Community Seed Banks and Seed Producer Groups in Fragile States: Operationalizing the Three Pillars of the Humanitarian-Development-Peace Nexus

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Cover Photo

Women members of the Beer Community Seed Bank in Togdheer, Somaliland.

Credit: Mustafe Abdillahi Abdi/Agriculture Development Organization (ADO), Somaliland

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1. Abstract

Background: Fragile and conflict-affected African states face persistent challenges in ensuring farmer access to quality seed, with over 90% of smallholder seed originating from farmer-managed systems. Traditional humanitarian responses often undermine local seed networks through poorly designed aid that creates dependency and market distortions. This paper explores the roles community seed banks (CSBs) and seed producer groups (SPGs) can play in addressing these challenges, presents operational results, and offers policy recommendations for seed aid in fragile states.

Methods: The study applies the Humanitarian-Development-Peace (HDP) nexus framework to seed systems in fragile African states, drawing on case studies from South Sudan's "Women United" CSB and Somaliland's "Beer" seed network, systematic literature review, and field evidence from ISSD Africa's Action Learning Projects.

Findings: CSBs and SPGs simultaneously deliver humanitarian relief (emergency seed access), support livelihood development (sustainable seed enterprises), and contribute to peace (inclusive resource governance and inter-community cooperation). Women United evolved from a humanitarian stopgap to a registered cooperative selling Quality Declared Seed (QDS) and improving livelihoods among conflict- and flood-displaced persons. The Beer network demonstrates how inclusive governance (rotating clan leadership) prevents conflict while maintaining 75+ crop varieties. Key enablers include supportive policies recognizing farmer-managed systems, QDS standards, gender inclusion, market integration, and conflict-sensitive programming.

Conclusions: Supporting farmer-managed seed systems yields multiple benefits across the HDP nexus. Interventions should strengthen—not replace—farmer-managed practices through local procurement, adapted quality assurance, and inclusive governance. Policy recommendations include formally recognizing community seed organizations, requiring Seed System Security Assessments before aid, expanding QDS, and leveraging seed initiatives for peacebuilding. Multi-year, flexible funding aligned with nexus principles is essential for transitioning from aid dependency to resilient, market-integrated seed systems.

Keywords: agricultural resilience, community seed banks, conflict sensitivity, food security, fragile state, humanitarian-development-peace nexus, seed system

2. Introduction

Conflict and protracted crises across Africa—from South Sudan's civil strife to recurrent Horn of Africa droughts—underscore the foundational role of seed systems in food security and resilience. Smallholder farmers in fragile contexts obtain the majority of planting material through farmer-managed and informal channels: studies covering thousands of households reveal that over 90% of seed in sub-Saharan Africa comes from farmer-managed seed systems (FMSS), with local markets accounting for roughly half of all transactions and at least 55% of seed acquired with cash (McGuire & Sperling, 2016). Proportions vary by crop, country, and stress context—lower for hybrid maize and some vegetables, higher for self-pollinated staples.

FMSS encompass the traditional practices and networks by which farmers produce, save, exchange, and sell seed—from on-farm saved seed and neighbourly exchanges to local grain markets where "potential seed" (grain that can be used for planting) is bought and sold. Far from subsistence-based, many FMSS have a strong, dynamic market dimension. Even under stress, farmers turn to local channels first: after Haiti's 2010 earthquake, nearly 70–80% of seeds sown came from local markets, the highest recorded rate, illustrating how informal markets can rapidly supply disaster-affected communities [1].

In many African communities, women are the primary custodians of seeds for certain crops (legumes, minor grains, vegetables) and possess deep varietal knowledge yet often lack access to training or formal seed business ownership. Ensuring women lead and benefit from seed interventions is both an equity goal and an impact multiplier, since women's income strongly translates to family nutrition and education gains. Through women in leadership positions of FMSS, communities can obtain broader gains in social cohesion and household resilience. Gender-informed entry points include shared decision-making in SPG governance, targeted support for women-led seed enterprises, and addressing barriers such as land access and mobility.

Yet FMSS strengths—their reach into remote areas, crop and varietal diversity, and local adaptability—are severely tested by conflict and fragility. Farmers may lose seed stocks to destruction, looting, or drought; markets may be disrupted; and social networks strained. Formal seed systems (e.g. certified seed companies and government distribution) often collapse or fail to reach insecure areas, leaving millions dependent on emergency seed aid. Poorly designed seed aid can inadvertently cause harm: seeds delivered too late, of unsuitable varieties, or repeatedly to the same communities without regard to local supply waste farmers' resources and undercut local seed businesses.

The Humanitarian-Development-Peace (HDP) nexus framework, endorsed at the 2016 World Humanitarian Summit and formally adopted by OECD-DAC in 2019, urges aid actors to work coherently across three pillars—addressing urgent needs, building resilience, and tackling conflict drivers—rather than in silos. This working paper applies the HDP nexus lens to seed systems in fragile and conflict-affected African states. It argues that community-based seed initiatives—such as community seed banks (CSBs) and seed production groups (SPGs)—have the potential to deliver humanitarian relief (by providing farmers with seed in emergencies), support development (by evolving into seed enterprises that improve livelihoods), and contribute to peace (by strengthening inter-community ties and equitable resource governance).

3. Methodology

This study used a mixed-methods research and consultative process in 2024–2025 under the ISSD Africa programme, comprising four components.

1. Literature Review: A systematic review was done of over fifty academic articles, policy reports, and technical guides post-2010, sourced via database searches and ISSD Africa's repository. Key topics included emergency seed security interventions, seed market functioning in crises, community seed banks and seed fairs, gender dimensions of seed access, post-conflict agricultural recovery, and the HDP nexus in agriculture. Attention was given to African protracted-crisis contexts (South Sudan, Somalia/Somaliland, DRC, Mali, northern Nigeria) to ground the analysis in relevant socio-political environments.

2. Case Studies and Primary Field Evidence: Two flagship case studies served as ground-truth exemplars: (a) the *Women United (WU) Community Seed Bank* in Bor South County, South Sudan, and (b) the *Beer Seed Bank and Farmer-Managed Seed Network* in Togdheer region, Somaliland. Community seed banks are farmer-managed organizations dedicated to conserving local genetic diversity and maintaining seed access for members. Seed-producer groups are cooperatives or associations of farmers who multiply and market seed, often beginning as a project intervention to produce Quality Declared Seed. In practice, the distinction is fluid—in Ethiopia, Uganda, South Sudan, and Somaliland, CSBs often originated as SPGs then expanded into conservation and community seed security. We use CSB/SPG interchangeably to denote community-level seed organizations functioning along a spectrum from local seed-saving to formal seed marketing, sometimes including crop improvement practices.

Cases were selected through ISSD Africa's Action Learning Project 1 (Resilient and Diverse Seed Systems) to represent different crisis contexts—South Sudan as a country emerging from civil war with ongoing instability, and Somaliland as a de facto state with chronic drought and post-conflict recovery needs. Data was collected by local researchers (Dr. John Garang University in Bor for WU; Sanaag University for Somaliland) through interviews with seed bank members and community leaders, focus group discussions, and project document review. Primary evidence—yields, membership, seed distribution records, qualitative testimonies—was documented. For instance, WU's records of seed stocks and sales (including 1.8 metric tons of sorghum seed on hand pre-2020 flood and thirty bags sold to NGOs thereafter), and Beer's data on variety diversity and emergency seed loans (bean seed loans totalling 264 kg during the 2021 drought) were gathered. These details enabled comparative analysis of how each initiative addressed humanitarian needs, pursued development objectives, and contributed to social cohesion. Findings were validated through feedback from the community groups and ISSD Africa experts.

3. Analytical Framework (HDP Nexus Lens): Evidence was mapped onto the three HDP pillars using an analytical matrix with guiding questions and indicators. For example: *Humanitarian*—How quickly and effectively do interventions restore seed security after a shock? Do they avoid negative impacts (e.g. not crowding out local seed supply)? *Development*—Do interventions strengthen long-term seed availability, varietal diversity, and market integration? Are they building capacity and economic viability for local seed actors? *Peace*—Do interventions incorporate conflict sensitivity and help build trust or reduce tensions? Each piece of evidence was categorized accordingly. We cross-checked against the Seed Emergency Response Tool (SERT) and its 10 Principles of Good Seed Aid as a normative benchmark. For instance, if a case reported that an NGO repeated direct seed distributions for multiple seasons in the same area, we flagged this as contradicting Principle 2 ("Match response to the problem; beware repeated identical responses"). The Context Analysis Tool (CAT) was used conceptually to ensure conflict drivers and impacts were considered. The analysis also drew on ISSD Africa's internal assessments, including the *Seed Systems in Conflict-Affected Areas* report and the *SSD4SS policy evaluation*.

4. Stakeholder Consultation: Preliminary findings were discussed in two virtual workshops (late 2024) with stakeholders from African seed programmes, government seed units, NGOs (Mercy Corps, FAO), and community representatives. Their input refined the practical relevance of recommendations. For example, a seed coordinator in Somalia highlighted the importance of engaging local traders in any voucher-based seed aid—a point incorporated in the humanitarian section. A gender specialist from Uganda's seed sector contributed perspectives on women's constraints in accessing certified seed, informing the gender analysis.

Limitations affecting this study included restricted field travel to some conflict zones and the lack of detailed case studies.

4. Pillar 1: Humanitarian Interventions — Relief and Recovery

4.1 Challenges in Humanitarian Seed Response

In emergencies—whether caused by conflict, displacement, or natural disaster—farming communities often face acute seed security crises manifesting as lack of seed availability (farmers have lost their stocks or local supply is insufficient), lack of access (seed is available but farmers cannot obtain it due to cost or insecurity), or seed quality issues (diseased or poorly adapted material). Traditionally, humanitarian agencies distributed standard crop varieties, often imported or sourced from outside the region, assuming farmers "have no seed." Extensive evidence shows this approach can be ineffective or harmful. A fundamental lesson: genuine seed shortages may not exist, or may be highly localized, and blanket distributions risk crowding out local sellers, undermining farmers' seed-saving strategies, and creating dependency. In poorly managed programmes, farmers receive seed aid yet still plant their own preferred varieties; the distributed seed—especially maize, sorghum, groundnut, and sesame—is eaten or dumped.

Local procurement carries its own caveats. Buying large volumes from surplus zones can deplete those markets, attract low-quality seed, or distort intra-regional trade if not sequenced carefully. Mitigation measures include: (i) pre-season market assessments and vendor mapping; (ii) staggered purchases capped as a share of typical seasonal volumes; (iii) procurement from multiple micro-markets rather than a single hub, with post-purchase monitoring of prices and availability. Emergency movement of seed can also accelerate varietal erosion or spread seed-borne pathogens. Programmes should: (a) retain local adaptation by prioritizing farmer-preferred varieties; (b) implement minimum lot testing and field-origin documentation; and (c) adopt quarantine or treatment protocols where risk is non-trivial, in line with SEADS guidance and SERT principles (SEADS, 2022[37]; SERT, 2022–24 [38]).

Timing is critical. Agriculture is calendar-dependent; seeds arriving after planting rains waste the opportunity, increasing food shortage rather than ensuring food security. In most of South Sudan, farmers have one rainy season; even a few weeks' delay can force them to skip planting or plant whatever is available. Late delivery was a common flaw in older seed interventions and a cause of disappointing food security impacts.

Variety suitability matters equally. Too often, relief seed consisted of whatever surplus could be procured—sometimes from large companies or other countries—without regard to local agro-ecologies or farmer preferences. Seeds that arrive too late or are poorly adapted waste farmers' land and labour, bringing poor harvests. In conflict zones, the wrong variety—for example, a long-season maize type in a region with a shortened rainy season—can be nearly as detrimental as no seed at all. Influxes of outside varieties also risk eroding genetic diversity if local varieties are lost in the process.

The SERT, developed through ISSD Africa with Mercy Corps and seed system experts, distils these lessons into 10 Guiding Principles emphasizing interventions that support rather than replace local seed systems. These principles align with the humanitarian localization agenda, which calls for empowering local actors and markets. Applying them increases the chances that emergency seed interventions avert short-term crises while setting the foundation for recovery.

4.2 Local Seed Systems as First Responders

An emerging insight is that local seed systems are often the first and fastest responders after a shock. Even in acute crises, farmers frequently obtain seeds through their traditional networks and markets before external aid arrives. After severe flooding in Bor, South Sudan (2020), 78% of affected farmers obtained replanting seed from local informal markets and neighbours, whereas only a minority waited for or received formal aid (ISSD Africa field monitoring). In drought-affected northern Kenya and Uganda, traders moved grain seed from surplus to deficit areas spontaneously within weeks [2][3]. Humanitarian programmes must recognize and build on these local responses rather than displacing them.

One practical approach is to provide aid in ways that reinforce informal channels. Seed fairs with vouchers are a prime example: local seed sellers (including farmer groups) come to a central marketplace on a given day, and farmers use vouchers to "purchase" seeds of their choice. This model injects cash into the local seed economy, validates local providers, and typically offers greater crop diversity than pre-packaged kits. In the Central African Republic and Zimbabwe, seed fairs successfully delivered seed to millions of farmers while supporting hundreds of small enterprises and trader-suppliers.

Another strategy is local procurement for aid: instead of importing seed, relief agencies buy from surplus-producing smallholders or CSBs in nearby unaffected regions. NGOs in Somaliland procured sorghum and cowpea seed from community seed producers in relatively stable areas for distribution to drought-hit pastoral communities, cutting delivery time and cost while ensuring varietal familiarity. However, local procurement must be carried out carefully to avoid depleting stocks in source communities or driving up prices excessively. Proper assessments (Principle 1 of the SERT) help determine whether surplus is genuinely available.

The CSB model can function as a humanitarian seed reserve. Women United (WU), established by displaced women in 2019, had by early 2020 built up stocks of sorghum seeds through collective multiplication. When catastrophic floods hit mid-2020, many individual farmers lost their saved seeds—but the seed bank's stocks in elevated storage survived. WU sold 30 bags of sorghum seed (~0.6 tonnes) to Norwegian People's Aid and ZOA for emergency distributions, and further loaned and redistributed seed to community members for the next planting [4][5]. By the following season, farmers who received WU seed produced their own harvest and returned seeds, replenishing communal stocks. This virtuous cycle reduced dependency on continuous external aid. In essence, CSBs and farmer groups can function as localized seed relief agencies—often more efficiently than distant operations—if they are supported and connected to the humanitarian system.

Participatory varietal selection (PVS) and local seed diversity also serve humanitarian contexts. Frequently after a shock, there is an impulse to distribute only a few "approved" staple crops, but farming communities may need fast-yielding vegetables, stress-tolerant grains, and fodder crops. Tapping into diversity maintained by local seed systems helps meet this need. During a 2021 drought in Somaliland, the Beer seed group organized an informal PVS comparing which sorghum landraces survived the dry spell best, identified one local variety that significantly outperformed others, and prioritized distributing that variety's seed through loans and swaps—a bottom-up approach ensuring farmers received seed proven under their conditions. External agencies can learn from this: rather than assuming "improved = best," they can support farmers in selecting and multiplying resilient local varieties as part of emergency recovery programmes.

A common gap is limited pre- and post-distribution farmer training. Most seed aid practitioners assume recipients know crop-specific best practices. In most interventions, contact training between farmers and seed delivery institutions is minimal. Farmers should receive sufficient training particularly when receiving seed originating from a different region.

4.3 Innovations and Best Practices

Humanitarian seed aid in fragile states has seen several innovations aligning with the above insights. Table 1 provides an overview.

Table 1. *Humanitarian seed innovations.* The humanitarian pillar of the HDP nexus calls for seed aid that is smart, context-specific, and supportive of existing systems. The evidence shows this is both necessary and feasible.

Innovation / Practice	Core Concept & Methodology	Real-World Examples & Evidence	Key Benefits / Outcomes
Seed System Security Assessments (SSSAs)	Diagnosis before action: deploying teams to gather data on seed sources, needs, and market function before designing a response. Moving from "seed dumping" to evidence-based aid.	CRS, CIAT, FAO: used in South Sudan (2014), Nigeria (2017), Ethiopia (2016). Finding: the problem is often access (cash), not availability.	Avoids distorting local markets; shifts to cash/vouchers rather than physical distribution; more cost-effective.
Market-Strengthening Interventions	Supporting local actors: using local traders to distribute aid via "consignment stock" or offering credit guarantees to share risk with suppliers.	Somaliland: traders given consignment stock at controlled prices. Nigeria (Mercy Corps): partial credit guarantees for bulk suppliers in conflict zones.	Keeps rural shops open during crises; reduces aid dependency; farmers prefer familiar local vendors; risk shared between NGO and trader.
Emergency Quality Assurance (QDS)	"Light" certification: trained community inspectors check germination/purity, bypassing slow formal certification.	Uganda (refugee areas): local groups produced QDS maize/beans for settlements. Kenya: adapted QDS for rapid emergency deployment.	Balances speed with safety; ensures seed health without bureaucratic delays; supports local producer incomes.
Pre-positioning & Seed Reserves	Proactive planning: establishing community or regional seed stocks for immediate release upon a shock.	Ethiopia: community-managed silos for drought hotspots. African Union (ARC): exploring regional insurance-triggered seed funds.	Shifts from ad-hoc reaction to preparedness; rapid deployment protects next planting season.
Pre/Post-Distribution Farmer Training	Participatory farmer field schools to reduce misuse of seed and clarify appropriate agronomic practices.	Sudan: Sustainable Agrifood Systems Approach (SASAS, 2022). Agencies: ICRISAT, CIMMYT.	Reduces misuse (eating/selling seed); increases farmer knowledge of variety traits, planting dates, spacing.

5. Pillar 2: Development — Resilience and Livelihoods

5.1 From Relief to Self-Reliance: The Role of Local Seed Businesses

After immediate humanitarian needs are addressed, the focus shifts to restoring and improving seed system functionality in the long term. The development pillar centres on enabling communities not merely to survive one season but to thrive through future seasons—empowering farmer organizations and small enterprises to take charge of seed supply rather than leaving communities perpetually reliant on external aid or distant markets. A core strategy is supporting the transition of CSBs and informal seed groups into viable seed producers or businesses.

Many community-based seed initiatives begin with conservation or emergency seed access but evolve towards commercial or semi-commercial operations—producing seed for sale to NGOs, government programmes, or local markets. In Uganda and Ethiopia, numerous CSBs have registered as cooperatives to market QDS of local crops (beans, groundnuts, sorghum). Women United (WU) started as a humanitarian stopgap (helping members replant after conflict displacement) and, with training, became a certified seed producer group by 2021. They secured official state-level registration, enabling contracts with NGOs and access to an EU-funded development project as suppliers. WU now owns assets (thresher, grinder, water pumps) that serve as collateral for expansion loans—marking a shift away from dependence on external agencies towards a more autonomous model.

Supporting this transition requires interventions at multiple levels:

Capacity Building: Farmers need training in technical seed production (rogueing off-types, maintaining varietal purity, proper drying and storage) and organizational management (record-keeping, marketing, governance).

NPA's 2020 training on seed quality standards was pivotal for WU in enabling the group to produce seed meeting buyers' expectations. The Beer network received mentoring on cooperative governance and basic agronomy from a local university. Such capacity efforts draw on ISSD's principles of integrated seed sector development, emphasizing local innovation and entrepreneurship. Participatory approaches like Farmer Field Schools, as used in Uganda's ISSD programme, complement formal training.

Quality Assurance Mechanisms: As local groups sell beyond their membership, seed quality regulation becomes important. Full government certification is often inaccessible in remote, fragile areas due to limited inspectorate capacity. QDS provides an entry-level standard with simplified field inspections and testing protocols that communities can partly self-manage. Tanzania and Uganda have long used QDS for rice, beans, and millet where formal companies are absent. Under QDS, a seed producer group can market seed as "Quality Declared" if it follows set guidelines and passes a minimum germination test—a government agent inspects a sample of fields rather than every field. In eastern DRC, NGO-supported farmer groups produced QDS bean seed that the government allowed for school feeding programmes [6]. Uganda's QDS regulations "offer a hospitable environment for farmer-led seed enterprise" by letting groups produce and market seed meeting basic standards without heavy bureaucratic burdens. Embracing QDS is a key policy recommendation for fragile states.

Infrastructure and Equipment: Development support must fill critical storage and processing gaps. Traditional storage (mud granaries or polypropylene bags) may suffice for grain but is suboptimal for seed, which can lose viability quickly if moisture and pests are uncontrolled. WU identified lack of modern storage as a major challenge and has plans for a ventilated seed store. WU also received a mechanical thresher from FAO—used to process sorghum seed faster and with less breakage and rented to neighbouring farmers at ~$50/day, generating income. This innovation reduces labour, improves seed cleanliness, and creates a revenue stream covering operating costs—an example of entrepreneurial adaptation. Climate uncertainty requires portfolio strategies: prioritizing stress-tolerant and early maturing options, supporting farmer-managed diversity (seed lots across maturity classes), linking CSBs/SPGs with seasonal forecasts and advisories, and embedding diversity metrics (e.g. Shannon index for varieties handled) and "climate utility" indicators in M&E.

Market Development: A sustainable seed enterprise needs steady demand. Creating or expanding demand in fragile economies is difficult; farmers may be accustomed to saved seed or wary of paying for something formerly received as aid. Development interventions therefore include awareness campaigns, demonstration plots, field days, and local radio promotion. Another approach is linking seed groups with agro-input shops in town centres. In Uganda and South Sudan, ISSD Africa helped community seed groups connect with agro dealers, sometimes offering seed on consignment initially [7][8]. Institutional markets—humanitarian and government procurement—are major buyers. WU sold seed to NGOs; Ethiopian cooperatives won government bids for the national seed reserve. However, procurement rules often favour larger suppliers or certified seed only. Advocacy to open tenders to accredited farmer groups (especially for local crops that big companies neglect) secures vital market outlets. Ethiopia's Seed Coordination Committee, which includes local producers in planning and procurement, exemplifies institutional market linkage [9].

Complementarity with Formal Seed Actors: FMSS and regional companies can co-exist through structured roles—companies supply hybrids and certified classes where scale and QA are critical; CSBs/SPGs supply landraces and QDS for orphan crops and remote markets. Public–private models (foundation-seed access, outgrower contracts, co-branding through agro-dealers) reduces crowd-out risks and expand local reach.

Diversification and Value Addition: To remain profitable, seed enterprises often diversify. The Beer network not only sells seed but also grain when overproduction occurs. They ventured into greenhouse vegetable seedling production—notably tomato seedlings supplied to NGOs running kitchen garden projects—covering ~64% of operating costs as of 2024 (ISSD Africa ALP data). In Kenya, two CSBs started producing nutritious composite flours (mixing millet, sorghum, etc.), boosting demand for their seeds [10]. Such value-added activities strengthen economic sustainability—often the weakness once donor support ends.

Challenges persist. Access to credit is a major barrier—formal banks are hesitant to lend to small farmer groups in conflict-prone areas. WU could not secure bank credit to expand storage or buy a vehicle, lacking collateral and tailored financial products for cooperative seed enterprises. Some programmes address this via revolving funds or matching grants. Scale is another challenge: community seed initiatives are typically small. To achieve system-level impact, they must network together. Producing guidelines and toolkits (like ISSD Africa Technical Notes) from case studies assists scale-out.

5.2 Agrobiodiversity and Climate Resilience

Development-oriented seed interventions in fragile states prioritize crop and varietal diversity as a hedge against future shocks. CSBs inherently conserve and multiply local varieties, including neglected crops that commercial breeders overlook. This diversity provides farmers options—a mix of early and late maturing varieties, drought-tolerant versus high-yield types—to spread risk and protect genetic resources important for climate adaptation.

Linking formal breeders with community seed systems through Participatory Variety Selection (PVS) or Participatory Plant Breeding (PPB) yields development gains. In Ethiopia's Oromia region, a PVS exercise introduced improved haricot bean lines to farmers, who compared them with their landraces [11][12]. Farmers adopted two lines with higher yield and similar taste. The CSB then obtained QDS status for wider distribution while continuing to conserve landraces—one was sent to a national research station for a drought tolerance trait identified through the PVS. This synergy between formal and informal systems accelerates variety diffusion while grounding it in farmer preferences. In fragile states, where government extension is weak, community networks are crucial conduits for such diffusion.

Climate-smart varieties are particularly important. In Northern Uganda (Acholi sub-region), post-war development projects worked with returnee farmer groups to multiply orange-fleshed sweet potato vines (a biofortified, drought-hardy crop) and striga-resistant maize seed [13]. By training groups as decentralized multipliers, thousands of farm families received these varieties within two years—far faster than a centralized system—while groups earned income from sales. Such models reinforce how development and resilience objectives strengthen each other.

A cautionary note: some CSBs risk narrowing to a few cash crops for income, undermining their broader diversity mandate. Under pressure to be financially self-sustaining, some CSBs have prioritized only cash crops and stopped conserving minor crops, creating dependency on external seed for crops farmers still needed. Development support should encourage multi-functionality—balancing commercial production with diversity conservation and community service. Small subsidies or incentives for maintaining a wider range of varieties may be justified.

6. Pillar 3: Peace — Cohesion and Stability

6.1 Conflict Sensitivity in Seed Interventions

In fragile and conflict-affected states, any development intervention must be carefully designed to "do no harm" and, where possible, contribute to peace [14]. Seed systems might seem tangential to high-level peace processes, but at community level, they significantly affect relationships and sources of tension. Conflict sensitivity involves understanding how ethnicity, clan affiliation, displacement status, or resource competition play out in farming communities, then tailoring programmes accordingly.

Equitable access is fundamental. If a seed distribution or programme is perceived to favour one group, it can exacerbate grievances—for example, if IDPs in a camp receive high-quality seeds while host villagers outside do not, or if a certain ethnic community dominates a seed cooperative and only benefit relatives. Agencies therefore implement conflict-sensitive targeting: consulting communities, mixing participants from diverse groups, and being transparent about selection criteria. In Côte d'Ivoire, an FAO post-war recovery project organized seed fairs deliberately including both ex-combatants and community members as vendors and buyers, creating a neutral space where former adversaries engaged in trade (FAO, 2018).

CSBs bring people together around a shared interest—food and farming—that can transcend political or ethnic divides, but only with inclusive governance. The Beer Seed Network's 17-member executive committee includes representatives from different clans, with leadership positions rotating among clan groups each term. Local elders credit this mechanism with preventing conflicts, as no single clan can monopolize benefits or decision-making. Such embedded power-sharing turns the seed bank into a microcosm of inclusive governance—modelling the cooperation vital in a society emerging from civil strife.

Site selection and membership also matter. A 2023 policy brief noted that if a seed bank's location is in a contested area or membership overlaps with only one side of a conflict, it can become a flashpoint. Strategies include establishing seed banks in neutral, shared locations and creating satellite banks serving different communities. In South Sudan, NGOs established multiple smaller CSBs across various payams, each locally managed but loosely networked [15]—spreading benefits and reducing the risk that seed stores become conflict targets.

Land and resource disputes intersect with seed programming. If an intervention encourages expansion onto new land, it might spark friction between farmers and pastoralists or communities over boundaries. Peace-conscious programmes coordinate closely with local authorities. In Uganda's post-conflict North, NGOs introduced contour hedgerows of legumes for soil conservation and seed production, first facilitating community dialogues to clarify that hedgerows benefited everyone and to avoid misunderstandings about semi-permanent land claims.

When done right, seed-related activities serve as entry points for peacebuilding. In South Sudan, a seed project brought Nuer and Dinka women together in neutral seed selection and storage training [16]. Working side by side on a shared problem broke down stereotypes and created interpersonal connections across ethnic lines—no small feat in a country split by ethnic conflict. In the Central African Republic, inter-village seed fairs brought formerly clashing villages together to trade seed and planting materials, facilitated with cultural activities and dialogues about farming challenges [17][18].

6.2 Seeds for Peace: Cooperation and Social Capital

Beyond avoiding harm, the peace pillar actively leverages seed initiatives for peacebuilding. Women and youth inclusion has ripple effects: WU in Bor not only improved livelihoods but shifted norms by proving women could lead a successful enterprise. Local authorities began involving WU leaders in broader governance decisions, elevating women's voice—linked to reduced gender-based violence and more robust community decision-making. Youth involvement in seed enterprises provides alternatives to joining armed groups; in Mali, a project engaging young men in certified millet seed production gave them economic stakes in community well-being, reportedly reducing militia recruitment susceptibility (Mercy Corps, 2021).

Inter-community seed exchanges build trust. PVS trials involve farmers from different areas visiting each other's fields—sometimes one of the few sanctioned reasons for people to cross into another community's territory. In Somalia, two clans with historical conflicts both participated in a drought-tolerant sorghum PVS facilitated by an NGO. They agreed on the best variety and arranged a barter: one clan's farmers multiplied sorghum seed using irrigation access, then traded with the other for surplus cowpea—a mutually beneficial exchange that built trust and laid groundwork for dialogue on other shared issues. Traditional practices and cultural respect also matter in Ethiopia, CSB-hosted "seed festivals" where different ethnic communities showcase heritage varieties celebrate diversity and create positive narratives around interdependence.

Seed loan management constitutes a less visible but critical dimension of trust-building. When the Beer network extended 264 kg of bean seed as credit during the 2021 drought, it constructed a social compact of obligation, reciprocity, and mutual accountability. Successful repayment reinforces trust, validates the institution, and normalizes cooperative behaviour across community lines. The HDP nexus operates not as a static alignment but as a dynamic process in which everyday transactions—borrowing seed, repaying it, accounting for it collectively—continuously reproduce or erode the social fabric that peace depends on.

However, when defaults cluster within a particular clan or displacement group—often due to crop failure, renewed displacement, or flooding—the CSB's response becomes politically charged. Aggressive recovery can exacerbate inter-group grievances; blanket forgiveness erodes the reciprocity norm. Evidence from CSBs in Ethiopia and Uganda points to tiered, community-managed default resolution protocols engaging traditional authorities: partial repayment in grain rather than seed, harvest-linked rollovers endorsed by elders, and in-kind labour contributions. By involving elders or local peace committees in loan arbitration, these mechanisms convert bilateral financial disputes into structured community dialogues—peacebuilding infrastructure embedded in the seed system itself. Systematic documentation of default rates and resolution mechanisms remains sparse and constitutes a priority for future ISSD Africa action learning.

Seed interventions are not a remedy for conflict resolution—they work best as part of broader peacebuilding efforts. However, they help mend the social fabric by enhancing food security (removing a potential tension spark), providing livelihoods (reducing poverty exploitable by conflict entrepreneurs), and institutionalizing inclusive practices. Government support under the peace pillar can include incorporating farmer-managed seed systems into peace dividends—Somaliland's draft Seed Law explicitly recognizes community seed producers, partly aimed at unifying the agricultural sector across clans and regions.

7. Cross-Cutting Enablers

Achieving humanitarian, development, and peace objectives for seed systems in fragile states requires more than well-designed projects. It hinges on cross-cutting enablers—overarching factors that create an environment in which local seed initiatives can flourish: supportive policies and governance, market integration and private sector engagement, gender equality and social inclusion, quality assurance, and conflict sensitivity and coordination. These enablers reinforce each other across all three HDP pillars.

7.1 Supportive Policies and Governance

Seed laws in many African countries have historically favoured the formal sector—breeding programmes, national seed companies, and certification rules—often neglecting FMSS realities. Fragile states must formally recognize CSBs, SPGs, and informal seed traders in national seed laws, granting legal identity that opens doors to credit, training, and government programmes.

South Sudan's draft seed policy lacks explicit CSB provisions, leaving groups like WU in a grey zone. Encouragingly, Uganda's draft Plant Variety Protection Bill [19] includes clauses protecting farmer seed exchanges and acknowledging QDS producers; Somalia's national seed policy similarly calls for integrating informal seed actors [20].

Simplifying variety release procedures for local and farmer-bred varieties is critical. Standard DUS and VCU testing are onerous and unsuited to heterogeneous, location-specific varieties common in FMSS, leaving many excellent local varieties "unreleased" and community groups technically unable to market them. Creating a "farmer varieties" or "landraces" category with relaxed requirements—as Nepal, India, and Bangladesh have done, and Kenya and Uganda are discussing—would greatly help. For example, Beer's network conserves a sorghum landrace called Gubato, prized for drought resilience but with no formal company producing it. If Somaliland's upcoming Seed Bill includes provision for registering such landraces (which early drafts suggest), groups like Beer could market Gubato seed legally.

Public procurement and funding must adapt. Procurement rules often favour large suppliers or insist on certified seed only. A more flexible guideline—allowing purchase of QDS from community groups, pre-qualifying community seed organizations, and using vouchers to fund local farmer purchases—would empower local seed actors. Rwanda provides a positive example: after 2018, its government input subsidy programme sourced bean seed from QDS-producing farmer cooperatives, possible because the national seed authority endorsed QDS for subsidized distribution. Regional harmonization (COMESA/ECOWAS) offers benefits but risks sidelining farmer varieties; fragile-state reforms should include adapted pathways for QDS and farmer-selected varieties [21].

Multi-stakeholder coordination is essential. Somalia's Seed Sector Working Group—meeting quarterly with local seed companies, community producers, and humanitarian clusters—has been instrumental in drafting seed policy and orchestrating emergency responses that feed into development. Similar inclusive coordination bodies are recommended for South Sudan, DRC, and other fragile states.

Rule of law and security remains enabling conditions mostly outside agriculture's control but critically affecting it. In practice, CSBs depend almost entirely on social enforcement—group norms, reputational sanction, and traditional leaders' moral authority—to manage defaults. CSB bylaws should include conflict-sensitive default management protocols developed participatorily, specifying graduated responses from peer follow-up and elder-mediated dialogue to restructured repayment in grain or in-kind contributions. Building default resolution capacity alongside seed production training strengthens both financial resilience and peacebuilding function.

7.2 Market Integration and Private Sector Engagement

An enabled seed system in a fragile state connects informal and formal markets and incentivizes private sector participation at all sizes. Private sector engagement includes not only large companies but the myriad informal seed traders, local agribusinesses, and small agro dealers that are the true backbone of seed supply for African smallholders (Sperling et al., 2020). In fragile contexts, where large firms see too much risk and too low profit, local enterprises and traders become even more important.

Improving market information and linkages is a key enabler. Simple interventions—publishing seasonal seed price information, broadcasting radio bulletins on seed availability—help traders and farmers make better decisions and avoid panic-induced price spikes. Digital tools can also play a role: in Uganda, a digital seed trading platform was piloted that allowed community seed producers to list seed lots and buyers to see availability across regions. While high-tech solutions may face connectivity issues in very fragile areas, the rapid spread of mobile phones means even basic SMS-based systems (texting a code for seed price information or to place an order) can be viable.

Finance is critical. Private traders and small seed companies need working capital to move seed from surplus to deficit areas. Innovative financing—credit guarantees (as piloted by Mercy Corps in Nigeria), matching grants for agro-dealers to restock after conflict, and microfinance with harvest-linked repayment schedules—can stimulate trade. Development banks or funds (e.g. IFAD, Africa Enterprise Challenge Fund) could consider windows specifically for seed sector SMEs in fragile states. Governments might grant temporary tax relief or subsidies on seed transport into conflict-affected zones to incentivize traders.

An integrated market approach recognizes informal seed traders as legitimate actors. Research shows these traders often employ quality management practices and serve remote areas where the formal sector will not go. Building their capacity—training on seed quality and handling, linking them with research stations—enables a bottom-up feedback loop where the private sector aligns with farmers' needs. Public-private partnerships can catalyse activity: an NGO mobilizes farmer groups to produce seed, a company provides foundation seed and technical oversight, and government facilitates distribution. In Ethiopia's lowlands, an international seed firm worked with local cooperatives to multiply hybrid sorghum under a government pastoralist agriculture programme—cooperatives earned income while the company expanded its market with reduced cost and risk.

At the micro level, community seed initiatives must operate with business principles. ISSD Africa facilitated WU's adoption of a tiered pricing model: selling to members at a slightly subsidized rate (social goal), to humanitarian buyers at a moderate price, and to commercial farmers at a higher price—ensuring revenue while fulfilling the community mandate. Engaging larger private players can also yield benefits of scale: companies might contract community groups to produce certain varieties or rely on informal networks for last-mile distribution, since local traders know the territory best.

7.3 Gender Equality and Social Inclusion

Women are primary custodians of seeds for food crops in many African societies—saving seed, selecting varieties, and controlling crops for home consumption—yet frequently have less access to improved seeds, information, land, or credit. Gender-responsive seed system strengthening is both an effectiveness and equity imperative.

Ensuring women participate and lead: WU demonstrates that women-led seed banks can excel. In Mali, a women's collective produced high-quality rice seed that became an entire region's preferred source [22][23]. Programmes should set female membership targets and earmark leadership training for women, addressing cultural barriers through adaptive measures (training closer to communities, childcare provision).

Addressing specific constraints: Women often face limited land ownership, which affects their ability to produce seed. Some projects have negotiated communal land allocation for women's seed groups—in eastern Congo, village chiefs allotted fertile land to women's associations for bean seed multiplication as part of a reconciliation project [24]. Finance schemes tailored to women (group-guaranteed loans, in-kind seed credit) and women's savings groups doubling as seed exchange circles enable participation.

Gender-sensitive breeding and selection: Women's trait preferences (cooking quality, storability, taste) are often overlooked in formal breeding. In Rwanda, women's PVS input led to selecting a bean variety with shorter cooking time (saving scarce fuel)—a trade-off male agronomists had not considered—which became hugely popular with consumers [25][26]. This underlines why women's criteria must shape seed choices.

Monitoring and mitigating negative effects: Some voucher programmes now explicitly issue vouchers to women, because men otherwise captured all vouchers and sometimes chose only crops that men control. Introducing commercial orientation can shift control from women to men; bylaws should protect women's roles (quotas, joint financial signatures) to prevent this. Beyond gender, social inclusion involves youth, ethnic minorities, displaced people, and persons with disabilities. In Uganda's West Nile, South Sudanese refugees and Ugandan host farmers jointly produce QDS sesame and maize, easing host-refugee tensions [27].

7.4 Quality Assurance and Seed Standards

Trust in the seed system underpins humanitarian, development, and peace outcomes. Quality assurance mechanisms must function in low-capacity environments and be accessible to small producers.

QDS Systems: South Sudan's Ministry of Agriculture, with FAO support, is drafting QDS guidelines for sorghum, groundnut, and cowpea, inspired by Tanzanian and Ugandan models [15][5]. Training para-inspectors (community-based seed inspectors—often schoolteachers or lead farmers given short courses) extends quality control to remote areas where government staff cannot regularly go.

Alternative evidence of quality: In crisis situations, formal testing may be impossible. Some agencies use minimum seed quality protocols—checklists that non-specialists can apply visually checking for weevil damage, ensuring moisture content is low enough by biting seeds, and conducting a quick germination test on damp cloth. These are not foolproof but weed out terribly bad seed and build farmer confidence.

Strengthening local seed quality knowledge: Farmers have traditional assessment methods (sink-or-float tests for seed weight, observing colour and texture). Extension can enhance these with scientific tips. In post-crisis Zimbabwe, training farmers to demand quality—such as asking for germination test results or testing samples—reportedly improved accountability of relief seed vendors, as farmers voiced complaints when seed performed poorly, leading agencies to tighten procurement checks [28].

Community-based quality control: In Nepal, CSBs maintain "quality truth tanks" where members store small samples of each seed lot and monitor germination periodically; any member whose seed lot shows issues is flagged [29]. Linkages with labs for seed health testing are valuable—the Ethiopian Biodiversity Institute provided free tests to CSBs, catching disease in wheat seeds before distribution [30][31].

Aligning humanitarian seed procurement with quality standards is vital. A collective commitment by aid actors to verify that distributed seed meets at least QDS standards would set a benchmark. Emergency seed aid harmonization working groups are pursuing this [32]. An enabling policy could require that all seed aid, regardless of source, clear by the national seed unit or cluster for quality.

7.5 Conflict Sensitivity and Coordination

Conflict sensitivity must be omnipresent—in strategy, planning, implementation, and M&E. In fragile states, conditions change rapidly, requiring agile coordination and adaptive management.

Context Analysis as Routine: Tools like the Context Analysis Tool (CAT) should be used regularly, not as one-off exercises. The CAT pilot in Northeast Nigeria mapped how insurgency affected seed systems in different localities, identified which interventions were possible or risky, and recommended tailor-made approaches for each Local Government Area [33][34]. Making such analysis mandatory at proposal design stage and mid-term reviews ensures conflict sensitivity is sustained.

Coordination among HDP Actors: Humanitarian actors (UN agencies, NGOs in the Food Security Cluster), development actors (longer-term projects, government extension), and peacebuilding actors (local peace committees, UN peacekeepers) all need to communicate on seed-related activities. A practical measure is a joint HDP coordination platform for agriculture. South Sudan's HDP nexus working group for food security (established 2021) enabled humanitarian actors to share SSSA results with development planners and identified opportunities like using emergency distribution networks to promote CSBs or having development projects follow up in areas where humanitarian actors conducted seed fairs to help sellers formalize.

Early Warning and Flexibility: If tensions rise, seed programmes must adjust. Flexibility in donor funding to reallocate resources to conflict mitigation is an enabling factor. In the Central African Republic, an NGO repurposed its seed storage facility as a humanitarian food distribution point during a violence surge—possible because the funder allowed resource repurposing to meet urgent needs and maintain community goodwill [18]. Rigid project designs that cannot adapt often fail or do harm.

Monitoring Peace Outcomes: Including indicators tracking peace impact—number of inter-group partnerships, conflict incidents in project versus non-project areas, trust perceptions—justifies continued support for integrated programming and can provide evidence for scaling similar approaches.

External Conflict Resolution Support: Ensuring local authorities and traditional leaders are briefed and ready to mediate is essential. In Ethiopia's Tigray, an independent mediator from the regional cooperative union resolved benefit-sharing disputes within a seed cooperative, preventing an ethnically charged split [35][36]. Security of operations also matters coordination with security actors (informing peacekeepers of distribution events, timing activities in safe windows) enables the physical work while maintaining neutrality and community acceptance.

These enablers are interdependent: supportive policy can institutionalize gender inclusion and conflict sensitivity; market integration fails without quality assurance; gender inclusion boosts market success. A holistic approach addressing all areas in tandem is essential.

8. Policy Recommendations

While the HDP pillars are complementary in principle, they entail real trade-offs in practice. Rapid humanitarian timelines can conflict with the slower institution-building needed for development; subsidy-driven relief can undercut market emergence if prolonged; inclusive peace processes may reduce short-term efficiency but build legitimacy. We frame recommendations with explicit sequencing and mitigation strategies to balance urgency, market integrity, and social cohesion.

1. Integrate Farmer-Managed Seed Systems into National Seed Policies and Strategies: Governments should formally recognize CSBs, SPGs, and informal seed traders in national seed laws and agricultural policies. Provisions should register such groups as legal entities (cooperatives or associations) and allow farmer variety registration and protection. Somaliland's draft Seed Bill, which acknowledges community seed producers, is a model to follow. National seed councils should include smallholder farmer organization representatives.

2. Establish Emergency Seed Response Guidelines Aligned with Best Practices: Humanitarian coordination bodies (e.g. Food Security Clusters) in fragile states should adopt guidelines based on the Ten Guiding Principles of Good Seed Aid Practice [38]. All actors must conduct SSSAs before intervention, prioritize local procurement or vouchers, and ensure quality and timeliness. Donors should require SEADS/SERT compliance checklists, publish after-action reviews, and track KPIs: (i) share of responses preceded by SSSA, (ii) percentage of seed sourced in-country meeting quality criteria, and (iii) on-time delivery to planting windows. Funding tranches can be tied to these KPIs (SEADS, 2022 [37]; SERT, 2024 [38]).

3. Expand and Fund Quality Declared Seed (QDS) Systems: Ministries of Agriculture should implement QDS schemes bridging FMSS and formal sectors—training community inspectors, simplifying varietal release, providing testing resources (seed testing kits, forms, labels). Recognize QDS in public procurement. Fund QDS pilots in fragile regions and pursue regional harmonization through the African Union.

4. Facilitate Local Seed Procurement in Humanitarian and Recovery Programmes: Organizations should commit to sourcing seed from local markets or producer groups, investing in identifying local sources pre-crisis (databases of producers, stock availability, quality). Humanitarian donors should allow budget flexibility for possibly higher unit costs. Where direct procurement is not viable, seed voucher and fair programmes can stimulate farmers' purchasing from traders. Governments can support by exempting relief seed purchases from certain taxes and providing rapid quality testing. A directive that "80% of seed in emergency responses must be sourced in-country if meeting quality criteria" would set a clear target.

5. Invest in Community Seed Bank Development as Part of Rural Development and Peacebuilding: Allocate dedicated funding for infrastructure (storage, drying floors), training, extension support, and access to foundation seed. Support CSBs as community institutions for cohesion: encourage inclusive membership (women, youth, different ethnic groups) and link activities with reconciliation initiatives. For conflict-affected regions, a new CSB can be treated as both an agricultural input project and a social cohesion project. Donors should fund multi-year programmes (5+ years).

6. Promote Seed Enterprise Development and Market Linkages: Create incubation programmes for small seed enterprises: business training, business plan assistance, contract facilitation, and seed marketing support (branding, packaging). Provide matching grants or concessional loans for agro-dealers and seed cooperatives in conflict-affected areas. Reduce or subsidize certification fees for small producers. Improve physical market infrastructure as part of post-conflict reconstruction.

7. Strengthen Gender and Youth Integration: Set targets for women's participation (at least 50% in SPGs with access to leadership roles). Provide accessible training and complementary interventions—land titling, leasing arrangements, and tailored financial products for women seed entrepreneurs. Support youth-led seed multiplier groups, apprenticeships in seed businesses, and school gardening programmes.

8. Ensure Seed Quality through Adapted Quality Assurance Systems: Authorize and train local paraprofessionals for field inspections and seed testing. Promote community quality protocols and periodic external audits. Supply basic equipment (moisture meters, germination trays). Adopt truth-in-labelling laws with farmer awareness campaigns. Institute quality checkpoints in humanitarian cluster systems.

9. Leverage Seed Interventions for Peacebuilding Outcomes: Design programmes to mix groups from different clans/ethnicities, couple technical work with social cohesion activities (dialogues, cooperative agreements), and use seed fairs or agricultural shows as neutral meeting venues. Facilitate inter-community seed exchanges fostering interdependence. Integrate these approaches into national peacebuilding or recovery strategies.

10. Provide Multi-Year, Flexible Funding and Coordination for Nexus Programmes: Commit to 3–5 year programme funding bridging emergency response to development phases, with contingency flexibility for shock response. Establish nexus coordination units—joint teams between humanitarian cluster leads and development ministries—overseeing HDP nexus projects like seed system rehabilitation. Niger's National Resilience plan [39], pooling donor funds into a common programme, offers a model.

11. Align Donor Instruments with Nexus Requirements: Donor architecture should mainstream multi-year, flexible instruments allowing budget reallocation across HDP activities as conditions shift. Formal SEADS/SERT alignment [37][38] should be a funding criterion, and reporting should include market-impact and cohesion indicators, not just input counts.

9. Conclusions

Seeds are more than agricultural inputs in fragile and conflict-affected African states—they are lifelines for families in crisis, the foundation of rural livelihoods and enterprises, and potential platforms for peace and reconciliation. Applying the HDP framework reveals that CSBs and SPGs are multifaceted assets: they provide emergency seed relief when formal systems fail, grow into sustainable businesses improving farmer incomes and crop diversity, and foster inclusive community engagement that can mend social divides.

Key lessons from South Sudan, Somaliland, and elsewhere underscore that strengthening FMSS should be a strategic priority in fragile state interventions. Rather than sidelining or replacing farmer-managed networks, humanitarian and development actors should reinforce them—sourcing from local seed markets, training and equipping community groups, and adapting policies to accommodate farmer-led seed activities. External support amplifies existing coping strategies and knowledge, making interventions more effective and culturally appropriate.

An enabling environment is critical. Technical fixes alone will not be transformative unless governance and socio-economic conditions allow local seed systems to flourish. A community seed bank can only scale its impact if national law permits it to sell seed beyond its members and it can access buyers; a great new drought-tolerant crop will only be adopted if farmers trust the seed quality and find it meets their needs. Policy recommendations focus on integrating HDP principles into seed aid guidelines, institutionalizing QDS, opening procurement to local producers, and providing legal recognition to community seed initiatives.

The findings carry a message of hope and resilience. Even amid conflict and instability, African farmers—women and men—have shown remarkable capacity to innovate conserving precious seed diversity, rebuilding stocks after disasters, sharing knowledge across communities, and making the most of scarce resources to sustain food production. In Bor, South Sudan, a small group of displaced women transformed into a seed enterprise feeding not only themselves but surrounding communities and aid efforts. In Somaliland's Beer village, what began as a few farmers saving seed has grown into a network influencing regional seed policy.

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