

Productivity of different cacao cultivars in different production systems

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Background and objectives

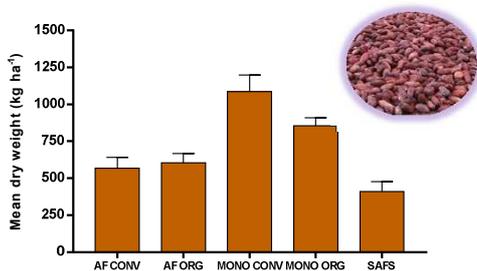
- > Cacao production (*Theobroma cacao* L.) varies from full-sun monocultures to highly diversified agroforestry systems
- > Agroforestry systems have the potential to improve biodiversity and farmer's food security by diversifying crops. However, higher cacao yields are usually reported in monocultures. A proper choice of cultivars might help to improve cacao yields in agroforestry systems.
- > **Objective:** To evaluate the performance of 12 cultivars, i.e., 4 international clones, 4 clones out of local elite tree selection and 4 hybrids in 5 different production systems, and to identify the most suitable cultivars for organically managed agroforestry systems

Experimental design

- > In a field trial established end of 2008, full-sun monoculture and agroforestry systems under organic (MONO ORG, AF ORG) and conventional (MONO CONV, AF CONV) management, and a successional agroforestry system under organic management (SAFS) are compared. Each system is replicated 4 times, in a randomized block design (20 plots in total). Plot size is 48 m × 48 m and data collection was performed in the inner 24 m × 32 m.
- > In 2015, the total number of pods and fresh weight were registered at tree level, i.e., a total of 48 trees per plot. Moreover, the number of cherelle wilt, the physiological abortion of the small pods, and the incidence of pest and diseases was also registered.

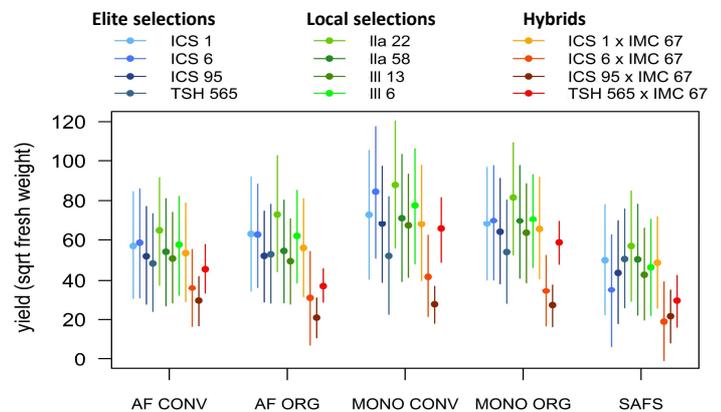
Results

Cacao yield



- > Yields were higher in the monocultures, especially under conventional management. No differences between organic and conventional management were found in the agroforestry system.

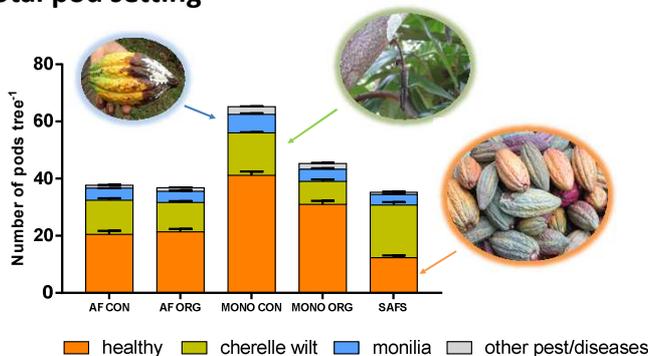
Cacao yield per cultivar



Points represent mean values (50% quantile extracted from n=5000 model simulations), error bars represent 95% credible intervals; mean values which do not lie within the 95% credible intervals of other mean values are significantly different from each other.

- > In general, no major differences were found between cultivars, with the exception of the lower yields of two of the hybrids.
- > There was a tendency of higher yields of the local cultivar Ila 22.
- > Overall, we did not find an interaction between the production system and the cultivar, i.e., the cultivars performed in a similar way in all the production systems. However, the hybrid TSH 565 x IMC 67 better performed in the monocultures and the TSH 565 had higher yields in the agroforestry systems.

Total pod setting



- > The loss of pods due to cherelle wilt was higher than due to pest and diseases (monilia).
- > Cherelle wilt was higher in the SAFS and more healthy pods were harvested in the monocultures.

Conclusions

- > In general, cultivar performance did not differ between production systems. Data collection will continue to monitor yield dynamics over the years.

Partners:



Funding:

