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Measuring sustainability in aquaculture systems

Midiendo la sostenibilidad en sistemas acuícolas

Wagner C Valenti, BSc, MSc, PhD.

Sao Paulo State University – UNESP, Campus Experimental do Litoral Paulista, Praça Infante Dom Henrique s/n 11330-900 São Vicente SP Brazil.
Email: valenti@clp.unesp.br

Sustainability should be approached by four dimensions (scopes): economic, environmental, social and governance. All of them are important and should be equally considered. The huge difficulty to evaluate sustainability is the challenge to explore and analyze a system in a holistic way. It is essential to contemplate all dimensions of the production process and compare measurements of variables from very different nature. A few papers have been published using Ecological Footprint, Life Cycle Analysis and Energy Analysis to assess the sustainability of aquatic production systems. These methods give an integrated overview of the systems and are very useful. However, all of them request a huge amount of data, which is difficult to obtain. In addition, the two first focus mainly on environmental dimension. On the other hand, aquaculture sustainability may be divided in parts, which may be evaluated using sets of indicators; these indicators can be combined originating indexes. Recently, groups of indicators have been proposed to evaluate aquaculture sustainability in several regions of the world. For each dimension, we propose the computation of indicators, which shows different features of the process. These indicators should be estimated using good quality and scientific data and, after that, they can be converted to a performance scale according to criteria scientifically defined (example**:** we may attribute zero for the worse score and 100 for the best one). Then, we can combine the indicators and obtain a subindex for each dimension. The arithmetic average among the four subindexes will generate the sustainability index. For the economic dimension, we can use indicators, which show if the capital is efficiently used and the activity can generate enough wealth to retain the producer in that activity, pay the negative externalities and reinvestments. For environment dimension, we have to consider three major aspects**:** the quantitative use of natural resources, the efficiency in using natural resources and the waste generated, which can potentially damage the environment. For the social dimension, we can use indicators to evaluate if projects generate inputs for local community and distribute wealth. Governance is measured by indicators, which show the relationships among all stakeholders and the capacity to build and manage a communal project according to rules and regulations. Selected sustainability indicators and/or sustainability indexes may be used by scientists to evaluate different treatments of an experiment, by investors and policy makers to evaluate different projects to be supported, or by farmers to adequate their farming systems towards sustainable production.