Integration of Formal and informal Resilient Seed System Development in Western Kenya

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Background and rational

Community Seed Banks (CSBs) represent a strategic interface between farmer-managed and formal seed systems, with proven potential to conserve agrobiodiversity, enhance climate resilience, and improve equitable access to quality seed for smallholder farmers across heterogeneous landscapes. In Western Kenya, where CGIAR sister centers, national institutions, farming communities, and development partners collaborate under the CGIAR Multifunctional Landscapes (MFL) Science Program to advance food production, biodiversity conservation, and livelihood outcomes, CSBs offer a locally grounded and cost-effective mechanism for addressing persistent weaknesses in the seed system. These weaknesses stem largely from a policy and regulatory environment that prioritizes the formal seed sector. This bias limits the recognition, institutional support, and scaling of farmer-managed seed systems, and generates tensions with constitutional provisions that protect indigenous seed systems and associated knowledge.

The brief identifies key binding constraints (BCs) alongside emerging opportunities and proposes actionable recommendations to embed CSBs within national and county-level strategies, in accordance with the indigenous seed protection provisions of the Kenyan Constitution. Realizing the full potential of CSBs will require deliberate policy coherence, targeted investment in local capacity, and strengthened science–policy–practice interfaces to deliver sustained, landscape-level impact.

Western Kenya is a smallholder-dominated farming region characterized by highly diverse agroecosystems spanning mountains, deep valleys, and plains. The presence of both long and short rainy seasons enables year-round cropping. These landscapes are inherently multifunctional, delivering food, ecosystem services, cultural values, and rural employment. However, they are increasingly exposed to climate shocks, soil degradation, and declining crop diversity. In this context, Community Seed Banks (CSBs) in Western Kenya play critical roles, including:

- In situ conservation of locally adapted agrobiodiversity and genetic resources.
- Improving affordable farmer access to diverse, climate-resilient plant propagation materials.
- Supporting agroecological transitions and enhanced dietary diversity.

Policy and Institutional Context

The relevance of the Kenyan policy and regulatory framework to CSB includes:

- **The Seeds and Plant Varieties Act (Cap 326)**, which governs formal seed systems but has historically marginalized informal and farmer-managed seed systems.
- **The Constitution of Kenya (2010)**, which mandates protection of biodiversity and indigenous knowledge.
- **The National Agroecology Strategy for Food System Transformation (2024–2033)** provides an enabling policy entry point for CSBs.
- **Recent judicial decisions** affirming farmers' rights to save, use, exchange, and sell farm-saved seeds, strengthening the legal legitimacy of CSBs.

Western Kenya CSB Alignment to CGIAR Science Program agenda

The CGIAR MFL Science Program emphasizes:

- Integrated landscape procedures and approaches
- Co-creation and generation of knowledge with local actors
- Scaling agroecological and biodiversity-based solutions
- Evidence-driven policy engagement

CSBs directly operationalize these principles at landscape scale, thus a MFL strategic partner.

Key Constraints for

1. **Regulatory and Policy Misalignment**
   - Limited formal recognition of CSBs within national seed regulatory frameworks.
   - Dominance of comprehensive certification - based seed quality assurance system for formal seed sector produced seeds.
   - Absence of tailored quality assurance mechanisms for community-managed seed stocks.
2. **Institutional Fragmentation**
   - Weak integration and linkages between the CSBs with extension systems, county agricultural plans, and climate adaptation strategies.
   - Limited coordination between research institutions, county governments, and farmer organizations.
3. **Technical and Capacity Gaps**
   - Inadequate infrastructure for seed storage, documentation, and regeneration.
   - Limited skills in seed quality management and governance.
   - Limited mechanisation in seed production and post-harvest seed operations
   - Financing and Sustainability Dependence on short-term project funding.
   - Focus on small scale germplasm conservation operations with little income generation
   - Lack of incentives for local seed enterprises to collaborate with the CSBs

Text Box 1. Evidence-Based Support to CSB

The Alliance of Bioversity International and CIAT initiated the CSB development in Western Kenya in the mid-2010s through participatory agrobiodiversity and farmer-managed seed system research, which later matured into structured CSB partnerships between 2018 and 2021. From 2022 onwards, the consolidation phase under CGIAR Nature-Positive Solutions initiative and Multifunctional Landscapes followed with ICARDA playing a key role in anchoring the partnership within its dryland and climate-resilience agendas focusing on resilient seed system development.

Under the umbrella of the Alliance led CGIAR partnership of the national institutions, county governments, non-government organizations (NGOs), and development partners (including FAO, the Netherlands Ministry of Agriculture, Fisheries, Food Security and Nature, the Global Affairs Canada, and CGIAR system funding), ICARDA provided technical backstopping on seed system development, and investments on infrastructure development (seed processing, quality management, and capacity development on variety identification and early generation seed production and further multiplication to facilitate crop production and value addition (Figures 1-3).

The partnership has delivered functional CSBs, improved access to seed of locally adapted climate-resilient varieties, strengthened farmer capacities, and positioned CSBs as ready to complement actors to the Kenyan's formal seed and agrobiodiversity governance landscape.

Figure 1. Seed drying, threshing, and cleaning machines handing over

Figure 2. Non airconditioned seed store

Figure 3. Hermetic jars for safe seed storage

Figure 4. Training in seed sanitation

Opportunities

Policy Momentum: The MFL ecosystem health and biodiversity interventions create an enabling environment for formal CSB integration.

Devolution: The CGIAR centers and county government officials in Western Kenya are keen to embed CSBs in localized development and climate strategies.

CGIAR MFL Platforms: Existing and strong Alliance-CSBs partnership and active research sites can support evidence generation, learning, and scaling.

Farmer-Led Innovation: Strong social capital and farmer organizations offer a foundation for inclusive seed governance.

Policy Recommendations

National Level

- Formal recognition of Community Seed Banks and the Formal Seed Sector complementarity.
- Formulation of differentiated regulatory pathways and quality assurance standards for farmer-managed propagation materials.
- Establish functional linkages to the national research, extension, seed certification, and agriculture credit facilities

County Governments

- Incorporate CSBs into the County Integrated Development Plans (CIDPs), climate adaptation agenda, and extension services.
- Recognize CSB, a key resilient seed system actor as agroindustry to be illegible for agriculture credit services.

CGIAR and Research Partners

- Generate evidence-based CSB contributions to resilience, biodiversity, and livelihoods using MFL indicators.
- Enhance the science–policy interfaces through policy labs, learning alliances, and landscape platforms.

Development Partners

- Support long-term institutional strengthening rather than short-term projectization.
- Invest in CSBs as anchors for agroecological and nature-positive scaling.

Text Box 2. Focus group discussion on impact of technical support and training on CSB seed quality

Seed physical quality:

Overall performance is strong (64% good, 33% medium, 3% poor), indicating a solid operational base. Drying and storage infrastructure performs well—solar driers (75% good), normal driers (62.5% good), hermetic containers and seed stores (100% good)—though capacity expansion is needed. In contrast, threshers and cleaners face operational constraints, leading to mainly medium ratings. Seed supply from ICARDA and on-the-job training are adequate in quality but insufficient in scale, pointing to the need for expansion rather than redesign. The limitations observed in the threshing and cleaning machines are genuine. The reasons are:

- The equipment is locally manufactured appropriate technology to support the local industry.
- The equipment is designed to handle the limited quantities of early generation stocks produced by the CSB.
- Limited expansion of the task to service provision for income generation is possible but a large-scale expansion will require higher capacity equipment.

The equipment supported 51 farmers, processing 94.5 bags of sorghum, maize, and finger millet, demonstrating clear community-level value. Sorghum dominated service demand (54 bags), reflecting its strategic importance in local farming systems. Farmer feedback is largely positive, citing community-wide benefits and good threshing quality, though some services require efficiency and quality improvements, particularly for sorghum. Overall, the service model is functional and impactful, with scope to enhance reliability and throughput as demand grows (Annex1 & 2).

Seed physiological quality:

Under ambient storage conditions of the CSBs in Western Kenya, seed showed clear variation in seed longevity across crops, varieties, and seed lots stored under ambient conditions in three Community Seed Banks in Western Kenya. Overall, seed viability for Maize, Beans, and Finger Millet declines over time, whereas the germination percentage of Sorghum, Amaranth and Cow Pea maintains its germination rates over time under ambient storage conditions, reflecting differences in genetic background, initial seed quality, and post-harvest handling. The results underscore that hermetic storage of dried seed alone is not enough to extend seed longevity for more than a year under ambient storage conditions (Figures 4-6). For extended storage period, cooling is a must.

Figure 5. Declining seed longevity for Maize under ambient storage conditions

Figure 6. Declining seed longevity for beans under ambient storage conditions

Figure 7. Sustained seed longevity for Sorghum under ambient storage conditions

Conclusions and Implementation Pathway

An enabling policy environment and robust regulatory frameworks are essential to elevate Community Seed Banks (CSBs) from isolated initiatives to system-level solutions for agrobiodiversity conservation, climate resilience, and inclusive development in Western Kenya.

A phased approach is recommended

- Short-term: Continuation of the ongoing policy dialogue, capacity assessments, and pilot integration in selected landscapes.
- Medium-term: Institutionalization within county systems and development of quality assurance mechanisms.
- Long-term: Scaling through national policy reform and CGIAR-supported learning networks.

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Output 1211. – 3 policy revisions or improvements to policy on nature positive and agroecological approaches integrated into NBSAPs and cascading development plans
Output 1212. – 10 incentives for conservation co-developed
Output 1213. – Provide access to innovative technologies and capacity development for 10,000 people (40% M, 60% W, YM, YW, IP, VG) to design and monitor inclusive conservation objectives and initiatives

CGIAR MULTIFUNCTIONAL LANDSCAPES

ICARDA Science for resilient livelihoods in dry areas

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