

World Soil Day- Soils where food begins

On the 6th of December 2022, Naturland e.V. celebrated “World Soil Day” through an online seminar featuring two guest speakers: agronomist Haekoo Kim from FAO and Karmel Abufarha from Canaan Fair Trade, a Naturland member that gathers 84 farmers in Palestine. Below are the key points of the presentations.

Introduction to the World Soil Day by Eva Kohlschmid

Agriculture is intimately linked to the soil and, in a sense, has lost its "grip" on the soil. Loss of organic matter contents and loss of nutrients threaten nutrition and are considered major challenges for healthy soil management. This online seminar celebrates World Soil Day Soil, where the food begins, held annually on the 5th of December to raise awareness of human well-being by addressing growing challenges in soil and thus improving soil health.

Soil is a crucial resource for food security, water, climate, and biodiversity. Soils deliver ecosystem services that enable life on earth. Approximately 25% of the global biodiversity is sustained by soil. Meanwhile, worldwide nutrition depends on soil: 95 % of our food is directly or indirectly produced on soil.

Healthy, fertile, and productive soil is base of organic agriculture. Therefore [Naturland Standards](#) approaches soil management holistically and the organisation supports its members through different formats: online-seminars and face-to-face-workshops and peer-to-peer exchange. Additionally, the [Naturland website](#) provides technical information and the organisation participates in international projects to pilot new techniques and practices preserving and creating fertile soils.

“Soil fertility and soil nutrition, where food security begins?”

by Dr. Haekoo Kim

Dr. Haekoo Kim is a crop physiologist living and working in different parts of the world. As a plant science researcher, he has been working on different crops focusing mainly on cereals (Rice, sorghum, maize, etc.). Nowadays, he’s working as a technical adviser at the Food and Agriculture Organization of the United Nations (FAO) in Plant Production and Protection Division.

Soil is an essential element to humans as it provides resources to plants. In terms of the UN Sustainable development goals, soil is interconnected to different goals, explained Dr. Kim, from regulating climate to the cultural heritage side that can’t be neglected.

When talking about the future of food and agriculture, there are many challenges that we will have to face in the next decade and among those, Dr. Kim, focuses on the following challenges:

- **Micronutrients deficiency** (Hidden Hunger): Lack of micronutrients (such as Zinc, Iron, copper, manganese) in the soil is ultimately impacting our diet and health, especially when talking about nutrient-poor diet (staple crops diet like rice or maize). Therefore, we need to consider soil health, which is correlated to the plant absorption of bioavailable nutrients that are then conserved in the edible parts of the plant, which, at the end, is consumed by humans.

- **Nutrient imbalance in soils:** Nutrient depletion in the soil is becoming less and less productive while on the other hand, there are also problems related to pollution, caused mainly by using too much external input in agriculture, which leads to other problems related to greenhouse emissions and global warming.

What are the actions to prevent and reverse nutrient imbalances?

Dr. Kim highlighted the following strategies that FAO recommended this year in the context of the fertilizer crisis:

- Soil mapping and nutrient measurement
- Crop diversification
- Judicious use of fertilizers and adequate use of micronutrients
- Enhance technical support to farmers
- Adopt long-term sustainable soil management practices (see below)

And in practice how can we tackle challenges related to nutrient imbalance in the soil?

- **Investigate the relationship between soil and plant:** Using different soil tools, digging into the soil, and analysing the different layers and the root system of the crops.
- **Minimal disturbance of the soil:** minimizing tillage or making deep holes and planting.
- **Restore soil fertility with plants:** using permanent soil coverage with residues from the field.
- **Crop diversification in various soils and landscapes:** depending on the tools, it can be challenging. Perennial legumes can be used and kept for a couple of seasons. In Ethiopia, for example, they use the so-called false banana Enset, a crop close to the banana but that doesn't produce edible fruits, and the tuber is mainly used for consumption.

Questions of the Audience

- Question #1: Brazil is on the same latitude as Ethiopia and has excellent government research centers, such as EMBRAPA, with more sustainable technologies and less intensive use of chemical fertilizers that need to be purchased from large companies, leaving the farmer hostage to these purchases. Why not use more sustainable techniques such as agroforestry, syntropy, green manuring, and regenerative agriculture instead of thinking only about fertilization fears with agrochemical packages?
- Answer #1: Yes –Brazil has a strong research center. You are correct. More sustainable tools. Reality: sub-Saharan farmers do not have the knowledge or alternative input. Difficult to have the level to start. Need support to begin improving practices. The need for Context-based support is most important for farmers so that we can understand the problematics, collect the data, and based on the results found, assess the entry points and later combine it with long-term practice.
- Comment: I feel that soil and plants are always working in unison to increase each other's living capacity as plants feed the microbial life of the soil by the power of the sun and the soil life is decomposing the fallen biomass in carbon mass of the soil to hold more water for both the soil life and the plant life. Reciprocity is a common theme in ecosystem processes; everything works together.

- Comment: Soil is the cradle of life, not only for plants, but the soil is also well-ventilated by good plowing, and the addition of composted animal manure and plant remains
- Question #2: What is more sustainable, to have conservational soil tillage combined with herbicides/pesticides or to go with organic agriculture land reduce soil tillage?
- Answer #2: Depending on the soil, area, and type of equipment farmers have. In many countries, most farmers are unable to afford herbicides. Depending on the context, there is always a trade on having a starting point for the technology's improvement while simultaneously trying to minimize the dependency on these products. There is no correct answer, but one of the possible methods is more environment-friendly weed control (cover crop, residue coverage to reduce weed pressure).
 - According to Nurland standards, herbicides and synthetic pesticides are not allowed. Farmers must use different types of sustainable soil management, such as crop rotation and cover crops.
 - In the long run, using herbicide treatments and synthetic pesticides can pollute the soil (including disturbance of the soil microbial community) and the groundwater. When we compare then conventional farming with organic farming, it is true that conventional farming needs less area for the same organic farming yield, but what is not considered in conventional agriculture is the pollution caused by the overuse of agrochemicals that, in the future, negatively impacts the yield and the surrounding environment.
- Comment: I have a very small-scale farm (1 ha) in Mozambique where I do agroforestry since 3 years. My best practice is: When I start a bed newly I take the weeds out (minimally disturbing the soil), then I mix 50% biochar plus 50% bokashi or aerobic compost soil and then cover all with first bigger sticks, then the smaller branches, then gras as final cover. I have planted Moringa, Leucaena, Gliricidia, Banana, Papaya, Guava, etc. No tillage. No animal products. All biocyclic vegan. I am sharing my knowledge with locals. In Moz 80% of the population is still working in agriculture, many subsistence farmers. 99% have less than 5ha... about 85% have only 1 to 2 ha. So it is not feasibly to use manure. It would be an external input. So I am working circular with what my little piece of land gives. I am happy as most indigenous trees here are leguminous.

Additional Resources mentioned in the chat from participants

- Video on improving soil on 460 hectares of degraded land with almost no need for outside input: [Life in Syntropy - YouTube](#)

“More life creates more life”

By Karmel Abufarha

Karmel Abufarha is part of [Canaan Fair Trade](#), a Nurland member that gathers 84 farmers in Palestine. Canaan Oil is a fair-trade project, assembling family farms growing olives, citrus fruits, almonds, and organic vegetables. They operate for local markets as well as export their products worldwide.

Karmel Abufarha shared his holistic view that observing nature and ecosystems is the key to resilient farming. He outlined the characteristic of ecosystems in which all the elements are connected reciprocally – and that biodiversity is the main driver for life: The more plants there are, the more water is managed, the more carbon is produced and the healthier soil can be created - which then holds more water and more plants.

Regarding the impact of biodiversity on the site Karmel Abufarha pointed out the relevance of roots and the effect on water management:

- **Roots:** Looking at the diversity of plants, Karmel Abufarha recommended considering their diversity of roots and their contribution to keeping soils activated. Roots have different shapes and sizes, and the variety of roots creates a larger surface area for microbes to be fed from plants, to hold water, and to slow water. Therefore, we increase soil biodiversity and facilitate access to more nutrition and overall fertility.
- **Water:** Biodiversity has an impact on water balance, too. Plants slow the flow across the land and above and below the surface. Different plants provide a diversity of space and increase the surface to collect due and slow flow. Additionally, plants themselves store water.

What can farmers do? Karmel Abufarha highlighted the ability of farmers to grow and nurture plants and their very capacity to cultivate crops:

- We can speed up natural processes.
- Increase plants quickly by planting, bringing water, start/adding to the living process in any space, so farmers can jumpstart nature by fostering plants.
- Increase diversity
- Observe how plants work with and in between each other
- Design groups of plants that work well together

Karmel Abufarha also emphasized the **impact of pruning:**

- Pruning ignites growth among plants.
- Pushing plants to grow more means more carbon absorption from the atmosphere.
- Decomposition is a slow process; we can make it faster by increasing the surface area for microorganisms to process if we shred and crop tree branches.

Grazing contributes to farmer's work:

- Animals do what humans do
- They can help us in our work, benefit themselves and increase productive "output".

According to Karmel Abufarha, all these measures contribute to **stability:**

- More active complex soil, more carbon, more water, and more nutrients cycling through at a faster rate than could happen without our intervention
- Biodiversity gives us "more eggs in more baskets" – that is, different crops in one season.
- Biodiversity and fertile soils offer us more seasons, income, and reasons to be on the land.
- More complexity on the field reduces the risks of extensive crop failure due to pests and diseases.
- We do this for our society, community, and family to continue healthy in the present to the future.

Questions of the Audience

- Question #1: How do you decide and evaluate what to plant next to your main crops? Are you just observing nature or doing special research, or exchanging with other producers?
- Answer #1: There are several options you have. It depends very much on what functions you try to achieve: Some knowledge is inherited knowledge: For example, we have carob trees between the olives because the carob tree attracts specific wasps that are predators of the flies that eat the olives. This is an example of integrated pest management. And at the same time, this tree happens to be nitrogen-fixing. This can either be you dealing with a pest issue or trying to find a solution. Or it could be a matter of function. For example, if you are trying to direct the wind in a certain way. You decide on planting good windbreakers. Olives roots are widespread, whereas fig trees have different tab groups. In this way, you can combine different types of roots. Some trees grow very fast, and those

can be good for producing carbon. You prune them vigorously every year, chop them up into widgets, and put them around your trees. This way, they serve as a super booster to create biomass.

- Another example is that you plant very smelly plants around your vegetable– like salve or thyme. Or rosemary next to tomatoes or vegetable beds. And they function as barriers that many insects won't like. It's all related to the functions and what you want to achieve.
- Question #3: Aren't the spontaneous plants that emerge considered the best adapted to promote the regeneration of these soils between crop lines? Or can only commercial plants be used?
- Answer #3: This is a beautiful question. Land literally speaks: Wild plants growing naturally, grow in an environment that suits them. And while they exist in that land, they are also changing it. For example, these nitrogen fixers that spontaneously pop up, create a more nitrogen-rich soil over time. And over time, this makes other plants grow there. Once the soil is well nitrogen-enriched, fewer nitrogen enrichers will exist, and other plants will fill that gap. That is the natural progression and regeneration process. But this poses a difficult question: How do you balance using nature's function and allowing spaces to grow wild versus producing a crop you want to sell and economically feed your life and make your farm function in a modern world? And that is the balance that everybody has to dictate. In different contexts, the different plants and crops that you are growing, in different climates and regions, in different economic situations - that's a balance and decision that every farmer has to figure out.

Additional Resources mentioned in the chat from participants

- Website of biocyclic vegan network - a certification IFOAM approved: <https://www.biocyclic-vegan.org/>