Proceedings

5th World Congress on Agroforestry

"Transitioning to a viable world"

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Transitioning to a Viable World

Proceedings of the 5th World Congress on Agroforestry: "Transitioning to a Viable World". Québec, Canada, July 17-20, 2022.

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coefficient de décomposition compris entre 0.008 et 0.033. Les paramètres de croissance du sorgho ont été significativement influencés par les traitements. On note que l'ajout de la demi-dose de la fumure minérale vulgarisée aux différentes émondes a permis une amélioration significative du diamètre au collet et le nombre de feuilles du sorgho. Un accroissement de l'humidité gravimétrique est observé avec l'apport des émondes. L'utilisation des émondes peut être une alternative pour la restauration de la fertilité des sols dans la zone de l'étude.	
Effect of planting density of *Faidherbia albida* on soil properties, sorghum and cowpea productivity in the Sudanian zone of Mali In the Sahel countries, the issue of land fertility is at the heart of debates on rural development and the future of agriculture. Livestock occupies a preponderant place in production systems, the economy and the social life of households. An integrated approach is needed to resolve both the constraints linked to the soil fertility and low livestock productivity. The effect of planting density of Faidherbia albida on the bio-physico-chemical properties of the soil, the productivity of sorghum and cowpea in the Sudanian zone of Mali is the subject of a study that aims to contribute to improving food security and reducing poverty through the use of agricultural practices resilient to climate change. The trial installed in a device three repetition split-plot experiment includes two factors: (1) Type of cultivation practice at three levels variation: (a) sorghum and cowpea in rotation under Faidherbia albida, (b) sorghum and cowpea in monoculture under Faidherbia albida (c) Pure culture: Faidherbia albida. (2) Plant density of Faidherbia albida under three levels of variation at the rate of 1, 2 and 3 feet per experimental unit of 100 m2. The results of the 2020-2021 campaign reveal the weak growth and development of Faidherbia albida in presence of sorghum (average height, 31.96 cm; average diameter at the neck, 0.42 mm; length of the first branching 18.19 cm;) and cowpea (average height, 33.97 cm; average diameter at the neck, 0.47 mm; length of the first branch 18.92 cm;) against average height, 42.72 cm; mean diameter at the neck, 0.54 mm; length of first branch 24.00 cm. We find that this weakness is higher with the high culture from the year the device is installed.	Kone, Souleymane Kouyate, Aliou Badara
Harvesting practices and their influence on soil macrofauna in cocoa-based agroforestry systems Agroecological approaches require a complete understanding of the agroecosystems by considering complex and countless interactions. Agroforestry systems, that combine at least one ligneous perennial with at least one crop or cattle species, often aim at optimizing ecological and economical interactions among their components. They encompass highly contrasted agroecosystems, from mechanized input-intensive plantations intercropping only two species to family grown, highly diverse and ecologically intensive agroforests. Cocoa-based agroforestry systems have been widely described in the literature for the high taxonomic and functional diversity of the soil biota, especially of larger-sized organisms such as earthworms and macroinvertebrates. However, the interactions between farmer's practices and soil macrofauna are poorly documented. A common practice all over cocoa producing countries consists in piling the harvested pods on a determined area of the plantation floor before opening them. The cocoa beans are extracted and carried out of the plantations, but pod husks remain on the floor. In this study, we compared pod harvesting sites and sites free of pod husks for the diversity of soil macrofauna in the leaf-litter, the 0-10 cm and the 10 – 20 cm soil layers. Based on 60 soil and leaf litter samples, we compared mature (aged 11-25 years) with old (aged > 70 years) cocoa-based agroforestry	Guittonneau, Marie Deheuvels, Olivier Marichal, Raphaël

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plantations in the Dominican Republic. We found that under the cocoa pods, macrofauna density and taxa richness were significantly higher and bulk density was lower. This result is enhanced by the age of the cocoa plantation, as the accumulation of pod husks on a determined harvesting arena tends to be higher over time. The trade-off between a recommendation to spread pod husks over the plantation floor when harvesting cocoa and the current sanitary recommendations for harvesting is discussed.	
Comparison of Soil Morphology Under Tree Windbreaks and Adjacent Fields in the U.S. Great Plains Tree windbreaks or shelterbelts became a common agroforestry practice in the U.S. Great Plains following the severe drought of the 1930's. The U.S. Forest Service created the Prairie States Forestry Project that planted over 300 million trees in six Great Plains states from 1935 to 1942. Following these initial plantings, windbreak practices became well-established across the region with new plantings coordinated through multiple programs and agencies. The objective of this study was to characterize changes in soil profile properties under representative tree windbreaks of four Great Plains states. Two sites in each state were identified with typical tree plantings and adjacent crop fields on the same soil map unit. Sites had a range in mean annual precipitation of 570 to 840 mm, mean annual temperature of 6.2 to 12.8 ºC, and tree age from 15 to ~115 years. Soil pits were excavated to 1.25 m within the tree and crop areas and local Natural Resource Conservation Service soil scientists prepared full profile descriptions and classified each profile. Samples collected from pit walls and adjacent auger holes were analyzed for pH, texture, organic carbon (SOC), and nutrient contents. Evidence of previous wind erosion (reduced thickness of surface A horizon) under some windbreaks suggest that their planting was a direct response measure to protect and restore degraded soils. Most windbreak soils had evidence of SOC movement deeper into the profile (darker soil color) while changes in soil structure (type, strength, and size) varied by location and are likely influenced by climate and parent material. Profiles of SOC (https://doi.org/10.1007/s10457-019-00425-0) support the morphological observations as subsurface layers (30-125 cm) beneath trees stored on average 7% more SOC stocks than the surface 30 cm. Averaged across all sites, SOC stocks to the 1.25 m depth were 16% greater beneath trees than adjacent fields.	Khaleel, Ala Sauer, Thomas Chendev, Yury
Towards further intensification of push-pull technology with agroforestry One of the sustainable intensifications approaches to improving yields of maize, a major staple and cash crop in eastern Africa, is the push-pull system, a companion cropping system that involves intercropping maize with a forage legume (desmodium), and planting a forage grass (brachiaria) around this intercrop. Push-pull effectively controls stemborer, fall armyworm and striga, while improving soil health and providing fodder. However, the technology is unable to march the current demand for food, firewood and income among smallholder farmers, prompting the need to expand its scope from cereal-based to other important crops and cultivation systems. A participatory needs assessment comprising of 10 focus group discussion with 85 farmers and 25 key informant interviews was held in Kisumu, Siaya and Vihiga in Western Kenya to identify pathways for further intensification of push-pull. Respondents included women and men, farmers, commodity traders, civic leaders, agricultural extension officers, advisory providers and researchers in the region. Respondents identified agroforestry as one of the strategic practices for expanding the usefulness of push-pull system. Farmers grow trees for ecological benefits (soil fertility improvement, erosion control, wind breaks), tree products (fruits, timber, fodder, firewood, medicines,	Buleti, Sylvia Were, Samuel Gichua, Moses Kuyah, Shem