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List of Acronyms

ASASS	Association of seed actors in South Sudan
CAD	County Agricultural Director
CIMMYT	International Maize and Wheat Improvement Center (CIMMYT)
EAC	East African Community
ESP	Extension service Provider
FGD	Focus Group Discussion
FSS	Formal seed system
ICRISAT	International Crops Research Institute for the Semi-Arid Tropics
IFSS	Informal seed system
INGO	International Non-Government Organisation
IPC	Integrated Food security Phase classification
KII	Key Informant Interviews
LVC	La via campesino
MAFS	Ministry of Agriculture and Food Security
MNC	Multinational Cooperate Firms
PPP	Public Private Partnership (PPP)
S.S	South Sudan
STAK	Seed Trade Association of Kenya
STASS	Seeds Trade Association of South Sudan

UN	United Nations
UNFAO	Food and Agricultural Organisation of the United Nations
UNOCHA	United Nations Office for Coordination of Humanitarian Affairs
USTA	Uganda Seed Trade Association
WFP	World Food Programme

Abstract

The informal seed system offers a great potential in addressing food insecurity though it has largely been under explored in research initiatives, lobbing and advocacy as well as policy development. 'Small holder farmers' are the main beneficiaries of this seed system in South Sudan and in the global South at large. Seeds from this system demonstrates qualities of adaptation to specific agro-ecological zones, biodiversity conservation and dietary diversification potential for food security and sovereignty. Even so smallholder farmers find themselves faced with this contradiction of obtaining certified seeds from the formal seed (FSS), intermediate seed system and through the informal seed system (IFSS) through seed exchange and seed saving to addressing food insecurity. This research investigates how the informal seed sector commonly used by smallholder farmers contributes to food security and sovereignty in Rajaf Payam Juba South Sudan. This is addressed through engaging in understanding the everyday practice influencing seed sourcing and preferences, opportunities and tensions in the IFSS and how this contributes to food security and food sovereignty. This research uses moral economy approach and Feminist Political Ecology (FPE) approach as analytical tools.

Contribution to development studies

The growing loss of crop biodiversity, dietary diversity globally due to concentration of seed patent rights to only a few multinationals cooperate companies mainly dominated in the global north and expanding their scope to the global south is nothing to ignore in this critical global periods of agrarian transformations, economic hardship and increasing food insecurity in countries such as South Sudan. Besides politics in the seed system, other initiatives such as the new green revolution for Africa were initiative to further increase on the use of certified seeds by small holder farmers in Sub Saharan Africa where South Sudan falls. These have instead placed 'small holder farmers' and indigenous communities in a marginalised position as such processes unfold. These involves various actors such as the state, private sector, and multinational organisations among others. This research therefore uses a critical agrarian lens to analyse, debate and advocate for the informal seed system as a potentially under explored seed system to consider in addressing food insecurity and food sovereignty in South Sudan. A Feminist Political Ecology (FPE) approach offers an opportunity to understand the dynamics of the informal seed system. FPE offers a multifaceted analytical tool through which this research amplifies women`s voices in the everyday politics of seeds, indigenous knowledge, role of the elderly women and women in general as custodian of local seeds and how gender is not an end point of critique and analysis but rather interacts with age, culture, class and ethnicity in household decision making, power concentration in the everyday agricultural practices of seed saving and seed exchange in the study area. These are important in agrarian change and development studies in addressing the everyday politics of various groups within communities and the injustices, inequality created among and within marginalized groups creating various subjectivities at different levels.

Keywords

Seeds, Informal seed system, Formal seed system, food security, food sovereignty, seed sovereignty, gender, Women

Chapter 1: Introduction

1.1 Introduction

> "I love all my seeds. Sorghum, silver king maize, speckled beans… I have Noah and white beans, and Basotho Yellow. Pinto… Finger millet too. I sell sorghum seed for M300 – 400 per 20 litres, maize for M240 for 20 litres, beans at M600 for 20 litres… I work hard. The seeds were gifts from my elders. So when you keep replanting them they are renewed. They don't get old. I got all my seeds from my mother-in-law. She was born on the 5th March 1928 and she passed on the 8th March 2018. They withstand the sun and the rain. But the sorghum gets eaten by birds." Manthabiseng Moholobela (61). Ha-Mphaololi, Mafeteng, Lesotho (Rural Women Assembly, 2024).

This citation resonates with what my 76-year-old grandmother practices yearly in her back yard farm, she 'controls' and keeps various cowpea local seeds[1] for the longest time I can remember. She carefully selects best performing cow pea plants, the biggest, most filled and disease-free pods which she sun dries before mixing it with wood ash and keeping it in an airtight bottle for the next season. This is common among small holder farmers in South Sudan (S.S) which makes up the *Informal seed system (IFSS)* defined and characterized as being unregulated by the state , managed and controlled by farmers and their social networks, quality standards mainly based on trust, involves seed exchange, seed saving, seed sharing, seeds obtained through social networks, inherited seeds from one generation to another (Subedi et al.,2022; Ngalamu et al., 2021). Seeds are the first linkage in the food chain and are a transformational catalyst (Bonny, 2017; Galiè, 2013; Reddy et al., 2007). They are of emblematic and ritual importance in present and ancient times and the preservation of seeds is a priority in the food system (Peschard, 2022).

Food security is dependent on seed security (Vernooy et al., 2023; Louwaars and Manicad, 2022) and the same is to food sovereignty through seed sovereignty (Kloppenburg, 2010; Kloppenburg, 2014). "Food sovereignty is the right of peoples to healthy and culturally appropriate food produced through ecologically sound and sustainable methods, and their right to define their own food and agriculture systems. It puts those who produce, distribute, and consume food at the heart of food systems and policies rather than the demands of markets and corporations. It defends the interests and inclusion of the next generation. It offers a strategy to resist and dismantle the current corporate trade and food regime, and directions for food, farming, pastoral and fisheries systems determined by local producers. Food sovereignty prioritises local and national economies and markets and empowers peasant and family farmer-driven agriculture…It ensures that the rights to use and manage our lands, territories, waters, seeds,… . are in the hands of those of us who produce food…" (La via campensino,2007). On the other hand, "Food security exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life" (FAO, 2001, p.49).

Seed sovereignty constitutes the principle of the "right to save and replant seeds, the right to share seeds, the right to use seeds to breed new varieties, and the right to participate in shaping policies of seeds" and it is envisioned in a situation where farmers continue to share seeds and applying indigenous knowledge with the interference of external force. (Kloppenburg, 2014, p.1234-1235). Seed security is a situation of seed availability, accessibility, utilization and stability and "doesn't include control over use of seeds by farmers" (Bezner Kerr, 2013,p.871)

[1] Local varieties are informal seed varieties in possession of farmers that have been grown for over 10 years (Maguet, 2014)

S.S has an estimated 30 million hectares of potential fertile agricultural land of which 95% is unutilized, the food insecurity situation has been recurrent over the years (Kose and Kongas, 2023, p.102). Despite this, the latest Integrated Food Security Phase Classification (IPC)report estimates 56% (7.1 million) of the total population in S.S risk facing crisis (IPC 3) between April and July 2024, even worse with an estimated 79000 people risking famine (IPC 5) among which include 28000 returnees from Sudan conflicts (FAO, 2024). This is due to input inaccessibility [seeds, fertilizers], climate change, lack of extension service to small holder farmers in addition to insecurity challenges and economic meltdown (Subedi et al., 2022). Despite this, small holder farmers[2] have been in the limelight in addressing the food insecurity situation in S.S as potential food suppliers however they cultivate for mainly for subsistence. Smallholder farmers have the potential to provide a large percentage of the populations with access to safe food especially in low developed countries [such as S.S], however, to enable food production by these smallholder farmers numerous factors and inputs such as seeds are essential (Gill et al., 2023).

Sorghum followed by maize are the most consumed cereal in S.S (Smits et al., 2024; Ngalamu et al., 2021; Dorosh et al., 2016). It is the fifth top carbohydrate rich source globally after wheat, maize, rice and barley, besides its importance "in fighting starvation and food insecurity in many of the world's underprivileged people's food security" due to its nature to tolerate and thrive in droughts, low fertilizer requirement and to its multifunctional use as food and feed hence "king of millet" (Hossain et al.,2022, p.1). In S.S, the supply of cereals from farmers` production doesn't meet the demand for sorghum consumption (Kose and Kongas, 2023). The domestic demand is supplemented by imports from Uganda and Sudan (Dorosh et al., 2016). Sorghum is used to produce flour, alcohol brewing, stems as chewable parts to extract the sweet starch and straws for constructing local thatched houses (Kazungu et al., 2023). In the greater Equatoria region of S.S sorghum flour is mixed with cassava flour or maize flour to prepare *asida or kisra* [3]. For this reason, most smallholder farmer plant maize or cassava alongside sorghum. From 2022 to 2023 an estimated 7.2 % production increment in sorghum production was registered in S.S as compared to maize with an increment of 16.5% while rice registered a decline by 2.9% over the same period in S.S (FAO, 2024) (table 1).

Table 1: Cereal production in S.S 2022 - 2023

	2018-2022 Average	2022	2023	Change 2022/2023 Percent
		000 tonnes		
Sorghum	730	809	867	7.2
Maize	107	121	141	16.2
Rice (Paddy	29	34	33	-2.9
Total	860	964	1041	7.9

(Adapted from Source: FAO 2024)

[2] Smallholder farmers in the S.S context are mainly subsistent farmers who operate in a small acreage of land potentially less or more than 2 hectares and mainly dependent on family labour however at peak seasons engage other community member and reward them with local brew or part of the harvest. They equally engage with the market in selling excess harvest and plant numerous crop types in each season.

[3] *Asida or kisra* are common food consumed by south Sudanese people which can be equated to *Ugali or Posho* as commonly used in kenya and Uganda respective and kisra is an equivalent of the Ethiopian *angera* formed equally is slightly fermented sorghum flour mixed with maize flour

Cereal seeds such as maize, sorghum and rice are revolutionary within the African continent due their use as stable crop and food, key source of carbohydrates and used "as the central technological component of the new Green Revolution" (Scoones and Thompson, 2011. p.3). Over 1.4 billion US dollars was injected in achieving *Africa's Green Revolution* under the Alliance for a Green Revolution in Africa (AGRA) program between 2006 to 2020 (Elhassnaoui et al., 2023). The main goal was addressing food insecurity in sub-Saharan African through introduction of improved hybrid seeds and fertilizer to mimic Asia and Latin America Green revolution "to unleash a truly African Green Revolution that will transform African agriculture into a highly productive, efficient, competitive and sustainable system that ensures food security and lifts millions out of poverty" and improve the lives of smallholder farmers in 13 selected countries by 2020 (Elhassnaoui et al., 2023, p.872). S.S joined in 2010, however, by 2020, it was clear that the green revolution bypassed Africa as the program registered disappointing results in achieving its mission and objective (Wise, 2020). In S.S and some parts of sub–Saharan African (SSA)during this period, low adoption rate and use of improved certified seed varieties and hybrid seeds from the formal seed system (FSS) was registered (Ngalamu et al., 2021; Monyo et al., 2003). Against the odds of availing improved seed varieties to small holder farmers in South Sudan, the seeds from the FSS have hit a dead end (Ngalamu et al.,2021). During the Green Revolution period in Africa donors, multinational organisations, government body rallied towards the adoption and use of certified and hybrid seed varieties from the FSS [4] to address the food insecurity because they assumed that seed obtained through the IFSS are of "low quality" compared to certified seed from the FSS (Puskur et al., 2021, p.112).

Numerous accounts have been put forward for low adoption rates like, seed affordability (seeds from FSS are expensive), seed accessibility challenge (Puskur et al.,2021), seed source and variety preference (Nabuuma et al., 2022). However, Ngalamu et al (2021) research in S.S shows that the low adoption rates are due to preference given to specific native seeds with good yield, tolerant to droughts and floods (climate change adaptation), good eating quality, high market demand, good storage ability, nutritional benefits and little damage by birds and pests especially for maize and sorghum. The great potential of IFSS has been underexplored in research, investment and use despite the record of good quality seeds acclimatized to the local conditions and ability to address food security needs especially in developing countries (Gill et al., 2023; van Uffelen et al.,2023). Evidently research in Ethiopia and Syria show that seeds from the IFSS met certified seed quality standards of purity and germination (Bishaw et al.,2012) while in Tanzania, 90% community seeds of rice met "national seed quality standards" (Puskur et al., 2021, p.112). Even with these attributes and preference by smallholder farmers in SSA, IFSS has received little to no attention among the state, seed companies and multinational cooperatives (MNCs). Success of the IFSS is *more contextual in nature* hence its effect and contribution to food security and use is heterogeneous among farmers and locations (Wattnem, 2016). In S.S the IFSS is functional and robust in nature.

1.1.1 Problem statement and objectives

Seeds from FSS are considered a game changer in addressing and eradicating the recurrent food insecurity in S.S due to the associated high yield, however the introduction of such cereal seed varieties mainly sorghum through various initiatives such as seed aid has received a backlash by small holder farmers. It is paradoxical, that small holder farmers continue to use seeds from the IFSS with over 80% of seeds sourced through the IFSS and the food security situation in the country continues to deteriorate. Seeds are known to be one if not the most important contributor to food security and food sovereignty depending on choices made by small holder farmers. This research seeks to explores and investigate how the IFSS contribute to food security and food

[4] I will use the word improved seed varieties or hybrid seeds interchangeably to mean seeds from the formal seed sector.

sovereignty in Rajaf[5] Payam Juba County South Sudan with a focus on sorghum by addressing the questions of.

1. How is the everyday practice of informal seed preference and sourcing determined by small holder farmers?
2. What opportunities and contestation exist in the IFSS?
3. How is household food security and food sovereignty contextualised by small holder farmer in Rajaf in relation to IFSS and gender?

1.2 Relevance and Justification of study

The seed systems in the past and present time received attention in investment and research in global south and SSA. Research such as on Seed sovereignty (Rodríguez,2023; Bezner Kerr ,2013; Kloppenburg, 2010, Kloppenburg, 1988), role of women in the informal seed system (Puskur,2021; Subedi et al.,2022), seeds and potent rights (Nizam and Yenal,2020), seed standardization and laws (Wattnem, 2016) and new green revolution for Africa implemented by AGRA. However, exploring the potential of the IFSS and its contribution to food security and food sovereignty has received minimal research attention in S.S and remains a gap which requires research. "Food sovereignty is the right of peoples to healthy and culturally appropriate food produced through ecologically sound and sustainable methods, and their right to define their own food and agriculture systems. It puts those who produce, distribute, and consume food at the heart of food systems and policies rather than the demands of markets and corporations. It defends the interests and inclusion of the next generation. It offers a strategy to resist and dismantle the current corporate trade and food regime, and directions for food, farming, pastoral and fisheries systems determined by local producers. Food sovereignty prioritises local and national economies and markets and empowers peasant and family farmer-driven agriculture…It ensures that the rights to use and manage our lands, territories, waters, seeds, are in the hands of those of us who produce food…" (La via campensino,2007). On the other hand, "Food security exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life" (FAO, 2001, p.49). Given the high use of the IFSS by small holder farmers in this new state, this research seeks to contribute to the growing literature, knowledge and study on the role the IFSS towards food security and food sovereignty in Rajaf Payam Juba County S.S. In this research both terms will be used as key concepts.

In this paper I argue that everyday practice of seed preference and sourcing among small holder farmers in Rajaf is heterogeneous and fluid in natural influenced by culture, marriage and superiority of a wife other factors. Secondly that numerous opportunities and contestation exist in the IFSS that threaten seed sovereignty and food sovereignty such a seed aid and adulteration, conflict, sourcing of seeds from the IFSS through seed fairs and purchase by seed companies among numerous opportunities the IFSS present. Thirdly food security is defined based on seed saving, seed availability and cultural practices in addition to the 4 pillars of food security. Lastly gendered roles and responsibility in the everyday practices of the IFSS play an important role in resource allocation, decision making and determining which seed system is most preferred by various genders intersecting along age, class and culture

1.3 Analytical framework

This paper applies the moral economy (ME) approach and feminist political ecology (FPE) as analytical concepts.

ME examines ways in which moral-political norms and sediments impact economic actives, to answer questions of 'who is morally bound to whom, and why' (Shipton 2010 in Watts, 2018). It

[5] Rajaf is also sometimes called Rejaf or Rageef in other literature sources

is the "expression of and production of a social group's explicitly normative frameworks outlining the 'proper' organization of society and division of (what are perceived to be) scarce resources" (Wolford, 2005, p. 245). "It is maintained by strong cohesions among peasant such as cultural norms, ceremonies, sharing excess fame produce, redistribution and common land, collective labour provision, mutual aid, risk averseness, subsistence ethics where subsistence is the primary objective to provide for household food requirement and market sales is secondary" (Scott 1976,p.4). From the farmers side of production, the ME focuses on values, *subsistence ethics for the fear of food shortage*, *redistributive effect* where the richer peasants are expected to be at the rescue of poor peasant, *risk averse* such as by planting more than one variety of seed a tendency in practice by peasants (Scott 1976, p.3-8). Scott (1976) further presents that the ME help us understand more on how peasants operate and what triggers their anger and explosive situation.

Edelman (2005, p.337) on the other hand introduce the "new contemporary rural moral economy" that is taking shape in the 21st century. The current increasing commodification of resources and the moral discourse of affected peasants is the same as was a century back, "the right of subsistence" have further developed to include the "right to being agriculturalist" (Edelman, 2005). Therefore, any threat to these rights result into resistance. The current peasant unlike the ones presented by Scott and in the 60s and 70s are different as the current peasant's struggle against privatisation, exploitation, concentration of MNCs, market changes, and their expectations have as well risen (Edelman, 2005). Rural and urban cultures have shared community which involves local, national, regional and international movement like the La Via Campesino and improved coordination and communication among such peasant movement argues Edelman They now "exchange information and delegations, and mount joint lobbying, research, and protest actions" (Edelman, 2005, p.337).

Examining the ME offers an analytical tool to view social relations and the organisation of societies to create solidarities and divisions based on available resources. ME also examines "how assemblages of norms and behaviours may clash; and power relations that dictate the outcomes of these clashes" (Watts, 2018, p.282). It is based upon this that the moral economy is deployed to seek an understanding of how smallholder farmer in Rajaf operate in the IFSS and how this influence the dynamic of the IFSS to contribute to food security and food sovereignty.

Reflecting on Wendy Harcourt`s FPE lecture on the 23th April, she presents that FPE is a toolbox to do research and a framework to study the everyday reality we live in to understand the autonomy and opportunity that we live with, access scales in terms of gender relationships within and between households and their interconnectedness, power, politics and acknowledge the plurality of knowledge (Harcourt, 2024)."FPE interrogates structural forms of power that define inequality and differentiated access and control of resources through multiple forms of social difference such as gender, class, ethnicity, age, ability, sexuality and nation" (Clement et al., 2019, p.4). FPE examine gender identities importance in shaping resources access and control and how this interacts with class, race, culture and ethnicity to shape processes of ecological change, and the struggle of men and women to sustain ecologically viable livelihoods (Rocheleau et al., 1996).

Therefore, in FPE gender is not the only unit of analysis but how gender interacts with class, ethnicity, culture among others and how these interactions enable access to resources hence challenging the dominant view of men being 'visible, dominant and powerful' and 'women are invisible weak and passive' (Clement et al., 2019). Besides social norms and resources access move hand in hand which FPE acknowledges is influenced by both political economic dynamic, state and environmental changes and FPE challenges the narrative of certain conceptions in patriarchy societies by looking deeper and further into the roles women and other marginalised groups play in protection of the ecology (Rocheleau et al.,1996).

"At the heart of FPE is a focused examination of gendered knowledge, experiences and responses to political economic and environmental change using diverse methodologies" (Vercillo, 2022, p1470). FPE also looks at how everyday interaction and processes shape gendered power

relations and analyse how people`s lived experience, responsibilities and interests in nature and environment are based on the various identities and their interactions (Clement et al.,2019). The micro politics of gender in respect to resources [inclusive of seeds] and control at community, household and intrahousehold level in addition to politics at play at a micro and global scale is equally important in FPE (Hovorka, 2006). In this research the interaction of gender, age, marriage, class, ethnicity and culture is used as multiple identities to make analysis in the dynamics of the IFSS and how these identities produce subjectivities and inequalities in the embodied everyday practices within households and community at large. subjectivities "refer to how one understands oneself in a social context activated by situated power relations" (Clement et al., 2019, p.3).

This paper is structured in 6 chapters with chapter 1 and 6 presenting introduction and discussion and conclusion respectively. Chapter 2 offers a glance at S.S how the effect of conflict influences the seed system with an emphasis on seed aid and the IFSS. Chapter 3 presents methodology used and positionality and reflexivity, Chapter 4 present key theoretical framework Chapter 5 findings and discussions and chapter 6 present conclusion

Chapter 2: South Sudan at a glance

2.1 Context of South Sudan

S.S gained independence in 2011 after decades of civil armed war over political differences, autonomy, identity, religious differences, and control over natural resources. Hardly two years post-independence, S.S went back into an internal political conflict further destabilizing the country causing death, displacement of thousands of south Sudanese within and outside S.S (Johnson, 2014). "Despite a revitalization of the peace agreement in September 2018 and the subsequent formation of a unity government in February 2020, S.S remains a country in turmoil and in the making" (Smits et al., 2024, p.2).These conflicts increased food insecurity, malnutrition, economic meltdown, insecurity, destruction of infrastructure, unfavourable investment opportunities hence reliance on humanitarian aid [such as seed aid], disruption of crop production and unpredictability of the country's political situation (Shams et al., 2024; Subedi et al., 2022). Heavy reliance of the country on seed aid threatens the seed sovereignty of small holder farmers in the country.

An estimated 2 million internally displaced people (IDPs) and 2.28 million South Sudanese refugees have been recorded due to this conflict (FAO, 2024). S.S tops the world among countries hit hard by inflation with real food inflation rate of 164 % and comes second with normal food inflation with a 186 % (World bank, 2024).In comparison to estimated 25% food insecurity prevalence of other regional SSA countries, S.S stands at an estimated 38% above the regional food insecurity situation over the years due to the convergence of a number of shocks and crises (Shams et al.,2024).These include "weak governance and public administration (in the face of overwhelming needs), breakdown of local institutions, insecurity and conflict in addition to climate related effects (prolonged droughts and flooding), pest and disease, insufficient agriculture extension service and inadequate policies and programs" (Subedi et al., 2022, p.14).It is based upon this that Smits et al,(2024) propose for seed aid by UN agencies and NGOs in fragile countries faced with conflict and its effect because of accessibility challenge by farmer due to insecurity. Hence between 2018 to date over 40% of farmer in S.S has received seed aid (FAO et al., 2019 in Smits et al., 2024)

2.2 Seed systems in S.S

Seed system "is the sum of physical, organisational and institutional components, their actions and interactions that determine seed supply and use, in quantitative and qualitative terms" (Scoones and Thompson, 2011, p.8). "In short, they are systems that make seed available to farmers"

(Westengen et al., 2023, p.1). The Formal seed system (FSS), Informal seed system (IFSS), and Intermediate seed system are recognised in S.S(Subedi et al.,2022). This is based on criteria of accessibility and diversity, ability of seeds to be used for breeding and seed governance in regard to standards, laws, regulation around seed exchange and sale (Louwaars and Manicad, 2022). Other criteria include "operational parameters (public, private, informal, formal, mixed), crops and varietal type, seed quality assurance (informal, Quality Declared Seed, certified) and the seed dissemination mechanisms (local exchange, agro-input distribution schemes, agro-dealers)" (Marimo et al., 2021, p.2).

The *FSS* in S.S accounts for less than 5% of seed supply (Subedi et al., 2022). The *FSS* in S.S is still in its infancy stages with mainly open pollinated varieties (OPVs) of sorghum and hybrid maize varieties newly introduced by STASS and undergoing multilocation adaptive trials (KII 1). It I highly underdeveloped (Smits et al., 2024).

The *intermediate seed system/semi- formal seed system* accounts for 15% of seed supply in S.S, mainly seed aid, community-based seed systems, 'quality declared seeds' and is increasingly recognised by actors, institutions, multinational organisations and Ministry of agriculture and food security (MAFS) (Subedi et al.,2022). This system involves individuals, farmers groups, cooperatives that produce and sell seed not sufficiently covered by the FSS, often following simplified certification schemes (Louwaars and de Boef, 2012). It avails opportunity for the multiplication of native varieties and improved seed varieties (Subedi et al.,2022) and is an improved version of the IFSS. FAO and other NGOs are making efforts to develop this system through initiative such as "supporting these companies to increase local production of quality seeds, and the marketing of these seeds to farmers and to humanitarian agencies" (Smits et al., 2024, p.3).

The *IFSS* which is the largest accounts for over 80% of seed supply in S.S (Subedi et al., 2022). It is characterised by farmer`s seed saving, seed exchange, informal market seed sourcing, seed networks and generally "native uncertified farmers seeds" with no clear trace of the seed parent material, 'no patent rights' but rather 'farmers right' (Nabuuma et al., 2022; Subedi et al., 2022; Ngalamu et al., 2021; Wattnem, 2016, p.852; Scoones and Thompson, 2014; Sperling, 2008). It is governed by social norms, rules and built on lines of culture and tradition (Westengen et al., 2023). IFSS offers for diversity in seed variety choices, adaptation to different agro-ecology, soil and climate within a given locality due to adoption dependent native seeds ability to self-select and adapt to changes in climate, farmers' preference, farmers indigenous knowledge of the variety of choices and previous experience with the same variety and attributing traits such as taste or brewing capacity (Louwaars and Manicad, 2022). In South Sudan it more dominated by small holder women farmers who are key custodian of local seeds.

These seed systems involve numerous actors, institutions and structures that interact to enable functionality of each seed systems. These seed systems are theoretically independent but interconnected and 'messy' in practices as seeds from one system cross into another seed system, once in the hands of small holder farmers and can easily join the IFSS including 'baptising' a new name (Wattnem, 2016).

As a new state faced with effects of conflicts, such as destruction of research stations and institutions, displacements of technical personnels (farmers and breeders), loss of seeds and insecurity, financial constraints these affects the various seed systems. Both State and non state actors play a role in the seed system development and technical support through fundings and technologies. Besides initiatives to address food security such as seed aid threaten seed sovereignty (Bezner Kerr, 2013). Key actors and institutions involved are Ministry of Agriculture and Food security (MAFS), multinational donors, University of Juba (UoJ), Seed trade Association of South Sudan (STASS), seed companies and farmers. Their interaction creates an enabling environment and tensions in the various seed systems.

Chapter 3: Methodology

3.1 Study area and Scope

This research was conducted in the village of Kolye West Rajaf Payam Juba County located in the central Equatoria state of S.S and data collection was caried out between 25th July 2024 to 30th August 2024. It is located within the green belt agro ecological zone with a growing season of 280 to 300 days per year (Peschard, 2022). Rajaf is a farming community indigenous to the Bari ethnic group and is a peri-urban area through which the White Nile crosses and supplies the capital city with fresh foods all year round supplemented by irrigation. Sorghum is the dominant crops grown in central Equatoria accounting for 70% of land dedicated for cereal (Subedi et al., 2022). It hosts Internally Displaced People (IDPs) and of recent refugees as well.

3.2 Research design and tools

"A case is an edited chunk of empirical reality where certain feature is marked out, emphasized and privileged while other are recede into the background" (Lund, 2014, p.224). Furthermore Lund (2014, p. 224) emphasizes that "when we are analysing data, we are breaking complex substance into smaller parts" hence to develop a case we move between specification, generalization, concretization and abstraction to create a matrix which include observation and concepts, pattern and theories, observation and pattern, and lastly concepts and theories respectively. Lund (2014, p.227) propose for the use of concept to make meaning from cases hence cases can be used to "debunk general understanding". It is based upon this that this study used a case study method

Key informant interviews (KII) were used to get opinions of experts considered as "valuable knowledge from expertise" or "special or expert knowledge" (Taylor and Blake, 2015, P.153). key informants influence any social science research agenda because the information they hold greatly influences the outcome of the research in relation to relevance of the research and offer an opportunity for the interviewer to probe and expand on topics in the research agenda and offers the interviewer the opportunity to take the interview into the required direction. Power imbalance is often noticed when KII are the only tools used because key informants are often people placed at a privileged position within society thereby sometimes providing biased information hence this research was complemented with other research tools such as Focus Group Discussions (FGD) (Lokot, 2021) and participant observation. 7 KII were conducted which lasted between 60 to 90 minutes, of which 6 KII were men of the age range of 30 to 50 year and only one female of between the age range of 25 to 30 years.

FGDs engaged a 'homogeneous' group of small holder farmers engaged in sorghum production. The female FGDs were mainly elderly women of over 50 years and a few middle-aged married women of between 30 to35 years comprising of Baris and IDPs. This included married, widowed and one person with disability (physical disability). The male FGDs were dominantly between 25 to 65 years comprised of married and unmarried men, natives and IDPs. This was to engulf wide and numerous opinions on the same research topic from various sources and lens. FGDs enable validity and complementarity of the information obtained from KII and potential information as perceived through the lens of small holder farmers hence offering "social dynamics of peer groups" (Caillaud and Flick, 2017, p.161). The concept of 'triangulation' as discussed by Caillaud and Flick (2017) was adopted in this research with FDGs offering diverse view from various participants involved in the discussion which required a consensus by all participants to be concrete information and can be used to gather wide opinions within a short period of time (Smithson, 2008). FGD enable participant to collectively agree on what works for them thereby potentially creating theory based on experience and language of participants as statements are made in 'voices' that best describe the situation and topic (Smithson, 2008) though it lacks privacy and confidentiality of information (Caillaud and Flick, 2017). Both FGDs lasted between 90 minutes to 105 minutes each. Under participant observations, various nonverbal gestures were observed

during the various FGDs and KII to read body language, voice tone on various issues discussed as well as facial expressions to closely understand and get a grip on some of the discussions in which no verbal interaction were used especially before and after the FGDs. Use of existing secondary data was used in this research. In both FGDs and KII, semi- structured and structured questionnaire were used (Appendix 2). "Confidence is established through iteration and triangulation until a certain degree of saturation is reached" (Lund, 2014, p.227). This gives more reason for the KIIs, FGDs and participant observation

Non-probability sampling techniques combining purposeful sampling and snowball sampling methods was used to identify key informants and participants for FGDs for this research to enable an in-depth study (Bernard, 2017). Purposeful sampling is used to find "intensive, critical and hard to find population" (Bernard 2017, p.148). 7 KII and 2 FGDs were conducted (table 2). Before the interviews, introduction and oral consent was sought from the research participants (Appendix 1). Besides knowledge from a limited number of events are claimed to be valid for a large group (Lund, 2014). Both primary and secondary data from journals, books, articles, policy brief and reports. I took notes and recordings for those who consented, however both FGDs didn't consent to recording though they consented to engaging in the discussions[6]. The KIIs were conducted in English while the FGD was conducted in a mixture of Bari language, Juba Arabic and English in which I am well versed. This was later transcribed to English using Micro soft word document and google translate. A thematic analysis was adopted, and commonality of responses considered using direct quotes from key responses to make meaning and raise sub heading which are discussed in relations to the research questions and objective.

Table 2: Interview Exhibition details and codes

S/N	Codes	Research participant Category	Interview	Gender	Date of interview
1	KII 1	STASS representative	In person	Male	29/7/2024
2	KII 2	seeds company	In person	Male	25/7/2024
3	KII 3	seeds company	In person	Male	7/8/2024
4	KII 4	Community Extension service Provide (ESP)	In person	Male	12/8/2024
5	KII 5	Government representative-Plant breeder	In person	Male	8/8/2024
6	FGD 1	Male participants	In person	All Male	20/8/2024
7	FGD 2	Female Participants	In person	All female	21/8/2024
8	KII 6	INGO representative	In person	Female	27/8/2024
9	KII 7	UN Agency representative	In person	Male	30/8/2024

[6] Due to the political tensions in S.S, open meetings with large number can be complicated for political meeting and hence require security clearance and the presence of security personnel. For this reason, participants are skeptical on recordings and photo taking even when the agenda is clearly explained for fear of further complications on opinions shared

Source: compiled by author

3.3 Positionality, reflexivity [7] and Ethics

I am a 32-year-old female South Sudanese from the Bari tribe born to farmer parents originally from Mangala payam bordering Rajaf Payam. I consider myself a middle-class citizen based on education privileges obtained inclusive of this current MA am enrolled in the Netherlands and my undergraduate in Agriculture from Uganda. I have experience as a working-class woman living in juba city. I am fluent in both juba arabic and Bari language and have worked with in a few villages in Rajaf over seeing a food security and livelihoods project. Through this I engaged with numerous lead farmers (men, women, youths, IDPs and persons with disability) from various ethnicity and social classes for groundnuts and pearl millet seed multiplication and adaptive trials production for commercial seed companies. I have established contacts with community leaders, lead farmers who are considered gate keepers into the community. I have engaged in procurement of improved cereal seeds from seed companies through which I learnt of the existence of the Seeds Trades Association of South Sudan (STASS). I used contacts I had established from STASS to gain access to other seed companies and other partners dealing in seed related projects. I engaged with a 45-year-old male Bari friend of mine whose mother is a lead farmer in Kolye West to gain contact for the participants whom I engaged in the FGDs

Based on my positionality, I received more willingness to engage in the discussion from middle aged participants (25 to 40 years) in both FGDs though the degree of engagement varied between the two FGDs. The middle aged female FGDs freely expressed and debated before arriving central points of agreements as opposed to their middle-aged male counter parts who engaged less and were more calculative of their responses in the discussions. In both FGDs middle aged participants used words like "you can relate" and "like you" to assume I understand their perspectives. They even preferred discussing more in Arabic and English as compared to Bari. The elderly women on the other hand referred to me like "my daughter" while discussing while others went as far as wanting to gain an understanding of how much time I spent with my grandparents and parents while growing up and what their occupation is to explore the depth of knowledge, I had in practices of the IFSS. The elderly both male and female preferred expressing themselves in Bari. During the Female FGDs, we all sat on mats while in the male FGDs, the men sat on chairs while I sat on a mat to observe cultural practices among the Bari.

From the above visible and no visible identities, I considered myself as partly an insider and an outsider which influenced how the research participants responded to the interviews. Probably due to my age, ability to speak Bari and Arabic, gender, class and other physical attributes such as my dressing code in jean trouser and T-shirt, I felt more of an insider among the middle-aged women and the elderly women as opposed to the elderly men and middle-aged men. However, I capitalised and strategized on my established relationships to gain access to the research participants (strategic positionality). Chege (2015, p.465) stated, "no pre-fieldwork training had or could have prepared her for the assigned identities" that her research participant gave her hence the need for researchers to be strategic in capitalising on their "positionalities and capital in both successful and unsuccessful ways" (Reyes, 2020, p.221-222).

3.4 Limitations.

There is limited literature and research related to this topic from S.S. Available publication and research are by University of Juba S.S in partnership with Wageningen university of Research Netherlands, multinational organisations and UN Agencies. Other key institutions and actors such as STASS lack a website and most of the information regarding this were obtained through the

[7] Part of this was submitted as an assignment on positionality and reflexivity in the course ISS 3303 Ethnographic Research and Reflexivity in Development Contexts

interviews or on website of other partners. This have an implication on this research as more literature related to the research were obtained from other localities in the global south like East Africa to Supplement the available literature from S.S and grey literature. However, this poses an opportunity for originality in aspect to this research and an impactful contribution to the growing literature in this field in the country.

This research was conducted in one village as opposed to the initial planned two villages and only two FGDs were held each comprising of 10 participants. This research was conducted during peak season for first season harvesting and second season planting (July to August). During this period small holder farmers were fully engaged in their farms hence engaging in immediate non rewarding activities are considered less important during such a time as they race against time considering labour constraints and catching up with the season. Therefore, there is limitations in full representation of the Payam at large and the country in respect to South Sudan to enable a generalisation of the research findings especially due to the difference in the agro ecological zones and restricted crop choice however the representative sample can be taken as a projection of the voices of other small holder farmers within central Equatoria due to the commonality of the case.

Chapter 4: Conceptual framework

This chapter presents key concepts on the politics of seeds at a various scale. Lund (2014) says that to make meaning, scholarly work should use concept. This chapter presents key debates involved in the politics of seed which enlighten on the next chapters and on the engagements on findings and discussion.

4.1 Seed sovereignty

"Who controls the seeds gain a substantial control over the shape of the entire food system" (Kloppenburg, 2010, p.368). Seeds can be a microcosm for examining struggles for food sovereignty, between men and women, different generations, within communities, the state, scientific arenas and private corporations" (Bezner Kerr, 2013, p.868). The main cause of the struggle of farmers for seed sovereignty is struggles to control seeds and the right to share and exchange seeds (Kloppenburg, 2010). The privatisation, commodification, monopolization of seeds, seed laws and standard that favour capital accumulation and dispossession of farmers are some reasons for the seed sovereignty movement (Kloppenburg, 1988). The growing interest of seed companies and multinational cooperations to expand their markets in the global south due to the 'potential' market opportunity for seed produced from FSS as well contributes to this movement (Fischer et al., 2022; Wattnem, 2016; Kloppenburg, 2014)

The growing concentration of cooperate power, privatization, intellectual property rights on seeds, patent right and control of genetic material were moment of accumulation by dispossession, in breeding and hybridization, progressive development of restriction on seeds the intellectual property right legislative (Kloppenburg,1988; Kloppenburg,2010). Therefore, control over genetic material [seeds] should not be in the hands of those who aim to patent it but rather in the hand of "social group and/or institutions" for sustainability and equal use (Kloppenburg, 2010).

What then mut be done? Kloppenburg (2010) proposes for what he called 'open source' as a way for to achieving seed sovereignty struggle following the less effect resistance under the umbrella of 'farmer`s right'. He affirms to the "General Public License for Plant Germplasm" (GPLPG) that can serve a diverse audience of actors involved in seed involvement. He suggests GPLPG will "impede the patenting of plant genetic material, impede bioprospecting and impede the use of farmer derived genetic resources" (p.377-378). However on a positive side the GPLPG could help develop a legal framework that recognise farmer, allows farmer to freely exchange, save, improve and sell seeds , develop an institutional framework in which farmer cooperate with

plant scientist in the development of new plant varieties that contribute to sustainable food systems and finally develop a framework for marketing of seeds that is not patented (p.378-379).

Other scholars propose the "decommodification" approach (Rodríguez, 2023, p.990). This is a "political, social and cultural process that reduces the scope and influence of the market in everyday life" (Vail, 2010, p.313). it involves 'local communities' in discussion and decision making on protection of native seeds and breeding program proposal to prevent privatisation of local seed and the mother seeds in resistance campaign to protecting native seeds against genetic modification among other initiatives (Rodríguez, 2023).

Typical of the moral economy, Wattnem (2016) proposes defiance and disobedience, open resistance and opposition to seed laws, creating protected community seed bank and a combination of all the global struggles to seed sovereignty. Typical of the moral economy. However, farmers who rely on the IFSS or native seeds have a degree of sovereignty over their seeds (Rodríguez, 2023) due to their ability to control, share and exchange seeds, pass seeds through generations.

How then in practice does farmer saved seeds contribute to seed sovereignty? Bezner Kerr (2013) proposes 3 ways through which farmer-produced seed [seeds from the IFSS] are a form of food sovereignty; First, it enables conservation of agrobiodiversity which enables engagement of farmers on their traditional knowledge and practice in participatory plant breeding and influence in decision making. Second, such seeds contribute to building seed security and through farmers engagement in "determining what type of seeds are most appropriate for their context in a democratic, participatory way, based on shared knowledge" (p.871).Third, farmers saved seeds engulfs cultural perspective, where seed are used as an important items in social practices and cultural belonging since common seed varieties hold secret cultural values and knowledge which influence the large political economic system.

Therefore seed sovereign align to both ME and FPE approaches of which there I resistance to the expanding hand of capitalism and the appreciation of the plurality of knowledge in manging, having and election of seed in the IFSS

4.2 Global food systems

Food systems and their framework entail seed systems hence influencing food security, health, social economic and environmental outcomes thereby creating food system change (Westengen et al., 2023). The seed sector and the agri-chemical sector is dominated by 4 MNC (Dow and Dupoint, Sinochem, Bayer and BASSF) with annual global commercial seed market and pesticide industry is worth $39 billion and $ 57 billion respectively (Clapp,2022). These have direct and indirect impacts on a global and domestic scale as discussed by Clapp (2022) in '*The rise of big food and agriculture: corporate influence in the food system*';

First, the power concentration in the MNCs enable them to prioritise their interests in decision of food cultivated, food produced, food distributed and prices of food at purchase and sales. Clapp compares the food system to an hourglass with the few firms in the middle of the hourglass as a chokepoint with the producer and consumers at the opposite sides of the glass. Through this, the MNCs influence the boundaries of marketplace and political environment in which they operate.

Second, Clapp (2022) proposes that these firms shape market parameters through influencing prices of some items such as seeds of GMOs. This creates an effect on equity either by farmers using less seeds thereby lowering production or passing the effect of the high seed prices to consumers by increasing food prices. This further create inequality in the food systems through shaping the prices of goods paid to suppliers in this case farmers by paying less for more due to limited opportunities for sale of their produce. Other market parameters such as labour, availability of products to both producer [inclusive of farmers] and consumers, consumer choices are hugely influenced negatively by MNCs.

Finally, MNCs influence and shape policy and governance through numerous strategies among which include investing huge sums of money in lobbying strategies that are favourable for their products and their interest. This creates broader implication such as broadening inequality within the food system.

On a micro level, Westengen et al., 2023 argues that the global food systems and the food system framework acknowledge the significance of the heterogeneous demand for crop diversity linked to household food demand, availability and associated costs influenced by both local and global scales forces. These factors influence households and farmers seed choices based on opportunity cost of farming in comparison to other livelihood strategy, economic value of crop choice, cultural dynamics, type of farming (subsistence or commercial), political and environmental factors (Westengen et al., 2023). For example, from both FGDs and a few KII women mostly cultivate local sorghum varieties for household food consumption and other cultural practices because they are easily available. Men on the other hand preferred to cultivate both the improved varieties and those from seed aid for market purpose while local varieties are to supplement household food demands. In rajaf it was recorded that it easier to give male farmers improved seed on loan by seed companies as opposed to the female farmers making accessibility easier for men hence their engagement with seeds from the FSS.

Therefore, globalisation of food system has an effect at a global and micro scale, these as well influence seed systems. This is through influencing and shaping markets, science and policy frameworks through exploration of a few profit maximizing seeds types such as GMO maize, soy and agro chemical inputs while in regards to "policy influence, free trade and regional trade agreements commonly include requirements for implementation of IPR protection and harmonization of seed regulations to attract commercial interests" (Westengen et al., 2023, p.6).The above debates portray the level of power inequality and concentration, decision making, politics and larger influence of the globalisation of food system at household level and global scale.

From the ME and FPE perspective, numerous social movements have raised, locally, national, regionally and internationally to resist the dominance of MNCs and their dominance in controlling plant germplasm and genetic material and challenge local household and community structures. Example of such movement are the la via campesino

4.3 Political economy of seed

The functionality and politics of each seed systems affects seed availability, seed quality control and seed accessibility (Remington et al., 2002; Puskur et al., 2021). Therefore, it is important to seek an understanding of how the seed system of a country is governed.

4.3.1 Seed policy

"Seed policy is a statement of principle that guides government action and explains roles of stakeholders in coordination, structure, functioning and development of seed systems both formal and informal sector and these include seed laws, seed quality standards and certification requirements providing an overall regulatory framework for seeds and adherence to government requirement in the seed sector with alignment to national, regional and international level" (FAO, 2015, p.3). They are independent to each country and work as an enablers and disablers for the various seed systems (Scoones and Thompson, 2011). Other countries are equipped with fully developed national seed policy while other countries are still developing national seed policies. S.S falls in the later with its seed policy draft in place however it has not been approved to regulate the seed system (van Uffelen et al., 2023). In Uganda the national seed policy took a process of over sixteen years (2002 to 2018) before its approval (Mastenbroek et al., 2021).

Global framework, rules and regulations embedded in various agreements since the 1990s affecting national seed policies and strategies of key private actors often do not consider the interest of small holder farmers in these agreements (Tansey, 2011). Nation state have control over

their genetic material inclusive of seeds however amounting pressure from global powers make it difficult for nation state not to comply to international seed standards and laws thereby "eroding national state sovereignty over their genetic material" due to nature of international trading and requirements (Wattnem, 2016, p.859).

Efforts towards development of a seed policy in S.S have been in place inclusive of numerous meeting and consultative workshops since 2013 upon the arrival of AGRA in S.S. Some of these effort include the first seed hub held at the university of Juba in September 2022 involving state and non state actors such as MAFS, UNFAO, academia from University of Juba, Wageningen University & Research, ISSD-Africa, private sectors from STASS among others which concluded with the established of action points publishment of *'Call to action: Priorities and partnerships for a robust, inclusive, sustainable and resilient seed sector in South Sudan'* and *'Policy brief: Ten pathways towards a robust, inclusive, sustainable and resilient seed sector in South Sudan'* (ISSD Africa, 2024).STASS in partnership with other seed actors drafted a *Ministerial Position Paper* on seed production and supply to the Minister of Agriculture and Food security to lobby for a ministerial order which is still tabled to the MAFS and awaiting approval to address the rising issue of seed adulteration and non regulatory operation of seeds within South Sudan especially those imported into the country (KII 2). Therefore, in principle S.S has a draft national seed policy however this has not been approved to enable adherence to seed legal framework hence most seed companies and other stakeholders dealing in seeds business work under the disgust of 'good will and self-discipline' along with other measures imposed by the state to ensure seed quality for imported and domestic seeds. On a positive side this also allows for small holder farmers to freely control, share and exchange local seeds.

4.3.2 Public private partnership in seed systems

The new green revolution in Africa is key to the politics of the seed as this was an agrarian transformation agenda in Africa created to address food insecurity through introduction, dissemination, marketing and increase the use of hybrid seeds and fertilizers in sub–Saharan Africa to mimic the green revolution in Asia and Latin America. The Green revolution adopted partnerships option to deliver results such as the "private public partnerships (PPP) or brokering arrangement" created to enhance "seed research, develop products and market them" (Scoones and Thompson, 2011, p.4).

These PPPs engaged different actors each with different goals, interest, priorities, authority and power inequalities. The private partners are profit oriented, and NGOs are not profit making while the state plays the role of autonomy to ensure checks and balances in the seed systems. Farmers are the producers and consumers hence these partnerships are/were presumed to interact perfectly with the market, increase adoption improved released seed varieties and hybrid seeds. However, balancing between the interests of the public and private is where the politics come into play hence making the PPP and other partnerships under seed system subjective and context specific in nature influenced by political and economic situations (Scoones and Thompson, 2011).

Under these PPP, key players are the state and private sector who prioritise their interest to shape the direction of agrarian transformation through the choices and types of seeds to be delivered to farmers, determined and influenced by how much profit is made from the seed type and choice by private entities while sidelining the farmers interest of crop variety choice due to power imbalance and inequality thereby influencing decision making (Tansey, 2011). A win-win situation is hardly reached as "loser and winners are created in such partnership due to the unlevelled ground for participation" (Scoones and Thompson,2021, p.7). It is however undeniable true that small holder farmers equally welcome seeds from the formal seed sector since such seeds guarantee seed quality (Cooke, 2002). Small holder farmers interact with both the FSS and IFSS hence potentially benefiting from such PPP.

Odame and Muange (2011) article on *Can Agro dealers deliver the green revolution in Kenya*? presents how seed politics in the seed system unfolds in Kenya which is led by private sector who receive incentives from NGOs, the government and other donors to strengthen the private seed sector to spread new technology and disseminate hybrid seed varieties. These agro dealers influence crop choices to only crops with low investment cost and high sales for profit maximization and not necessarily crop choice by small holder farmers. This raises questions like *Who decided which cereal should be given priority? How can this address dietary diversification? What was farmers choice of crop? Were farmers consulted*? (Odame and Muange, 2011, p.85). IFSS most preferred by small holder farmers was not prioritised as agro dealers and seed companies concentrated in areas with high seed demand dominated by large scale farmers thereby sidelining areas with low demand mainly those with small holder farmers (Odame and Muange, 2011). PPPs are on the increase in South Sudan (discussed later in chapter 5). The benefit of PPPs is not homogeneous as some actors gain while other lose.

4.4 Food sovereignty and Food Security. Competing but complementary concepts

Food sovereignty is a counter narrative and alternative by peasants to the intellectual food security discourse used by NGOs, policy makers, government as an approach to address food insecurity (Patel, 2009). Its emphasis is on the democratization of food systems, policy, practice, knowledge and the rights and autonomy of food producers (Nyéléni Declaration, 2007). It serves as a proposed alternative to addressing food insecurity locally (Leventona and Laudanb, 2017). These struggles among many peasants include the rights to seeds of a peasant`s choice and management and the resistance against seed patent rights since seeds are patrimony at the service of humanity (Patel, 2009). In some countries like Venezuela, Bolivia, Mali and Senegal food sovereignty has been integrated as a complementary approach to achieving food security supported by their governments (Godek, 2015).

4.4.1 Food sovereignty in practice

The terms of 'family farm' and attaining 'gender equality' (roles, decision making, and rights) is contradictory in nature in the definition of food sovereignty on the account of that many family farms are run by women while the land is owned by men (Agarwal, 2014). Agarwal discusses on the unlevelled ground on which women farmer operate due to numerous constraints (land access, credit access, unpaid labour among others) and the "feminization of agriculture" (Agarwal,2014, p.1251).This points out the power dynamics, intrahousehold inequality, politics and power, structural challenges with less autonomy offered to women under family farms which makes it challenging to achieve the food sovereignty (Louwaars and Manicad, 2022; Leventona and Laudanb, 2017; Agarwal, 2014; Payel 2009). Proposal of addressing intrahousehold inequality and structural inequality in production, distribution and consumption I required to achieve equality in the family farm (Masson et al., 2017; Agarwal,2014).

There is however growing attention to acknowledge women`s involvement in food sovereignty under small scale farming, food preparation and food production distribution [such as seed] (Masson et al.,2017). They propose these elaborations seek that the role of women is recognised, acknowledged and rewarded which is often silent and ignored creating gender inequality and blindness in food sovereignty and the silent role of women in mobilization and the heterogeneity of women is also getting recognition in the food sovereignty movement. Masson et al. (2017) also propose the growing interest in "documenting and analysing women's and feminist involvement with food sovereignty" such as participation of women in struggles for more decision making in the LVC structure, documenting and analysing the Nyeleni Women's Declaration on Food Sovereignty.

On the other hand, the everyday embodied practices involving the work done by both men and women in ensuring local food production involving cultures, daily way of life and biodiversity are alternative to resisting the embeddedness to the global food system hence localised food system and therefore food sovereignty (Turner et al., 2022). The everyday practice of food sovereignty share "a focus on local and micro scales of practice, lived experience, and local meaning-making situated within broader regional, national and global processes and structures", which are deeply rooted into histories, culture and portrays how food sovereignty is taking place in practice and not only at regional or national mobilization (Turner et al., p.404).

Therefore, analysing food sovereignty through the everyday practice opens a new lens by revealing the everyday practices exhibited by the women in a "localized food system deeply embedded in social-ecological relationships that reflect local culture and ecological knowledge" (Turner et al., p.404). This is by making visible the role women play in the everyday struggles in achieving food sovereignty through processes of "production and harvesting of food, sustaining food production spaces, maintaining seeds and genetic and culinary diversity, and ensuring the continuity of transformation and exchange processes that have deep cultural value" (Turner et al., 2022 p.420). Furthermore, the distinctive nature of the logic of production within women's provisioning is "social and cultural reproduction" as women create social networks and a community of practice among themselves, their families, and community at large creating strong sustainable relationships (Turner et al., 2022 p.421). This shows how local food systems are sustained and reproduced and how women play an important role in the very day practices driving the food sovereignty

4.4.2 Food security

Numerous critiques have come up from the concept of food security. Among this include the failure of the food security definition to address the "where, how and by whom food is produced and distributed" (Bezner Kerr,2013, p.869) which is addressed by food sovereignty. Clapp (2014, p.208) argues otherwise and poses additional views to consider.

First, the critique of food security being "productionist in orientation" is challenged by Clapp since the food security definition has evolved over time and current definition puts into consideration access however, she acknowledges that in mainstream policy agenda for addressing hunger instead production is prioritized over access (Clapp, 2014, p.208).

Another debate presented by Clapp (2014, p.209) is she challenges the critiques presented by different others authors that food security "embodies neoliberal trade and market orientation" which is parallel to food sovereignty. She however acknowledges that agendas by institutions such as the World Bank were aimed to promote trade, nevertheless Clapp poses that the focus of critique of food security should be in establishing and showing the inequalities that exist in the global agricultural trading system rather than establishing a link between food security and neoliberal, trade and market.

Thirdly, other critiques argue that the use of individual as a unit of analysis shows a neoliberalism nature of food security, and it focuses on purchasing power hence relating to markets which influence decision making. Clapp looks on the other sides of the coin where individual as a unit of analysis best shape appropriate policies to addressing food insecurity, since other units of analysis such as household or nation doesn't portray clear image of food distribution, access within the HH or within the society respectively as it covers inequality in access to food especially along gender lines (Clapp, 2014).

Food security and food sovereignty should be looked at as complementary concepts rather than as competing concepts which creates more confusion, and we risk missing the main objective to solving the hunger and malnutrition problem (Clapp,2014). Clapp argues that food sovereignty is more for producer oriented agrarian movements with a focus on peasant rights production side, land rights, food rights, environmental protection among others and is silent or speaks little on

equitable food access and nutrition for both peasants and non peasants, as well as less articulated details on food sovereignty designs for marginalised communities. These debates presented are indicative that each of these two concepts have their weaknesses and strengths and learning can be picked from each concept to complement the other such as food sovereignty advocates can learn from food security advocates and vice versa as both concepts are important contributors to advocating and formulating policies to addressing the global hunger challenge and inequality in the food system (Clapp, 2014).

Chapter 5: Findings and discussions

This chapter presents key research findings; first on the seed preference and sourcing influenced by micro politic of gender, resources and intra household dynamic and seed availability, accessibility and quality. Second on contestation and opportunities with contestation on seed adulteration and seed aid, sourcing of IFSS seeds through seed fairs and purchase by seed companies and numerous opportunities of the IFSS and lastly on contextualised understanding of food security and sovereignty.

5.1 Seed preference and sourcing.

5.1.1Micro politics of gender, resource access and intra household dynamics

The KII and FGDs revealed that seed preference and sourcing form the IFSS is dynamic and multifaceted in nature, space and time and intersect with gender, age, culture, status, ethnicity and class

Marriage is important in seed sourcing and access for females within small farmer households as discussed in the FGDs. "*We have a metallic suitcase in which my parents store over 5 different local varieties of sorghum and other seeds. Those that mature in three, six, nine and twelve months. When I got married last year, they gave me each of those seed types to use in my new family. Each is planted at different time of the year and harvested at different time of the year"* (a middle-aged female participant in FGD 2). Many of the female participants nodded their heads in agreement with the statement, the elderly, the middle aged and the young in the FGDs. Through marriage some women get access to local seeds which gives provision for seed dissemination and distribution to where a woman is married. Unmarried women and men are considered to contribute their labour to the 'family farm' where their parents/guardian cultivate until marriage. The men are not assigned land of their own as they are still considered 'children' and not independent until marriage as was revealed during both FGD.

This aligns with resources distribution based on marriage status and intersects along with age, ethnicity and culture as this applies to the bari speakers[8]. Bezner Kerr (2013) study aligns with this where seed gifting at marriage between mother-in-law to daughter in law occurs in northern Malawi. Marriage avails an opportunity for availing "start-up" kits in terms of seeds and indigenous seed knowledge passage through generations (mother-in-law to daughter in law) (Bezner Kerr, 2013, p.884). This however does not apply only to sorghum but to table food like cowpea seed, jute mellow, okra, amaranthus and spider plant.

Cultural norms, practices and indigenous knowledge were more aligned to elderly women. The elderly women were considered more knowledgeable on local varieties, physical seed traits distinctness and how these seeds play cultural roles (FGDs and KII). The *habubas*[9] reflected on their lived experience and how some cultural practices have been passed through generations and the importance of local sorghum seeds. Others *habubas* expressed loss of culture due to modernisation such as the fading cultural practice of the celebration falling of the umbilical cord

[8] Bari Speaker comprises of over 10 tribes within the central equatoria region that share a closely related langue to the Bari language. They include other tribes like kakwa and pojulu among others.

[9] Habuba is a juba Arabic word used to respectfully refer to grandmothers who have biological grand children

stump of newborn babies in the first week of birth before the naming ceremony. One elderly widowed participants originally from Bor who was married to a bari man had this to share, "*The taste of akurachot and lodoka [10]is different from the ones our husbands cultivate and take to the market for sell. Each variety serves its own purpose, what we women cultivate is for household consumption and we use the flour for porridge, brewing alcohol, making bread and for cultural naming ceremonies of newborn babies and cultural rituals like youth initiations".* She spoke in bari having lived in the area for over 20 years.

In addition, the purpose of cultivation, distinctive taste of each variety and use, culture (naming ceremony and youth initiations) is considered important. Age is equally important since flour from certain native seeds are used for youth initiations and naming ceremony (*semaya*) which also influences sourcing for such parents. I observed that mainly the elderly women and men dominated the discussions. This could be because of respect for elder by younger participants or it could be their social dominance over the younger participants in respect to knowledge and lived experience about IFSS.

5.1.1.1 Semaya as a cultural practice

In both FGDS we discussed the naming ceremony (*semaya)* as an important cultural ceremony. It takes place once a child`s umbilical cord stump falls off. The Bari and other Bari speakers practices *semaya.* It is during this ceremony that both the child and mother come out of the house after birth and happens either at sunrise or at sunset. The parents and the baby are smeared with sesame oil on their forehead and later given a drink made from *Lokorejeng*[11]flour before the proposed name is given by the man`s eldest aunt. That is the procedure for by child however for girl children the parents take the porridge after the names is given. "*it is believed if the baby is for another man, something bad will happen to the new born*" (elderly woman in FGD 2). It is culturally a ceremony beyond naming but traditionally believed to also confirm a child`s paternity. After the naming follows eating, singing of cultural song and dancing which are led by women. Only close elderly female relatives attend the *semaya* like auntie to the parents, their grandmother, wives to their bother, wives to their brothers in law and co-wives in polygamous family. Therefore, it is expected that once a family has an expectant mother, the husband should source *lokorejeng* seed and cultivate it in preparation for the *semaya*. Surprisingly in this ceremony only women who have produced children participate.

Therefore "seed is a crucial locale of cultural control, because cultural values and knowledge can be embedded in seed varieties and farming strategies, which are themselves closely aligned with broader political and economic system" (Bezner Kerr, 2013, p.871). She further argues that seeds are intimate and play a linkage to rural livelihoods, well-being and cultural practices and should not be looked at as only a commodity or food source (Bezner Kerr, 2013). Seed and seed system adoption, production, management, crop choice and use are gendered and intersects with culture, norms, socio economic, demographic, income, age, religions and social class (Adam et al.,2019 in Marimo et al., 2021, Puskur et al., 2021; Kramer and Galiè, 2020). This influence intrahousehold dynamics, decision making capacity and power (Marimo et al.,2021; Christinck et al., 2014) to determine seed quality, seed accessibility, seed availability, seed control and use as they play an active role in achieving seed security between both men and women in all seed systems (Marimo et al., 2021; Puskur et al., 2021; Kramer and Galiè, 2020).

5.1.2 Seed quality, seed availability and seed accessibility

*S*eed quality is not limited to only physiological seed traits but also gendered preference on how each of these categories defines seed quality (Kramer and Galiè,2020). This as well intersect with ag and indigenous knowledge. Elderly women and men defined good seed quality in aspect of

[10] *akurachot* is local variety common in Bor Jongeli state which matures in 90 days while *Lodoka* is common in central Equatoria which matures in 6 to 7 months. Each of this varieties are used for different purposes

[11] *Lokorejeng* is a local sorghum variety used in the naming ceremonies of babies. The flour from the Lokorejeng variety is used in making foods and local alcohol in the semaya

agroecological adaptation and taste other than yield. The men focused on the plant height as an important attribute where local varieties like *lodoka and lokorejeng* were preferred for their tall plant height conducive during harvest as they don't have to bend because of their tall height. On the other hand, women in the FGDs preferred the tall varieties during conflict as the tall local varieties offered a hiding spot in the farmland argued the women in the FGD. The elderly and middle-aged women had contradicting views in weeding to determine choice of local variety. The elderly women preferred tall varieties to provide shade as they weed using a *maloda*[12] while the middle-aged women preferred sorghum with shorter heights to enable them easily use hand hoe for weeding.

Information access also influence seed sourcing and preference. Information was accessed through different channels by different social groups. The middle aged and elderly men got information on seeds and other agriculture related information from agro dealers, INGO and UN agencies and radio talk shows such as '*zira tana*'[13]. Middle aged women and the elderly women got information from *Rabita*[14], neighbours, friends, relatives, in-laws, on the farm, water collection points, the market and radio talk shows. The male youth on the other hand get information at local drinking joints, *boda boda*[15] stages and at soccer watching spots where they discuss 'all issues' from politics to agriculture among others.

Therefore, information channels are accessed and used differently among men, women, male youth and other groups of small holder farmers to gain seed accessibility based on established social networks with other groups in Rajaf. Women dominate the informal information channels such as friends, relatives etc while men dominate the formal information channels and institutions to gain information on seed access such as agro-dealers, research institutions due to the above discussed challenges of mobility and decision making (Marimo et al., 2021). Through their (women) everyday practices of interaction, they create strong social relationship with other household and community at large creating a strong community cohesion. Seed accessibility involves information sharing, which is influenced by intra household dynamics, affordability, delivery mechanism, seed users' mobility and social network (Kramer and Galiè, 2020).

Seed availability not only relates to getting access to good quality seed during the planting season but involves identifying and addressing mobility challenges often faced by rural farmers [especially women] in the global south who are faced with movement challenges to agro-dealers and connectivity to seed distribution channel (Kramer and Galiè, 2020). These restrict their seed availability options in the FSS as compared to the IFSS of seed saving and seed exchange however even in the presence of local institutional initiative such as seedbanks, gender biases exist thereby influencing seed availability (Kramer and Galiè, 2020). In my field work, it was evident that one`s social network played an important role in access and availability. Most women and a few men interviewed acknowledged obtaining seeds from either friend, family members or people they share the same social cycle as *rabita* for the women. However, how much can be shared without pay is determined on how close of a relationship one has been established, they value of the local variety and previous season yields. In this case some local varieties are more valued and preferred

[12] *Maloda* is a traditional hand tool in S.S commonly used women for digging and weeding which requires a woman to bend or kneel while weeding. It is traditionally made by black smiths

[13] *Zira tana* translates as our garden. It is a radio talk show program funded by FAO to discuss topics on agriculture technologies, climate change, anticipatory action and weather forecast.it is on aired on eye radio, radio Miraya aired in different languages numerous times weekly.

[14] *Rabita* is a social practice common among elderly and middle-aged women in which they meet on a regular basis (daily, weekly, bi-weekly or monthly) to discus and share good practices for self-empowerment, innovations, business opportunities and savings. It is commonly practiced among married women though in some cases unmarried women can join some cycle as long as you have close relationship with the other participant

[15] *Boda Boda* is where motorbikes are used as a means of transportation. It is a common means of transportation used in S.S and are usually assembled on stages where most male youth operate and other spend their leisure time at such stages/station.

as compared to others as is the cases of *lodoka*, *lokorejeng, akurachot* and *Nyithin* which is more preferred and valued.

5.1.2.1 The everyday practices of division of farm labour within households

> "As a first wife among 3 wives of my husband with 5 adolescent sons, I am privileged and given more land for farming because of my marital status superiority and labour force. Unlike the youngest wife who has two younger daughters, my husband sometimes supplements my local seeds with some improved seeds that he obtains from some of the village agents on loan" (Elderly female participant in FGD 2).

I learnt that married couples cultivated on different pieces of land with the size of the land decided by the husband, but crop choice determined by the wife since women cultivate for household consumption Their children (both female and male) contributed to their father`s farmland and wives helped their husbands at weeding and under exceptional cases such as pregnancy, childbirth, sickness and persons with disability is when children help their mothers. Produce from the woman`s farmland was for home food and only supplemented by their husbands when harvest is low. Otherwise, all the harvest from the man`s farmland is taken to the market and money used for other expenses in the house like sickness, school fees and ceremonies. This overlooks the unpaid labour by women like cooking within households and limits their decision-making capacity. As presented by Agarwal (2014) these are some of the challenges women face in the struggle to achieving food sovereignty and food security creating inequalities. unless addressed it is challenging and may cause "self exploitation" a term by Scott (1976) to mean over working oneself to ensure provision for the family

As it stands at household level, "farming households organize themselves in different ways depending on various socioeconomic, cultural factors and the control and decision-making dynamics" which often influence men, women and other social groups differently at decision making, production, family farming, land allocation and size per crop across gender, seed sourcing and planting time for each crop (Marimo et al.,2021, p.3). Besides "seniority among cowives and other social positions within domestic sphere" as well influence access to farm resources such as seed banks (Frimpong, 2019 ,p.110).This depends on household type, either female headed or male headed household [or even child headed or youth headed] creating different priorities and preference in seed system preference, crop type and variety (Adam et al.,2019 in Marimo et al.,2021,p.2).Dependly, this can either create opportunities for access to better or more resources and decision-making capacity or deprive one from such opportunities.

From both a ME and FPE approach, numerous factors influence decisions for sourcing and preference for seeds by small holder farmers in Rajaf. Like most SSA communities are patriarchy societies which influence women`s decision making and access to resource such as land and seeds, Rajaf is not exception. This limits the decision-making capacity and engagement of women in FSS unlike in the IFSS in which women have strong established social networks and low associated costs involved (Marimo et al., 2021; Kramer and Galiè, 2020). There is also gender biases and blindness based on marital status, position of wife in polygamous families, number, sex and age of children and social relations creating gender inequality and subjectivities in these among the women and men. There is intersectional relation that create objectivities to seed sourcing. Seed variety preference is dependent on purpose for cultivation (subsistence or commercial), cultural ceremonies and distinctive taste of each variety. Decision-making, gender and intra household dynamics largely influence seed systems through access, availability, seed quality, power imbalance and decision making. Above all women play a fundamental role as custodian of seeds from the IFSS and are considered more knowledgeable on how the IFSS operates along with their social networks, norms and cultures. There is strong reliance on community cohesion and one`s social network to access seeds

5.2 Contestations and Opportunities in the IFSS

5.2.1 Seed aid, seed souring and seed adulteration

Seed adulteration referring to seed contamination, poor germination, non purity, not true-to-type or non uniformity of the seeds, wrong seed description and packaging was the main challenge expressed by smallholder farmers in both FGDs and some KIIs. This was recorded to be common from seeds received through seed aid. Seed aid in S.S is seeds delivered freely to small holder farmers who are seed insecure following a crisis such as conflicts, floods or prolonged droughts by UN agencies and NGOs.

These seeds are sourced from seed companies who import these seeds mainly from Uganda, Kenya and Sudan. *"80% to 90% of our seeds is imported to supply our biggest market the NGOs and UN who request seeds in bulk during planting season. The domestic supply cannot meet the domestic demand for seeds. To meet this demand, we source from various seed companies from within the region who also source their seeds from out growers and farmers. The seed sourcing chain is long, quite hard and expensive to trace"* (male seed company rep KII 2). The main challenge enabling seed adulteration is however intertwined between seed sourcing, seed demand at peak season, seed handling and regulatory frameworks. Moreover Smits et al., (2024) state that seed aid "has the potential to hinder or distort local seed production and commercialization" because of the importation of seed into S.S. Barriga and Fiala (2020) study on "*The supply chain for seed in Uganda: Where does it go wrong?*" however indicate that seed adulteration is not purposefully conducted by sellers, but rather seed mishandling, poor storage and poor transportation leads to seed adulteration. However small holder farmer pins the poor germination and seed vigour to purposeful seed adulteration by sellers. It is not always the case though.

According to KII 1,2 and 3, the imported seeds are transported through unfavourable conditions with exposure to extreme sun and rain. it takes loaded truck between 7 to 14 days on average to travel from Uganda and Kenya respectively to Juba S.S. *"If you get lucky, you may get good seeds [from seed aid] but if not, you may get poor quality seeds. I personally use my own seeds and if I want to add more, I know where to buy from. There are some authentic seed dealers who are ready to compensate you if the seeds don't germinate"* (middle aged male Participant in FGD1). Another elderly man in the same FGD, acknowledged this concern particularly for cereal seeds and legume seeds likely to be adulterated. Maguet (2014,p.66) also confirms to this where by "Some of the farmers expressed concern that formal varieties they get from NGOs and agencies[seed aid] sometimes fail them (not yielding to the expectation)" while others expressed concern on the inability of seeds from the FSS to reproduce itself over numerous seasons as the yield drastically reduced though they acknowledged first season yield to be good citing the example of *Wad Ahmed*[16]

It became unclear in some KIIs if seeds sourced from within the region are from the FSS or other seed systems or if it relates to mishandling at transportation or sellers' deliberate adulteration. I attempted to understand more on this through probing and asking a middle-aged man casually on the possibility of grains importation and treatment under the pretence of seed. Observing from the body language of the participant, his sarcastic smiles and shyness, he responded by saying "we don't speak such here" (KII 4). However, some participants in the male FGDs expressed that there is a probability that seed provided through seed aid may be compromised where grains are instead provided as seeds. It is likely possible seeds get adulterated during transportation, however there is also the possibility that grains are imported into the country and later treated, branded then sold as seeds. The other possibility could be that seeds lots could potentially contain more than one type of variety from the same seed system. This is because Sorghum as a crop is not lucrative for seed, as such seed companies and outgrower are less attracted to the production of sorghum

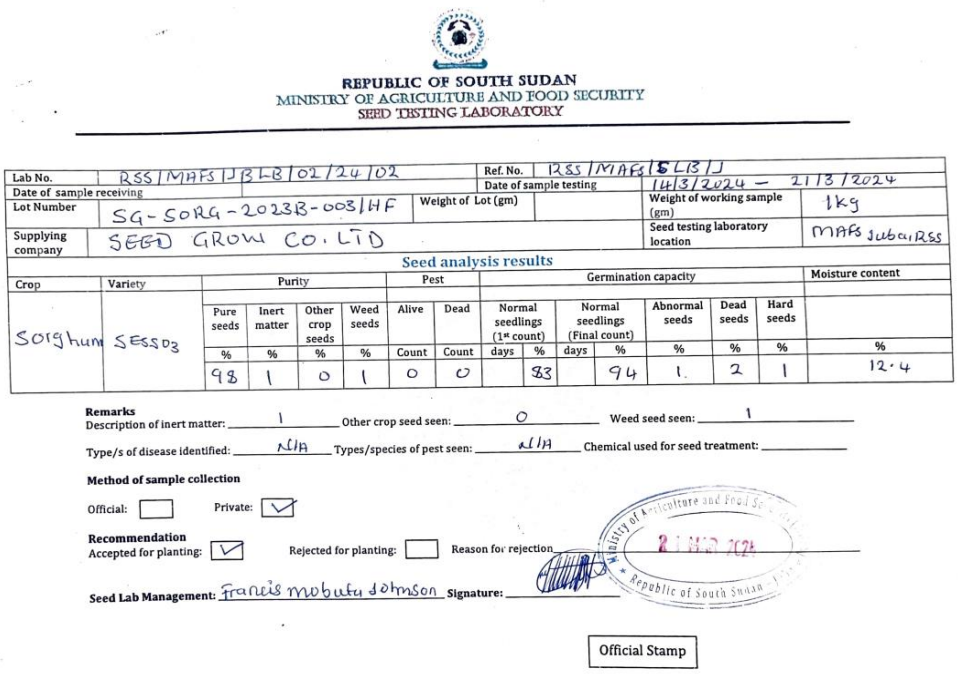
[16] Wah Ahmed is a short-term sorghum variety from the FSS originally from Sudan commonly grown within South Sudan especially in bordering areas with Sudan such as Renk

seeds as opposed to maize due to the risk involved in its production and low price for sorghum seeds as revealed in KII 2 and KII 3. Risks like bird eating, sorghum`s susceptibility to water logging/flooding and pest attach like the fall army worm all make it a risky crop for seed production.

5.2.2 State and regulatory framework

How then does this happen under the watch of the state? Regulatory frameworks by the state for imported seeds into S.S include, seed inspection report, certificate of germination for each seed lot (Figure1) and phytosanitary certificate from country of origin of the seeds. However, there is heavy non-compliance to these regulatory frameworks because; first S.S lacks a fully developed and approved seed policy. Second there is high dependence on seed importation from neighbouring countries and minimal production of improved seeds within the country. Lastly raised by KII 1 and KII2 is some multipurpose companies which are not specialised seed companies, non-members of the STASS and "*brief case companies*" also venture into the seed business and usually quote lower prices for such 'seed'. As such due to the non-technical nature of such supplier, the seed sourcing process is compromised. The week governance and institutions within the developing and fragile state of S.S allow for such loopholes to exist. Besides S.S has recorded high rates of corruption and misuse of office.

Figure 1: sample of seed germination certificate for imported seso 3 sorghum seeds.



REPUBLIC OF SOUTH SUDAN
MINISTRY OF AGRICULTURE AND FOOD SECURITY
SEED TESTING LABORATORY

Lab No.	RSS/MAFS/JBLB/02/24/02	Ref. No.	1285/MAFS/SLB/J
Date of sample receiving		Date of sample testing	14/3/2024 – 21/3/2024
Lot Number	SG-SORG-2023B-003/HF	Weight of Lot (gm)	
Weight of working sample (gm)	1kg		
Supplying company	SEED GROW CO. LTD	Seed testing laboratory location	MAFS Juba, RSS

Seed analysis results

Crop	Variety	Purity				Pest		Germination capacity						Moisture content
		Pure seeds	Inert matter	Other crop seeds	Weed seeds	Alive	Dead	Normal seedlings (1st count)		Normal seedlings (Final count)		Abnormal seeds	Dead seeds	Hard seeds	
		%	%	%	%	Count	Count	days	%	days	%	%	%	%	%
Sorghum	SESSO3	98	1	0	1	0	0		83		94	1	2	1	12.4

Remarks
Description of inert matter: 1 Other crop seed seen: 0 Weed seed seen: 1
Type/s of disease identified: N/A Types/species of pest seen: N/A Chemical used for seed treatment:
Method of sample collection
Official: ☐ Private: ☑
Recommendation
Accepted for planting: ☑ Rejected for planting: ☐ Reason for rejection
Seed Lab Management: Francis Mobutu Johnson Signature:
Official Stamp

Source: Seed company

5.2.3 Seed fairs an avenue for seed sovereignty

Seed fairs registered success where farmers buy and sell local seeds to each other, exchange seeds and indigenous knowledge among themselves in an 'organised market space' Local seeds were always available to fellow farmers in required quantities as discussed by KII 7. *"FAO and its implementing partner held seed fairs for local seeds in the last 2 months [June and July] to supply seeds for the main season in some parts of the country such as Magwi and Wau. It is through such initiative that we promote local seeds and its circulation within the community" (KII 7).* Farmers are willing to bring their local seed for seed fairs to promote local seeds, indigenous knowledge, cultural practice and social networking

among farmer which aligns with what hold the moral economy and principle of food sovereignty. This happened in rajaf the previous season as confirmed in both FGDs. Here source is known and trusted by the small holder farmer important in the ME and among mall holder farmer faced with the fear of adulteration and striving in their everyday practice to ensure a localised food system for addressing food insecurity. Besides in seed fairs various local seed types and varieties and farmer have a choice to make on varies seed type and varieties.

The seed company representative KII 2 said. *"We once got an order…to supply 15MT of Nyithin and 30 MT of akurachot. Upon commencing the sourcing, the prices more than tripled because of the scarcity and the inability of farmers to supply such seeds in bulk. We had to cancel… Seed supply in the IFSS is restricted and controlled by farmer. They are sometimes used for food during severe times of the year. As a company we work on orders, we cannot stock local seeds"*. Large supply and sourcing of seeds form the IFSS is challenging in S.S as they are priced higher due to scarcity according to KII 1,2 and 3.

Hoarding of seeds by farmers was a way of resistance to keep farmers local seeds from 'outsiders' such as seed companies as was revealed during both FGDs, but at the sourcing the same variety of local seed is challenging due to the different preference among farmers. This could be to preserve their seed and food sovereignty. Bocci (2009) argues that the IFSS lacks the capacity to provide required quantities of seeds for large scale industrialised monoculture farming.

Kloppenburg (2010, p.380) suggest that "If large numbers of farmers chose to refuse to supply seeds to any representative of any organization except with an accompanying GPLPG-MTA, a protected commons could be rapidly and virally enlarged" (Kloppenburg, 2010, p.380). As proposed by Kloppenburg, once a protected common is established then one way of promoting seed sovereignty. These farmer use "weapon of the weak" like price hiking for local seeds to outsiders and hoarding. Moreover, in all this "speed and effectiveness is largely dependent on the quality of the variety to be diffused; kinship relationships; the existence of a culture of local agricultural experimentation; and the economic stability of the farming enterprise" (Wattnew 2016, p.852). Therefore, it is possible that farmers have enough seeds to share and sell among themselves but not to non farmers in this context. This is also a form of resistance as seed companies are a threat to their moral economy and seed sovereignty

5.3 Opportunities of the IFSS

The IFSS present an opportunity for seed sovereignty a principle of food sovereignty. Local sorghum varieties have attributes such as "*taste, brewing capacity, traceability, ability to tolerate and withstands specific agro ecological conditions, use over seasons and familiarity with local varieties" (FGD1 and FGD2)* which makes the IFSS a preferred choice. *"Our local seeds are good and pure. We can use many times. All we need to do is to keep the best and most filled head when harvesting, dry and keep it in ash or dry neem leaves. We don't paint them with medicine which can kill us [participant meant seed dressing with Thirum and Actellic commonly used for seed dressing in S.S]. When hunger strikes hard, we can use our seeds for food*" (Elderly female participants in FGD 2). Along with other attribute like good yield, tolerant to droughts and floods, good eating quality, high market demand, good storage ability, nutritional benefits and little damage by birds and pests caused on cereals such as maize and sorghum (Ngalamu et al., 2021).

Seeds from the IFSS can "freely (re) produced and are exchanged by farmers" due to its ability to germinate and produce seeds from itself "its capacity to reproduce itself" (Peschard and Randeriac, 2020, p. 615). IFSS play a critical role in agricultural production, agrarian transformation and food systems by enabling food security and food sovereignty through various interconnectedness. Firstly, offering a platform for dietary diversification (Gill et al., 2013) especially 'orphan crops' (Mayes et al., 2012). Secondly IFSS seeds are a source of crop and variety biodiversity conservation (Badstue et al., 2006). Thirdly the IFSS "broaden the genetic base of production with multiple crop species and varieties adapted to specific production systems and microclimates" which can be used for breeding program in the FSS (Gill et al., 2013, p.141; Almekinders, 2000). This is by saving best preforming varieties that are suitable and adapted to

various agro -ecological zones therefore used as a risk mitigation measure among small holder farmers (Jackson et al., 2007; Thrupp, 2000) hence building resilience of local communities and small holder farmers (Gill et al., 2013). Lastly, it offers opportunity for "preserving culture, food security, farmers right and autonomy" (Wattnem, 2016, p.852).

The IFSS is complementally to the FSS and intermediate seed system. A middle-aged male participant in FGD1 who spoke fluent English shared his experience of engaging with FSS and IFSS; "*I buy Wad Ahmed and other vegetable seeds but not local sorghum varieties. Lodoka helps during the dry season and is not so palatable to birds because of its sour taste. It is the best for alcohol*". He concluded this statement while laughing and his fellow men in the group clapped their hands while stomping their feet typical of south Sudanese men to mean you hit the nail on the head. IFSS has been acknowledged as a potential complementarity to the FSS in SSA due to low adoption rates of the improved seed varieties and adaptation of seeds from the IFSS to climate change there by enhancing farmers capacity to have required seed varieties of best choice as defined by farmers themselves of required quality enabling seed system sustainability (Louwaars and Manicad, 2022).

However, such complementarity must be received with caution they can be a threat to seed and food sovereignty as is the case of seed aid. As presented by Kloppenburg (2014) as much as farmer are faced with threats of seed sovereignty erosion, same are plant breeder as their work is influenced to meet the interest of the gene giants to favour more control over seed and germplasm. Therefore, a much as complementarity I potentially an opportunity, caution should be taken. Potentially for complementarity is the desire and willingness of farmers to pay for seeds from any seed system based on, trust, ability of seeds to reproduce over seasons, "experiment good", nature of seed variety (Louwaars and Manicad, 2022, p.143; Puskur et al., 2021).

There are exiting contestation and opportunities for the IFSS with contradicting views presented by research participants. Some threatening seed and food sovereignty such as in-kind seed aid while others contributing to food security and food sovereignty such as seed fairs

5.4 Contextualised food security and food sovereignty

"A person or household could be food secure, but lack food sovereignty" (Bezner Kerr, 2013, p.869). This statement triggers one to think that a household or person could be both food secure and food sovereign or be both food insecure and food unsovereign.

At household and individual level, availability and ability of household to save local seeds from previous season was used as an indicator of food security and food sovereignty by the elderly women in FGD 2. "*When I have extra seeds saved from previous season, I can share and exchange with my friends and neighbours*" (elderly woman in FGD 2). This is because, under subsistence ethic, the primary objective is to address immediate food needs hence an individual or household that can reproduce themselves I considered food secure and food sovereign in this case. Due to the nature of how the IFSS operate, seeds are dualistic in nature as both seeds and grains because it I from the best grain that seeds are reserved at harvest. Therefore, those individual and household unable to save seed from previous season may be considered food insecure in this context. It is however also important to consider that it not may not always be the case, other calamities may come in to disrupt production and yield at large such a pests, diseases and climate change related effect.

In FGD 1, household size was used to define food security where polygamous homes were considered more food secure. This is due to labour availability to farm. However, this was contradicting to how middle-aged women viewed family size as a parameter, they considered small household size and nuclear families to be more food secure because of less consumption of food from the farm and the ability to save farm produce all year round. Homes with more girl children were considered more wealthier and food secure because of potential wealth they could contribute

through dowry[17] by both FGDs. Besides preference was given to locally produced food by women of all age brackets. As opposed to their male counterparts who were more concerned on food availability with less attention to the "where, how and by whom food is produced and distributed" questions that food sovereignty answers. For the male small holder farmers interviewed food aid, subsidized imported food, seed aid all contribute to household food security but also it was important to have locally grown food available to a family. Lastly granary size and presence were used by the small holder farmers as an indicator of a household food security where bigger granary indicated food security and vice versa.

How these small holder farmers define their food security go far beyond food availability, accessibility, affordability, stability and include food sovereignty components and principles where preference is given to locally grown food by themselves(famers) using local seeds with the campaigns being women especially the elderly women in preserving their seeds and indigenous knowledge. Surprisingly middle-aged men debated with the elderly men on the parameter of diverse local grown food as a parameter of food availability. The elderly men disagreed on this food served this parameter because they considered it wastage and poor planning while the middle aged considered this as good dieting and food availability.

At 'community' level, harvest ceremonies in the event of good harvest, sharing of harvested food to vulnerable people unable to cultivate like persons with severe disability and elderly widow and widower who have no children was important. Other participants in both FGDs included low price of domestically produced food and large quantities of such foods in the market as indicators of food security and food sovereignty. The ME is built on such like the reciprocity practice through the redistributive effect celebration ceremonies and social cohesion.

5.4. Example of a private institute , STASS

"*We advocate for local production, local food and local consumption of food grown in S.S. The seed fairs are one way to buy and eat local*" (KII 7). Unlike the STASS representative who said "*STASS advocate and lobby for favourable and fair-trading environment for seed companies. We are faced with many challenges as a young country. it is our role to put things in order. Partly this is what STASS as a non-governmental body is working towards with seed companies, the government and other partners*" (KII 1). These two quotes are compelling and contradicting, while one is advocating for the producer side (farmers) for local production and consumption to promote both food security and food sovereignty, the other is capitalist oriented.

STASS is a 'merger' or partnership of seed companies coming together with a common objective to address challenges seed businesses face in the country but at the same time marginalise other actors and groups in the seed system by addressing their individual needs. For example, STASS proposed and drafted to the MAFS a '*Ministerial position paper*' to temporary oversee seed supply and demand, seed production and farmers compensation in case of seed contamination which seeks the MAFS to issue a Ministerial Order (KII 1,2 and 3). This is awaiting approval.

STASS is also an avenue through which fundings from partners like UN agencies, NGO, donor go for the promotion of new seed varieties, seed multiplication, private public partnerships and other innovations related to seeds. These partnerships include UNFAO for seed production, Resilience through Agriculture in South Sudan (RASS) by DAI for capacity building and IFDC for crop value chain development (KII 1). *"Several sorghum varieties from ICRISAT have been in possession of our partners who have conducted multilocation adaptive trials with support from STASS members and MAFS. These are showing promising results ready for release to the farmers. STASS members will multiply these sorghum varieties as an avenue to reach small holder farmers" (KII 5).*

Figure 2: Sorghum crop Adaptive trial field bagged for seeds from FSS in Rajaf

[17] S.S has one of the highest dowry rates globally. It is believed dowry payment can be a family 'asset' once they are girl children in a family.

Photo Credit: [Jimmy Morris -Plant breeder], [2023]

PPP are contradictory in nature as they provide opportunities for STASS members and at the same time exclude other potential seed companies, seeds dealers, outgrower and small holder farmers. These exclusions are from opportunities in terms of fundings, capacity building, seed production and crop value chain development. Besides these are seed actors who could potentially present a greater potential if such opportunities are presented to them.

Moreover, most of these are interest driven from choice of crop to locations of interest based on conditions attached to such opportunities and backed up by the government, NGO and private sector. Therefore, as much as STASS plays a lobby and advocacy role, its masks a lot of opportunities and actors who could otherwise prosper with in the seed system since their main objects comes to ensuring a favourable condition for seed business. However, on the other hand due to their established relationships with other institutions like the MAFS, INGOs and UN agencies, they equally play a fundamental role in influencing major decision making in the seed sector as key actors in S.S

Furthermore, STASS closely associates and collaborates with regional seeds Association such as USTA and STAK in sharing and exchanging learning opportunities. Which could potentially be linked to the 'seed giants'. STASS is more than just an independent body private body floated by AGRA to lobby and advocate for a conducive environment for trading of seeds but more of a political and power concentrated body. Clapp (2022) on the effect on concentration of MNCs and how these enables power concentration in the hands of the few firms as they struggle to prioritise their interests at the expense of differentiated societies, shape market parameters through influencing prices of some items such as seeds, creating inequality in the food systems through shaping the prices of goods paid to suppliers in this case farmers by paying less for more due to limited opportunities for sale of their produce due to the dominance of these firms on a global scale, Other market parameters such as labour, availability of products to both producer [which can as well include farmers] and consumers, consumer choices are hugely influenced negatively by such concentration of firms. Finally, such firms influence and shape policy and governance.

Odame and Muange (2011) debates these PPP in seed business are mostly supported to strengthen private seed sector who are driven by objective of profit maximization hence focus on opportunities to maximize profits ranging from crop choice restriction and investment

opportunities. This is justifiable for the concentration of STASS members in the greater Equatoria region hence the role STASS plays and how it pushes for its advocacy and lobby role tend towards this role multinational cooperate firms play as discussed above through more interest driven advocacy, power concentration to take decisions, location concentration, influencing market prices for seeds produced locally and more direction towards private sector development which is more oriented towards the FSS.

Chapter 6: Conclusion

The persistent and continuous use of seeds from the IFSS by over 80% of small holder farmers in S.S has remained a puzzle amidst the increasing food insecurity situation in the country. Even amidst various initiatives used by state and non state actors to addressing food insecurity through *seed aid* and certain approaches to promote FSS, the IFSS has persisted over time among small holder farmers in Rajaf. This paper dives into the dynamics of the IFSS and its contribution to food security and food sovereignty among small holder farmers of Rajaf through addressing 3 questions; How is the everyday practice of informal seed preference and sourcing determined by small holder farmers? , What opportunities and contestation exist in the IFSS? and How is household food security defined and contextualised by small holder farmer in Rajaf in relation to the informal seed sector?

The everyday practices of seed preference and sourcing of seeds is heterogenous, multifaceted and fluid in nature. Gender intersects with age, culture, and ethnicity to create subjectivities which influence the seed preference and sourcing process. Marriage gifting, cultural practices and ceremonies like *semaya* are practices which influence preference and sourcing of seeds. Women particularly elderly women are the backbone of the functionality of the IFSS in Rajaf as key custodian, source of indigenous knowledge and lived experience. Other influencing factors are seed accessibility regarding information access among various age groups of men and women, seed quality as defined by various social group and seed availability depending on seasonality. However, through also I present this various subjectivities, marginalisation, and oppression in respect to resource allocation and access, decision making, and gender inequality created based on the above criteria. For example, land and seeds for male and female respectively based on marriage, exclude a number potential farmer from exploring in this system except for those who acquire land through purchase or hire. Therefore, to achieve food sovereignty require addressing gender inequality which are rooted in community structures (Agarwal, 2014Bezner Kerr et al., 2019)

The IFSS present opportunities associated with attributes of tolerance and adoption to specific agro ecological zone and successful seed fairs indicative of the ability of small holder to supply seeds among themselves as farmers. There is also the diffusion of the local seed from one locality to another. For example, *nyithin* from Eastern Equatoria and *akurochot* form Jonglei state. Above all the IFSS presents an opportunity to preserving seed sovereignty which translates to food sovereignty and food security. However, the seed sovereignty is threatened by seed aid, conflict, and the domination of intuitions such as STASS who advocate for the FSS. Amidst this are contestations in of seed adulteration from seed aid mainly imported from neighbouring by seed companies and seed hoarding of local seeds by farmers to seed companies. As such farmers react by resisting such threats through hoarding and price hiking of local seed varieties.

The contextualised understanding of both food security and food sovereignty are interlinked and interrelated among research participants. Their definition and understanding are different at individual and household level, within the community and in various institutions creating various assemblages. Through a moral economy lens harvest ceremonies and harvest sharing are considered indicator of food security and food sovereignty. Finally, STASS a lobby and advocacy body has be critiqued in this paper as a power concentrated body with contradiction of its -lobby

strategy creating exclusion and inclusion creating more inequality, marginalisation to non-members.

The proposal put forward by Kloppenburg (2010) of open source could apply in this context with the use of the GPLPG as a requirement for buying seed from farmers. Along will also is the concern raised by Agarwal (2014) and Bezner Kerr et al., 2019 in addressing gender inequality from the structure within agriculture to realise food sovereignty. The everyday localised food system in in achieving food sovereignty (Turner et al., 2022) would probably be the most appropriate.

For a country faced with food insecurity and conflict, I propose for the use of local sorghum varieties that exhibit good traits from various localities within the country and multiplying them through local initiative. As shared by small holder farmers, local sorghum is used differently for different uses and these local sorghum varieties have diffused over space and time which shows adaptation and use in various localities. This portrays potential for scalability within the various states in the country`s agro ecological zones. By potentially sourcing and banking such promising local varieties. The IFSS in Rajaf and South Sudan at large contribute to food sovereignty and food security through local initiatives and everyday practices of seed sovereignty such as planting and using seeds from common sorghum varieties for cultural practices. I propose for the regulations on seed aid by the state proposed as the largest source of seed contamination and adulteration. Since seed fairs have shown great success, gives a guarantee on the possibility of domestic seed sourcing by farmer themselves for farmers. As proposed by Kloppenburg (1998, p.361) that "sovereign state has the right to close boarders to both export and import of germplasm". This will further promote seed and food sovereignty. For bodies such as STASS, which are connected to other regional bodies, revising their strategy to prioritise local seed production and learning from how other countries work with local everyday practices to promote food sovereignty would address the food insecurity situation.

Finally, this research has opened gaps to numerous opportunities to further investigate seed systems in S.S. The seed systems in S.S has largely been under explored in term of research in area of seed adulteration, seeds and climate change, seeds and PPP, seeds and land struggles among other gaps. Therefore, future researchers interested in the seed politics of S.S can have a starting point by researching on 'what influences small holder farmers to pay for some seed varieties from the various seed systems in the S.S'

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Appendices

Appendix 1: Introduction and consent form

Research Paper Title: Dynamics of informal seed system to food security and food sovereignty in Rajaf Payam Juba County South Sudan

Introduction

Dear [Participant Name], thank you for taking time to read through this consent form. I am Foni Sarah Juma Joseph, a South Sudanese Student studying at the International Institute of Social Sciences of the Erasmus university Rotterdam in the Netherlands. I am inviting you to partake in a study contributing towards my research paper to fulfil a master's degree in development studies with a major in Agrarian Food and Environmental study. I kindly invite and seek you participation and contribution towards the study subject on the *Dynamics of the informal seed system (IFSS) and its contribution to food security and food sovereignty in Rajaf Payam of Juba County South Sudan*. The findings and contribution for this research will solely be used for academic purpose and consent will be sought from participants in the case of further use for any other purpose other than the outlined purpose. This research is made possible with the Orange Knowledge Program (OKP) scholarships from the Ministry of Foreign Affairs of the Netherlands and this financial support has no influence on the outcomes of this study. While reading, you may mark parts of the text that are unclear to you.

What is the research about?

This research seeks to investigates and seek an in depth understanding and contribution of seeds commonly use by small holder farmers in Rajaf Payam through seed exchange and seed sharing (what I call in the study the informal seed system) to household food security and food sovereignty. In order to achieve the above objective, I will be interested in getting an understanding on how seed companies operate in this seed system, the role the state and institutions plays in promoting the different seed system, how smallholder farmers respond and find their way about with issues related to seeds and what enables their decision on choices, seed quality, seed access, seed availability, use and control and interconnected of institutions involved in the seed system in S.S.

What can you expect?

This interview will last between 1 hour to 1 hour and 30 minutes at maximum with an allowance to withdraw from the interview in case of any discomforts as well as options to not respond to questions you feel uncomfortable talking about.

Interview KII This research engages in interviews with experts and knowledgeable research participants in the seeds systems, food security and food sovereignty as either decision makers, influencers and end users of seeds. Participants will be expected to respond to the best of their knowledge when asked a question as well as seek clarity in the case the questions are not clear

Focus Group. This will involve a discussion with 10 other relatively homogeneous research participants.Each of the focus group will be organised involving small holder farmers who are sorghum producers within the study locality of Rajaf Payam. It will be expected that we respect each other's views and contribution in the discussion, and everyone should feel comfortable to express themselves either in agreement or disagreement in a respectable manner. .

Benefits of participation: While your participation is highly appreciated, there will not be any financial compensation for your contribution however sharing your experience will shed more light on the current seed system situation in South Sudan.

Data protection and storage

I will store all your data and information collected securely and Only I will have access to your data. All recordings will be transcribed, and your name will be replaced with a number/made-up name.. For organisations that will participate in the study, consent will be sought from the

representatives for inclusion of the organisational name to be included in the report and this is so because although we do not include your name in publications or communicate it to other participants or third parties, there is a risk that you could still be indirectly identified. Regarding the Focus Group, because you are participating in a group discussion, you should realize that the other participants will also hear your opinion in this study hence we ask all participants not to talk to people outside the group about what was said in the group and matters discussed should remain confidential. Your data will be retained for 10 years after completion of the research.

Study information dissemination.

When the results and findings from the study are established, you may indicate if you would like to receive the results of the study, *alternatively* We publish the results/findings on the ISS website so that interested parties can learn about the study.

If you have any questions about the study or your privacy rights, such as accessing, changing, deleting, or updating your data, please contact me.

Name: Foni Sarah Juma Joseph

Phone number: +211925234493/+31630287022

Email: fonisarah@gmail.com

Do you have a complaint or concerns about your privacy? Please email the Data Protection Officer (fg@eur.nl) or visit www.autoriteitpersoonsgegevens.nl. (T: 088 - 1805250)

Do you regret your participation?

Please indicate this by contacting me. I will then delete your data. Sometimes we need to keep some of your data so that, for example, the integrity of the study can be checked. However, when anonymized deleting your data is no longer possible making it impossible to trace which data came from you which is done within weeks during the data analysis period after the data was collected while for Focus group discussions should you regret your participation during or after the study. Please indicate this or contact me. I will see if I can remove your data. As you will be participating in a group discussion, it may be difficult to delete everything you have said, as it is closely related to the contribution of the other participants.

Ethics approval

This research has been reviewed and approved by an internal review committee of Erasmus University Rotterdam and the academic supervisor for this project and falls under low sensitivity with minimal risk of ethical risk foreseen.

Declaration of Consent

I have read the information letter. I understand what the study is about and what data will be collected from me. I was able to ask questions as well. My questions were adequately answered.

By signing this form, I:

1. consent to participate in this research.
2. consent to the use of my personal data
3. confirm that I am at least 18 years old.
4. confirm that I understand that participating in this research is completely voluntary and that I can stop at any time.
5. confirm that I understand that my data will be anonymised for publication, educational purposes, and further research.

Check the boxes below if you consent to this (only tick what is applicable)

Audio recording

I consent to [the interview] being audio recorded. ☐

Visual recording
I consent to [the interview] being filmed. ☐

Sharing of data outside the EEA

I consent to the sharing of my data with [name of organization] in [country]. ☐

Optional (ask now or after the research)

I give permission for my answers to be used in papers, such as an article in a journal or book. My name will not be included. ☐

Use for educational purposes and further research
I hereby consent to having information shared in this study stored and used for educational purposes and for future research, also in other areas of research than this research. ☐

Name of participant:

Participant's signature: **Date:**

Appendix 2: Interview Guide

TOOL 1: Key Informant (KII) guide.

Topic 1: Seed systems in South Sudan

1. How is the seed system in South Sudan organised? (*probe to understand why each seed system is used by which group of farmers and potential estimated supply made under each seed system and to which category of clients/farmer for sorghum and other associated sorghum*)
2. Which is the dominant seed system used by small holder farmers in Rajaf Payam for sourcing seeds? Why? How about large-scale producers? (*probe more specific to sorghum*)
3. what structures and institutions are in place facilitating each seed system? (*special interest and probes for the Informal seed system IFSS and on sorghum with structures & intuitions that support or contest each seed system)*
4. What seed governance strategy are in place to ensure seed quality and standards are met? (*in regards to controls at production and supply*, *probe to get an insight into their sources of seeds for supply to the market and how that operates*)
5. What roles does the Seed trades Association of South Sudan (STASS) Play in each seed system? (*Probe to also get information on its mandate, composition, sustainability, funding, subscription, regional integration into other seed Association within East Africa & Africa*)
6. What is the role and mandate of STASS/seed company in the South Sudan seed system?
7. How does STASS/seed companies influence the supply and demand of seeds in South Sudan? (*Interest in seed politics, tensions, policies, business environment, Seed quality standards, coordination with government and INGO/UN AGENCY)*
8. How is the seed sourcing process done by seed companies, INGOs and UN agencies? Where do they source their seeds from and What opportunities and challenges present

themselves in each source? (*probe to understand the channels existent in the seeds system, seed market, integration into the regional markets*)

9. What roles does STASS /seed companies play in promoting the IFSS? (*Interest sorghum*)
10. How does seed aid influence the different seed systems? (special focus on IFSS)

Topic 2: Seed Quality Assurance (role of State, Institution and STASS)

1. what are the 'laws, standard, procedure, certification' put in place by the state for operation seed companies and ensuring seed quality? (*probe to include trading especially importing seeds from neighbouring countries and focus Quality control on the IFSS*)
2. How are quality seed made easily accessible to farmers? What channels exist? (*By either STASS, seed companies, farmers,INGOs and UN Agency etc*)
3. What is the overall standing of the informal seed system? (*opinion from technical view and country wide state of the IFSS from the key informants*)
4. What efforts /campaigns are in place to support each of the seed systems? What efforts are in place in promoting local and native seeds (IFSS)? (*probe with an emphasis on sorghum & IFSS and how small holder farmers are campaigning for this and who is possible listening to them and in what way)*
5. what are challenges and opportunities in the IFSS? (*from the angle of state, farmers, and seed companies, UN agency, INGO among others)*

Topic 3: Food security and food sovereignty.

1. How is the IFSS protected in Rajaf payam? (*probe to get initiative in place to protect native seeds by farmers, seed companies, state etc and role of indigenous Knowledge*)
2. Why is the IFSS persistent over the years? What challenges do small holder farmers involved in obtaining seeds from the IFSS face?
3. How does seed saving and seed saving enable or promote food security especially in times of crisis such as climate change, conflict etc?
4. What contribution does social network play in seed security to promote food security and food sovereignty?
5. How does the IFSS compliment other seed systems to promote food security and sovereignty?

TOOL 2: FOCUS GROUP DISCUSSION GUIDE (small holder farmers)

Topic 1: Seed quality, access, availability, and seed control

1. Through what access channel do you access your seeds? (*Interest in the IFSS and sorghum seeds)*
2. How much on average do you spend on seed? If not, how do you acquire the seeds?
3. What factors influence you to pay for some seed varieties and not for others?
4. How do you ensure seeds obtained are of good quality from the various sources mentioned? (*probe to understand what is small holder farmers quality standard for seeds in particular sorghum and other cereals and how this is contextualised or universalised*)
5. How easily accessible and available are seeds during peak planting season? Are the seeds available of required quantity, quality, and variety? If not, how do you go about with the extra requirement and cover the excess requirement?
6. How do you get information on new and improved seed varieties?
7. What role does your social network and indigenous knowledge play in seed accessibility, seed quality, availability and seed control?

Topic 2: Intrahousehold and Power dynamics regarding seed varieties, seed system and choices

1. Who is/are the main seed custodian in your household and community? (*Interest in sorghum and make comparison with other seed types,relate this as well with crop type in relation to gender,age and others)*
2. How are seed variety, planting time, produced food usage and others within you community and at household level? (*Probe with differences between informal seed system (IFSS), intermediate seed system and Formal seed system (FSS) with an interest in sorghum and other cereals)*
3. What factors influences those decision? *(probe to understand gender roles, division of labour and economic importance of crop and variety, preference in seed choices and variety between men, women, youth and intrahousehold dynamic such as social norms and values, division of labour, access and control over resources and decision making*)
4. What roles do local intuitions and community network play in mediating intrahousehold dynamics related to seed choices and seed system preference?

Topic 3: Food security (accessibility, availability, stability, and affordability) & food sovereignty

1. How do you define/determine a food secure home in you community? How does this relate with seed security?
2. How does seed saving, seed sharing, and seed exchange translate to food security?
3. Why do you prefer seed sharing and seed saving within you community and among small holder farmers? Opportunities of the IFSS
4. What challenges do you face with seed sharing and seed saving? (*Constatations)*
5. Why do you prefer a given sorghum seed variety over another? Probe in engaging the commonly planted sorghum local variety within the community.
6. What other factors influence food security and food sovereignty in you community?
7. What services does the state, and the seed companies render to the community and how is your interaction with them as small holder farmers? (*role of intuitions and services)*

Appendix 3: Summary of themes of interest in the questionnaire guide

Themes of interest and rationale for selection	Actors
• Seed systems; Coordination, Market dynamics, Advocacy for different seed system • Seed quality assurance; Seed sourcing, seed security, Opportunities and contestations, Advocacy for different seed system, Funding, and financial support to the various seed system development • Food security and food sovereignty: Seed system programs, using seeds as an approach to addressing food insecurity, Role of the state and government at large and policies	• Rep STASS • Seed companies • INGO/UN agency • County Agriculture Director CAD • Community extension service provider
• Seed quality, access, availability, use and seed control. • Intrahousehold and power dynamics: social norms and values, division of labour, access and control of resources and decision making. • Food security (accessibility, availability, stability, and affordability) & food sovereignty	Focus Group Discussions (FGD) for Female and Male groups