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Abstracts

education. Off-farm engagement was minimal. Farming enterprises were predominantly rainfed and farmers' perceptions of rainfall variability substantiated by meteorological data. Interannual and seasonal rainfall variability prevailed in the reference and preceding years. Forest gardens were the oldest land use, had the greatest area, highest plant and crop species richness, crop diversity, numbers of primary and secondary crops, and products. They provided several benefits to households and their tree-dominance ensured strong adaptive capacity. However, farmers adopted multiple land uses with diverse landscape designs because this offered greater opportunities, buffered risk and fostered resilient farming enterprises. Policy-makers must engage farmers when planning for resilient farming enterprises in a changing climate.

Horizontal distribution of the soybean yield in integrated crop-livestock-forest system in the north of Mato Grosso, Brazil

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The integrated crop-livestock-forest system can enhance the overall production, especially of soybeans, and economics of farming in regions characterized by warm climate. The aim of this study was to evaluate whether strip of trees in the integrated crop-livestock-forest systems (ICLF) change the horizontal distribution of the soybean yield and reduces the production by area four years after the establishment of eucalyptus, in the north region of Mato Grosso State, Brazil. The experiment was conducted at Sinop/MT, evaluating the following treatments: 1) crop with soybean during the main season and maize intercropped with *Brachiaria brizantha* during the second season and 2) Crop-livestock-forest system with triple rows (3.5 m x 3.0 m) of eucalyptus, spacing of 30 m and east-west orientation, annually cultivated with soybean crop (main season) and maize intercropped with *B. brizantha* (second season). The experimental design was in randomized blocks with four replicates. In the production systems with trees, evaluations were carried out in four equidistant transects, at 3, 6, 10 and 15 m from the rows on the northern and southern sides. Significant differences were verified in the agronomic characteristics of soybean, difference in productivity was verified comparing the exclusive and integrated systems. The tree component affect the soybean yield by area in the fourth year of the system implementation. The interference of eucalyptus reduced the soybean grain yield by 20.0% and the effect was stronger close to the tree rows.

D1G: CLOSE-TO-NATURE SILVICULTURE: FOR PEOPLE, PRODUCTS AND NATURAL PROCESSES

Legacies of previous disturbances structure contemporary forests

John Stanturf[1] Kalev Jogiste[1], Lee Frelich[2], Marek Metslaid[1], Ahto Kangur[1], Palle Madsen[3]
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Alternative forest management approaches seek to emulate natural disturbance regimes and produce more diverse forest structure and composition with lesser emphasis on traditional timber objectives. These alternative management paradigms, including continuous cover forestry, biodiversity restoration, and close-to-nature forestry, all emphasize "natural" conditions, including natural disturbance regimes. Although they may differ in their approach to managing complexity and defining what is "natural", they all recognize that ecosystems are dynamic and that persistent effects of previous disturbances play a significant role in structuring ecosystems. Ecosystem legacies, remnants of previous conditions persisting after disturbances, collectively comprise ecosystem memory. Ecosystem memory in turn contributes to resilience and possibilities of ecosystem reorganization following further disturbance. Overlapping legacy concepts (disturbance, biological, soil, land-use, and silvicultural) are subsumed in the new terms "material legacy" (individuals or matter, e.g., survivors, coarse woody debris, nutrients left after disturbance) and "information legacy" (adaptations to historical disturbance regimes). The resulting six legacy types (above- and belowground, biotic and abiotic material legacies and above- and belowground information legacies) are influenced by differential patterns of editing and conditioning by "legacy syndromes" that result from natural or human-manipulated disturbance regimes. These legacy syndromes in turn influence forest response to management actions and constrain resilience, leading to a mosaic of natural, manipulated, and artificial (novel) ecosystems across the landscape. The condition of forest ecosystems depends on the temporal and spatial pattern of natural and anthropogenic disturbances and the legacies that are produced and persist.

Close to nature forest management for multiple purposes: an option for China

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The ecological, economic and social benefits of forestry are of high importance worldwide. After a heavy decline in forest area up to the 1950s, the Chinese government has implemented ambitious afforestation plans, initially mainly to counteract environmental consequences of deforestation like floods and landslides. During the last four decades, China's forest area increased from 12% to 22%. In response to climate change, China planned to increase another 40 million ha by 2020 and 4.5 billion m^3 more by 2030 from the 2005 level. However, many of the Chinese forests are of low vitality and low productivity. On the other hand, China's fast growing economy requires additional resources especially renewable resources such as wood. Furthermore, forest environmental services are gaining more and more importance. The huge demand on timber and the increase in protected forest area at the same time result in a severe shortage of wood. Highly productive and healthy forests are needed which provide not only wood and non-wood forest products but also urgently needed ecosystem services. A strategic transition in China's forest management is needed, with a shifting emphasis from area expansion to stand productivity and quality enhancement, from overwhelming timber production to multipurpose management for various forest goods and services, and from monoculture plantations to biodiversity rich mixed forests. Based on an overall view of the challenges of China's forests and the alternative management options, this paper presents case studies and suggestions on close to nature forest management for China.