

# A Quarter-Billion Dollar Industry?

## *The DRC Seed Sector*

**BRIEF DESCRIPTION:** Compelling investment opportunities exist for seed companies and seed start-ups in the Democratic Republic of the Congo (DRC). This document outlines the market potential and consumer demand trends in the DRC and highlights the high potential of seed production in the country.

## Executive Summary

Compelling investment opportunities exist for seed companies and seed start-ups in the Democratic Republic of the Congo (DRC). This document outlines the market potential and consumer demand trends in the DRC and highlights the high potential of seed production in the country.

The DRC is the second largest country in Africa with over 80 million hectares of agricultural land, of which 4 to 7 million hectares are irrigable. Average rainfall varies between 800 mm and 1,800 mm per annum. Bimodal and extended unimodal rainfall patterns allow for two agricultural seasons in approximately 75% of the country. Average relative humidity ranges from 45% to 90% depending on the time of year and location.

The market potential for maize, rice and bean seed in the DRC is estimated at \$191 million per annum, of which a mere 3% has been exploited. Maize seed sells at \$3.1 per kilogramme of hybrid seed and \$1.6 per kilogramme of OPV seed, a higher price than in Tanzania, Kenya, Uganda and Zambia. Seed-to-grain ratios are comparable with regional benchmarks at 5.5:1 for hybrid maize seed and 5.0:1 for OPV maize seed.

The DRC is defined by four relatively distinct sales zones, which broadly coincide with the country's four principal climate zones. Low-quality infrastructure and natural barriers draw distinct divides between the zones. These barriers, plus differences in culture, language and agricultural practices, mean that the DRC is comprised of not one but four markets. The highest potential zones in terms of seed sales are the East and South regions, which border South Sudan, Uganda, Rwanda, Burundi, Tanzania and Zambia.

Amendments to the Agricultural Code, *Loi n°11/002* of 24 December 2011, mean that foreign investors can now acquire tracts of agricultural land in the DRC. The National Institute of Study and Agricultural Research (INERA) and the National Seed Service (SENASA) govern seed production and certification in the DRC. Variety release takes approximately 26 months, less time than in Kenya and Tanzania, but is more costly. The National Seed Catalogue, last updated in 2012, contains some 137 varieties and an additional 20 varieties have been released in the DRC since 2012 by ministerial decree. The majority of foundation seed in the DRC comes from national research institutions but it is possible to import foundation seed from public and private suppliers outside the DRC including CIMMYT, CIAT and ICRISAT.

# A Quarter-Billion Dollar Industry? The DRC Seed Sector

Written by Bastiaan Huesken contributions by Ngama Munduku

## DRC: Context

The DRC is the second largest country in Africa, with a surface area of over 2.3 million square kilometres. It is endowed with 80 million hectares of agricultural land, of which less than 10% is under cultivation. This large central African country borders Congo-Brazzaville and the Central African Republic to the North, South Sudan, Uganda, Rwanda, Burundi and Tanzania to the East, and Zambia and Angola to the South. The DRC is principally an agrarian country, home to over 56 million smallholder farmers. Agriculture accounts for about 20% of Gross Domestic Product (GDP). Approximately 90% of the agricultural activities in the DRC are informal, and agricultural productivity is low compared to regional benchmarks<sup>1</sup>. The DRC ranks 176th out of 189 countries on the Human Development Index and has been the recipient of sustained, long-term inflows of Official Development Assistance (ODA) to the value of US\$ 2 billion per annum<sup>2</sup>.

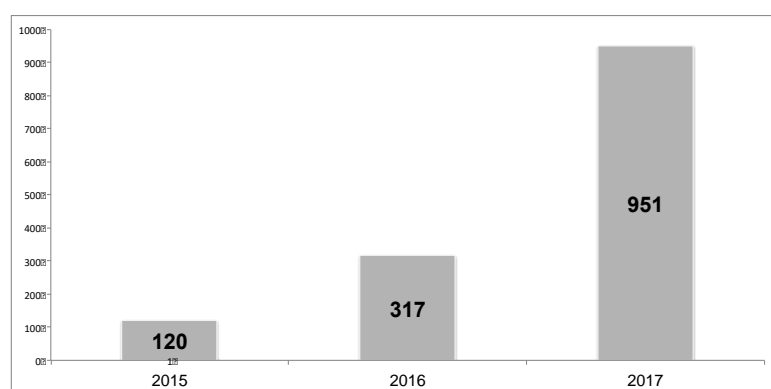
French is the official language of the DRC but is not widely spoken outside of the main urban areas. Lingala is the predominant language in the North and West of the country while Swahili is the most widely spoken language in the East and South. English fluency is low to non-existent.

## Market Potential and Consumer Demand

The market potential in the DRC for maize, rice and bean seed sales alone is conservatively estimated at \$191 million. A mere 3% of this market potential has been explored and an estimated 54.3 million smallholder farmers continue to lack access to high quality seed varieties.

Market trends indicate a shift in consumer behaviour in favour of commercial seed production, sales and distribution systems. This shift is particularly apparent in the East and South of the DRC following over \$3.1 million of sustained investment in demand creation in those two regions<sup>3</sup>. As a result, sales to smallholder farmers in the East and the South of the DRC grew by 690%, from 120 MT in 2015 to 950 MT in 2017, and gross revenue totalled \$4.57 million. Further exponential growth in consumer demand is forecast.

*Figure 1. Sales to Smallholder Farmers (MT)*



Source: ÉLAN RDC, 2018

<sup>1</sup> FAOSTATS reports that the average maize yield in the DRC is 0.77 MT per hectare compared to average maize yield in Kenya of 2.0 MT per hectare (AgriExperience, 2012).

<sup>2</sup> The Organisation for Economic Co-operation and Development (OECD) registered net ODA inflows of \$2.4 billion in 2014, \$2.6 billion in 2015 and \$2.1 billion in 2016.

<sup>3</sup> ÉLAN RDC, a private sector development program funded by UKAid, and private sector partners invested \$3.1 million in consumer demand creation from 2014 to 2018.

A significant number of agro-industrial companies operating in the South (Haut-Katanga), West (Bandundu) and East (Beni and Rutshuru) of the DRC constitute a further sizeable and reliable customer base for seed companies<sup>4</sup>.

In terms of both volume and variety of seed sales, the DRC holds tremendous potential. The country is defined by multiple overlapping climate and agro-ecological zones, which allow for the cultivation of a large variety of agricultural products.

### Food Crops Cultivated in the DRC

Maize, Rice, Cassava Sorghum, Beans, Soya Beans, Groundnuts, Potatoes, Sweet Potatoes, Peas, Cow Peas, Pigeon Peas, Carrots, Lettuce, Zucchini, Eggplant, Tomatoes, Bell Peppers, Onions, Spring Onions, Bananas, Plantains, Pineapples, Strawberries.

Consumer demand for seeds for the aforementioned food crops is high and growing. For some of the food crops, seed sales in the DRC have already surpassed those in Tanzania, Uganda, Kenya and Zambia.<sup>5</sup>

This significant market potential and growing consumer demand are complemented by high prices for seed in comparison to regional benchmarks. The price of hybrid maize seed is significantly higher in the DRC than in it is in the neighbouring countries to the East and South including Tanzania, Uganda, Kenya and Zambia.

*Table 1. Average Seed Prices per Country*

Country	Maize: hybrid (\$ per KG)	Maize: OPV (\$ per KG)	Rice (\$ per KG)	Beans (\$ per KG)
<b>DRC</b>	3.1	1.6	2.0	2.3
<b>Tanzania</b>	2.2	1.3	-	1.1
<b>Uganda</b>	1.5	0.8	-	0.8
<b>Kenya</b>	1.8	1.7	-	1.8
<b>Zambia</b>	2.6	1.5	1.8	2.6

Source: TASAI, 2017

Seed-to-grain ratios in the DRC are comparable to regional benchmarks at 5.5:1 for hybrid maize seed, 5.0:1 for OPV maize seed, 1.8:1 for rice seed and 1.4:1 for bean seed.<sup>6</sup>

Market competition in the DRC is low, with only eleven seed companies operational in the entire country, all based in the East and South.<sup>7</sup> By comparison there are 23 seed companies operational in Kenya and 30 in Tanzania. The low number of seed companies and the large geographic expanse of the country mean that there is very little overlap in sales territories.

The rural agro-dealer network is small but growing. A 2017 study estimated that the ratio of agro-dealers to farming households was approximately 1:9,000 compared to 1:2,900 in Tanzania and 1:3,200 in Zambia (TASAI, 2017). The rural agro-dealer network is growing as a result of sustained investment by development programmes and the private sector. In 2017 and 2018 an estimated additional 390 agro-dealers were established and trained in Eastern and Southern DRC – almost double the 199 agro-dealers recorded in 2016. All 390 agro-dealers received comprehensive training on good agricultural practices and business management.

<sup>4</sup> For more information on agro-industrial companies operational in the DRC visit: [www.fec-rdc.com](http://www.fec-rdc.com)

<sup>5</sup> 430 MT of rice seed valued at \$860,000 was sold in the DRC in 2016 and sales volumes are estimated to have doubled since (ÉLAN RDC, 2018).

<sup>6</sup> Seed-to-grain ratios in Tanzania are: 8.7:1 for hybrid maize seed; 5.2:1 for OPV maize seed; 1.4:1 for bean seed.

Ratios in Uganda are 6.0:1 for hybrid maize seed; 3.0:1 for OPV maize seed; 1.2:1 for bean seed.

Ratios in Kenya are 4.5:1 for hybrid maize seed; 3.7:1 for OPV maize seed; 1.8:1 for bean seed.

Ratios in Zambia are 13.4:1 for hybrid maize seed; 10.0:1 for OPV maize seed; 1.4:1 for rice seed; 2.3:1 for bean seed.

For more information visit: [www.tasai.org](http://www.tasai.org)

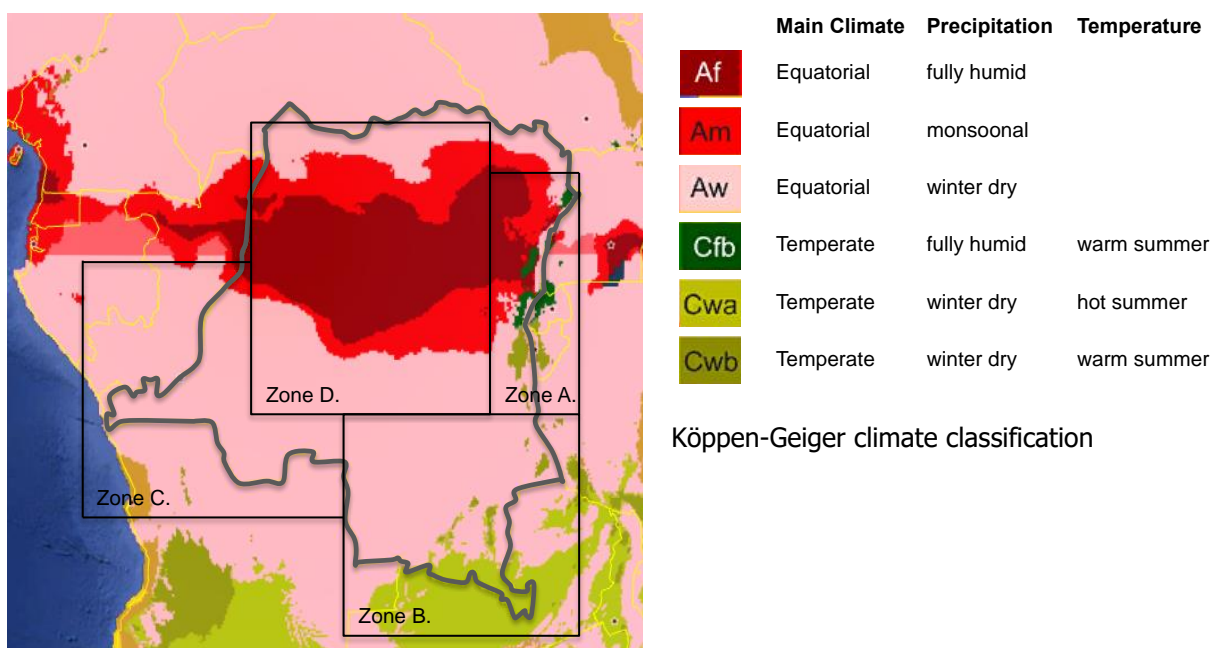
<sup>7</sup> There are no seed companies operational in the West or the North of the country.

## Sales Strategies

The DRC is defined by four relatively distinct sales zones, which broadly coincide with the country's four principal climate zones. The highest potential of the zones in terms of seed sales are the East and the South zones followed by the West zone, labelled Zone A, Zone B and Zone C, respectively, in the map below. Low-quality infrastructure and natural barriers draw distinct divides between the zones, and differences in culture, language and agricultural practices mean that the DRC is constituted of not one but four markets. Seed companies and start-ups that intend to operate in the DRC will need to establish regional offices to manage local operations.

Zone A covers the East of the DRC and includes, from North to South, the cities of Bunia, Beni, Butembo, Rutshuru, Goma, Bukavu and Uvira. This zone is the most agro-climatically diverse and has the highest population density<sup>8</sup>. Cross-border trade (CBT) occurs mainly via the Kasindi (DRC to Uganda), Goma (DRC to Rwanda), Rusizi (DRC to Rwanda) and Kamanyola (DRC to Rwanda) border posts. Travel between the cities listed above is complicated by poor infrastructure and security concerns. Intra-regional travellers therefore commonly transit via Rwanda or Uganda.

Figure 2. Climate Zones of the DRC



Source: Climate Service Center, 2013

Zone B covers the South of the DRC and includes, from North to South, Kalemie (on the shores of lake Tanganyika), Likasi, Kolwezi and Lubumbashi. Cross border trade occurs predominantly via the Kasumbalesa crossing point with Zambia. Zone B has a low population density by comparison with other regions of the DRC and the local economy is defined by the mining industry. Several large agro-industrial farms and maize mills have been established to provide for the growing demand from the urban population and mines. The zone is further defined by good infrastructure, relative to the rest of the DRC, and intra-regional travel by road is feasible. The zone has the lowest average relative humidity in the DRC, on a par with average relative humidity in Zambia.<sup>9</sup>

Zone C covers the West of the DRC and includes the cities of Kinshasa (the capital of the DRC, home to between 10 and 15 million inhabitants), Mbanza-Ngungu, Kikwit and the harbour towns of Matadi and Boma on the Atlantic coast. There are currently no seed companies operational in Zone C in spite of the fact that there are several large agro-industrial companies operating in the region, particularly on the Plateau de Bateke in the Bandundu Province. In addition, there are an estimated 16 million smallholder farmers in the region.

<sup>8</sup> Population density in the Zone A. is 97 per km<sup>2</sup>

<sup>9</sup> Average relative humidity in Zone B ranges between 45% and 85%.

Zone D is not currently a commercially viable market.

As noted above, sales and distribution strategies tailored to smallholder farmers have been piloted and scaled with remarkable success in the DRC. Research has indicated that price is not the principal determinant in the willingness of smallholder farmers to pay for seed. Smallholder farmers have proven capable and prepared to pay from \$1.5 for OPV maize seed to \$4.0 for hybrid maize seed as long as the quality of the product has been clearly demonstrated and the product is physically accessible. Sales strategies that target this demographic therefore necessarily include consumer education tools and emphasize the establishment of points of sale (POS) in close proximity to the target demographic.

#### How to sell to smallholder farmers

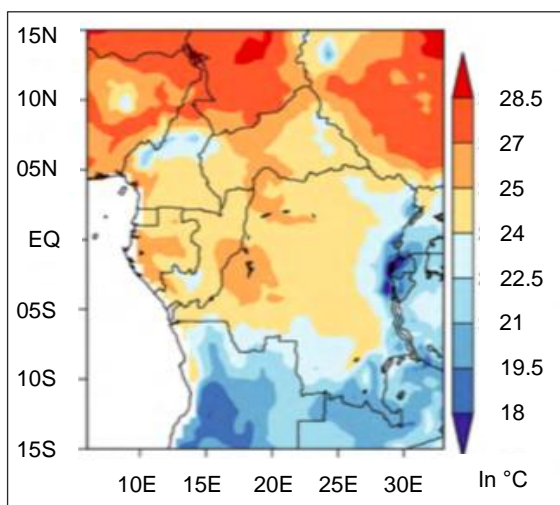
- Market seeds adapted to the local environment;
- Establish a dense network of trained POS;
- Develop a mobile sales force (motorized);
- Produce small seed packs (less than 10kg);
- Establish a large number of micro (10m<sup>2</sup>) demonstration plots;
- Conduct farmer field days;
- Air radio transmissions that emphasize consumer education.

The above tactics have gained significant traction among smallholder farmers.

## Seed Production in the DRC

Average temperatures in the DRC vary dramatically between climate zones as indicated in the map below.

*Figure 3. Average Temperatures in the DRC*



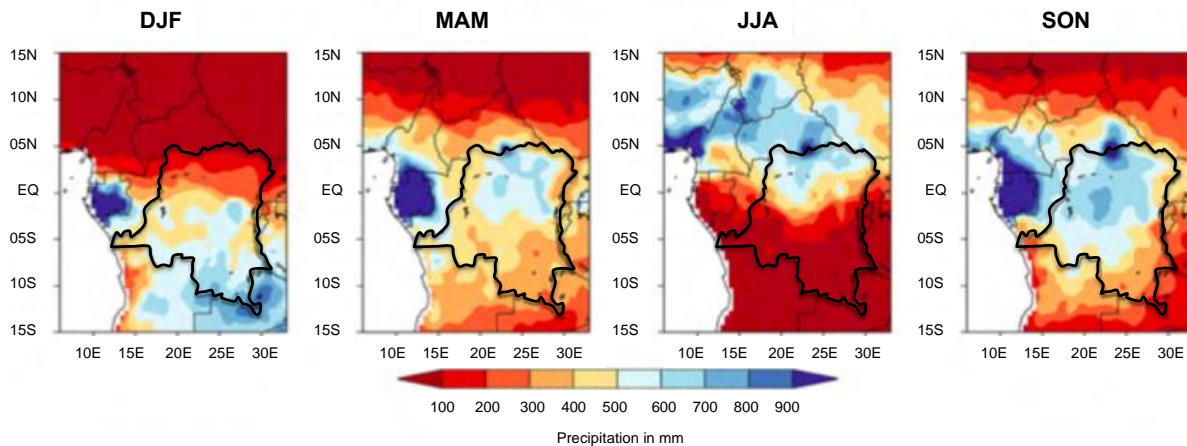
Source: Climate Service Center, 2013

Average rainfall in the DRC varies between 800 mm and 1,800 mm per annum, depending on location. Bimodal and extended unimodal rainfall patterns allow for two agricultural seasons in approximately 75% of the country (FEWS NET, 2015). In addition to abundant rainfall, the DRC contains almost half of Africa's fresh water reserves (Ibid).

Average relative humidity varies considerably across the country. Zone A is defined by average relative humidity of between 60% and 80%, while average relative humidity in Zone B varies between 45% and 85%. Average relative humidity in zone C ranges between lows of 70% and highs of 95%.

Of the total 80 million hectares of agricultural land in the DRC, an estimated 4 to 7 million are irrigable. Current total irrigated land is estimated at a mere 13,500 hectares (FAO, 2005).

Figure 4. Average Rainfall in the DRC



Source: Climate Service Center, 2013

## Agricultural Concessions

Foreign investors can now acquire agricultural concessions in the DRC. The Agricultural Code, *Loi n°11/002* of 24 December 2011, was heavily criticized by local and international commentators for the fact that it severely restricted access to land for foreign investors. In particular Article 16, which stipulated that applicants:

*"be a natural person of Congolese nationality or a legal person governed by Congolese law whose shares are majority owned by the Congolese State and/or nationals."*

The law elicited concerted criticism from local and international commentators and resulted in a sharp decline of FDI inflows into the DRC agricultural sector. The law was eventually revised on 13 November 2017. The revised Article 16 states that applicants:

- (a) be a natural person or a legal person under Congolese law;
- (b) have a residence, domicile or registered office in the Democratic Republic of Congo;
- (c) submit proof of registration in the Trade and Personal Property Credit Register, in the case of a person engaged in the business;
- (d) justify the financial capacity likely to bear the burden of the development of the concession;
- (e) produce an environmental and social impact study.

Agricultural concessions in the DRC are established by a registration certificate and granted by the Congolese State. The concession is unassailable after two years from the date of delivery.

Broadly there are two kinds of concessions:

- 1) Perpetual concessions (without time limit); and
- 2) ordinary concessions (for a period of 25 years, renewable without limitation).

The perpetual concessions are reserved for natural persons of Congolese nationality and legal persons under Congolese law whose majority shares are owned by the Congolese State and/or nationals. The ordinary concessions are available to the aforementioned persons as well as foreigners.

To acquire concessions, applicants must:

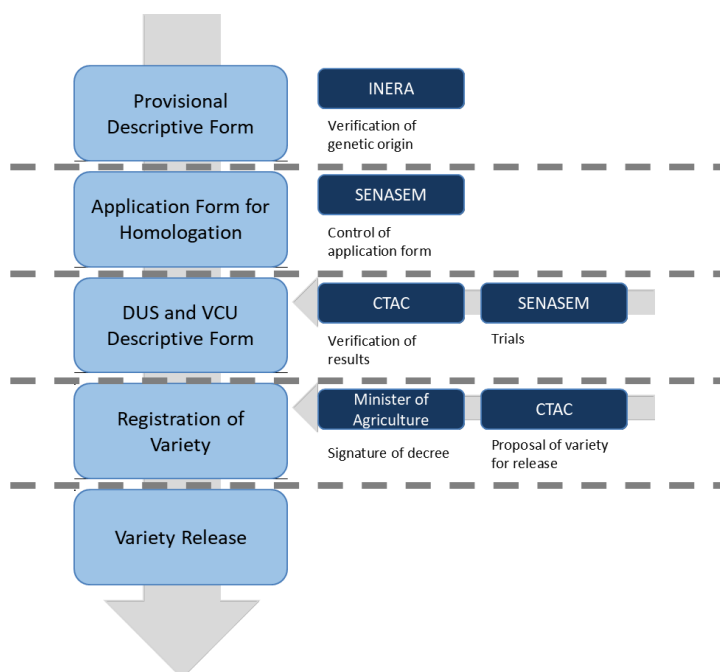
- 1) Identify the concession with the Ministry of Land Affairs or the National Investment Promotion Agency (ANAPI);
- 2) Sign an agreement with the traditional authority of the area against payment of a sum of money and goods in-kind according to custom;
- 3) Conduct a land vacancy inquiry and demarcation of the land by the relevant government authorities including the local departments of the Ministry of Agriculture and the Ministry of Land Affairs;
- 4) Obtain a signature for the concession contract with the Registrar of Real Estate Titles;
- 5) Establish the registration certificate by the Registrar of Real Estate Titles.

For large concessions special approval is required. Concessions of over 2,000 hectares require approval by law. Concessions of between 1,000 and 2,000 hectares require approval by order of the President of the Republic. Concessions of between 200 and 1,000 hectares require approval from the Ministry of Land Affairs. Concessions of under 200 hectares require approval from the Governor of the Province; the Provincial Government may delegate their powers to the Registrar of Real Estate Titles for land areas under 50 hectares.

## Seed Production and Certification

The responsible authorities in relation to the release of seed varieties are the National Institute of Study and Agricultural Research (INERA), the National Seed Service (SENASA) and the Technical Commission for Admission to the Catalogue (CTAC). Breeders generally liaise with INERA to verify the genetic origin of the seed prior to submission of the application form for homologation with SENASEM. SENASEM will verify the application and may request additional information. SENASEM will thereafter conduct trials to establish Distinctness, Uniformity and Stability (DUS) and Value for Cultivation and Use (VCU). SENASEM subsequently submits trial data to CTAC for evaluation and, once all the members of the commission agree, the variety is registered in the National Seed Catalogue.

Figure 5. Variety Release Process



Source: UNAGRICO, 2010

The entire process takes 26 months in the DRC, six months longer than the process takes in Uganda but shorter than in Tanzania and Kenya. However, the cost of variety release in the DRC is significantly higher than the cost in neighbouring countries (TASAI, 2017).

Table 2. Variety Release Duration and Cost

	Average Duration of Variety Release	Average Cost of Variety Release
<b>DRC</b>	26 months	\$5,000
<b>Tanzania</b>	31 months	\$504
<b>Uganda</b>	20 months	-
<b>Kenya</b>	33 months	-
<b>Zambia</b>	24 months	\$1,070

Source: TASAI, 2017

The National Seed Catalogue is generally updated every three years but, because of financial constraints, it has not been updated since 2012. In the interim, the Minister of Agriculture has issued decrees to the same effect on an annual basis. In November 2018, TASAI started working with stakeholders to update the National



Seed Catalogue, taking into account all of the ministerial decrees of recent years. The 2012 catalogue contains some 137 varieties and an additional 20 varieties were released in the DRC between 2014 and 2016 (see appendix 1 for further information).

Production of certified seed in the DRC is regulated and must be accredited by SENASEM. SENASEM will inspect the production site prior to planting and will conduct three additional inspections throughout the vegetative cycle. Upon harvest, SENASEM will conduct tests and produce a report that certifies the quality of the seed. Inspection costs total approximately \$160 per visit and certification costs total approximately \$13 per metric tonne.<sup>10</sup>

## Foundation Seed

There are 14 active seed breeders in the DRC, all linked to either INERA or the University of Lubumbashi (UNILU). The majority of seed breeders receive insufficient support from the government in spite of their importance to the sector. While the majority of foundation seed in the DRC comes from either INERA or UNILU, it is possible to import foundation seed from private and public suppliers outside the DRC; permitted sources include CIMMYT, CIAT and ICRISAT (TASAI, 2017).

## Import and Export Policy

Import of seed into the DRC can be challenging but recent developments in relation to ratification of legislation aligned with COMESA regulations holds promise. The DRC has not had a seed law in over 30 years but a law has been drafted under the stewardship of the COMESA Seed Harmonization and Implementation Program (COMSHIP) and submitted to the parliament of the DRC for review and ratification and eventual promulgation by the President of the Republic. The seed law is aligned with the COMESA Seed Trade Harmonization Regulations and should greatly facilitate the production, import, export and sale of seed in the DRC.

The DRC is one of four countries expected to ratify national legislation in line with the COMESA Seed Trade Harmonization Regulations in 2019. Following stated support for the draft seed law from the Minister of Agriculture and the Speaker of the House in 2017, COMSHIP is confident that the aligned seed law will be ratified by parliament and promulgated by the incoming President of the Republic by Q3 of 2019. From Q3 of 2019 onwards, COMSHIP intends to train provincial regulators and the private sector on the COMESA Seed Trade Harmonization Regulations.

The DRC is expected to align with all three of the core components of the COMESA Seed Trade Harmonization Regulations:

- Chapter 3: COMESA Seed Certification System
- Chapter 4: COMESA Variety Release System
- Chapter 5: Quarantine and Phytosanitary Measures for Seed

This move will enable seed companies based in COMESA member-states to legally commercialize seed varieties listed on the COMESA Plant Variety Catalogue in the DRC and it will thereby greatly facilitate the importation of seed. To further bolster regional trade of seed, COMESA anticipates the launch of the COMESA Seed Labels and Certificates in Q1 of 2019. The Seed Labels and Certificates will accompany large consignments of seed crossing borders.

Export of seed from the DRC to COMESA member-states will remain problematic due to the limited technical capacity of SENASEM and the fact that the DRC does not have a laboratory certified by the International Seed Testing Association (ISTA). COMSHIP has neither the resources nor the remit to support the development of capacity of SENASEM, so coordinated donor action will be required to bring the capacity of the National Seed Services up to the required standard.

The current import processes in the DRC are not clearly defined and vary from region to region. There are three main mechanisms by which seed companies and agro-dealers import seed into the DRC:

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<sup>10</sup> In total there are 105 seed inspectors in the DRC. In spite of this high number, the quality of seed inspection services in the DRC is low (TASAI, 2017).

### 1. Customs clearing agents

This mechanism is not defined by a regulatory framework and is generally the most expedient import mechanism.

### 2. Formal import of seed with tax exoneration for agricultural inputs

This mechanism is formally defined by a regulatory framework but has proven difficult to apply in practice. Article 72 of the Agricultural Code Loi n°11/002 of 24 December 2011 stipulates that *"imported agricultural inputs destined exclusively for agricultural activities are exempt from import duties and taxes"*. In order to benefit from exoneration, an importer will be required to fulfil the conditions in the box below.

1. Have a company registration number
2. Have a national identification number issued by the Provincial Division of the Economy
3. Have an import-export number issued by the Foreign Trade Division
4. Have a tax number issued by the Provincial Tax Office
5. Have a bank account with a commercial bank in the DRC

### 3. Formal import of seed without tax exoneration for agricultural inputs

This mechanism is formally defined by a regulatory framework and is generally more expedient than the second mechanism outlined above.

Research has indicated that the average length of time required to import seeds into the DRC is comparable to regional benchmarks (TASAI, 2017), as indicated by the following table.

*Table 3. Duration of Seed Importation*

Country	Average Time for Seed Importation
<b>DRC</b>	16 days
<b>Tanzania</b>	12 days
<b>Uganda</b>	6 days
<b>Kenya</b>	38 days
<b>Zambia</b>	11 days

Source: TASAI, 2017

Research has also indicated that the import of seed through informal channels is generally more expedient than the import of seed through formal channels. Informal import of seeds into the DRC takes approximately seven days, compared to the average 16 days it takes to import seeds formally. It is important to note that the length of time it takes to import seeds and the costs associated with the importation of seeds vary per border region. Formal and informal import costs range between \$45 and \$2,000 per consignment across the highly autonomous regions (TASAI, 2017).

## Infrastructure

Infrastructure in the DRC is poor relative to regional standards. In spite of extensive road networks, travel times between cities in the DRC are long and the routes are arduous (see appendix 4 for further information). Trade routes in the East and South of the DRC generally avoid the poor national road network by transiting through Uganda, Rwanda, Burundi, Tanzania and Zambia. As an example, the most expedient route from Butembo in Zone A (East) to Lubumbashi in Zone B (South) is via Uganda, Tanzania and Zambia.

Access to electricity is also problematic in the DRC. Supply from the national electricity company, Société Nationale d'Electricité (SNEL), is unreliable. Most companies that operate in the DRC invest in generators to provide for their electricity requirements.

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### About ÉLAN RDC

ÉLAN RDC is a UKAID market development project in the DRC implemented by Adam Smith International. The project aims to reduce poverty in the DRC by increasing the incomes of over one million poor smallholders, producers, entrepreneurs and consumers by the end of 2020.

Despite its extraordinary economic potential, the DRC remains desperately poor. Decades of conflict, instability and poor governance have taken their toll, and 85% of the population living in poverty lack the opportunities to lift themselves out of poverty.

We work to tackle the root causes of market failures and constraints. We work with the private sector to design and spread new economic models that increase income, create jobs and lower prices for the poorest. Our work places a particular focus on advancing the role of poor Congolese women and adolescent girls, some of the most marginalised in the world.

ÉLAN RDC works across four geographical areas and six sectors of the economy.

- Perennial agriculture
- Non-perennial agriculture
- Access to finance
- Mobile money
- Renewable energy
- Transport

We have more than 200 partnerships with private sector actors in the DRC, providing technical advice, leveraging funds and fostering networks to change business practices.

## Appendix 1. Varieties Released by SENASEM and in the Seed Variety Catalogue

Variety	Origin Country	Institution	Year of Introduction into the DRC	Year of Inscription into Seed Catalogue
<b>Maize</b>				
Babungo 3			1988	2012
Babungo	Tanzania		1989	1997
Bambou	Rwanda		1990	2008
Kasai 1	DRC		1990	1997
Katanga	Zimbabwe	CIMMYT	2008	2008
Katoki Wa Lukasa	Nigeria	IITA	2011	2012
Mudishi 1	Uganda	NARO	2012	2012
Mudishi 3	Nigeria	IITA	2012	2012
Mus(angana) 1	DRC	INERA	2003	2008
Salongo 2	Mexico	CIMMYT	1987	1995
Samaru	Nigeria	IITA	1988	2008
Tambo	Zambia		1999	2008
Unilu (ZM 623)	Zimbabwe		2008	2008
<b>Rice</b>				
Bainbinge 1			2002	2008
Hubei 6	China		2003	2008
IAO2	Ivory Coast		1997	1999
Inera 6	DRC	INERA	1997	2005
Inera 7	DRC	INERA	1997	2005
IRAT 112	Ivory Coast	IRAT	1995	1990
IRAT 216	Ivory Coast	IRAT	-	2012
IRAT 233	Ivory Coast	ADRAO	1997	2001
Liboga (IRAT 112)	DRC	INERA	1997	2008
Lienge			1992	2005
Lioto	DRC	INERA	1989	2008
Nercia 3	Ivory Coast	ADRAO	2006	2008
Nerica 6	Ivory Coast	ADRAO	2006	2008
Nerica 4	Ivory Coast	ADRAO	2006	2008
Nerica 7	Ivory Coast	ADRAO	2006	2008
PNR 1	Ivory Coast	ADRAO	1996	2008
Jasmine		IRRI	1999	2008
PRERP 1	Ivory Coast	ADRAO	1996	2000
PRERP 3	Ivory Coast	ADRAO	1997	2000
SIPI	Nigeria	IITA	1995	2008
<b>Beans</b>				
Mpolo	DRC	INERA	2001	2008
Bombe			2000	2008
CIM 9321-2	South Africa	CIAT	2002	2008
D6 Kenya		CIAT	1988	1997
Lola	DRC	INERA	2000	2008
Muduku	Colombia	CIAT	2000	2008
PC 115-B4			2004	2008
PVO 14			-	1997
PVO 14/2			-	1997
SIMAMA	Colombia	CIAT	2000	2008
Ntendezi			-	1997

Variety	Origin Country	Institution	Year of Introduction into the DRC	Year of Inscription into Seed Catalogue
Mbidi	DRC	INERA	2006	2008
Nitu	Colombia	CIAT	-	2012
Lyamungu	Colombia	CIAT	2006	2012
Sepe	Colombia	CIAT	-	2012
C 12476-50			2003	2008
DB196	South Africa	CIAT	2002	2008
DOR 715	South Africa	CIAT	2002	2008
DPS-RS4	South Africa	CIAT	2002	2008
Kirundo	Burundi	ISABU	1985	1988
Maharagi Soya	Colombia	CIAT	2003	2008
MCR 2301			2003	2008
M'Futila	Rwanda	ISAR	2002	2008
M'Sole	Rwanda	ISAR	2000	2008
Mvuazi	Tanzania	CIAT	2001	2008
Ntomo	Colombia	CIAT	2000	2008
Uyole 96	Tanzania	CIAT	2003	2008
XAN 76	South Africa	CIAT	2002	2008
Aliya		CIAT	1981	2012
Diasivi	Colombia	CIAT	-	2012
G 59 / 1-2	Colombia	CIAT	2000	2008
Kihembe	Colombia	CIAT	2000	2008
Lib 1	Colombia	CIAT	2000	2008
Lumbua			-	2012
Manseki	DRC	INERA	-	2012
Moore 88002	Burundi	ISABU	2003	2008
Mpolo	DRC	INERA	2001	2008
<b>Soya</b>				
Afya	Nigeria	IITA	1989	1997
Imperial				2012
Kitoko	Nigeria	IITA	1989	1997
Munanga	Nigeria	IITA	1990	1997
Siatsa	Nigeria	IITA	1988	1997
TGX573-209D	Nigeria	IITA	1990	1997
TGX1440-1D	Nigeria	IITA	2004	2008
TGX1830-20	Nigeria	IITA	2003	2008
UFV 1	Nigeria	IITA	1988	1997
Vuangi		IITA	1989	1997

Source: Ministère de l'Agriculture et Développement Rural, 2012

## Appendix 2. Varieties Released by SENASEM but not in the Seed Variety Catalogue

Variety	Origin Country	Institution
<b>Maize</b>		
Nsima (ZM 625)	Zimbabwe	CIMMYT
Apska (ZM 725)	Zimbabwe	CIMMYT
Bukidi Bukidi (ZM 525)	Zimbabwe	CIMMYT
Kitoko (ZM 627)	Zimbabwe	CIMMYT
Tokachini (ZM 625)	Zimbabwe	CIMMYT
Amani (UH 50-53)	Uganda	NARO
<b>Rice</b>		
ARC 37-16-1-51G		
ARICA2		
NERICA-L14		
GIZA 182		
<b>Beans</b>		
Manjonjo / Masese (NUV 131-1)		
Baliahamwabo / Kinja (RWV1129)		
Binja / Sawasawa / Gobwine (CODMLV095)		
Kipendwa / Mushagalusa (MBC23)		
Pendeza (CODMLV096/2013A)		
Nsimire / Namunene / Kombidoki (MAC 44)		
Tochachini / Duchime / Democratia (Munyanya)		
Nambiyo Mbiyo / Rukundo (NABE4)		
Nafranga / Zirimo (HM 21-7)		
Kinja / Mwizarahenda (RWR1668)		

Source: TASAI, 2017

### Appendix 3. Varieties Diffused in the DRC and to be Assessed by SENASEM

Maize	Rice
Ecavel 1; Bazooka; Sam4Vita; Longe10H; Pannar 53; H629; H628; H627; PNR67; ZM607; SC117; SC719; SC627; SC647; PN53; SC727; SC701; SC633; SC634; SC637; SC608; SC602; SC513; SC506; SC403; SC720; Zamseed 700; 634MRISEED; 624MRISEED	Rukarumu; Fashingabo; TOX3154; Namweru; Nerica 1; IRAT 13; Mayiyakunya
Beans	Soya
Kabulangi; HM21-7; CODLMB001; RWV1129; RWR2154; RWR2245; Namulengi; Pigeon Vert; Kabulanketi; KAROUGE; Kasoda; Kademayi; PNR148	PK6; SB24; SAFARI; SEQUELE; CANADA; Kaleyia; Hernon; MRISEED

Source: TASAI, 2017

## Appendix 4. Distances Between Main Cities in the DRC

	KINSHASA	MATADI	BANDUNDU	KANANGA	MBUJIMAYI	LUBUMBASHI	KINDU	BUKAVU	GOMA	KISANGANI	MBANDAKA
KINSHASA		355	490	1,105	1,283	2,317	2,033	2,66	2,709	2,624	3,192
MATADI	355		1,051	1,46	1,638	2,672	2,388	3,015	3,064	2,979	3,547
BANDUNDU	490	1,051		973	1,151	2,184	1,901	2,528	2,577	2,492	3,059
KANANGA	1,105	1,46	973		179	1,212	928	1,556	1,604	1,52	2,087
MBUJIMAYI	1,283	1,638	1,151	179		1,036	752	1,379	1,428	1,344	1,911
LUBUMBASHI	2,317	2,672	2,184	1,212	1,036		1,421	1,432	1,655	2,013	2,831
KINDU	2,033	2,388	1,901	928	752	1,421		627	841	591	1,878
BUKAVU	2,66	3,015	2,528	1,556	1,379	1,432	627		220	647	2,028
GOMA	2,709	3,064	2,577	1,604	1,428	1,655	841	220		856	2,237
KISANGANI	2,624	2,979	2,492	1,52	1,344	2,013	591	647	856		1,577
MBANDAKA	3,192	3,547	3,059	2,087	1,911	2,831	1,878	2,028	2,237	1,577	

Source: DLCA Logcluster, 2018