

One welfare: looking for sustainable animal production systems

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Modern livestock production systems are often associated with unsustainable practices as they have contributed to greenhouse gas emissions, to the loss of biodiversity and environmental services, and have impacted negatively on animal welfare. There is a need to carry out transdisciplinary research on the trade-offs and synergies between the environmental impact, animal welfare and socioeconomic aspects of different livestock systems. With this purpose, an on-going research project is being carried out in Yucatan, Mexico, including conventional pasture and silvopastoral systems, composed of trees, shrubs and pastures. More than 20 ranches, with different landscape designs and vegetation coverage have been studied, representing a gradient of landscape that include farms with fragmented forests, intensive silvopastoral systems and monoculture, with only one species of pasture. Furthermore, the trade-offs between animal welfare and other sustainability indicators (environmental and socioeconomic impact) have been assessed using different methods and tools such as the Life Cycle Analysis (LCA), the Marco para la Evaluación de Indicadores de Sustentabilidad (MESMIS), and the Sustainability Assessment of Food and Agricultural Systems (SAFA-FAO). Initial results show that a three level vegetation structure, with edible plants, provide greater ecosystem services, more biodiversity (bird and mammal species richness and abundance) and better welfare of cattle. Farms that contained wider and more complex vegetation coverage had significantly higher rates of native and specialist species of birds, bats and rodents, than monoculture farms ($P < 0.05$). Using different sustainability assessment tools, a positive relationship between animal welfare and environmental services scores were found. Heifers that forage in paddocks with greater and more complex vegetation cover, show lower skin temperatures, express more affiliative behaviours ($P = 0.04$), rest longer and in longer bouts ($P < 0.01$; respectively), and forage less at times of maximum temperature and humidity ($P < 0.01$), than heifers on monoculture systems. Silvopastoral systems can be an efficient way to produce food, provide environmental services, and promote animal welfare.

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