AN UNDERSTANDING OF THE MULTIFUNCTIONALITY OF ORGANIC MATTER FROM THE POINT OF VIEW OF AGROECOLOGICAL PRACTICE

Juana Labrador

Department of Plant Biology, Ecology and Earth Sciences, School of Agricultural Engineering, University of Extremadura, Badajoz (Spain).

SUMMARY

The conceptualization of nature and the functions of the organic matter of the soil has varied enormously in the course of the last 300 years, involved in a continuous process of discoveries, interconnections and recurrent discussions, and as a result of interdisciplinary inheritance and changing relations between human beings and their environment. This concept has therefore been, not only an endogenous process of pedology and agronomy, but also a social construct.

At the present time organic matter is considered by Pedology as a principal component which regulates the soil's capacity to maintain its fertility and conservation and to offer environmental services that permit the sustenance of human societies on the local and global plane.

Nevertheless, this conceptualization, although accepted by agronomy, which is responsible for soil management in productive systems, fails to take shape in any immediate application in the handling of agrosystems, and this continues to follow the pattern of production goals to which the current agronomic paradigm has led us.

In the present agricultural context and under the heading of a truly lasting agriculture it is therefore vital to design another theoretical framework for the real significance of organic matter and what it represents for human beings and life on this planet in general. We should never forget that the focus is on the soil as an essential resource and finally on the agrosystem as an environmental unit in which a specific model for the use of its resources is developed.

This new approach requires an integrating view of agriculture and development and a deep understanding of the dynamics of life – both organic and mineral – involving all the disciplines that have a role in their study and management.

In today's setting only agroecology – the ecology of agricultural systems – has established the foundations of what a global perception of the organic world really means for agriculture. This perception takes in more than systems of production, adopting agrosystem management models based on the handling of biodiversity and organic matter, showing how a lasting balance between conservation and production is possible.

For organic farming the integrity of the agrosystem depends on synergies between a specific model for the use of resources – traditional agriculture, ecological agriculture, etc.-, the diversity of crop and non-crop plants and the continuous functioning of a macro and microbial community within and outside the soil, the latter being of course sustained by a soil rich in organic matter in all its forms.

But which conceptual framework allows agroecology to manage agrosystems more effectively in relation to organic matter? Let us take a closer look at this question.

1. Agroecology tackles fertility at global level as the expression of the components and biological, chemical and physical processes of a soil in a specific environmental and socioeconomic context. It recognizes the irreplaceable role of organic matter in the genesis of the architecture that permits life in the soil and lasting production in agricultural systems.

2. It establishes that agricultural activity is only effective if carried out with a view to the increase, conservation and management of edaphic biodiversity.

3. It considers that at agrosystemic level we cannot speak of sustainability unless we reintroduce in the system the organic byproducts generated by farming and livestock breeding. Agroecology thus recognizes the value of certain techniques for the treatment of organic byproducts like composting, provided that this is done for the purpose of increasing the quality of organic matter added and improving life in the soil.

4. Organic matter should not be seen as an isolated indicator when it comes to quantitative and qualitative evaluation of the sustainability of agrosystems since it tells us, not only about properties, but also about processes. The method used in quantifying it and following its development is of the utmost importance, involving both the farmers on their farms and the technical experts with their analytical data. A good follow-up enables us to increase cooperation among the different disciplines involved in soil science and participatory research with the farmer.

5. Agroecology thus quantifies organic matter in all its forms, bearing in mind that an analytical method is subject to numerous interferences and may itself produce significant alterations. It evaluates the suitability of specific organic matter for specific processes and for the purposes of its use and integrates it in the agrosystemic context, since an isolated datum without such a context cannot express the parameter's functionality.

6. It assumes that traditional knowledge of the handling of organic matter can contribute to its more efficient management in ecological agrosystems and is the source of the autonomy essential to the survival of family-based and small-scale farming.

7. Finally, perception of the global role of organic matter at biosphere level brings home to us its equally global importance. This should encourage us to promote its optimal use in the adaptation of agricultural systems to climate change and consider the importance in the agricultural context of the reserves of organic and inorganic carbon in cultivated soils.