

## Regenerative Agriculture: A Multi Beneficial Approach towards Sustainable Agriculture

Deblina Roy<sup>1\*</sup>

<sup>1</sup>Ph.D. Research Scholar, Department of Agronomy, Bidhan Chandra Krishi Viswavidyalaya, Mohanpur, Nadia, West Bengal-741252

ARTICLE ID: 41

*‘More than a mere alternative strategy, regenerative agriculture represents a fundamental shift in our culture’s relationship to nature’*

----- Charles Eisenstein

### Introduction

The world confronting the horrific consequences of a pandemic that upended supply chains, the ravages of climate change, fertilizer shortages, and rising prices at the grocery store. India’s agricultural sector contributes to 18 percent of the country's greenhouse gas emissions (GHG). Agriculture as we know it is failing us. Our future has to be stronger, healthier, more equitable, and

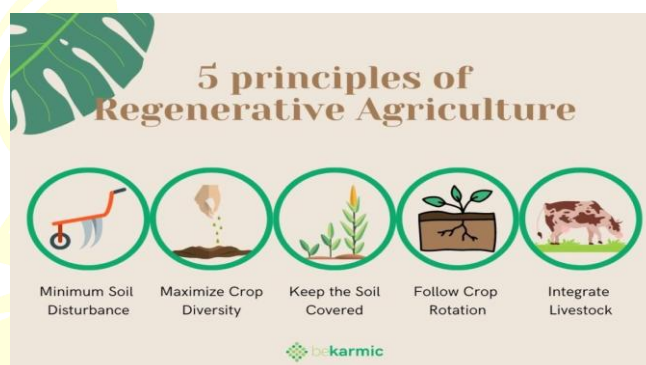


more resilient. Using Regenerative Agriculture as an alternative vision of agriculture will enable farmers and ranchers to better respond to external shocks (like a pandemic), combat climate change by embracing Indigenous growing principles, protect biodiversity by managing farms and ranches as ecosystems, and give independent farmers and ranchers more power by putting them in charge of their own destiny. In stark contrast to today's dominant industrial model, regenerative agriculture is focused on enhancing soil health. Chemical and fossil-fuel-produced fertilizers are heavily used in industrial agriculture, which can destroy soil and cause erosion. The soil stores carbon naturally; therefore, if the soil is damaged or eroded, agricultural lands can't sequester carbon and confront climate change. Regenerative agriculture's fundamental principles and practices largely focus on improving soil health,

which in turn protects and restores that carbon sink, and it is one-way regenerative farmers combat climate change. Apart from these regenerative principles, practices, and philosophies, farmers are committed to a vast array of benefits on and off their farms with their love, care, and creativity. While some had just started their careers in regenerative agriculture, others had been doing so for decades. Those who were in the beginning stages of change made gradual changes while others plunged into the deep end and changed everything at once. In regenerative agriculture, Indigenous perspectives are being revived and the narrative is being flipped to show how agriculture can transform the environment, fight climate change, rekindle relationships, boost economic development, and bring a sense of joy to many people, including consumers and farmers.

### What is Regenerative Agriculture?

Regeneration International describes, regenerative agriculture reverses climate change through improving soil biodiversity and restoring soil organic matter, which results in the reduction of carbon emissions and the improvement of the water cycle.



Specifically, Regenerative Agriculture entails leveraging the power of photosynthesis in plants to close the carbon cycle. Consequently, soil health and crop resilience will be improved.

Basically, regenerative agriculture increases soil organic matter, which in turn improves soil health. In addition to enhancing soil biodiversity and health, it also increases water holding capacity and carbon sequestration at greater depths, thereby reducing climate-damaging atmospheric CO<sub>2</sub> levels, and finally improving soil structure to fight against civilization-threatening soil erosion. Researchers continue to reveal that tillage, chemical applications and salt-based fertilizers, as well as carbon mining, cause soil damage. By reversing this paradigm, Regenerative Agriculture creates a sustainable world.

### Origin and Development

The Rodale Institute coined the phrase "regenerative agriculture" in the early 1980s. In 1987 and 1988, Rodale Releasing established the Regenerative Agriculture Association,



which began publishing regenerative agriculture publications. However, the institute ceased using the phrase in the late 1980s, and it only emerged intermittently between 2005 and 2008, until a white paper titled "Regenerative Organic Agriculture and Climate Change" was produced in 2014. According to the paper's summary, "we could capture more than 100 percent of present yearly CO<sub>2</sub> emissions by switching to common and affordable organic management approaches, which we call' regenerative organic agriculture." While the concept has been using for the decades, regenerative agriculture has become more prevalent in academic study in the disciplines of environmental science, plant science, and ecology since the early to mid-2010s. As the concept has gained popularity, several books on the subject have been produced, and numerous organizations have begun to promote regenerative agricultural approaches.

In 2021, various multinational corporations expressed interest in regenerative agriculture, such as PepsiCo, which announced that by 2030, it will work with farmers in its supply chain to establish regenerative agriculture practises across it's approximately 7 million acres, and Unilever, which announced an extensive implementation plan to incorporate regenerative agriculture throughout its supply chain. Nestle announced a \$1.8 billion investment in regenerative agriculture in order to cut emissions by 95%.

### **Principles of Regenerative Agriculture**

Nurture Relationships Within and Across Ecosystems *i.e.*, Regenerative growers foster and protect relationships between people, lands, water bodies, livestock, wildlife and even microbial life in soil.

- Prioritize soil health
- Use of all-year-round cover crops to avoid bare soils and thus mitigate erosion
- Reduce reliance on synthetic inputs
- Enhancement of biodiversity
- Nurture communities and reimagine economies

### **Key Components of Regenerative Agriculture**

No-till farming and pasture cropping, Organic annual cropping, Compost and compost tea, Biochar and terra preta, holistically managed grazing, Animal integration, Ecological aquaculture, Perennial crops, Silvopasture/agro forestry are the key components of regenerative agriculture practices.



## Practices for Successful Agricultural Regeneration

**A. Compost:** Compost is a soil amendment made from recycling organic matter. Hence, it is an integral part of regenerative agriculture. Additionally, compost acts as a natural pesticide in soil due to its humus content and humic acids. Composting at



home involves taking wastes like leaves and food scraps and letting worms, fungi, and aerobic bacteria, turn them into soil enhancers. The microbes in the compost help to fill in the soil's missing spaces, which reduces the risk of plants suffering from nutrient deficiencies, diseases, insect damage, and drought stress.

**B. Perennial Crops:** Perennial crops are an important part of regenerative agriculture. The goal of a regenerative farm is not to grow all crops perennially, but shifting more land to perennial crops and pastures is a good way of limiting soil disruption. Perm culture design focuses on recreating how things work in



nature, which is an important principle. It's like creating food in collaboration with nature rather than against it. The assumption is that by using a permanent design, the workload will be reduced and agricultural yields will rise over time. Many regenerative farms use multi-canopy food forests as a major perm culture principle.

**C. Biochar and Terra Preta:** They maintain fertility for long and are of great interest to regenerative agriculture practitioners. In fact, researches show that black carbon content in terra preta exceeds its content in the infertile neighbouring soils of a region up to seventy times.



**D. Rotational Grazing:** It focuses on moving livestock from one area of pasture to another. It prevents compaction of soil and overgrazing of pasture plants and does not consider the

timing of when to move the livestock. Only involves moving the livestock to fresh pasture.

**E. Mob Grazing:** This practice involves keeping a larger number of animals on a smaller piece of land. Moving occurs frequently and up to three times a day. Time for plant recovery does not factor into when livestock are moved.

**F. Holistic Planned Grazing:** It is a Gold-standard practice. Compared to rotational grazing or mob grazing, it takes additional factors into consideration. Plants' recovery time and the amount of time livestock spends with



plants are taken into account. The grazing plans also consider breeding and nesting seasons for all types of animals and birds, thus promoting biodiversity.

**G. Crop Rotation:** A change in soil today will influence future crops in some way, as long as it is planted today. One of the most widely recognized benefits of crop rotation is nutrient retention and nitrogen fixation, which serves as a natural fertilizer for the next crop. However, there are also other advantages to consider. Some crops affect the rhizosphere around the roots, allowing mineral nutrients to be more easily absorbed by the next crop. As a result, the next crop's health and immunity are boosted, and higher yields are achieved by doing this, according to Advancing Eco Agriculture.

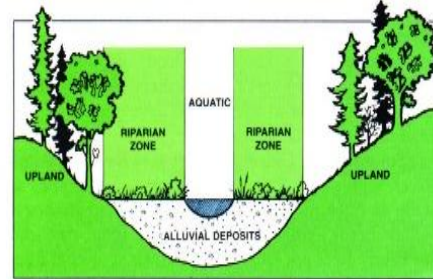
**H. No Tillage Practices:** Conservation tillage by adopting low or no-till practices that leave the soil intact when planting rather than disturbing the soil through ploughing induces carbon sequestration.



**I. Silvopasture:** The practice of growing trees and livestock together. Trees provide shade and protection from extreme weather conditions, while also providing timber, fruit, and nut crops, as well as forage for animals. Bringing trees and livestock together helps to create a healthier soil by promoting stronger root growth.



**J. Riparian Forest Buffers:** The riparian forest buffer is an area along with rivers and streams composed of trees, shrubs, and grass. Stream, river, lake, and pond banks can be stabilized by these buffers while their roots filter runoff from farms. Wildlife can also thrive in these areas, providing another source of revenue.



### Benefits of Regenerative Agriculture

- ❖ **Ecological Benefits:-** Within one season of taking their first steps on the regenerative journey, farmers reported seeing incredible transformations on their land. The crops grew healthier and the yields improved, as the soil became healthier and more fertile. The soil felt spongier and had more moisture, along with well-coloured soil aggregates attached to the long roots of their plants. There were vibrant microbial communities in the soil as evidenced by soil tests and earthworms, the basis of healthy water, nutrient, and the carbon cycle. A greater diversity of organisms on land, air, and water followed a greater diversity of organisms in the soil. In addition, an increasing number of birds, bees, and insects, as well as a greater diversity of plant life on the farm.

Water quality and quantity are also improved by regenerative farming. Chemical and pesticide inputs are reduced in regenerative farming, which in turn results in less water pollution and less harmful algal growth. Better soil health will increase the soil water holding capacity and recharge the groundwater and will result in a greater volume of water conserved on the farm or ranch and more resilience to floods and droughts. Soil contains the greatest carbon sink on Earth, thanks to photosynthesis and to the mighty microbes that live there. With proper management, it could draw down 250 million metric tons of CO<sub>2</sub>-equivalent greenhouse gases in India every year, thereby reversing the impacts of climate change.

- ❖ **Economic Benefits:-** The ecological, community and personal values of farmers are primary motivators for regenerative agriculture, but economic benefits are also important. The growers and farmers found that regenerative farming techniques





resulted in improved crop health and yields in part due to improved soil health. A reduction in the use of chemicals like fertilizers, pesticides, and herbicides led to cost savings for farms and ranches. Their prudent financial choices resulted in reduced debt and risk, and overall benefits to their financial security and bottom line. It's crucial to acknowledge that financial success came easier for farmers who inherited or were granted land from family or friends. This is problematic when historically racial and gender inequalities kept land ownership at a distance. In addition to luck and luck of the draw, circumstances played a role in a farmer's success. The power of regenerative agriculture to drive rural economic development is apparent at the macro level. Farmers will have to make some substantial changes in our agricultural economy if they are to be rewarded for their labour, but regenerative farmers and ranchers appear to be on the right track to make that happen.

- ❖ **Community Benefits:** - As regenerative farming and ranching networks grew, new and experienced growers could trade information, learn from one another, and build community. Cooperatives were sometimes formed to help smaller farmers and ranchers to aggregate their market power and get a larger share of the revenue.

Farmers and ranchers learned regenerative agriculture by hosting farm and ranch tours, which helped to build relationships with families, kids, and other customers. Once farmers and ranchers transitioned to a more regenerative mindset, the children of farmers and ranchers found renewed interest in agriculture.

Investing in a stronger rural workforce and reinvigorating local economies are all ways to cultivate a new generation of farmers and ranchers, grow existing networks of farmers and ranchers, and inspire children to return home to the family business.

- ❖ **Mental & Physical Benefits:** - Farmers experienced joy and happiness through regenerative farming. They spent less time working against nature and more time working with it. Transitioning to regenerative agriculture and sharing their enjoyment of farming and ranching again after doing industrial agriculture. They found it more satisfying to see earthworms returning to their soil and birds returning to the land. Following their break up with the chemical industry, they felt healthier and more liberated something that farm workers also gained. Regenerative agriculture provides



financial security through its diverse revenue streams. Farmers acknowledge that diversifying their enterprises added work, but they acknowledge the benefit of not having to rely on just one or two crops for their entire income. Additionally, regenerative growers were proud that they were providing food for the community while protecting the health of the soil.

### **Conclusion**

We are at the most critical moment in the history of our species, as man-made changes to the climate threaten all living beings' security on Earth. Regenerative farming, however, offers solutions to transform farmers into environmental and societal heroes. To feed the growing population, limit climate change and extreme weather and to stop biodiversity decline, we must regenerate farmlands around the planet. Regenerative agriculture has at its core intention to improve the health of soil or to restore highly degraded soil, which symbiotically enhances the quality of water, vegetation and land-productivity. Regenerative agriculture has recently received significant attention from producers, retailers, researchers and consumers as well as politicians and the mainstream Medias as it spans the public, private, and non-profit sectors. In the public sector, governments from international to local levels are exploring the possibilities for regenerative agriculture to contribute to climate action plans.

### **References**

- Bodirsky, B. L., Rolinski, S., Biewald, A., Weindl, I., Popp, A., & Lotze-Campen, H. (2015). Global food demand scenarios for the 21<sup>st</sup> century. *PloS one*, **10**(11)
- Rhodes, C. J. (2017). The imperative for regenerative agriculture. *Science progress*, **100**(1): 80-129.