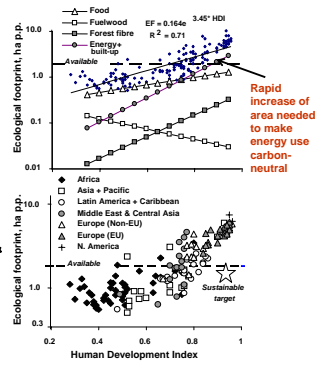
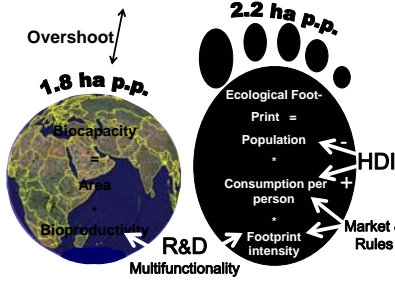


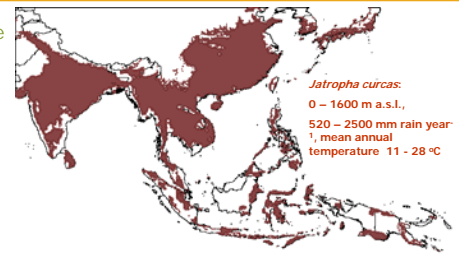
# Jatropha in agroforestry context? WaNuLCAS predictions



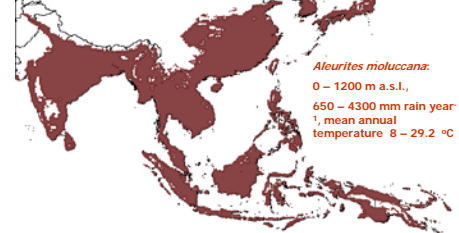
With the human footprint exceeding the natural resource base of the world, at current population size, lifestyle and (in)equality, the relationship between human development index (HDI) and the energy-related footprint is of particular concern. As long as energy use is mainly based on fossil fuel, current western lifestyles are unaffordable.

Biofuels have attracted a lot of attention as potentially C-neutral sources of fuel.

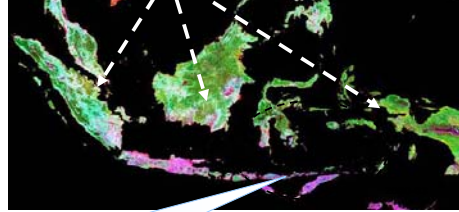
Jatropha curcas as plant for 'degraded soils' and 'not competing with agricultural crops' has raised special interest



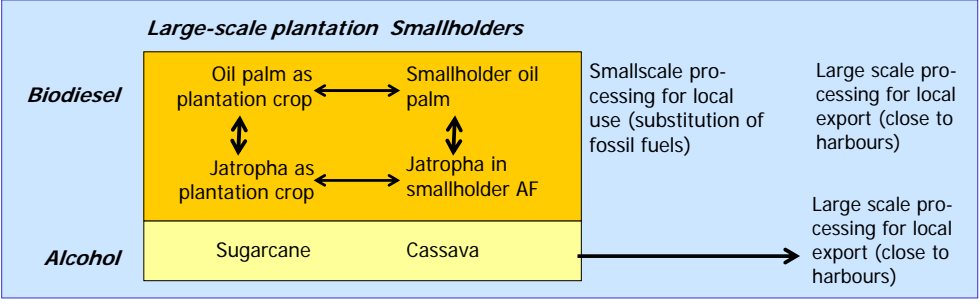
In terms of ecological requirements and potential distribution, Jatropha can be well compared to *Aleurites moluccana*



Jatropha as export crop: \* Not competitive with oil palm, even on mediocre oil palm habitat

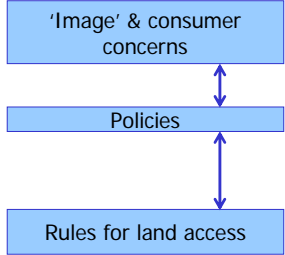


Eastern Indonesia - remote locations, substitution for expensive fossil fuel for fishing boats etc. Further spatial analysis needed....

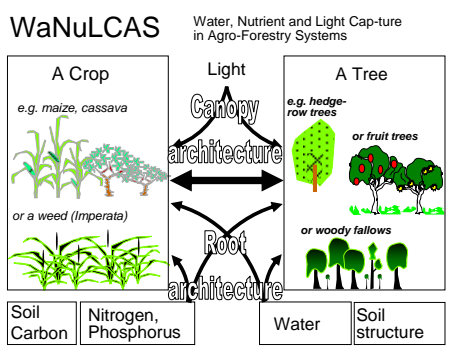


## Paradigm choice...

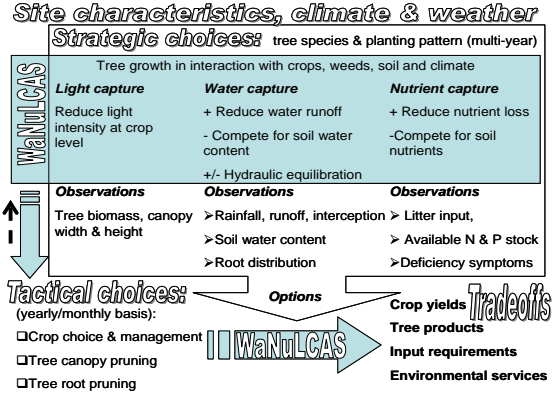
- Jatropha as plantation crop (A), bordering on 'horticulture' - intensive water & nutrient management, pest control etc
- Jatropha as one of the (many) components of smallholder production systems (AF)
  - risk averse strategies
  - return to labour not return to land as primary criterion
- Jatropha as forestry species (F)



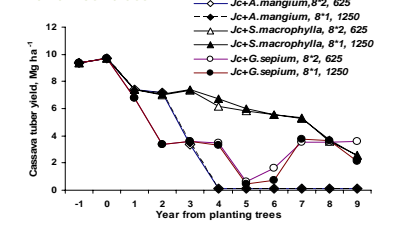
## Components of the WaNuLCAS model



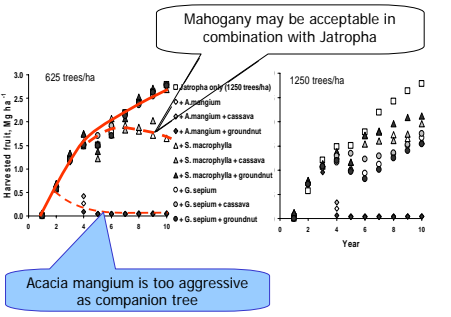
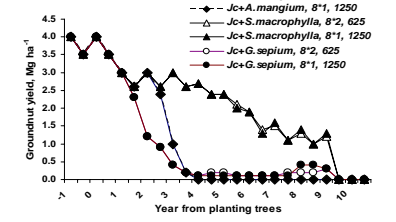
## Steps in exploration of site-specific intercropping scenarios (tradeoff analysis)



Cassava can be intercropped between Jatropha with timber trees...



Groundnut can be intercropped between Jatropha with timber trees...



## Conclusion

The model scenarios presented here are a first step in the exploration of intercropping options for *Jatropha* for different soil and climate combinations. Depending on the level of initial soil organic matter and subsequent rates of mineralization, in reality the nutrient stress may well develop faster than presented. Potential benefits of intercropping with leguminous trees may also be underestimated in the simulation. A research program to improve the simulation tool would have to follow the steps presented above and collect a number of data sets for validation, across the relevant range of soil and climatic conditions. Based on existing and validated tree data sets, a range of intercropping scenarios can then be explored, with economic valuation of the input-output tables under various assumptions of prices for inputs, labour, outputs and discount rates. Considerations of uncertainty in these parameters can then be used to project farmers risk for monoculture and mixed options. A concerted effort to derive a valid parameter set can thus pay off in the exploration of ways *J.curcas* as biofuel crop can be safely integrated into diverse farm landscapes, minimizing risk and maximizing utility to farmers.