Crimson Publishers
Wings to the Research

Opinion

# Towards a Sustainable Green World? A Better use of OM

**Orange Didier***

IRD, Research Unit "Functional Ecology and Biochemistry of Soils", University of Montpellier, IRD, INRAe, Cirad, SupAgro-Montpellier, France

## Opinion

In a world in constant and rapid changes, it becomes urgent that research activities adopt new methodologies to develop technological innovations allowing rapid adaptations by the policy-makers and the smallholders in respect to the environment. Nature-based solutions (NBS) and problem-solving learning (PSL) ensure active participation from the actors. By this way ecohydrology within bioengineering, bioinspiration, ecological engineering offers new opportunities for scientific activities on organic matter (OM) management to pass achievements to policy makers and the public through more active developments in social media. Then better competencies on OM management will create opportunities for technological innovations and paradigm shifts to make possible and efficient an economic and ecological asset for green production, promoting food and health security for the populations and for a sustainable environment. As more and more well known, the stationarity is dead. The Earth is a non-linear complex system. Recent discoveries on the importance of living things and their environmental feedbacks, on the role of homeostatic processes and breakpoints confirm that global warming is only part of the current ecological crisis which is also manifested by the loss of biodiversity, the loss of soil fertility, the water pollution but also the drastic increase in diseases that affect the entire living world. The current COVID-19 pandemic is just one more dramatic example. In 2020, the management of domestic wastewater remains a major global challenge, as well as feeding the poorest populations, stopping the soil losses through the galloping urbanization and mitigating the environmental quality of our cities. 2/3 of the world's population still does not have access to sanitation, creating recurrent health and environmental disasters. The majority of them are in tropical regions, mainly in Sub-Saharan Africa, in countries whose economy does not allow the rapid development of wastewater treatment plants. It is therefore necessary to innovate and change the wastewater management model. Like international institutions (UNESCO, USAID, AFD, FFEM, etc.) and the pursuit of the SDGs for the Horizon 2030, the Research arena is highly challenged to develop technological innovations allowing changes in concepts regarding the perception of the usefulness of wastewater for green production. Domestic wastewater represents a volume of water loaded with organic matter useful for plant production (natural and agricultural), for the rational and amplified use of water and soil (maintenance of fertility, carbon storage) and for improvement of the living conditions of the populations while fully respecting their health, their environment, the soils, the waters and the biodiversity. The innovation opportunities are numerous, from process engineering to ecological engineering and bioengineering, from biogeochemist and microbiologist to creator of IoT and AI algorithm, from architect and urban planner to geographer. Then it is obvious than a better use of the residual organic matters in respect of soils, waters and local climate will help to improve the food production, the human and environmental health, the water and nutrient efficiency, the short cycles for resources consumption and local economy.

The spatial analysis of human pressure on natural resources and of the required ecosystem services according to a systemic approach of the ecosystems makes possible to understand cause-and-effect relationships through the hydrological logic along the watershed. The understanding of the water flow pathways and the associated dissolved and suspended matter fluxes drives to optimize the position of nature-based eco-engineering solutions. Based on the management of all the liquid and solid fluxes inside the watershed,

ISSN: 2637-8078


***Corresponding author:** Orange Didier, IRD, Research Unit "Functional Ecology and Biochemistry of Soils", University of Montpellier, IRD, INRAe, Cirad, SupAgro-Montpellier, France, Email: didier.orange@ird.fr

**Submission:** November 17, 2020

**Published:** November 25, 2020

Volume 4 - Issue 2

**How to cite this article:** Orange Didier. Towards a Sustainable Green World? A Better use of OM. Significances Bioeng Biosci.4(2). SBB.000581.2020.
DOI: 10.31031/SBB.2020.04.000581

the ecohydrological approach promotes to restore and often to amplify the key ecosystem functions in regards of the human uses and needs. The purpose of this approach concerning the integrated management of ecosystem services at watershed scale is to organize and to optimize the use of ecosystem services along the surface flows according to their nature and in order the principle of dual regulation between biocenoses and fluxes. It could be by increasing the reactive surfaces of biocenoses and/or reducing biodegradable flows through upstream actions on water and matter fluxes in the streams, or by using their seasonal variability to put in action cascades of bioreactions.

This approach involves to reserve some specific areas such as biogeochemical reactors and bioengineering actions, at key points to ensure the requested ecosystem services at the right times and in the right places matching with the people users. The scientific output is to perform some scenarios of structuring points of the studied landscapes and infrastructures to promote a sustainable water management regarding the environment, the economy and the social wellbeing. Special points should face to the specific properties of seasonal and intermittent flows (surface flows, groundwaters, lateral flows), of interannual flows, related to rainfall and evapotranspiration framework, crossing the human use and the natural demand. It is clear that urban and rural areas have the same importance, and it will be a great advantage to be able to consider both in a complementary vision.

In this context, significant challenges of scientific fields appear to be addressed.

**a. Developing dynamic hydrological models based on changing environmental conditions (e.g. soil-water dynamics)**

This implies further development of a more process based rather than a calibration-based approach, a need justifies by the non-stationarity of the earth complex system. The process based approach means a development towards models that adequately simulate the interface between different functional compartments, e.g. stream-aquifer interaction, water-vegetation interaction. Then groundwater storage, soil humidity and infiltration dynamics, evapotranspiration should receive more attention (e.g. concept of Green-Blue waters).

**b. Climate change and sustainable ecological transition (e.g. urban-rural association)**

It aims to develop a new approach to improve the water management as a core for a sustainable development of the human society (ONU SDG 6). Because of the large range of ecosystem services addressed, it will deal with poverty reduction, economic growth, environmental sustainability. It will perform the increase of water-use efficiency across all sectors to improve the water security. It will get serious implications in the ability to achieve the food security (ONU SDG 2) through an increase of the nutrient use efficiency and to promote the wellbeing (ONU SGD 3). It will promote the bioeconomy approach.

**c. Nature based solutions as a rising awareness towards environment (e.g. REUSE-Soil-Biodiversity nexus)**

A sustainable solution to ensure withdrawals of freshwater is related to local water recycling implementation, such as the constructed wetlands for wastewaters management. Indeed, current encouragements to apply nature-based solution for urban facilities, such as clean garden, are based on their ability to answer simultaneously to economic and sustainability issues. The creation of local water cycles in the urban quarters is one promising solution to substantially reduce the demand of new fresh waters. And it will help at the environmental transition for sustainable building of green cities.

The technological implementations to a solution that produces tangible outputs will help visualization and impact assessment of learning actors. Then the basic solution should apply nature-based solutions (NBS) and problem-solving learning (PSL), ensuring active participation from the actors. By this way ecohydrology within bioengineering, bioinspiration, ecological engineering will offer new opportunities for scientific activities to pass achievements to policy makers and the public through more active developments in social media. It will help to strengthen the science-policy interface to help decision-makers. Then better competencies on OM management will create opportunities for technological innovations and paradigm shifts to make possible and efficient an economic and ecological asset for green production, promoting food and health security for the populations and for a sustainable environment.