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# Spatio-temporal dynamics of suitable habitats for *Detarium microcarpum* Guill. & Perr. (Fabaceae), a priority food tree species in Benin (West Africa)

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## 1- INTRODUCTION

*Detarium microcarpum* Guill. & Perr. (Fabaceae), is an indigenous multipurpose tree species in Africa (Agbo et al. 2019). Unfortunately, due to overexploitation of its timber and the effects of climate change, the species is becoming vulnerable (Adjahossou et al. 2016). It is therefore urgent to set up strategies for its conservation. Ecological niche modelling (ENM), one of the most recent fields in geographic distribution assessment, has emerged as a powerful tool for understanding species' present-day distribution and anticipating future shifts in response to environmental changes (Peterson et al. 2011). This study aims to answer the following questions: (i) what is the geographical distribution of *D. microcarpum* in Benin? (ii) How efficiently do protected areas network conserve the geographical distribution areas under present-day and future climates of *D. microcarpum*?



## 2- METHODOLOGY

**Study area:** 6 Phytodistricts where the species occurs within the Sudanian and Guineo-Sudanian zones, were prospected in Benin.

**Sampling and data collection:** 189 occurrences recorded using a GPS supplemented by those downloaded GBIF platform and 45 environmental variables from the WorldClim database were used.

### Data analysis

**Modelling and validation of the model:** Jackknife test, using MaxEnt to determine those of variables which contribute most to the distribution modelling. To assess potential impacts of climate changes on the species distributions, we transferred present-day model to 2 future climate models HadGEM2-ES and CNRMCM5.

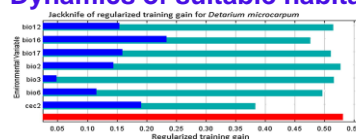
**Mapping and spatial analysis:** Outputs produced by the models were imported into ArcGis 10.3 to classify the different suitability levels for *D. microcarpum* from the logistic probability thresholds of presence ranging between 0 and 1 (Fandohan et al. 2013)

## 3- RESULTS

### Geographical distribution of *D. microcarpum*

*Detarium microcarpum* is present in Bassila, Zou, North Borgou, South Borgou, Atacora chain and Mekrou-Pendjari ==► *D. microcarpum* is a species adapted to several types of soil (Kouyaté & Lamien 2011).

### Dynamics of suitable habitats of *D. microcarpum*



7 environmental variables: bio2, bio3, bio6, bio12, bio16, bio17 and cec2.

Fig. 1 : Jackknife test.

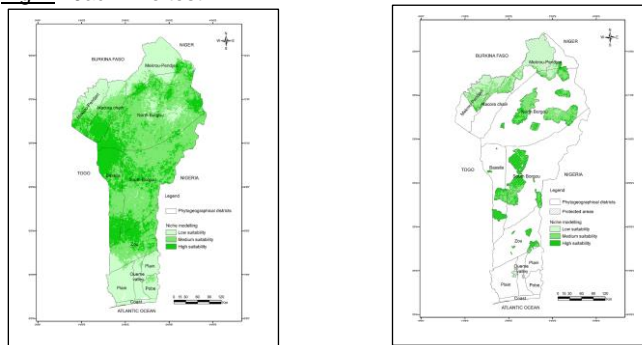


Fig. 2: Maps showing the present-day global suitable habitats of *D. microcarpum* (left) and in protected areas (right) in Benin.

Table 1: Dynamic of suitable areas for *D. microcarpum* for the present and the two future models in Benin.

	Low suitability	Medium suitability	High suitability
	Area (Km <sup>2</sup> )	Area (Km <sup>2</sup> )	Area (Km <sup>2</sup> )
Present	31743.77	58507.15	22371.08
CNRM-CM5	29912.58	54035.16	28674.26
HadGEM2-ES	28724.07	51623	32274.93

## 4- CONCLUSION

This study, which allowed to know the suitable areas for conservation of *D. microcarpum* thanks to a powerful tool of modelling is very important for the conservation of this species in Benin. Moreover, the occurrences collected on *D. microcarpum* constitute a crucial base for subsequent studies.

## 5- ACKNOWLEDGEMENTS



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- Rural world

## 6- REFERENCES

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