscape in the high-forest zone of Ghana. The study included a combination of structured surveys, botanical inventory and focus group discussions with local farmers. Joint site visits and excursions to agroforestry plots in Ghana allowed stakeholders to exchange local and scientific knowledge on management practices, yields and suitable species as well as on processing and marketing opportunities. A prioritisation process for species suitable to the social-ecological context included farmers' species preferences, current market demand, potential for value-chain development, conservation value and environmental suitability. The species finally selected for cultivation in local farmers' demonstration plots were *Aframomum melegueta*, *Piper guineense*, *Terminalia superba*, *Tetrapleura tetraptera*, *Triplochiton scleroxylon*, *Milicia excelsa*, *Khaya grandifoliola*, *Terminalia ivorensis*, *Pericopsis elata* and *Tieghemella heckelii*. Their potential to enhance the three functions of a biosphere reserve is examined, finding that they can strengthen conservation and development function, while the demonstration plots as collaborative learning platforms enhance the logistic support function of a BR. The demonstration plots enable farmers and stakeholders to observe performance, exchange scientific and local knowledge, and refine management approaches. The agroforestry plots allow to further adapt and co-develop agroforestry systems that strengthen multifunctionality of the LBBR.

Keywords: Agro-forestry, NTFP, transdisciplinary research