

SUSTAINABILITY AND VALUATION OF ECOSYSTEM SERVICES

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Abstract:

Earth's population is entirely dependent upon the planet's ecosystems and the services they offer. The planet's capacity to endure its species diversity, including the human species, is great, but essentially limited. In this context, the environmental issue has frequently been discussed from a strategy based on the concept of ecosystem services, and the valuation of these services must be understood as an indispensable tool for information organization aiming both at the direct decision-making process and at providing support to the formulation of public policies that contribute to the sustainable management of the environmental resources. This work was developed at the city of Araras, SP, Brazil, which has a strong tradition in agriculture and livestock exploration with intensive use of agricultural supplies and wide agricultural mechanization, as well as excessive deforestation, which already points to the occurrence of serious environmental problems. This scenario may represent a situation of environmental unsustainability and jeopardize the offer of ecosystem services. In this scenario, this work aimed at answering the following questions: (i) Is the land occupancy carried out in a sustainable form at the city of Araras? What is the effect or impact of the land occupancy to ecosystem services, and which is the corresponding economical value? The method used was the concept of sustainable scale preconized by Ecological Economics. The capacity of use of the city's land was established, and an environmental sustainability index was defined with the aid of the Constructivist Multiple Criteria Decision Support method (MCDAC) using the MMacbeth software (Bana e Costa et al., 1995). Environmental Economy valuation methods were also used to quantify and value the ecosystem services provided by riparian forests; carbon sequestration by the soil, the roots, and the phytomass; surface water loss by drainage; and provision environmental services (production). Three scenarios were established: (i) current land use; (ii) current use of lands with recovery of permanent preservation areas (PPAs) ; and (iii) land use in compliance with the use and recovery capacity of PPAs and legal reserves (RLs) . A sustainability index was defined for each agricultural activity explored at the city and took into consideration criteria such as soil management and conservation, use of phytosanitary products, use of fertilizer, and legal observation for the occupancy of PPAs and RLs. The same methodological procedure was applied to the three scenarios that were idealized. The results point to an improvement in the sustainability indices from scenario one throughout to scenario three. Economically, there is also an increase in value for the ecosystem services, except for scenario three, due to a great loss in provision ecosystem services. This work shows that although the ecosystem services were quantified in a reductionist way, the importance of considering them during the formulation of environmentally sustainable public policies is clear.

REFERENCES

BANA E COSTA, C. A.; STEWART, T. J.; VANSNICK, J. C. Multicriteria decision analysis: some thoughts based on the tutorial and discussion sessions of the ESIGMA meetings. In: Euro Conference, Jerusalem. Proceedings... Jerusalem, p. 261-272, 1995.

1 Areas protected by the Brazilian environmental law, such as: river margins, mountain tops, slopy areas, etc.

2 Mandatory legal reserve areas with possible economical exploration corresponding to 20% of the property's area at the study region.