

Research Application Summary

**Aligning Sustainable Agriculture to Sustainable Development Goals in Africa**

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**Abstract**

Agriculture is faced with the challenge of offering remedies to the three of the world's most important threats to human life, namely food shortage, poverty and adverse effects of climate change. These challenges are on their part affected by declining productivity of land, growing human population and global warming. Sustainable Agriculture has been identified as important means of addressing these limitations and included as a key target in the Sustainable Development Goal No. 2. Considering the universality and integration of Sustainable Development Goals, it becomes the responsibility of everyone to promote sustainable agriculture as a means of attaining this goal. Additionally, everybody needs to understand how sustainable agriculture will contribute to all the other 16 goals. To deliver on these responsibilities, it will be imperative that everybody concerned sufficiently understands the concept of sustainable agriculture and applies it within their respective roles in diverse agricultural systems. Unfortunately, the concept of sustainable agriculture is highly misunderstood, mistaken, misrepresented and overlooked especially within the mainstream national agricultural research and extension systems in Africa. This paper highlights the key principles of sustainable agriculture with the objective of broadening the understanding of sustainable agriculture concept among all players in agriculture. It highlights the contribution of sustainable agriculture to all the 17 sustainable development goals and proposes some transformations that may be necessary for wider embracing of sustainable agriculture in Africa.

**Key words:** Agricultural systems, sustainable agriculture, Sustainable Development Goals

**Résumé**

L'agriculture est confrontée au défi d'offrir des remèdes aux trois plus importantes menaces qui pèsent sur la vie humaine au monde, à savoir le déficit alimentaire, la pauvreté et les effets néfastes des changements climatiques. Ces défis sont les résultats de la baisse de productivité des terres, la croissance démographique et le réchauffement climatique. L'agriculture durable a été identifiée comme un moyen important de remédier à ces problèmes, et pour ce faire, est incluse comme objectif de développement durable n° 2. Compte tenu de l'universalité et de l'intégration des objectifs de développement durable, il devient la responsabilité de chacun de promouvoir une agriculture durable en tant que moyen d'atteindre cet objectif. De plus, tout le monde doit comprendre comment l'agriculture durable contribuera à l'atteinte de tous les 16 autres objectifs de développement durable. Pour s'acquitter de ces responsabilités, il sera impératif que toutes les personnes concernées comprennent

suffisamment le concept d'agriculture durable et l'appliquent dans leurs rôles respectifs dans les divers systèmes agricoles. Malheureusement, le concept d'agriculture durable est très mal compris, erroné, déformé et négligé, en particulier dans les principaux systèmes nationaux de recherche agricole et de vulgarisation en Afrique. Le présent papier met en évidence les principes clés de l'agriculture durable dans le but d'élargir la compréhension du concept d'agriculture durable au sein de tous les acteurs de l'agriculture. Il met en évidence la contribution de l'agriculture durable à l'ensemble des 17 objectifs de développement durable et propose certaines transformations qui pourraient être nécessaires pour une adoption plus large de l'agriculture durable en Afrique.

**Mots clés:** Systèmes agricoles, agriculture durable, objectifs de développement durable

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## Introduction

Agriculture is faced with three major obligations in the world today, first is to providing food to feed the ever increasing world population. The Food and Agriculture Organization (FAO) estimates that for us to provide sufficient food to the world in the next 50 years, food production has to increase by at least 70% (FAO, 2011). This is coupled with increasing consumer diversity and preference. Second, is poverty alleviation for majority of the world's poor. According to the World Bank, about 70% of Sub-Saharan African population is engaged in agriculture (World Bank, 2016) implying that agriculture is a key determinant of their livelihoods through offering them income and employment. Thirdly, is mitigation against adverse effects of climate change. Agriculture is a major contributor to greenhouse gasses; it has also the potential to mitigate against climate change effects. All these obligations are adversely challenged by non-sustainable agricultural practices. Provision of food is constrained by declining soil fertility and non-sustainable production technologies. Poverty alleviation is constrained by the increasing poverty level and marginal improvement in these levels in developing countries. With global poverty projected to have fallen below 10% for the first time in 2015, sub Saharan Africa has made insignificant progress, improving only by 28% over the last 25 years (United Nations, 2015). Finally, non-sustainable agricultural methods contribute largely to global warming instead of mitigating it. The solution to the challenges highlighted above lies in sustainable agriculture. Because sustainable agriculture has been identified as part of Sustainable Development Goal (SDG) No. 2, and considering the universality of SDGs, it is important that knowledge on it is fostered since everyone is challenged to act on promoting it. This paper discusses the alignment of sustainable agriculture to the 17 SDGs and highlights its contribution to each of them.

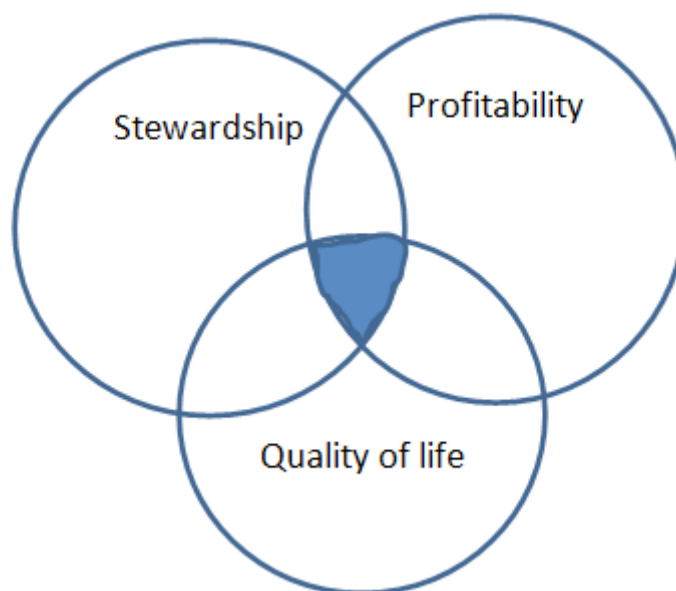
## The Concept of Sustainable Agriculture (SA)

It is not in the scope of this paper to define sustainable agriculture since this is a term that has defied definition for a long time. It is however generally agreeable that for purposes of promoting a wide understanding of sustainable agriculture, it is important to minimize common misunderstandings by highlighting what SA is commonly confused to be while it is not. Sustainable Agriculture is not organic farming or organic agriculture. It is not a method of agricultural production nor does it refer to a prescribed set of practices. Sustainable agriculture does not refer to the use of labour intensive, low cost input and low technology methods. It does not mean farming without application of synthetic chemicals and fertilizers. Nor does it mean low external input farming, conservation agriculture nor minimum or zero tillage. Many authors have agreed that it is no longer useful to belabor so much with defining sustainable agriculture. Instead, a general common understanding of the concept will suffice.

In the words of Benbrook (1991), the community had reached about as explicit, useful, concrete a definition of sustainable agriculture as now possible in view of the differences of opinion and views that exist that such a definition would end up being a compromise among differing world views and values [FAO, 2011]. In other words, what is common in the definitions highlighted so far should be sufficient to guide all towards the right general direction without striving to have a standard definition.

### Principles of sustainable agriculture

According to SARE (2010), there are with regard to sustainable agriculture three underlying pillars namely stewardship of natural resources, profitability of farm business and quality of life, illustrated with circles as below (Figure 1).



**Figure 1. Sustainable agriculture revolves around three sustainability pillars**

Sustainable agriculture should nurture the role of farmers as stewards or custodians of the land and natural resources. This is the principle of stewardship. Sustainable agriculture involves considering interactions and interrelations of a system as a whole, from individual farms, to local ecosystems to communities affected by the farming system both locally and internationally. This is the principle of stewardship. The focus of sustainable agriculture is on development of farm businesses that are profitable in the long run. This is the principle of profitability. In the principle of improvement of the quality of life, sustainable agriculture strives to foster improvement in the life of farmers and communities with clear consideration that farmers play a key role as producers of food for the society. Sustainable agriculture uses the insights of modern science to improve rather than displace the traditional wisdom accumulated over centuries by farmers around the world (Sustainable Agriculture Treaty, 1992). This is the principle of equal emphasis on science and experience. Sustainable agriculture relies on knowledge from virtually all disciplines. This is the principle of multi-disciplinarity. Finally, the principle of transition emphasizes the fact that the transition to sustainable agriculture is a process where a series of small but realistic steps taken by farmers lead to the ultimate goal to be attained. FAO (2018) vision of sustainable food and agriculture highlights five principles of sustainable agriculture, improving

efficiency in the use of resources, direct action to conserve, protect and enhance natural resources, protection and improvement of rural livelihoods and social well-being, enhanced resilience of people, communities and ecosystems, and responsible and effective governance mechanisms. It is on the basis of these principles that sustainable agriculture is aligned to SDGs.

### **Sustainable Agriculture and Sustainable Development Goals**

Sustainable Development Goals are the various goals agreed upon by the nations of the world to be achieved by 2030. They are an expansion of the Millennium Development Goals in terms of reach and targets. Sustainable Development Goals have three overlying guiding principles namely universality, integration and transformative. The SDGs are universal because they apply to every nation and every sector and everybody is called upon to act to attain them; SDGs are integrated because they are all interconnected and must be achieved together; SDGs are transformative because achieving them involves making very big, fundamental changes in how we live on Earth [SARE, 2010]. All the seven principles of sustainable agriculture contribute to the three broad areas.

**SA and SDG No 1.** The SDG No. 1 involves ending poverty in all its forms everywhere. Through the principles of sustainable agriculture, we intend to attain SDG No. 1 by sustainably increasing productivity of land. This is possible if we should uphold the principle of stewardship. Again we need profitable systems to provide incentives for producing. We shall also rely on science yes, but we cannot overlook local knowledge and the experience gained over years on which we need to build in order to increase profitability of farmers' activities which contribute to income generation and alleviation of poverty.

**SA and SDG No 2.** As stated earlier, Sustainable Agriculture is a key target for SDG no. 2, which proposes to promote Sustainable Agriculture. It should be remembered that SDGs are universal and integrated. This implies that everybody is obliged to End hunger, achieve food security and improved nutrition and promote sustainable agriculture. Sustainable Agriculture contributes to all the eight targets of SDG No.2. Sustainable Agriculture will support to ensure access by all people to safe, nutritious and sufficient food all year round including ending malnutrition. Therefore Sustainable Agriculture will promote attainment of the target of doubling agricultural productivity and incomes of smallholder farmers, ensuring sustainable food production systems and adaptation of such systems to climate change as well as maintenance of genetic diversity. Sustainable Agriculture will enhance investment and agricultural productive capacities and promote fair trade of agricultural commodities around the world. Finally, Sustainable Agriculture will promote functional food commodity markets and help limit extreme food price volatility, a major cause of hunger and low incomes for farmers.

**SA and SDG No. 3.** Sustainable Agriculture is central to production of more nutritious food for the world population. The importance of quality food in promoting healthy lives and wellbeing cannot be overemphasized. Hence Sustainable Agriculture will contribute to most of the targets of SDG No. 3 through provision of quality food. According to Centre for Disease Control and Prevention, maintenance of healthy diets is one of the best recommendations for reducing maternal mortality [Sustainable Agriculture Treaty, 1992]. The same applies to preventable deaths of newborns and children under five. Diet and nutrition are also important in the fight against AIDS, tuberculosis and other tropical diseases targeted in SDG No. 3. Sustainable Agriculture is also key to attainment of the target to reduce the number of deaths and illnesses from hazardous chemicals and air, water and soil pollution and contamination. This is the principle of stewardship.

**SA and SDG No. 4.** How does Sustainable Agriculture contribute to Quality and Inclusive education? By raising income to support education needs. This is the principle of profitability. In many parts of Africa, education has succeeded because of school feeding programmes made possible by the principle of sustainably increasing productivity of land. In sustainable agriculture, skills development is emphasized through the principle of equal emphasis on science and experience. Sustainable Agriculture also promotes vocational training, entrepreneurship and provision of decent jobs through improvement of quality of life. Sustainable Agriculture contributes to the target of lifelong learning through the principle of transformation, that Sustainable Agriculture is a process and there is continuous learning and action towards sustainability.

**SA and SDG No. 5.** Sustainable Agriculture contributes to this goal by promoting fair distribution of labour in agricultural enterprises, At the same time Sustainable Agriculture promotes affirmative action for women and youth, recognizing and building on what each gender can do best. Sustainable Agriculture may be the most economically empowering enterprise for women and youth. In fact, it had been reported that up to 80% of labour is provided by women.

**SA SDG No. 6.** Sustainable Agriculture contributes significantly to the goal of access to water for all. The principle of stewardship is the major contribution in ensuring that the environment is well taken care of hence the target of improving water and sanitation management. Sustainable Agriculture also promotes water use efficiency and ensures sustainable withdrawals. Sustainable Agriculture, much as it may make use of water, e.g. for irrigation, ensures that such use is sustainable. It contributes directly to the goal's target of protecting and restoring water-related ecosystems, including mountains, forests, wetlands, rivers, aquifers and lakes.

**SA and SDG No. 7.** It can never be disputed that hydroelectric power is the most reliable and sustainable source of renewable energy. Sustainable Agriculture can guarantee sustainable supply of water for that purpose through the principle of stewardship. On the other hand, Sustainable Agriculture promotes efficient use of energy to promote continuous production.

**SA and SDG No. 8.** This SDG reads like what is what in Sustainable Agriculture, inclusive and sustainable economic growth is a result of profitability of enterprises promoted by Sustainable Agriculture, which, as already mentioned earlier is the primary source of employment among the African population. A key principle of Sustainable Agriculture is improvement of the quality of life which feeds significantly into the target of decent work for all. Sustainable Agriculture is not about labour intensive technologies but promotes efficient and modern appropriate technologies, "Achieve higher levels of economic productivity through diversification, technological upgrading and innovation, including through a focus on high-value added and labour-intensive sectors", this is entirely the contribution of Sustainable Agriculture. As a major source of employment, Sustainable Agriculture contributes directly to reducing to a great extent, the proportion of youth not in employment.

**SA and SDG No 9.** Sustainable Agriculture contributes significantly to development of infrastructure to support agricultural production from mostly remote hitherto inaccessible regions. This spurs development especially of rural areas. In addition, Sustainable Agriculture will ensure sustainable supply of raw materials for industry hence contribute significantly to industrialization being targeted here. Sustainable Agriculture also fosters innovation in an effort to be efficient and modern.



**SA and SDG No 10.** The major source of inequality is income disparities. Sustainable Agriculture has a major contribution to make towards reducing inequality within and among countries. Sustainable Agriculture endeavors to enhance productivity and incomes of low income earners through sustainable production systems, and promote fair trade on the principle of profitability whereby a profitable business must only be seen to be profitable when it is fair to all the participants.

**SA and SDG No 11.** This SDG derives a lot of input from Sustainable Agriculture to attain sustainable, inclusive and safe cities. Sustainable Agriculture will ensure efficient management of environment reduce undesired effluent from agro-industry, sustainable development of backyard garden as well as urban and peri-urban agriculture. This SDG has the target to reduce the number of deaths and the number of people affected and substantially decrease the direct economic losses relative to global gross domestic product caused by disasters, including water-related disasters. Sustainable Agriculture can contribute to this goal by enhancing soil cover and reducing erosion and land degradation that can cause water related disasters. Sustainable Agriculture will reduce environmental impact on cities and promote better air quality and municipal and other waste management. No integrated development policy as proposed by specific targets of this goal can be implemented without factoring in sustainable agriculture. This goal also anticipates building sustainable and resilient buildings utilizing local materials; Sustainable Agriculture is the primary source of such materials.

**SA and SDG No 12.** This SDG has the target of attaining sustainable management and efficient use of natural resources. This is the core of Sustainable Agriculture, advanced by the principle of stewardship. Farmers are custodians of the land and Sustainable Agriculture encourages them to take good care and efficiently make use of natural resources. The target of halving per capita global food waste and reducing food losses along production and supply chains, including post-harvest losses is directly related to the sustainable agriculture which seeks to produce sufficient food by reducing losses as an economical way of increasing available food and is line with FAO's principle of improving efficiency in the use of natural resources (FAO, 2018). The target of achieving environmentally sound management of chemicals is also contributed to by Sustainable Agriculture through the principle of stewardship as well as the target of sustainable development and lifestyles in harmony with nature.

**SA and SDG No. 13.** This SDG also relies heavily on Sustainable Agriculture to the extent that climate smart agriculture is now a fully-fledged approach promoted widely. Sustainable Agriculture promotes many practices that support adaptation and mitigation. The fact that agriculture is a key contributor to greenhouse gasses notwithstanding, Sustainable Agriculture is relied upon to provide adaptation and mitigation approaches. In addition to reducing CH<sub>4</sub> and N<sub>2</sub>O emissions from livestock operations and agricultural lands, agriculture has opportunities to assist in offsetting emissions from other sectors. The agricultural sector can store carbon in soils and plants as well as produce fuels and energy from biomass and animal waste to replace fossil fuels. FAO have published a work related to climate change adaptation in a framework for climate adaptation in agriculture, fisheries and forestry, most of it rotating around Sustainable Agriculture principles [UN, 2015].

**SA and SDG No 14.** Sustainable Agriculture prevents and significantly reduces marine pollution, in particular from land-based activities, including marine debris and nutrient pollution through judicious use of inorganic fertilizers and enhanced use of organic fertilizers. Sustainable Agriculture is able to manage and maintain coastal ecosystems and reduce ocean acidification as envisaged in the targets for this SDG. The latter is as a result of increased concentration of carbon dioxide in the atmosphere due to various factors including eutrophication and the use of fossil fuels. Sustainable Agriculture practices

reduce the quantities of CO<sub>2</sub> hence minimizing acidification. It has been reported that acidity of oceans is 29% higher compared to the figures of 200 years ago (Bates, 2016). The target of providing access for small-scale artisanal fishers to marine resources and markets is a consequence of sustainable agriculture under the principles of efficient utilization of natural resources and profitability.

**SA and SDG No 15.** This SDG also has several direct contributions of Sustainable Agriculture to its targets. Conservation, restoration and sustainable use of terrestrial and inland freshwater ecosystems is effectively provided for under Sustainable Agriculture's principle of stewardship. Under the same principle there is also sustainable management of forests, restoration of degraded forests and substantially increasing afforestation as per the target of this SDG. The targets of combating desertification, restoring degraded land and soil, reducing degradation of natural habitats and halting the loss of biodiversity are the direct responsibility of Sustainable Agriculture under the same principle.

**SA and SDG No. 16.** Under target of ending all forms of violence it should be noted that much violence in Africa is as a result of disputes relating to economic resources. It should also be remembered that agriculture is the main stay of most of the populations in these counties. Sustainable Agriculture will guarantee better and sustainable incomes from agriculture. With increased income from fair and just sources, these forms of violence are likely to reduce, including organized crime, arms trade and gangs for hire. Under the target of ending abuse and exploitation of children Sustainable Agriculture plays a significant role by promoting just and fair production systems which would reduce especially the utilization of child labour in agriculture. The principle of fairness goes against corruption and bribery in all their forms as envisaged in the target of this goal, Sustainable agriculture is inclusive.

**SA and SDG No 17.** Under the target of trade under this goal, Sustainable Agriculture strives to promote a universal, rules-based, open, non-discriminatory and equitable multilateral trading system through its principle of fair trade hence contributing directly towards this target. Sustainable Agriculture also contributes directly to the target of significantly increasing exports from developing countries by providing a variety of agricultural produce for export.

## **Conclusion**

Based on the alignment of Sustainable Agriculture to SDGs done, it can be demonstrated that Sustainable Agriculture is a key contributor to sustainable development through its contribution to all the 17 SDG. Sustainable Agriculture contributes entirely to all the targets of SDGs No. 1, 2, 3, 8, 11, 12, and 15 and partially to all the remaining SDGs. Since Sustainable Agriculture is in itself part of SDG no 2, it becomes an obligation of all sectors and nations to promote it. For effective promotion of SA, awareness about it and its integration in the general agricultural practices becomes mandatory. Since SDGs are integrated, promotion of Sustainable Agriculture will not only achieve objective 2 but support the attainment of specific targets in all the other 16 SDGs. Since SDGs are transformative, we need to start today small bold but progressive steps towards attaining Sustainable Agriculture as a step towards attaining them.

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