Modeling forest growth for a large scale restoration in the South Eastern of Madagascar

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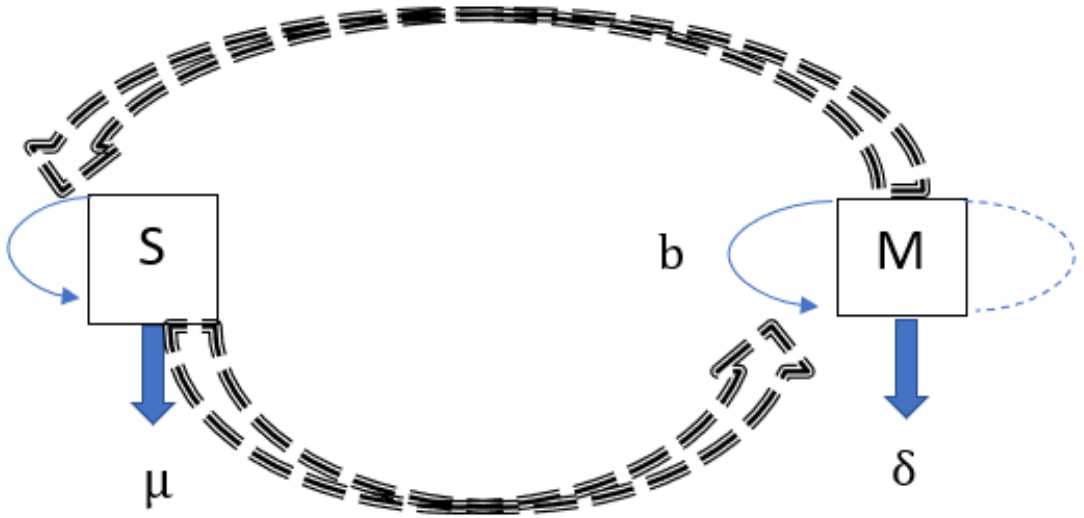
Background:
Classified as one of the key areas for biodiversity conservation, Kianjavato, South Eastern of Madagascar represents more than 10km long forest which is a part of the Corridor Fandriana Vondrozo (CoFaV). We set a total 60 of 50x50m^2 plots in 6 forest fragments.

Statistical Question: *What is the relationship between the crown cover and the basal diameter ?*

Mechanistic question: *How does the use of mycorrhizae affect the growth and survival rate of native seedlings?*

Acknowledgements: Miatrana and Estelle

Mechanistic question:
How does the use of mycorrhizae affect the growth and survival rate of native seedlings ?



States	Processes
S: Seedling	π= photosynthesis
M: Mycorrhiza	b= birth (mitosis)
	δ = death (competition fungi)
	μ = mortality rate

$$\frac{dS}{dt} = \pi SM - \mu S$$

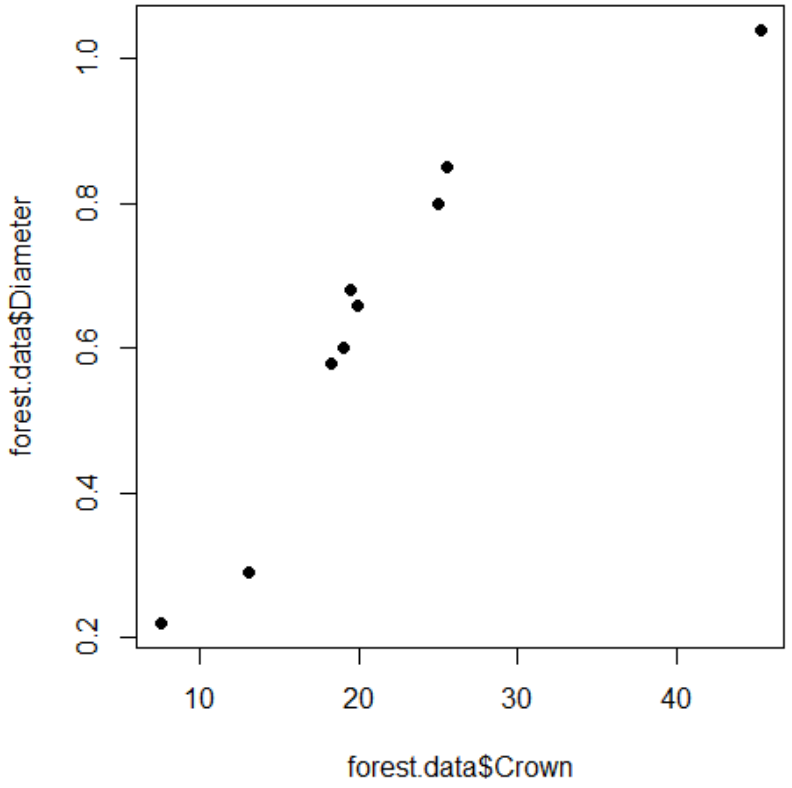
$$\frac{dM}{dt} = bMS - \delta M$$

Statistical question:
What is the relationship between the crown cover and basal diameter ?

Response Variable: variation of basal diameter
Family: Gaussian
Link: Identity
Potential Predictors: crown diameter
R code

lm(crown_cover~dbh, data=forest.data, family="Gaussian")

Hypothesis
We predict that the crown cover and the basal diameter are positively correlated all along the year.



Next steps:

1. Conduct more surveys in full wet and dry seasons ;

2. Consider more variables for building linear mixed models

3.Assess the variation of the canopy cover with all weather parameters by analyzing synthetic aperture radar and multi-date high resolution satellite images