

COMMENTARY

Regenerative Agriculture in the Context of African Smallholder Farmers: The Sasakawa Africa Association (SAA) Way



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Background

Industrial agriculture, defined by large-scale, intensive production of commodity crops with increased use of mechanization, chemical pesticides, and high-yielding cereal hybrids, has resulted in abundant, low-cost food and a decrease in global hunger. Industrial agriculture, on the other hand, has come at a high environmental and social cost, raising serious concerns about food production's future.

The downsides of industrial agriculture include soil and ecosystem degradation, micronutrient loss, biodiversity loss, decreased dietary diversity, increased freshwater consumption, groundwater contamination, air pollution, and greenhouse gas emissions [1]. The negative impact of industrial agriculture is also exacerbated by climate change, population growth, natural resource scarcity, weak financial and welfare systems, and widening inequalities.

In response to this multifaceted concern, a movement toward sustainable agriculture began in the 1960s, at the same time that the Green Revolution was exporting modern high-technology agriculture worldwide. Sustainable agriculture is based on the principle of meeting current needs without jeopardizing future generations' ability to meet their own. In this regard, the United Nations Sustainable Development Goals (SDGs) marked a watershed moment in global sustainability.

Since then, several alternative approaches to industrial agriculture have been evolved with regenerative agriculture being one of the most recent terms in the thinking and practice of the sustainable farming movement, which is gaining popularity and acceptance as a major path for global farming's future. The objective of this commentary is to reflect on the concept of regenerative agriculture, its importance for African smallholder farmers, the need for adaptation to the African context, and to highlight the Sasakawa Africa Association's (SAA) ongoing efforts to champion and promote regenerative agriculture in Africa.

The concept of Regenerative Agriculture

Agroecosystems, unlike natural ecosystems, lack inherent balance and self-regulation, ecological succession, and are characterized by low genetic diversity and incomplete nutrient cycling, among other things. Given the extent of land and environmental degradation that has already occurred, simply maintaining agricultural ecosystems will not be sufficient to ensure long-term agricultural production [2]. This necessitated an approach that goes beyond preservation and seeks to regenerate the productive capacity of natural resources. Consequently, regenerative agriculture (a term used since the early 1970s but that came into wider circulation in the early 1980s when picked up by the Rodale Institute) has resurfaced [3] as one of the most recent and robust solutions within the sustainable

agriculture movement. That is, whereas sustainable systems must maintain the status quo and their productivity and usefulness to society indefinitely, regenerative systems go a step further in restoring what has been lost and improving what is currently present.

Regenerative agriculture is not a specific practice in and of itself, but rather a suit of sustainable agriculture techniques. Regenerative agriculture's concept and practices were already in place. However, they were overshadowed by other more established concepts such as sustainable agriculture, climate-smart agriculture, and conservation agriculture, which have taken center stage in stimulating dialogue and promoting pathways to sustainable agricultural futures, resulting in multiple versions and interpretations of regenerative agriculture. Agroecology, biodynamic farming, and holistic management are also more or less synonyms for regenerative agriculture.

However, there is no agreement on a specific definition of regenerative agriculture since local climatic, ecological, and socio-cultural contexts influence which regenerative farming practices are feasible and thus manifest differently at each location [4]. Some authorities defined regenerative agriculture as "a broad suite of principles and practices aimed not simply at sustaining the current state of soils and ecosystems, but rather regenerating and enhancing them through an array of considered agricultural activities" [5]. This implies that regenerative agriculture aims to go beyond the rationale underpinning sustainable agriculture's 'do no harm' ethos. Others defined regenerative agriculture as "a system of principles and practices that generates agricultural products, sequesters carbon, and enhances biodiversity at the farm scale" [1]. Generally, regenerative agriculture is a way of reimagining humanity's relationship with the land, climate, and soil, as well as the food that grows on it. It is a farming method that restores the complex soil ecosystem's ability to produce food by replenishing the land's functional capacities [4].

Regenerative agriculture is founded on the following general principles: regenerating soils, improving biodiversity and ecosystem services, reducing synthetic inputs, developing new value chains, markets, and businesses, and fostering ecological, social, and economic resilience [5]. Thus, regenerative practices are multifunctional in the sense that they improve ecosystem services and biodiversity while also sustainably improving agricultural produce.

Why is it important for African farmers to advance regenerative agriculture?

African soils present inherent challenges for agriculture, with more than half of cultivable land consisting of old, fragile, weathered, acidic soils, lacking essential nutrients and organic matter that, if used for agriculture, necessitate careful

management. Expansion of intensive agriculture, and poor land-use practices have exacerbated those challenges through crop nutrient mining, leaching, removal of soil cover, and inadequate erosion control [6]. As a result, crop productivity, and thus food security and/or farm household incomes, are severely constrained in many parts of sub-Saharan Africa. This necessitates an agricultural path that regenerates soils and agroecosystems while making them productive and resilient.

Consequently, opportunities for regenerative agriculture in Africa arise in the context of high land and environmental degradation, declining biodiversity, low productivity, increased vulnerability to climate change, food and nutrition insecurity, and a high rate of poverty. Overall, Africa's need for regenerative agriculture stems from current challenges, development goals, and lessons learned from industrial agriculture practices from the developed world, as well as a desire to contribute to the continental and global common development agenda. The need for regenerative agriculture arises from the need to contribute to the African Agenda 2063, which aims to achieve inclusive and sustainable economic growth and development, as well as the United Nations Sustainable Development Goals (SDGs), which provide a comprehensive framework for balancing social, economic, and environmental challenges through 2030.

Africa must, therefore, embrace regenerative agriculture in order to solve its numerous complex problems while also balancing economic, social, and environmental needs and creating its own new farming future.

Adapting regenerative agriculture to African socioeconomic and agroecological settings

The farming contexts between African and developed countries differ significantly, in terms of technologies, practices, inputs, and objectives. Farms in the developed world are for-profit, intensive, and use more inputs such as mechanization, chemical fertilizers, agro-pesticides, and are frequently specialized crop monocultures, pastures, and ranches.

African family smallholder farming, on the other hand, is characterized by a low-input low-output farming system, and is made up of a diverse range of relatively small-sized landholdings that pursue a variety of farming activities with crop farming or mixed crop-livestock farming, or pastoralism as their primary focus. Most family/small-scale farms are primarily devoted to self-consumption, with a small but significant amount of staple food crops and cash crops sold [7].

For millennia, African smallholder family farmers used sustainable farming practices such as crop rotations, shifting cultivation, mixed cropping, organic fertilization, and other practices, which are still used today. Smallholder farms in sub-Saharan Africa range in sustainability from more sustainable to moderately

sustainable to less sustainable, depending on the level of exposure to anthropogenic and natural factors. As such, the African landscape is more diverse and in tune with nature than advanced countries.

However, due to population growth and the strain on natural resources, the effects of climate change, technological innovations, and increased interest in commercial agriculture, a significant number of those age-old sustainable practices have faded, been dis-adopted, or abandoned over time. This implies that, while regenerative agriculture may imply a revival of pre-industrial farming practices for the developed world, with many African farmers still practicing various elements of sustainable farming, adopting regenerative agriculture in Africa entails reinforcing farmers' current environmentally friendly practices, and bridging gaps in indigenous practices with more sustainable practices informed by scientific knowledge.

From the above, regenerative agriculture in Africa is not about creating a new set of "convert farmers," but rather about assisting farmers to transition to more nature-positive farming practices on their farms on their own terms. As such, regenerative agriculture should be tailored to Africa's socioeconomic and agro-ecological conditions, with a primary focus on farmers' own problems from the ground up, prioritizing their extensive knowledge and practice and supplemented secondarily by external technical input [5].

Some of the regenerative agriculture practices that must be tailored to the context of African smallholder farmers include:

- **Use of external inputs** - One of the principles of regenerative agriculture is to reduce external inputs such as chemical fertilizers and pesticides, with some advocates proposing complete avoidance of external inputs. In the developed world, problems caused by excessive fertilizer or manure use may allow for input reductions without jeopardizing crop yields or farmer income. In contrast, fertilizer application rates in SSA are still very low (5-10 kg/ha), far below the Abuja Declaration's target of 50 kg/ha in 2015, and up to ten times lower when compared to application rates in more economically developed regions [8]. Organic residues are also in short supply with farmers competing for their use, and consequently, crop yields are generally low. As a result, most smallholder farmers in sub-Saharan Africa cannot afford to abandon or drastically reduce their use of inorganic inputs outright. African farmers can rather optimize the use of inorganic fertilizers with improved use efficiency in conjunction with organic fertilizer sources and other regenerative farming practices. Of course, as regenerative agriculture is practiced, soil biology is revitalized and becomes more capable of supporting a healthy ecosystem, and as soil rebuilds eventually the need for chemical inputs is reduced or eliminated, allowing

regeneratively-managed farms to increase income while lowering input costs [4]. However, this does not rule out the possibility of organic farming taking place in Africa where an efficient certification procedure and rewarding markets are in place.

- **Embedding regenerative agriculture with existing and emerging agricultural practices** - Agriculture in Africa is primarily subsistence-based, but there is a desire for and a trend toward commercial production, with farmers pursuing agriculture as a business. However, when it comes to sustainable farming, both farming methods have advantages and disadvantages. Despite being a relatively sustainable farming method, subsistence agriculture has not produced enough food to feed Africa. On the other hand, while the trending commercial farming may allow the continent to achieve short-term productivity gains, this would come at the expense of the environment and could not be sustained.

Based on the foregoing, neither subsistence nor commercial agriculture in Africa can progress further in isolation to meaningfully address and contribute to improved productivity, environmental sustainability, and social equity. The regenerative agriculture introduced to Africa should then build on and improve existing subsistence farmer practices while also adapting to emerging commercial agriculture. Regenerative agriculture should not be viewed as an alternative to or replacement for commercial agriculture; rather, it should be implemented in such a way that it complements and improves its efficiency and sustainability by incorporating additional environmental and social goals. It should not also intend to abandon the sustainable practices of subsistence farming, but rather to reorient it toward a more profitable and sustainable endeavor.

- **Building regenerative agriculture on existing mixed crop-livestock farming systems** - Livestock provides food security, livelihood opportunities, and a risk-management strategy for hundreds of millions of people in Africa. In the developed world, where most crops and livestock are raised separately and extensive ranching systems are common, incorporating livestock into the cropping system is being recommended in circular ecosystems where the animals feed the plants and the plants feed the animals. In sub-Saharan Africa, mixed crop-livestock farming systems predominate, primarily in the rain-fed system, though pastoralism and rangelands are also popular.

Hence, because crop and livestock are already integrated, particularly in the crop-livestock farming system, adopting regenerative agriculture in sub-Saharan Africa does not necessitate the re-introduction of livestock into the crop production system other than strengthening the already existing crop-

livestock system. Regarding livestock management on regenerative mixed crop-livestock farms, animal feeds can be made available through practices such as introducing high biomass crop varieties and growing forages alongside crops. Most importantly, holistic livestock management techniques can be used to limit grazing duration by rotating animals through a series of paddocks, preventing overgrazing and providing other benefits such as manure recycling [4].

- **Putting climate adaptation first** - Africa has the smallest share of global greenhouse gas emissions, accounting for only 2-3% of total emissions. However, because Africa is most vulnerable to the effects of climate change, such as increased drought and flooding, its immediate priority is to improve its current adaptive capacity [9,10]. As a result, Africa's regenerative agriculture needs arise not primarily from the need to reduce GHG emissions, but rather from the need to mitigate soil and ecosystem degradation and adapt to climate change impacts through adopting climate-smart regenerative practices, while also contributing to carbon sequestration and GHG emission reductions through complementary actions.
- **Helping farmers meeting economic benefit aspirations** - Many farmers in sub-Saharan Africa have limited resources and face food insecurity. As a result, farmers, without a doubt, prioritize economic returns over environmental sustainability. This is because farmers are unlikely to invest in long-term environmental goals or take risks to care for the environment unless they benefit economically and increase their income. They would rather be forced to degrade natural resources in order to improve their lives, even if they realize that this will harm their livelihoods in the long run. As a result, any attempt to implement regenerative agriculture must ensure that farmers benefit economically while also providing business opportunities for other actors along the value chain.

Moreover, they must also be compensated for any risks, such as yield instability in the early years. Farmers' agricultural products grown with regenerative farming practices must be reasonably priced as well. In addition, farmers should also be incentivized to change their farming practices, thereby contributing to environmental stewardship, carbon sequestration, and ecosystem services.

- **Providing framers technical and technological support** - Regenerative Agriculture, on the other hand, is context-specific and knowledge and skill intensive, so adapting packages from elsewhere may not always work. The decision to transition to regenerative farming involves important non-material subjective factors, with beliefs and values at the center [11]. Given agriculture's

constantly changing and locality-specific nature, sustainability necessitates a diverse and adaptive knowledge base that incorporates both formal experimental science and farmers' own on-the-ground local knowledge [12]. As a result, in addition to indigenous knowledge and practices, farmers must have access to appropriate technical and behavioral change training, technologies, and affordable tools and equipment for implementing regenerative farming practices.

- **Putting in place adequate enabling policies** - While regenerative agriculture has many benefits for farmers and the environment, farmers may face barriers to adopting these practices because the transition will not be free of cost nor particularly straightforward.

Adequate enabling policies are required for regenerative agriculture to gain traction in Africa. Especially, policy interventions are required to design and implement farmer-led regenerative agriculture practices; to establish a mechanism for multi-stakeholder coordination and collective action at the farm, landscape, and community levels; to establish incentive mechanisms for farmers; to manage resource management trade-offs; to establish rewarding markets for regenerative farmers; and to align regenerative agriculture practices with market-oriented agriculture, among other things.

- **Measuring success holistically** - So far, success in conventional farming has been measured in terms of commodity output. Regenerative Agriculture is a systems approach to addressing not only economic but also environmental and social goals that agriculture must contribute to. In order to pursue regenerative farming, new indicators must be developed that frame agricultural success not only in terms of productivity and economic outcomes, but also in terms of environmental and social/human outcomes.

Sasakawa Africa Association (SAA): championing African Regenerative Agriculture

Over the last three and a half decades, Sasakawa Africa Association's (SAA) efforts in Africa have significantly contributed to increased national food and nutrition security, as well as poverty reduction. This was made possible by catalyzing the adoption of improved agricultural technologies, resulting in a green revolution-order increase in productivity in crops such as maize and wheat in countries such as Ethiopia.

SAA interventions have evolved over time in line with the host countries' agricultural policies, strategies, and demands, beginning with a focus on crop production enhancement in the early 1990s and expanding to include post-harvest

management, agro-processing and markets, and the entire value chain until 2021, when its course shifted dramatically.

Following a thorough review of its prior interventions and a self-learning exercise, and realizing agriculture's new role in producing adequate, safe, and nutritious food while improving resource use efficiency and contributing to meeting social welfare, and public and environmental health goals, SAA prioritized regenerative agriculture in its new five-year strategy spanning 2021 to 2025.

SAA is currently leading the way in implementing regenerative agriculture in its entirety on the ground. SAA employs a blend of agro-technological and agro-ecological approaches to regenerative agriculture to achieve synergistic opportunities for producing agricultural and natural capital outcomes such as increased crop productivity, soil fertility restoration, increased agro-biodiversity, and improved agro-ecosystem services. It does so by employing two key pragmatic context-specific practices. (1) Conservation agriculture (CA) with its three interlinked principles of: minimizing soil disturbance, maintaining permanent soil cover, and amplifying agro-biodiversity; and (2) Integrated Soil Fertility Management (ISFM), which includes the judicious use of inorganic fertilizers, recycled organic resource management, improved agronomic practices, and the use of improved germplasm. These two practices are also linked beyond the farm into the wider landscape by involving the communities in collective action to resolve resource management issues such as rehabilitating degraded lands, tree planting, and controlling free animal grazing.

SAA approaches the implementation of regenerative farming practices by educating extension agents and farmers about the concepts and practices of regenerative farming; setting up demonstrations at farmer training centers (FTCs) and farmer fields; and organizing on-farm workshops (field day events) on host farmers' fields to facilitate farmer-to-farmer experience sharing and feedback.

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