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SUSTAINABLE PRODUCTION AND COMMERCIALIZATION STRATEGIES IN THE AGRI-FOOD SECTOR IN SOUTH AFRICA

DELIVERABLE D2.2

Guidelines for the Implementation of Green Certification Scheme and Sustainability Report Standard

PROJECT INFORMATION

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SUSTAINABLE PRODUCTION AND COMMERCIALIZATION STRATEGIES IN THE AGRI-FOOD SECTOR IN SOUTH AFRICA

SUPRA

DELIVERABLE D2.2.1

Guidelines for the Implementation of Green Certification Scheme

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GLOSARY

EU	European Union
EC	European Commission
UNOPS	United Nations Office for Project Services
UNEP	United Nations Environmental Programme
UNDP	United Nations Development Programme
GAP	Good Agricultural Practices

1. INTRODUCTION

The **D.2.2. Guidelines for the implementation Green Certification Scheme and Sustainability Reporting** is a confidential document delivered in the context of *Result 2—, Activity 2.2—Development of Green Certification Schemes and develop the standards guidelines.*

The SUPRA project (Sustainable production and commercialization strategies in the agri-food sector in South Africa; ZAF/UNEP/00091206/2015/027) is an action implemented by FUNDACION SUSTALDE (SUSTALDE, Spain, Coordinator), Agricultural Research Council – ARC (ARC, South Africa, partner), Cape Peninsula University of Technology - CPUT (CPUT, South Africa, partner) and Council for Scientific and Industrial Research -CSIR (CSIR, South Africa, partner).

The action is an EU funded programme, implemented by the United Nations Environment Programme ("UNEP") in collaboration with the United nations Development Programme (UNDP) and UNOPS, under the SWITCH Africa Green- Component B, which has been developed to support African countries in their transition to an inclusive green economy, and in promoting a shift to sustainable consumption and production patterns and practices.

The SUPRA project, which has an overall duration of 30 months, aims to develop more sustainable patterns in the agricultural sector in South Africa by engaging in transition towards a green economy, promoting resource and energy efficiency. The project is conducted in South Africa and focuses on three main levels: 1) Breaking the link between green economic growth and environmental degradation in the agri-food sector by assisting small farmers to adopt best practices in sustainable production, including the efficient utilisation of water in irrigation; 2) Promoting agri-food operators to adopt more sustainable practices by mean voluntary agreements and Green Certification Schemes engaging in transition towards an inclusive green economy; and, 3) promoting changes in policies, regulations and standards in order to foster the generation and implementation of Sustainable practices and Green Certification Schemes along the agri-food sector in South Africa.

It should be noted that, although the original contractual title is "Sustainable production and commercialization strategies in the agri-food sector in South Africa", the SUPRA has been selected as acronym for the action aiming at widen disseminate the action

2. OBJETIVES

The objective of the deliverable *"***D.2.2. Guidelines for the implementation of Green Certification scheme and sustainability Reporting"** is to carry out the creation of the framework for the Green Certification Schemes for smallholders according to the sustainability performance of the agri-food sector. Apart from the creation of a Certification Scheme, this activity will include the definition of guidelines and policies in order to provide smallholders and consumers with the necessary information about the green practices.

The implementation of Green Certification Schemes will contribute to the greening of agriculture and thereby to aligning the sector with the requirements of a green economy include conservation agriculture. Apart from the creation of a Green Certification Scheme, this activity will include de definition of a label to promote sustainable production and consumption practices.

With the aim of creating a framework for the Green Certification of South African smallholders, the following tasks have been developed.

2.2.1 Design of a Certification scheme and Green Label (D.2.2.1. Green Certification Scheme). Within this activity, the sustainability labelling for agri-food product has been carried out.

2.2.2 Standards for Sustainability Reporting (D.2.2.2. Sustainability reporting): Within this activity a standard for Sustainability Reporting will be defined for the South African framework, taking into account the guidelines established by the Global Reporting Initiative (GRI—www.globalreporting.org)

3. GREEN CERTIFICATION SCHEME

3.1. Objective

The objective of the standard is to encourage farms to analyse and consequently mitigate environmental and social risks caused by agriculture activities through a process that encourages continuous improvement..

Certified farms work with an environmental and social management system according to the complexity of its operation s and in accordance with local policies and standards. Farms have not destroyed valuable ecosystems after the implementation of the Green Certification scheme and conserve natural vegetation close to t terrestrial and aquatic ecosystem. Certified farms do not contribute significantly to pollution of the natural surface and groundwater and treat their wastewater.

The farm detects the health risks of the farmers and implements security measures to prevent accidents.

Certified farms monitor pests of their crop periodically and use biological and mechanical methods to control pests. If pests cause considerable economic damage, the farm can apply permitted pesticides, but must apply all safety measures for workers, communities and the environment. Genetically Modified Organisms (GMO) should not be grown or introduced on certified farms. The soils are managed in a sustainable manner: organic fertilizer is applied, vegetative cover and vegetative barriers are planted to reduce erosion and sediment runoff in rivers, streams or lakes. NO fire is used to prepare new production plots. Certified farms are aware of the waste they are generating and the water is separated into organic and inorganic. Organic waste is used to produce organic fertilizer (compost) . Plastic, paper and other inorganic wastes are delivered to recycling facilities, reused safely or deposited at a sufficient distance from the ecosystem and housing areas.

Potential benefits and challenges related to Green Certification Scheme:

Appropriate promotion and adoption of sustainable agricultural practices for Green Certification will help improve the safety and quality of food and agricultural products. In addition, producers and consumers will benefit flor formal markets and improve their livelihoods.

Adoption of Green Certification will help promote sustainable agriculture and contribute to meeting national and provincial environmental and social development objectives.

Adherence to food quality and safety will protect peoples 'health– an important factor in national development.

3.2. Scope:

The scope of the certification audits is the farm, which is defined as the production unit subjected to an audit. It includes the entire farm, its infrastructure, conservation areas and housing, as well as all the workers affected by the impact caused by its production activities. The lack of implementation of the standard criteria will result in nonconformity

3.3. Green Certification scheme rating system

Apply the following rating system to assess compliance with this standard:

General Compliance: To obtain and maintain certification, the farms must comply at least 50% of the applicable criteria of each principle and at least 80% of all applicable criteria Standard for Green Certification Scheme.

- Critical Criteria: Green Certification Scheme contains 15 critical criteria. A critical criteria is a criteria which requires fill compliance for the farm to be certified or maintain certification. This type of criteria is identified with the text "critical Criteria " at the

beginning of the criteria. A farm that does not comply with critical criteria will not be certified, or the certification will be cancelled even if it satisfies the other requirements of certification.

- If the farm does not comply with the implementation of any of the practices defined in the criteria described in Green Certification Standards, this fact will result in the assignment of a nonconformity, which is determined based on each individual criteria There are two categories non-conformities: 1) Major Non-Conformity, and 2) minor non-conformity.
  The levels of compliance defined for each of these categories are explained below:
  1. Non-Conformity (MCN): indicates compliance criteria less than 50%.
  2. Minor non-conformity (mnc): indicates compliance with more than 50% criteria, but less than 100%.

PRINCIPLE 1: SOIL MANAGEMNET

The agricultural practices for the Green Certification Scheme related to soil fertility improvement include maintaining and improving organic matter, appropriate crop rotation, manure application, rational mechanical and conservation tillage, maintaining soil cover, minimizing soil erosion lies by wind and water and application of organic and inorganic fertilizers in amount and timing, and by methods appropriate o agronomic environment and human health requirements. One objective of sustainable agriculture is to improve the soils that support agricultural production in the long term. Certifies farms should conduct activities to prevent or control soil erosion and thus reduce the loss of nutrients and the negative impacts. The farms should have fertilization programs based on crop needs and soil characteristics. The use of vegetation cover and crop rest contributes to the recovery of the natural fertility of the soil and reduces dependence on agrochemicals to control pests and weeds. Certified farms establish new production areas only in those lands suitable for agriculture and the new crops, and never by cutting forests.

1.1 The farm must implement a prevention and soil erosion control program that minimizes the risk of erosion and reduces the existing erosion. The program activities should be based on the identification of affected or susceptible to erosion lands and on soil properties, climatic conditions, topography and agricultural practices of cultivation. (Prevention soil erosion and degradation)

1.2 Critical criteria: Fertilizers should be stored separately from food, seeds, pesticides and animal feds. Store should be by and secured by padlock. Fertilizers store should be appropriately positioned to reduce the risk of contamination of water source.

1.3 The farm must use and promote practices that can help to protect against soil erosion and minimise the loss of topsoil.

1.4 Critical Criteria: The farm must organize full traceability of fertilizer application. (Traceability of fertilizer application). It is important to organize full traceability of fertilizer applications. The following information, at the least, needs to be recorded for each application: • Name of producer/or person responsible for application • Farm number and size (ha) • Date of application • Type of fertilizer • Origin of fertilizer • Quantity applied • Method of application.

PRINCIPLE 2: CROP MANAGEMNET

The sustainable Agriculture encourages the elimination of the use of chemical products for their negative impact on human health and natural resources. Certified farms contribute to the elimination of these products though sustainable crop management to reduce the risks and effects of pest infestations. The use of agrochemicals must be recorded to know their consumption and thus comply with the reduction and elimination of these products, especially more toxic products. To minimize waste and excessive application of agrochemicals, farms have the procedures and equipment for mixing chemicals and maintain and calibrate the equipment. Certified farms do not use unregistered chemicals in South Africa nor transgenic organisms or other products prohibited by different entities or national agreements.

2.1 The farm must implement different methods to keep the crops healthy without solely relying on spray of pesticides, called Integrated Pest Management (IPM). This method should give priority to the use of physical, mechanical, cultural and biological controls and minimum use of agrochemicals

2.2 Critical Criteria: The farm must collect and record information about pest infestation: dates, duration, extent and location of the infestation; type of pest; control mechanisms employed; etc. (Pest and disease control program)

2.3 Seeds sowing and seeding management are primary activities critical for better quality and more produce. The farm must organise full traceability on seeds and planting materials (Traceability on seed and planting). The following information at least needs to be recorded: Supplier name, Presence or absence of GMO, Planting /sowing date, previous crop etc.

2.4 Critical Criteria: When pesticides are used, the farm follows labels instruction for the mixing, loading and handling of the specific pesticide being used. The farm must have the needed equipment for mixing and applying agrochemicals and the maintenance and repair of the equipment in order to minimize waste and excessive application. (Registry of Equipment)

2.5 Critical Criteria: The farm must record the use of agrochemicals, which performs rotation and reduces use of chemicals in crop production. The agrochemical inventory on the farm must include, at least, the name of the product, quantity purchased and the date of purchase (Registry of Agrochemicals). For field applications, the farm must record the following information (The use of agrochemicals)

a. Applied products and application dates.
b. Identify the area where the application was made (name and number of the plot, on a map, etc)
c. Size of the application area (in hectares or another unit of measurement)
d. The dose and the total volume of the used products.
e. The name of the person in charge of mixing and authorizing the application.
f. The names of the farmers who made the application in the field
g. Identification of application equipment (spay, Knapsack sprayer etc)

2.6 Critical criteria: The farmer must use personal protection equipment during mixing, filling and cleaning/maintaining the sprayer. The farm must train the personnel responsible for using and applying pesticides. Farmers must use safety equipment and application devices. They should be aware of the dangers that can result from improper use of the product.

2.7 Critical criteria: Pesticides should store to avoid pollution and reduce fire hazards. Spayed field should be clearly marked to prevent people from entering until safe to do so.

PRINCIPLE 3: WATER RESOURCER AND IRRIGATION PRACTICES

Agriculture carries a high responsibility for the management of water resources in quantitative and qualitative terms. Careful management of water resources and efficient use of water for rain fed crop and pasture production, for irrigation where applicable are criteria for Green Certification Scheme. Certified farms conduct activities to conserve water and avoid waste. Prevent contamination of surface and ground water by treating and monitoring wastewater. The Green Certification Standards includes measures to prevent surface water pollution caused by runoff of chemicals or sediments. Farms that do not implement these measures should ensure through a monitoring program that do not degrade water resources, until they meet the stipulated preventive actions.

3.1 Critical criteria: The farm must implement irrigation planning program for each plot. (Irrigation Plan) .The farm must have a water conservation program to promote rational use of water resource. The activities of this program should make the best use of technology and resource available. It must consider the recirculation and reuse of water, maintenance of the water distribution system and the minimization of the use.

3.2 Critical criteria: Farms that use irrigation must employ mechanisms to precisely determine and demonstrate that the volume of water used and the duration of application are not excessive or wasteful. The farm must determine the amount of water and the duration of application based on climate information, available soil moisture and the properties of the soils. The irrigation system must have a good design and maintenance to avoid waste (Irrigation)

3.3 The farm must not deposit into natural water any organic or inorganic solids, such as domestic or industrial waste, rejected products, rubble, soil and stones from excavations, rubbish from cleaning land, or other materials

PRINCIPLE 4: HARVEST AND POST HARVEST PROCESS

Fresh produce must be harvested at the correct stage of maturity if it is to maintain its quality attributes throughout its post-harvest life. Prematurely harvested produce is highly susceptible to shrivelling and mechanical damage and it is of inferior flavour and colour when ripe. Over mature produce may be fibrous, soft and of poor eating quality in terms of sweetness, flavour and colour. It is, therefore, essential that those involved in harvesting receive training to identify the correct maturity indices for the produce concerned. Furthermore, carful and correct harvest techniques are essential in ensuring integrity of harvested produce and preventing rejections at the pack house. Wounding during harvest can provide entry points for pathogens, therefore causing decay. Those involved in harvesting must be trained in efficient and careful handling of fresh produce.

4.1 Workers must be properly trained in manual harvesting to assure the quality of the product. The certified farmers should implement a training program.
4.2 Critical criteria: Farm workers who are in direct contact with fresh fruit and vegetables must have good habits of body hygiene and wear clean clothes and cover their hair. The certified farm implement Hygiene Check program (Field Sanitation and Pre-harvest Assessment), and each farmer must go through the hygiene checklist.
4.3 Critical criteria: All field equipment used in harvesting produce must be cleaned and repaired on a regular basis. All harvesting equipment should be stored overnight in a closed facility, protected from rats and birds (Registry cleaning machinery and tools)
4.4 The certified farm must implement contaminated product procedures to ensure crop contaminated by glass/brittle plastic breakage, chemicals, or pesticide are not harvested for human consumption.

PRINCIPLE 5: HYGIENE IN THE FIELD

A large proportion of fruit and vegetables are eaten raw. The operations linked to production in the field, in the packing plant, as well as the equipment and accessories used (machines, packaging material, etc.) must reduce to a minimum the potential risks for consumer health that may arise from the contamination of fresh fruit and vegetables. Each producer must use measures of hygiene and practices that are adapted to the specific conditions of the site, the type of product, the methods and technologies used and the personnel, in order to control food risks and to favour the production of healthful food.

5.1 Certified farms are clean. Farmers cooperate to maintain the farm clean. There are programs to manage waste by type and quantity, though recycling, reduction and reuse of wastes. The final destination of waste on farms is managed and designed to minimize potential impacts on the environment and human health

5.2 Critical criteria: The production of fresh fruit and vegetables must be avoided in areas where the presence of potential harmful substances could contaminate the fruit and vegetable produced

5.3 Critical criteria: Manure must be stored so as to avoid contamination of the environment by runoff, seepage or by the wind. The construction of separation structures (concrete screed or clay bed, etc.) around manure treatment or storage sites may help reduce the risks of contamination of underground water.

5.4 Critical criteria: Areas where fruits and vegetables are cultivated, the certified farm implement measured to protect crops and particularly the harvests against the damage caused by animals

5.5 Open waste burning is not allowed. Only the burning of waster in an incinerator designed for that purpose. They must have the relevant legal permits for the construction and operation of the incinerator, as well as operational procedures

5.6 The toilets are not situated near a source of irrigation water or in a place likely to be flooded by strong rainfall. Leaks from poorly constructed or badly located toilets may contaminate the soil, water supplies or the fruit and vegetables.

5.7 Before the harvest, the areas for storing fresh fruit and vegetables must be cleaned. The certifies farm check these zones to ensure that they are not infected by pests, rats or insects.

5.8 Critical criteria: The farm must be clean and free of waste in order to maintain a positive image and contribute to the welfare of farmers. The farm should locate waste containers strategically and regularly collect and dispose their contents

PRINCIPLE 6: ECOSYSTEM CONSERVATION

Natural ecosystems are integral component of the agricultural and rural landscape. Crop pollination, pest control, biodiversity and soil and water conservation are some of the services. Certified farms protect natural ecosystem and conduct activities to restore degraded ecosystem.

6.1 Production areas must not be located in places that could provoke negative effects on national parks, buffer zones or other areas of public or private biological conservation.

6.2 A minimum separation between production areas and terrestrial natural ecosystems where agrochemicals are used must exist. The farm should establish a protection zone with vegetation by sowing or natural regeneration between different areas of permanent or semi-permanent crops or between different production systems.

6.3 Critical criteria: The farm must establish and maintain vegetation barriers between the crop and areas of human activity within the farm, as well as between production areas and the edges of public roads. These barriers must consist of permanent native vegetation with trees, shrubs or other plants, in order to promote biodiversity, minimize any negative visual impacts and reduce the drift of agrochemicals, dust and other substances coming from agricultural activities.

4. EVALUATION SHEET

PRINCIPLE 1: SOIL MANAGEMENT	Yes	NO	Comments
1.1 Does the farm implement a prevention and soil erosion control program?			
1.2. Are the fertilizers stored appropriately to reduce the risk of contamination of water source?			
1.3Does the farm utilizes practices to protect crop against soil erosion and minimize top soil? What practices are used? ☐Conservation tillage ☐Planting bunch grasses ☐Planting tree hedges and shelter belts ☐Planting perennial crops such as fruit trees with cover crops ☐Crop rotation			
1.4 Does the farm have a fertilization program?			
TOTAL			

PRINCIPLE 2: SOIL MANAGEMENT	Yes	NO	Comments
2.1 Does the farm implement Integral Pest Management method? What method of managing crop pest and diseases does the farm uses first? ☐Cultural methods ☐Biological control ☐Physical Methods ☐Chemical methods ☐Planting tree hedges and shelter belts			
2.2 Does the far, record information about pest infestation?			
2.3 Does the farm implement seed and planting management plan?			
2.4.1 Does the farm implement the instructions for mixing, loading, and handling of the specific pesticide being use?			
2.4.2. Does the farm has the needed equipment for applying agrochemicals and implement a maintenance program?			
2.5.1. Does the farm records the application of pesticides?			
2.5.2. Does the farm registry the purchase agrochemicals?			
2.6 Do farmers use safety equipment and application devices? ☐Gloves or plastic bags on hands ☐Eye protection —i.e visor, goggles, to protect eyes ☐Cotton clothes to cover the body, long trouser legs worn outside the boots and long sleeves ☐ Boots or shoes that cover the feet (NEVER sandals); ☐A hat ☐A light disposable mask or respirator ☐ Waterproof apron or large plastic bag to cover the front of the body ☐ Always have soap and water available to clean spilled pesticide off the skin			
2.7. Are pesticides stored correctly and clearly marked?			
☐ Provide an unused empty cabin or a drum with door cut for pesticide storage. ☐ Keep pesticides under lock and key in a cupboard or box inside the empty cabin. ☐ Put up clearly visible signs forbidding entry to the cabin where pesticides are stored. ☐ Always keep pesticides in their original containers ☐ Avoid storing pesticide for a long time, because they may become obsolete ☐ Never decant pesticides into beverage or oil bottles ☐ Avoid storing pesticide for a long time, because they may become obsolete ☐ Never decant pesticides into beverage or oil bottles ☐ Keep pesticides away from fire and out of direct sunlight, rain. ☐ A warning sign with a skull and crossbones should be kept in place			
TOTAL			

PRINCIPLE 3: WATER RESOURCES AND IRRIGATION PRACTICES	Yes	NO	Comments
3.1 Does the farm implement a sustainable irrigation program that ensures the rational use of water resource?			
3.3 Does the farms employ mechanisms to precisely determine that the volume of water used and the duration of application are not excessive or wasteful?			
3.4 Is the water used for irrigation of good quality? (without any organic or inorganic solid)			
TOTAL			

PRINCIPLE 4: HARVEST AND POST HARVEST PROCESS	Yes	NO	Comments
4.1 Does the farm have a training program in manual harvesting?			
4.2 Is there a training program for employees on food safety practices (personal health and hygiene, field practices standards operating procedures for cleaning). Do the farmers have good habits of body hygiene?			
4.3 Are storage facilities and equipment clean and cleaned and maintained on a regular bases			
4.4 Is there a policy in place for products that falls on the floor during packaging or a pest control program in place for storage facilities?			
TOTAL			

PRINCIPLE 5: HYGIENE IN THE FIELD	Yes	NO	Comments
5.1 does the farm implement programs to manage waste by type and quality, though recycling, reduction and reuse of wastes?			
5.2. Are there procedures in place to not harvest produce contaminated by chemicals?			
5.3 is manure and non-food grace substances such as fertilizers, chemicals, lubricant´s etc kept in a manner as to not contaminate the food.			
5.4 are any actions taken to restrict farm animals and wildlife from growing areas'			
5.5 is burning waste used?			
5.6 Are toilets located far from a source of irrigation water?			
5.7 Are the storage facilities (cooler, root cellars, and produce storage rooms) clean and cleaned and maintained on a regular basis?			
5.8 Can harvest containers and containers for non-food uses (compost, carrying tools, etc) be clearly distinguished so that only harvest containers are used for food contact?			
TOTAL			

PRINCIPLE 6: ECOSYSTEM CONSERVATION	Yes	NO	Comments
6.1 is the production area located in a sustainable place?			
6.2 is there established a protection zone between production areas and terrestrial areas			
6.3 Are established vegetation barriers between the crop and areas of human activity? And between production areas and the edges of public road? (Tress, plants, shrubs..)			
TOTAL			

ANNEX I: FIELD NOTEBOOK

HISTORY OF THE PLOT

	PLOT NUMBER							
	1	2	3	4	5	6	7	8
Location								
Area (ha)								
Altitude								
Orientation								
Slope								
Water availability								
Use of the previous soil								
Land use in adjacent land								
Previous crop								
Type of pests and diseases								
Possible previous contamination								
State of the current field								

IDENTIFICATION OF THE PRODUCER AND THE PLOT

Name of the cooperative:
Identification of the technical responsible:

Nº Plot	Area (ha)	Type of crop	Variety	planting framework	Start date	Harvesting date	D/I (1)
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							

(1) Indicate dry land (D) or irrigated (I), specify whether Flood (F), Drip (D) or Sprinkler (S)

PREVENTION SOIL EROSION AND DEGRADATION

Name of the plot	
Geographical location of the plot	
Plot boundaries	
Plot size	
Crop	**Previous:** Crop Specie: Variety: **Present:** Crop Specie: Variety: **To develop:** Crop Specie: Variety:
Soil type	
Water supply for irrigation	**Source:** **Quality:** **Reliability:**
Vegetation	
Previous land use	
Rainfall	**Mean Annual (mm):** **Mean Monthly (mm):**
Temperature:	**Monthly maximum:** **Monthly minimum**

TRACEABILITY ON SEED AND PLANTING

A. LAND PREPARATION				
Date	Operation	Previous crop	Method	Outcome
B. NURSERY ACTIVITIES (WHERE SEEDLINGS ARE PRODUCED FOR TRANSPLANTING)				
Date	Operation		Materials used (type, quantity)	Outcome
C. TRANSPLANTING (WHERE PRATICED)				
Date	Area planted	No of seedlings	Spacing	Outcome
D. SOWING (WHERE DIRECT SEEDING IS PRATICED)				
Date	Area	Seed (gm) Presence of absence of GMO	Method	Spacing	Outcome

PEST AND DISEASE CONTROL

Date	Duration	Type of pest/disease	Impact pre-treatment	Treatment date/type	Environmental factors during the infestation	Damages and estimated costs of damage and control

EQUIPMENT

Identification of the equipment	Annual Maintenance date	Responsible	Verification conducted	Observations
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				

Registry cleaning machinery and tools

Date	Equipment /machinery	Used Procedures	Observations
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			

MAINTENANCE OF MACHINERY AND TOOLS

Date	Equipment /machinery	Name of the person who calibrate the equipment or qualification	Observations
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			

IRRIGATION PLAN

Crop type	ha	Type of soil	Watering regularity	Frequency of irrigation	Timing of irrigation	Observations
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						

IRRIGATION

Date	Crop type	Irrigated area (ha)	Method	Duration and estimated hour of irrigated	Quantity	Climate information	Observations/Impact

CROP PRACTICES

Date	Crop type (1)	Irrigated area (ha)	Type of practices (2)	Equipment/machinery used (3)	Observations (4)

(1): You must attach the biannual crop planning in the case of horticultural and herbaceous annual planning to perform, including the density of planting and crop rotation
(2): all cultural practices carried out in the crops include: soil work (harrow, cultivator, milling, etc.), pruning, thinning, planting, harvesting, application of fertilizers and pesticides, irrigation (indicate volume provided), etc.
(3) Indicate the type of machinery used for the realization of production practices
(4) Labour / MAQ: Machinery

INVENTORY OF FERTILIZERS

Date	Commercial name of the product	N-P-K relation	Quantity stored	Responsible	Stored position	Observations

TRACEABILITY OF FERTILIZER APPLICATION

Name of producer/or person responsible for application	Farm number and size (ha)	Date of application	Type of fertilizer	Origin of fertilizer	Quantity applied	Method of application

REGISTRY OF AGROCHEMICALS

Name of the product	Quantity purchased	Date of purchased	Stored position	Observations

THE USE OF AGROCHEMICALS

Date	
Applied Product	
Identification of the area (name and number of the plot, map, etc.)	
Size of the application area (ha)	
Person in charge of mixing and authorizing the application	
Farmers who made the application in the field	
Identification of application equipment	

HARVESTING AND MARKETING

Date	Product	Quantity (kg) /Units	Yield (kg/ha)	Customer	Nº of invoice (if applicable)

TRAINNING PROGRAMM

Date	Training	Nº attendance	Name	Observations

FIELD SANITATION AND PRE-HARVEST ASSESSMENT

A pre-harvest assessment is made on the production area prior to harvest. Risk and possible sources of crop contamination are noted, assessed and, if applicable, corrective measures performed and documented.

Farm Name:			
Person conducting pre-harvest assessment			
Date of Inspection:		**Projected Harvested date:**	

Procedures:

1. Prior to harvest inspect the toilet and hand-washing facilities, harvesting tools and equipment, employee health and condition of the harvest area, making sure there are no potential food safety risks.
2. Where an issue is observed, correct the problem and document the corrective action before harvest begins.

	Date Inspected	Corrective Action Taken
Field Sanitation Facilities		
Are toilet and hand washing facilities properly located?		
Are toilet and hand washing facilities properly stocked?		
Harvesting tools and equipment		
Is harvest equipment available and in good condition?		
Have harvesting tools been cleaned and disinfected?		
Are field bins in good conditions?		
Are field bins clean?		
Is transportation equipment clean and available?		
Employee health		
Is potable water available for workers?		
Are first aid kits available in case of emergency		
Field hygiene		
There is no evidence of significant, high concentrations of domestic or wild animal contamination		
Are fuels and chemicals that might contaminate the crop areas isolated?		
There are no notable sources of biological, physical or chemical contamination (dump sites/manure/burning debris) that may be a food safety risk.		
Are contaminated areas isolated as “no –harvest” zones?		
There is no evidence of unauthorized entry in the crop area.		
If there is evidence of unauthorized entry in the crop area has it been investigated?		

CONTAMINATED PRODUCT PROCEDURES

Purpose: to ensure crops contaminated by glass/ brittle plastics breakage, chemicals or pesticide are not harvested for human consumption. Glass on harvesting equipment is protected so fruit is not contaminated in the event of a breakage.

Procedures:

1. Notify the appropriate supervisor
2. Fruit that is contaminated will be disposed of and harvested area avoided.
3. Where glass/brittle plastic breakage occurs, inspect harvest area, looking for signs of contamination. Remove and discard all broken pieces of glass. Clean up harvest area where contamination occurred.
4. Work will stop until equipment can be repaired, and all fruit containers that may have been contaminated are cleaned, washed and inspected.
5. Equipment that has been contaminated will be thoroughly cleaned and inspected prior to being used again.
6. Document the date of the occurrence, description of the event and corrective action taken

Date	Description of event	Corrective action taken	Supervisor Initials

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SUSTAINABLE PRODUCTION AND COMMERCIALIZATION STRATEGIES IN THE AGRI-FOOD SECTOR IN SOUTH AFRICA

DELIVERABLE D2.2.2

GUIDELINES FOR SUSTAINABIILITY REPORTING: ENVIRONMENTAL INDICATORS FOR AGRICULTURE

1. BACKGROUND AND OBJECTIVES

The impacts of agriculture on the environment and achieving of sustainable agriculture are a major public concern in the context of agricultural policy reform, trade and environmental agreements.

This study is part of Deliverable D.2.2 of the SUPRA project “Environmental indicators for agriculture”

The goal of sustainable development is to “meet the needs of the present without compromising the ability of future generations to meet their own needs”. As key forces in society, MSMEs have an important role to play in achieving this goal.

One of the key challenges of sustainable development is that it demands new and innovative choices and ways of thinking. While developments in knowledge are contributing to economic development, also have the potential to help resolve the risks and threats to the sustainability of social relations, environment and economies. New knowledge, management and public policy are challenging organizations to make new choices in the way their operations, products, services and activities impact the earth, people and economies.

The urgency and magnitude of the risks and threats to collective sustainability, alongside increasing choice and opportunities, will make transparency about economic, environmental and social impacts a fundamental component in effective stakeholder relations and other market relations. To support this expectation, and to communicate clearly and openly about sustainability, a globally shared framework of concepts and metrics is required. It is the Global Reporting Initiative´s (GRI) mission to fulfil this need by providing a trusted and a trusted and credible framework for sustainability reporting that can be used by organization of any size, sector or localization.

Transparency about the sustainability of organizational activities is of interest to a diverse range of stakeholders, including business, lab or, on-governmental organizations, investors, accountancy and others. This is why GRI has relied on the collaboration of a large network of experts from all of these stakeholder groups in consensus-seeking consultations.

Sustainability reporting is the practice of measuring, disclosing and being accountable to internal and external stakeholders for organizational performance towards the goal of sustainable development. “Sustainability reporting” is a broad term considered synonymous with others used to describe reporting economic, environmental and social impact.

The sustainability Reporting Guidelines consist of Principles for defining report content and ensuring the quality of reported information. It also includes Standards Disclosures made up of Performance indicators and other disclosure items, as well as guidance on specific technical topics in reporting.

2. FARM MANAGEMENT

2.1 Context

Environmental conditions and farming system vary within and across South African provinces and consequently, best farm management practices vary from one region to another. Information of farm management practices, and how these practices affect the environment and meet compulsory, regulatory or voluntary standards, is an important tool for policy makers.

There can be trade-offs in implementing environmentally sound management practices. Reducing soil erosion, for example, whereby farmers move from conventional to reduce or no-tillage in crop production can be achieved if weeds are controlled with herbicides. An environmental side-effect of these practices is a likely change in water movement in the soil, with no-tillage leading to increasing infiltration and percolation of nutrients such as nitrate to the water table compared with conventional tillage. In addition, the increase in herbicide use may cause pesticide leaching. Thus, the objective of lowering soil through no tillage may lead to some negative environmental effect.

2.2 Indicators

Farm management indicators have the potential to help policy makers take into account the linkages and trade-offs between different management practices and their impact on the environment, including: whole farm management involving the overall farming system; and farm management aimed at specific practices related to nutrients, pests, soil and irrigation.

Concerting *Nutrient management* indicators include the share of farms with nutrient management plans and the frequency of soil nutrient test.

Pest management indicators measure the share of cultivated agricultural area that is not treated with pesticides and the share of cultivated agricultural area under integrated pest management.

Soil and land management indicators measure the number of days in a year that the soil is covered with vegetation. The greater the cumulative soil cover, the greater the protection from soil erosion, compaction and run-off and the contribution, in general, to biodiversity.

Irrigation and water management indicators measure the share of irrigation water applied by different irrigation technologies, from the least efficient methods (fllodding) to technologies (drip emitters) that use water more efficiently.

3. NUTRIENT MANAGEMENT

3.1 Context

Inputs of nutrients, such as nitrogen and phosphorus, are essential to agricultural production, and integral to raising productivity. At the same time, a surplus of nutrients in excess of immediate crop needs can be a source of potential environmental damage to surface and ground water, air quality and contribute to global warming. If soils are farmed and nutrient not replenished, this can lead to declining soil fertility and may impair agricultural sustainability through “soil mining” of nutrients.

One nutrient use indicator is the efficiency nitrogen use in agriculture, which measures the physical nitrogen input/output ratio.

3.2 Nitrogen management

Context: Inputs of nutrients, such as nitrogen and phosphorus, are essential to agricultural production, and integral rate raising productivity. At the same time, a surplus of nutrients in excess of immediate crop needs can be a source of potential environmental damage to surface and ground water

Definition: share of farm or cultivated area with nutrient management plants.

Method of calculation: The method of calculation involves measuring the number of farms or cultivated area with nutrient management plans as share of the total number of cultivated area.

Nutrient management plans normally include restrictions on the:

- ✓ Periods when the application of fertiliser is inappropriate;
- ✓ Application of fertiliser to steeply sloping ground;
- ✓ Application of fertiliser to water saturated, flooded, frozen or snow-covered ground;
- ✓ Conditions for application of fertiliser near water courses;
- ✓ Capacity and construction of storage containers for livestock manure, including measures to prevent water pollution by run-off and seepage into the groundwater of liquids containing livestock manure and effluents from stored plant materials such as silage

Nutrient management plans also usually include:

- ✓ Application of nutrients, including the rate and uniformity of spreading, of both chemical fertiliser and livestock manure, to restrict nutrient losses to water to an acceptable level,
- ✓ Timing and method of application for the land application of livestock manure and other organic materials to encourage efficient crop recovery of nutrients to minimise losses to water and air,

- ✓ Maintenance of a minimum quantity of vegetative cover during (rainy) periods that will take up the nitrogen from the soil that would otherwise cause nitrate pollution of water;
- ✓ Establishment of fertiliser plans on farm by farm basis and the keeping of records on fertiliser use,
- ✓ Prevention of water pollution from run-off and the downward water movement beyond the reach of crop roots in irrigation systems

In addition, nutrient management plans may include land management elements, such as the use of crop rotation system, and the proportion of the land area devoted to permanent crops relative to annual tillage crops.

The existence of a nutrient management plan does not necessarily mean that the plan is followed, thus, it is the implementation of the plan that should be measured. This indicator is closely linked to nutrient use, water and soil quality and other farm management areas.

3.3 Nitrogen efficiency

Definition: the ratio of total nitrogen uptake (output) to the total nitrogen available (input) if an agricultural system.

Method of calculation: this indicator provides a physical measure of nitrogen use efficiency in agriculture by calculating the ratio of total nitrogen uptake (output) to the total nitrogen available (input).

Interpretation: It important to emphasise that this and indicator of physical and not economic efficiency of nitrogen use in agriculture. Also the indicator measures the use efficiency of all sources of nitrogen used in agriculture and not just inorganic nitrogen fertilisers. Moreover, the efficiency with which different crops use nutrient varies.

3.4 Templates

FARM MANAGEMENT INDICATORS			
	2016	**2017**	**2018**
1. Nutrient sources	**Percentage of planted area**		
Previous crop was legume, hay or pasture			
Only manure applied			
Both commercial fertilisers and manure applied			
2. Commercial fertilises and manure	**Percentage of planted area**		
Applied at the recommended rate			
Applied above recommended rate			
Applied below recommended rate			
3. Timing of nitrogen application (available also or phosphate timing)	**Percentage of area receiving commercial fertilises**		
Autumn before planting			
Spring before planting			
At planting			
After planting			
4. Nutrient placement	**Percentage of area receiving commercial fertilizers**		
Broadcast (ground)			
Broadcast (air)			
Chemigation			
Banded			
Foliar			
Injected (knifed in)			

COMPOSITION OF NUTROGEN INPUTS AND OUTPUTS			
	2016	**2017**	**2018**
1. Nitrogen inputs from:	**Share of total inputs (%)**		
Inorganic fertiliser			
Net livestock manure			
Other nitrogen inputs:			
2. Nitrogen Outputs (uptake) from:	**Share of total outputs (%)**		
Harvested crops			
Pasture			

4. PEST MANAGEMENT

4.1 Context

Agricultural pesticides contribute to agricultural productivity but also pose potential risks to human health and the environment. The risks vary greatly depending on pesticide´s inherent toxicity (or hazard) and exposure. Exposure to a pesticide depends on the way it is applied and its mobility and persistence in the environment.

Pesticide use by farmers depends on a multitude of factors, such as climatic conditions, the composition and variety of crops, pest and disease pressures, farm incomes, pesticide cost/crop price ratios, pesticide policies and management practices. Pesticide indicators re potentially useful tool to help policy makers monitor and evaluate policies and also provide information concerning human and environmental pesticide risks.

4.2 Use of non-chemical pest control methods

Definitions: the area of cultivate crops not treated with chemical pesticides

The pest management practices included in the indicator are assumed to pose fewer risks to human health and the environment that “conventional” pesticide application method and they can potentially be applied to manage pest pressures without affecting farm profitability. The definitions of practices could be harmonised to improve international comparability and the data availability could also be improved.

In general it can be assumed that an increase in agricultural area under non-chemical pest control methods is beneficial to human health and the environment. However, some caution is required with such an interpretation, as it will be necessary to link these farm management practices to actual environmental outcomes, or outcomes measures through other indicators such as soil and water quality, biodiversity and wildlife habitats.

Method of calculation: The crop area not treated with chemical pesticides is divided by the total cultivated agricultural area to calculate the indicator. The cultivated agricultural area includes the total arable and permanent cropland and assumes that pesticides are not used on temporary or permanent pasture. Non-chemical pest control methods include, for example, tillage (e.g. plough down of allopathic residues, that is plants whose roots and residues can suppress the growth of many other plants, including weeds), crop rotation, biological control (e.g. parasitic organisms for control of insect pests), pheromones and hand weeding.

Interpretation: the pest management practices included in the indicator are assumed to pose fewer risks to human health and the environment than “conventional” pesticide

application method and they can potentially be applied to manage pest pressures without affecting farm profitability.

In general it can be assumed that an increase in agricultural area under non-chemical pest control methods is beneficial to human health and the environment. However, some caution is required with such an interpretation, as it will be necessary to link these farm management practices to actual environmental outcomes, or outcomes measured through other indicators such as soil and water quality, biodiversity and wildlife habitats.

4.3 Use of integrated pest management

Definition: the area of cultivated agricultural land under integrated pest management (IPM).

Method of calculation: the indicator measures the area under IPM divided by the total cultivated agricultural area. The cultivated agricultural area includes the total arable and permanent cropland and assumes that pesticides are not used on temporary or permanent pasture. IPM is a knowledge-intensive and farmer based management approach that encourages natural control of pest populations by anticipating pest problems and preventing pests from reaching economically damaging levels. Activities under IPM include, for example, the enhancement of natural enemies, planting pest-resistant crops, adapting crop management and “judicious” use of pesticides.

Interpretations: new pesticide products generally pose lower environmental risks, but may still have an impact on non-targeted species and water quality. The pest management practices included in these indicators are assumed to pose fewer risks to human health and the environment thank “conventional” pesticides application methods and they can potentially be applied to manage pest pressures without affecting farm profitability.

The cultivated area under IPM is an indicator of comprehensive pest management, reduced pesticide risk, and optimal timing of pesticide use (as measured the area of farms/crops where IPM is used). It addresses all pests and pest control methods, and it attempts to optimise the use of pesticides, not to replace them. it may be the best indicator of farm pest management efficiency, but it probably has a lower sensitivity to environmental concerns than the indicator on the use of non-chemical pest control methods.

As with non-chemical pest control methods, it can be assumed in general that an increase in agricultural area under IPM is beneficial for human health and the environment. However, some caution is required with such an interpretation ,as it will be necessary to link these farm management practices to actual environmental outcomes, or outcomes measures through other indicators such as soil and water quality, biodiversity and wildlife habitats.

It is necessary to distinguish between certain herbicides and other pesticides. This is partly because herbicides are frequently used to reduce tillage, which has considerable environmental benefits. Herbicide materials can be divided into those that are used in forage or close-grown crops, where there is no benefit from reduced tillage, and those used primarily in wide row crops, and in reduced or no-tillage systems, as an alternative to tillage

PEST MANAGEMENT INDICATORS			
PEST CONTROL METHOD- Use of integrated pest management	**Total arable land (ha)**	**Total cultivated agricultural area (ha)**	**Percentage of field crop area treated**
1. Cultural methods - Crop rotation - Sowing date - Plot selection and layout - Association crops - Destruction of crop residue - Tilling - Reasoned fertilization - Resistance varieties.			
2. Biological control: involves the use or promoting natural enemies (predators and parasites)			
3. Physical methods: where pests are killed or prevented from reaching the crops by physical means (i.e. planting maize on the edge of cabbage field, maize acts as physical barrier to cabbage pests)			
4. Chemical methods: where chemicals are used to kill the pests. The chemical may be manufactures pesticides or natural extract from plants such as neem and pyrethin			

Percentages may exceed 100% where more than one practice is used on the same crop area

5. SOIL AND LAND MANAGEMENT

5.1 Context

Enhancing soil quality is essential for maintaining agricultural productivity. It can be degraded through three processes: (i) physical (e.g. erosion, compaction), (ii) chemical (e.g. acidification, salinization); and (iii) biological degradation (e.g. declines in organic matter). These degradation processes are linked to changes in farm management practices, climate and technology. There can be lags between the incidence of degradation, the initial recognition of a problem by farmers and the development of conservation strategies.

Some aspects of soil degradation are only slowly reversible (e.g. declines in organic matter) or are irreversible (e.g. erosion). Essentially farmers need to balance three key aspects of soil quality: sustaining soil fertility, conserving environmental quality, and protecting the plant, animal and human health.

The availability of land and water resources is basic to all agricultural activity. Agriculture is often a major use of both of these resources, which can affect the flow of surface water and the loss of soil sediment from agricultural land. Appropriate land use, combined with environmentally sound soil and water management practices can help to reduce the peak flow of surface water and loss of soil sediment.

Damage caused by off-farm sediment flows is important in South Africa where there are alternate periods of drought, which limit soil vegetation cover, followed by heavy rainfall.

5.2. Land Management Practices

Definition: the share of the total crop area under environmental land management practices.

Method of calculation: The indicator is calculated as the crop area under environmental land management practices divided by the total crop area. Environmental land management practices include conservation and no-till practices. These include practices other than conventional tillage methods that incorporate most of the crop residue (remaining after harvest into the soil), and other best land management practices including crop rotations and winter cover crops. Crop areas under following land management practices are included in the indicator:

- ✓ Conservation tillage, also called mulch tillage, minimum tillage and reduced tillage: these are tillage methods that leave most of the crops residue (i.e. plant material remaining after harvest) on the surface of the soil to provide protection against erosion, reduce soil crusting and increase the organic matter content of surface soils.

- ✓ No-till, also called zero tillage. This is a tillage method where the soil is not disturbed between harvesting one crop and planting the next. It includes direct seeding into stubble or sod, and ridge tillage.
- ✓ Winter cover crops. These are crops which are planted after the autumn harvest as means of soil protection
- ✓ Crop rotation, that is planting different crops successively in the same field
- ✓ Wind break, also called shelterbelt. This is a natural or planted line of trees, bushed or hedge at the border or within a field

Interpretation: This is an indicator of the use of best management practices in crop production to minimise soil erosion, pesticide and nutrient run-off etc. The higher the adoption rate of such practices on land areas at risk, the lower the risks of various environmental impacts. The relative effective of different practices in reducing soil erosion, for example, can be further evaluated and the practices weighted to calculate an index. This indicator is closely associated with the indicator on soil cover, but only considers the adoption of different soil management practices, rather than the actual effect of soil management, such as the extent of soil cover.

LAND MANAGEMENT AND SOIL PRACTICES			
	2016	**2017**	**2018**
1. Reduced soil tillage	**Percentage of planted area**		
Tillage retaining most crop residues on soil surface			
No tillage prior to seeding			
1. Other land and soil management practices*	**Percentage of planted area**		
Crop rotation			
Permanent grass cover			
Contour cultivation			
Wind breaks			
Winter cover crops			

* Percentages may exceed 100% where more than one practice is used on the same crop area.

6. IRRIGATION AND WATER MANAGEMENT

6.1 Context

South Africa is facing increasing competition for surface and groundwater. Also there is a growing recognition to meet environmental need though allocations of water for the environment and protection of down-stream impacts from agricultural pollution.

Water underpins most aspects of human life. It is becoming increasingly clear that the availability of safe water is now a substantial limiting factor regarding the health and welfare of the population. Although water is a renewable resource, its availability is finite in terms of the amount available per unit of time. The extent of the pressures on total water resources and the consequent impacts on ecological processes vary from region to region reflecting, in many instances, population pressures, availability of water and technological developments.

Monitoring water use efficiency has the potential to identify opportunities for increased production of more food and fibre from existing or reduced water allocation. This is important in terms of being able to accommodate growing demands for food and fibre without additional demands on a limited water resource; and to shift production away from land with a low production potential. It may also help ease the pressure of increasing water withdrawals on natural processes and aquatic ecosystems, and on aquaculture enterprises.

6.2 Irrigation and water management

Definition: the share of irrigation water applied by different forms of irrigation technology

Methodology of calculation: the indicator is calculated as the share of irrigation water used under different irrigation technologies and systems (such as, flooding, sprinklers, drip system) divided by the total quantity of water used for irrigation.

Interpretation:

The greater the percentage of irrigation water applied by high efficiency appliances (e.g. Drip), compared with low efficiency appliances (flooding), the less amount of water waters and the lower risk of adverse environmental effects. It is necessary to clearly define the hierarchy of the technical efficiency of different irrigation systems. Also it is important to take into account the share of irrigated area when interpreting the indicator, as the large share of the irrigated area in the total agricultural area the larger potential environmental impacts of irrigation technologies. The indicator provides supportive information to the water use efficiency indicators by showing the share of irrigated area under different irrigation system

6.3 Water use efficiency

Definition: The indicators of water use efficiency cover irrigated agricultural land and are defined as:

- Water use technical efficiency: for selected irrigated crops, the mass of agricultural production per unit volume of irrigation water utilised.

- Water Use economic efficiency: for all irrigated crops, the monetary value of agricultural production per unit volume of irrigation water utilised

Method of calculation: water use efficiency indicators are a measure of the utilization of irrigation water by crops relative to the water input to the farming system, thus identifying overall leakage, evaporation, and other water loss that are not utilised by crops. This indicator takes account of the different methods of irrigation, as well as water losses from the system.

The indicator require information on the physical mass (and value for the economic efficiency indicator) of agricultural produce over the accounting period, and the volume of water diverted or extracted for irrigation, less storage and transmission losses and return flows, and excluding precipitation. In order to remove the annual fluctuations caused by changes in climatic conditions and commodity prices, interpretation needs to focus on longer run trends which may reflect changes in irrigation practices, the selection of crops irrigated and trends in crop productivity.

Interpretation:

The indicator of technical water use efficiency is more likely to be useful in comparing and tracking performance of different areas.

These indicators are strongly linked with various aspects of farm management, in particular irrigation and water management indicators. The link with these indicators is important in revealing the extent to which the application of different forms of irrigation technology affects irrigation water efficiency.

IRRIGATED CROP AREA			
	Total arable land (ha)	**Total cultivated agricultural area (ha)**	**Total area under irrigation (%)**
Flooding			
Sprinklers			
Drip system			
Pivot			
Other			

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