



Research Brief

Seed System Resilience Assessment in Torit County, South Sudan

Food and Nutrition Security Resilience Programme (REPRO)
South Sudan Programme

Research Brief, 2021

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1. PURPOSE

Building seed system resilience in protracted crises is an important goal of the Food and Nutrition Security Resilience Programme (FNS REPRO) of South Sudan. The programme employed a Seed System Resilience Assessment (SSRA) as a diagnostic and planning tool to co-create with local actors and stakeholders a better understanding of the behaviour of seed systems; that is, how they change and respond in the face of local shocks and stressors, change their current performance, and enable the development of a seed systems resilience pathway, enabling evidence-based programming to strengthen the robustness of local seed systems and their contributions to local food system performances for improved food and nutrition outcomes.

The overall purpose of this assessment is to develop integrated context-specific seed sector pathways in selected areas of South Sudan, with the aim to:

- 1 reduce the number of people in IPC-3 (food crisis) through integrated seed sector development
- 2 reduce the number of people in IPC-4 (food emergency) through an effective seed insecurity response.

The seed system resilience assessment was conducted in Torit, Ikwoto and Magwi county of Eastern Equatoria, South Sudan in September-October 2020. These three counties differ significantly from one another in terms of food systems and the seed systems underpinning them. These differences are in terms of agro-ecology¹, livelihood systems, and drivers impacting on the food-seed systems (conflict and insecurity, economic shocks including Covid-19, and climate change).

This report presents the key findings of the field assessment and the multi-stakeholder dialogues conducted in Torit County. Torit county assessment captures the reality of local seed systems in a context of urban dynamics as well as the conflict-prone rural areas. County based reports make it easier for both government, humanitarian actors, and local private seed companies to design specific interventions for each county to build seed systems resilience. This report further builds on the findings of South Sudan seed security assessments undertaken by FAO and partners across South Sudan, including Torit County in 2018.

2. METHODOLOGY

2.1 ASSESSMENT SITES

The assessment sites in Torit County included two fundamentally different situations represented by two clusters (Figure 1 & 2):

- the Nyong cluster - representing Nyong (Torit Town and surroundings) and Kudo Payams
- the Himodonge Cluster - representing Himodonge , Ifwotu and Imuruok Payams.

Nyong cluster, with a population of approximately 50,812,

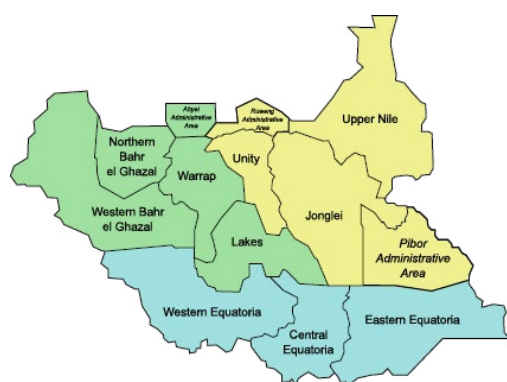


Figure 1. Administrative map of South Sudan. Source: Wikipedia

is characterised by its urban dynamic status and its position in the hills and mountain area. The community of this cluster are farmers who rely to a considerable degree on natural resources for their survival, such as the collection of wild fruits and vegetables, harvesting wild honey, poaching of animals, and the collection and sale of fuel woods. Livestock rearing and fishing are also practiced but are of less importance than the aforementioned activities.

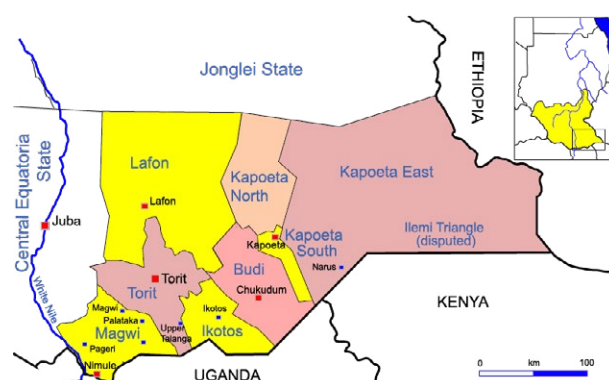


Figure 2. Map showing the assessment sites in the Eastern Equatoria, South Sudan. Source: Wikipedia

¹ Torit County is made up of hilly areas; Ikwoto County lies partly in the hills and mountains and partly within the greenbelt area; and Magwi County is in the greenbelt zone, with flat lands having long two rainy seasons.

Himodogne cluster, with a population of approximately 29,476, is characterised by agro-pastoral farmers; however, it is conflict-prone. This cluster also falls within the hills and mountains agro-ecological zone. With the return of refugees from camps, in particular those from Uganda, farmers have been exposed to new crops including maize and vegetable production for local markets.

2.2 ASSESSMENT TEAM

A multidisciplinary team representing the knowledge institutes, private seed sector and UN Agency jointly conducted the assessment in Torit cluster in strong co-ordination with and support from several local actors and stakeholders (Table 1). The field assessment team was trained by WCDI. Data analysis was done by both WCDI and the University of Juba team. In addition to this, a total of six field enumerators were hired to conduct the household interviews in the assessment sites.

2.3 SEED SYSTEMS RESILIENCE ASSESSMENT TOOLS

The assessment employs a newly developed seed system resilience assessment (SSRA), providing both a diagnostic and planning tool for evidence-based programming, by Wageningen Centre for Development Innovation (WCDI) of Wageningen University and Research in partnership with Juba University and FAO South Sudan as part of the learning agenda of FNS-REPRO programme.

The SSRA Facilitation Tool² offers several tools. The first two tools included the focus group discussion with key informants that included farmers and their communities which were made up of old and young, males and females, documenting the historical trend of conflicts and climate change impact on local livelihoods and food and nutrition security, and documenting the availability, use and preference of crop diversity by farmers (tool 1: analysis of crop diversity availability & preference) and by climate resilience (tool 2: climate resilience analysis). The focus group discussion was conducted in Nyong Payam and Himodonge Payam with 60 total key informants: 30 were female, 30 were male, and 30 were youth of both genders (18-35 years).

The third tool analysed the dynamics of the social network due to the flow of crops, varieties, seeds and information between farmers, other groups competing for natural resources, and organizations linked with farmers and local markets. The continuity of this network builds trust, social cohesion, and reciprocity. In protracted crises, vitally, the social network often extends into IDP/returnee/refugee areas (tool 3: social seed network analysis). A total of 40 starting respondents consisted of local farmers, refugees, IDPs, and refugee hosts /returnees, representing the different age groups and genders from each cluster selected in the survey. In every next stage the number of participants increased, based on the snowball sampling method; finally there were a total of 441 respondents in the Nyong

Table 1 Details of assessment team

S/No	Name	Affiliation	Representation and role
1	Tony Ngalamu, PhD	University of Juba	Knowledge institute (Field study team leader)
2	Madalina Kaku Daniel	University of Juba	Knowledge institute (Gender & socio-economist)
3	Obudra Francis Bile	Seed Grow Ltd	Private seed sector (Agronomist)
4	IVU Charles	FAO SSD	UN Agency (Agronomist)
5	Abishkar Subedi, PhD	WCDI	Knowledge institute (SSRA methodology design and training to the field study team)
6	Gerrit-Jan Van Uffelen, PhD	WCDI	Knowledge institute (SSRA methodology design and training to the field study team)

Table 2 Seed systems resilience tools and participants

S/No	Tool	No of key informants/ respondents	Gender (%)
1	Analysis of crop diversity availability & preference	60	50% male and 50% female
2	Climate resilience analysis	60	50% male and 50% female
3	Social seed network analysis	762	71% female and 28% male*
4	Seed systems analysis	11	9% female and 91% male
5.	Seed value chain analysis	11	9% female and 91% male

* remaining 1% represented by local markets and various organizations

² <https://research.wur.nl/en/publications/building-seed-system-resilience-in-protracted-crisis-situations-s>



cluster and 321 respondents in the Himondonge cluster. The fourth and fifth tool (tool 4: seed system analysis, and tool 5: seed value chain analysis) were applied at Torit County level through multi-stakeholder workshop involving participants from key institutions of Torit seed sector (Table 3). The workshop was organized on the 9th of

October 2020 in Nyong Payam. The workshop started by sharing a short synthesis of key findings of tool 1 and 2 to constitute the building blocks for the workshop. The workshop focused on the development of seed system resilience pathways for Torit County.

Table 3. Stakeholder participants in the Torit workshop

Public sector	Private sector	I/NGOs	Farmers Organization
State Ministry of Agriculture	Afrognanics	UNICEF	Author Cooperative Society
County Department of Agriculture		FAO	
Payam Agriculture Department		AVSI	
		BASENET	
		CARTIS Luxembourg	

3. RESULTS

3.1 KEY DRIVERS OF FOOD CRISES

Conflict and insecurity

Nyong Cluster: In terms of drivers of food crises, this cluster *per se* has experienced several conflicts or insecurities in the past 30 years. The documented conflicts of the 1990's to the early 2000's was between the Sudan government in the form of the Sudanese Armed Forces (SAF) against an armed rebel group known as the Sudan People's Liberation Army (SPLA). Later conflict, from 2013 onward, was between the government of South Sudan (SPLA) and a splinter group known as SPLA in Opposition.

Himodonge cluster: This cluster is quite unique because of the types and nature of conflict it has witnessed in the three decades covered in this study. It suffered because of conflict between the Sudan People's Liberation Army (SPLA) and Sudan Armed Forces (SAF), the Lord's Resistance Army (LRA) insurgencies, and communal conflict within and among communities, and it equally suffered from the SPLA IG (in government) and SPLA IO (in opposition).

Economic shocks and Covid-19

Nyong cluster: Displacement disrupted agricultural production and income generation. Access to financial support or loans is very limited and if available at all interest rates are very high. The Covid-19 crisis and the measures taken to combat it reduced crop yields, as timely weeding and harvesting are normally communal activities to better manage the workload but this was not possible because of the social distancing and mobility restrictions measures of Covid-19.

Himodonge cluster: The most notable economic shocks experienced included the inability to buy food and quality seeds and lack of resources to hire tractors for producing food and cash crops for the market, most notably Irish potatoes, sesame, sunflower, and vegetables. Access to low interest loans was a key challenge. As for Nyong cluster, Covid-19 measures reduced crop yields as timely weeding and harvesting are normally communal activities to better manage workload and this was not possible because of Covid-19 measures.

Weather extremes and climate change

Nyong cluster: This cluster has suffered from several

climate hazards such as recurrent droughts, flood, weed infestation and diseases. Ongoing conflicts, coupled with climate change, have crippled livelihood activities, resulting in forceful displacement, loss of crops and livestock, and looting of reserve food and seeds.

Himodonge cluster: This cluster has registered climate shocks such as recurrent droughts, flood, pest infestation (termite), desert locust, variegated grasshopper, heavy rainfall, striga weeds and diseases.

Causes of undernutrition: poor diets, diseases, and care practices³

Nyong cluster: The conflicts, coupled with negative impacts of climate change, have crippled livelihood activities, resulting in forceful displacement, loss of crops and livestock and looting of reserve food and seeds. This has disrupted dietary status because of interaction between insecurity and climate stressors. The inhabitants of Nyong Payam were forced to evacuate their villages to look for a safe haven because of rampant cases of malnutrition from poor-quality food stock; outbreaks of disease have resulted in crippled health and loss of lives.

Himodonge cluster: The interaction between conflict/insecurity and climate stressors in this cluster has resulted in the destruction of livelihood activities; the food and nutritional status of the inhabitants have been seriously affected. People have lost their lives, the Norwegian Church Aid's established health systems have been jeopardized, and because of the cluster's proximity to Uganda people have taken refuge there.

Response of humanitarian assistance

Nyong cluster: There have been some level interventions by I/NGOs such as FAO, the AVSI Foundation (AVISI) and others in areas of seeds, food and nutrition, and rehabilitation.

Himodonge cluster: NGOs such as CordAid, Walter Hunger, Global Aim, NIRAS, AVSI and others were able to introduce improved vegetable seeds assortments, and now the cluster acts as the source of foodstuffs for Torit County main markets.

³ Good nutrition goes beyond food security. Proper care practices, including breastfeeding and other recommended infant and young child feeding practices, hygienic environments, and access to health services are needed in addition to nutritious diets. Good nutrition is as much about ensuring an appropriate intake of nutrients as it is about ensuring that children are healthy enough to absorb those nutrients. Global Report on Food Crises, 2021.



Table 4. Mapping the crop diversity status in Nyong Payam and Himodonge Payam in 2020

Crop diversity status	Nyong Payam	Himodonge Payam
Crop grown by many farmers in large area	maize (local early maturing variety) sorghum (Akale, local varieties -Aderi, Osiogo, Akonglogi), groundnut (Red Beauty), sesame (Anvim), groundnut (Lokova), cassava (local variety Agwana Ondwato, Agwana Onolek)	maize (local variety yellow corn, early maturing), sorghum (Akale), groundnut (Red Beauty)
Crop grown by many farmers in small area	pumpkin, guava, mango, lemon, local cowpea, local okra, cherry tomatoes, improved tomatoes, cowpea, eggplant, sorghum (Serena, Akele) groundnut (Amilo, Red Beauty)	jute mallow, rigila, amaranths, onion, spinach, carrots, eggplant, tomatoes, cabbage pumpkin, local cowpea, okra and sukumawiki
Crop grown by few farmers in large area	maize (longe-5), sweet potatoes, sesame (Anvim), cassava (Agwana Onolek)	sorghum (Osiogo), groundnut, cassava
Crop grown by few farmers in small area	sesame, papaya, okra (improved variety Tiktik), tomato (Moneymaker), eggplant (Black Beauty), green pepper, pumpkin, lemon, sukumawiki, guava and onion	sesame, sugar cane, papaya, green gram, banana, sweet potatoes, and Irish potatoes.
Lost crops	yellow corn, pearl millet and soybean	pigeon pea, sunflower, finger millet, bambara nut and pearl millet

3.2 STATE OF CROP DIVERSITY

The crop diversity wheel tool was used to identify the types of crops and varieties that are currently available and that have been lost in Nyong Payam and Himodonge Payam in Torit County (Table 4). A total of 19 crops with over 34 varieties are currently grown by farmers in Nyong Payam. Similarly, 24 crops with over 26 varieties are currently grown by farmers in Himodonge Payam. Crops (for example pear millet, pigeon pea, sunflower, finger millet and bambara nut) have been reported as lost crops from the Nyong and Himodonge Payams.

In Torit County, maize, sorghum, groundnut, cassava, and sesame are grown over large areas by many farmers for food security and as a source of income generation. In certain villages some crops such as soybean, bambara nut, pearl millet, yellow corn, cassava, and sweet

potatoes have been completely lost because of conflicts (notably an attempt by the Sudan Armed Forces to capture Torit before 2005, the power wrangle within SPLA/M that resulted in the formation of the Sudan People's Liberation Army in Opposition, and the inter- and intra-communal wars) and climate hazards that have caused havoc in Torit County. Crop diversity is furthermore affected by recurrent droughts, flood, disease, pests such as grasshoppers, and *striga hermantica* (parasitic weeds).

Some farmers grow crops commercially for income generation, especially sesame, cassava, maize, groundnut, and sorghum. Most cultivate vegetables in small areas for home consumption and medicinal benefits; however, they have stated that vegetables crops cannot withstand occurrences of drought. There are a group of fruits (papaya, banana, sugar cane) and vegetables

(tomatoes, potatoes, sesame, onion, okra) which are grown in small areas by few farmers. The main reason for venturing into vegetable production is their short crop cycle, which ensures a steady market income. However, vegetable farming demands good management since the plants are prone to pests and disease.

Table 5 maps out the reasons for growing these crop varieties on different scales; the challenges faced; the effects of crises and humanitarian interventions on availability and use of crop diversity; the crops, varieties and seed systems that are important to the group in dealing with future/expected shocks and stressors; and recommendations for an intervention plan.

Impact of shocks and stressors on availability of crop diversity

The main shocks and stressors impacting crop diversity and its local availability are conflict, insecurity, drought, erratic rainfall, and the introduction of new diseases and pests. For instance, conflict between Sudan Armed Forces and Sudan People's Liberation Army/Movement; internal power wrangling within the Sudan People's

Liberation Army/Movement in the 1990's and again in 2013; thugs and cattle raiders, inter and intra communal fighting; infestation of desert locust in 2020; and variegated grasshopper, drought, heavy rainfall, striga weeds and disease outbreaks. This paradox has resulted in the internal displacement of inhabitants because of famine; exodus to refugee camps in Uganda (Biyali) and Kenya (Kakuma); and the loss of indigenous sorghum varieties, bulrush millet, and the Yellow Corn unknown maize variety.

3.3 FARMER'S PREFERRED CROP DIVERSITY

Female-only and male-only focus group discussions were separately conducted to identify their preferences for specific crop traits, crops, and varieties. Twenty (10 female and 10 male) farmers participated in a two-day workshop in each cluster in Torit County.

Crop preference criteria

Both female and male farmers prioritized their most preferred crops or varieties on the same sets of six criteria: good yield, drought tolerant, flood tolerant, good eating quality, high market demand, and less damage by

Table 5. Key reasons strengths and challenges of promoting crop diversity in Torit County in 2020

Cop diversity status	Key strengths	Key challenges
Crop grown by many farmers in large areas	Income generation, food security, conservation, brewing (sorghum), cultural importance, consumer preference, and high yield	Pests and diseases, parasitic weeds, erratic rainfall, flood, drought, late delivery of seeds by I/NGOS
Crop grown by many farmers in small areas	Home consumption, some for medicinal benefits and for their ability to withstand stressors	Pests and diseases, seeds are inadequate, flood and drought, dependence on free seeds with poor quality distributed by I/NGOS
Crop grown by few farmers in large areas	Food security crops with high market demand (commercial purpose)	Army fall worm and lack of fertilizer (maize), tuber seeds of improved varieties are easily damaged compared to local varieties.
Crop grown by few farmers in small areas	Short cropping cycle	The short cropping cycle varieties are prone to pest attack and climate stressors Lack of quality seeds, lack of irrigation during dry season, high pest infestation, inferior seed quality and poor roads.
Lost crops		Crops are lost because of conflict, changes in farmer preference, lack of seed and planting materials, and the introduction of new crop varieties, pests, diseases, and animals. Farmers tend to eat distributed seeds because they are distributed late. Soyabean and pear millet does not fall under national priority.

birds and pests. Female farmers had one additional preference criteria which was not prioritized by their male counterparts: crop maturity. Based on these preference criteria, farmers prioritized their most preferred crops, as illustrated in Figure 3.

Sorghum, maize, cassava, groundnuts, sesame, pumpkin, and tomato crops were the most preferred crops in Torit County. Female and male farmers preferred different types of varieties (Table 6).

Farmer-preferred cereal and oil seed crops

Sorghum and maize: In Nyong cluster, preference for sorghum varieties in all the villages was for local varieties; however in the case of maize the improved variety was preferred (Iduye). Specific traits preferred were good yield, high market demand, good palatability, and high malting quality, tolerance to drought/flood, less bird damage, and early maturity (sorghum); eating quality, market demand and flour quality (maize). In Himodonge cluster, male farmers preferred sorghum; a mixture of Odoko and Aderi, Aderi the most preferred. Specific traits preferred for Aderi were good yield, high market demand, and good palatability, tolerance to drought/flood, less bird damage, and early maturity. In contrast, female farmers preferred Akele, a local variety for sorghum, with the same traits except for medium maturity and including good malting quality.

Groundnut and sesame: An improved variety of groundnut Red Beauty was preferred because of its high yielding ability; two local varieties were equally preferred, Ogom

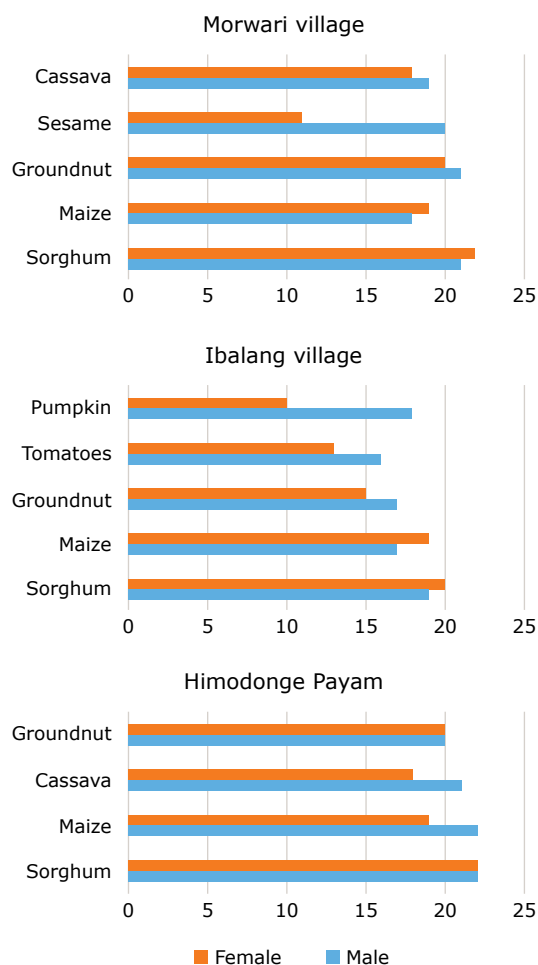


Figure 3. Preference ranking of most important crops in (Morwari and Ibalang) Nyong Payam and Himodonge Payam

Table 6. Female and male farmers preferred crops varieties in Nyong Payam and Himodonge Payam of Torit County

Crops	Nyong Payam				Himodonge Payam	
	Morwari village		Ibalang village			
	Female	Male	Female	Male	Female	Male
Sorghum	Aderi, Okweleng (L), Apayi, Akele (L), Serena	Aderi, Odoko, Osingo	Akele (L), Serena, Okweleng (L), Kabi Aderi (L), Ababaula (L)	Akele (L), Serena, Okweleng (L), Kabi (I), Ababalua (L)	Akele (L), Aderi (L), Okweleng (L), Serena, Apayi (L)	Odoko (L), Aderi (L), Adudunge (L), Apra
Maize	Iduye (L)	Yellow Corn	Longe-5(I)	Longe-5(I)	Yellow corn	Longe-5(I)
Cassava	TME-14 (I)	Agwana (L)			Onolek (L)	Ondwato (L)
Groundnut	Red Beauty (I)	Gurrguru (L)	Ogom (L)	Red Beauty (I)	Red Beauty (I)	Ogom (L)
Sesame	Sesame 2 (I)		Black sesame (L)			
Pumpkin			Pumpkin variety (I)	Pumpkin variety (I)		
Tomato			Money Maker (I)	Money Maker (I)		

* L = Local variety, I = Improved variety

(extra early maturing) and Gurrugu (good quality paste). Sesame 2, an improved variety was preferred due to its high yielding ability and local variety (Anyim) black seeded was preferred due to its high oil content.

Farmer-preferred root and tuber crops

Improved variety of cassava (TME 14), a high yielding variety with high level of resistance to disease was the male farmers' most preferred variety, followed by the local varieties Agwana, Ondwato and Onolek. They also ranked an improved variety of sweet potatoes, Orange Flesh (rich in beta-carotene and high yielding) as an important variety.

Farmer-preferred vegetable crops

The most-preferred vegetables were pumpkin and tomatoes. However, several other vegetable crops are also reported as important because of household consumption and income generation. The vegetables commonly grown across Torit County are a variety of jute mallow (unknown), Rigila (unknown), amaranths (Dubious or red spinach), onion (Red Creole), spinach (unknown), carrots (Nantes), eggplant (Black Beauty), tomatoes (Money Maker), cabbage (Copenhagen) pumpkin (unknown), cowpea (Secow 2) okra (Pusa Swana) and Sukumawiki (1000 head). The farmers of cluster 2 supply Torit market with daily fresh vegetables and attest to the nutritional benefits of vegetables.

3.3 CLIMATE RESILIENT CROPS AND VARIETIES

Climate hazards impacting livelihoods

Farmers and local communities in Torit County perceived various climate hazards that impact their livelihoods. Flood, high temperature, less amount of rain, delayed rain, hailstorms and introduction of new pests and disease are the major climate hazards; they severely impact the crops and livestock management and cause severe disruption of the local food system (Table 7).

Climate resilient crops and varieties

Nyong cluster: Sorghum and cowpea were ranked as the two most climate resilient crops in Ibalang village (Figure 4). Comparatively improved varieties are more resilient in cowpea, okra and groundnuts crops while local varieties are more resilient in sorghum and maize crops (Table 8). In Morwari village cassava, sweet potatoes, sorghum, groundnut, and okra were reported as the most climate resilient crops (Figure 5). Local varieties of sorghum, cowpea and groundnuts are more resilient in Morwari village while improved varieties are reported as more resilient in maize, okra, and sesame crops (Table 9). The major seed sources of these climate resilient crops and varieties in Nyong Payam are the farmers' own seed savings, seed exchanged with other farmers, grain purchased from the local market, and the seed distribution programmes of FAO, AVSI, and BRAC.

Table 7. Key drivers (hazards) of climate change impacting the farmers and community livelihoods in Torit County

Villages	Climate hazards	Impact on livelihood	Severity of impact (highest to lowest) [+++, ++, +]
Nyong Payam			
Ibalang			
	Flood, high temperature, hailstorms, introduction of new pests and diseases	Crop production and livestock	+++
	Drought, erratic rainfall, increased crop diseases and pest infestation	Crop production	++
Morwari			
	Less rain, floods	Disruption of crop production and food system, effect on crop and livestock production	+++
	More rain, hailstorms, delayed rain, crop and animal disease and pest	Damage of field crops	++
	Early onset of rain	Crop production	+
Himodonge Payam			
	Less rain, delayed rain, flood, high temperature	Crop failure and death of livestock,	+++
	Early onset of rain, hailstorms, pests, and diseases	Crop production and livestock	++
	More rain	Crop production and livestock	+



Ibalang village

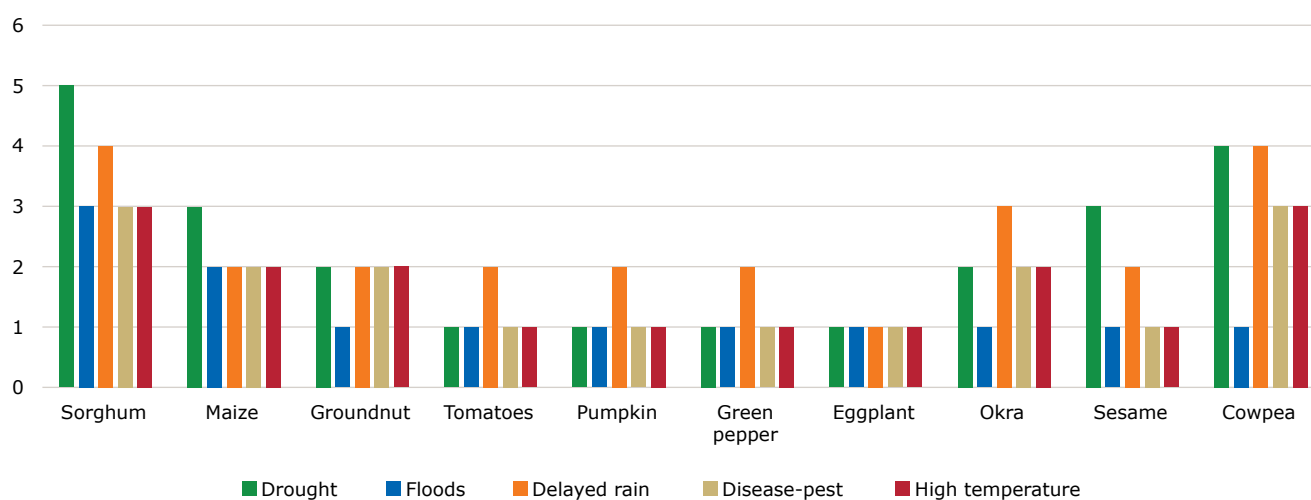


Figure 4. Analysis of climate resilient crops based on farmer perceptions in Ibalang village of Nyong Payam (higher value = more resilient, lower value = less resilient)

Morwari village

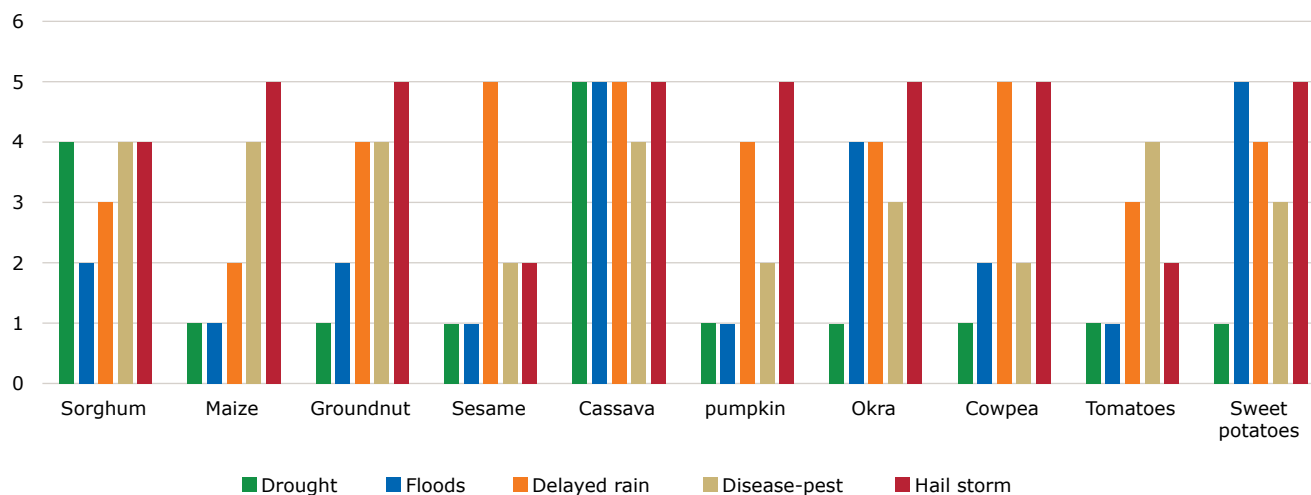


Figure 5. Analysis of climate resilient crops based on farmers perceptions in Morwari village of Nyong Payam (higher value = more resilient, lower value = less resilient)

Table 8 Analysis of climate resilient varieties based on farmer perceptions, Ibalang village

Crops	Varieties	Types of varieties	Climate hazards ranking (1= least resilient, 5= high resilient)					Resilient variety (higher total rank = more resilient)
			Drought	Floods	Delayed rain	Disease-pest	High temp.	
Sorghum	Akele	Local	4	2	3	4	3	16
	Serena	Improved	3	1	4	3	4	15
	Kabi	Improved	4	2	3	3	2	14
	Ababalua	Local	3	1	3	2	3	12
	Okweleng	Local	3	1	2	2	3	11
Cowpea	Secow 2	Improved	4	3	4	3	2	16
	Namaduro	Local	4	2	3	3	3	15
Maize	Iduye	Local	3	3	4	2	2	14
	Longe-5	Improved	3	2	1	3	4	13
Okra	Long fruit	Improved	4	3	4	3	4	17
	Tiktik	Improved	3	2	3	4	3	15
	Obolochore	Local	5	3	3	2	1	14
Groundnut	Red Beauty	Improved	3	2	4	5	3	17
	Gurguru	Local	4	3	3	2	2	14
	Ogom	Local	2	2	2	3	1	10

Table 9 Analysis of climate resilient varieties based on farmer's perceptions Morwari village

Crops	Varieties	Types of varieties	Climate hazards ranking (1= least resilient, 5= high resilient)					Resilient variety (higher total rank = more resilient)
			Drought	Floods	Delayed rain	Disease-pest	Hailstorms	
Sorghum	Aderi	Local	5	4	3	3	3	18
	Akele	Local	4	3	3	4	3	17
	Serena	Improved	3	2	3	4	3	15
	Osingo	Local	3	1	3	2	3	12
Cowpea	Namaduro	Local	4	3	4	3	3	17
	Secow 2	Improved	3	2	3	3	2	13
Maize	Longe-5	Improved	3	2	2	3	4	14
	Yellow corn	Local	3	2	3	2	2	12
Okra	Ladies fingers	Improved	3	2	3	3	3	14
	Tiktik	Improved	2	1	3	3	2	11
Groundnut	Gurguru	Local	4	2	3	3	4	15
	Red Beauty	Improved	3	2	3	3	3	14
Sesame	Sesame 2	Improved	3	3	2	2	2	12
	Black sesame	Local	3	2	1	3	2	11

Himodonge cluster

Sorghum, cassava, and cowpea were ranked as the three most climate resilient crops in Himodonge Payam (Figure 6). Comparatively, sorghum, cowpea, and okra local varieties were more resilient while maize and groundnuts

improved varieties were more resilient (Table 10). The major seed sources of these climate resilient crops and varieties in Himodonge Payam were farmers' own seed savings, seed exchanged with other farmers, and the seed distribution programmes of FAO, AVSI, WHH, and NCA.

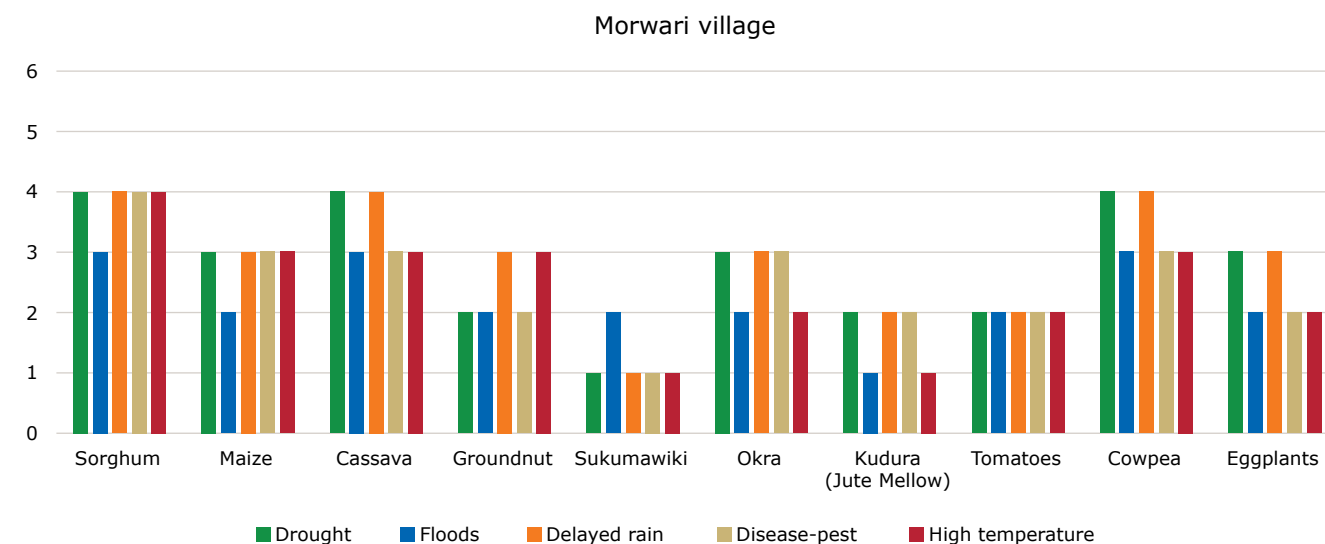


Figure 6. Analysis of climate resilient crops based on farmers perceptions in Himodonge Payam (higher value = more resilient, lower value = less resilient)

Table 10. Analysis of climate resilient varieties based on farmer's perceptions Himodonge Payam

Crops	Varieties	Types of varieties	Climate hazards ranking (1= least resilient, 5= high resilient)					Resilient variety (higher total rank = more resilient))
			Drought	Floods	Delayed rain	Disease-pest	High temp	
Sorghum	Aderi	Local	4	3	3	3	4	17
	Osingo	Local	3	3	4	2	4	16
	Akele	Local	3	4	3	3	2	15
	Serena	Improved	3	2	3	3	3	14
Cowpea	Namaduro	Local	4	3	4	3	3	17
	Cowpea 2	Improved	4	2	3	3	2	14
Maize	Longe-5	Improved	3	2	2	3	4	14
	Yellow corn	Local	3	3	3	2	2	10
Okra	Obolochore	Local	5	3	4	2	3	17
	Tiktik	Improved	3	1	2	4	3	13
Groundnut	Red Beauty	Improved	3	2	3	4	3	15
	Ogom	Local	2	2	2	2	1	9

3.4 SOCIAL SEED NETWORK FOR BUILDING PEACE, TRUST, AND RECIPROCITY

Refugees, IDPs and returnees are key actors of the local seed system in Torit

Farmers and members of the communities access the seed of sorghum, maize, groundnut, cassava, beans, and several vegetable crops through their social seed network. The members of the communities include local farmers, IDPs, refugees, returnees, host of refugees, and local traders, I/NGOs, and government institutions. This shows that social seed network plays the most fundamental role in building trust and reciprocity between the local farmers and members of their communities, which involves refugees, IDPs, returnees, and other actors (Table 11). Interestingly, refugees, IDPs and returnees are found to have an important role in the access and exchange of seeds and actively sharing the seed with local farmers. For example, upon returning home from refugee camps returnee-farmers have the possibility of adopting new crops or new crop varieties and accessing these seeds through bartering. This could be an exchange of seed, or variety of their choice, with a different crop or seed variety, livestock or even labour. Local farmers do most (60%) of the cash-based exchanges, while refugee hosts provide the other 40%. But refugees, IDP and returnees seem to not take part in any cash transactions. Most seeds received by refugees (100%), IDPs (91%) and

returnees (92%) are on a free basis. Refugees tend to exchange more types of crops with the same recipient; local farmers tend to do this less often. The proportions of sorghum crop seeds shared and exchanged by refugees (89%), returnees (89%) and host of refugees (75%) are the largest compared to other categories of farmers and their communities in Torit.

Female farmers play a dominant role in the access and flow of seed in Torit

Out of the 752 farmers involved in the social seed network, 71% were female farmers. The average age of the respondents was between 36-39 years (Table 11). Females tend to exchange more with family/friends outside the Payam (79%) while male farmers tend to exchange more with family/friends within the Payam (86%). In addition to this, female farmers share and exchange the seeds of sorghum crops more than male farmers.

Seed exchange and bartering are dominant mechanisms in Torit

The seed exchange and barter system was found to be the dominant mechanism for accessing seed in Torit County. Over 80% accessed seed through this system, mainly involving seed exchange of the same variety or exchange of seed with new crops (Table 12). Most of the exchange of seeds are cashless and most seed exchanges are of

Table 11. Farmers and their members of the communities in seed network in Torit County

Categories	Nyong cluster		Himondonge cluster	
	Number	Percentage	Number	Percentage
Local farmer	306	69.4%	271	84.4%
IDPs	41	9.3%	17	5.3%
Refugees	8	1.8%	3	0.9%
Returnee	27	6.1%	24	7.5%
Host of refugees	45	10.2%	3	0.9%
Market trader	3	0.7%	1	0.3%
I/NGO	4	0.9%	0	0.0%
Public government extension or similar function	1	0.2%	0	0.0%
Public research institution or similar function	0	0.0%	1	0.3%
Others	2	0.5%	0	0.0%
No data	4	0.9%	1	0.3%
Total	441	100%	321	100%
Female		65.2%		76.5%
Male		32%		21.2%
Market/Organisation		2.8%		2.3%
Average age of respondents		39.2		36.5

Table 12. Seed access and exchange mechanism in Torit County

S.N.	Seed access and exchange mechanisms	Nyong cluster		Himondonge cluster	
		Number	Percentage	Number	Percentage
1	Free	125	17%	83	15%
2	Exchange/barter with same variety seed	378	51%	332	58%
3	Exchange/barter with another other variety	76	10%	48	8%
4	Exchange/barter with different crop	76	10%	71	13%
5	Exchange/barter with labour	66	9%	19	3%
6	Exchange/barter with other methods	6	1%	4	1%
7	Cash purchase	4	1%	3	1%
8	Vouchers/coupons	7	1%	10	2%
9	Seed on credit/loan	2	0%	0	0%
10	Others	1	0%	0	0%
Total		741	100%	570	100%

single type. For instance, a farmer choice could be sourced from within or outside the Payam. The source could be a relative, friend, local market, or I/NGOs (Table 12).

Sorghum, groundnut, and maize are the key crops in seed network

The study revealed that farmers and their communities are involved in seed access and distribution with over 20 different crops. However, sorghum (63.8%), groundnut (20%) and maize (12.4%) are the most exchanged crops in the network. They represent 96.2% of all exchanges (Table 13). These crops are major food and nutrition security crops in Torit and in addition to this sorghum has

a cultural importance across the county. Most dominate means of seed access and exchange is bartering of same variety.

Local markets and AVSI programme are major source of seed to the farmers

Torit market and Omoliha market are the two local grain markets which have the highest number of direct connections with farmers and their communities in Torit County. The Torit and Omoliha market are both a source of seeds and a recipient of seeds, since farmers actively trade the grain and use it as seed for their crop production. Next to this, AVSI programme has the largest connection with farmers (Figure 7 and 8).

Table 13. Types of crops exchanged through the social seed network in Torit County

Crops	Nyong cluster		Himondonge cluster	
	Number of exchanges	Percentage	Number of exchanges	Percentage
Sorghum	479	63.8%	396	69.8%
Maize	93	12.4%	155	27.3%
Groundnut	150	20.0%	1	0.2%
Cassava	11	1.5%	6	1.1%
Cowpeas	2	0.3%	-	-
Egg Plant	1	0.1%	1	0.2%
Lubia	3	0.4%	-	-
Millet	2	0.3%	1	0.2%
Olobong	3	0.4%	-	-
Okra	-	-	5	0.9%
Ogom	1	0.1%	-	-
Simsim	1	0.1%	-	-
Soyabean	1	0.1%	-	-
Sweet Potatoes	1	0.1%	-	-
Sukumawiki	-	-	1	0.2%
Tomato	-	-	1	0.2%
Total	751	100%	567	100%

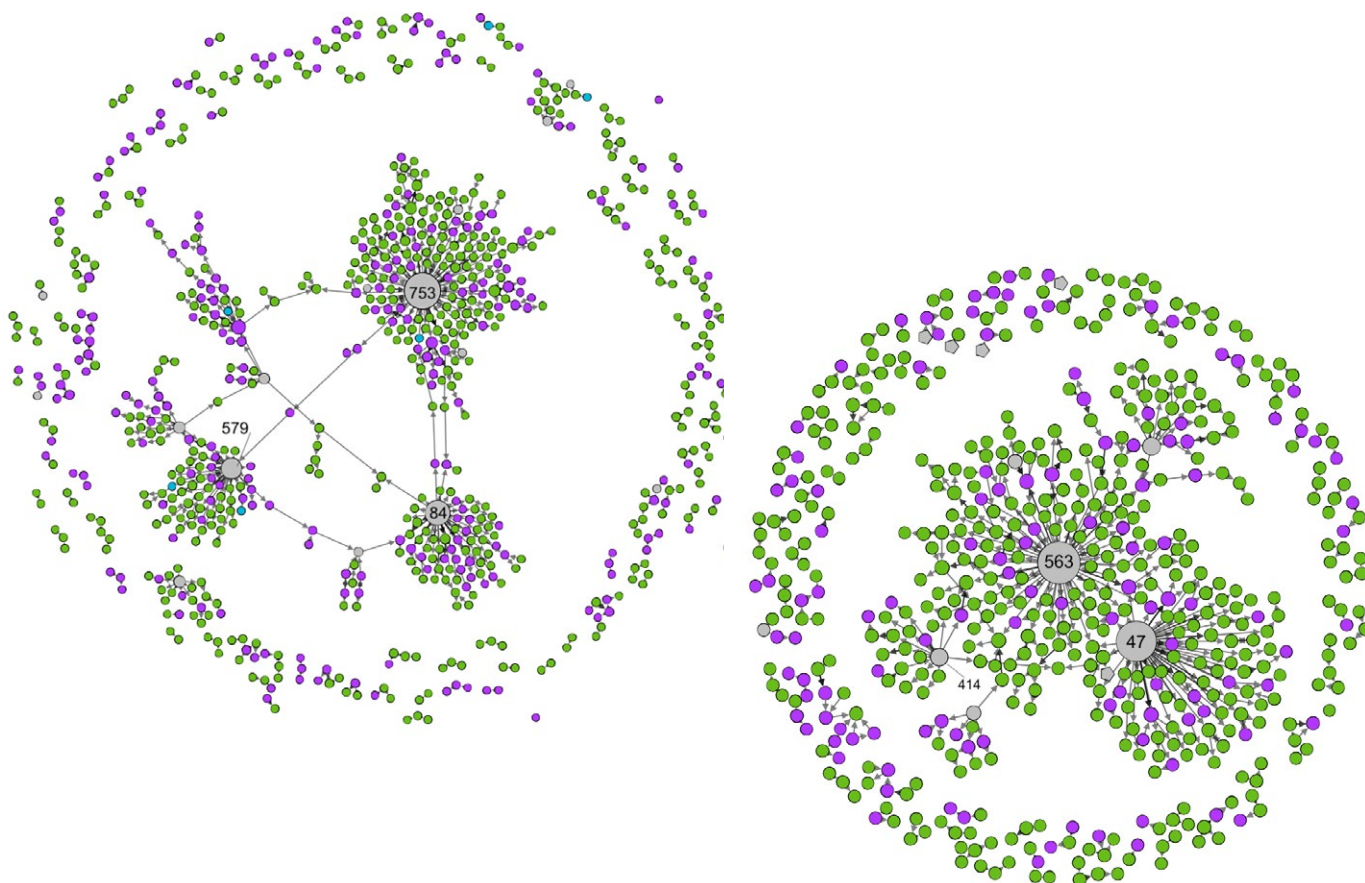


Figure 7 and 8. Social seed network map showing the central role of local markets and I/NGOs role in seed supply in Nyong cluster (left figure) and Himondonge cluster (right figure). The biggest grey color nodes number 753, 84 and 579 in the Nyong cluster are represented by Torit market, AVSI and Omoliha market respectively. Similarly, the biggest grey nodes number 563, 47 and 414 in the Himondonge cluster are represented by Torit market, AVSI and Omoliha market respectively. Green color nodes represent the female and purple color nodes represent the male.

3.5 SEED SYSTEMS AND CHALLENGES

Major seed systems

Seven different seed systems have been identified in Torit County which are clustered into informal seed systems, (represented by household seed saving, seed network and local market), intermediary seed systems (represented by community-based seed production schemes and seed relief) and formal seed systems (represented by public/government seed programmes and national private seed companies). A detailed characterisation of each of these seed systems is presented in Table 14, analysing the key stakeholders involved, types of crops and varieties covered, types of seed quality, and seed dissemination mechanisms. These different seed systems co-exist in parallel and supply the seed of different crops and varieties to the farmers and their communities, including IDPs, returnees, refugees, and refugee hosts .

Informal seed system (household seed saving, seed network and local market): Despite the co-existence of different seed systems, the informal seed system is the

dominant source of seed of major food security crops in Torit. It is estimated about 68% of the seed supply to the farmers in Torit is by this seed system alone. Key stakeholders involved are farmers and their communities that include IDPs, returnees, refugees, host of refugees, and grain traders operating in the local market. Sorghum, cassava, maize, groundnut, sesame, millet (bulrush, pearl and finger) and sweet potatoes are major crops. Varieties are mostly local (landraces) as well as improved ones. Torit and Omoliha marketplaces are the most important sources of seed to the farmers. Female farmers play a dominant role in seed production and seed exchange within the informal seed system.

Intermediary seed system (community-based seed production and seed relief): Seed relief is the second dominant seed system in Torit. It contributes to 17% of the total seed supply in Torit. This seed system contributes to seed supply of not only the cereals, pulses, and oil seed crops but also a wide range of fruits and vegetable crops, therefore contributing to food and nutrition security as well as income generation of farmers. Key stakeholders

operating within the seed relief seed system are AVSI, FAO, WHH, Save the Children, CordAid, Care, BASENET, Plan International and Global Aim. The community-based seed production scheme is involved in the seed multiplication groups, block farmers, farmers' associations, and cooperative societies/unions. It contributes 5% of total seed supply in Torit.

Formal seed system (government/public seed programmes, private seed companies): Public seed programmes, mainly implemented by the Ministry of Agriculture and Food Security and the Directorate of Research, contributes to 2% of the seed supply in Torit, focusing on maize, sorghum, cowpea, beans, finger millet, sweet potatoes, pearl millet, and groundnut. The private seed sector, represented by private seed companies, contributes to 8% of the seed supply in Torit, so represents the third major suppliers of seed in Torit country. Crops include cereals, pulses, oil seed crops and a wide range of vegetable crops. The agro-dealers network plays a major role in seed dissemination.

Seed system development challenges

The seed systems in Torit cluster are both affected by continuous conflicts. These involve, for instance, the Government of South Sudan and armed opposition factions (SPLA in Opposition and the National Salvation Front); disgruntled SPLA fighters and wanderer cattle herders from Jonglei State causing instability in the county; and, in particular, influxes of illegal cattle herders and thugs along the roads and armed inter-communal fighting.

Each of the seed systems is adversely affected by the conflicts in particular ways (for instance, an attempt by the Sudan Armed Forces to capture Torit before 2005, the power wrangle within the files of SPLA/M that resulted in the formation of the Sudan People's Liberation Army in Opposition, and recurrent inter and intra communal war) and climate hazards (in particular drought, disease, pests such as grasshoppers, the parasitic weed *striga herman-tica* parasitic weed, and flood).

Table 14. Seed system characterization, Torit County

	Informal seed system	Intermediary seed system		Formal seed system	
Types/ organisations	Farm-saved seed, seed network and local grain market	Community-based seed production	Seed relief	Public seed programmes	National seed company
Key stakeholders	Female and male farmers, farmers groups, refugees, returnees, IDPs, host of refugees, traders	Seed multiplication groups, block farmers, farmers' associations, cooperative societies/ union, AVSI, CARITAS Luxembourg	FAO, AVSI, WHH, Save the Children, CordAid, Care, BASENET, Plan International and Global Aim	Ministry of Agriculture and Food Security, Directorate of Research	Afroorganics
Major crops	Sorghum, cassava, maize groundnut, sesame, millet (bull rash, pearl, and finger) and sweet potatoes	Cassava, groundnut, maize, sesame, and sweet potatoes	Sorghum, groundnut, cowpea, maize, sesame, cowpea Fruits & vegetables: tomatoes, onion, eggplant, kale, cabbage, green pepper, carrot, pumpkin, amaranth, kudra, watermelon, cucumber, spinach, okra	Maize, sorghum, cowpea, beans, finger millet, sweet potatoes, pearl millet and groundnut	Maize, sorghum, cowpea, common beans, finger millet, sweet potatoes, pearl millet and groundnut Vegetable crops: Eggplants, okra, cucumber, sukumawiki, cowpea, tomatoes, cabbage, carrot, green pepper, amaranths, onion, and spinach
Types of varieties	Local (landraces), improved	Improved such as maize variety NARD I, but predominately local varieties	Improved, hybrid	Improved	Improved, hybrid
Seed quality	Local seed, trusted seed	Partial inspection	Certified, truthfully labelled	Certified	Certified, truthfully labelled
Seed dissemination	Seed exchange	Cash involved	Free distribution or vouchers	Agro-dealers and government extension	Agro-dealer networks
Estimated seed supply	68%	5%	17%	2%	8%

The reported effects (in decreasing order of significance) were the obstruction of the seed supply chain by slow adoption of improved crop varieties, compromised seed quality during distribution, heightened susceptibility to crop diseases, high pest pressure, leaching of soil nutrients because of flood or water run-off, and poor field establishment because of loss of vigour/adaptability and low yields. It is evident that both local and improved varieties are more resilient during occurrence of stressors/shocks and their interactions. Farmers reported that some of the seeds imported by humanitarian organisations are fake seeds or of low viability. Climatic hazards are not only intensifying the incidence of pest and disease but also blocking the accessibility of seed (for instance, during floods).

The common challenges faced by seed systems are (in decreasing order of significance) poor road connection, inadequate storage facilities, lack of market information, and the absence of a seed certification body. In addition, crop failures were caused by conflicts resulting in looting and burning of fields and by climate hazards such as floods and drought.

An additional challenge is the absence of village-based advisors who are supposed to play a role as custodians of basic knowledge on good quality seed production. Another major challenge repeatedly stressed by all stakeholders is the delays in passing seed policy affecting seed regulation. The formal seed system is affected by the lack of standard seed laboratories; the limited number of seed technologists (recruitment was stopped in 2007); the lack of standard storage facilities; inaccessibility for delivery in

remote areas because of poor road connectivity; unwillingness to adopt new varieties; the absence of a national gene bank in South Sudan for conservation of its crop genetic resources; and an inadequate number of plant scientists and assistants. The seed companies, however, seem eager to support varietal development and some I/NGOs (AGRA and CARITAS Luxembourg) are involved in foundation and certified seed production, creating opportunities for formal seed system development.

3.6 SEED VALUE CHAIN AND CHALLENGES

The seed value chains and key challenges were analysed in formal, intermediary, and informal seed systems of Torit County by taking two indicator crops for each seed system. The formal seed system seed value chain and its main challenges are explained in Table 15. This seed system is represented by government/public seed programmes and private seed companies. Major seed operators and service providers are NMAFS, I/NGOs (FAO SSD, AGRA, CARITAS Luxembourg), Government institutions, Agricultural Bank of South Sudan, National Bureau of standard, South Sudan Seed Traders Association, private seed companies, varietal release committees, plant protectionists and the University of Juba.

The intermediary seed system is represented by community-based seed production and seed relief systems. Major seed operators and service providers are seed multiplication groups, block farmers, farmers' associations, cooperative societies/unions, refugees, returnees, IDPs, refugee hosts, FAO, AVSI, CARITAS Luxembourg WHH, Save the

Table 15. Seed value chain analysis of formal seed system

Seed value chain steps	Challenges (risks)
Crop breeding and variety development	Lack of research grants; drought; pests and diseases; instability; absence of national gene bank; inadequate number of plant breeders and technical assistants; no introduction of new varieties in seed production system since 2016
Early generation seed	Ill timing; storage in a sub-standard seed storage facility; in most cases seed quality is compromised and volumes discarded
Seed quality assurance	Absence of a standard seed laboratory; inadequate number of trained seed technologists; seed quality testing in most cases not carried out; fake seeds are easily imported; viability questionable
Seed processing and storage	Untrained labourers carry out processing and storage in normally in grain stores; absence of automated processing system; inadequate number of skilful seed processors; poor seed storage facilities
Seed distribution and marketing	Low purchase of locally produced seeds by I/NGOs; seed companies and government institutions cannot deliver service in inaccessible areas due to poor roads; unwillingness to adopt new varieties; massive importation of seeds by I/NGOs affecting local private seed sector development
Seed extension	Seed produced are not of good quality; adoption rate of the newly released varieties is low
Seed enabling environment	Lack of national seed policy, lack of seed certification body



Children, CordAid, Care, BASENET, Plan International and Global Aim. The intermediary seed system seed value chain and its main challenges are explained in Table 16.

The informal seed system is represented by farmers saved seed, social seed network and local market. Major seed

operators and service providers are female and male farmers, farmers groups, refugees, returnees, IDPs, host of refugees, grain traders in local market, FAO, I/NGOs, and government extension. The informal seed system seed value chain and its main challenges are explained in Table 17.

Table 16. Seed value chain analysis of intermediary seed system

Seed value chain steps	Challenges (risks)
Crop breeding, adaptive trials	Government institutions and universities are not actively engaged with farmers in testing varieties through use of PPB/PVS to ease adoption. Likewise, NGOs only distribute imported seeds without conducting adaptive field trails
Early generation seed	Community based seed production groups uses certified seed as starter. The quality is not superior; however, post-harvesting and storability becomes an issue due to the volume produced and processed.
Seed quality assurance	Field inspections and certifications are not regularly followed
Seed processing and storage	Seed processing under CBSP is expensive and cumbersome, while seed relief agencies faces ill-timed delivery of seeds to partners and beneficiaries.
Seed distribution and marketing	infrastructure and access to market are the main challenges
Seed extension	Inadequate field demonstration trials in farmers field
Seed enabling environment	Lack of national seed policy; absence of Seed Authority and Seed Council; lack of QDS guidelines; lack of seed and varietal bill; lack of seed certification protocol; lack of harmony between seed unit in the MAFS and SSNBS, thus making seed trade more or less impossible.

Table 17. Seed value chain analysis of informal seed system

Seed value chain steps	Challenges (risks)
Crop diversity maintenance	Droughts, flood, delayed rain, disease-pest, low yield, loss of crops, lack of recognition of women farmers role in crop diversity maintenance, limited choice of improved varieties, lack of recognition and promotion of local varieties seed production in formal seed production programmes
Starter good quality seed	Lack of quality seed availability of several farmers preferred and climate resilient crops, late delivery of quality seeds
Seed quality management	Very limited training on good quality seed selection, seed production and seed storage practices
Crop-seed production and storage	Very limited field demonstration trials on good agriculture practice and seed production, lack of machineries for post-harvest processing, lack of knowledge to operate and maintain machines, some processing chemicals are absent, poor storage systems, lack of storage systems, lack of knowledge on safety measures on operation of the machineries and use of chemicals.
Seed dissemination	Poor roads, insecurity, poor storage facilities, unorganized marketing systems,
Enabling environment	Lack of business-friendly working environment, insecure mode financial system and physical insecurity



4. SEED SYSTEMS RESILIENCE PATHWAYS

4.1 Country level

- The Government of South Sudan should ensure that the country, States and Counties have a functional seed policy and regulations, early generation seed bulking, and varietal development for adaptation.
- In the absence of this the Government of South Sudan at the State level should institute a Seed Quality Board (SQB) at County level to regulate seed activities; identified lead farmers, together with partners, should embark on early generation seed bulking; and the national government should make research grants available to breeders for the purpose of varietal development for adaptation. In addition, local government at County level should catalogue all existing and lost varieties to maintain and develop varietal development and support the conservation of existing food and forage crops diversity.
- International and national organizations should procure seeds from local seed producers to kick-start seed companies with local context that can introduce new varieties that are tolerant to climate hazards and have resistance to diseases and pests. CARITAS Luxembourg is already purchasing maize seeds from local seed multipliers and distributing to farmers in Torit County using the voucher system.
- The private sector should create an enabling environment

through avoidance of hegemony and ensure the development of more seed companies.

4.2 Eastern Equatoria State level

- Eastern Equatoria State should develop an appropriate seed policy and seed regulatory framework to guide State level action. Such a policy and regulatory framework should not just be copied from stable economies with fully functional government and public systems, but rather account for the current protracted crisis situation in most of the state.
- Government seed system at State level should be the sole source of foundation seeds and regulate the import of seeds.

4.3 County level

Formal seed systems

- Government/public seed system at County level should be the sole source of foundation seeds and regulate the import of seeds. The imported seeds are mostly of improved vegetables that are kept in stores for a long time because farmers complain about the prices. Additionally, most of the relief seed interventions are made up of free vegetable seeds. Farmers in Torit County believe

that if the government could subsidize and lessen the heavy taxes on the importation of those improved varieties, adoption and production would be enhanced.

- Government should also allow and support the private seed companies to produce foundation seeds, so it helps to reduce the risk when government systems fail.
- Government should assume its role in seed import, distribution and controlling counterfeiting seeds.
- Private seed companies such as Afrogenics, Pro-Seed and Seed Outgrow should invest in crop research and crop breeding, build the capacity of extension personnel, and embark on branding and marketing. This results in a shorter seed value chain and reduced possible risks. This modality could be initiated by partnership with the crop breeding department of Juba University or with government research for technical support.
- Government and I/NGOs should further strengthen the business cushioning support to the emerging local private seed sector by ensuring that a certain % of their seed is purchased under the current market price.

Intermediary seed systems

- Humanitarian organizations should help government fast-track seed policy, initiate the establishment of a decentralised Seed Quality Board (SQB) at county level, and strengthen the capacity of technical staff. The SQB can only be functional at county level if it is decentralised in its operations, so that they take their own decisions following established rules/policies.
- Humanitarian agencies' seed programming should broaden their crop/variety portfolio. This can be done by promoting farmer-preferred and climate-resilient local crops & varieties, in particular crops such as sorghum and varieties Aderi, Osiingo and Akele, cowpea local variety Namaduro, local variety of groundnut Gurguru, and local maize variety Iduye.
- Humanitarian agencies should, in consultation with the government, strengthen the local seed producers to become seed companies.
- The capacity of local seed producers (technical expertise and seed testing laboratories) should be strengthened to produce Quality Declared Seed (QDS) as governed by the seed law and regulation.
- The I/NGOs should deliver seeds and other inputs before March (at least a month before commencement of the first rainy season in April) or before the end of June (before the onset of the second rainy season starting in July).

Informal seed systems

- Farmers under the informal seed system should have access to credit facilities using the land as collateral, and in the absence of such services I/NGOs should buy seeds locally to empower farmers to become financially independent.
- Producers under these seed systems opted for proper

storage that had good carrying capacity; met the standards of seed stores; and that had suitable processing/value addition facilities (at present women do all the post-harvest operations; in most cases, this processing results in a loss of quality, reducing monetary gains).

- The Torit market and Omoliha market contributes significantly to the local seed supply; farmers and communities frequently access the seed of major local food security crops from these local grain markets. The capacity of local traders in these marketplaces could be further strengthened by sharing quality seed-related information through training, and by linking with local seed producers to purchase good quality seed.
- Female farmers play a dominant role in local seed supply in Torit County (over 71%); women farmers need to be further empowered through targeted training on quality seed production, by promoting improved seed storage practices and involvement in seed related programming at county level. In addition to this, there are specific nodal seed farmers who play a central role in access and supply of seed to several other farmers including refugees, IDPs, and returnees. The relationships are built upon trust and reciprocity. These nodal seed farmers could be further empowered through training on good quality seed production so that they can become a reliable (sustainable) source of seed dissemination of new and improved varieties within the county level.

4.4 Cluster level

Cluster 1 - Nyong: hills and mountains, urban dynamic, agro farmers

- Due to its urban status, farmers in Nyong Payam still believed their existing informal seed system was more reliable; seeds under this system are affordable, available, and accessible.
- Similarly, farmers suggested that seed delivery by I/NGOs should follow the local cropping calendar to avoid crop failure that could create food and nutrition insecurity in the cluster.
- Farmers stated that adoption of new crops and varieties introduced by I/NGOs was not an issue, because their level of literacy aids the process; however, they said there was a need for awareness on aspects of healthier eating since most of them believe in their traditional eating habits (people eat food that is purely cereal based).
- Farmers suggested the establishment of a sustainable community seed bank that would be a source of seeds in case any member lost their seeds of preference.

Cluster 2 – Himodonge: hills and mountains, rural, agro-farm, conflict-prone

- Due to its conflict-prone status, farmers suggested the establishment of a community seed bank aimed at

securing and conserving their local seeds and seeds introduced by I/NGOs.

- The experience of conflicts and stressors and shocks in the past 30 years have resulted in the complete loss of some crops and varieties. In the past, ancestors hid seeds in caves and believed that seeds kept during war should not be eaten or destroyed even if they belong to an enemy.
- The establishment of community seed bank would act as

the only available resort for those who had lost their varieties; those farmers would borrow what they need and, following the harvest, would return an extra quantity to the seed bank, with the quantities to be decided by the community themselves.

Acknowledgement

We convey our sincere gratitude to the Food and Agriculture Organization of United Nations South Sudan for the facilitation of all the field activities and technical contributions, AVSI South Sudan office for strategic partnership, State Ministry of Agriculture, Forestry, Animal Resources, Fisheries and Cooperatives for approval of the study; and other organizations, institutions and individuals who were instrumental during the Seed System Resilient Assessment in Eastern Equatoria State. We particularly acknowledge the blessing given to the study team by the Paramount chief and sub-chiefs; the undoubted role played by six enumerators each in Torit County; and the commendable effort of the three engaged community mobilizers in Nyong and Himodonge Payam.

We honour the effective participation of AVSI, FAO, CARITAS Luxembourg, BASENET, Afrogenics, UNICEF, the State Ministry and its other level of government.

We thank the study team members: Mr. Francis Bile Obudra, Ms Madalina Kaku Daniel, Mr. Ivu Charles and the Director of Agriculture in Torit County. We thank Sharmila Pun, Wageningen University and Research, for compiling and editing the field reports.

We sincerely acknowledge the Dutch Ministry of Foreign Affairs for financial support and for making the REPRO South Sudan programme possible.

Tony Ngalamu, Abishkar Subedi, Gerrit-Jan van Uffelen, 2021. Seed system resilience assessment in Torit County, South Sudan; Food and Nutrition Security Resilience Programme (REPRO) South Sudan Programme. Wageningen Centre for Development Innovation, Wageningen University & Research. Research Brief WCDI-22-210. Wageningen.

This research brief summarises the key findings of a seed system resilience field assessment and a multi-stakeholder dialogue conducted in September-October 2020 in Torit County, South Sudan. This activity was conducted as a joint collaborative effort between the Wageningen Centre for Development Innovation (WCDI) of Wageningen University and Research (WUR), University of Juba, FAO South Sudan, and AVCI, under the Food and Nutrition Security Resilience Programme (FNS-REPRO) South Sudan Programme.

Keywords: Torit County, South Sudan, Seed Systems Resilience Assessment, protracted crisis, food systems, food and nutrition security

This research brief can be downloaded for free at <https://doi.org/10.18174/575682> or at www.wur.eu/cdi (under publications).



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Report WCDI-22-210

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