

Contributions to the discussion during the seminar
Virtual Event - **Agricultural Support Reform and GHG Emissions**
APR 21, 2020 – 12:15 PM TO 01:15 PM EDT
Organized by International Food Policy Research Center (IFPRI)

**Proposals for political reforms
that reduce emissions, increase resilience, and reduce poverty.**

Why is agriculture responsible for a quarter of global greenhouse gas emissions and nearly 70 percent of freshwater use?

The answer to this question is quite simple.

But first, a little story about thinking differently.

When I was in my teens it was talked about that many people in the world are starving. As a daughter of a farmer, I thought I could save the entire hungry world by learning more about how to best deal with plant nutrients.

Now about 60 years later you can read on <https://ceres2030.org/> “Still, in 2017, over 821 million people went to bed hungry every night.”

In 1987, I was offered the opportunity to start as a doctoral student and my supervisor proposed to study the recycling of plant nutrients by conducting various experiments with composting. The results can be found in the thesis “Product Oriented Composting. From open to closed bioconversion systems.” Thesis is available at <http://biotransform.eu/history/>. One of the articles in the thesis is influenced by studies on biogas plants. The anaerobic process significantly reduces the loss of both plant nutrients and bioenergy found in everything that comes from plants, animals, and microorganisms. The article is available at <http://biotransform.eu/wp-content/uploads/2017/10/Bioconversion-of-organic-waste-2018-RG-RS.pdf>.

Composting is unsustainable. Generally, of 100 kg of material, produces about 30 kg of compost of uncertain quality. Can society afford a process where 70% by weight are losses that create pollution and the product is of poor quality?

Unfortunately, even biogas plants are still very poorly constructed, rarely adapted to the needs of microorganisms. In the same way, old logistics and pre-treatment of organic material create emissions that cause losses and unhygienic environment

Here is the answer why agriculture is polluting:

Cultivated land lacks organic fertilizers containing all plant nutrients bound by bioenergy in organic structures of partially converted residues of plants, animals, and microorganisms as well as in living microorganisms.

Why do organic fertilizers adapted to cultivation still lack?

Decision makers at all levels are responsible for ensuring that plant nutrients are still handled with expensive unscientific and outdated, i.e. unsustainable, methods that offer companies in the waste and wastewater industry. Residents pay both with fees and with health problems caused by hazardous emissions to the air, water, and soil.

Political reforms are needed to support a transition to the "Sustainable Biological Recycling System" (SBRS) instead of the current unsustainable waste and wastewater systems that pollute air, water, soil, and vegetation and has a negative impact on health, the environment, and the climate.

SBRS takes care of Renewable Organic Material that originate from now living plants, animals, and microorganisms and by using several innovations

- radically reduce emissions polluting air, water, soil, and vegetation
- utilize efficient bioenergy in biogas for electricity, heating, and cooling
- promote production of biofertilizers and thus improve
 - recycling of plant nutrients
 - increase carbon sequestration in cultivated soils
 - support biodiversity in arable land
- positively affect 10 of the 17 sustainability goals in Agenda 2030 directly and others indirectly.

In order to change to a knowledge-based sustainable society, the responsibility for the management of renewable organic material in the waste must be transferred to the farmers. People in agriculture have the best knowledge of biological processes and have the greatest interest in producing sustainable biofertilizers and wisely utilizing bioenergy in local high-tech biogas plants.

Clarification:

The lack of fully organic fertilizers means that farmers have two possibilities:

- a) either get poor growth
- b) or buy expensive imported mineral fertilizers.

In both cases, (1) plant nutrients, (2) biodiversity and (3) water holding capacity are not adequately managed.

(1) Of all **plant nutrients** that leave cultivated land and are transported to urban areas, less than 2% is estimated to be returned to cultivated fields, writes the Ellen MacArthur Foundation in the report **CITIES AND CIRCULAR ECONOMY FOR FOOD**, published in May 2019. There are huge problems with reactive nitrogen that have passed planetary boundaries presented in 2017 at https://www.researchgate.net/figure/The-nine-planetary-boundaries-as-safe-operating-space-for-humanity-based-on-Rockstroem-et_fig5_318635245. Phosphorus starts to be recycled from sewage sludge with very costly and polluting methods instead of being used in a sustainable way.

The plants are the most important producers – primary producers. The plants biomass becomes nutrients and bioenergy in food, feed, and fiber. During assimilation, solar radiation energy is converted and stored as bioenergy in vegetation.

For assimilation to work, plants need access to at least 16 chemical elements. Hydrogen (H), carbon (C) and oxygen (O) extract the plants from water (H₂O) and carbon dioxide (CO₂). Other elements must be present in the soil and the following are called important plant nutrients: nitrogen (N), phosphorus (P), potassium (K), calcium (Ca), magnesium (Mg), sulfur (S), chlorine (Cl), iron (Fe), boron (B), manganese (Mn), zinc (Zn), copper (Cu) and molybdenum (Mo). In addition to essential elements, various plants need stimulating elements and these are considered to be cobalt (Co), chromium (Cr), nickel (Ni), vanadium (V), tin (Sn), lithium (Li), fluorine (F), selenium (Se), silicon (Si), etc. Bioenergy and elements are used by other organisms, including humans through food chains.

(2) **Biological diversity** in the soil decreases in both cases and the need for pesticides increases. Here are two recently presented statements:

- “Keeping plants healthy and productive has always been, and will remain, an important issue for people's food safety. New technologies have a key role to play in ensuring that the methods we use to keep plants healthy and productive are effective, have a low impact on the environment and contribute to net emissions.” – This is not the case when using agricultural chemicals.
- Biological agents to replace chemical compounds ... "There are currently many concerns about the environmental and health effects of conventional chemical pesticides and the increasing resistance of pests and pathogens to pesticides we use ..."
Both sentences are available at www.crophealthnorth.co.uk.

(3) The soil's **water-holding capacity** decreases with a reduced proportion of organic matter in both cases. It results in increased need for irrigation.

The following is obvious: All people in urban areas need food and it comes from rural farming systems.

It should be equally obvious that plant nutrients and some of the bioenergy found in urban waste from plants, animals and microorganisms should be recycled to cultivated land without polluting losses to maintain soil fertility / production capacity and thus ensure good harvests.