Ministry of Foreign Affairs

Senegal Value Chain Study - Vegetables

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SENSE

Senegal Value Chain Study - Vegetables

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Preface

A promising future in agriculture

Senegal is expanding its food production with great ambition to serve consumers and spur rural development. Products of Senegalese farmers find their way to not only domestic customers but also to export markets in West Africa and the European Union. Dutch growers realized long ago that local circumstances are very favourable for the production of high-quality, nutritious agricultural products. The relative proximity to Europe and accessibility of the wider Sahel region make Senegal an attractive partner for close cooperation.

Partly due to climatic conditions, agriculture in Senegal certainly faces challenges, such as water scarcity and soil salinity. Dutch modern technology and expertise can support (further) improvement of overall performance and sustainability of production, post-harvest handling and marketing. It goes without saying that this will benefit Senegalese farmers to produce in a more sustainable, and profitable manner. Dutch innovative technologies could improve, for example, the use of quality seeds, precision agriculture, storage and packaging.

This 'scoping study' has analyzed those value chains in Senegalese agriculture to which Dutch expertise and technology can have the most added value for improved overall performance. In the framework of the study, a number of specific business cases have been developed, which could enable Senegalese and Dutch partners to cooperate (more) successfully. The overarching objective is to build a sustainable partnership between Senegal and the Netherlands around agriculture.
I thank the consultants of Sense for their good work. For more information on the study or advice, please contact our agricultural experts through DAK-LNV@minbuza.nl.

H.E. Mrs. Joan J.J. Wiegman
Ambassador of the Kingdom of the Netherlands to Senegal

Préface

Un avenir prometteur pour l'agriculture

Le Sénégal développe sa production alimentaire avec une grande ambition de servir les consommateurs et d'accroître le bien-être en milieu rural. Au Sénégal les produits agricoles sont vendus dans les louma, les marchés locaux, et sont également destinés à l'exportation en Europe et dans les pays de la sous-région. Depuis quelques années, des producteurs néerlandais ont investi le Sénégal pour la fabrication des aliments nutritifs de très bonne qualité et pour son personnel qualifié et engagé. Du fait de sa proximité géographique avec l'Europe et l'accès facile aux pays du Sahel, le Sénégal demeure une excellente destination pour les affaires.

Cependant, l'agriculture sénégalaise est confrontée à plusieurs défis qui l'empêchent de prendre son envol notamment l'amélioration de l'agriculture durable en plein champ, le renforcement des produits post-récolte, du contrôle de la qualité et de la commercialisation; l'utilisation efficace des intrants et réduction des pertes alimentaires dans la production agricole (gestion de l'eau, fertilisation des sols, utilisation des semences de qualité). De par leur expérience, les entreprises néerlandaises pourraient être un grand atout pour l'agriculture sénégalaise. En effet au vu de cette situation, les investisseurs néerlandais sauront contribuer à amélioration de la performance globale de la production et du marketing en utilisant des technologies modernes qui rendent l'agriculture plus attrayante pour les jeunes professionnels tels que les semences de qualité, l'agriculture de précision, le stockage et l'emballage des produits agricoles.

Cette étude de cadrage agricole a fourni une analyse de certaines chaînes de valeur stratégiques de l'agriculture sénégalaise où la technologie néerlandaise peut contribuer à de meilleures performances et à des positions considérables sur les marchés de consommation. Il a également développé des analyses de rentabilisation tangibles pour que les partenaires néerlandais et sénégalais coopèrent et créent conjointement des entreprises prospères. Pour de plus amples renseignements ou des conseils, vous pouvez communiquer avec nos experts en agriculture à l'adresse DAK-LNV@minbuza.nl

L'Ambassadeur des Pays Bas à Dakar
Son Excellence Mme Joan Wiegman

Executive Summary

Since the early 2000s, The EU vegetable market has undergone a significant evolution. Thanks to international sourcing, traditional summer vegetables are now available year around. To accommodate food safety and to reduce supply chain risks, retailers prefer to source vegetables from a few, vertically integrated suppliers, who can provide reliable supplies of vegetables year-round.

Morocco, Egypt, Kenya and Senegal have developed into sourcing locations for these firms. To attract foreign investment and stimulate the cultivation of export-oriented crops, the Senegalese government has introduced incentives such as VAT and import duty exemptions. Dutch, British and local investors have responded, enabling Senegal to become a meaningful exporter of green beans and sweet corn, along with cherry tomatoes, butternut, radish and spring onion.

Despite growth in production there still seems to be unmet demand in the market between December and April, when imports and consumption of vegetables are still far below the peak. And Senegal has a good opportunity to ride this wave of development, provided that they are able to successfully attract investors.

Yet, industrial integrated production has come with consequences- both positive and negative- for Senegal. It provides much needed employment- especially of women and youth. It also contributes significantly to trade balances and revenues. Through the corporate social responsibility initiatives of these firms, there have been significant improvement made to the infrastructure, clinics, schools in these communities.

But there are also costs. Firstly, small farmers in local outgrower schemes have not been able to keep pace with food safety requirements in the EU, nor have they remained competitive. They have largely exited the export market, with only 2 smaller outgrower schemes currently exporting to the EU. And these two remaining schemes face intense pressure from industrial producers who are lobbying to have outgrower schemes banned from being able to export. This they hope will avoid produce with less tightly controlled pesticide residues from reaching the EU and ruining the market for all Senegalese producers.

Secondly, industrial intensive production methods require intensive irrigation & pest control. This has an impact on soil health. The demand for water in the Dakar, Niayes and even along the Senegal River Valley require judicious use of the existing water resources, with far greater control on where production is planned, what this means for water supply and finally how to control salinisation that is increasingly problematic. This has both implications for the types of research and development needed in Senegal, for the dissemination of this knowledge and finally for the regulatory development and implementation.

Expanding investment in the production of vegetables for the EU winter season seems to make commercial sense and can deliver some development impact. Yet to make the most of this opportunity the investment promotion authorities APIX and ASEPEX (exports) would need to be strengthened. Some key areas highlighted by investors are clarification of land rights & efficient delivery of incentives. Poor administration mean that these are often not practically obtainable for investors. Finally, knowing the pressure on land and water resources it would be sensible to support APIX and ASEPEX to become better at investment promotion. This would include

improving their ability to develop project concepts that include land and water management; troubleshooting and support of existing investments to expand.

Résumé

Le marché européen des légumes a connu une évolution importante depuis le début des années 2000. Grâce à l'approvisionnement international, les légumes d'été traditionnels sont désormais disponibles toute l'année. Pour assurer la sécurité alimentaire et réduire les risques liés à la chaîne d'approvisionnement, les détaillants préfèrent s'approvisionner en légumes auprès de quelques fournisseurs verticalement intégrés, qui peuvent fournir des approvisionnements fiables en légumes tout au long de l'année.

Le Maroc, l'Égypte, le Kenya et le Sénégal sont devenus des sources d'approvisionnement pour ces entreprises. Pour attirer les investissements étrangers et stimuler la culture de produits destinés à l'exportation, le gouvernement sénégalais a mis en place des mesures d'incitation telles que l'exonération de la TVA et des droits d'importation. Les investisseurs néerlandais, britanniques et locaux ont répondu à l'appel, permettant au Sénégal de devenir un exportateur important de haricots verts et de maïs doux, ainsi que de tomates cerises, de courges butternut, de radis et d'oignons de printemps.

Malgré la croissance de la production, il semble que la demande demeure supérieure à l'offre sur le marché entre décembre et avril, lorsque les importations et la consommation de légumes sont encore bien inférieures au pic. Le Sénégal a la possibilité de surfer sur cette vague de développement, à condition de réussir à attirer les investisseurs.

Pourtant, la production industrielle intégrée a eu des conséquences pour le Sénégal, aussi bien positives que négatives. Elle crée des emplois très nécessaires, en particulier pour les femmes et les jeunes. Elle contribue également de manière significative à la balance commerciale et aux recettes. Grâce aux initiatives en termes de responsabilité sociale de ces entreprises de taille industrielle, des améliorations significatives ont été apportées aux infrastructures, aux cliniques et aux écoles de ces communautés.

Mais la production industrielle entraîne aussi des coûts. Premièrement, les petits agriculteurs participant à des programmes locaux d'aide aux petits exploitants n'ont pas été en mesure de suivre le rythme des exigences de l'UE en matière de sécurité alimentaire, ni de rester compétitifs. Ils se sont largement retirés du marché de l'exportation, et il ne reste que deux programmes d'aide aux petits exploitants exportant actuellement vers l'UE. Et ces deux programmes d'aide aux petits exploitants restants sont soumis à une forte pression de la part des producteurs industriels qui font pression pour qu'il soit interdit à ces petits exploitants d'exporter. Les producteurs industriels espèrent ainsi éviter que des produits contenant des résidus de pesticides moins strictement contrôlés n'atteignent l'UE et ne ruinent le marché pour tous les producteurs sénégalais.

Deuxièmement, les méthodes de production industrielle intensive nécessitent un contrôle de l'irrigation intensive et une lutte contre les parasites. Cela a un impact sur la santé des sols. La demande d'eau dans la région de Dakar, des Niayes et même le long de la vallée du fleuve Sénégal nécessite une utilisation judicieuse des ressources en eau existantes, avec un contrôle beaucoup plus important sur le lieu de production prévu, sur ce que cela signifie pour l'approvisionnement en eau et enfin sur la manière de contrôler la salinisation qui est de plus en plus problématique. Cela a des implications à la fois sur les types de recherche et de changement nécessaires au

Sénégal, sur la diffusion de ces connaissances et enfin sur l'élaboration et la mise en œuvre de la réglementation.

L'augmentation des investissements dans la production de légumes pour la saison d'hiver de l'UE semble être commercialement justifiée et peut avoir un certain impact sur le développement. Cependant, pour tirer le meilleur parti de cette possibilité, il faudrait renforcer les autorités de promotion des investissements APIX et ASEPEX (exportations). Les investisseurs insistent notamment sur des éléments clés tels que la clarification des droits fonciers et la mise en place efficace d'incitations. En raison d'une mauvaise gestion, il arrive souvent que les investisseurs ne puissent pas les obtenir dans la pratique. Enfin, compte tenu de la pression exercée sur les ressources en terre et en eau, il serait judicieux de soutenir l'APIX et l'ASEPEX afin de mieux promouvoir les investissements. Il s'agirait notamment d'améliorer leur capacité à développer des concepts de projets incluant la gestion des terres et de l'eau, la résolution de problèmes et le soutien des investissements existants pour l'expansion.

Table of Contents

1 Background and Method

The aim of this study is to provide insights into the Senegalese vegetable value chain and to define critical interventions that are needed for the sector to flourish. Ultimately it is hoped that these interventions will play a useful part in fueling an improvement in the livelihoods and food security of the Senegalese people, while improving the lot of women and youth and the environment.

More specifically the study aims to (i) describe the market, production and enabling environment in the onion chain in Senegal (ii) reveal the key issues, opportunities and bottlenecks in the value chain (iii) propose specific interventions that can help to address these bottlenecks & allow for the value chain to have greater impact (iv) identify areas where inclusive participation of women and youth in the economy can be stimulated (v) highlight opportunities for improved circular economy practices (vi) recommend areas where public, private and the knowledge sectors can make valuable, if not unique, contribution to these interventions.

The study involved 3 distinct phases. Firstly, desk research was conducted to understand the existing knowledge and open questions when it comes to the onion value chain. This was supported by interviews with subject matters experts. Generally, these were people, businesses or institutions who provide supporting services, knowledge development or institutional support in the agricultural sector in Senegal. To get a better understanding of Dutch expertise and strategic and commercial interests, interviews were conducted with businesses who trade with Senegal, professional sector organisations, research institutes or service providers who offer knowledge services in aid of Senegalese agricultural development etc. These were complimented with interviews of various sector experts involved in business development and access to finance support for East African export vegetable producers.

In step 2 we carried out field research in the Senegal River Valley area as well as in the Niayes. This included visits to farmer groups, marketing platforms, financial institutions, the Senegal River Valley Development Authority (SAED) and industrial growers.

Finally, in step 3, field research was conducted with 75 consumers, 15 trader and representatives in 3 cities/town in Senegal viz Dakar, Thiès and Pikine. 5 representatives from the Hotel restaurant and catering field (HoReCa) were interviewed in Dakar.

We must highlight that this research was carried out during the COVID 19 period, but after local constraints on travel were lifted. This has both advantages and disadvantages. A large number of interviews could be conducted telephonically, which made including a variety of perspectives and experiences from Senegal and the Netherlands far more possible. In some instances, the new “work from home” norm made interviewees more available. A downside was that research was carried out later than planned- outside of the key production period for onions. Nevertheless, access to farms, financial institutions and marketing platforms was possible during the fieldwork. These greatly enriched the quality of insight reflected in this report.

2 The Market for Green Beans

2.1 The European Market for Vegetables

Production of summer vegetables for the European winter has been a long-established activity in Senegal. The very first attempts were made in the 1970s when Bud Holland began to produce green beans for export to the Netherlands. Since then, European shoppers expect that fruit and vegetables, previously only available in season, are now available all year round. Global sourcing has expanded to cater to this need.

Shoppers are however not only looking for a continuous supply of produce. They're also increasingly concerned with quality and food safety. In response, retailers have been at the forefront of various food safety standards. Producers around the world are generally required to meet minimum pesticide residue standards and phytosanitary controls. In many cases certified product is seen as a minimum criterion required to trade with EU importers. HACCP, BRAC and a host of other certifications provide some measure of control that signal to retailers that the products are safe.

To avoid reputational risk, retailers have focussed on tightening control over their supply chain. Increasingly they are working with fewer suppliers, who are tasked with sourcing product all year around. In turn these suppliers have invested not only in strengthening relationships with producers in developing markets, but in themselves producing abroad. Often, they produce in a variety of locations around the world, making sure that as one country comes to the end of the season, they're able to source produce from another.

The food services sector (restaurants, hotels and catering) is another key outlet for produce in addition to consumers. Typically, wholesalers purchase produce from around the world. They then supply this to the food services sector and especially the hotel, restaurant and catering trade. The diffuse nature of this sector means that there's lower reputational risk. As a result, they have less of an incentive to control the supply chain. These wholesalers tend to source produce from more suppliers. They're also more fluid in their choices than retailers. From season to season they're able to switch suppliers. Nevertheless, food safety is important. So long term relationships are also valued.

2.2 The Market for Green Beans

Green beans are an important vegetable in most of the EU, and one of the most popular across most of the EU. Traditionally green beans are a summer vegetable, though the season has been increased through growing of different varieties in different countries across the EU.

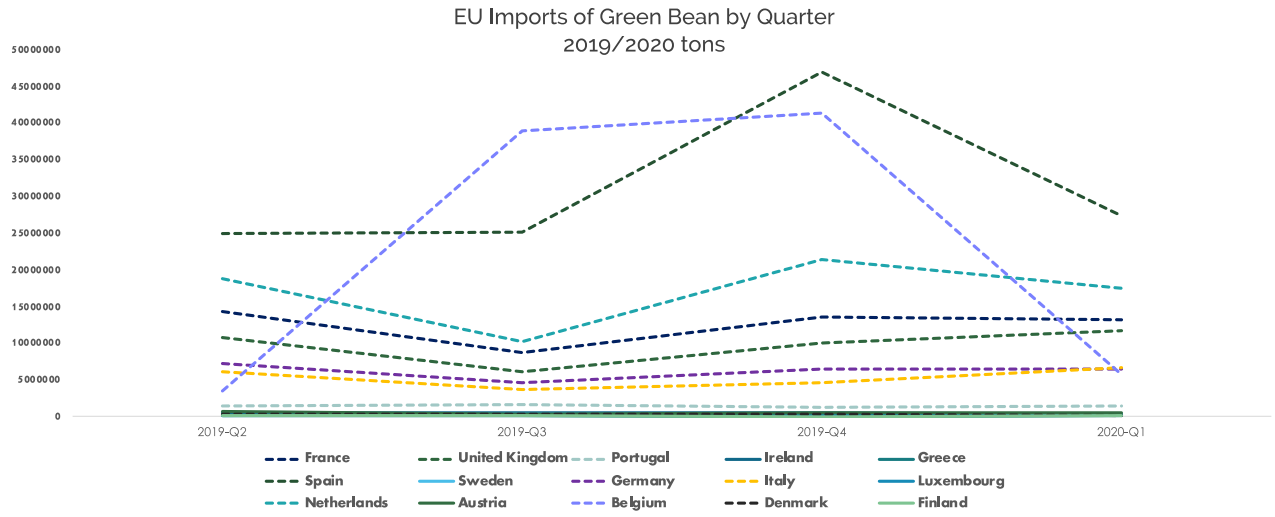
Yet, green beans have one major difference from many other vegetables such as peppers, tomatoes, courgettes: they have remained an open field crop. Where many other vegetables can be produces year-round in green houses, this is not the case for green beans. The yield per area is simply too low to make growing in green houses economically feasible. In addition, picking of green beans is very labour intensive and thus expensive in Europe. As a result, green house farmers have much more lucrative alternatives, and the EU remains in winter dependent on import from areas where green beans can be grown in open fields.

To a limited extent fresh green beans from Senegal and other African producers also compete with frozen beans. However, in terms of flavour and structure they are not comparable at all. Frozen green beans are mostly consumed as broken beans mixed with carrots and other vegetables.

The demand for green beans in the EU winter can thus only be met by fresh imports. Spain is the largest importer of green beans in the world. 20% of the worlds green beans are sourced by Spain, who import the some of the largest volumes of green beans throughout the year.

By autumn Belgium begins to ramp up imports of green beans. This is both for the fresh market and frozen vegetable production. By the peak winter months all of Europe begins to import green beans.

Figure 1: EU Imports of Green Beans Per Country



EU imports of green bean in the winter month are sourced from Morocco, Egypt, Kenya and Senegal[1].

Morocco is the world's largest supplier of export green beans. Over a quarter of global exports originate from this country. As a result, they supply to most of the EU market. However, the bulk of their green beans (63%) are exported to Spain, who sources almost exclusively from Morocco. Morocco is also an important sourcing destination for France and the Netherlands, who each import 16% of Morocco's green bean exports. Collectively Spain, Germany and The Netherlands account for more than 90% of Moroccan green bean exports annually.

To complete supply from Morocco the Netherlands has developed secondary sourcing in Egypt, Senegal and Kenya. France relies largely on Kenya as a secondary sourcing origin. Belgium and the United Kingdom both use Kenya as a primary sourcing location. This produce is mostly air-freighted, but some sea freight is also used.

But secondary sourcing locations differ. Belgium sources this from Egypt, while the United Kingdom sources from Morocco and Egypt. Both of these locations allow for sea and air freight, and road freight from Morocco to Belgium.

[1] Egyptian exports are excluded from these figures as they are unreliable

Figure 2 Export volumes from African Green Bean Producers to Key EU Importers

Export volumes from Key African Producers to Key EU importers				
	Morocco	Egypt	Kenya	Senegal
Spain	86 000			
Belgium		4 800	9 400	1 400
Netherlands	22 200	7 800	4 200	7 500
France	22 200	792	5 000	454
United Kingdom	4 000	4 000	15 000	1 340
*Source: ITC Trade Map				

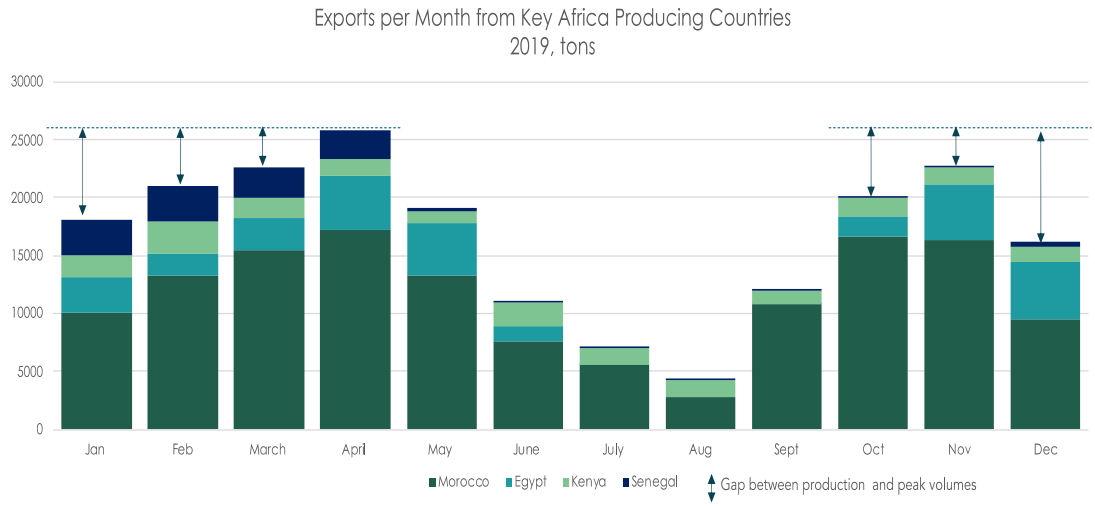
Volumes being exported from Kenya have fallen since the start of the decade. Today, Kenya exports only a third of the green beans they exported in 2012, with much of these declines coming from the UK. Exports from Morocco and Senegal have grown over this period, with Morocco adding more that 10 000 tons of green bean exports, largely in the winter period.

Figure 3 Changes in Export Volumes from Key African Exporters to the EU

Change in Volume and Value of Exports (2015-2019)				
	Morocco	Egypt	Kenya	Senegal
	+10 000 tons	-10 000 tons	-3 000 tons	+1 000 tons
Volume Growth	+3%	-2%	-3%	+4%
Value Growth	+20%	-14%	-3%	+8%
*Source: ITC Trade Map				

During winter month, imports from Morocco, Kenya, Egypt and Senegal into the EU peak at just under 26 000 tons. However, for much of the winter they sit far below this maximum. This gap in production suggests that there is space to export increased volumes between October and March. It would seem that from May to September export volumes are limited because of competition from production in the EU. Figure 60 shows the gap between maximum exports and consumption in April and actual exports for the month when the EU does not produce green beans.

Figure 4 Monthly Green Bean Exports from Key African Countries[2]



2.3 Types of Beans

Though we talk about green beans in general terms, there are actually two types of beans consumed in the EU: fine beans and bobby beans. Southern Europe prefers fine beans which are no wider than 9mm. Northern European buyers tend to prefer a larger bean that's also wider (>9 in width). This is the bobby bean. Producers thus have to choose which market they focus on.

The size of the bean is not so much determined by variety but the time on the stem. Fine green beans are harvested every two days whereas bobby beans are harvested every 4 days.

2.4 Local Market

A combination of low consumption and low production have made for a relatively small market for vegetables, with a narrow variety in the market. Tomatoes, potatoes, onions, okra and aubergine are consumed more often. However, green beans and sweet corn are eaten relatively infrequently. In other markets where European vegetables are grown for exports, rejects are often sold on the local market at affordable prices. This stimulates demand of these vegetables. For example, Kenyans now eat green beans fairly often and see it as a part of their regular menu of vegetables. Yet 10 years ago this wasn't the case.

However, in Senegal producers who want to benefit from VAT exemption and other financial incentives for exporters are limited to being able to sell only 20% of their produce locally. As a result, consumption of green beans and other export oriented vegetables is growing slow and the market is quite small.

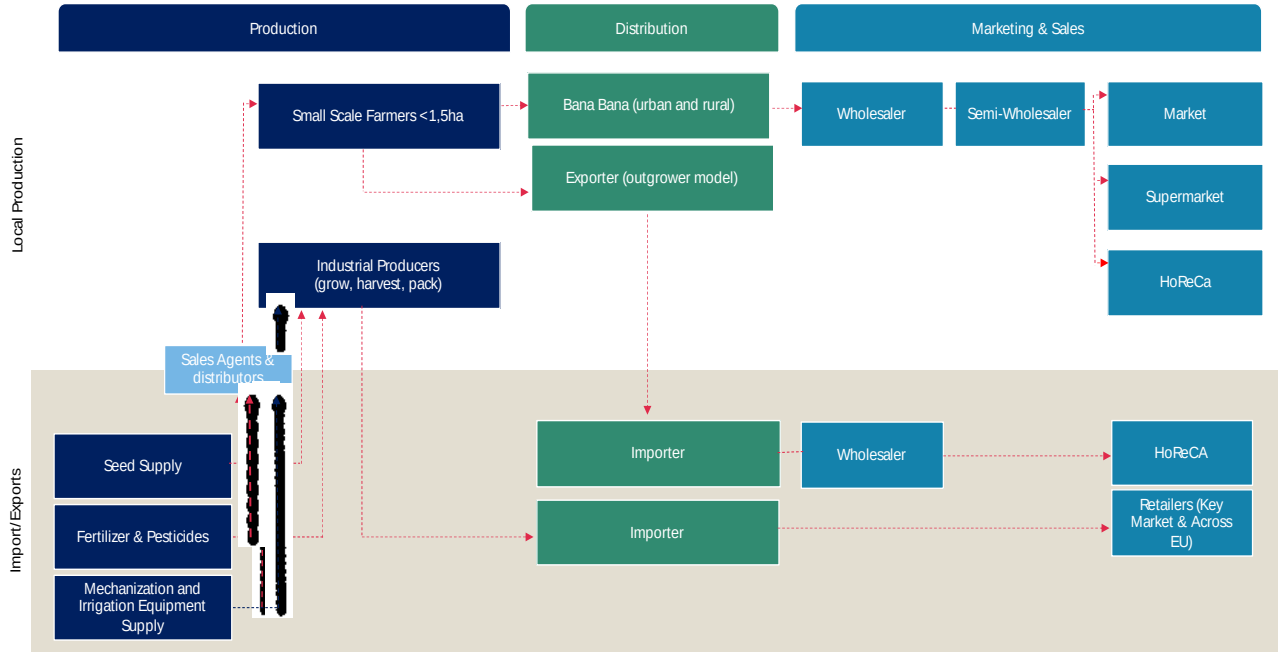
3 The Structure of the Value Chain

[2] Volumes exported from Egypt have been calculated using EU country import figures. Monthly export figures were not available for the Maghreb and East Africa. These monthly export figures were computed based on the monthly contributions going to the EU.

3.1 Overview of the Value Chain

The value chain is relatively simple, with the bulk of volume moving from large industrial producers to importers in the EU who sell to retailers, or wholesalers for the HoReCa market. Only 2 outgrower schemes exist where small producers export to the EU. Small scale farmers supply the national market via a long chain of traders (bana bana), wholesalers and semi-wholesalers.

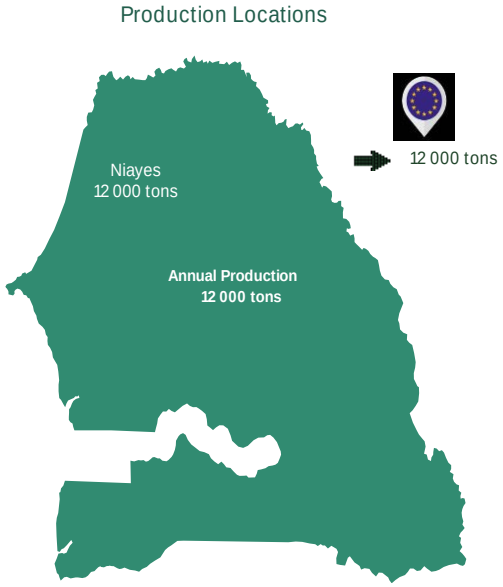
Figure 5: Overview of the Green Bean Value Chain



3.2 Production Locations, Calendar and yields

Green beans and sweet corn are largely produced in the Niayes and along the Senegal River near Saint Louis.

Figure 6: Map of the Growing Region For Export Vegetables



Between July and October humidity and high temperatures prevent producers from sowing seed. Disease pressure is markedly higher than during the dry season. So, some producers in Senegal close their operations. Then, in October, as the humidity and temperature falls farmers begin to prepare for the winter dry season production. A variety of vegetables are planted at this time. These range from onions and potatoes, to European vegetables such as green beans, sweet corn, cherry tomatoes, radish, spring onion. Some local vegetables such as Okra, peanuts, manioc etc are also grown in this season.

Rainfall in Senegal is low, but especially at this time of the year along the Senegal River Valley. As a result, these vegetables are grown under irrigation.

Senegal produces both the fine bean for Southern Europe and the bobby beans for northern Europe, which are basically the same variety but harvested at different intervals. Fine beans are harvested every two days whereas bobby beans are harvested every 4 days and thus have time to grow larger.

Figure 7 Overview of growing season in Senegal

	Cold Season Crops			Hot Season Crops		
	Early Crops (hasty)	Full Season Crops	Medium-Late Season Crops	Late Crops		
	Sowing/Growing Dates					
Variety	October	November-December	January-February	March-April	May-June	July-October
Green beans	*	*	*	*		
Sweet Corn		*	*	*	*	
Outgrower local vegetables	*	*	*	*		
Operations closed for some industrial producers						*

3.3 Producer Typologies

3.3.1 Large Industrial Producer

Six large industrial producers of green beans and sweet corn have sizeable investments in Senegal. These fall under an export promotion scheme which allows investors exemptions on VAT and customs duties on the import of equipment for 10 years. In return these companies are prohibited from competing with local market gardeners and are limited to selling no more than 20% of their produce locally.

All six producers produce primarily for retailers in the EU. There's a strong connection of producers to specific markets. SAFINA and Van Oers have their primary clients in the Netherlands while Barfoots and SCL focus first and foremost on the UK. GDS focuses on France while Misname focuses on Italy. The ambition is for these companies to produce a variety of vegetables for the winter months. Some opportunities that are technically possible are butternut, squash, onions, peppers, tomatoes. Yet, the reality is somewhat different. The focus of these companies until now has been on combined exporting of green beans, sweet corn and mangoes.

One of the core capabilities of these four companies is quality, yield control and continuous supply. They're required to produce high quality vegetables that meet retailer specification as well as the stringent EU food safety controls. As a result, these operations tend to be entirely integrated. Production, packing, marketing and logistics are all carried out by these companies themselves, with very little need to source inputs or services from the local market.

A second important skillset is their focus on delivering a continuous stream of produce throughout the season. To achieve this, they plant seed in weekly intervals from October through to March. This allows for ongoing harvesting and weekly deliveries to the EU.

The products can be shipped via sea freight. However, road freight has opened up for exporters. The produce can travel via Morocco to Spain and then onwards to the Netherlands. Within 9 days exporters are able to have produce in Dutch supermarkets. Because trucks are able to leave daily with smaller loads, receipts on the EU end are possible every day. This is in strong contrast with sea freight which requires consolidation of volumes and allows for weekly departures. Freight to the UK is generally via ship which takes 6 days.

These farms have their own privately-owned pack-houses and cooling facilities. These allow them to prepare and package produce for the EU. This involves top and tailing the beans and packing them in to shelf ready consumer packaging of 250 g and upwards depending on the needs of the retailer.

Farms in the Senegal River Valley source water for irrigation from the river, while those closer to Dakar use water from boreholes that sometimes go 100 m below the surface. Because these farms cannot sell vegetables or other crops for human consumption on the local market, they tend not to produce anything during the hot and rainy season. This tends to lead to a reduction of soil fertility, particularly a loss of organic matter and micro-organisms as the barren soil bakes in the sun. It also leads to soil salination, when salty ground water gets drawn up in a capillary reaction.

To solve this problem, SAFINA has experimented with production of rainfed Sorghum and irrigated maize for the production of silage for dairy farmers. However, in the Niayes where they are the irrigation cost are too high for profitable silage production. Furthermore off-takers are not always reliable, and the effort for a small profit is very high.

SCL has tried to produce silage from reject green beans and sweet corn, but the technique was poor, and this resulted in bad quality silage that was impossible to sell. Because they are located in the Senegal River Valley, irrigation is cheaper and maize silage production could be possible.

Both Safina and GDS have diversified into Mango production which has a complementary export season.

Figure 8 provides an overview of the large producers of vegetables.

Figure 8 Overview of Large Commercial Producers of Export Vegetables

	Barfoots SCL	Safina	GDS (Compagnie Fruitière)	Van Oers	Miname	West Africa Farms
Key Market	UK	Netherlands (AH)	France (EU redistribution)	Netherlands/ France, European Redistribution	Italy	UK

Export Crops	Sweetcorn, green beans, butternut squash, courgette, sweet potato, chillies	Green beans, mangoes, sweetcorn	Cherry tomatoes; Sweetcorn, mango,	Green Beans, Spring onion, Sweet Corn	Green Beans	spring onion, radish
Sweet Corn	18 000 tons		3000 tons			
Green Beans	2250 tons			6800 tons	1300 tons	
Tomato			10 000 tons			
Local Market crops				Onions, Cabbage, Carrot	Tomato, Carrots, Okra	
Land Area	2500 ha, 8ha covered	3000ha	255ha	600ha	500 ha	300 ha
Transport	Sea	Sea, Road	Sea	Air- 5% Sea- 80% Road: 15%	Road	Sea
Location	Saint Louis	Thiès	Diama, North of Saint Louis	Dakar (airport area)	Thiès and other	Saint Louis

3.3.2 Small Scale Producers

Historically outgrower schemes enabled a host of small-scale vegetable producers to produce for the EU. However, the stringent food safety controls alongside the availability and general use of disallowed pesticides in Senegal have made this type of production risky and very small in scale for export. Nevertheless, small scale export production models do exist in Senegal. In this model two exporters act as consolidators of the volumes from small scale producers. They then pack this produce ready for the EU. Since the early 2000s this method of production has decreased in importance. Stricter controls in Europe and the strategic ambitions from importers has meant that investments have tended to veer away from outgrower schemes.

The small scalers produce on small parcels of land, generally less than 1 ha in size. Some larger producers and cooperatives do exist (>5ha), but are an exception. Most farmers have a variety of crops, thanks to increased uses of irrigation. In general vegetables are only one of the crops that are produced throughout the year. A small-scale farmer might produce an onion, vegetable and or potato crop throughout the dry season i.e., winter. Then in summer they could switch production to rice.

In general, the few small-scale producers cultivating these vegetables tend to focus on the much smaller local market. In some cases, this is facilitated by industrial producers who assist small scale vegetable producers in a quasi-outgrower scheme. Usually, the farmers focus on vegetables for the local market. These are peanuts, onions, cabbage, tomatoes, okra, niebe etc.

3.4 Input Supply

The integrated producers source seed from international private sector companies. Quality seed is supplied by companies such as Bejo Seeds, who have a strong working relationship with these firms. For the more vertically integrated producers who produce in multiple countries, inputs in general are sourced for the entire group, rather than for their Senegal locations alone.

Government seed subsidies don't extend to green bean, sweetcorn or other classic vegetable crops, so they don't distort the seed market dramatically. However, subsidies on fertilisers affect the perceived value of fertilisers on the unsubsidised market. Subsidies of 50% are on offer for grains such as maize and rice. There is some leakage from this system. Corruption and maladministration mean that sometimes small commercial farms get access to the inputs that are intended to benefit small scale subsistence and staple crop production. Also, the overlap between farmers of rice, maize and vegetables is large, and often subsidised grain fertilisers are used in vegetable production. As a result of the subsidy, they expect that fertiliser should cost less.

Pesticides- both certified for use in the Eu and not are all available in Senegal. In fact, some would argue, too available and affordable. Over usage of uncertified pesticides is one of the main reasons importers hesitate to source from small scalers.

3.4.1 Local Seed Multiplication

Local multiplication of vegetable seed is only done on a very small scale by cooperatives in the sector. This isn't a major part of commercial production. Even small-scale producers typically access green bean and sweet corn (and other vegetable crops such as tomatoes, aubergine, squash etc) seed via input suppliers.

This sector is monitored more for the tax reasons and the impact on the local producers, than for proactive regulation of the sector.

3.5 Route to Market

Generally, the vertically integrated firms manage their own logistics and marketing. They tend to have a primary market and then produce is redistributed using the networks developed by their parent company or key clients. For example, Barfoots SCL has a UK partnership that directs most of their produce to the UK market. In the case of GDS, the French parent company co-ordinates imports via Marseille. Van Oers tends to manage redistribution of vegetables via the Netherlands. The primary markets serviced by Dutch suppliers tends to be Northern Europe and especially Germany.

French and Spanish importers tend to focus on Southern European markets. This might be a consequence of the different preferences for bean dimensions. Southern Europe tends to prefer extra fine beans.

3.5.1 Wholesalers

While Senegalese producers tend to produce for major retailers, it's important to recognise that there is a different route to market for the Hotel, restaurant and catering chain. Typically, importers will source produce, which they then sell to wholesalers. Wholesalers will then supply to the HoReCa channel.

3.5.2 Local Market Traders (Bana Bana's) & Coxeurs

Local vegetable production- outside of tomatoes, onions, sweet potatoes and aubergines potatoes- are relatively niche in Senegal. As a result, traders and coxeurs play a much smaller role than in other value chains.

Where they do operate, they purchase vegetables from the small producers and then transport these to wholesalers in markets where the vegetables will be sold. But as local bean and sweet corn consumption is still low in Senegal and rejects from the export chain cannot be sold on the market for food, their role in the total value chain is limited.

3.5.3 Wholesalers- local

In larger markets, traders may sell the vegetables to wholesalers, but for beans and sweet corn this is not frequent.

3.6 Indirect Actors in the Onion Supply Chain

3.6.1 Professional Organisations

Professional organisations, or groups of economic interest (GIE's) are a typically a common feature of the agricultural sector. Various cooperative unions, producer federations, groups and associations all work in some way to organise farmers at the local, regional and national level. However, vegetable production is green beans and sweet corn is still too nice to have very meaningful representation in the system of GIE's.

However, as these farmers tend to grow these vegetables as a secondary crop, it's important to consider their membership of other GIE's related to primary crops. Onion and rice associations (near Saint Louis along the Senegal River Valley) for example are amongst the strongest and most organised in the country. These would be useful entry points to work with farmers in Senegal. Some of the more active professional organisation in onions and potato are listed below:

Figure 9 Overview of Active Professional Organisation in the Onion and Potato Chain

Potatoes	Onions
• Book ligueye Notto gouye diamma • APMK Association des producteurs Maraîchers de Kayar • GIE des Producteurs Maraîchers de Kayar • Association des Producteurs Maraîchers de Fass Boye	• UGPAR (Union des Groupements et Agriculteurs de Rao) • UFMT (Union Forestière et Maraîchers de Thieppe) • APOQ (Association des Producteurs d'oignons de Qualités de Potou) • UGPM (Union des Groupements des Producteurs de Mboro)

3.6.2 Banks and Microfinance Organisations

Local banks do provide financing to larger producers, but for large integrated producers it is cheaper to organise finance in the Eu where the interest rate is much lower. In theory small scale vegetable farmers are able to access financing through the **CNCAS**. However, the vegetable market is very small, with no clear signs that there is momentum building in demand. In fact, since the early 2000s when food safety controls were tightened in Europe, production has declined. As a result, self-financing is largely required for working capital related to vegetable production. However, fixed assets investment can be financed through other crops such as onions or rice via the microfinance organisations active in the onion sector. But in Senegal a combination of low appetite for risk and high interest rates as well as low awareness of available products means that most farmers avoid formal credit products. In reality most farmers who are not able to self-finance, get financing from traders or personal networks. Where they are interested in pursuing financing from the banking system then tend to turn to micro-finance organisations.

PARMECAS, and the Union Financiers Mutualiste are some of the MFI's extending loan products to small scale farmers. These institutions offer unsecured lending, at 16% interest per year with a payback period of 3 years for investments in equipment or working capital for inputs. The growing popularity of solar irrigation- and the fact that it makes good business sense- means that this has become an important area of activity for these MFI's. These MFI's tend to work with the input and equipment suppliers, who provide interest free loans to the MFI's. They in turn conduct an assessment of the producers' credit needs, provide advice and conduct an assessment of the general credit worthiness of the recipients.

The MFI's are also able to access funding from the Priority Investment Guarantee Fund (FONGIP).

3.6.3 Agricultural insurance in Senegal

Agricultural insurance developed fairly recently in Senegal. The National Agricultural Insurance Company of Senegal offers a variety of insurance products in all agricultural sectors with the exception of livestock and fishing. Risks of crop failure due to flooding or (index insurance), to damage caused by birds, wildlife, etc. are some areas that are covered.

Large scale industrial producers tend to make us of this funding and insure their crops at 100% of the crop value. Small scale farmers, on the rare occasions that they take out insurance at all, insure only the inputs costs. This provides them some degree of protection from major losses, without eating too heavily into profits.

3.6.4 The Knowledge Sector

Knowledge and skills development are two important supporting activities in the agricultural sector. The ideal is a combination of proactive research and development, which is then enriched and disseminated to professional education, vocational training and extension services. The challenge is however that development happening in the "vegetable" sector is driven by four private enterprises, which are closed by nature. The knowledge is not widely accessible nor widely disseminated.

Agricultural research and development falls under the remit of the Senegal Institute of Agricultural Research (ISRA), which in turn falls under the Ministry of Agriculture and Rural Equipment's

(MAER) but operates as an autonomous unit. The Institute of Food Technology and the Universities of Dakar, Thiès, Saint Louis and Ziguinchor all contribute to knowledge development in the sector. Some private companies are also involved in research. For example, Tropicasem conducts applied research. This involves testing whether the available seed performs in the Senegalese environment.

The local knowledge developers listed above also work alongside international actors. For example, International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) of the CGIAR and advanced research institutes and universities in Europe (e.g., the Institute for Research on Development, France) and North America (e.g., University of Florida).

As these specific vegetables are not a major crop in Senegal, they're not active in much related research and development, if any at all.

3.6.5 Extension Services

The framework for extension services in Senegal are well provided for. However, as vegetables are not a staple foodstuff, they receive relatively little attention. Private-sector extension services delivered by input dealers is likewise relatively inactive apart from a few exceptional examples. For example, Bejo and Beemsterboer worked with small scale farmers for an onion outgrower model. Nevertheless, it's helpful to get a sense of the overarching system as it could provide routes for providing support in the future. So, a general overview is provided below.

Extension Services are designed to be coordinated and developed by **ANCAR**. This state funded agency has extension staff in each of Senegal's 45 districts and 190 counties. However, a chronic shortage of funds means that there's been a high vacancy rate in the organisation since 2017. To support ANCAR, Special Regional Development Agencies **(SRDR's)** were established by the government. They operate in particular zones and on particular theme. For example, the Senegal River Development Agency (**SAED**) was created in in the Senegal River Valley to support the development of irrigated agriculture there. The Agency's advisory service employs 85 field extension staff equipped with motorbikes and 12 supervisors. Extension activities include participatory diagnosis, needs assessment, implementing activities and monitoring and evaluation. SAED receives funding from the government and is currently managing seven donor- financed projects funded by the African Development Bank, the French Development Agency, the Japanese International Cooperation Agency, the Korea International Cooperation Agency, the Kuwait Fund, the Saudi Fund for Development and the World Bank.

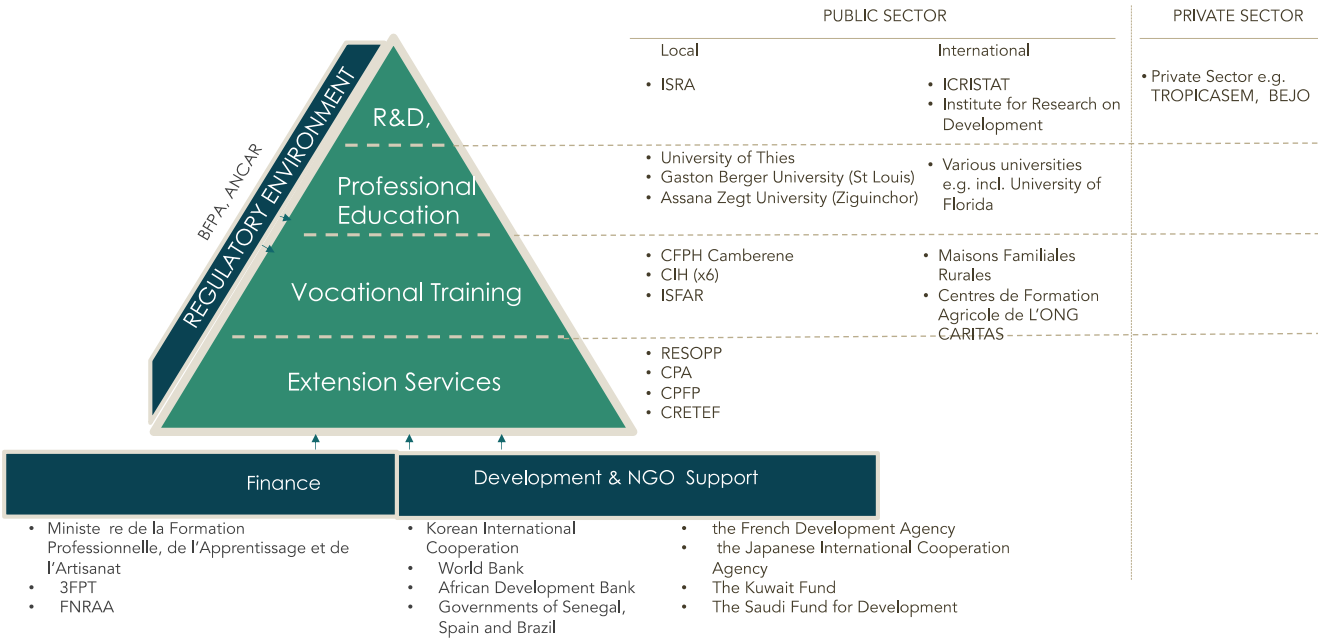
Another relevant agency is **ANIDA.** Founded in 2006, the National Agency for Agricultural is tasked with creating large, modern farms in "community agricultural domains," primarily to serve as employment opportunities for rural youth and to promote agricultural development. Twelve such domains are in operation and include over 100 farms. ANIDA employs 70 extension agents, who are supervised by 12 extension managers. Donors include the African Development Bank and the governments of Senegal, Spain and Brazil. In addition to extension services, these organizations provide a range of support including infrastructural development and supply of inputs.

Some professional and cooperative organisations provide training for their members. For example, RESOPP. This is a is a federation of farmer cooperatives, which offers training services to its member cooperatives as well as non-members. To realise this goal, they have training facilities in 8 out of the 15 regions in which Senegal is divided.

Centre Polyvalents de Formation des Producteurs (**CPFP**) & the Centres régionaux de formation technique et professionnelle, (**CRETEF**) provide training on agricultural techniques and innovative techniques for farming amongst other topics. These are targeted at producers.

The small scale of production and especially commercial enterprise related to these specific vegetables suggests that this is a small and relatively unimportant activity area for these extension services providers. However, should outgrower schemes become popular as a mode, local shoppers begin to look for these vegetables more often, or this be seen as a means to develop a more varied diet in Senegal, then this will need to be rectified.

Figure 10 Overview of Knowledge and Skills Development Actors in Senegal



Financing of skills development and research and development related to agriculture is provided by the National Agro-Food Research Fund of Senegal . This is a government agency established in 2004 that mostly funds research but has recently started funding dissemination of knowledge. The National Fund for Agro-Sylvo Pastoral Development (FNDASP) provides funding to support for the dissemination and large-scale adoption of technologies. They also fund projects that will expand the availability of certified seeds for priority sectors by promoting sustainable seed systems. Finally, bilateral and unilateral donor agencies such as the World Bank provide financing within specific programs e.g. The World banks funded West African productivity program.

3.7 Regulatory environment

The Bureau de la Formation Professionnelle Agricole (**BFPA)** is a service department of the ministry of Agriculture. They are responsible for coordinating agricultural and rural training policy in Senegal. Their ambition is to provide education to especially the rural population of Senegal by supporting and coordinating initiatives that improve agricultural education.

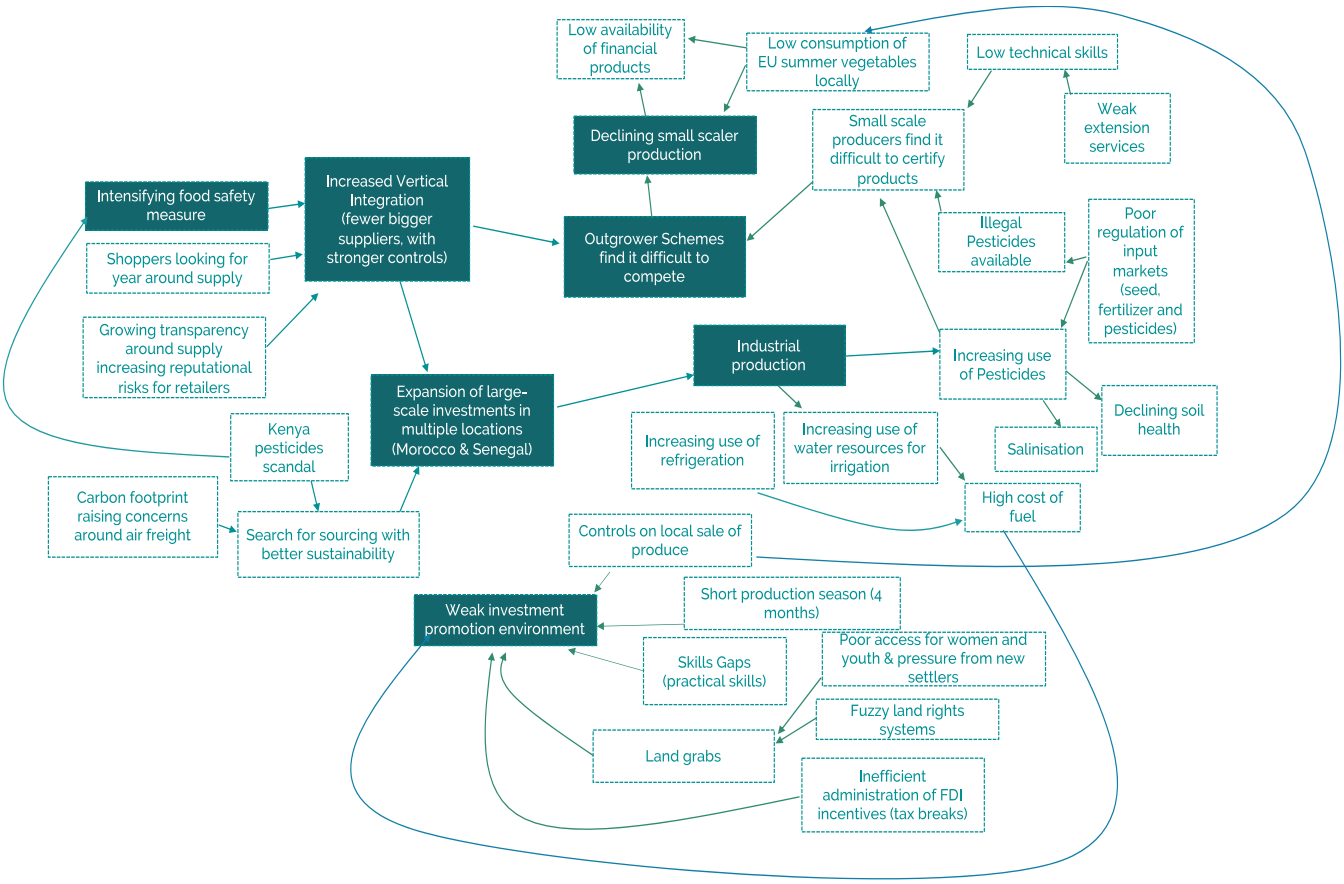
ANCAR is a parastatal that was formed in 1997 and given the role of providing advisory services throughout the country. ANCAR's mission is to provide a national system of rural and agricultural advisory services through improving advisory service delivery, harmonizing advisory methods, and facilitating a network of public and private advisory services. While the hope was that state funding would diminish over time, in reality it remains are largely public sector funded organisation. In addition to providing advisory services, they also are to link farmers to the providers of inputs, credit, marketing and processing services.

4 Issues and Opportunities along the Value Chain

4.1 Overview

Figure 11 provides an overview of key issues and opportunities in the value chain and how they are linked together.

Figure 11: Overview of Issues and Opportunities in the Value Chain



4.2 Growing Demand For Green Beans And Under Supplied Market

The import statistics clearly illustrate there is space in the market for more exports, which can offer an opportunity to grow production. However, Senegal at the moment does not seem to be the preferred location for expansion due to the short production season and high start-up cost that make it difficult to earn back the initial investment.

4.3 Short Production Season

Production in Senegal is limited to 4 months. Yet export oriented models need a large investment in packaging and cooling facilities. This is a heavy burden for producers, many of whom are looking to how they can use their equipment and staff for longer periods in the year. This is where mango could offer interesting alternatives, whereas vegetable production could be integrated as a rotation crop for potato and onion farmers.

4.4 Expansion into Mango Production

The mango export season is complementary to that of vegetables and thus provides an interesting diversification alternative. Particularly because there is ample opportunity in the market to grow mango export.

SAFINA already has one of the largest mango plantations and arguably the best yielding plantation. GDS has planted 50ha of mango 4 years ago and has just started export. Export allows shared use of packhouses, harvesting crates, truck and tractors, cold storage and fixed staff. It also provides a source of revenue ahead of the new vegetable season.

4.5 Combination with Onion and Potato Production

Another opportunity to increase green bean and sweet corn production and export is to introduce this as a rotation crop to larger producers of onions and potatoes. These large producers engage in mono-cropping which is problematic particularly for potato production. From a disease management perspective there should be 2 to 3 crop cycles between two potato crops on the same land. Maize and particularly green beans are good rotation crops for potatoes and onions.

4.6 Silage Production from Crop residues and as Hot Season Rotation Crop

Availability of good quality fodder at affordable prices is by far the biggest challenge in the dairy sector in Senegal, as well as for animal fattening. Crop residues from sweetcorn and green beans can easily be turned into high quality silage, if the right techniques are used. In addition, in order to avoid salination and soil degradation it would be better to farm a rainfed sorghum crop in the hot season for silage production, or maize silage with limited supplementary irrigation.

4.7 High Start-Up Cost

Developing projects in Senegal at this scale requires major investments in infrastructure. Scrub and existing vegetation needs to be cleared, roads need to be built and in the Niayes, wells need to be drilled sometimes up to 120m deep.

There are also indirect costs that are often not included in the operational or start-up budget. For example, there are often administrative delays in issuing permits; staff arrive with theoretical skills but might need on-the-job training to be able to do the job. These delays slowdown that start up, while increasing complexity of start up for investors. All the while loans that have been taken out need to be repaid.

4.8 Fuzzy Land Rights And Land Grabs

In Senegal access to land of women and youth is challenging. At the same time the land rights system is complex and unclear. This creates tension between commercial farmers and local communities who see large industrial investors getting access to thousands of hectares of land.

These developments also attract more labourers from around the country to these projects. This intensifies the competition for land access.

Many commercial farms invest in various community projects to build a social compact that allows them to farm the land unimpeded. This includes investing in schools, clinics, training programs for local farmers etc. But it's not always effective. In 2016 a "land grab" at the Senegindia farm highlighted to existing and prospective investors that more needs to be done to proactively manage community relations and improve the land rights framework.

One area where local Senegalese producers and lawmakers are particularly sensitive is in avoiding competition with industrial producers. Yet is this enough? Foreign investors are beginning to invest in local supply chains. Yet they remain fairly separate from the various groups of economic interest/professional associations that are ever-present in Senegal. It would be particularly helpful if some thought is given to how agricultural industrial investors can play a bigger role in disseminating production techniques and supporting agricultural services. These are all areas where small-scale famers in various value chains require support.

4.9 Limited incentives for Foreign Investment

Businesses have been promised various incentives in order to invest but through bureaucracy struggle to take advantage of them. For example, they struggle to import tractors and other equipment without having to pay import duties because it takes too long to get a permit. Meanwhile they are not allowed to sell produce on the local market.

A few locations are vying for the attention for foreign investors for counter-cyclical vegetable production. In fact, some of the investors in Senegal produce in other countries. Not being able to deliver against this hampers the ability to attract new investments, but also to stimulate the current investors to expand their investment in Senegal.

4.10 Lack of Technical Skills in the Local Labour Market

Farms struggle to attract staff with the right skills. Staff might have relevant qualifications, but often they lack practical skills and experience to be productive. As a result, these farms must provide significant on the job training before staff can become productive, or hire expensive expats. Some technical skills that are required and are often lacking are tractor drivers, tractor mechanics, irrigation repairs, agronomy, skilled packhouse managers etc.

4.11 Cost of Fuel

Irrigation and refrigeration all require energy. For example, water might be pumped up to 5km to reach the irrigation centre pivots on some parts of the farm. This is energy intensive and a substantial driver of costs. Irrigation costs are estimated to be 50% of the cost of production per ha, with 35% of that being fuel costs even when supplied by the national energy grid. The Senegalese power grid is can be unreliable at times, so large industrial farms are forced to resort to using more expensive back-up diesel engines to power this equipment.

4.12 Squeezing out of Small Outgrowers

Year-round supply has become an important part of securing market share for retailers. At the same time greater transparency and interest from shoppers around ethical supply chains and food safety has pushed retailers to look for new models of supply. For them working with fewer more vertically integrated producers with tighter controls over quality and supply chain risks is a huge benefit. They've also introduced more stringent food safety controls that require minimum certifications at the farm and packing facility level such as Global Gap, BRC, HACCP etc.

In the past small scaler supplied produce in outgrower models. Pressure from global trends has meant that only a few survive. Low technical farming skills and widely available illegal pesticides raises the risk of these farmers mis-stepping and jeopardising the reputation of Senegalese produce in the EU. As a result, the industrial producers have been lobbying the regulatory authorities to ban production of export vegetables via the outgrower model.

There is the possibility that these farmers will be forced out and will have to rely on the small local market. Consumption on the local market is low. Yet affordability and availability of quality vegetables are two ingredients to being able to grow consumption rates. The impact on farmer livelihoods and the required interventions to minimise any downsides would need to be considered.

4.13 Environmental Sustainability of Industrial Production

The commercial production of vegetables has a number of environmental concerns:
Intensive cultivation increases disease pressure which in turn has resulted in greater use of pesticides.

- Seepage of minerals and chemicals into precious groundwater.
- Unsustainable use of scarce groundwater.
- Salination of soils.
- Soil degradation and loss of soil fertility.
- High levels of food wastage due to rejects not being sold on the local market.

These issues have been discussed earlier in the document under industrial production and will be discussed in greater detail in the next chapter.

5 Environmental Sustainability (Circular Economy)

In the wider sustainability context production for Europe in winter months is better done closer to Europe. As a result, production in Morocco and Senegal have many advantages than production in Kenya, which relies on air freight and has also seen pesticide residue scandals. Senegal has a dried climate with lower disease pressure, requiring less pesticides.

However, as we discussed earlier in this report the agri-ecological conditions in Senegal create an environment that is fragile and particularly vulnerable to climate change. Soil degradation, salination and unsustainable use of groundwater are major issues.

Intensive cultivation increases disease pressure which in turn has resulted in greater use of pesticides. Secondly, there's increased irrigation, which is an essential in the Niayes and the

Senegal River Valley area. Over time these irrigated and fertilised soils create seepage of minerals in to the precious groundwater.

This is issue is especially critical in the Niayes region, where the underground water reserves being used for agricultural purposes feed the city of Dakar, or where city water is being used to irrigate crops.

This scarce resource requires better management. Firstly, to ensure that farms use only the least amount of water possible for successful cultivation. Secondly, that there is some planning made for summer crops to keep the land in use. Finally, a longer-term planning is required to ensure that water resources are used sensibly. Without well thought through water and land management continued salination can be expected.

Industrial cultivation is typically intensive. As a result of continued use many rely on pesticides to manage increased disease pressure. While current levels of pesticides might be within the EU pesticide residue norms, it's important to also be sensitive to the impact of using these pesticides, which are being used increasingly, on the health of the soil.

Small scale producers also access pesticides that are no longer sold in the EU. These are often outlawed because of their impact both on food safety as well as on the environment. Getting better control over the availability and sale of these ostensibly controlled pesticides would be helpful in protecting the fertility of the soil for the future.

Another issue is waste. The specific tax regimes under which these businesses typically benefit prevents sale of more that 20% of production to local markets. This is intended to protect local producers and encourage exports. As a result, waste in this chain is significant. For example, Kenyan producers estimate that waste from green bean production is 30%. Sweet corn producers in Senegal have over 5000 tons of waste per week from this crop alone.

Some producers have tried to sell this as **silage**. This ensures that this waste is still used productively, but poor quality due to poor techniques has limited success.

Energy costs for industrial producers in Senegal are quite high. They need to invest significant amounts for energy for irrigation pumps and refrigeration. Barfoots SCL has invested in a **bio-fuel** energy generation. They use waste from their packing facility- estimated at 70 000 tons per year for sweet corn alone- to supply energy for their entire operation. They them sell excess energy to the grid.

6 Socio-Economic Development (Food Security, Employment, Women And Youth)

Introducing new types of vegetables are key mechanism to provide some resilience to households in Senegal. Yet, in Senegal the local food supply chain is largely separate from the export supply chain. This keeps affordable, quality reject vegetables out of the local supply chain. This has some advantages in that it protects small scale vegetable producers from competing against industrial

producers, who in essence could be dumping waste on the local market. But it does also prevent these vegetables from becoming more readily available.

This industrial model of vegetable production also separates the input provision to these farms from the local input supply chain. Nevertheless, there are some benefits. Exports contributes to healthier trade balances with the EU. They also contribute significantly to local employment. A single large industrial producer can employ in excess of 10 000 employees. Many of these are temporary workers who are hired over the harvest period. In some case workers travel from far flung corners of Senegal such as the Casamance. This brings much needed revenue to these areas, just as the farmers begin to prepare their lands for the wet season production.

Labour on these farms demographically skews towards women. They tend to be more involved in activities in packhouses- where their better attention to detail gives them advantages in sorting of vegetables. On some farms, women make up a substantial share of the work force. Van Oers Senegal suggest that they hire 4000 women to work on the farm[3]. While the GDS farm employs roughly 22% women on their farm near Saint Louis.

In some respect on the job training offered on these farms is helpful to the youth. They tend to be hired as tractors drivers, training to provide mechanic services, to manage the irrigation systems etc. As a part of their corporate social responsibility initiatives many of these farms offer internships for local communities. In a small way these are helpful in addressing the skills development needed by the youth.

Figure 12 Women's Participation in the Labour Force for 3 Producers

	Barfoots SCL	Grand Domaine de Senegal (Compagnie Fruitière)	Van Oers Senegal
 Employees	1500 2000 (harvest)	3000	unknown
 Women	unknown	660	4000 (harvest time)

[3] Onderzoek naar de mogelijkheden voor Nederlandse bedrijven in de agrarische sector van Senegal. Ministerie van Buitenlandse Zaken, Nederland

7 Options for Intervention

7.1 SWOT Analysis

Strengths:	Weaknesses:
– Large industrial investors with market access – Good control over quality, food safety etc – Land and water available along the Senegal River Valley – High use of manual labour for harvest – Agri-insurance products exist for industrial producers	– Food safety measures increase demands for certification of improved food safety controls. – Outgrower schemes with small scaler models are increasingly squeezed out. – Increasing use of irrigation, fertilisers and pesticides and the resulting impact on soil health – Increasing salinisation of the soil – Poor investment climate (land rights, administration of incentives, practical skills gap) – Producers in the Niayes relying on groundwater, which feeds Dakar – High cost of fuel for irrigation – Low access to credit products
Opportunities:	**Threats:**
– Large market potential – Increased pressure for lower carbon footprint sourcing in the EU – Pesticide scandals in Kenya & the demand for tightly controlled production closer to Europe	– Declining soil fertility – Increasing pest pressure requiring heavier doses of pesticides – Land rights remain fuzzy- especially as this results in land grabs – Outgrower models using small scale producers create risks of pesticide residue scares in Europe.

7.2 Interventions (SDG Goals and Impact, Dutch Transfers)

The global trend towards industrial production in this chain is clear. It suggests that intervention should be focussed on expanding production in industrial systems through increased investment promotions and more sustainable production.

At a sector level better land, water and soil fertility management would be helpful. This has 3 areas of action. Firstly, at a regulatory level more needs to be done to proactively plan for development. This should include better use of water resources, where to encourage investment and what this means for water management systems. On a second level the regulatory authorities need support in developing and implementing water use policies and legislation and in regulating the use of fertilisers and pesticides etc. This should apply to both large scale and small-scale farmers. Finally, the question of salinisation specifically needs to be tackled. This includes investing

in research and development as well as training (professional and extension services) around sound practices to reduce salinisation.

To expand investment in the sector more needs to be done to ramp up investment promotions efforts and tackle the barriers to investing.

Clarifying the land rights framework is an essential step to reducing friction around access to land. Better land management and planning will go some way to ensuring that local communities are less in conflict with industrial producers. Finding space for women and youth to participate in various value chains- export and local all-important ingredients to managing a potentially volatile situation. Finally, these industrial producers could use their corporate social responsibility activities to tackle the impact of small-scale producers who are being forced out of the export chain. For example, providing extension service for local vegetable production, investing in developing training centres, internships or open days; loaning of mechanisation equipment, or investing in mechanisation services. Whatever the solution, these investors need to consider the impact of their separation from the local value chains on the social compact between themselves, the community around them and small-scale farmers in general.

Another key area is to tackle the weakness in delivering incentives to investors. This requires that administrative inefficiencies be reduced and that processes are simplified so that exporters can benefit from promised exemptions and tax benefits. When it comes to investment promotion, more needs to be done to develop and promote projects for potential foreign investors, who could be looking to shift production from Kenya, or expand from Morocco or Egypt to Senegal. Some potential solutions that seem to be working in other African countries are developing one stop shop services for foreign direct investment. These should act as trouble-shooters as well as look in to developing near shovel ready development projects for investment promotion. Some key issues that can be tackled in the project scoping are land rights, infrastructure, land and water usage planning etc. Investment promotions projects in other developing countries provide some lessons for Senegal and could be considered. These agencies bring "shovel ready projects" to the attention of investors. This includes scoping out the project scale and location, getting permits and exemptions ready and in some case providing some basic infrastructure for the development.

Some additional supporting interventions would be tackling the question of high waste and high energy costs related to irrigation. Expanding the practice of using waste as bio-fuel or silage for the dairy sector is one means by which these costs can be reduced. It also has the added benefit of providing energy to an unstable power-grid. Another mechanism to reduce waste and increase the environmental sustainability of these projects, might be sensible to promote mixed crop production models. For example, a winter season of onions, potatoes and vegetables in rotation, followed by silage in Summer.

Finally, practical skills development is an important area. At a sector level more needs to be done to ensure that professional and vocational training becomes more practical. Another potential intervention if working with existing vocational training centres to expand their offer of practical training. In the South African sugar industry major producers contribute to a training centre that provides training on these much-needed skills.

7.3 Overview of Proposed Interventions

Bottlenecks	#	Interventions	Fit with Dutch Knowledge, Strategic interests etc.	SDG Goals
Large market potential, but competition from the Maghreb as an investment location.	1a	Support APIX to develop capacity for project scoping, investment promotions and troubleshooting for FDI (new and expansion).	***	1,2,8
Gaps in the delivery of various incentives offered to investors.	1b	Strengthen administrative capacity to accelerate issuing of permits, troubleshooting etc	**	
Declining soil health due to increased use of pesticides and irrigation.	2a	Invest in knowledge development around salinisation management, crop rotation, water reduction etc. Engage industrial producers around sustainable production. Integrate in to regulatory mechanisms.	***	13,15
Water & Land Management.	2b	Strengthen Senegalese capacity around water and land management. This should include scoping of production zones (which crops, where, using which water sources) & ability to develop and enforce regulations.	***	
Practical Farming Skills.	3a	Support training institutions to develop practical skills courses. Potentially develop sector training centre to provide training for skilled labour.	***	1,2,4, 5
Waste from industrial production can't be sold as food.	4	Support the development of silage and bio-fuel models.	**	12

Sustainable Development Goals

Table of Figures

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Many thanks to the following participants who shared their time so generously.

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