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Sustainability indicators of the productive systems in the Ibirapuitã river basin, Brazil

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Abstract

The success of a given society or community depends fundamentally on the ability to manage local natural resources to generate prosperity without degrading them over time. The sustainability attributes of production systems are considered for their relevance at the global level. Climate change and biodiversity loss are two of the most urgent issues of the Anthropocene. Agricultural development projects aim to find alternatives to maximise food production, but it is essential to integrate water management and energy generation after considering the local issues. In this project, the Socio-Economic-Ambiental principle of the MESMIS acts indirectly on the sustainability attributes, whereas the indicators of the water-energy-food dimensions directly affects sustainable attributes. To represent the heterogeneity systems in the Ibirapuitã Catchment area, the characteristics of the different sub-catchments were used as references during the selection of properties, therefore, a total of 121 farms were sampled. The measures attributes were self-reliance, productivity, adaptability, stability, and equity. The average of all the properties of the basin suggested that the attributes reflect medium sustainability. The Self-reliance attribute had the highest value of 73 %, whereas the Equity attribute had a weight of 63 %, which was the lowest value. The farm with the lowest sustainability presented two indicators, namely equity and stability, at the low level with weightage of 48 % and 45 %, respectively. In contrast, the property with greater sustainability presents all the attributes in the quartile of high sustainability highlighted adaptability with 88 % and equity with 80 %. The sub-catchment that corresponds practically to the Ibirapuitã protect area presented the highest score with a value of 70.24 %. This sub-catchment only differed significantly from the Inhanduí and Pai Passo sub-catchments. The Mariano Pinto, Inhanduí and Pai Passo sub-catchments showed no major differences among themselves. These three sub-catchments are characterised by having larger properties and using agriculture in their production systems. The Pai Passo sub-catchment was the one that presented the lowest sustainability score, presenting the

lowest scores in all attributes: Self-management (64 %), Productivity (68 %), Adaptability (61 %), Stability (64 %) and Equity (55 %).

Keywords: APA do Ibirapuitã, NEXUS-MESMIS, Pampa biome