# Linking Research to Conservation Action


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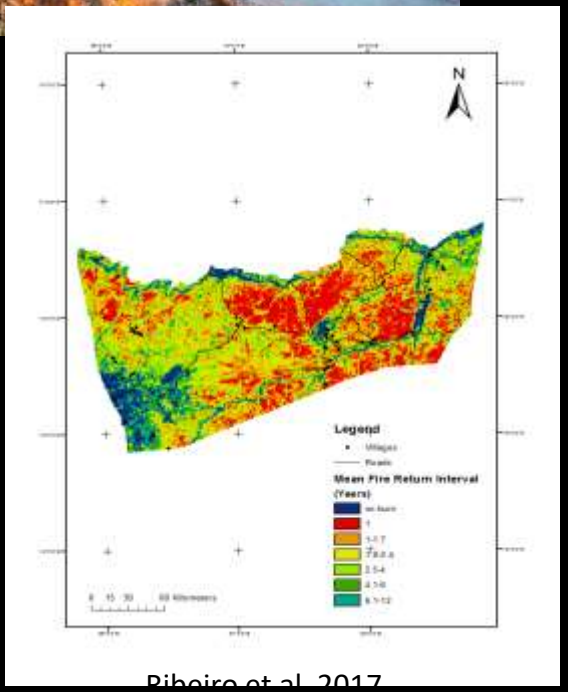
**First Niassa Special Reserve Science Meeting and Miombo Network Meeting: from science to miombo woodlands management**

**Maputo, 3-4 June 2021**

# Fire is part of miombo ecology

- Have long existed in MW (probably ~200,000 years ago; Morris, 1970)
- A major management tool for rural people.
- Most species are adapted and other depend on fires to survive.
- Fire regimes are important to maintain the ecosystem, but very few IFM programs exist.




Ribeiro et al. 2017

# Fire regimes are important to maintain biodiversity and ecosystem services

Grass fuels in the understory burn every 2-3 years

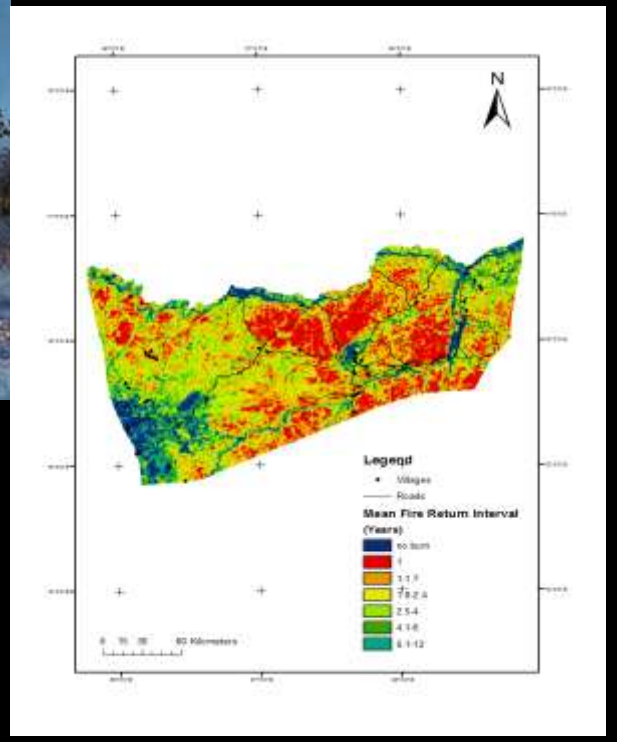
Hot annual fires

Shrub miombo

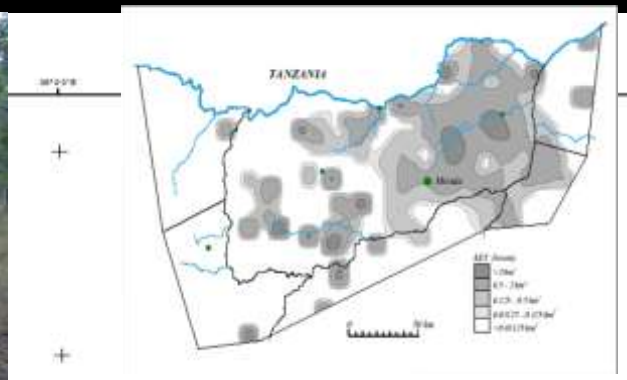
Cold fires

Tall miombo

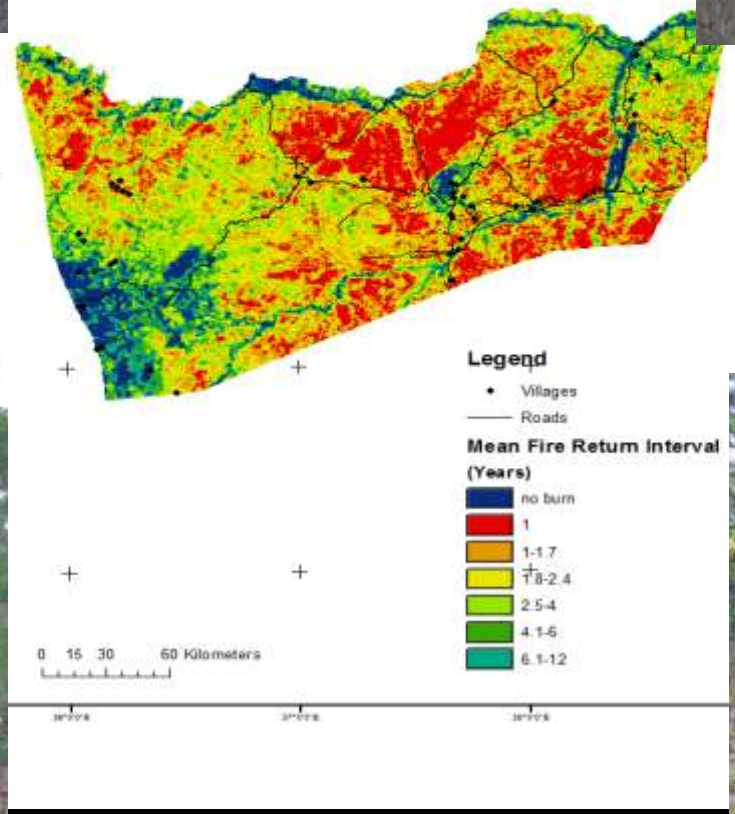
# Shifting from average fire regime (every 3-4 years) to annual burning  may compromise the ecosystem

# Woody composition linked to fires and elephants (Ribeiro et al., 2008; Ribeiro et al., 2013; Matola in prep., Matavele, in prep.)

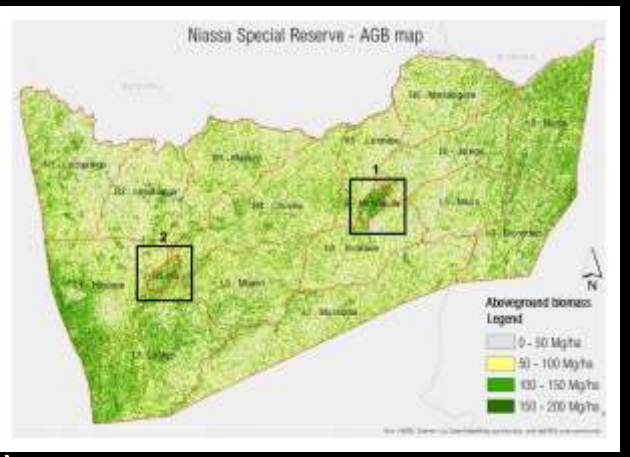



- > Woody biomass
- < grass biomass
- **True miombo**




- < Woody biomass
- > grass biomass
- **Combretaceae- miombo**

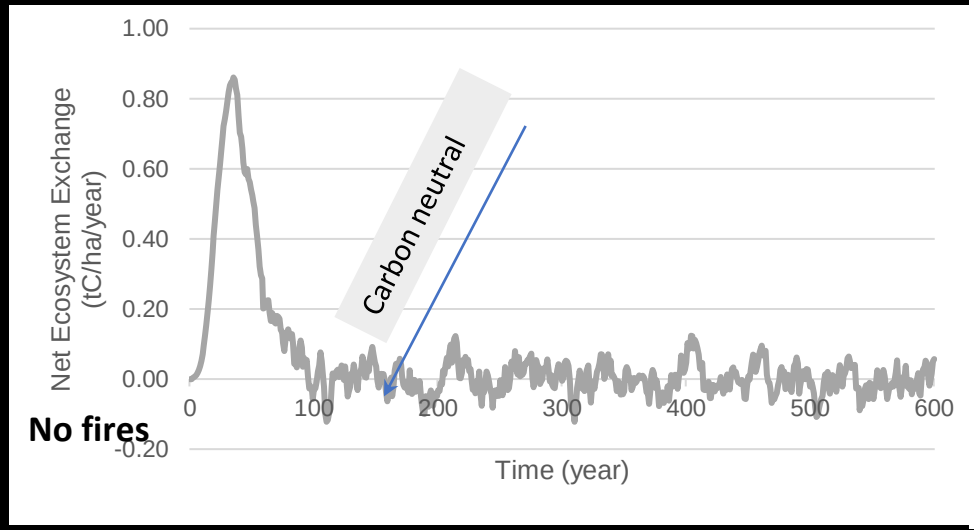
# Fires and carbon stocks in NSR

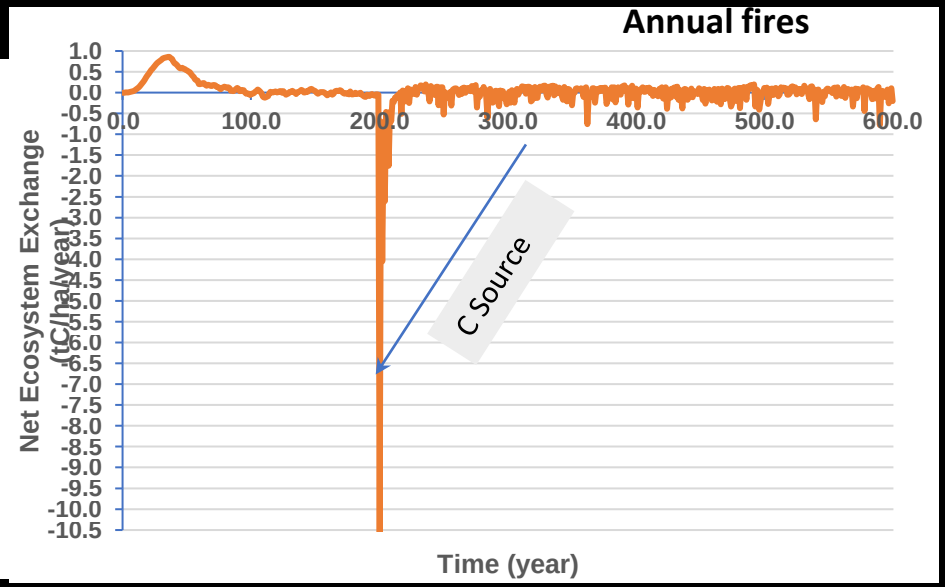



- NSR is an important C sink (15-47 MgC/ha; Matola et al., in prep; Macave et al., submitted).

- Reduction in fire return interval from 1 (45% of NSR) to 3.29 years (average for MW) may increase C sequestration by 4 MgC/ha/year (Ribeiro et al., submitted).

- C fire projects have potential to generate revenue for improved reserve management: \$12/ha/year (C value: \$3 $MgCO_2e$) to \$20/ha/year C value \$5 $MgCO_2e$)



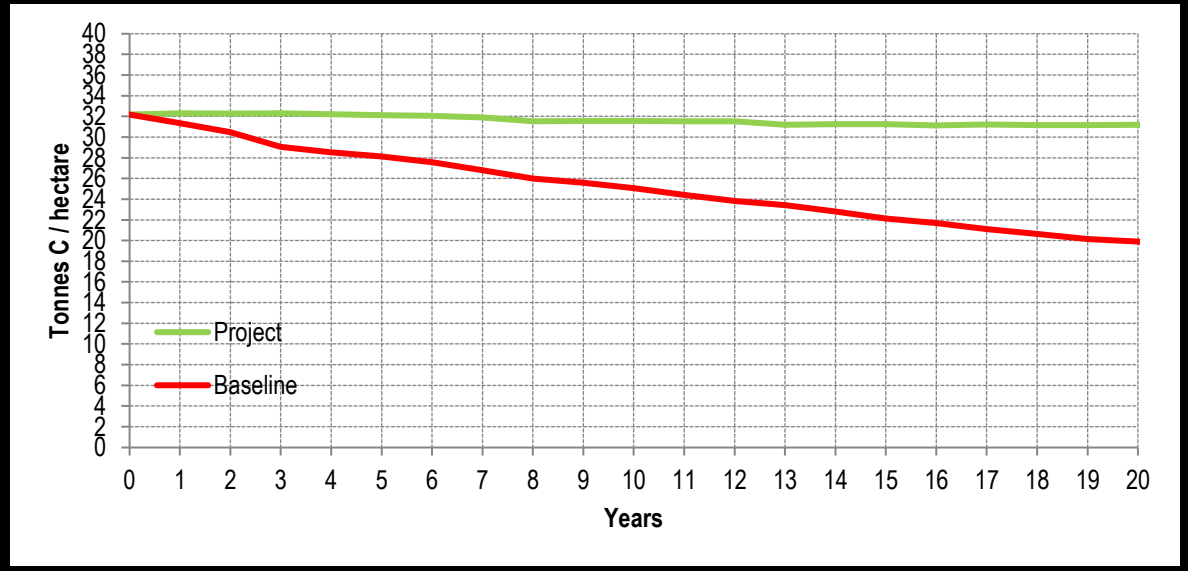



# Emissions from fires (GapFire Model)

- Reducing Late dry season in 50% (LDS) by increasing Early DS (EDS) burning by 80% may contribute to reduce fire C emission and increase C sequestration (Ribeiro et al., in prep.).

C emissions from fire (GapFire model)

| Biomass strata (MgC/ha) | Total (TCo2eq) BAU | Total (TCo2eq)- increasing EDS fires | Emission reductions | % reduction |
|---|---|---|---|---|
| 5-10 | 1,040.56 | 347.22 | -693.34 | -66.6 |
| >10-15 | 59,665.76 | 20,849.49 | -38,816.27 | -65.06 |
| >15-20 | 341,257.04 | 126,553.51 | -214,703.53 | -62.9 |
| >20-25 | 939,000.68 | 342,964.31 | -596,036.37 | -63.5 |
| >25-30 | 1,441,643.07 | 561,397.85 | -880,245.22 | -61.06 |
| >30-35 | 1,697,757.29 | 737,379.81 | -960,377.48 | -56.61 |
| TOTAL | 4,478,283.28 | 1,789,492.17 | 100 | -60% |




**C sequestration after 20 years:** 20tC/ha to 32 tC/ha

# Forest resources are key to people's livelihoods

- They support people's wellbeing (nutrition, health, culture, etc) and have market value (Falcao et al., 2021).
- Selling of forest products is limited by accessibility (Falcao et al., 2021)
- Fire remain the #1 management tool for cultivation, honey gathering, safety (Ribeiro et al., 2019; Paulo, et al. in prep.)
- People have low perception about the effects of fires on the ecosystem and the need to manage them (Paulo et al. in prep.). **No major changes in the ecosystem have been perceived.**

# Fire management is key to sustain miombo woodlands in NSR

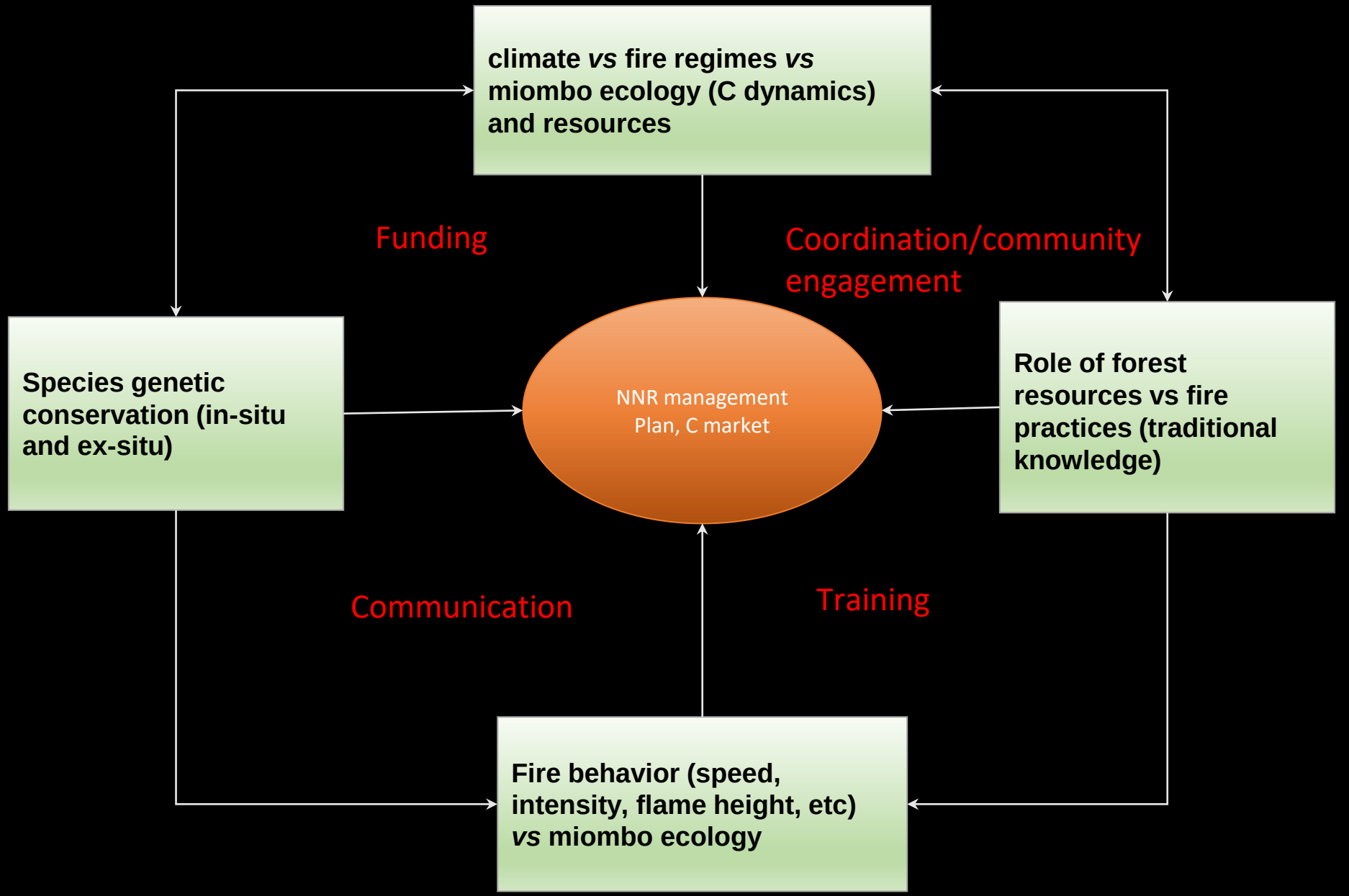
- The REDD+ system is a pathway to mitigate the effects of CC and woodland restoration and as a finance mechanism, but there should be a balance between C and non-C benefits (other ES) and consider IFM.

- National forest policies and governance do not support fire management action as they do not fully account for ecological and silvicultural knowledge of the miombo (e.g. Resprouting, light dependency, role of fires, etc.)

- An IFM program with a strong community engagement should be developed and implemented.

- Research activities should be better aligned with conservation/fire action.

# Proposed fire research framework for NSR

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