

**Modelling the population dynamics of a native plant:
application to sustainable management of the babassu palm tree in Brazil**

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Abstract: Largely represented in Brazil, the babassu palm (*Attalea speciosa* Mart. ex Spreng.) is an endemic species of the primary forests in South America. In these forests the progress of the pioneer front has highlighted the babassu in the henceforth man-made open areas: pastures and cultivated fields. Babassu is a part of the "extractive" resources: gathering activity followed by marketing of non-timber products. According to estimates, this activity involves two million people among the most disadvantaged in the country. Despite this fact, the knowledge of sustainable functioning of this species among these anthropic environments are sorely lacking. Our work serves to clarify this functioning and to provide support of local populations to guide them towards a sustainable management of the babassu. This work is organized around the selection and the implementation of a mathematical model of population dynamics. The matrix transition models (integrating only stages) are the most commonly used. However, we have selected a model from those used for modelling Areaceae which is based on the cohorts (integrates stage and age). We finally confronted these two models. The results obtained in this study have shown that the model we have proposed is more suitable than the currently used matrix transition models. This substitution model can better integrate the concept of annual variability in population caused by both the external and internal factors. We have proved that the concept of age of the individual is essential and inseparable from that of stage. The results obtained from simulations based on our model indicate that the unstationarity and stochasticity can be introduced for both parameters. Currently our team conducts a three years field study in Brazil. The results will allow us to have a clearer outline of the structure of our model. Moreover, these data will serve to feed and calibrate the model.