Cultivation Potential of Different Mango Varieties in Kenya, Considering Likely Impacts of Climate Change

JAMES NGULU, ROELAND KINDT, EIKE LUEDELING, KATJA KEHLENBECK

World Agroforestry Centre ICRAF, Tree Diversity, Domestication and Delivery, Kenya

Abstract

Agroforestry can potentially help smallholder farmers adapt to climate change. Trees, including fruit trees, are less prone to water stress than annual crops, and they provide valuable products for subsistence and income generation. Mango (*Mangifera indica* L.) production is an integral component of rural livelihoods in many parts of Kenya, but farmers' ability to grow this tree crop may be compromised by future climate change. These impacts are currently difficult to gauge, because the diversity of cultivated mango varieties, their distributions across Kenya's agro-ecological zones and their climatic requirements are poorly understood. Such information is needed for modelling future suitable ranges and for identifying areas in need of new, better adapted mango varieties. This study sought to establish the spatial distribution and performance of mango varieties along an elevation gradient across a broad spectrum of agro-ecological zones. Farmers' opinions about the future prospects of mango cultivation were documented. On 228 spatially-randomly selected farms, all mango varieties were inventoried and semi-structured questionnaires completed together with farmers. Qualitative response models were used to analyse and evaluate farmer's success following the adoption of different mango varieties. The survey identified 28 mango varieties, which varied widely in occurrence and abundance along the elevation gradient. Abundance, number and type of varieties also varied with gender of the household head, labour availability, farmers' income sources, availability of profitable and reliable markets, and the degree of market orientation of mango production. Respondents observed that they had made decisions related to mango cultivation based on changes that they had observed in rainfall and temperature during the past 15 years. The next step in this research will be the production of suitability maps for the different mango varieties for future climate projections. Results will be used to develop recommendations on suitable mango varieties, including the identification of locations where currently grown varieties will experience reduced climatic suitability. The developed approach can contribute to enhancing farmers' resilience to climate change through selection of mango varieties that can be expected to perform well under future climate conditions.

Keywords: Adoption, agroforestry, modelling, resilience, suitability maps

---