

Optimization of slash-and-burn agriculture in Central Menabe, Madagascar (project AGRIFEU)

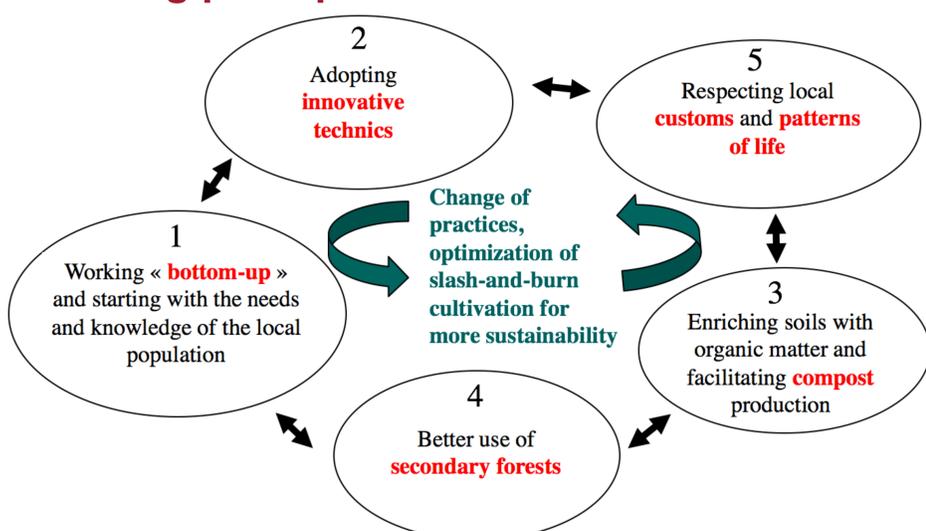
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Background : Madagascar is a hotspot of biodiversity, but the forest losses are continuous, partly because of slash-and-burn agriculture, which uses the natural primary forest as a reserve of soil. More than 100 years of efforts to reduce this practice have led to disappointing results. One of the reasons is that the use of fire in the forest is a deeply rooted tradition. The dry deciduous forest of Kirindy degrades at a rate of 2.6%, which means that it will have disappeared by 2030. We hypothesized that better results towards sustainability can be achieved if the slash-and-burn practice is modified by the use of compost produced locally with some productive species of the secondary forest, and by means of agro-ecological techniques leaving some protecting trees. The ultimate goal is to preserve the primary dry deciduous forest.



Aim : Optimization of slash-and-burn practice

Guiding principle :



Highlight of a result :

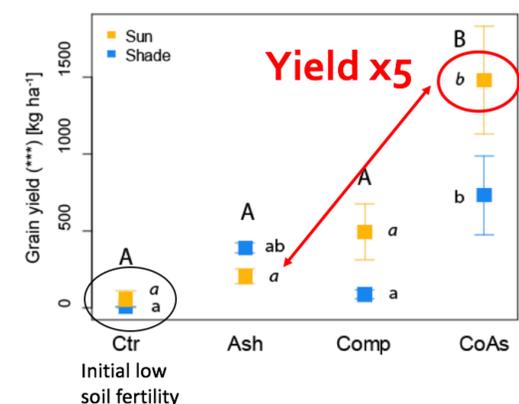
Control



Ashes + Compost



Gay-des-Combes et al., 2017
Ecology and Evolution



Methods and research questions :



1. Observation



2. Field experiments



3. Pots and laboratory experiments



4. Workshops

Q1 How do soil fertility and maize yield evolve along the cultivation cycles in farmers' fields?

Q2 Does the compost improve the yield? What is the effect of compost on soil nutrient retention?

Q3 What is the best mixture of ashes and compost?

Q4 Can protecting trees contribute to the cultivation improvements?

Q5 Will the compost technique be adopted?

Q6 What are the constraints?

Challenges for north-south collaboration and communication with stakeholders :

- Finding the best way and persons (e.g. guides) to establish trust between project teams, stakeholders and farmers
- Improving the restitution of results to the farmers
- Maintaining the motion for changes in follow-up application projects (funding?)
- Maintaining local partners for transfer of knowledge and capacity building once the project is finished
- Adopting common standards (working culture, performance, objectives, outputs) between research teams in both/all countries
- The time needed for doing good science is hard to understand for rural households, who need often urgent and immediate solutions to cope with poverty

Scientific challenges for global issues and poverty :

- Giving importance to the management of secondary forests, not only primary forests
- Make a better use of domestic waste for compost production
- Besides the soil fertility problem, weeds constitute also a major problem
- Composting requires water, but its use competes with domestic use. There is an urgent need to repair water wells and to construct new ones in remote villages
- Linking biophysical sciences with social sciences (tools)
- Considering new constraints for agriculture with climate change
- Better exploring techniques such as agroforestry, mulching and biochar
- Testing other less nutrient demanding crops
- Considering the diversity of ethnics and the migration
- Clear allocation (legislation) of land for agriculture within secondary forest areas