

## **Modelling the distribution of *Aspalathus linearis* (Rooibos tea): implications of climate change for livelihoods dependent on both cultivation and harvesting from the wild**

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### **Abstract**

*Aspalathus linearis* (Burm. f.) R. Dahlgren (rooibos) is endemic to the Fynbos Biome of South Africa, which is an internationally recognized biodiversity hot spot. Rooibos is both an invaluable wild resource and commercially cultivated crop in suitable areas. Climate change predictions for the region indicate a significant warming scenario coupled with a decline in winter rainfall. First estimates of possible consequences for biodiversity point to species extinctions of 23% in the long term in the Fynbos Biome. Bioclimatic modelling using the maximum entropy method was used to develop an estimate of the realized niche of wild rooibos and the current geographic distribution of areas suitable for commercial production. The distribution modelling provided a good match to the known distribution and production area of *A. linearis*. An ensemble of global climate models that assume the A2 emissions scenario of high energy requirements was applied to develop possible scenarios of range/suitability shift under future climate conditions. When these were extrapolated to a future climate (2041–2070) both wild and cultivated tea exhibited substantial range contraction with some range shifts southeastwards and upslope. Most of the areas where range expansion was indicated are located in existing conservation areas or include conservation worthy vegetation. These findings will be critical in directing conservation efforts as well as developing strategies for farmers to cope with and adapt to climate change.