



# **SUDANESE SEED SECTOR A BASELINE STUDY /SURVEY 31<sup>st</sup> MAY 2011**



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### **31<sup>st</sup> MAY 2011**

Sudan is going through a curtail transitional period. The referendum in the south leads to division of the biggest country in Africa into two independent States. One in the North keeping the old name and one in the south named the Republic of South Sudan. The official declaration of the new state will be on July 9<sup>th</sup> 2011. Until then the country is officially regarded as one country . The implications of these conditions on laws and law enforcement are tremendous .The prevailing seed law (2009) was made to govern seed activities over the whole country. The National Legislative Council (the parlement) decided that all laws in the north will keep valid with the exception of clauses referring to the southern part.

Southern Sudan will form the new state with its new laws and system. Hence, the seed law of 2009 and the intended new by laws will govern the States of Northern Sudan.

It worth mentioning here that all the seed activities, infrastructure, facilities are mainly in the Northern Side. The South new state will need to start with a National Seed Programme covering all the components of a seed programme (breeding – multiplication-processing-marketing.. etc) and until then Southern Sudan State will depend on neighboring countries for seed supply of suitable improved varieties.

Taking the above mentioned facts into consideration the seed activities discussed later will be referring to Northern Sudan although the statistics are made for the united country before the referendum outcome was declared.

#### **Seed Policy:**

The government awareness of the importance of improving agricultural productivity through providing farmers with quality seed goes back to the sixties of last century .In 1968 Plant Propagation Department was formed in the Ministry of Agriculture. Seed stations were linked to research stations where there were breeding programmes. The intention was to make quality seed of improved varieties available for farmers. The approach was to provide seeds as apart of the services provided by the government to the farming communities. To expand the service to more farmers the government, in the seventies, initiated seed production units in different agricultural production schemes in the modern sector to meet specific needs of the farmers of the corporations. In the nineties and later the policy changed towards liberalization and privatization of seed production activities. The government role is now concentrated on quality control after it completed withdrawal from production activity.

For smooth transition the government with other investors formed Arab Sudanese Seed Company (ASSCO) which is a private seed company working on profit basis.

The government policy encourages the formation of new seed companies and invites partnerships between local investors and reputable seed companies from abroad. Investment incentives were made clear in the new National Investment Encouragement Law. The new Seed Law (2009) was designed to accommodate and enhance development of the private basis seed industry.

Realizing that the development of a seed industry to cover all country's needs takes time, small farmers' seed programmes are suggested in remote and underdeveloped areas.

## **Current Status of the Seed Sector:**

### **1. Informal Sector:**

Statistics show that most of the seed used in Sudanese agriculture are farm retained seeds (89%). These come from local varieties and land races kept by farmers or seeds from improved varieties but not under the seed certification programme

### **2. Formal Seed Sector:**

The challenge for the formal sector is to expand and attract more farmers to adopt the use of certified seeds of improved varieties. This requires a multidisciplinary approach including breeding, extension, distribution, networks, credit facilities etc...

Historically the formal seed sector started during colonial era by cotton introductions trials as early as 1902. The Gezira research station was established 1918 with a mandatory crop, cotton. . Through a series of changes it developed into the Agricultural Research Corporation (ARC) which is the science and technology arm of the Ministry of Agriculture. ARC now comprises 18 research stations covering the main agro-ecological zones of the country. Activities of the corporation in the southern part of the country were handicapped by the civil war and instability.

### **2.1 . Breeding Activities**

**2.1.1. ARC:** Most of the breeding activities in the country are carried by ARC Scientists. Other varieties introduced by private companies or from other breeding activities outside ARC are introduced in collaboration with ARC scientists to go through the Variety Release committee (VRC) . However in a later development varieties introduced or bred by scientists from private companies and universities are accepted for the VRC and some of these were recognized and now on the National Variety List.(Appendix i) .

### **2.1.2. Breeding programmes in the private sector now includes activities carried by the following organizations:**

- 1 Arab Sudanese seed company (ASSCO) Sorghum
- 2 Kenana Sugar Company (Cane plantation)
- 3 Green Lakes Company (Vegetables ,mainly Tomatoes)
- 4 Nectar Group (Sorghum, Maize, Vegetables)

### **2.1.3. Introduction of New Varieties:**

Some companies are testing introduced materials from companies abroad, these include:

1/ASSCO

2/Central Trading Company (CTC)

3/ Harvest

4/ Alfa Seed Company

Material comes mainly from South Africa, Australia, India, USA and Turkey.

## **2.2. Seed Supply to the seed market:**

### **2.2.1. Local Seed Production**

As mentioned before most of the seed used in agricultural sector comes from farmers retained seeds. We are concerned here with seed produced by special arrangements or formal seed sector under seed certification.

#### **1 Special Crops;**

To explain above mentioned there are two main crops having special arrangements for seed production. Those are cotton and sugarcane. Cotton seed is looked after by Sudan Cotton Company in collaboration with cotton department in ARC. Sugarcane breeding programme is made by ARC for public sector plantation and by Kenana Research Unit for Kenana Sugar Company (KSC) cane plantation.

#### **2 Seeds Produced under seed certification scheme**

Seed production under certification scheme includes mainly field crops particularly sorghum, pearl, millet, maize, wheat, sesame and groundnut in addition to some vegetables like okra and eggplants. (table 1)

The comparison between the total seed requirements of main crops and the total seed produced shows the big gap between the two (Table 2) . Only (11.5%) of seed requirements are met according to the statistics obtained from Ministry of Agriculture.

**Table (1)**  
**Total Seed Production (2006/2010)**

Season	2006		2007		2008		2009		2010			
Crop	Area (Fed)	Production (MT)	Area (Fed)	Production (MT)	Area (Fed)	Production (MT)	Area (Fed)	Production (MT)	Area (Fed)	Production (MT)	Average Production (MT)	Estimated Value of the seed in USD
<b>Sorghum</b>	35694.5	10708.35	50637	15191.1	49888	14966.4	52992	15897.6	62382.5	18714.75	<b>15095.64</b>	<b>4783959.272</b>
<b>Sesame</b>	13589	1902.46	20322	2845.08	17656	2471.84	18859	2640.26	20856	2919.84	<b>2555.9</b>	<b>3679345.845</b>
<b>Groundnut</b>	5074	1116.28	9055	1992.1	8355	1838.1	8499	1869.78	10464	2302.08	<b>1823.67</b>	<b>1155842.046</b>
<b>Millet</b>	3470	902.2	6599	1715.74	5490	1427.4	5516	1434.16	7110	1848.6	<b>1465.62</b>	<b>825627.7146</b>
<b>Maize</b>	900	576	1012	647.68	1139	728.96	1240.57	793.9648	1440.5	921.92	<b>733.71</b>	<b>465025.398</b>
<b>Wheat</b>	3240	2592	3144	2620.6	4790	3234.4	59379	35491	59191	25497	<b>13887</b>	<b>11755067.76</b>
<b>Cowpea</b>	195	15.6	866	69.28	500	40	816	65.28	724	57.92	<b>49.62</b>	<b>52415.5908</b>
<b>Okra</b>	0	0	142	31.95	266.75	60.01875	298	67.05	381.5	85.8375	<b>61.21</b>	<b>1380.8976</b>
<b>Total</b>	<b>62162.5</b>	<b>17812.9</b>	<b>91777</b>	<b>25113.5</b>	<b>88085</b>	<b>24767.12</b>	<b>147600</b>	<b>58259.1</b>	<b>162550</b>	<b>52347.9</b>	<b>35672.37</b>	<b>22718664.52</b>

table (2)

**Annual Seed Requirements and Average Seed Production  
of Main Crops(2006/2010)**

<b>Crop</b>	<b>Annual Seeds Requirements (MT)</b>	<b>Average Annual Seeds Production (MT)</b>	<b>Estimated coverage of certified seeds %</b>
<b>Sorghum</b>	<b>66,162</b>	<b>15095.64</b>	<b>22.82</b>
<b>Wheat</b>	<b>29,900</b>	<b>13887</b>	<b>46.44</b>
<b>Millet</b>	<b>11,670</b>	<b>1465.62</b>	<b>12.56</b>
<b>Sesame</b>	<b>6,339</b>	<b>2555.9</b>	<b>40.32</b>
<b>Cotton</b>	<b>1,070</b>		<b>100.00</b>
<b>Groundnut</b>	<b>192,120</b>	<b>1823.67</b>	<b>0.95</b>
<b>Sunflower</b>	<b>454</b>		<b>100.00</b>
<b>Maize</b>	<b>688</b>	<b>733.71</b>	<b>100.00</b>
<b>Cowpea</b>	<b>1,020</b>	<b>49.62</b>	<b>4.86</b>
<b>Total</b>	<b>309,423</b>	<b>35611.16</b>	<b>11.51</b>

This percentage, however, does not consider the amount of unsold certified seed and left as carry over or consumed as a commercial crop.

To assess the potential size of the business an estimation of the total value of the seed used annually, of main crops, are made. Since most of the seed is not certified we used the current grain market price as the measure (table3)

table( 3)  
**Estimated Annual Seed Requirement**

Crop	(05/2006-09/2010)		(2010-2011)		(2010/2011)	
	Average Area (000Fed)	Annual Seeds Requirements (000MT)	Average Area (000Fed)	Annual Seeds Requirements (000MT)	Estimated Value of the seed in SDG	Estimated Value of the seed in USD
Sorghum	21,323	64	22,054	66	59,545,800	20,966,831
Wheat	690	35	598	30	71,880,000	25,309,859
Millet	8,427	13	7,780	12	18,672,000	6,574,648
Sesame	4,178	6	4,226	6	25,915,950	9,125,335
Cotton	333	3	107	1	6,955,000	2,448,944
Groundnut	2,701	108	4,803	192	345,816,000	121,766,197
Sunflower	310	1	227	0	11,350,000	3,996,479
Maize	133	1	86	1	1,238,400	436,056
Cowpea	43	1	85	1	3,060,000	1,077,465
<b>Total</b>	<b>38,138</b>	<b>231</b>	<b>39,966</b>	<b>309</b>	<b>544,433,150</b>	<b>191,701,813</b>

- Cotton and sunflower prices are current market prices.(Cotton Company and Agricultural Bank)
- Other crops based on grain market prices of cleaned seeds.
- Exchange rate 3.3 SDG/USD

### **2.2.2 Seed Imports**

Seed imports to the country are growing although lacks consistency. The demand forecast for the future suggests a big and steady growing demand. Hybrids of crops like sunflower, maize and sorghum are expected to be in the lead due to government's plans to encourage production of these crops for self sufficiency and ambition to increase agricultural products exports.

**Seed imports constituted of:**

- Field crops: sunflower, maize, and sorghum hybrids as well as, rice and wheat varieties (table4).
- Vegetables: tomatoes, onion, cucurbits, brassicas etc (table 5)
- Forage crops :alfalfa, forage sorghum and range grasses
- Ornamentals, flower seeds, turf grasses etc...

table(4)

**Imported Field Crops Seeds (2005/2010)**

Crop	Imported Quantities in Kgs						Estimated Value of the seed in USD (2010)
	2005	2006	2007	2008	2009	2010	
<b>Sunflower</b>	182,995	-	213,200	1,306,090	8,084	103,370	583007
<b>Maize</b>	91,506	1,500	1,500	94,141	58,562	33,559	118295
<b>Wheat</b>	-	-	710,000	4,400,300	665,640	4,458,000	3,566,400
<b>Sorghum</b>	83,500	-	-	60,000	140,410	1,140,000	2,736,000
<b>Rice</b>	-	-	1,200	8,000	20	71,900	215,700
<b>Groundnut</b>	-	-	-	-	-	1,242,000	2,484,000
<b>Total</b>	<b>358,001</b>	<b>1,500</b>	<b>925,900</b>	<b>5,868,531</b>	<b>872,716</b>	<b>7,048,829</b>	<b>9,703,402</b>



(table 5)

**Imported Vegetable Seeds (2005/2010)**

Crop	Imported Quantities in Kgs						Estimated Value of the seed in USD (2010)
	2005	2006	2007	2008	2009	2010	
Watermelon	24,140	28,784	44,564	57,871	30,321	15,053	445,719.33
Tomatoes	27,584	32,429	29,339	31,249	38,871	45,767	2,387,664.39
Onion	13,994	7,498	5,481	29,235	67,426	74,529	3,362,748.48
Carrot	9,222	15,659	7,827	9,510	11,361	17,561	371,415.15
Cucumber	1,481	862	1,047	1,711	2,731	1,102	31,076.40
Melon	1,000	976	725	1,272	240	1,914	75,564.72
Beet	657	425	145	1,375	1,377	504	10,659.60
Squash	2,223	1,770	2,426	4,247	3,040	2,534	89,323.50
Okra	5,304	6,895	11,491	10,335	2,156	22,971	518,225.76
Eggplant	417	397	4,910	2,110	1,230	6,836	134,942.64
Cauliflower	31	25	230	45	108	404	10,253.52
Cabbage	75	50	75	150	322	75	1,797.75
Radish	-	-	100	65	900	10	239.70
Sweet pepper	1,040	405	1,030	819	1,186	1,192	58,825.20
Kidney Bean	1,000	-	1,000	4,508	12,000	-	
Rocket	-	445	-	-	300	261	130.50
Hot pepper	-	-	25	100	-	-	
Jews Mallow	400	-	-	-	-	-	
Turnip	75	25	100	-	20	-	
Peas	-	405	300	-	-	-	
Others	400	-	80	500	1,000	2,000	5,640.00
<b>Total</b>	<b>89,043</b>	<b>97,050</b>	<b>110,895</b>	<b>155,102</b>	<b>174,589</b>	<b>192,713</b>	<b>7,504,226.64</b>

**3. Infrastructure for processing and storage.****1-Processing Plants and Storage facilities:**

Processing capacity of the currently available processing units is more than the production capacity. Most of those facilities are more than 20 years in service. The distribution of these facilities covers the main seed production areas now. If seed production activities are to expand to new areas new setup of processing plants will be needed.

**2-Storage Facilities**

ASSOCO seed company is the only company having own storage facilities in its different production stations which total to 3100MTs.

Storage facilities are also available with the Sudanese Agricultural Bank branches in Different production areas.

#### **4. Size of Sudanese Seed Business:**

The estimated total value of annually planted seeds based on estimation of the total quality seed produced locally and imported is known below :-

- Estimated value of local seed production(table 1) = **22718665 \$**.
- Estimated value of imported field crop seeds(table 4) = **9703402 \$**.
- Estimated value of imported vegetable seeds(table 5) = **7504227\$**.
- Total estimated value of the seed in the seed market = **39,926,294 \$**

Some crops like cotton, sugar cane and local vegetables can not be assessed because they are managed outside the normal seed market.

#### **5. Regulatory Framework and Infrastructure of Sudanese Seed Industry:**

##### **5.1. Quality Control Authority:**

The Seed Administration (SA) of the Ministry of Agriculture is the National Seed Authority of the Sudan (NSA). It is the responsible body for certification and quality control of seeds in the country and seed moving across the countries borders.

Its head Quarter is in Khartoum and has three stations in Hudieba, Khashmelgerba and Sennar in northern, eastern and central Sudan respectively .Its activities include:

- 1- field inspection which is done by teams covering all parts of the country.
- 2- seed testing and this is done in four working laboratories in Hudieba, Khashmelgerba ,Sennar and the central in Khartoum.

Seed certificates are issued but yet no tags issued and no tagging procedures are followed (only labeling the bags).

SA work is governed by field and seed standards included in the by laws which is published in Arabic and available for producers.

SA is headed by a Director who is also Secretary of the National Seed Council and Variety Release Committee.

SA manger is the main contact person in all aspects of seed in the country. Despite the importance and big responsibilities of SA it lacks adequate funding, facilities, staffing and training. It needs to be supported in those four aspects to fulfill its role in the development of aviable seed industry.

##### **5. 2. Standards of Seed Certification:**

Seed certification standards are under the authority of the seed council. The current seed standards are made according to Seed Law of 1990 . They will keep in effect untill revised or renewed by the new council. They are published in Arabic. Efforts are going to make an English version for dealing within Southern Sudan States and for in the region harmonization. Table (6) shows examples of standards followed for the main crops for field inspection and laboratory tests.

table (6)

**Certification Field Standards (main crops)**

SR No.	Crop	Off types		Noxious weeds		Insuperable of other crops		Diseases	
		Foundation	Certified	Foundation	Certified	Foundation	Certified	Foundati on	Certifie d
1	<b>Sorghum</b>								
	<b>Hybrid</b>	0.05	0.1	0.01	0.1	0.05	0.5	0.05	0.5
	<b>O.P.V.</b>	0.1	0.2	0.01	0.1	0.5	0.5	0.05	0.5
2	<b>Millet</b>	0.1	0.2					0.03	0.04
3	<b>Wheat</b>	0.1	0.2	0.01	0.02	0.05	0.5	0.01	0.05
4	<b>Maize</b>								
	<b>Hybrid</b>	0.01	0.05	0.01	0.1	0.05	0.5	0.05	0.5
	<b>O.P.V.</b>	0.02	0.1	0.01	0.1	0.05	0.5	0.05	0.5
5	<b>Rice</b>	0.3	0.6	0.01	0.03	0.01	0.05	0.02	0.05
6	<b>Groundnuts</b>	0.1	0.5						
7	<b>Sesame</b>	0.1	0.2			0.1	0.2	0.5	0.1
8	<b>Sunflower</b>	0.1	0.5	0	0.05				
9	<b>Soyabean</b>	0.1	0.5					0.1	0.2
10	<b>Cotton</b>	0	0.05		0.01	0.1			

Table(7)

**Seed Standards (Laboratory Standards)  
(Main Crops)**

Crop	Pure seeds (Min)%		Inert matter (Max)%		Weed seeds (Max)No. of Seeds/Kg		Noxious weed seeds (Max)%		Other varieties Seeds (Max)%		Other Crops seeds (Max)%		Germination (Min)%	M.C (Max)%
	F	C	F	C	F	C	F	C	F	C	F	C		
<b>Sorghum</b>														
Hybrid	98	98	2	2	5	0.1	0		0.01	0	15	0.1	80	12
O.P.V.	98	98	2	2	0.2	0.02	0				0.02	0.2	80	12
Millet	98	98	2	2	10	0.1					10	0.1	75	12
Wheat	98	98	2	2	0.03	0.05	2	5	1	2	0.03	0.1	85	12
<b>Maize</b>														
Hybrid	98	98	2	2	0	0					0.02	0.2	90	12
O.P.V.	98	98	2	2	0	0			0.1	3	0.1	1	90	12
Rice	98	98	2	2	10	0.01	2	5	0.1	2	10	0.1	80	13
Groundnuts	98	98	2	2	0.1	0.5			0.1	2	0.1	0.5	70	10
Sesame	98	98	2	2	0.1	0.2			0.01	0	0.1	0.2	80	10
Sunflower	98	98	2	2	0	0			0.1	2	0	0.5	80	9
Soya bean	98	98	2	2	5	0.1			0.1	1	0	0.05	70	12
Cotton	98	98	2	2	0	0.1					5	0.1	70	10

F: Foundation

C : Certified

**Seed Categories:**

According to current regulations seed categories are in accordance with AOSCA categories:

- 1 Breeder seed
- 2 Foundation seed
- 3 Registered seed
- 4 Certified seed

This situation is not matching the norm in the region which follows the OECD categories:

- 1 Breeder Seed
- 2 Pre –basic seed
- 3 Basic seed
- 4 certified seed

There is a common understanding within seed industry stakeholders to adopt the OECD categories in the new by laws.

### **5.3 Variety Evaluation, Release and Registration:**

#### **5.3.1. Variety Evaluation:**

- This is the responsibility of the plant breeder who submits his variety performance trials report to the variety release committee.
- Private sector and universities breeders and foreign companies' agents have to co-operate with scientists from (ARC) to conduct trials and submit their reports for release in collaboration with them.
- Only variety performance trials ( VCU ) are required.
- No DUS tests are conducted.

#### **5.3.2. Variety Release:**

- The release of new varieties is decided by the Variety Release Committee (VRC).

The procedure and requirements are issued by the VRC to be followed by the applicants for release of new varieties. Release is done on performance data based on (VCU) provided by the breeder.

#### **The following are the basic requirements:**

- Performance data from trials conducted for a minimum of two seasons and two locations in the targeted region for release of the variety.
- The breeder must provide clear description of his variety to facilitate identification and verification. This is mainly to help quality control processes for production and field inspection.
- An adequate quantity of breeder seed should be available with the breeder for multiplication purposes and an authentic sample should be deposited at the Gene Bank of ARC.
- The breeder should propose a name for the variety according to the followed procedures.
- Up to date no open National Performance Trials or DUS tests are conducted officially. However ARC organizes national performance trials for their breeder's materials and readily cooperates with private sector breeders at request.

#### **5.3.3. Variety Registration**

Variety registration arrangements are within the authority of (SA). The variety accepted by the VRC is eventually included in the national list of varieties for the recommended region /regions.

The crops included in the variety evaluation, release and registration includes field crops, vegetables, trees (fruits and forestry) . According to the new seed law the seed council will be formed on new basis and consequently all the current setup of regulations, standards and procedures will be revised and amended if deemed necessary.

The new seed law states that the Seed Administration (SA) serves as the Secretary for the National Seed Council. Accordingly the SA Director will be the contact person for relevant matters to the council.

## **6. Phytosanitary Measures**

Quarantine laws go back to 1913 during colonial era with controls the movement of plant material to the country and within the country from region to the other for specific plant materials .

- Currently movement of plant materials across the country's borders is governed by the International Plant Protection Convention (IPPC) of which Sudan is a signatory.
- Importation of seeds into the country requires a phytosanitary certificate from the origin.
- At arrival of consignment a sample is drawn for testing by National Plant Protection Directorate(NPPD) of the Ministry of Agriculture. There are quarantine officers at airport and entry points (Port Sudan and Khartoum International Airport)
- Quarantine pests and diseases list is not yet compiled and /or published. The Directorate (NPPD) has qualified staff. They depend on the crop protection compendium 2005 as a guide and the locally gained experience and information.
- Support for compilation and publishing a national quarantine pest list is important for facilitating trade into and out of the country.
- Southern Sudan will be needing support of expertise training and equipments to develop its phytosanitary measures and system.
- The country is taking part in the COMESA harmonization efforts through active participation in the workshops organized for this purpose.
- The National Plant Protection Directorate (NPPD) of Sudan is headed by the Director General and its Head Quarters is in Khartoum North.

## **7. Plant Variety Protection (Intellectual Property Rights):**

The National Seed Law 2009 clearly states the protection of plant variety rights according to the following:

- 1/ the plant variety should be “new”, “distinct”, “uniform” and “stable”.
- 2/ any other regulations issued by the National Seed Council (NSC).
- 3/ The use of the protected variety is however allowed for the following purposes:
  - i. none commercial personal use
  - ii. scientific research purposes
  - iii. use for breeding new varieties
  - iv. farm retained seed within the farm

Up to date of this study

- National Seed Council (NSC) is not formed
- DUS testing organization does not exist.

## **8. Seed Import /Export Procedures and Documentation:**

Seed imports and exports regulation is the responsibility of the Seed Administration (SA). The procedures however involve other disciplines as shown in the documentation and requirements to be fulfilled as displayed below.

### **8.1. Seed Importation Requirements:**

1. Registration with S.A
2. Proforma invoice stating origin – quantity-variety-port of entry.
3. Application confirming the above information.
4. Provisional approval from under secretary of the Ministry of Agriculture to get the importation permit.
5. Certificate of origin.
6. Phytosanitary certificate from the origin
7. Seed testing certificate from a recognized organization e.g. ISTA.
8. Non-genetically modified crop variety certificate.
9. Local quality control organizations acceptance “S.A. ,Sudanese Standards and Metrology Organization (SSMO), and National Plant Protection Directorate (NPPD).

### **8.2. Seed Exportation Documentation:**

- 8.2.1 An application on headed paper and the stamp of the exporter showing the crop, the variety, the quantity and port of departure.
- 8.2.2 Above should be accompanied by the following:
  - I. Selling contract approved by the Ministry of Trade.
  - II. Seed analysis certificate.
  - III. Phytosanitary certificate.
  - IV. Seed should be labeled.
  - V. For forestry materials no objection letter from National Forestry Corporation.

### **9. Membership to International Organizations:**

**9.1. OECD:** Sudan is not a member of OECD and it follows the AOSCA certification categories. The OECD certificates are, however, accepted for importation of seeds. For harmonization with region the tendency in seed industry stakeholders is towards adopting the OECD categories and look forward for joining the scheme in the future.

**9.2. ISTA:** There is no ISTA accredited seed laboratory in Sudan despite the fact that all the official laboratories follows the ISTA rules and procedures as the guide for conducting their work.

**9.3. Sudan is a member of CBD, Cartagena Biosafety Protocol, International Treaty on Plant Genetic Resources for Food and Agriculture, and International Plant Protection Convention (IPPC).**

**9.4. AFSTA and ISF** Sudan is a member of the two organizations through the membership of Sudan Seed Trade Association (SSTA).

**9.5. WTO:** Although Sudan is not yet a member, negotiations to join are continuing. Sudan is an observer in the organization

**9.6. UPOV:** The discussion within the seed sector stakeholders on whether to

seek membership of UPOV or not favored actively seeking the membership. The new seed law made provision for Plant Variety Rights Protection and gave room for more detailed procedures and regulations which seems encouraging for future positive developments.

### **9.7. Local Seed Organizations:**

9.7.1. Sudanese Seed Trade Association (SSTA) was formed 2007 with the mandate to develop a private sector based seed industry.

9.7.2. Sudanese Seed Technologist Society (SSTS) formed 2010.

It is intended to organize and develop a science based organization in the seed field gathering expertise from public and private sector.

### **10/ Constrains:**

1. Most of seeds produced are open pollinated varieties in the absence of strong protection for plant varieties rights.
2. The size of the seed market is comparatively small since the use of certified seeds is at best estimate is 11% of total requirements.
3. Weak government institutions SA, extention services, ...etc.
4. Credit terms do not encourage investment in seed industry.

The most important areas that require strong immediate efforts to make real progress:

1. Formation of an independent, efficient and fair variety testing system for (VCU) and (DUS).
2. Improving the seed testing laboratories, preferably with ISTA accreditation or at least have recognition within the region countries.
3. Securing plant variety protection and breeders rights provision arrangements either within (UPOV) or any other practical means with local and regional recognition.
4. Facilitate seed trade within the region to expand the seed market for a growing seed industry.



## Appendix i:

### List of Key Stakeholders Addressed

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## Appendix ii:

### Released Varieties

Species	Variety	Breeder/ Maintainer	Year of Release
<b>Banana</b>	Grand Nain	ARC	2001
	Albeely	ARC	2003
<b>Bread Wheat</b>	Giza 144	ARC	1940
	Falsheto	ARC	1970
	Giza 148	ARC	1972
	Giza 155	ARC	1972
	Mexipak	ARC	1976
	Mexcani	ARC	1977
	Mukhtar	ARC	1978
	Chiniab-70	ARC	1978
	Condor	ARC	1979
	Debiera	ARC	1979
	Giza 157	ARC	1980
	Wadi EL-Neil	ARC	1987
	Sasariab	ARC	1992
	EL Neileen	ARC	1992
	Argeen	ARC	1996
	Nasr	ARC	1996
	Sham-1	ARC	1996
	Emam	ARC	2000
	ELTagana	ARC	2004
	Khalifa	ARC	2004
Gezira	ARC	2006	
Bohein	ARC	2006	
Nebta	ARC	2007	
<b>Cane Sugar</b>	CO6806	KSC	
	CO997	KSC	
	B 63349	KSC	1998
	B 70531	KSC	1998
	BJ 7938	KSC	1998
	BT 74209	KSC	1998
	COC 671	KSC	1998
	Kn H 80412	KSC	1998
	Co 775	KSC	2001
	TUC 75-3	KSC	2003
	BJ 8532	KSC	2003
	CO527	KSC	
R-579	KSC	2010	

<b>Species</b>	<b>Variety</b>	<b>Breeder/ Maintainer</b>	<b>Year of Release</b>
<b>Citrus</b>	Kinnow	ARC	1997
	karra	ARC	1997
	Honey	ARC	1997
Chickpea	NEC 2491	ARC	1987
	Gebel marra	ARC	1995
	Atmor	ARC	1996
	Wad Hamid	ARC	1996
	El Mtama	ARC	1998
<b>Cotton</b>	Shambat-B	ARC	
	Barac (67)B	ARC	1993
	Barac (69)2	ARC	1993
	Brakat S	ARC	1998
	Dr. Knight	ARC	2004
	Hadi	ARC	2004
	Hamid	ARC	2004
	Khairalla	ARC	2004
	Sidig	ARC	2004
	Khalefa	ARC	2006
	Abdeen	ARC	2006
Wagar	ARC	2006	
<b>Cowpea</b>	Ain El gazal	ARC	2000
	Dhab El goz	ARC	2000
	Gamar dourin	ARC	2000
	Hidob	ARC	2000
<b>Common bean</b>	Basabeer	ARC	1998
	Giza 3	ARC	1998
	Sirage	ARC	1998
	Motwaki	ARC	2003
	Ibariea	ARC	2003

<b>Species</b>	<b>Variety</b>	<b>Breeder/ Maintainer</b>	<b>Year of Release</b>
<b>Faba been</b>	BF 2/2	ARC	1971
	Hudeiba 72	ARC	1972
	Sulaim	ARC	1985
	Improved Sulaim	ARC	1987
	Shambat 75	ARC	1991
	Shambat 104	ARC	1991
	Basabeer	ARC	1993
	Hudeiba 93	ARC	1993
	Shambat 616	ARC	1993
	Damar	ARC	2006
	Salih Hussein	ARC	2009
<b>Forestry</b>	Altragma	ARC	1998
	Kaly	ARC	1998
<b>Garlic</b>	Chinese Garlic	ARC	1995
<b>Groundnut</b>	Ashford	ARC	1960
	Barberton	ARC	1960
	MH-383	ARC	1970
	Natal	ARC	1970
	Espanco	ARC	1984
	Sodari	ARC	1986
	Kiriz	ARC	1987
	Medani	ARC	1993
	Gebaish	ARC	1997
	Tozie	ARC	2000
	El Ahmadi	ARC	2000
	Bunting	ARC	2007
<b>Lentil</b>	Gebel mara	ARC	1993
	Robatab	ARC	1993
	Ndea	ARC	1998
<b>Maize</b>	Stock 113 (Fodder)	ARC	1975
	Mexican June	ARC	1978

<b>Species</b>	<b>Variety</b>	<b>Breeder/ Maintainer</b>	<b>Year of Release</b>
<b>Maize</b>	Bafwear	ARC	1978
	Hudeiba 1	ARC	1998
	Hudeiba 2	ARC	1998
<b>Millet</b>	Pan 6480	ARC	1998
	Pan 6578	ARC	1998
	PAN-6966	ARC	2009
	PAN-6026	ARC	2009
	PAN-6568	ARC	2009
	Yai1	ARC	2010
	Yai2	ARC	2010
	Biuda 1	ARC	1970
	Sereira Composite 2	ARC	1981
	Ugandi	ARC	1981
Ashana	ARC	2000	
<b>Okra</b>	Higairat	ARC	1987
	Raeba	ARC	1987
	Sennar	ARC	1987
<b>Onion</b>	Elhelo	ARC	1987
	Kamleen	ARC	1987
	Sagai mohasen	ARC	1987
	Aldnglawy(balady)	ARC	1993
	Baftim		
<b>Pea</b>	karima	ARC	1989
	Shambat	ARC	2003
<b>Pigeonpea</b>	Tiba	ARC	2000
<b>Potato</b>	Desiree	ARC	2004
	Diamant	ARC	2004
	Draga	ARC	2004
	Frisia	ARC	2004
	Spunta	ARC	2004

<b>Species</b>	<b>Variety</b>	<b>Breeder/ Maintainer</b>	<b>Year of Release</b>
<b>Sesame</b>	Ziraa 1	ARC	1964
	Ziraa 7	ARC	1964
	Al Ziraa 3	ARC	1964
	Ziraa 9	ARC	1985
	Huria 49	ARC	1985
	Huria 31	ARC	1985
	Kenana 1	ARC	1985
	Hiraihri	ARC	1991
	Kenana 2	ARC	1991
	Khidr	ARC	1998
	Promo	ARC	1998
	Um Shagara	ARC	2003
	Gadarif	ARC	2003
	<b>Sorghum</b>	Dwarf White Milo	ARC
Maatug		ARC	1971
TUB 11		ARC	1971
TUB 22		ARC	1971
TUB 7		ARC	1971
Karkateib		ARC	1975
Dabar/1/1/1/1		ARC	1978
Gadam El Hamam-47		ARC	1978
Hageen Dura 1		ARC/ICRISAT	1983
Mogawim boda1		ARC/ICRISAT	1991
Mogawim bod		ARC/ICRISAT	1991
Pioneer 988(Fodder)		Pioneer	1991
Pioneer 877(Fodde		Pioneer	1992
Ingaz		ARC	1992
Shaikhan		ARC	1992
Wad Ahmed		ARC	1992
Shaikhan		ARC	1992
Rabih- Hageen		ARC	1996
Tabat		ARC	1996
Hageen Y,SW64		ARC	1996
PAN - 888(Fodder)		Pioneer	1998
PAN- 606		ARC	1998
Aros El Rema		ARC	2000
Yarwasha		ARC	2003
Safed Moti (Fodder)		ASSCO	2003

<b>Species</b>	<b>Variety</b>	<b>Breeder/ Maintainer</b>	<b>Year of Release</b>
<b>Sorghum</b>	Kambal	ARC	2004
	Bashayir	ARC	2008
	Butana	ARC	2008
	Sudani 1	ARC	2009
	ArfaGadamak8	ARC	2009
	Hageen grawia (fodder)	ARC	2010
<b>Sunflower</b>	Damazin 1	ARC	1991
	Damazin 2	ARC	1991
	PAN – 7392	ARC+ASSCO	2003
	PAN – 7355	ARC	2003
	Hysun 33	ASSCO	2003
	Jwalmukhi	ASSCO	2003
	Salih	U. K	2004
	Shambat	U. K.	2004
	PAN – 7351	ARC	2006
	PAN – 7371	ARC	2006
	Bohooth1	ARC	2009
	Bohooth2	ARC	2009
	Bohooth3	ARC	2009
<b>Squash</b>	Gezira 1	ARC	2009
	Gezira 2	ARC	2009
<b>Tomato</b>	Sennar 1	ARC	1993
	Sennar 2	ARC	1993
	Gezira	U.G	2000
	Abdalla	U.G	2000
	Elsalama1	ARC	2009
	Elsalama2	ARC	2009
<b>Sweet potato</b>	Salih Hussein	ARC	2009
	Abusabi	ARC	2009
<b>Rice</b>	Kosti1	ARC	2010
	Kosti2	ARC	2010
	Umgar	ARC	2010
	Warda	ARC	2010