



Netherlands Enterprise Agency

# *“Climate Smart Agriculture”*

*How Dutch technology can add value to the South African  
(emerging) farmers*

*Commissioned by the ministry of Foreign Affairs*

*>> Sustainable. Agricultural. Innovative.  
International.*



2017

# “Climate Smart Agriculture”

How Dutch technology can add value to  
the South African (emerging) farmers



**Authors:**

**Ir. L.C.J. van Eck**

**Drs. P. van der Hout Smit**

**A.J. van den Bos MBA**

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Kingdom of the Netherlands



### **Colophon**

The Embassy of the Kingdom of the Netherlands in South Africa asked Verbos Business Development to carry out a scoping study on Climate Smart Agriculture in the Netherlands and South Africa. Dutch technology, knowledge and experience in climate change mitigation and adaptation can add significant value to South African farmers. With this study, we identified a number of gaps in current South African farming systems and linked these with Dutch solutions.

### **Important Notice and Disclaimer**

This Scoping Study has been prepared by Verbos Business Development and is issued to the Embassy of the Kingdom of the Netherlands, Pretoria, South Africa, pursuant to a written agreement arising from the proposal dated 16 June 2017 and letter of appointment dated 3 July 2017, under reference number 201704261536-MAT17ZA02.

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## SUMMARY

In this scoping report, we examine how new technology will drive value in the evolving agribusiness value chain in South Africa as far as the topic **Climate Smart Agriculture** is concerned related to Dutch technology. We address different areas of value creation: operational excellence, supply chain orchestration, and transparency. We show how future technology developments will contribute to these sources of value and how they will transform the structure of the agribusiness value chain.

We show how Dutch advancements in system design solutions, and orchestration technologies can facilitate intelligent food production and how they'll enable the development of new business models for emerging farmers. As a result, food systems will be more productive, efficient, sustainable, inclusive, transparent, and resilient.

### Participant (Landbank)

*"The current system is not working, we need to develop packages for farmers including agricultural mentorship, financial, management, and various other skills so they can become serious entrepreneurs."*

The use of (new) climate smart technology and skills development offered by the Dutch private sector is necessary to move the world's agriculture to a more productive and sustainable path. Over the next few decades, a rising global population will put great pressure on food systems. While the overall demand for food is expected to be met over this timeframe, it is unclear whether it can be met in a sustainable manner. Agriculture is a major contributor to greenhouse gas emissions, a significant consumer of freshwater resources, and it uses a significant part of the land area.

### Nono Sekhoto

*"There is no shortage of passion and desire to put hard work amongst us as new players – we just need support. Especially from the white commercial farmers, the government and the industry players. It is in the interest of all of us."*

**(promising South African young farmer)**

At the same time agribusiness is a major employer in developing countries, and yet the proportion of farmers is declining, leading to the potential for social disruption.

Technological innovation is one lever that can address some of the environmental, social, and economic challenges and opportunities in the growing food.

As has historically been the case, technology and various types of innovation can serve as an enabler for improvements in food system productivity and welfare. Advancements in areas such as seed and food bioengineering, information and communication technology platforms, and robotics present new opportunities to produce food in smarter ways and help farmers to become more **climate resilient**. For such innovations to succeed and scale, however, other factors such as business regulation, workforce development, public sector governance, and trade and tax policies will also be important.

## **ACKNOWLEDGMENTS**

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Thanks to Dr. Jack Vera and Mrs. Anne Ligthelm, to give us the opportunity to elaborate this study which hopefully leads to a more extensive cooperation between the Netherlands and South Africa. We also would like to express our gratitude to researchers Bart van Eck (For Elements), Petra van der Hout, Marijn Zwinkels (Living Lands) for their appreciated assistance.

The authors especially thank Dr. Jack Vera and Bernard Likalimba both from the EKN Pretoria for their pleasant way of collaboration, positive and constructive feedback.

Finally, we would like to thank all interviewed persons for their time, efforts and hospitality to make this scoping report a good step forward in the collaboration with South Africa.

## FOREWORD

Drought, losses of cattle, reduced harvests, land degradation, water scarcity are happening in South Africa. Use of climate smart technologies to adapt or to mitigate these are not common practice in all sectors and is often limited to smaller groups of (large commercial) farmers. Knowledge dissemination for implementation at farm level and climate proofing of agricultural value chains are important. **Climate Smart Agriculture** includes proven practical techniques but also innovative practices. Climate mitigation and adaptation technologies can be manifold and can concern (but are not limited to) the introduction of new varieties of plant material, use of water efficient instruments, soil improvement, use of inputs. It is about getting existing technologies off the shelf and into the hands of farmers and developing new technologies to meet demands of climate change.

The Netherlands is a world-leading exporter of agri-food products and leading in innovation. Dutch agriculture remains successful by continually investing in sustainable development and the renewal of agricultural production chains, where farmers are full partners in the agricultural production chains. The Netherlands supports also the Global Alliance for Food security, which has embraced the Climate Smart Agriculture approach developed in the Netherlands.

To truly understand the unique South African context and achieve real results in agriculture we actively engage with South African stakeholders. Through these Dutch - South African Partnership / cooperation in the agriculture sector we co-create ideas and innovations for a sustainable future in South Africa and the Netherlands. Examples of these are the #cocreateSA and Orange Corner initiatives. The Kingdom of the Netherlands in South Africa is committed to bring together the South Africans and the Dutch. This scoping report, commissioned by the Government of the Kingdom of the Netherlands, offers information about companies that have something real to offer and do want to be part of the solution to the challenges that are there.

Enjoy reading and specifically we hope this input will give you some ideas and tools to determine the way forward.

Dr Jack Vera  
Agricultural Counsellor  
Embassy of the Kingdom of the Netherlands

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# 1 INTRODUCTION

## 1.1 OBJECTIVES

*"The aim to inform Dutch Businesses and the Embassy about the opportunities for Dutch business to be involved with the use of climate adaptation and mitigation technologies (such as drought resistant plant varieties, use of water efficient instruments, soil improvement, use of inputs, solar power for water for production, early warning systems) in the primary production agricultural area in South Africa."*

### **Sub-objectives**

The objectives are:

- Relevant climate mitigation and adaptation technologies that are 'ready to use' or will be within the next 4 years, within the agricultural primary production area for South Africa, become clear to Dutch and South African companies;
- The current uptake in South Africa of these technologies by indicating the extent they are already used and the companies involved will become clear;
- The relationship between uneven rainfall patterns (e.g. droughts and floods) and the technologies being used will be identified and described;
- The early warning systems used by farmers, the institutionalization of such systems and the main stakeholders and companies involved will be identified;
- The gaps in use and reasons for this will be identified;
- Dutch (recent) start-ups in the area of climate smart agriculture and their interest to become active in South Africa will be identified;
- At least five (5) leads for potential business development in climate adaptation and mitigation technology and ways to improve the uptake of them (implementation strategy) in South Africa will be formulated by presenting and describing the areas that are relevant to the prevailing technologies, and companies leading in such areas, in the Netherlands;
- Two (2) of these leads will be translated into proposals for follow-up activities, including knowledge dissemination for implementation strategies and recommended market entry strategies. These activities can be of a very different nature and may involve using/organizing Orange Corners (incubator), use of trade promotion fairs/missions, matchmaking, development of projects with support from other instruments (DHI, DGGF) and or organising seminars/workshops on specific items;
- A proposal to showcase some of these leads at the upcoming PMA conference in Cape Town (16/17 August 2017);
- Showcasing Dutch solutions at the PMA conference.

## 1.2 SCOPE

During the mission and the scoping study we have targeted the black emerging commercial farmers. The group of emerging farmers is diverse, as are the various names and economic position given by the various stakeholder groups. As there is not a specific definition of the targeted group we have loosely defined this group as:

*"An agribusiness which adds value to the agricultural sector with a focus on pre-and post-production enterprises and builds linkages with enterprises. The micro or medium sized agribusiness is owned by Historic Disadvantaged Individual."*

The figure below shows the economic position of the target group that we focussed on.



In principle, one can state that the target group is already farming commercially, but on a smaller scale.

Secondly, we focussed on crop farmers. The Netherlands is the primary supplier of high tech supplies for horti- and agriculture and most of the climate smart technologies focus on the reduction of water and energy and the improvement of soils. We thereby marginalize the number of relevant stakeholders during our one-week mission in South-Africa.

## 1.3 CSA

Climate-smart agriculture (CSA) may be defined as an approach for transforming and reorienting agricultural development under the new realities of climate change. The most commonly used definition is provided by the Food and Agricultural Organization of the United Nations ([www.fao.org](http://www.fao.org)), which defines CSA as *"agriculture that sustainably increases productivity, enhances resilience (adaptation), reduces / removes GHGs (mitigation) where possible, and enhances achievement of national food security and development goals"*. In this definition, the principal goal of CSA is identified as food security and development (FAO); while productivity, adaptation, and mitigation are identified as the three interlinked pillars necessary for achieving this goal.

### **CSA is based on 3 pillars:**

- **Productivity:** CSA aims to sustainably increase agricultural productivity and incomes from crops, livestock and fish, without having a negative impact on the environment. This, in turn, will raise food and nutritional security. A key concept related to raising productivity is sustainable intensification
- **Adaptation:** CSA aims to reduce the exposure of farmers to short-term risks, while also strengthening their resilience by building their capacity to adapt and prosper in the face of shocks and longer-term stresses. Particular attention is given to protecting the ecosystem services which ecosystems provide to farmers and others. These services are essential for maintaining productivity and our ability to adapt to climate changes.
- **Mitigation:** Wherever and whenever possible, CSA should help to reduce and/or remove greenhouse gas (GHG) emissions. This implies that we reduce emissions for each calorie or kilo of food, fiber and fuel that we produce. That we avoid deforestation from agriculture. And that we manage soils and trees in ways that maximizes their potential to acts as carbon sinks and absorb CO2 from the atmosphere.

## **1.4 METHODOLOGY**

The main goal of the scoping mission is to indicate opportunities for the Dutch Agri-food sector. Findings from the PMA, from literature, the scoping mission with various workshops and a great deal of interviews have provided an indication of the current level of technology used by emerging farmers in South Africa as well as the present gaps between what is available and why certain technologies are not used. In Annex 7 a more detailed overview is given regarding the methodology of the study.

Throughout the scoping report we work according these 3 pillars of Climate Smart Agriculture as defined by FAO:

- Productivity
- Adaptation
- and Mitigation

CSA is one of the 11 Corporate Areas of Resource Mobilization under FAO's strategic objectives. It is in line with FAO's vision for Sustainable Food and Agriculture and supports FAO's goal to make agriculture, forestry and fisheries more productive and more sustainable".

## 2 CSA STATUS IN SOUTH AFRICA

### 2.1 EXTREME WEATHER CONDITIONS & TECHNOLOGIES USED

South Africa has a long history with periods of drought, followed by heavy flooding due to extensive rainfall. The construction of dams and usage of ground water have declined the risks of droughts over the last decades. Climate change has altered the stress relief that ground water and the construction of dams provided, as the periods of drought become longer, while expected total rainfall will reduce by 30% until 2050. South Africans have become aware that the drought that they suffer from today is basically the new normal (comments in a local newspaper and discussion during workshops). The new, water-constrained 'normal' demands an absolute commitment to water efficiency.

Farmers in general and particularly commercial emerging farmers (CEFs) are very vulnerable to reduced water availability (rainfall and/or irrigation) due to climate change as most CEFs practice rain-fed agriculture. Those who farm at a commercial basis have land under irrigation. Depending on the type of crop produced, the used technology is often poor to medium – from hosepipe / flood irrigation to basic sprinklers (results questionnaire). The farmer we visited farmed under cover and used more advanced drip irrigation.

Research carried out in 2010 by the WRC indicated that there are 302 smallholder irrigation schemes. A total of 47.667 ha of land is under irrigation by these schemes, servicing 34.158 farmers (average 1,3 ha/farmer). Rivers were the principal source of water. A total of 46 114 ha (96.7%) obtained its water from rivers, either pumped directly, diverted by means of weirs, or through dam storage. Groundwater was used on 1 405.5 ha (3.0%), municipal water on 110 ha (0.2%) and spring water on 37.6 ha (0.1%). Water was pumped on 23 111.8 ha (48.5%), gravitated on 16 497.2 ha (34.6%) and on 8 058.5 ha (16.9%) gravity and pumping occurred in combination. An overview is given in table 1:

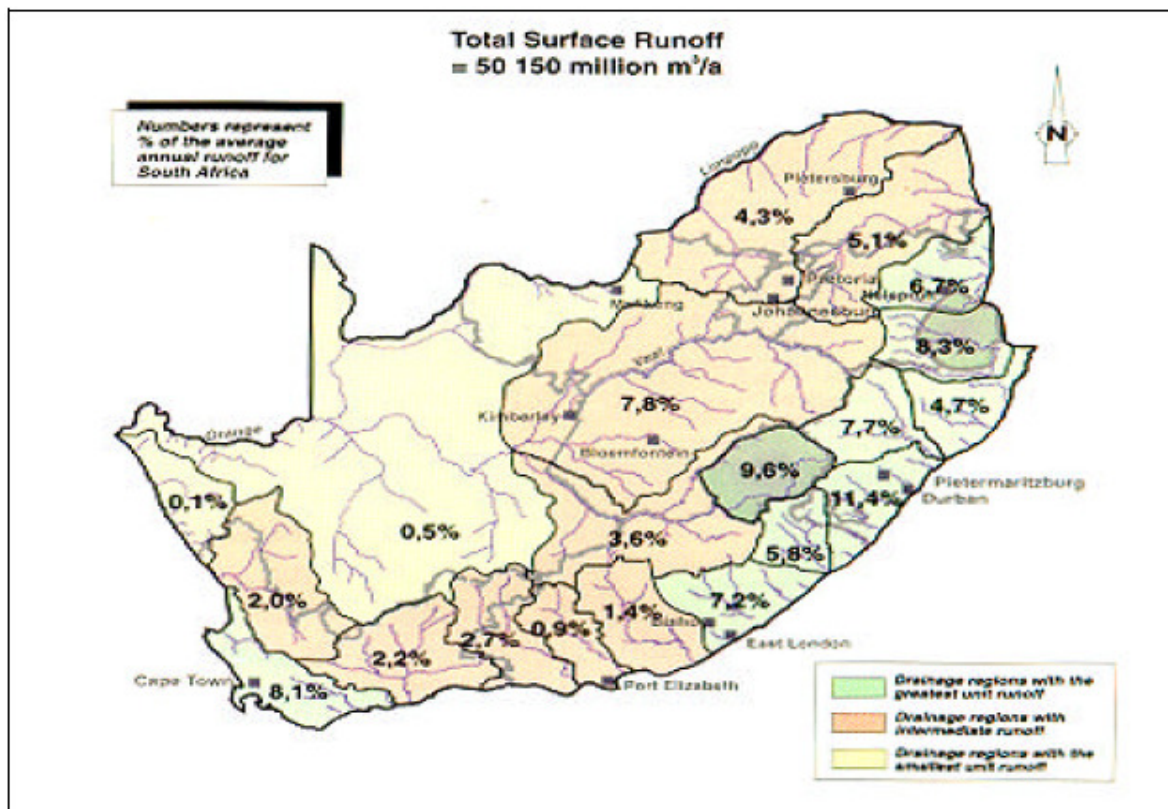
Province	Number of operational schemes by irrigation system				Number of non-operational schemes by irrigation system				Total
	Gravity-fed surface	Pumped Surface	Overhead	Micro	Gravity-fed surface	Pumped Surface	Overhead	Micro	
Limpopo	49	9	30	13	12	5	41	11	170
Mpumalanga	3	0	4	0	1	0	11	0	9
North West	0	2	0	0	0	0	0	0	2
KwaZulu-Natal	5	0	30	0	0	0	0	0	35
Free State	0	1	0	0	1	0	0	0	2
Northern Cape	0	2	0	0	0	1	0	0	3
Eastern Cape	4	0	46	1	0	0	16	0	67
Western Cape	6	0	1	0	0	0	1	0	8
Total	67	14	111	14	14	6	59	11	296 <sup>1</sup>

<sup>1</sup> The operational status of six schemes, five in the Eastern Cape and one in KwaZulu-Natal, was not known, bringing the total to 302.

*Overview of total usage of smallholder irrigation schemes (left) and (right) the amount of irrigation schemes that are not functioning*

On all existing schemes, the irrigation system was constructed after 1950. Overall the irrigation schemes have a life expectancy of about 40 years, however many of these schemes are under operation for 50 years or more, without hardly any maintenance. Most of these schemes therefore do not meet their full potential (WRC). The table also shows that "advanced" technology is often non-operational (overhead >50%; micro >75%). It is questionable if only maintenance will increase production, as literature indicates that 43% of all interviewed farmers in the Eastern Cape have limited knowledge about irrigation and techniques to irrigate.

In addition, the dependency of surface water is high. The figure below indicates the percentage of annual rainfall that finds its way to rivers. These percentages are very low. Climate change will further decrease annual run-off as evapotranspiration will increase by 5-10% (according to IPCC). Surface water as resource will become less available.



*Overview average annual run-off percentage based on annual rainfall*

## Conclusions

- Emerging farmers have access to limited amounts of land;
- Irrigation schemes are present but poorly maintained;
- Most of the water comes from surface water bodies;
- Water availability will reduce rapidly once climate change will reduce the net rainfall.
- Pressure from population growth and increased water consumption

## 2.2 POLICY DEVELOPMENT CSA

The Intergovernmental Panel on Climate Change (IPCC) has unequivocally noted that we are witnessing climate change and its related effects.



The South African government supports the view expressed by the IPCC. The South African Constitution notes that, *'everyone has the right to an environment that is not harmful to their health and wellbeing'*.

It further states that we have a right to secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development'. In line with the Constitution, the National Development Plan (Vision 2030) acknowledges the detrimental effect of greenhouse gas emission and the contribution to climate variability and change.

South Africa's Climate Change Response White Paper (2011) posits that climate change poses risks to various key sectors of the South African economy, water, agriculture and forestry. Various aspects of the South African economy are vulnerable to the increased intensity and frequency of extreme weather such as droughts and floods. The agriculture sector plays a critical role on the South African economy. Impacts of climate change are currently negatively impacting on production both in aquaculture, plant and animal farming. This will inherently impact negatively on the sustainability of the agriculture sector and its ability to provide food and employment opportunities.

The government is currently working on a framework that outlines the role that climate smart agriculture can play in addressing vulnerabilities facing the agriculture sector. Various stakeholders, and in particular farmers, have a role to play in promoting resource efficiency, increased productivity and social equity through mitigation and adaptation efforts. Targeted efforts are made to ensure that women, youth, people living with disability and subsistence farmers are involved in implementation of this framework. All South Africans have a role to play through implementation of this framework in ensuring sustainability of the agriculture sector as one of the anchors of our Gross Domestic Product (GDP).

To achieve this the National Department of Agriculture, Forestry and Fisheries (DAFF) is working on the 'National Strategic Framework on Climate Smart Agriculture (2018-2028).

Another sign of awareness is that one is working on a “proudly South African Standard for sustainable farming”.

*The development of the Proudly South African Standard: Sustainable Farming (PSA-SFR01-17S) was made possible through the Proudly South African Ecolabelling Project entitled “**Awareness Creation and Capacity Building on Ecolabelling in the Agricultural Sector**”, which is being undertaken with the support of United Nations Office for Project Services (UNOPS) through the Switch Africa Green Project.*



## 2.3 WHY FARMERS FAIL TO USE CSA TECHNOLOGIES

We found various reasons why many emerging farmers are failing. There is a wide variety of reasons but in this report, we focus on the issues that relate to CSA.

**Lack of management capabilities.** The management team either lacks the ambition or capabilities to successfully execute the business strategy that will assure commercial viability and *sustainability*. Sustainability is considered to include climate resilient farming practices which is pre-condition to sustain the business in the long run.

**Relative value to emerging farmers.** The willingness of the emerging farmer to use a new climate resilient product and or production technique to improve productivity is limited. The emerging farmer may perceive the opportunity cost of doing something new and different as too great on the short run while not realizing nor understanding the mid- and long term benefits.

**Lack of clear sustainability business drivers.** The sustainability business case is not compelling, is not well aligned to core business objectives, and still is seen to be more aligned with corporate philanthropy and corporate responsibility objectives that may not contribute to long-term sustainability or commercial viability.

**Regulatory constraints.** Farmers depend on a change in the regulatory environment where there are no incentives for sustainable farming, nor penalties for non-sustainable farming practices. For example, there are no incentives for farmers who reduce carbon emissions by storing carbon in their soils. At the same time farmers are not hold responsible for the environmental and social damage they cause due to their unsustainable farming practices. And sometimes laws are in place but not enforced.

**Lack of Climate smartness.** A CSA approach is obviously attractive and compelling in principle, but its application under emerging farmers is still very limited due to lack of knowledge about CSA, related technology and the benefits it can bring. During the workshop it was said that most farmers do not know what kind of useful CSA technologies are available on the market.

**Few good examples.** Next to lack of knowledge there are also very little good examples of CSA. It is important to decently inform farmers and policy makers. Any scaling up initiatives will depend on how the CSA concept is understood in practices, allowing for adaptations and continuous two-way feedback mechanisms between researchers and practitioners, farmers and policy makers.

**Lack of skills.** Even if farmers want to change, knowing that it is possible and helpful, they often don't have the skills to really do so. Since we do not talk about rocket science it would make a big difference if farmers would be taught by the right people who are aware of how CSA and the usage of technology can help the farmers make a huge leap forward.

**Immature system of extension officers.** One important conclusion of the workshop was that the system of extension officers often is not working very well. Apparently, there is an insufficient knowledge and skills set at the level of extension officers and they are not well enough equipped to do their job.

**No standards used.** Climate-smart agricultural practices do already exist in standards. Standards offer a good possibility to up-scale such practices further in agricultural systems. However, evidence of their effectiveness in mitigating climate change and increasing resilience and adapting to negative climate changes often still remains to be proven and need to be improved. Nevertheless, most emerging farmers do not comply to any standard at all despite the SIZA (Sustainability Initiative of South Africa) is a specific South African standard, but mainly dealing with social issues.



## 2.4 GAP ANALYSIS

When asking all participants to rank the current situation versus the desired situation then the follow spider graph can be drawn as shown below. The previous paragraphs have indicated the reasons behind the current situation. This paragraph therefor focusses on the future.



The ranking was done via a series of subtopics per main topic as defined by the experiences of the group through interviews, discussions and interactive games using mobile phones. The scorings were processed and led to the following table below of which a large version can be found in Annex II.

Topic	Uptake									Aim	
	0	1	2	3	4	5	6	7	8		9
<b>Production</b>											
○ Resilient Varieties											
○ Crop production											
○ Farm management											
○ Inputs (seed, material)											
○ Access to information (water / soil)											
○ Land availability											
○ Degraded & Saline Soils											
<b>Finances</b>											
○ Credit lines											
○ Collateral											
○ Collaboration											
<b>Entrepreneurship</b>											
○ Management											
○ Entrepreneurial skills											
○ Aging (bring back youth)											
○ Measure											
○ Analyse											
○ Adjust											
○ Communicate											
○ Capitalise											
<b>Enabling Policy environment</b>											
○ Build capacity											
○ Invest in R&D											
○ Integrate CSA in existing policies											
○ Incentivise good practices											
○ Build partnerships (PPPs)											
○ CSA Knowledge base											
<b>Market Access</b>											
○ Access to market information											
○ Infrastructure (market places, roads)											
○ Legalities											
○ Market research											
○ Marketing knowledge											
<b>Post Harvest</b>											
○ Storage & Cooling											
○ Quality control											

## 3 CHALLENGES

### 3.1 CHALLENGES

During the study, various workshops were held (Johannesburg & Cape town) where a diversity of relevant stakeholders were present. These sessions, together with over 40 interviews, resulted in nine different challenges that South African emerging farmers are facing. After clustering, we came to the following six challenges which are described in more detail. In the last 3 paragraphs, more specific topics will be mentioned categorised along the 3 pillars of CSA as defined by FAO: Production, Adaptation, Mitigation.

#### 1. Production

Today's farmers are subject to volatility in international oil prices, rising local input costs, uncertainty about land reform and increasing labour discontent. Increasingly scarce arable land and water amplified by climate change will only increase their risk and vulnerability.

Declining farming profitability and water scarcity (drought, declining rainfall or over-demand for water) has left South Africa with less than two-thirds of the number of farms it had in the early 1990s. In many instances, the lost farms have been changed to other land uses, or consolidated into larger farming units to achieve effective economies of scale. A trend towards intensified production and larger production systems (economies of scale) are making farming for emerging farmers even more difficult.

#### 2. Finances

South Africa has a dual agricultural economy, with both well-developed commercial farming and smaller-scale communal farming (located in the former homeland areas). Agriculture contributes a relatively small share of the total GDP, but is important in providing employment and earning money let alone foreign exchange. Sufficient income is a pre-condition to invest in technical solutions that can assist farmers to farm more sustainable and make more money.

In addition, access to finance is a huge issue. It is extremely difficult for farmers to get loans since banks have money available but no-, or lack of collateral is usually a problem. More innovative financing products are needed.

As a director of landbank said: *"The current system is not working, we need to develop packages for farmers including agricultural mentorship, financial, management, and various other skills so they can become serious entrepreneurs."*

### 3. Entrepreneurship

Emerging (black) farmers are often talked about as a group, which, to some extent, implies that they are a homogenous bunch. While individual emerging farmers and agricubusinesses share a common history, there are significant differences among them that are often hidden beneath the averaging and aggregation that is typical of most published reports and analytical research. We focus on a growing group of emerging farmers as explained before.

"*Not every farmer is an entrepreneur*" was said by one of the participants. Often emerging farmers lack the skills of real entrepreneurs.



(source: [www.sab.co.za](http://www.sab.co.za) example of SAB facilitating their suppliers with entrepreneurial programs)

### 4. Enabling Policy Environment

South Africa is a rule of law country; its constitution ensures that the rule of law is upheld and it scores well on the Rule of Law index of ILO. It ranks 73 in the World Bank's 2016 Ease of Doing Business report, down from 69 in 2015.

The increasing level of crime however remains a deep concern for the country and it shows a considerable lack of trust in the capacity of the police to deal with South Africa's crime burden and the costs associated with it, especially amongst small businesses that are particularly hard hit by violent armed robberies and cable theft, which interrupts productivity. Also emerging farmers suffer from this kind of crime and therefore they need to experience a strong institutional environment to operate. Obviously, there are many more topics that were mentioned. However, it is promising that the South African government is working on a strategic framework for Climate Smart Agriculture and that for example the Western Cape province developed her own strategy called SmartAgriPlan to combat climate change.

### 5. Market Access

A big issue is that emerging farmers have very limited access to external markets and failure to penetrate established markets. Their inability to compete effectively in the open market is a significant obstacle. Next to the specific topics as mentioned below other challenges are noted like cheap imports from other countries; transaction costs; long distance from farm to markets and lack of collaboration. Consumers want more transparency and are increasingly interested in where the product is coming from and how if it is grown in a Climate Smart way.

## 6. Post-Harvest

Food insecurity is a great problem worldwide and South Africa is one of the many countries that are suffering from poverty and food insecurity and a significant part of the population is living in a state of undernourishment.

To increase food security, it is important to focus on ways to decrease post-harvest losses of food products and not only have the productivity of agriculture in focus. Food losses after harvest until the food reach the consumer are significant. According to FAO post-harvest losses in developing countries can range from 15 percent up to 50 percent causing an enormous amount of extra carbon emissions.

Fruit & vegetables are perishable products and therefore sensitive which leads to greater losses than for non-perishable crops. Losses occur in all post-harvest activities such as handling, storage, processing, packaging, transportation and marketing.

The losses occur within the whole supply chain due to limited resources such as infrastructure, knowledge, and access to post-harvest technologies. One way to decrease post-harvest losses can be an efficient supply chain management.

## 3.2 UPTAKE OF CSA TECHNOLOGIES

To 'measure' the uptake we asked the participants to provide a score on a scale of 1 to 10 regarding the uptake of technology & knowledge per topic based on a mixture of subtopics per challenge.

Gap Analysis	Uptake
Production	2,7
Finances	0,3
Entrepreneurship	1,3
Enabling Policy environment	2,1
Market Access	2,6
Post-Harvest	1,0

*(For further specification of the subtopics we refer to the Annexes)*

Overall **Finance** has a very low score according to the challenges mentioned. Farmers really struggle to get their investments financed through the existing structures. Banks are not very well equipped for financing agriculture and many micro-finance institutions have failed to reach poorer rural areas and emerging agricultural producers whose livelihoods are characterised by seasonal investments, risks and returns.

Due to the requirements put forward by formal providers of credit, such as the Land Bank, Commercial Banks and co-operatives, emerging farmers cannot obtain credit. Since the majority of emerging farmers do not have formal records and live in communal areas, farmers do not have collateral that could be used when borrowing money from financial institutions

such as banks. Emerging farmers require access to some form of external capital to purchase agricultural inputs, working implements, and to pay for labour in order to produce enough crops and sell to markets.

Additional reasons for the low uptake for **technology** are:

- unaware of available technology or need for available technologies;
- low education standards. In South Africa, the labour force is poorly educated because of apartheid. Even though this era belongs to the past, the effects are still noticeable;
- no skills to use the technology and therefore emerging farmers seem hesitant to obtain new technologies.

Different crop varieties, infrastructure, access to information and farm management are all part of the production cycle. Information about the production of a certain crop and related types of technology is key. Co-operations, associations, extension officers from the department of agriculture, ARC and other all provide knowledge to emerging farmers. However, it seems that only the department of agriculture reach the emerging farmer successful. The other organisations indicated that only a few emerging farmers knock on their doors for information and support (information that came out of the workshop).

Once emerging farmers find an organization that provides support, most of the support provided is most often:

- Focussed on the production of one single crop (associations and co-operations);
- Generalized and not up to date (extension officers of the department of agriculture) or
- Not practical enough.

Findings during the workshop underpin the above stated conclusions. The invited organizations themselves mentioned that the success rate of support is rather low. In general, approximately 20 - 50% of the emerging farmers that request for support, get support. And of those emerging farmers that get support, eventually approximately 20% is able to implement this information successful.

**Post-Harvest** and **Market access** are strongly linked. Retailers, restaurants and other off takers expect quality and quantity. Most emerging farmers produce for the local market. Once they want to produce for the retailers, cooling, packaging, distribution etc. come in place to comply with the market demands (quantity and quality). Most white commercial farmers make use of a cooperative cooling and packaging facility, after which all their products go to the big distributions centres of the retailers.

Most emerging farmers battle to get their finances right for increased production, additional investments in these facilities seem to be of a lesser priority.

Spar differs from the other retailers as they have local hubs. Each individual farmer can deliver their products to the local hub of SPAR after which SPAR will distribute it to one of their shops. This appears to be an interesting structure for the emerging farmers, especially since SPAR has a shop in almost all the little towns in South Africa.

However, all participants agree that providing finance, or support in the silo's, alone will not solve the challenge and the combination of different solutions is key to improve the livelihoods of emerging farmers.

### **Finances and policies**

The aim for 2020 is clear. The South African government is developing new policies and the Landbank has obtained a loan to provide financial support to emerging farmers. Although the development for new policies itself are not interesting from a commercial point of view, the policies create new demands for new technologies and possible investments amongst pre- and post-harvest entities and producers (the farmer). It is there for advised to follow the policy developments of the South African governmental organizations (National, provincial and local).

The Landbank, as the main agricultural development bank, could invest in these new demands, however, current financial products are not suitable for financial support to emerging farmers. The Landbank started to create new, tailored financial products to support commercial emerging farmers. Even though, there is a strong need for new financial products that work and collaborations with the private sector are welcomed.

### **Production and entrepreneurship**

The production and entrepreneurial challenges are strongly related to skills, knowledge and technology (obviously policies and finances as well). Skills and knowledge can be provided through training, workshops and on-site support. Mentorship (white commercial farmer collaborates with emerging famer) is a system that is already in place which seems to work quite good.

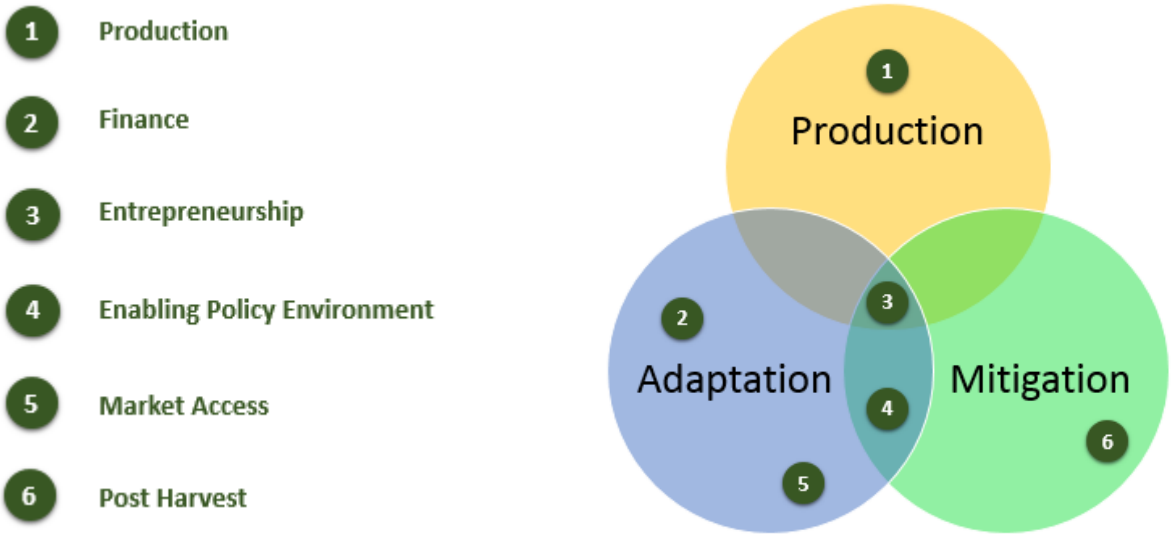
Mentorship is not the only answer. There are various organizations in South Africa who provide key knowledge and experience to emerging farmers. Strongest bottleneck seems to be the rate of success to get access to this support and the follow-up after support has been provided.

Participants during the workshop indicated that round-table meetings with all relevant stakeholders from different sectors (associations, universities, private entities and other) could address these shortcomings and, together with emerging farmers, develop action plans and support programs. Facilitation of such multi-sector meetings are not yet in place.

**Post-Harvest and Market Access**

During the workshops, several factors were addressed to reduce postharvest losses, including weak policies, inferior infrastructure, and poor market strategies. However, the lack of basic knowledge (including demographic, scientific, and economic knowledge) among the stakeholders (e.g., researchers, farmers, governments, nongovernment organizations, and merchants) on how to develop, implement, use, and sustain the recommended handling technologies is probably the most problematic. High priority should be given to closing the knowledge gap, which could enhance the efforts of all the stakeholders to address and reduce postharvest losses and improve market access.

When converting the topics as mentioned above in the 3 pillars of FAO’s definition of **Climate Smart Agriculture** we get the following picture:



*Topics converted to the 3 CSA pillars according to FAO*

In the following paragraphs, we will briefly describe the gaps based on these 3 pillars:

- Production
- Adaptation
- Mitigation

### 3.3 PRODUCTION

During workshops, interviews many issues were discussed and a number of topics that were mentioned regarding production were: resilient varieties; crop rotation, access to water, fertilization, mechanisation, access to land, proper technical assistance, increased input costs.

For example, most participants of the workshop mentioned that farmers do not have sufficient knowledge about more resilient varieties. Whether they are available and what the cost/benefits are of those varieties.

*One of the farmers said that technical assistance is given but that these extension officers are often not equipped with the right knowledge. He gave the example where an extension officer came who was specialized in maize, while he is growing cucumbers.*

Farmer:  
*“As a matter of fact I am teaching the extension officers instead of the other way around”.*

Most of the emerging farmers are the first generation to farm within their family. They lack the experience that most white farmers do have, as knowledge is transferred from generation to generation. Thus, emerging farmers must learn, get the needed skills to produce and invest. “first generation farmers die poor. They lack the proper skills and they make mistakes, that will cost them (quotes of the ARC during the workshop in Pretoria)”. The starting material seems to determine the cause of the farmer. It is likely that persons who want to start to farm get support from the department of agriculture, thus they depend on the skills and knowledge of the extension officers. This, potential costs and uncertainty of the benefits will put a threshold on the usage of resilient crop varieties.

Access to land and water is often subject to land reform processes. For many years the South African government aims to equally divide water rights and riparian rights amongst the South African population. The development of Water user committees and the integration in land reform processes have slowed down due to various issues<sup>1</sup>. Conclusion is that most emerging farmers do not or have limited access to water, thus depended on rainfall or groundwater<sup>2</sup>.

<sup>1</sup> <https://pmg.org.za/committee-meeting/23583/>

<sup>2</sup> [irrigation strategy South Africa](#)



### 3.4 ADAPTATION

To start farming, one needs finances, infrastructure and use available knowledge. Access to finances is a challenge, as collateral is lacking, banks are not willing to provide financial services (pers. Comment Land bank). The risks for financial institutions are simply too great, as there is no collateral, no track records and poor business plans (personal comment Land Bank). Financial institutes are aware of these challenges and therefore the landbank has started an innovative process to develop special financial packages that could provide financial relief.

Outdated technical assistance at extension officers level (farmer - *"they are learning more from me than the other way around"*). Physical infrastructure in terms of logistic no or bad access to water and often poor water quality. There are no adequate learning systems for which technology could play an easy role (MOOC, eLearning). We think peer2peer learning can be an interesting and relatively cheap contributor to individual and collective knowledge building.

An example is under cover farming. It is as a great method to produce vast quantities of good quality produce, needed to become an interesting player on the market. Capital investment in under cover farming infrastructure are however high, and not easily financed. The private sector could play an important role to solve this issue.

In the end, the private sector such as technological providers are entrepreneurs and they find ways to sell, even to those who are less (financially) favoured. We need to be open for the opportunities, while managing the possible risks.

Gaps to market access and post-harvest are quality and quantity related. Economies of scale over the last decades have ever increased the size of white commercial farmers. Via BBBEEE certifications the South African government aims to ease the market access of emerging farmers, however with limited results. Quantity and quality are lacking, but the structure with local hubs, created by SPAR, seems promising.

### 3.5 MITIGATION

In the light of the global trends and all the challenges as mention earlier in the report we call for a redesign of the whole food system to achieve sustainability and climate change mitigation. Fortunately, even modest shifts in agricultural practices can reduce emissions. The biophysical potential for mitigation in agriculture is comparable to that of the energy and industrial sectors and exceeds that of the transport sector (*Smith et.all. 2007 a*).

Agriculture thus holds enormous potential for mitigating climate change. We focus mainly on the production of food at the farm level, rather than mitigation across the food supply chain.

Lifecycle analysis shows that for most food products, emissions from production at the field level greatly exceed those generated from processing, transportation and distribution or storage. Especially in a market like South Africa where most (emerging) farmers produce for the local market and products are consumed domestically. By using technology quality control can be improved and brought to a higher level, however that also links again with knowledge & skills.

**SmartAgri** is an interesting feature in this domain as well. During interviews with the Western Cape government we learned that SmartAgri is developed by the department of agriculture from the Western Cape government and aims to disseminate all available knowledge about climate resilient agriculture to all of those that require the available knowledge. It forms a great platform for the private sector to not only show their products, but most important the way these products are functioning. Writers of this report see a strong connection with [www.waterwindow.nl](http://www.waterwindow.nl) which is a Dutch platform for water management practices that allows new users to obtain the nitty gritty of the used technologies and get in contact with the users.

## 4 DUTCH SUPPORT

### 4.1 TECHNOLOGICAL FOCUS

#### 4.1.1 Emerging farmers

South Africa, agricultural technology is widely available to farmers. In general, the technological level used by emerging farmers is however low to moderate. Irrigation practices result in great losses due to excessive usage of water, poor maintained infrastructure and the lack of the precise technology for example. Besides we indicated that most of the emerging farmers:

- Use chemical fertilizers;
- Focus on one type of crop;
- Practice open field agriculture (sometimes shade netting);
- Are dependent on the national electricity grid;
- Lack proper information about soil fertility, moist content of the soils etc;

#### Trend

Under cover farming is becoming a trend amongst CEF's. Under cover farming is great methodology to produce vast quantities of fresh produce on the limited amount of land (5 to 10 ha) most CEF's poses. During the mission, we visited a CEF that produced cucumber under cover, with success. His usage of technology differs from the above mentioned general technological usage. The technology used considered:

- Plastic greenhouses;
- Precision irrigation;
- mixing water and nutrient equipment;
- Pots and sleeves with soil.



#### Example

Additional insights were gained during the visit to various farmers. Below a short overview:

- An Israeli firm was used as an example by the local farmer because he was most familiar with this technology. Besides that, this company is well established in South Africa and offers on-site support via a big network of extension officers, smart business solutions (in terms of finances) and fast services;
- Lights were not used in the plastic greenhouse;
- Waste water was transported to a local ditch, where it could infiltrate in the soil. Re-use of waste water did not have any priority, while the possible value of this water was understood;
- Technology to reduce the EC value of the water was not in place;
- The mixing machine (water/nutrients) had a return of investment between 6 to 8 months.

When we asked about Dutch technology one of the farmers stated that he is certainly aware of the high standards, good quality, but also think it is expensive and more than he really needs. But if the parties could provide him with a financing scheme, good service and guidance during the first period of extension than he definitely would be open to change towards Dutch technology and expand the production area.

#### **4.1.2 Climate smart agriculture**

Climate smart agriculture aims to implement technology that will:

- increase the production while minimizing resources, thus increasing farmers income;
- reduce emissions and losses;
- increase resiliency of the farmers and the food production process.

This can be translated in the following products and services:

##### **Resource efficiency**

- re-use of waste water and less consumption;
- more efficient constructions;
- more efficient production and distribution processes;
- more efficient modes of transport;
- Resource substitutes and diversification;
- Smart usage of crop varieties.

##### **Energy source**

- lower-emission sources of energy;
- energy security and shift towards decentralisation;
- usage of new technologies (such as led-lights);
- participating in the carbon market (capitalise on CSA).

##### **Products and services**

- insurance risk solutions;
- diversification of production/business activities;
- development of local co-operatives;
- tailored financial constructions in collaboration with private sector.

Used or promoted technology must match with the emerging farmer. The paragraphs above and the GAP-analysis indicate that:

- Financial means are limited;
- Post-harvest technology is limited;
- Entrepreneurial skill must improve.

In Chapter 3 the various challenges were identified as well as the largest gaps. The Agro-food sector has technology that suits the requirements and opportunities of emerging farmers. Below a technological overview per CSA pillar as referred to in chapter 2 and 3.

## 4.2 PRODUCTION

Increased production can be generated through:

- The usage of different varieties;
- Tailor used variety to local circumstances;
- Analyse soil and 'customize' fertilization
- Increase knowledge level about farming;
- Access to "real-time" production data via smart apps;
- Reduce loss of seedlings during initial production.

### Example - Soil testing

Global solutions for soil analysis and crop monitoring. SoilCares offers affordable packages to give farmers access to a database and agricultural expertise. Imagine yourself scanning soil with an easy-to-use handheld tool and proceeding to your own on-the-spot quality soil checks using your smartphone **in 10 minutes**. They will give access to the SoilCares Global Soil Database and put the knowledge of their leading soil scientists in your hand.

The Soil Scanner will determine the amount of Nitrogen, Phosphorus and Potassium and determine the pH, electrical conductivity, soil temperature and the organic matter level.

#### *Suitable crops*

The Soil Scanner will provide you with a list of crops suitable for your soil.



### Example - Protected growing

An interesting innovation is the Cocoon from the Landlife company. The COCOON is designed to support a seedling through its critical first year. By providing water and shelter while stimulating the seedling to produce a healthy and deep root structure, tapping into the sub-surface water supply within its first year. This way, the COCOON produces independent, strong trees which are not reliant on external irrigation and can survive harsh conditions.



### **Example - Knowledge & skills development**

There are different types of knowledge & skill that are required for a successful business. An example is [Delphy](#), a Dutch organisation with a team of experts in various countries around the world, including South Africa. The core of [Delphy](#) is the development of knowledge and skills about the **cultivation** of crops and the **optimization** of the cultivation conditions and the implementation of this knowledge through consultancy and training or by developing and executing turnkey projects.

***Education is not the learning of facts, but the training of the mind to think.***

(Albert Einstein)

An example of an organisation who can train trainers on more entrepreneurial skills & knowledge is [Verbos Business Development](#). They have experienced experts who are specialised in working with emerging farmers and are very well equipped to train, for example, extension officers in these topics.

## **4.3 ADAPTATION**

Resiliency of farmers and adaptability to climate change is created by:

- the usage of better varieties;
- co-operative farming;
- diversification of produce;
- institutional credit;
- marketing;
- better access to practical information about all pre- to post harvest steps;
- develop functional micro insurances.

### **Example - Climate resilient varieties**

Globally, but also in South Africa there is an increasing amount of saline soils. Instead of focussing on de-salinization one can also choose for salt tolerant varieties. A company who is specialised in this is [Salt Farm Texel](#) (The Netherlands). When farmers opt for these varieties their yields will be less dependent on fluctuations and trends in the salinity of soil and irrigation water. The water manager can therefore control or adjust - within wider bandwidths and in a more cost-effective and flexible manner - the desired salinity of the surface water used for irrigation.



The Dutch diverse seed sector is active throughout the world. Dutch companies are the world's number-one supplier of vegetable seed, seed for ornamental plants and seed potatoes. This success is a result of the unique Dutch approach of strong collaboration between businesses, government, inspection bodies and the research and education sector, creating a conducive climate for innovation and production.

Recently, in its report *Enabling the Business of Agriculture*, the World Bank stated that the Netherlands leads the world in seed regulations. We achieved high scores in regulatory areas such as policy, the availability of plant breeders' rights, the ease with which new varieties can be registered and released, and the efficiency of seed quality assurance measures. Well-known companies active in South Africa are: [RijkZwaan](#), [Bejo Zaden](#), [East West Seed](#) who developed specific varieties for more difficult climatological conditions.

### **Example - Post Harvest loss Reduction**

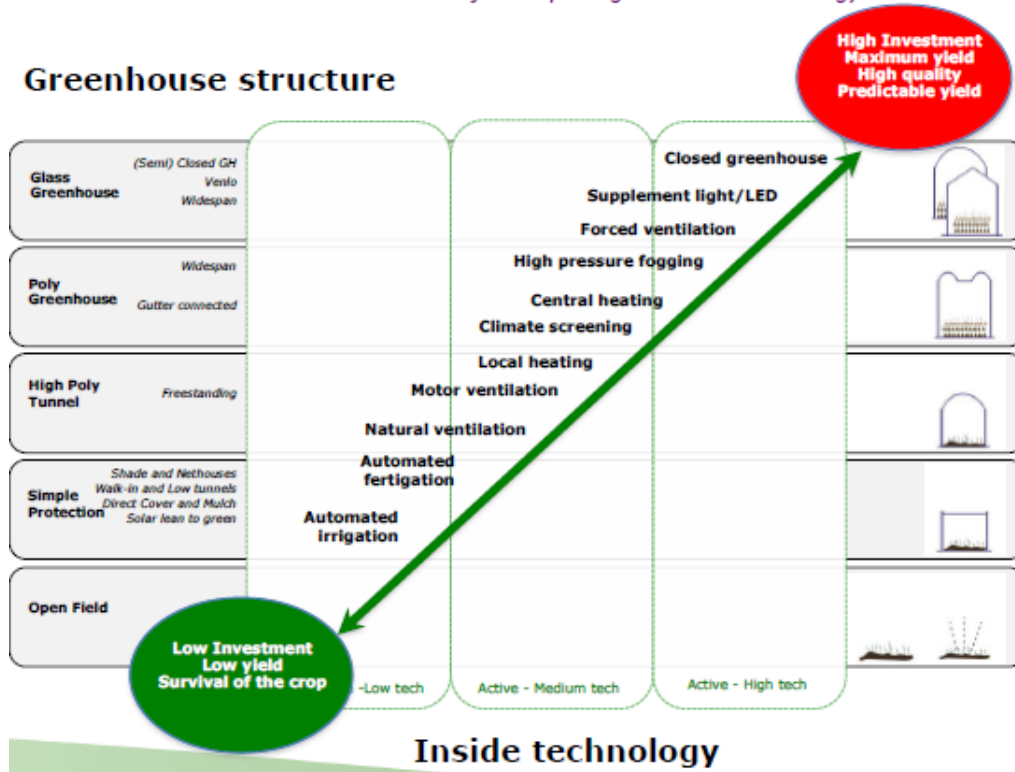
An interesting static storage solution for a **group** of emerging farmers or **cooperative** is the [SunCooler](#). It is a mobile cooling device that cools fruit, vegetables, meat, fish, dairy or medicines in a cheap, sound and sustainable way on the spot. There is **no need for fuel**, generator, grid or even batteries. It creates the possibility to cool cheaply, and on the spot (no transportation to cooling facility), **lowering CO2 emissions** and hardly any technical maintenance. Nature forces all farmers to harvest at about the same time. This forces them to sell their products quickly, if there is no possibility for cooling.

Therefore, prices are relatively low and often many products turn bad. This not only limits food availability, but also risks food security and food safety. The availability of a SunCooler contributes in many ways and makes life easier. **No hassle** with diesel, generators, noise and logistic issues and it contributes simply and fast to food security and food safety in **remote areas**. This [animation](#) will explain the Suncooler in two minutes.

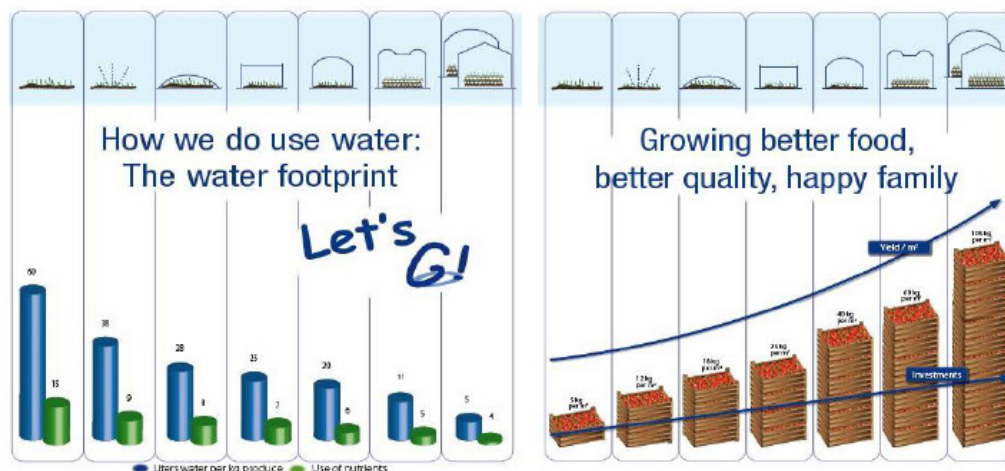
**Example - Undercover farming**

For different type of customers there are different solutions. The right technology depends on the level and capabilities of the customer. Most **emerging farmers** farm in open field. A next step for more production and less water usage could mean working in tunnels.

*Need for adaptive greenhouse technology*



Consequently, the more technology is used the lower the water footprint. Nevertheless, usage will depend on the skills and available knowledge of the farmer, so a gradual approach is advised.



Source: Wageningen University

Important suppliers of these systems are [HortiMax](#) and [Bosman van Zaal](#).



## 4.4 MITIGATION

Emissions and losses focus on 1. carbon, 2. water and 3. fertilization / organic waste.

1. The reduction of the carbon footprint aims on the reduction of CO<sub>2</sub>, thus:
  - generating alternative energy (solar, wind, biogas etc.);
  - storing CO<sub>2</sub> in the soil, via organic fertilizers/composting;
  - zero tillage;
  - reduce transportation and distribution of products and resources (source local);
  - usage of LED lights.

### Example - Soil Fertility

Healthy soils secure producer's long-term agricultural productivity. [Soil & More International](#) is a company that helps identifying practices that develop and maintain **healthy soils** - to stay in business. Every region, farm and field has different soil conditions and nutrient requirements. Soil fertility programs therefore need to be adapted to the local circumstances. They developed a series of practical training modules which guide producers through the process of:



- identifying what's needed for the farm;
- defining appropriate fertilization measures;
- producing own fertilizer;
- monitoring and evaluation of progress made.

In order to monitor and evaluate the impact of the jointly developed fertilization solutions, they provide different **innovative and practical tools** to monitor and evaluate the farmer's activities, securing continuous improvement. These tools include an **App or online platform** which can be used on the farm. Farmers will have a **central evaluation dashboard**, embedded into Excel meaning **no additional software** license is required.

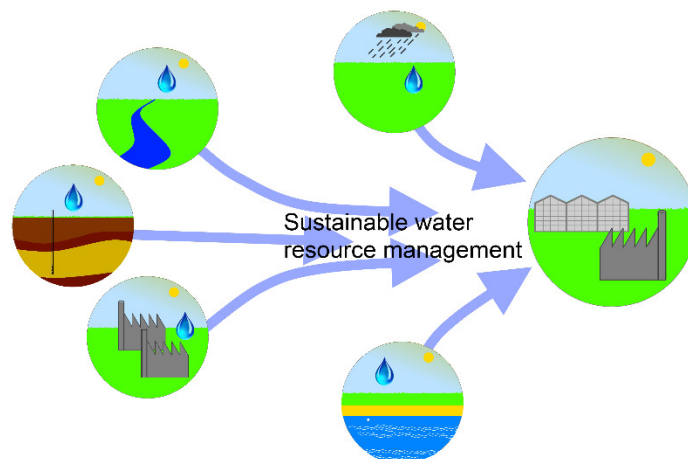
Soil & More International works with small-, medium- and large-scale farmers, producer groups or entire regions, both organic and non-organic although their focus always is on natural fertilization strategies. To further roll-out these practices they provide various **train the trainer (extension officers)** and **farmer field school** contents and formats. These include explain- and real-life videos, posters and manuals. They will launch a natural soil fertility channel on **WhatsApp** as well soon.

2. To reduce water usage the following techniques can be used:
  - maintenance of existing infrastructure (decline leakages);
  - focus on more advanced irrigation (stop with flood irrigation);
  - use organic fertilizers to improve soil moisture content;
  - more crop per drop via diversification of production (crop/animal farming);
  - re-use of (municipal) waste water;
  - water harvesting techniques;
  - under cover farming to reduce evapotranspiration;
  - usage of soil moisture probes to indicate soil moisture content, combined with decision tools for water needs;
  - access to climate data, with decision tools for water needs;
  - mulching to decrease evapotranspiration.

### **Example - Water availability**

In a large part of the world year-round sufficient fresh water is not within reach. One of the products from Aqua Terra Nova is, the **Water Resource Survey (WRS)**, creates an overview of all available water sources for new developments.

The WRS determines the potential sources of water (precipitation, surface water, groundwater, wastewater, etc.), its **10-year** predicted structural availability (distribution over seasons and years, distances, depth, flow, aquifer, etc.) and the water composition (quality). The features of the surrounding geology (such as elevation) are also included.



The WRS is generally applied for developments related to new agricultural and / or horticultural areas. It includes the following topics;

- Assurance of irrigation water for sustainable horticultural projects;
- Quantifying the effects of agri- & horticulture on water resources, and vice versa;
- Predict and calculate the effects of seasonality on water availability and buffer capacity;

- Strategic buffering and cost optimization studies;
- Quantifying the ladder of sustainability of available resources;
- Specify the need for ecosystem services;
- Calculate the water balance for a horticultural region;
- Advisory on Reversed Osmosis (RO) and other (waste) water treatment techniques;
- Optimization studies, Business Cases and risk analysis.

**Well known Farmer**

*“I read a report stating that only 2% of the farmers use drip irrigation. Can’t understand why, because considering current issues with water this should be priority number one”.*

3. To reduce the use of fertilizers, the following techniques can be used:
  - reduce organic waste by implementation of composting;
  - climate smart drainage systems to collect and reuse water and minimize percolation;
  - use of technology to dose added fertilizers and pesticides.

**Example - Drip Irrigation**

Drip irrigation is a network of perforated tubes that line row crops. Water is pushed through the tubes using a low-pressure pump, and the tubes empty when the pump is off. Another common irrigation type, sub-surface drip irrigation in particular, can be a good fit for small or irregularly shaped fields. Drip systems are a good solution because they place water directly on the soil (or near the root zone with sub-surface drip systems). This reduces the amount of water lost to evaporation and run-off significantly.

While the operating costs for a sub-surface drip system is average compared to other irrigation solutions, the labor and maintenance needed to keep a drip system running smoothly can be a drawback. On-going upkeep costs on drip systems are typically 3-5 times higher than other irrigation systems. Drip systems usually last 10 to 15 years before they need to be replaced, and water uniformity can degrade during the system’s lifespan. Salinity, corrosion contaminates, and small particles may influence your water uniformity, which is vital to maintaining a functioning network of pipes and improving crop yields.

While the efficiency can often be a selling point for drip systems, it’s important to consider that they are less adaptive and less forgiving when it comes to irrigation management. Sub-surface systems are very difficult to adjust once they are trenched, and finding leaks and clogs can be cumbersome. As with flood irrigation, people have been very successful using drip systems, you just need to do your research and weigh the pros and cons for your situation.

## 4.5 SUMMARY

Technology alone is not the solution. In relation, the provided gaps it is stated that technology should come with a good business model that will address the skills, financial means and knowledge level of emerging farmers. A combination of technologies or practical business-models are there for key for successful business. A few interesting combinations are mentioned below:

- Reduce water usage and precision farming. Moisture probes combined with smart apps to increase water use efficiency:  
[My Smart Farm](#) to measure plot specific disease information; [Delphy](#) to advise the farmers of how to handle and [Eijkelkamp](#) soil & water expert to provide the equipment.
- Knowledge transfer and dissemination. DAFF involves knowledge providers such as [HAS University](#) to develop an up to date CSA curriculum and train extension officers. Structural collaboration with South African universities will embed a continuous learning platform for the future farmers, farm managers and Agri-entrepreneurs.
- Re-use of waste water from multiple farmers, processing businesses: combine forces and collect all wastewater, process it through an innovative solution and receive the clean water back. [Aqua Soil Group](#) can provide turn-key solutions (including COD removal).
- Get insight in on farm evapotranspiration and promote decision making for irrigation. [eLeaf](#) already has a deal with the Western Cape province to make this technology available for farmers. Now it should be taken to a national level.
- The South African government should incentivise 'good behaviour' and give incentives to farmers who save water, reduce carbon (carbon sequestration in the soil), bring back biodiversity. Most likely there are companies in South Africa who can measure impact but [Soil & More](#) has specific knowhow of measuring impact and pricing the impact. Together with [www.ey.com](#) they developed a model for True Cost Accounting which can serve as a basis for such an approach.
- Under Cover Farming creates much better farming condition where the 'climate' can be controlled. [Renlyn](#) is representing a number of Dutch companies and developed an innovative model for turnkey projects to farmers. This model is worth to further explore with for example [Landbank](#), who is in search for innovative Agri business models. This does not only solve issues like a lower water usage, carbon emission reduction, higher yields but also the issue of financing.
- Combine education, business and government. A great example is the [World Horti Centre](#) in Naaldwijk, the Netherlands. As a result of knowledge exchange and collaboration the sector is able to innovate even faster than it already did in the past.

More examples will be described in Chapter 5 where some strategies will be discussed of the way forward.

## 5 STRATEGIES

### 5.1 INTERESTING PMC'S

Product, price, location and promotion. The agri-food sector of the Netherlands has much to offer - technology, knowledge, skills, infrastructure from pre-to post harvest production. Derived from the previous chapter one can state that the following products seem to be most promising:

- improved irrigation in combination with smart apps;
- business models that boost cooperative farming;
- knowledge transfer and training;
- undercover (plastic tunnels) farming technology;
- post-harvest technology.

Above mentioned PMC's focussing on emerging farmers are elaborated below.

Product	Solution to	Additional added value	Market strategy	Support EKN
Improved irrigation open field	Efficient water usage	Smartphone apps Moisture probes	Price, added value with apps, implementation and usage support, Integrated in showcase, smart refund strategy	Promotion via showcases
Soil Improvement through re-using biomass	Soil degradation	Water saving, higher yield	Through trainings	Promotion via showcases
Improved irrigation under cover farming	Efficient water usage,	Dosing of pesticides, training and mentorship	Price, smart refund strategy	Promotion via showcases
Cooperative farming	Market access, resiliency farmers	Showcase of CSA farming (re-use waste water)	Collaboration with private sector SA and public sector  Project in combination with other cooperative facilities as composting, cooling facilities	Develop a showcase for promotion, training centre etc.

Product	Solution to	Additional added value	Market strategy	Support EKN
Post-harvest technology	Food quality and logistics	Cooling, packing, marketing	Cooperative farming via food-hub	Promotion via showcases
Training/knowledge transfer	Knowledge gaps, skill development	Promotion of Dutch technology	Training of extension officers, combination with Dutch tech suppliers in SA	G2G agreements with dep. of agriculture
On and offline promotion Dutch agro-food sector	Awareness creation Dutch technology	Combined with showcase and training	Practical set up of website like <a href="#">Waterwindow</a>	Development website / provide content <a href="#">Waterwindow</a> combined with green-Agri (WC)
Soil testing	Cheap analysis	Immediate advice	Set up soil testing service via input suppliers	Promote and matchmaking
Water Resource Survey	Integrated water approach	Stimulates landscape approach and collaboration	Target Project developers working with emerging farmers	Provide support / facilitate
Business modelling	Access to finance	Entrepreneurial mind-set	Include in total package	Stimulate entrepreneurship

## 5.2 STRATEGIES

### 5.2.1 Demonstrate – Centre of Excellence

The Netherlands traditionally has a rather transparent knowledge structure in which companies and individuals are willing to share information with each other. Probably the main reason that this treasure of Dutch horticulture has faced quite some challenges in recent years, is the fact that many family owned businesses cease to exist or merge into bigger holding structures.

Nevertheless, collaboration is part of the Dutch DNA. Many companies organize knowledge exchange by themselves. Courses are organised for (inter)national growers, demo nurseries are established in and outside of the Netherlands, joint training centres are founded, etc. In some cases, it is for instance a seed supplier or a technical supplier who takes the initiative to setup such knowledge exchange centres, in other cases it is a group of companies who take responsibility. A good example of such a group of companies is to be found in the Westland area: **Demokwekerij Westland**.

[Demokwekerij Westland](#) is a demonstration nursery in the heart of the Westland area which focusses on applied technology in horticulture. The demonstration nursery creates the greenhouse of tomorrow by concentrating on three pillars:

a) *Demonstration*: in the 5000 m<sup>2</sup> greenhouse more than 25 companies show their latest technologies and innovations.

b) *Research*: 41 compartments are available for research and small-scale testing.

c) *Knowledge exchange*: the nursery is the linking pin between business, education and government and facilitates further development of knowledge and innovation within Dutch and international horticulture.

Circular: An idea is to link it with the commercially feasible masterplan that was made 3 years ago for Drakenstein Municipality where even a waste water treatment facility was part of the building blocks that entails modules like job creation, entrepreneurship, food security, water re-use, horticulture, agriculture, fish farming, algae-production. Perhaps now the time is ripe to implement such an approach or parts of it. More info at: [www.aquasoilgroup.com](http://www.aquasoilgroup.com)

The Demokwekerij is active in the Netherlands, Vietnam and Colombia and invited by other countries to explore collaboration.

### Another example is the green farming demonstration site in Kenia called the **Latia Resource Center - Growing Solutions demonstration location**

The new demonstration project is situated at the Latia Resource Centre, a social enterprise in agriculture founded by the Faraja Trust in Kenya. The Centre provides training and business support services to farmers, pastoralists and agribusinesses in Kenya and Eastern Africa from the point of view that the modernization of agriculture and improvement in food security in Africa can be greatly facilitated by effective training, adequate dissemination of knowledge and provision of business support services.

### Consultancy companies

On a company level, a large range of consultancy companies exists in the Netherlands covering fields such as cultivation, crop protection, business development, marketing, certification, project development, environmental studies, etc. Some of these companies are specialized in Africa. A short list of providers of knowledge and services from the Netherlands:

Organization	Type	Website
Groen Agro Control	Laboratory	<a href="http://www.agrocontrol.nl">www.agrocontrol.nl</a>
BLGG	Laboratory	<a href="http://www.blgg.nl">www.blgg.nl</a>
Agro Advies Buro	Project implementation	<a href="http://www.agroadviesburo.nl">www.agroadviesburo.nl</a>
VEK Adviesgroep	Project implementation	<a href="http://www.vek.nl">www.vek.nl</a>
Delphy	Crop consultancy	<a href="http://www.delphy.nl">www.delphy.nl</a>
Flynth	Accountancy and financial advice	<a href="http://www.flynth.nl">www.flynth.nl</a>
Triple Consultancy	Financial services	<a href="http://www.tripleconsultancy.nl">www.tripleconsultancy.nl</a>
Alfa	Accountancy and financial advice	<a href="http://www.alfa.nl">www.alfa.nl</a>
Verbos Business Development	Sustainability services and BD	<a href="http://www.verbos.nl">www.verbos.nl</a>

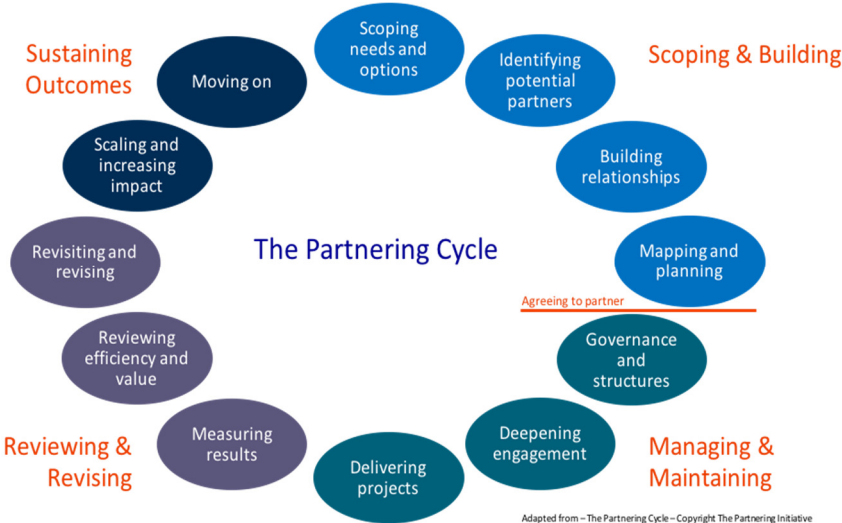
At the same time, it is clear that doing business in South Africa is not a matter of quick wins. In the past, various type of collaborations between different parties from both the Netherlands as South Africa have been tested. With these lessons learned one of the proposed strategies is to set up a demonstration farm where emerging farmers can see, smell, feel and hear about how Dutch companies can provide support. Basically, farmers want to experience (seeing is believing) climate smart agriculture instead of watching beautiful PowerPoint presentations.

### 5.2.2 Consortium Building

Economic growth is the most effective way to lift people permanently out of poverty. However, the right kind of growth is needed: responsible, sustainable and inclusive. Business becomes a 'partner in development' when it looks beyond immediate short-term financial gain and looks towards building longer-term business and societal value.

Business does this in two main ways: by aligning its investments and core business activities with a country's development priorities; or by investing resources of all kinds to support the development of the social, economic and environmental fabric in which it operates. In both cases, business helps to ensure long-term prosperity for itself and the country in which it operates. Collaboration between business and other development actors is effective when it can achieve both development impact and business benefit beyond that which could be achieved through unilateral action.

The second strategy is to build consortia together with local partners with the objective to offer emerging farmers a **full package** instead of individual offerings per supplier. One of the important outcomes of this study is that most models targeting emerging farmers are not working because often a few elements are missing. The strength of the Dutch approach should be to offer a full package including proper training (technical & entrepreneurial), hardware adjusted to local needs and financing.



A proven model that can be used is the Partnering Cycle of the Partnering Initiative.

This tool is working well in many (developing) countries and is becoming more and more popular in situations where collaboration is key.



The key challenge is to set up strong collaborations in South Africa with Dutch entrepreneurs on board that are able to supply (ideally in collaboration with SA counterparts) the complete package. Development of collaborations require time and effort from all participants. There must be trust, willingness to work together and shared successes. This can only be achieved with ongoing support to the collaboration. Independent brokers (without a stake) are essential to get partnerships working, especially during the scoping to deepening engagement steps.

Collaborations with South African partners are important. They understand their market and have access to it, offers options to distribution of Dutch goods and services etc.

FDW and other Dutch support mechanisms offer great opportunities to set up these partnerships. However, finances for the scoping and mapping phase of partnerships are often not available and incoming missions are often too short to really start the engagement. To avoid the event of "going back to business" after a fruitful first connection, additional support must be delivered to ensure that proposals are developed. In comparison to a single product or service offering a complete package requires more time and effort to develop and tailor. Focus on specific user groups is therefore advised.

### **5.2.3 Local corporates – BEE level**

Although it is not a law yet, part of a system is that large corporates in South Africa have to allocate a percentage of their profits to achieve specific BEE levels. The system is there to motivate empowerment and transformation. The % differs from specific sectors, and the level you can achieve is made out of seven different areas that you have to score points:

1. Ownership
2. Management control
3. Employment equity
4. Preferential procurement
5. Skills development
6. Enterprise development
7. Socio-economic development

Therefore large companies have funds available and some are willing to set up Agri projects with emerging farmers once 'total turnkey' projects are provided. An idea is to make this self-sustaining model that can be replicated through embedding this in a revenue model which is commercially viable. Then this will be a large catalyser for growth, creating jobs and conducting business!

Sectors that produce great amounts of waste water are especially interesting. Mining and wine distilleries or beer breweries are often threatening the municipal waste water treatment plants and the waterbodies on which the effluent is discharged. The usage of this water for agricultural production is interesting. Examples are already in place (collaboration between SABMiller, Nelson Mandela Bay Municipality and Rhodes University). Local governmental organizations, who are willing to set up community projects e.a. farming projects are in search of private partners that are willing to co-invest.

### **5.2.4 Train the trainers (extension officers)**

Knowledge (practical) skills and understanding CSA technologies. Available information is scattered amongst associations, governmental organizations, private entities, research institutes and other. We have indicated that:

- The educational level of agricultural extension officers is limited and generally, especially when it comes to knowledge about specific crops, production systems etc.
- Organizations are not successful in providing non-financial support to emerging farmers;
- The rate of success of provided support on the increase of success of emerging farmers is limited;
- Mentorship between commercial white farmers and emerging farmers is working;

- Online products, such as SmartAgri are launched to provide information about farming in general to the total agricultural sector.

Strong aspects that can be derived from the mentioned topics above are:

- There is a big and strong network of agricultural extension officers in every single town;
- Mentorship is working;
- SmartAgri will further develop and aims to be an online platform that can provide information to the agricultural sector from scientific knowledge to the nitty-gritty aspects of the job.

The foreseen strategy is two folded:

1. Train the extension officers about the latest (Dutch) CSA technologies and methodologies;
2. Use PUM to provide extension officers with follow-up support and share gained experiences in which Dutch technology is used via SmartAgri.

This strategy brings the Dutch knowledge and experience on site, where it should be used. Besides, it ensures that experiences from emerging farmers are shared, on line, via a trustworthy platform. The reach of this approach is great and the effort can be minimized once a clear focus is brought to the table and good appointments are made. The networks are there and the promotion of the website will be done by the WC-department of agriculture.

From the Dutch perspective, this strategy requires:

- A tailored training program in which Dutch technology is incorporated and therewith the involvement of the Dutch private sector;
- Dutch technology must be available for practice (ideally in a centre of excellence);
- G2G collaboration must be intensified, in order to provide training to governmental employees and the usage of an existing website/platform.

Obviously, there are many more interesting strategies that can be defined together, which we need to do anyway. However, a strategy stays a strategy if it is not linked to action!

Most important is that this document gives you some more insight of the opportunities that there are, thus creating momentum to further explore, act, collaborate, innovate, implement, think out of the box, invest and contribute to a world that embraces Climate Smart Agriculture. Not only for yourself but also for future generations!!



regenerate  
emission reduction  
soil credits horticulture climate concept smart  
ecosystem carbon farming  
recover metropolitan trust footprint fruit approach  
**agriculture**  
profitable neutral health aqua fresh  
Compost fertility water re-use  
sustainable food cluster

# ANNEXES

## ANNEX 1: CONTACTS

Name	Job Title	Organisation
Shirly Maseko	Extention officer	DAFF
Dimakatso (Nono) Sekhoto	MD Makalobane Enterprises	AFASA
Dr Jane Battersby-Lennard	Researcher	African Centre for Cities
Dr. Nadine Methner	Researcher	African Climate and Development Initiative
Danny Versloot	Owner	AgriConnect
Violanda De Man	Portfolio Mgr. Agribusiness	Agrics / ICS
Aart-Jan Verschoor	Sr. Mgr. Strategic Info Mgt.	Agricultural Research Inst.
Gil Arbel	CEO	AgriLiving Ltd.
Livhu Ngwekhulu	Manager Transformation	AgriSA
Sander Mager	Directeur	APF
Aart Monster	Product Manager	AppsForAgri
Aad Wubben	Owner	Aqua Terra Nova
B. van Eck	Co-founder	Aqua Soil Group
Craig Fulton	Pre-Harvest Mgr.	Berry World
Niek van Dijk	Consultant	BoPInc
Steven Trijsburg	Consultant	BoPInc / MVO NL
Robert van Donk	Int. Business Developer	Bosman van Zaal
Kenneth Carden	Self employed @ cape energy	cape energy
Kobus Oosthuizen	Chief executive technology	Casidra
Bonnie Horbach	Co-Create S	Consul Generaal
Emma vos	Economic Diplomacy Intern	consulate - Capetown
Nichi Walker	Economic Diplomacy	consulate - Capetown
Thessa Bos	Independent	Consultant
Martine Groenewegen	CEO	De Klik Biomassa
Majella van der Arend	Consultant	Delphy
Herbert Stolker	Consultant	Delphy
Frank Hollaar	Mgr. International Business	Demokwekerij
Nico de Groot	Consultant	Green Farming

Name	Job Title	Organisation
Mashatole Mokgadi	Intern	Dep. of Agriculture
Mantsha Ketso	Intern	Dep. of Agriculture
Peter Sassa	Manager	Dream Team Foundation
Jack Vera	Agricultural Counselor	Dutch Embassy Pretoria (SA)
Bernard Likalimba	Senior Policy Officer – Agriculture	Dutch Embassy Pretoria (SA)
Ruben Goudriaan	Project Manager	eLeaf
Claire Jarvis	Environmental Scientist	Ethicx
Bart van Eck	Business consultant	For Elements
Jan Swanenpoel	Researcher & Lecturer	Free State University
Johan van NIEkerk	Professor	Free State University
Hlamalani Ngwenya	Lecturer	Free State University
Gina Shoemaker	Founder	Green Earth Concepts
Cathy Pineo	Researcher	GreenCape
Lauren Basson	Manager Technical & Knowledge	GreenCape
Raymond siebrints	Green finance analyst	GreenCape
Pieter Jansen van Vuren	Economic Analyst	GreenCape
Detlev Meyer	CEO	Reliance Compost
Angelique Koolschijn	Communications Manager	HHI
Lidia Aalpoel	Project Manager	HHI
Martin Helmich	Director Mkt. Sales	Hoogendoorn
Rob Veenstra	Global Accountmanager	HortiMax
Jan Willem Fieren	Regional Investment Mgr	ICCO
Violanda de Man	Portfolio Manager AgriBusiness	ICS
Michiel Pols	Business consultant	Innovation Quarter
Jan de Lange	Manager product division	Kaap-agri
Kobela Mokgohla	Owner	Korema Farm
Pauline Verhagen	Communication Specialist	Koppert Biological Systems
Noko Masipa	GM regional office	Landbank
Johan van der Merwe	Editor	Landbou weekblad
Lyndre Nel	Representative	Landlife Company
Noel Bastiaan	CEO	Leading Edge
Marijn Zwinkels	Director	Living Lands
Liezl Leroux	Landscape Mobilizer	Living Lands
Philip Immerzeel	Sales Representative	Ludvis Svensson

Name	Job Title	Organisation
Ariane van Beuzekom	Senior Policy Officer - Agriculture	Min Buiza
Wolfgang von Loeper	CEO	mymartfarm
Mr M Ngokro	Acting director urban Agriculture, tourism and economic Dev.	NMBM
Mrs. Nozipho Mkhaleba	Financial Advisor	NMBM
Peter Prins	Consultant	NWP
Paul van Koppen	Consultant	NWP
Maaïke Feltman	Project officer SA	NWP
Daan Louw	CEO	OABS development pty
Leon van Duijn	Founder	Plantlab
Marcel Kers	Founder	Plantlab
Erna du Plessis	Managing Director	Renlyn
Anne Ligthelm	Project advisor	RVO
Ariane van Beusekom	Project advisor	RVO
Arianna Baldo	Southern African Regional Representative	RSB
Robert Proos	Program advisor Global Public Goods	RVO
Kees Kwant	Sr. Expert Biobased	RVO
Jan Van Saane	PA Mondiale Vraagstukken	RVO
Anne de Boer	Project adviseur BioVALSA	RVO
Willemien van Asselt	Advisor Science and Technology innovation and National Contact Point Horizon 2020	RVO
Saske Hoving	National Contact Point Horizon 2020	RVO
Reynard Snetler	Product Dev. Mgr	RijkZwaan
Jan Coetzee	Project Extension Officer - Better Barley Better Beer Project	SAB/ SA-wwf
Mark Agterdenbosch	General Manager	SANEC
Bart de Jonge	Managing Director	SI Tech
Pieter Smits	Sales Director Africa	SoilCares
Tobias Bandel	Managing Partner	Soil & More International
Karin Kleinbooi	Program Manager	Solidaridad
H. Rost van Tonningen	CEO	Soteq Energy
James Lonsdale	National Fresh Produce Mgr	SPAR
Prof. Julia Harper	Researcher	Stellenbosch University

Name	Job Title	Organisation
Dr. Stephanie Midgley	Lead Researcher	ACDI / Stellenbosch University
Dr. Scott Drimie	Researcher	Stellenbosch University
Natasja van der Vlist	Founder	SunCooler
Peter Johnston	Researcher	UCT
Dafne Nienhuys	ESG Coordinator	UFF
Gareth Haysom	Researcher and PhD Candidate	University of Cape Town
D. De Mooij	Executive	Utily Sys
Petra van der Hout	Business consultant	Verbos
Jason Engledoe	AGribusiness specialist	Wesgro
Amanda Tshaya	Head department agribusiness investment unit	Wesgro
James Milne	Head department investments	Wesgro
Reinette Champanis	Director	WestCape Biotech Pty Ltd
Ilse Trautmann	Chief Director Research & Technology	Western Cape Government
Dirk Troskie	Director Business Planning	Western Cape Government
Andre Roux	Director sustainable resources	Western Cape Government
Kobus Pienaar	Technical manager	Woolworth
Tom McLaughlin*	Food sustainability manager	Woolworth
Jennie van der Mheen	Acc.Mgr. Africa	WUR
Marlene Roefs	Researcher	WUR



# ANNEX 2: SPECIFICATION GAP ANALYSIS

Topic	Uptake					Aim				
	0	1	2	3	4	5	6	7	8	9
<b><u>Production</u></b>				●				●		
○ Resilient Varieties			●					●		
○ Crop production					●			●		
○ Farm management					●			●		
○ Inputs (seed, material)				●					●	
○ Access to information (water / soil)			●						●	
○ Land availability				●				●		
○ Degraded & Saline Soils		●				●				
<b><u>Finances</u></b>	●					●				
○ Credit lines	●							●		
○ Collateral	●				●					
○ Collaboration		●				●				
<b><u>Entrepreneurship</u></b>		●					●			
○ Management		●					●			
○ Entrepreneurial skills		●						●		
○ Aging (bring back youth)		●				●				
○ Measure			●			●				
○ Analyse		●					●			
○ Adjust			●			●				
○ Communicate			●				●			
○ Capitalise	●						●			
<b><u>Enabling Policy environment</u></b>			●					●		
○ Build capacity			●				●			
○ Invest in R&D		●						●		
○ Integrate CSA in existing policies				●			●			
○ Incentivise good practices					●				●	
○ Build partnerships (PPPs)		●						●		
○ CSA Knowledge base		●						●		
<b><u>Market Access</u></b>				●			●			
○ Access to market information			●			●				
○ Infrastructure (market places, roads)			●				●			
○ Legalities			●			●				
○ Market research						●	●			
○ Marketing knowledge			●				●			
<b><u>Post Harvest</u></b>		●						●		
○ Storage & Cooling	●						●			
○ Quality control			●						●	

## ANNEX 3: REFERENCES

- *From smallholder to shareholder* (2015), A guide to optimizing partnerships with the private sector for smallholder's impact – USAID, FINTRAC
- *Reconnecting South Africa's Foodsystems to its ecosystems* (2015) – WWF
- *Crop farming 2030, Reinvention of the Sector* (2015) – Boston Consulting Group
- *CSA urgently needed in Africa* (04.09.2017) – Reliefweb
- *The Initiative for the Adaptation of African Agri. to Climate change* (2017) – AAA
- *Scoping mission Water & Agrofood South Africa* (2017) – I. van der Stoep, P. Prins
- *Draft CSA Strategic Framework 2018-2028* – South African Government
- *BCG-Crop-Farming-2030, the reinvention of the sector* – Boston Consulting Group
- *FAO Strategy on Climate Change (2017)* – FAO
- *UMLINDI Newsletter ARC Soil Water Climate (2017)* – ACR LNR
- *Cropping Systems and Agronomic Management Practices in Smallholder Farms in South Africa: Constraints, Challenges and Opportunities* – G. Moswetsi, M. Fanadzo B. Ncube
- *How-digital-technology-is-changing-farming in Africa (2017)* – Harvard Business Review
- WorldBank Enabling the business of Agriculture (2017) - Worldbank
- *Agroberichten buitenland - Your partner in Quality Seed*
- Success stories FAO on CSA (2013) - FAO
- *CEO guide for SDGs* - <https://youtu.be/ovZYYdndB5Q>
- *SDG Hub* - <http://sdghub.com>
- *WBCSD* - [www.inclusive-business.org](http://www.inclusive-business.org)
- *BCTA* - [www.businesscalltoaction.org](http://www.businesscalltoaction.org)
- *FAO-SDGs* - [www.fao.org/sustainable-development-goals/en](http://www.fao.org/sustainable-development-goals/en)
- *A Look at the Sustainable Development Goals* - <https://youtu.be/5G0ndS3uRdo>
- *Sustainable development: what, where and by whom?* - <https://youtu.be/4sJ-uixn7Jg>  
(Kitty van der Heijden at TEDxHaarlem)
- *Guide to Climate Smart Agriculture* - <https://csa.guide/>
- *New tools for farmers* - <https://youtu.be/PQUI5wOHCYQ>
- *Farmers First* - [www.farmersfirst.org](http://www.farmersfirst.org)
- *Understanding Climate Smart Agriculture (FAO)* - <https://youtu.be/IUdNMsVDIZ0>
- *Lets talk about Soil (FAO)* - <https://youtu.be/invUp0SX49g>
- *Climate-Smart Agriculture in Action* - <https://youtu.be/q7JnJ0oBa94>
- *WRD Profitability and productivity barriers and opportunities in small scale irrigation schemes* - Henning Bjornlund, Andre van Rooyen & Richard Stirzaker
- *Seeds not diamonds will make Africa great article 29.08.2017* – [www.newsday.co.zw](http://www.newsday.co.zw)

## ANNEX 4: DUTCH SUPPLIERS

### *Selection of suppliers of technical goods*

Organization	Type	Website
Priva	Climate and fertigation control	<a href="http://www.priva.nl">www.priva.nl</a>
AppsforAgri	Interactive software	<a href="http://www.appsforagri.com">www.appsforagri.com</a>
Van der Heide Greenhouses & Solar	Plastic greenhouses, solar systems	<a href="http://www.foliekassen.com">www.foliekassen.com</a>
Luiten Greenhouses	Screening and greenhouses	<a href="http://www.luiten-greenhouses.com">www.luiten-greenhouses.com</a>
Solteq Energy	Wind driven desalination	<a href="http://www.freshwatermill.com">www.freshwatermill.com</a>
AWETA	Post-harvest equipment	<a href="http://www.aweta.nl">www.aweta.nl</a>
SunCooler	Mobile offgrid storage	<a href="http://www.suncooler.com">www.suncooler.com</a>
JAVO	Potting machines	<a href="http://www.javo.eu">www.javo.eu</a>
Celtic Cooling	Cold stores	<a href="http://www.celtic.nl">www.celtic.nl</a>
Formflex-Metazet	Growing systems – internal transport	<a href="http://www.formflex.nl">www.formflex.nl</a>
Hordijk Groep	Packing materials	<a href="http://www.hordijk.nl">www.hordijk.nl</a>
Certhon Groep	Turnkey greenhouse projects	<a href="http://www.certhon.nl">www.certhon.nl</a>
Dalsem Groep	Turnkey greenhouse projects	<a href="http://www.dalsem.nl">www.dalsem.nl</a>
Hortimax	Climate control	<a href="http://www.hortimax.nl">www.hortimax.nl</a>
Hoogendoorn	Climate control	<a href="http://www.hoogendoorn.nl">www.hoogendoorn.nl</a>
KUBO	Turnkey greenhouse projects	<a href="http://www.kubo.nl">www.kubo.nl</a>
Buitendijk Slaman	Internal transport systems	<a href="http://www.buitendijk-slaman.nl">www.buitendijk-slaman.nl</a>
Flier	Horticultural machines	<a href="http://www.fliersystems.com">www.fliersystems.com</a>
Greefa	Post-harvest equipment	<a href="http://www.greefa.nl">www.greefa.nl</a>
Genap	Geosynthetic applications	<a href="http://www.genap.nl">www.genap.nl</a>
Bosman Van Zaal	Turnkey horticultural projects	<a href="http://www.vanzaal.com">www.vanzaal.com</a>
Verkade Climate	Heating installations	<a href="http://www.verkadeklimaat.nl">www.verkadeklimaat.nl</a>
Flamingo – van der Meer	Used equipment	<a href="http://www.hortimat.com">www.hortimat.com</a>
Plantlab	Turnkey indoor farming	<a href="http://www.plantlab.nl">www.plantlab.nl</a>
Berg Hortimotive	Horticultural machines	<a href="http://www.berghortimotive.nl">www.berghortimotive.nl</a>

### *Knowledge and service providers*

Organization	Type	Website
Groen Agro Control	Laboratory	<a href="http://www.agrocontrol.nl">www.agrocontrol.nl</a>
BLGG	Laboratory	<a href="http://www.blgg.nl">www.blgg.nl</a>
eLeaf	Satellite solutions	<a href="http://www.eleaf.com">www.eleaf.com</a>
Soil & More International	Sustainable farming	<a href="http://www.soilandmore.com">www.soilandmore.com</a>
VEK Adviesgroep	Project implementation	<a href="http://www.vek.nl">www.vek.nl</a>
AgriConnect	CSA solutions a.o. dripirrigation	<a href="http://www.AgriConnectSA.com">www.AgriConnectSA.com</a>
Delphy	Crop consultancy	<a href="http://www.delphy.nl">www.delphy.nl</a>
Aqua Soil Group	Circulair economic concepts	<a href="http://www.aquasoilgroup.com">www.aquasoilgroup.com</a>
Flynth	Accountancy and financial advice	<a href="http://www.flynth.nl">www.flynth.nl</a>
Triple Consultancy	Financial services	<a href="http://www.tripleconsultancy.nl">www.tripleconsultancy.nl</a>
Alfa	Accountancy and financial advice	<a href="http://www.alfa.nl">www.alfa.nl</a>
Verbos Business Development	Business Development	<a href="http://www.verbos.nl">www.verbos.nl</a>
AgriProfocus	Network	<a href="http://www.agriprofocus.nl">www.agriprofocus.nl</a>
Netherlands Water Platform	Network	<a href="http://www.nwp.nl">www.nwp.nl</a>
Demokwekerij	Training / demo center	<a href="http://www.demokwekerij.nl">www.demokwekerij.nl</a>
HAS University	Training & education	<a href="http://www.hasuniversity.nl">www.hasuniversity.nl</a>
World Horti Centre	Education, demonstration, business	<a href="http://www.worldhorticenter.nl">www.worldhorticenter.nl</a>
MVO Nederland	Platform for CSR	<a href="http://www.mvonederland.nl">www.mvonederland.nl</a>

*Selection of suppliers of operational goods*

<b>Organization</b>	<b>Type</b>	<b>Website</b>
SoilCares	Soil analyses & crop monitoring	<a href="http://www.soilcares.com">www.soilcares.com</a>
Van der Knaap Groep	Coco substrates	<a href="http://www.vanderknaap.info">www.vanderknaap.info</a>
Agrics	Inputs + credit	<a href="http://www.agrics.org">www.agrics.org</a>
Utilysis	Sustainable crates	<a href="http://www.utilysis.eu">www.utilysis.eu</a>
Koppert Biological Systems	Biological crop protection and pollination	<a href="http://www.koppert.com">www.koppert.com</a>
Modiform	Plastic pots and trays	<a href="http://www.modiform.com">www.modiform.com</a>
SI Technologies	Plant growth	<a href="http://www.sitecin.com">www.sitecin.com</a>
Van der Windt Group	Packaging materials	<a href="http://www.vanderwindt.com">www.vanderwindt.com</a>
Chrysal	Flower care products	<a href="http://www.chrysal.com">www.chrysal.com</a>
Jiffy	Substrates and plant plugs	<a href="http://www.jiffygroup.nl">www.jiffygroup.nl</a>
Bas van Buuren	Substrates	<a href="http://www.bvb-substrates.nl">www.bvb-substrates.nl</a>
LandLife Company	Cocoon planting	<a href="http://www.landlifecompany.com">www.landlifecompany.com</a>
Bato Trading	General supplies	<a href="http://www.bato.nl">www.bato.nl</a>
Horticoop	General supplies	<a href="http://www.horticoop.nl">www.horticoop.nl</a>
Desch Plantpak	Pots and trays	<a href="http://www.desch-plantpak.nl">www.desch-plantpak.nl</a>
Grodan	Rockwool substrates	<a href="http://www.grodan.com">www.grodan.com</a>
Dillewijn Group	Packaging materials	<a href="http://www.dillewijn.nl">www.dillewijn.nl</a>
Royal Brinkman	General supplies	<a href="http://www.brinkman.nl">www.brinkman.nl</a>
Aqua Terra Nova	Sustainable water management	<a href="http://www.aquaterranova.eu">www.aquaterranova.eu</a>
Westerncape biotech Pty	Breeding support	<a href="http://www.westcapebiotech.com">www.westcapebiotech.com</a>
Svensson	Textile climate solutions for horticulture	<a href="http://www.ludvigsvensson.com">www.ludvigsvensson.com</a>
RijkZwaan	Seed	<a href="http://www.rijkszwaan.nl">www.rijkszwaan.nl</a>
Bejo Zaden	Seed	<a href="http://www.bejo.nl">www.bejo.nl</a>
EastWest	Seed	<a href="http://www.eastwestseed.com">www.eastwestseed.com</a>
Enza Zaden	Seed	<a href="http://www.enzazaden.nl">www.enzazaden.nl</a>
Eminent	Seed	<a href="http://www.eminent.nl">www.eminent.nl</a>

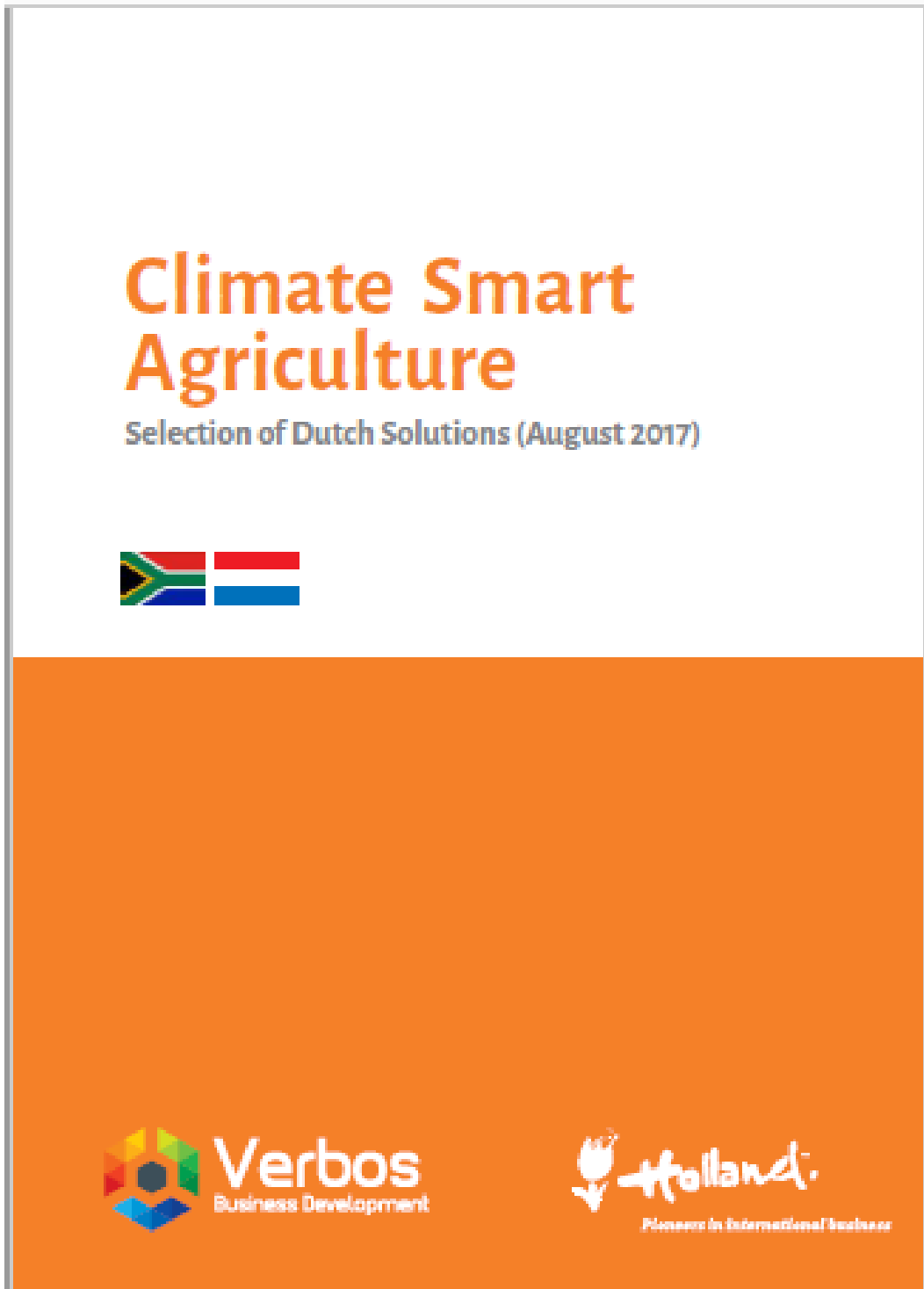
## ANNEX 5: SUSTAINABILITY DEVELOPMENT GOALS

 <p>1 NO POVERTY</p>	<p>Bank the unbanked through micro-credits and financial services (leveraging local distribution and mobile technology)</p> <p>Micro-insurance products to increase resilience of low-income populations</p>
 <p>2 ZERO HUNGER</p>	<p>Produce and provide access to fortified food and supply of micronutrients</p> <p>Develop innovative and more efficient farming technologies to increase productivity and income of smallholder farmers</p>
 <p>3 GOOD HEALTH AND WELL-BEING</p>	<p>Provide access to affordable, high-quality healthcare through decentralized clinics and mobile health workers</p> <p>Leverage IT-based solutions to avoid stock-outs of life-saving drugs in rural areas</p>
 <p>4 QUALITY EDUCATION</p>	<p>Combine expansion of internet coverage with web-based learning tools</p> <p>Set up vocational training programs targeting disadvantaged youth and women</p>
 <p>5 GENDER EQUALITY</p>	<p>Distribute your products through local, female entrepreneurs, thereby empowering their role in society and economy</p> <p>Strengthen access to sexual &amp; reproductive health care products, services and medicine</p>
 <p>6 CLEAN WATER AND SANITATION</p>	<p>Expand water &amp; sewage infrastructure to unserved areas</p> <p>Develop low-cost water filtration systems for end-customers or whole villages and informal settlements</p>
 <p>7 AFFORDABLE AND CLEAN ENERGY</p>	<p>Invest in solar-powered appliances and solar home systems or establish shops powered by solar energy</p> <p>Leverage hydropower to electrify remote villages</p>
 <p>8 DECENT WORK AND ECONOMIC GROWTH</p>	<p>Train and employ local communities</p> <p>Source materials from small-scale producers, sell and deliver products and services through local retailers and workforce</p>

<p><b>9</b> INDUSTRY, INNOVATION AND INFRASTRUCTURE</p> 	<p>SDG 9 aims at innovation, resilient infrastructure (key elements for successful BoP ventures) and inclusive industrialization in terms of increased industrial employment as well as promoting growth of small-scale industrial enterprises.</p>
<p><b>10</b> REDUCED INEQUALITIES</p> 	<p>SDG 10 targets to achieve income growth of the bottom 40% population at a higher rate than the national average as well as promoting social and economic inclusion, aligning itself to the generation of sustainable income opportunities through inclusive business solutions.</p>
<p><b>11</b> SUSTAINABLE CITIES AND COMMUNITIES</p> 	<p>Invest in innovation of building materials and techniques, like earth-based bricks, taking into account local resources Provide construction training and access to housing loans for low-income families</p>
<p><b>12</b> RESPONSIBLE CONSUMPTION AND PRODUCTION</p> 	<p>Reduce post-harvest losses through improved value chain management in rural areas</p>
<p><b>13</b> CLIMATE ACTION</p> 	<p>Create smallholder insurance based on disaster risk reduction measures</p>
<p><b>14</b> LIFE BELOW WATER</p> 	<p>Train and cooperate with fisher communities in improved fishing techniques and marine conservation Promote sustainable fishing and procure from small fishing communities</p>
<p><b>15</b> LIFE ON LAND</p> 	<p>Restore plantations affected by natural disaster, reviving local agriculture to benefit affected communities</p>
<p><b>16</b> PEACE, JUSTICE AND STRONG INSTITUTIONS</p> 	<p>Employ former combatants and integrate different ethnic groups in post-conflict settings into the value chain Increase employment of small-scale miners and source conflict-free minerals for high-end technologies</p>
<p><b>17</b> PARTNERSHIPS FOR THE GOALS</p> 	<p>SDG 17 highlights the importance of partnerships as means of implementing action geared towards the SDGs. This holds true especially for scaling inclusive business solutions, as we have seen that most barriers cannot be addressed by business or any other stakeholder on its own.</p>

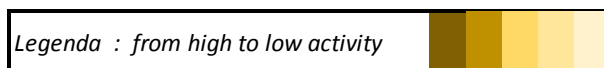
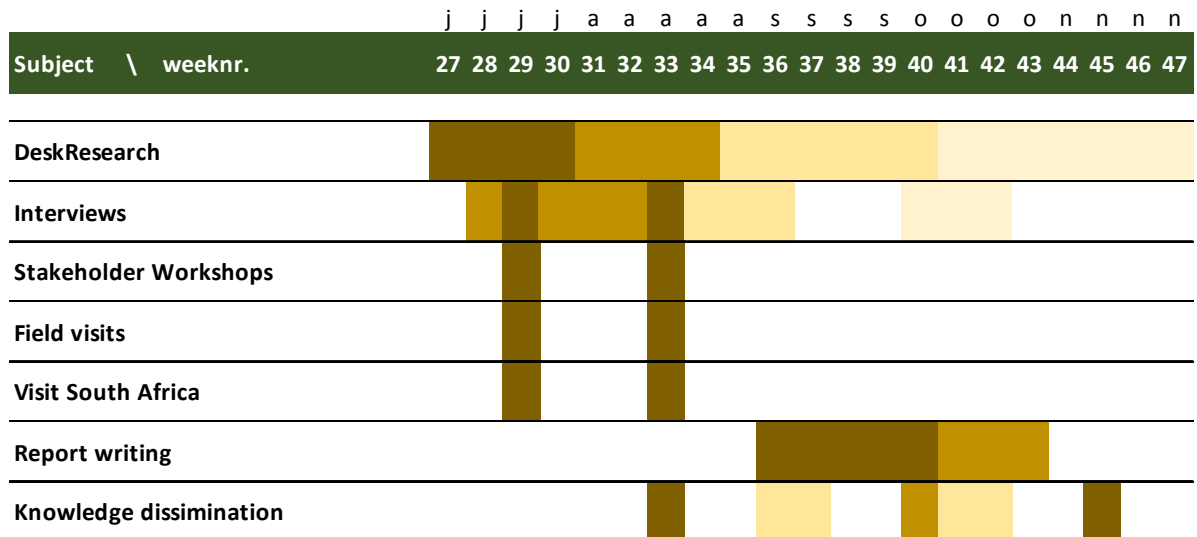
## ANNEX 6: BOOKLET CSA EXAMPLES

Download via: [Booklet CSA Technology Providers](#) (or <http://bit.ly/2yAwjQ0>)



## ANNEX 7: METHODOLOGY

### Methodology RVO Scoping Study South Africa on Climate Smart Agriculture



#### Stakeholder Workshops

- Pretoria (Embassy)
- Capetown (GreenCape)
- Port Elisabeth (Municipality)
- Utrecht (Netherlands)
- The Hague (Netherlands)

#### Visit South Africa

- |        |                                      |
|--------|--------------------------------------|
| trip 1 | 16th of July - 22nd of July 2017     |
| trip 2 | 13th of August - 18th of August 2017 |

#### Fieldvisits

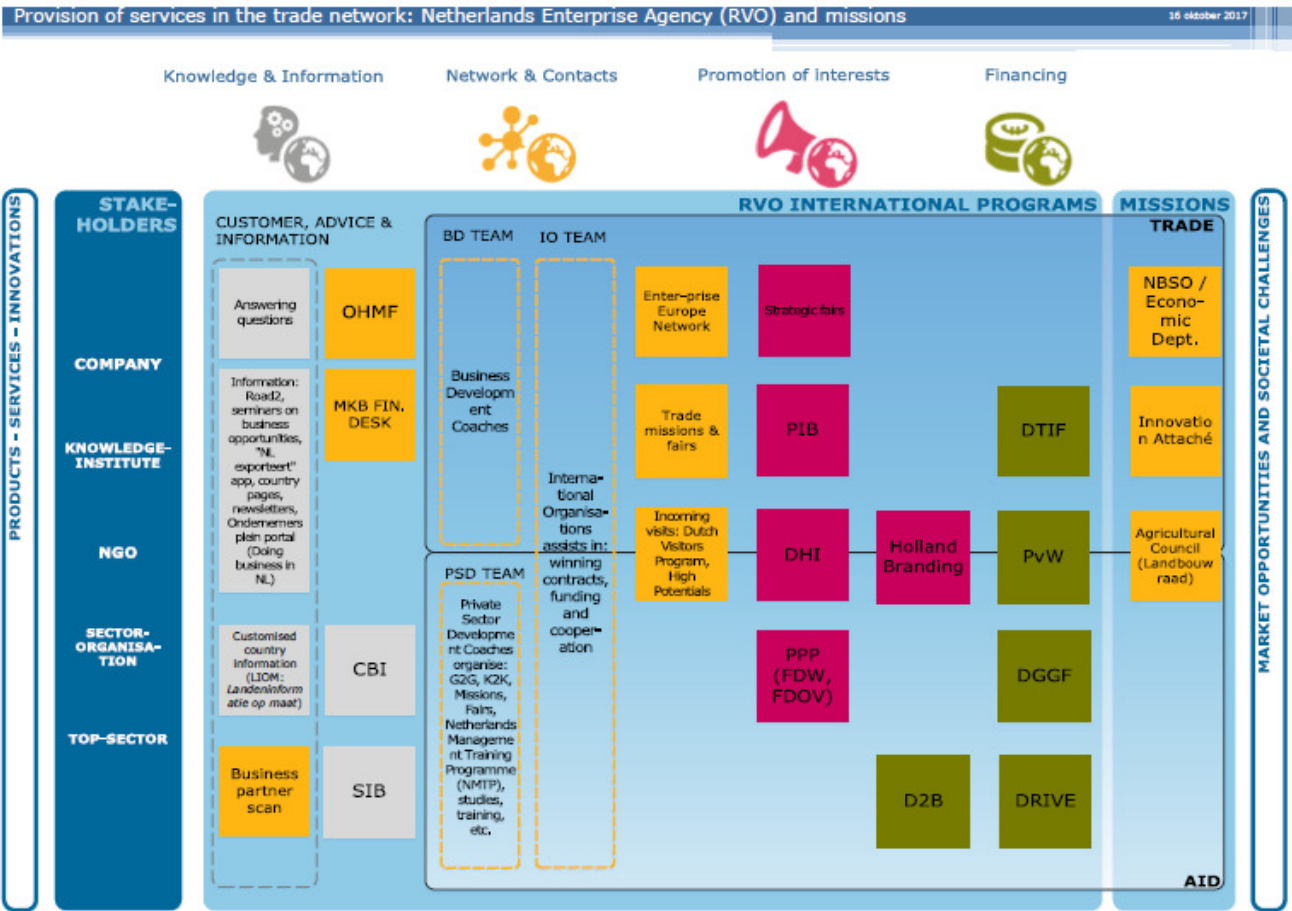
visit different farmers

#### Knowledge Dissimination





- articles (Newsletters, Magazines, social media)
- presentations (RVO, stakeholders workshops, BioVAISA)
- booklet (on Climate Smart Agriculture)



# ANNEX 8: NETHERLANDS ENTERPRISE AGENCY (RVO)



For further information contact website: [www.rvo.nl](http://www.rvo.nl) or for additional assistance send email to: [info@verbos.nl](mailto:info@verbos.nl)

Knowledge & Information	Network & Contacts	Promotion of interests	Financing
 <p><b>CUSTOMER, ADVICE AND INFORMATION</b> First point of contact for customers.</p> <p>-----</p> <p><b>Starters for International Business (SIB)</b> <u>Coaching vouchers</u> Individual coaching pathway in research opportunities abroad with concrete action plan <u>Mission vouchers</u> trade mission / collective exhibition submission <u>Knowledge vouchers</u> expert will guide you in acquiring market position.</p> <p><b>Centre for the Promotion of Imports from developing countries (CBI)</b> Connecting SMEs in Development Cooperation countries and fragile states to the European market.</p> <p><b>Customised country information (UQM: Landeninformatie op maat)</b> Specific information about a country.</p> <p><b>Information</b> • Countries pages • Meetings: Road2, seminars on business opportunities, etc. • Internationaal ondernemen.nl • Newsletters • "NL exporteert" app</p>	 <p><b>BUSINESS DEVELOPMENT COACHES (BDC)</b> Account holder for trading country, liaison business between community and government.</p> <p><b>PRIVATE SECTOR DEVELOPMENT COACHES (PSD)</b> Account holder for developing country, liaison between business community and government.</p> <p><b>INTERNATIONAL ORGANISATIONS (IO)</b> Liaise with investment banks such as World Bank, EIB, AfDB, ADB, ERBD.</p> <p>-----</p> <p><b>Oranje Trade Mission Fund (OHMF: Oranje Handelmissiefonds)</b> Ten SMEs realise international ambitions each year: Practical support, knowledge of local markets, access to network of diplomatic missions, participation in international trade fairs, missions.</p> <p><b>Incoming and outgoing missions</b> Meeting potential business partners, increasing market opportunities, brand awareness.</p> <p><b>Business partner scan (BPS)</b> Personal introduction to potential business partners in 60 countries.</p> <p><b>Enterprise Europe Network (EEN)</b> Finding trading partners and acting as an intermediary in technological cooperation.</p> <p><b>Dutch Visitors Programme (DVP)</b> Relationship building with foreign decision-makers.</p> <p><b>Finance Desk for SMEs</b> Finding funding.</p> <p><b>Netherlands Business Support Office / Economic Department</b> Foreign mission to support Dutch private sector.</p>	 <p><b>DHI (subsidy scheme for demonstration projects, feasibility studies and investment preparation studies of the Dutch government: Demonstratieprojecten, Haalbaarheids- en Investeringsvoorbereidings-studies)</b> <b>Demonstration project:</b> substantial exports of potential customer for a maximum of €200,000 (2017) <b>Feasibility study:</b> Demonstrate feasibility <b>Investment preparation study:</b> Sustainable economic development in developing country with growth potential Dutch SMEs, up to €100,000 / 50% of investment (2017).</p> <p><b>Holland Branding</b> Clear communication aimed at strengthening the image of corporate Holland.</p> <p><b>Partners for International Business (PIB)</b> Market access in cluster form together with Dutch government through long-term commitment in trading countries. Max. €300,000 per cluster.</p> <p><b>Sustainable Water Fund programme (FDW)</b> Promotion of PPPs in the water sector to improve water safety and water security in Development Cooperation countries. Max. €3 million per project</p> <p><b>Partners for Water programme (PwW)</b> Water safety and water security Urban Deltas. Testing and demonstration of innovative method, technology or prototype, and feasibility studies. Subsidy for companies, knowledge institutions, NGOs.</p>	 <p><b>Dutch Good Growth Fund (DGGF) and Dutch Trade &amp; Investment Fund (DTIF)</b> Helps SMEs to do business with developing countries and emerging markets vs trading countries, among other things, through loans, guarantees and participations with repayment obligation and export credit insurance and export financing opportunities.</p> <p><b>Development Related Infrastructure Vehicle (DRIVE)</b> For investment phase of development-relevant public infrastructure through investments, guarantees and loans. To be combined with bank financing in sectors such as food security, water, sexual and reproductive health and rights (SRHR), and climate.</p> <p><b>ATRADIUS DUTCH STATE BUSINESS</b> Export credit insurance, guarantee and investment insurance.</p> <p><b>NETHERLANDS FINANCE DEVELOPMENT COMPANY (FMO) – (DUTCH BUSINESS)</b> Development of international projects and offering</p>

For further information contact website: [www.rvo.nl](http://www.rvo.nl) or for additional assistance send email to: [info@verbos.nl](mailto:info@verbos.nl)

## ANNEX 9: ABBREVIATIONS

Abbreviation	Meaning
ACBF	Africa Capacity Building Foundation
AIDS	Acquired immunodeficiency syndrome
ARC	Agricultural Research Council
BSCI	Business Social Compliance Initiative
CA	Conservation Agriculture
CCAFS	Climate Change and Food Security Programs CGIAR
CCARDESA	Centre for Coordination of Agricultural Research & Development of Southern Africa
CEF	Commercial Emerging Farmer
CIAT	International Centre for Tropical Agriculture
COMESA	Common Market in East and Southern Africa
CSA	Climate Smart Agriculture
CSR	Corporate Social Responsibility
DAFF	Department of Agriculture Forestry and Fisheries
EIA	Environmental Impact Assessment
EMAS	Eco-Management and Audit Scheme
EMS	environmental management system
EnDev	Energising Development
EPZ	export processing zones
ETI	Ethical Trading Initiative
EU	European Union
FANRPAN	Food, Agriculture and Natural Resources Policy Analysis Network
FAO	Food and Agricultural Organisation
FLA	Fair Labor Association
FUSP	Fryslan Urban Sanitation Program
GAP	Good Agricultural Practices
GAWU	General Agricultural Workers' Union
GDP	Gross Domestic Product
GFSI	<a href="#">Global Food Safety Initiative</a>
GHG	Greenhouse Gases
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit GmbH
HACCP	Hazard Analysis and Critical Control Point
HIV	Human immunodeficiency virus
ICSR	International Corporate Social Responsibility
IFC	International Finance Corporation
IPCC	Intergovernmental Panel on Climate Change
IRI	International Research Institute for Climate and Society
ISP	Input Subsidy Program
KT	Knowledge Translation
KZN	Kwazulu Natal
LAP	Land Administration Project
LCA	Life Cycle Analysis
LMIC	Least & Middle Income Countries

Abbreviation	Meaning
MDAs	municipal and district assemblies
MDG	Millennium Development Goal
MRLs	maximum residue levels
NEPAD	New Partnership for Africa's Development
NGO	Non Governmental Organisation
OECD	Organisation for Economic Co-operation and Development
OGS	Organic Guarantee System
OHS	Occupational Health and Safety
RAP	Regional Agricultural Policy
RVO	Rijksdienst Voor Ondernemend NL
SADC	South African Development Community
SAI	Social Accountability International
SDGs	Sustainable Development Goals
SIFAV	Sustainability Initiative Fruits and Vegetables
SME	Small Medium sized Enterprises
WHO	World Health Organisation
BBBEE	Broad-Based Black Economic Empowerment
CMA	Catchment Management Agencies
DEA	Department of Environmental Affairs
DWS	Department of Water and Sanitation
EKN	Embassy of the Kingdom of the Netherlands
G2G	Government to Government
K2K	Knowledge to Knowledge
NWA	National Water Act
NWP	Netherlands Water Partnership
PIB	Partners in International Business
PMC	Product - Market Combination
ZAR	South - African Rand
SAAFWUA	South African Association for Water User Associations
SWPN	Strategic Water Partner Network
WAS	Water Administration System
WMA	Water Management Area
AEZ	Agro Ecological Zone
AFF	Agriculture, Forestry and Fisheries
CAADP	Comprehensive African Agriculture Development Programme
CBOs	Community Based Organizations
CGIAR	Consultative Group of International Agricultural Research
EbA	Ecosystem-based Adaption
GCF	Green Climate Fund
GEF	Global Environment Facility
GoSA	Government of South Africa
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change



This is a publication of  
Netherlands Enterprise Agency  
Prinses Beatrixlaan 2  
PO Box 93144 | 2509 AC The Hague  
T +31 (0) 88 042 42 42  
E klantcontact@rvo.nl  
www.rvo.nl

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