

A brief overview of the Trace & Save system

Agriculture is imperative to the provision of food security. In order for food production to be done in a sustainable manner agriculture needs to meet economic, environmental and social goals (Hacking & Guthrie 2008). This triple-bottom-line approach to sustainable agriculture requires integrated, holistic farm management practices to be incorporated at the farm level. The sustainable agriculture approach is broadly agreed upon, but the considerable challenge facing agriculture is how to go about facilitating and supporting the adoption of such practices (Brundtland 1987; Hansen 1996; Pretty 1997; Tilman et al. 2002; Foley et al. 2011).

Trace & Save is a measured agricultural sustainability company which aims to support farmers in the implementation of sustainable agriculture, and show consumers, with integrity, how farmers are addressing the challenge of sustainable food production. We believe in the importance of the responsible use of natural resources in agriculture. The stewardship of natural resources is not just an environmental and social responsibility of all landowners and land managers, but it is also integral to the success of any farming business – considering the natural resources within an agro-ecosystem underpin and support long-term agricultural production. It is therefore imperative that farmers are continually examining, assessing, measuring and adapting to various aspects of their farm systems which provide insight as to whether they are indeed managing their farms and their future livelihoods in a sustainable manner. The Trace & Save system has the ability to support farmers to do just this.

The Trace & Save system uses the following measures of on-farm indicators to attain a trustworthy, holistic measure of agricultural sustainability:

1. The SWAN system (Soil, Water, Atmosphere and Nutrients)
2. Biodiversity conservation
3. People welfare
4. Animal welfare

The SWAN system and biodiversity conservation ensure that environmental goals are addressed. By incorporating the wellbeing of people and animals, social goals are addressed. Ensuring that every aspect of the Trace & Save system is addressed also directly contributes to the long-term economic goals of a farm. This is firstly due to the SWAN system addressing farm efficiency, and as environmental efficiency improves so does economic efficiency (Galloway et al. 2017), and secondly due to environmental protection, the health of the agroecosystem and the wellbeing of the people working on a farm being integral to the long-term success of the agricultural business.

The Trace & Save system is a dynamic system which aims for continual growth and adaptive management. The pillars on which the Trace & Save system has been built to ensure this are: 1) the use of integrated (combining separate facets to provide a more effective, cooperative interrelated whole) on-farm measures which inform farm management and build towards sustainability; 2) the use of a central database which supports an online research platform (online software used, by farmers and Trace & Save researchers, to systematically investigate farm information in order to establish trends, and identify new opportunities for improved farm management) to service farmers and consumers. This has three main advantages. Firstly, improvements on farms can be reflected in the data which is collected over time. Each farmer can trace their own improvement using

integrated sustainability measures on their specific farm, and monitor the change in these measures compared to their own farm's original baseline assessment. Secondly, it provides traceability, with integrity, in whether farmers are addressing sustainability. Thirdly, it supports continual growth, as research is carried out by Trace & Save researchers, in partnership with academics at prominent universities, using the integrated sustainability measures for each farm which are stored on the central database.

This dynamic system is illustrated through the three diagrams below. The three diagrams serve as a broad introduction to the manner in which the SWAN system uses integrated measures to build towards sustainability, how the facets of the SWAN system are all interrelated, and the strength of the Trace & Save system. This strength lies in the use of a database to create a farmer research platform and consumer tracking platform, so both farmers and consumers can trace the progress of sustainable agriculture, in the applicable level of detail, over time.

THE SWAN SYSTEM USES INTEGRATED* MEASURES TO BUILD TOWARDS AGRICULTURAL SUSTAINABILITY

* Integrated: combining separate facets to provide a more effective, cooperative interrelated whole.

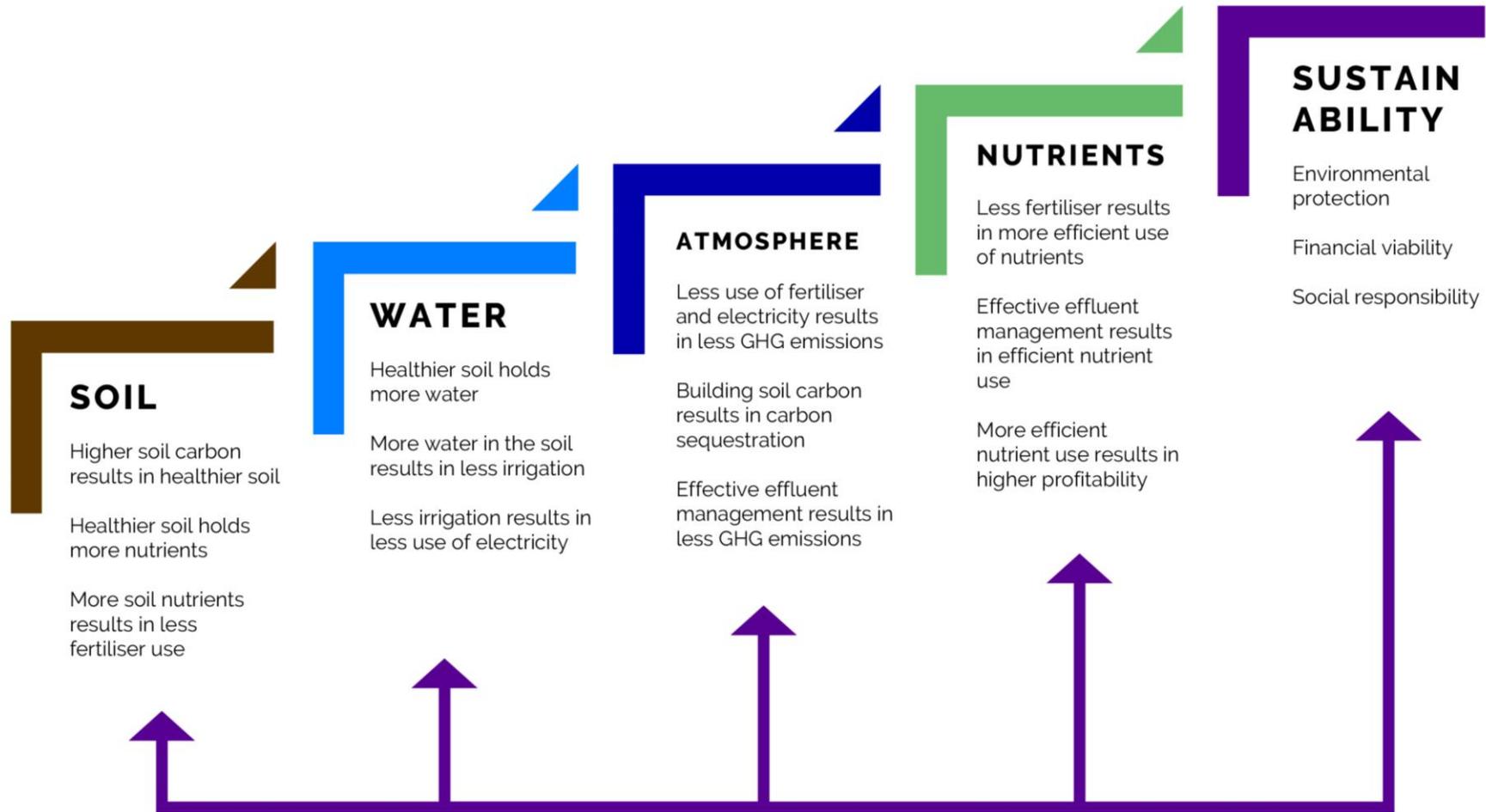


Figure 1: Diagram showing the SWAN System as a process to the holistic goal of sustainability. The diagram not only shows the process, but also the linkages between the different facets of the SWAN System.

SWAN SYSTEM: INTERRELATED FACETS OF SUSTAINABLE FARM MANAGEMENT

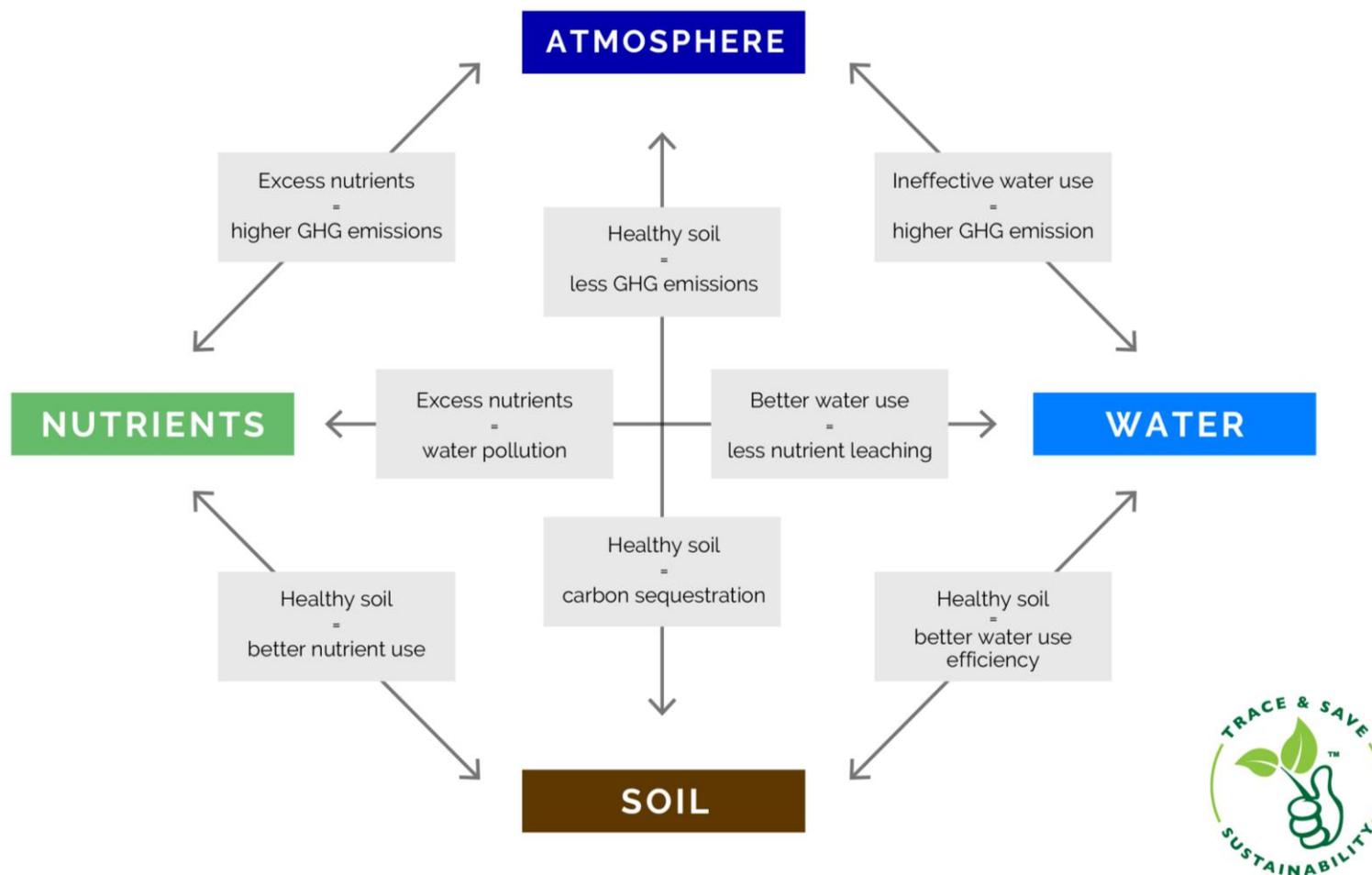


Figure 2: Diagram illustrating some examples of the interrelation between the facets of the SWAN system.

These interrelations can be explained as follows. Soil – Nutrients: improved soil health is directly associated with better nutrient use, as healthier soil relies less on imported fertiliser; Nutrients – Atmosphere: excess nutrients which result from inefficient nutrient use are usually in the form of fertiliser and/or feed, both of which have associated greenhouse gas emissions; Atmosphere - Water: inefficient water use results in unnecessary pumping, which uses electricity and therefore has associated greenhouse gas emissions; Water – Soil: healthier soil results in better soil water holding capacity through higher carbon levels, which results in less demand for irrigation; Soil – Atmosphere: improved soil health is directly associated with lower greenhouse gas emissions, as healthier soil relies less on imported fertiliser, and improved soil health is associated with increased soil carbon levels which is a result of carbon sequestration; Nutrients – Water: when nutrients are not utilised efficiently it results in excess nutrients which cause water pollution, and more efficient water use results in less run-off and leaching which means nutrients are kept within the farm agro-ecosystem.

THE POWER OF THE TRACE AND SAVE SYSTEM



** Research platform: online software used, by farmers and Trace & Save researchers, to systematically investigate farm information in order to establish trends, and identify new opportunities for improved farm management*

Figure 3: Diagram showing the power of, and illustrating what differentiates, the Trace & Save system.

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