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Agriculture, Ecosystem Services and Biodiversity: Nature to Nature and People to People

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The concept of agricultural sustainability is due to Altieri in 1987, who defines agricultural sustainability as the ability of an agro-ecosystem to maintain production in time, compared to socio- economic pressures of long-term and ecological limitations [1,2]. The relationship between agro-ecosystem, pest management and biodiversity results to be interesting [3]. The multifunctional agriculture includes three basic functions, which concern relations with the space (environment, landscape), with the production (health, food safety, food quality) and services (rural areas management, biodiversity), a condition that determines the coexistence in the same area of ecological, economic, cultural, historical and aesthetic functions [4].

A broad literature study has highlighted the existence of a limited number of peer-reviewed related to specific sub-categories as for example the ecosystem approach in human health and epidemiology. While day by day further increases the spread and the global movement of populations and goods, answers to these fundamental scientific questions are essential for understanding the function of the ecosystem services in human dominated ecosystems and their historical pressures in resilience of ecosystem.

What is a resilient ecosystem approach (REa)? The REa is an appropriate scientific methodology based on the study of the interaction between environmental assessment and ecosystem resilience. REa is probably a very qualified method also in the sustainable fight against diseases. The accidental introduction of alien species, parasites and pathogens, takes place directly with people or indirectly through transport. Animals, plants and human diseases represent a strong indirect impact on ecosystem services [5], so knowing the resilience of the ecosystem becomes important to counter such pressures and negative impacts. It is evident that we must in all cases take account of the principle that, in environmental assessment, the 'core' is a set of relevant indicators that have been properly selected and subjected to a thorough efficiency analysis.

In 1997, the influential work by Costanza, proved to be a watershed in scientific thought regarding the environmental assessment. To successfully address the environmental assessment, Costanza suggested and introduced the Ecosystem services (ES) concept or classification functions, in relation to the services they provide for the ecosystem [6]. Ecosystem services related to agriculture and urban areas are a complex system in constant transformation that includes an array of biotic, abiotic and anthropogenic constituents; the structural interaction of these components results in a large variability of ecosystem services. For example, a sustainable managed cropland can support ecosystem services [7]. The Costanza's work is information about how natural ecosystems supported the human wellbeing; the ecosystems are quantified in units (dollars) and there are many functions correlated to Ecosystem Services benefits [8].

Environmental sustainability is understood as the ability to preserve the natural resources over time and the capability of the ecosystem to absorb and tolerate any negative impacts. At this point, it seems clear that the areas with greater availability of ES and therefore more engaged in concrete actions for environmental sustainability, are generally to be more resilient and less vulnerable to extreme natural events or negative impacts [9].

Returning to the issue of multifunctionality and ES in agriculture, there is an appropriate approach level during the implementation of a new assessment methodology due to:

a. Corporate level, through the analysis of farm production functions.

b. Agro-ecosystem level, through the analysis of biodiversity as a support function of ES. In ES disturbance, regulation is highly amenable to economy evaluation and the most appropriate method for evaluation is to avoid the cost and production approach [10].

c. The relationships, pressures, historical impacts of human activities on the resilience of the human-dominated ecosystem.

The aim is to identify a set of indicators that can be an instrument of knowledge and information, as well as monitoring and policies for adapting to the goals of sustainability. When indicators are developed for the purpose of mathematically evaluating a "space" like an ecosystem, a series of problems are found that have already been expressed by K.F. Gauss himself: "We must humbly admit that, while number is a pure product of our minds, space has a reality outside of our minds, so that we cannot completely describe its properties".

Indicators are asked not only to represent the state of the systems (natural, ecological, human health, epidemiologic, economic), but also to guide government policies and their action programs, considering that they always contain a certain degree of subjectivity. The question remains open at this point: is ecosystem services and human well-being possible through the study of ecosystem resilience? Certainly, the multidisciplinary study, simple and clear communication and great effort on the part of the scientific, social and economic world re-established its starting point.

References

1. Altieri M A (1987) Agroecology, the scientific basis of sustainable agriculture. Westview press, Colorado.
2. Altieri M A (1999) The ecological role of biodiversity in agroecosystems. Agriculture Ecosystems and Environment 74(1-3): 19-31.
3. Altieri M A, Nicholls S (2003) Biodiversity and pest management in agroecosystems. Haworth Press, USA.
4. Durand G, Van Huylenbroeck G (2003) Multifunctionality and Rural Development: a new paradigm for European Agriculture and Rural Development. Ashgate, Burlington, VT (USA) e Aldershot (UK), USA.
5. Cheatham M, Rouse R, Esker M N, Ignacio P D, Pradel S, et al. (2009) Beyond yield: plant disease in the context of ecosystem services. Phytopathology 99(11): 1228-1236.
6. Costanza R, d Arge R, de Groot R, Farber S, Grasso M, et al. (1997) The value of world ecosystem services and natural capital. Nature 387: 253-260.
7. Foley J A, R De Fries, Gregory P Asner, Carol Barford, Gordon Bonan et al. (2005) Global Consequences of Land Use. Science 309(5734): 570-574.
8. Costanza R (2007) Value of the world's ecosystem services: the influence of a single paper.
9. EEA (2010) Rapporto su Beni e Servizi Ecosistemici.
10. Farber S, Griner B (2002) Using conjoint analysis to value ecosystem change. Environ Sci Technol 34: 1407-1412.

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