



Today, the 5<sup>th</sup> of December is the **WORLD SOIL DAY**. Every year, countries across the globe observe this international day to create awareness on the importance of healthy soil and advocate sustainable management of soil resources. This year, the Day is being observed with the theme “*Halt Salinization, Boost Soil Productivity*”.

Soil salinization is a process by which there is build-up of salt concentration in soil to such a level that impacts on the agricultural production, environmental health, and economics and quality of life.

Not all countries have salinity issues. Generally, salt-affected soils are predominant in arid and semi-arid regions as well as croplands of coastal areas. Salinization can occur naturally by raising sea level or water intrusion from sea, river or groundwater, but can also be of anthropogenic origin through agricultural intensification, inappropriate management practices, and use of residual irrigation water or excessive application of mineral fertilizers. In Bhutanese context, soil salinization is not an issue at the moment, but there are signs of salt affected soils as indicated by the preliminary results from the digital soil mapping model. Soil salinization is caused by numerous factors. For Bhutan’s case, one of the causes is inappropriate application of chemical fertilizers. With the aim to meet growing need for food due to increasing population and to enhance farm profitability, the use of chemical fertilizers has increased over the recent years (see Figure 1).

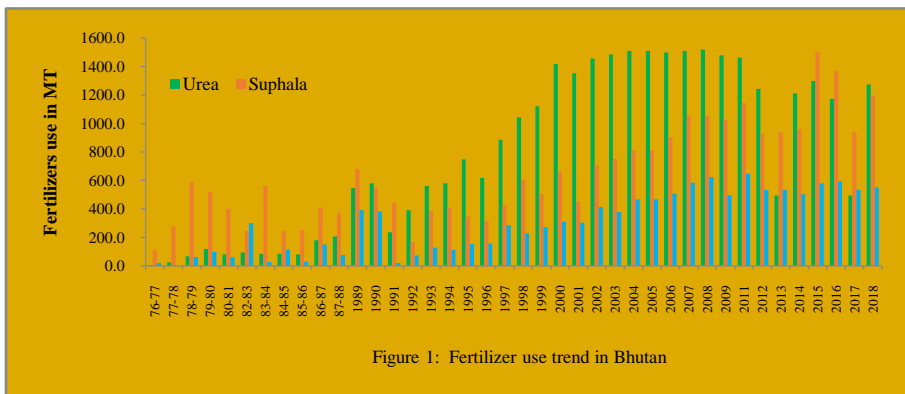


Figure 1: Fertilizer use trend in Bhutan



While the overall use of chemical fertilizers in the country is still low as compared to other countries, the inappropriate use of it is becoming a serious concern. First, the use of chemical fertilizers is concentrated in some Agricultural landscapes based on commercial crops, affordability and accessibility. Second, there is imbalance and higher rate of fertilizers application which results to inefficient use of nutrients and wastage. And third, the decision to use chemical fertilizers is not based on the soil test results; rather it is influenced by the sense of competition among farmers to use more inputs. As a result, the risk of salt or chemical build up in the soils is becoming high which will deteriorate the overall soil health and the long term economic productivity of soils. The soil microbial activity and their functional diversity, which are important indicators of soil health, are also impacted by the extensive use of chemical inputs. In fact, the excessive and prolonged use of agrochemicals can reduce the biodiversity of the soil. Other impact of imbalanced and excessive use of agrochemicals is the pollution in the underground and surface water bodies – streams and rivers which are the major sources of drinking and irrigation water and are also the major habitat for aquatic life forms.

Apart from chemical fertilizers, the use of other agrochemicals including pesticides, weedicides and herbicides, which are also on increasing trend, can also lead to chemical build up in the soil and have serious impact on the life belowground – Soil Biodiversity.

Therefore, as we observe World Soil Day today, let’s take a moment and commit what we (as policy makers, decision makers, researchers, extensionists, farmers, academics, students, youths, NGOs, CSOs) can do to reduce the use of agro-chemicals or improve the way we use and manage it. Our small individual thinking and action will collectively contribute towards better soil health which will further lead to healthy food production and healthy life. Let us all know that **SOIL** is the basis and foundation of 95% of food that we eat, biodiversity, climate change adaptation and mitigation and all life forms on earth.

From the National Soil Services Centre, we would like to encourage our extension and farmers, especially commercial farmers who are using chemical fertilizers extensively to adopt the following principles of sustainable soil management.

**Principles of sustainable soil management:**

- **Soil testing** – Soil testing is starting point and thus so critical to understand the soil nutrient status that will guide the precision agriculture practices especially in nutrient management.
- **Foster soil nutrient balance** - Rationalize application of chemical fertilizers based on the soil nutrient status and crop requirements to maximize soil health, avoid unnecessary costs and minimize the risk of run-off and build up in the soil. Fertilizer application methods, types, rates and timing should be appropriate to limit losses and promote balanced crop nutrient uptake. Promote integrated plant nutrient management including manure and compost addition.
- **Enhance soil organic matter (SOM) content** – SOM plays a central role in maintaining soil functions and preventing soil degradation. So, ensure to build up and maintain SOM through addition of farmyard manure, compost, cover crops or straw incorporation.
- **Preserve and enhance soil biodiversity** - Soil microorganisms play a key role in soil. They are essential for maintenance of soil structure, transformation and mineralization of organic matter, making nutrients available for plants. But no work is done yet to understand the status of soil biodiversity in Bhutan.
- **Improve soil water management** - A sustainably managed soil has rapid water infiltration, optimal soil water storage of plant available water and efficient drainage when saturated. Soil moisture is critical for efficient uptake of nutrients in the soil.

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