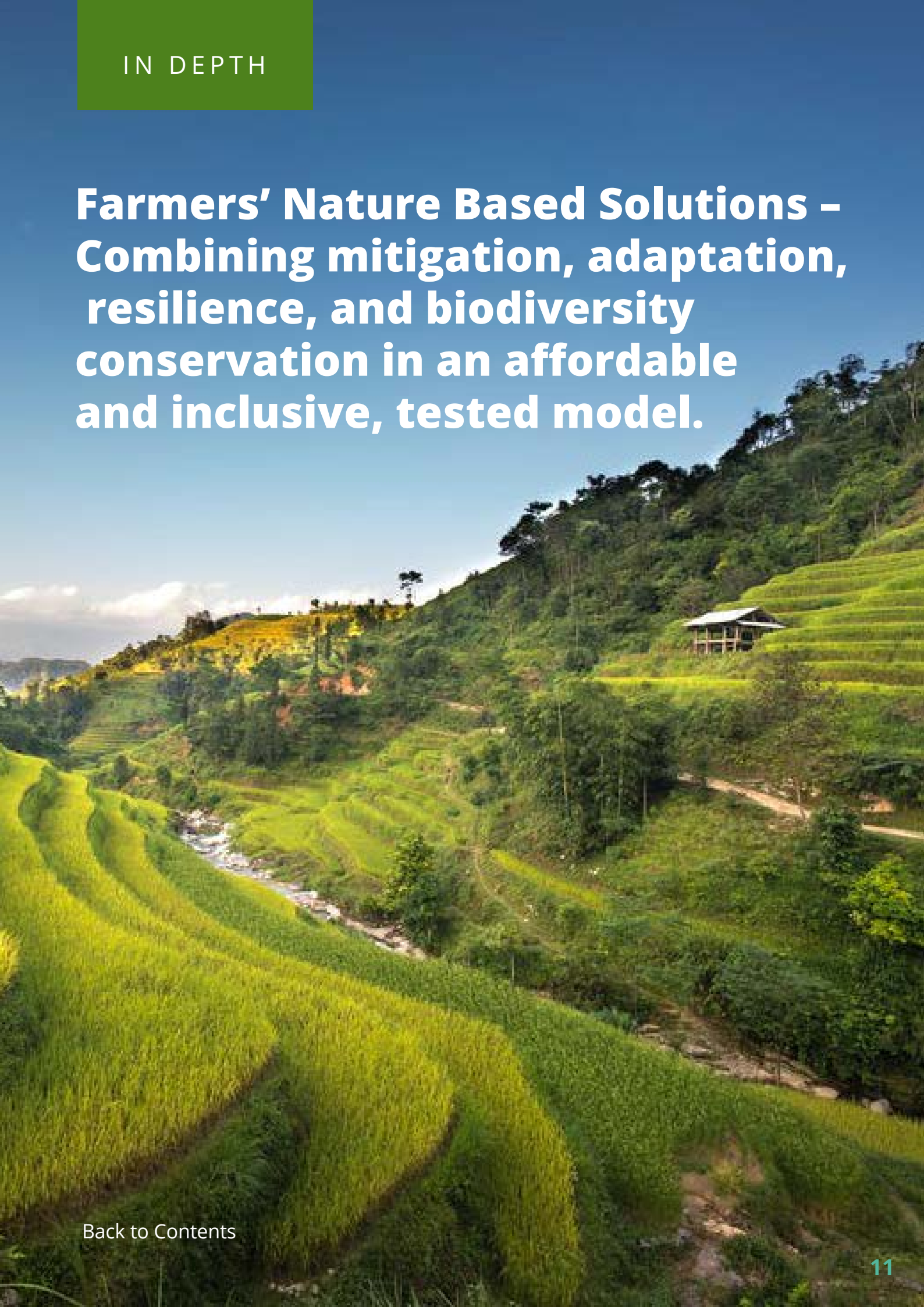
Farmers' Nature Based Solutions – Combining mitigation, adaptation, resilience, and biodiversity conservation in an affordable and inclusive, tested model.



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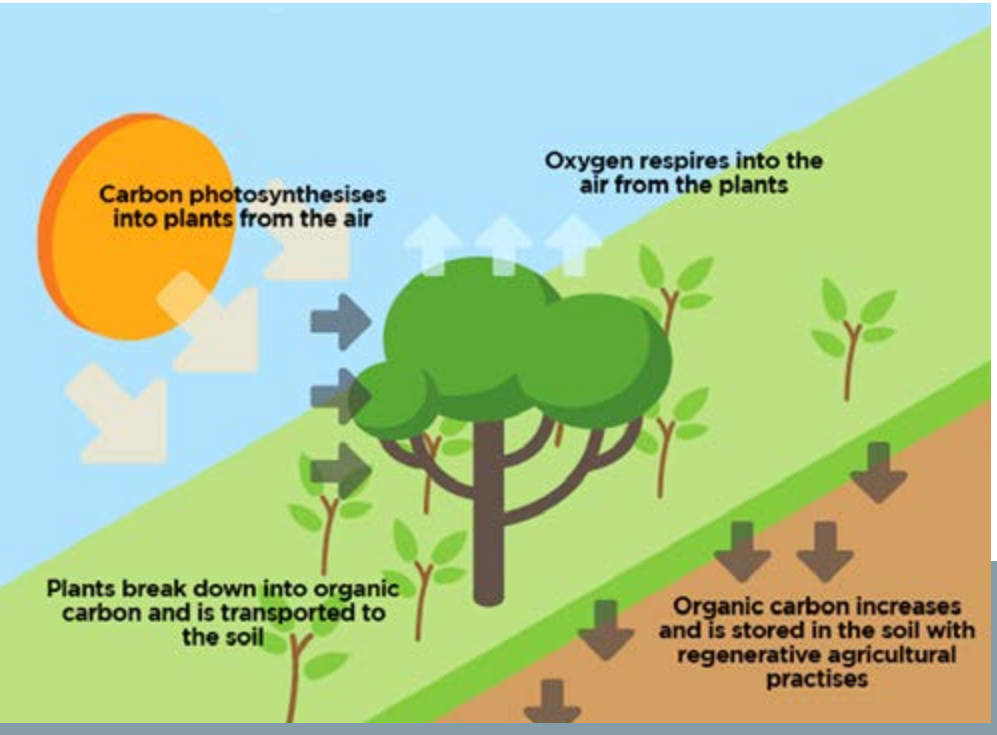
Farmers' Nature Based Solutions – Combining mitigation, adaptation, resilience, and biodiversity conservation in an affordable and inclusive, tested model.

by Giovanni Vanni Frajese, Scientific Advisor and Council Coordinator, World Farmers' Organisation

Agriculture is undoubtedly a source and beneficiary of nature-based solutions: to nurture their crops and forestry, sustain their livestock and perform aquaculture and fishery activities, farmers depend on soil, water and air; resources that are at the core of their daily lives. Their conservation is crucial for the sustainability of the agricultural sector, and climate change constitutes a crucial challenge in this effort.

Living and working closely to nature- closer than any other economic actor- farmers are at the frontline of changes in climate and nature itself, struggling to adapt their activity to a flexible environment.

However, adaptation is just one side of the coin, as agriculture has the potential to contribute immensely to the fight against climate change through carbon sink, and the preservation of biodiversity. Nature-based solutions in agriculture can combine climate change mitigation, adaptation, disaster risk reduction, biodiversity conservation, and sustainable resource management.

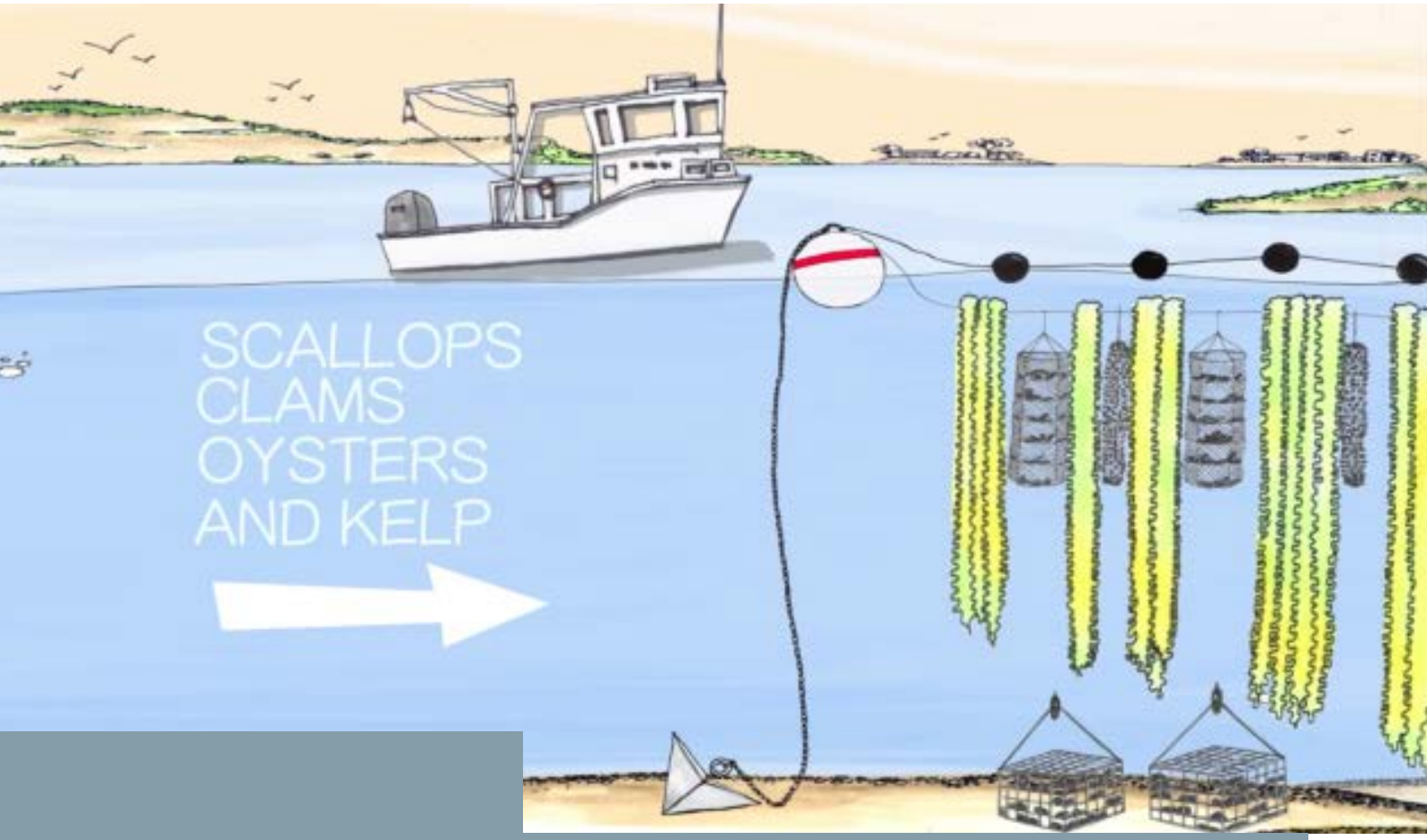


Prof Giovanni V. Frajese is currently the director of the "SMART Lab" at the "University of Rome Foro Italico", and researches medicine and bio-technologies with interest in the field of Endocrinology, Oncology, Metabolism and Nutrition. He graduated in 1996 in Medicine at the University of Rome "Tor Vergata" and specialized in Endocrinology and Dysmetabolic diseases in 2001. He has authored over 70 papers in international peer-reviewed scientific journals. Member of several societies including Endocrine Society (USA), American Diabetes Association (ADA), N.Y. Academy of Sciences, SIE (Italian Society of Endocrinology), Prof Frajese is the Scientific Advisor for the WFO and Coordinator of the WFO Scientific Council, bringing together almost 20 scientists across different domains to make sure that farmers' ambitions are answerable to the best available science.

Worldwide, farmers practising sustainable agriculture are an essential part of the climate action through nature-based solutions. Some examples of farmers driven, successful, regenerative, and game-changing ideas:

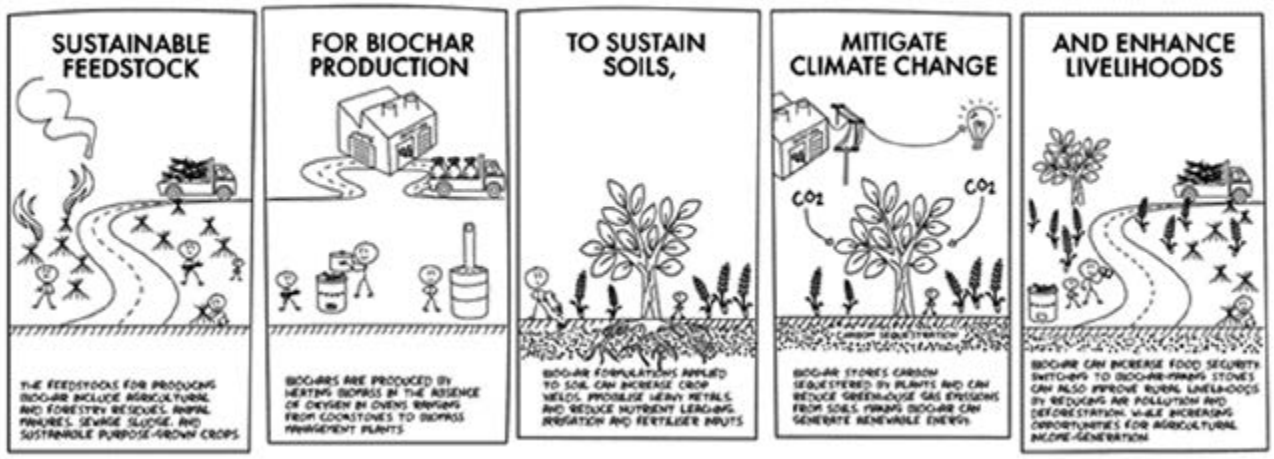
Aquaculture

Imagine a vertical underwater garden with hurricane-proof anchors on the edges connected by floating horizontal ropes across the surface. From these lines, Kelp and Gracilaria and other kinds of seaweeds grow vertically downward next to scallops in hanging nets that look like Japanese lanterns and mussels held in suspension in mesh socks. Staked below the vertical garden are oysters in cages and then clams buried in the sea floor. "*Because the farm is vertical, it has a small footprint. My farm used to be 100 acres; now it's down to 20 acres, but it produces much more food than before. If you want "small is beautiful," here it is. We want ocean agriculture to tread lightly. Our 3D farms are designed to address three major challenges: First, to bring to the table a delicious new seafood plate in this era of overfishing and food insecurity; second, to transform fishermen into restorative ocean farmers; and third, to build the foundation for a new blue-green economy that doesn't recreate the injustices of the old industrial economy*".



Biochar

Biochar is a charcoal-like substance that is made by burning organic material from agricultural and forestry wastes in a controlled process called pyrolysis. During pyrolysis organic materials, such as wood chips, leaf litter or dead plants, are burned in a container with very little oxygen. As the materials burn, they release little to no contaminating fumes. During the pyrolysis process, the organic material is converted into biochar, a stable form of carbon that cannot escape into the atmosphere. **Biochar production is a carbon-negative process**, which means that it reduces CO2 in the atmosphere. Biochar contributes to the mitigation of climate change by enriching the soils and reducing the need for chemical fertilizers, which in turn lowers greenhouse gas emissions. The improved soil fertility also stimulates the growth of plants, which consume carbon dioxide.

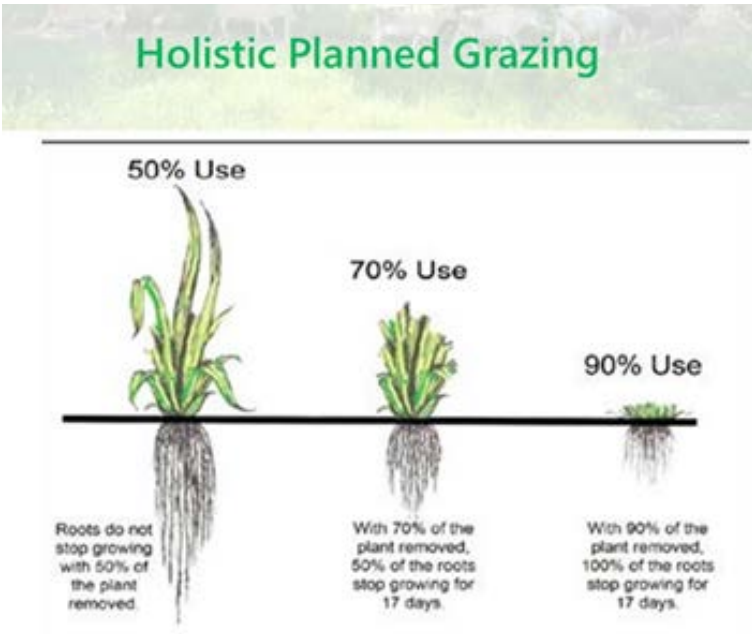


No till Practices

No-till practices allow the soil structure to stay intact and protect the soil by leaving crop residue on the soil surface. Improved soil structure and soil cover increase the soil's ability to absorb and infiltrate water, which in turn reduces soil erosion and runoff and prevents pollution from entering nearby water sources. No-till practices also slow evaporation, which not only means better absorption of rainwater, but it also increases irrigation efficiency, ultimately leading to higher yields, especially during hot and dry weather. No-till saves the farmer time and money decreasing the fuel expense by 50 to 80 percent and the labor by 30 to 50 percent. According to Rodale Institute, adopting regenerative agricultural practices across the globe could sequester global annual greenhouse gas emissions, which is roughly 52 giga-tonnes of carbon dioxide

Holistic Planned Grazing

To achieve desired economic goals, regenerative grazing farmers manage specifically to optimise four key ecosystem functions:
1) maximise energy capture via photosynthesis to drive ecosystem function,
2) maximise capture of incoming precipitation, retention in the soil and cycling through plants,
3) maximise nutrient cycling through plants and soil to facilitate biotic function and productivity,
4) create and maintain high biodiversity below and above ground to increase ecosystem stability and productivity.



Sustainable Agroecosystems

Farmers successfully using regenerative agricultural practices have done so using the following conservation practices:

• Changing plough tillage to no-till cropping and using precision agriculture to moderate the rate and timing of application of agrochemicals and water;

• Diversifying annual cropping systems to include legumes, perennial crops, and forages in rotations;

• Using cover crops in conjunction with row crops to keep the soil covered;

• Reintegrating grazing animals back into cropping systems; using pasture-ley rotations and pasture-cropping;

• Using organic soil amendments, such as cover crops, manure, and biofertilizers, reducing nitrogen use;

• Changing the type of fertilizer used (e.g., legumes, controlled-release, and nano-enhanced fertilizers);

• Applying biotic fertilizer formulations that feed the soil microbial systems and improve mycorrhizal function, reducing N and phosphorus (P) runoff and groundwater losses.

• Improving grazing management, converting marginal and degraded cropland to permanent pasture, agroforestry, and restoring wetlands.

Farmers are committed to finding alternatives to business as usual, a different approach that means a safer, healthier, bio-diverse system. The added values of different regenerative approaches include increased resilience to extreme events and increased economic value of the crops.