FOREST CONNECTIVITY RESTORATION THROUGH REFORESTATION

AN INTEGRATED METHODOLOGY FOR PRIORITIZING AGRICULTURAL LANDS AND SELECTING REFORESTATION SPECIES

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OBJECTIVES

Provide land planners and managers effective tools and methodologies…

1.To identify in advance those landscapes where connectivity should be really treated as a critical concern for the conservation goals.

2.To optimize the reforestation of agricultural patches in order to favor the enhancement of forest connectivity.

3.To make a more reliable selection of reforestation species.

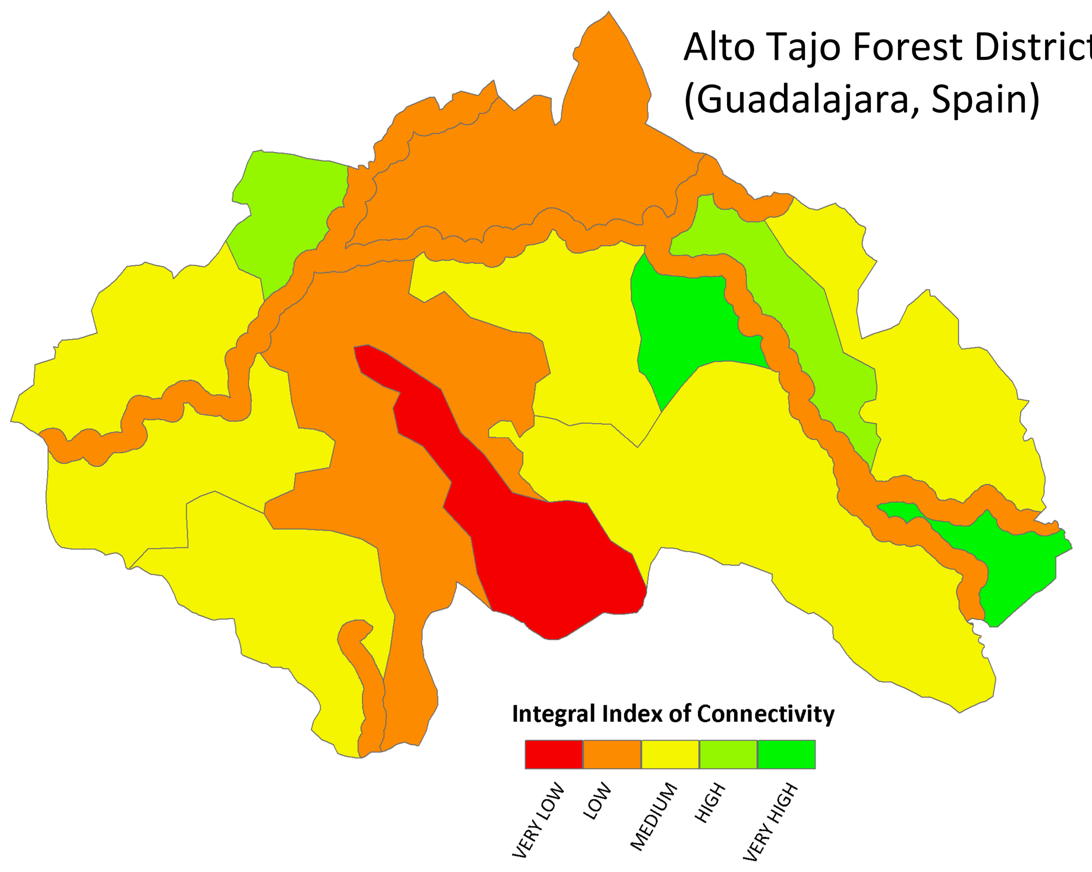
STEP 1

Quantify forest connectivity within landscape units

• Discriminate and map the landscape types according to abiotic and biotic variables (García-Feced et al., 2008).

• Use the software Conefor Sensinode 2.2 (Saura and Torné, 2009; available at http://www.conefor.org), a powerful tool for analyzing potential landscape connectivity, to calculate within each landscape unit the Integral Index of Connectivity (IIC, Pascual-Hortal and Saura, 2006) at a specified dispersal distance (as an example, the dispersal distance of the figures is 1000 m).

1



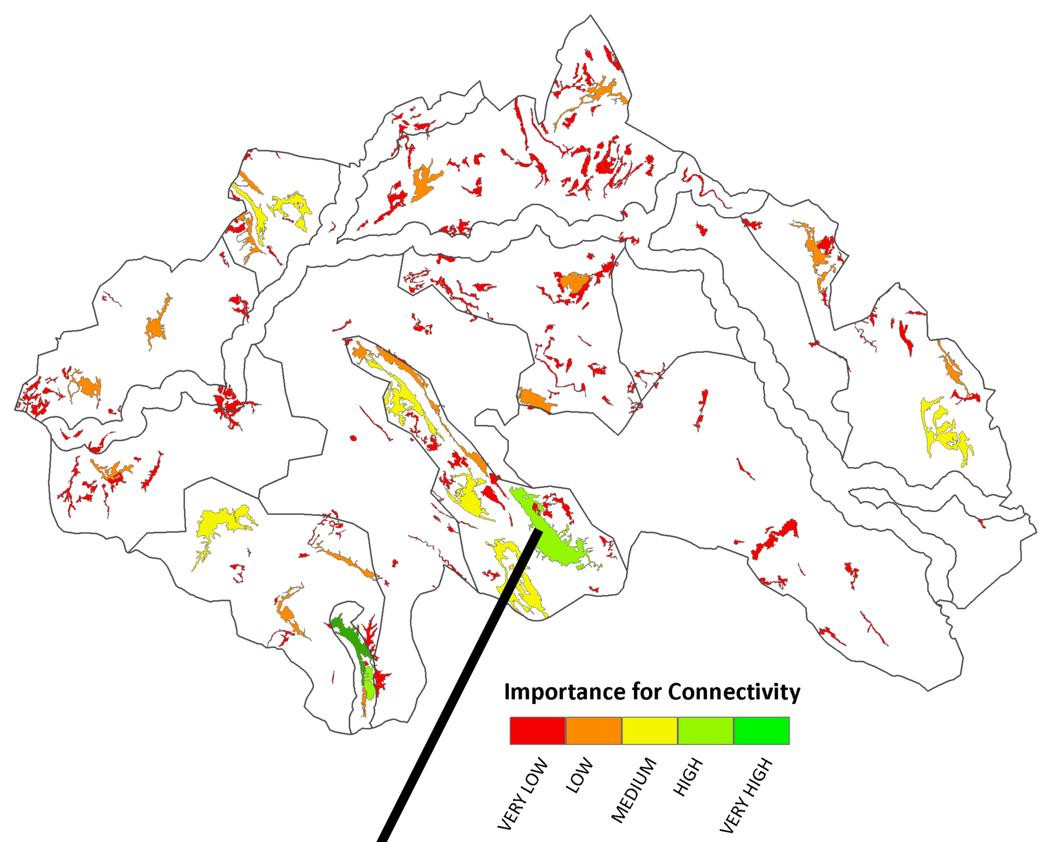
STEP 2

Identify priority agricultural patches for reforestation in order to enhance forest connectivity within the landscape units

• Calculate the increase of IIC (dIIC) that would result from the conversion of each agricultural patch into a forest (García-Feced et al., 2011).

• Classify dIIC values into five categories using natural breaks of the whole district values in order to prioritize patches for reforestation.

2



STEP 3

Identify suitable tree species and order them by probability of occurrence

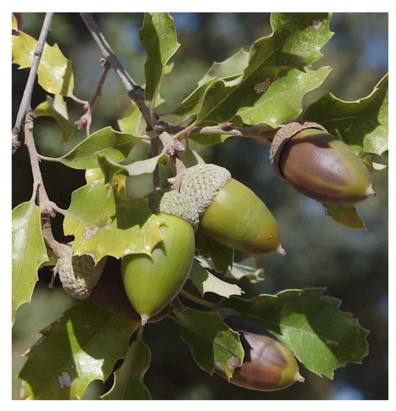
• Estimate occurrence probability of each tree species within the priority patches for reforestation using:

- Ecological niche models fitted with penalized logistic regression (Gastón & García-Viñas, 2011).

- Native tree species distribution data from the Spanish Forest Map as response variable and climatic and lithological variables as predictors.

3

Species	Occurrence probability
Quercus ilex	0.60
Q. faginea	0.43
Juniperus oxycedrus	0.32
Pinus nigra	0.26
P. halepensis	0.22
J. phoenicea	0.19
J. thurifera	0.15
Q. coccifera	0.14
Crataegus monogyna	0.12
J. communis	0.09
Acer monspessulanum	0.02
Amelanchier ovalis	0.01
Pistacia terebinthus	0.01



Suitable tree species in a patch important for connectivity

CONCLUSIONS

The major outputs of this combined methodology are: 1) A map of the agricultural patches that would contribute most to uphold forest connectivity if they were reforested. 2) A list of suitable tree species for those patches ordered by occurrence probability. Therefore this methodology may be useful for suitable and efficient forest planning and landscape designing.

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