

SBI/SBSTA Koronivia Joint Work on Agriculture:
***2(d): improved nutrient use and manure management towards sustainable and resilient
agricultural systems***
Response from the Farmers Constituency

The Farmers' Constituency represents the many millions of farmers from all corners of the world, from smallholder farmers to large-scale farmers, those planting crops, raising livestock, practising silviculture and fisher folk. We welcome the opportunity to respond to this consultation in this important step forward for agriculture in the UNFCCC negotiations.

The Farmers Constituency welcomes the detailed examination of the different topics within the KJWA. However agriculture is multi-functional with interlinkages between many topics. As such awareness is required of the various synergies and possible trade-offs to ensure that solutions are farm and farmer specific.

Improved nutrient use is a case in point. An integrated approach is central to successful nutrient management which should include a range of practices which support improved crop and livestock productivity, maintain and enhance soil carbon stocks, below and above ground biodiversity and reduce nutrient losses to the environment.

1. Integrated management of inorganic and organic fertilisers

- Advice and training for farmers and extension workers are important to promote best practice and avoid over-application of both inorganic and organic fertilisers in order to limit emissions of nitrous oxide, a powerful greenhouse gas;
- We support the correct and timely applications of all fertilisers including the adoption of approaches which close the nutrient cycle and minimise losses to the environment;
- Consideration should be given to both availability of and balance of nutrients. Nitrogen fertilisers (organic and inorganic) are often the sole focus of mitigation measures. Advice on the specific nutrient content of inorganic and organic fertilisers and nutrient demand of plants is important in order to meet plant needs;
- Nutrient deficiencies can pose serious threats to plant productivity but excess is equally problematic to both plants and the environment;
- Maintaining and improving the health of soils should be a critical target when planning on-farm nutrient management. With better soil structure and greater organic matter content, soils hold more nutrients which could improve nutrient bioavailability and soil carbon stocks. This will vary with soil type;
- A range of practices and farming systems have a significant role in contributing to improved nutrient management including crop rotation, cover cropping, alley cropping, mixed farming, mulching, reduced tillage, hedgerows, shelter belts and agroforestry systems.

2. Planning, storage and management and application of nutrients

- Good planning is a critical step in the improved management of nutrients and advice has a key role to play;
- Better storage and processing of manure can reduce greenhouse gas emissions, reduce the risk of odour and the transfer of zoonotic diseases to humans which could pose a public health threat especially where livestock is kept in urban and peri-urban areas.
- The risk of 'pollution swapping' will require management i.e. different storage options may lead to an increase or decrease in nitrous oxide, methane and ammonia;
- Storage which is fit-for-purpose requires levels of investment that is often beyond many farm businesses at a range of scales. This is an area where government incentives have a real role to play, to both help tackle current issues and future-proof farm businesses.

3. Organic nutrients

- Organic fertilisers provide multiple benefits:
 - nutrition for crops;
 - some contain high levels of carbon and so are beneficial for increasing soil carbon content;
 - improve soil biodiversity;
 - keep soils healthy;
 - improve the water-holding capacity of soils.
- In addition most organic fertilisers are produced on the farm as a valuable by-product of agricultural production. They have a critical role in closing the nutrient cycle and freeing farmers from purchasing and dependence on costly external input. The manufacture of inorganic nitrogen fertilisers via the Haber-Bosch process gives rise to greenhouse gas emissions. The quantity of emissions produced varies by manufacturing site;
- Testing of organic manures is also important but most practical where manures are collected e.g. in dairy farming. A diversity of options including general guidance/reference information is required appropriate to the farm scale and extension services;
- Organic fertilisers, and manures in particular, should not be labelled as waste management; these are valuable by-products on a farm. This perspective has important policy implications.

4. Important role of testing soils for nutrient status before any application

- Excess application of nutrients (both phosphorus and nitrogen) can have negative environmental effects. They should be applied according to plant needs and the nutrient content in the soil;
- Phosphorus is a scarce resource that should be applied only when necessary. Additionally, phosphorus recovery from wastewater treatment plants can help to close the nutrient cycle but this should not contain harmful organic substances like pharmaceuticals. In addition the phosphorus needs to be plant available;

- The nitrogen content of soils after harvest / before planting could be determined in order to minimise and avoid negative environmental impacts. However the mobilisation of nitrogen from organic matter is highly dependent on soil temperature and water status during the growing season;
- Tools and training appropriate to the country/region should be available to farmers and extension staff to analyse soil fertility e.g. soil testing or leaf colour charts;
- While nutrient deficiencies can pose serious threats to plant productivity, excess is equally problematic to both plants (especially micronutrients) and the environment;
- The chemistry and composition of certain soils can make it harder for plants to absorb nutrients. The nutrients may not be available in certain alkaline or acidic soils, or may be present in forms that the plants cannot use. In addition to soil pH, soil properties like water content and compaction may exacerbate these problems.

5. The nutrient cycle starts with animal feed

- Improved nutrient use has to be seen as a holistic approach and livestock feeding is a central element in influencing the nutrient content of manure;
- Adjusting the nutritional content of feed to meet animal needs can significantly save resources and also improve animal health and productivity;

6. Clean energy from organic manures

- Biogas plants provide solutions for storing manure, reducing emissions and producing green energy at the same time, a triple-win for the farmer and the environment;
- Small-scale biogas plants processing manure and other residues can help provide decentralised green energy for smallholder farmers and rural communities without access to the electricity grid, so supporting sustainable development.

7. Innovation and dissemination

- It is important that research on nutrient use and the interaction with soils, plants and animals are understood in a site-specific context. Different agricultural systems require different nutrient solutions;
- Research and innovation in various aspects of nutrient management is required developing cost-effective solutions for farmers;
- Farmers and their needs should be integrated in research design;
- It is essential to ensure that women have more opportunities to benefit from training and the use of technologies;
- Research has shown that most effective extension services in disseminating good manure management practices were those with demonstrations that allowed farmers to see what fellow farmers were doing. Ethiopia and Malawi used lead farmers to carry out various manure management activities such as proper collection and storage, bio-slurry fertilization, composting, and application of manure on crop farms¹

¹ <https://www.frontiersin.org/articles/10.3389/fsufs.2019.00029/full>

- There is evidence to suggest that in some countries the agricultural extension system has not sufficiently included manure management. Most of the farmers believed the most crucial constraint to enhanced manure management was the lack of information;
- Farmers should consider opportunities to diversify and align their businesses with production value chains, networks and economic initiatives;
- Nutrient management practices could also contribute to carbon accounting under an agreed Paris Agreement Article 6 framework. Indeed, it is critically important that the mitigation and removal potential held by agriculture and forestry be recognised under Article 6.