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Forage Seed System Performance - Ethiopia

February 2022

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Forage Seed System Performance of Ethiopia: An overview based on key indicators

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- Mr. Anisa Gobano — SNNPR Livestock Bureau
- Mr. Abebe — Amhara Livestock Bureau

Background

- The GTP 2020 targets aim to increase meat, milk and egg production by 58%, 83% and 828% respectively (ELMP, 2015).
- The GoE has acknowledged these problems and developed the National Feed Strategy in 2020. The strategy recognizes the role of cultivated forages in improving feed for livestock in Ethiopia.
- Lack of good quality seed is still commonly cited as a constraint to expanding the production of cultivated forages (Assefa et al., 2012, Shapiro et al., 2015, Turner et al., 2019).
- The need to improve the quantity and quality of livestock feed in Ethiopia through the use of cultivated forages to improve livestock productivity by reducing pressure on the environment is well recognized (Dey et al. 2022).

Introduction

- Forage seed supply must be a priority to realize a substantial increment in livestock productivity basically through wider utilization of improved forage and pasture crops.
- Forage seed systems should be strong enough to respond to an increasing need for cultivated forages.
- Seed system performance indicators for forages does not exist at present. This study fills in that gap.

Study Objectives

- Leverage existing seed indices to develop a framework more suited for forages and the pluralistic nature of the forage seed systems in Ethiopia
- Monitor the growth and transformation of the forage seed sub-sector
- Provide the national stakeholders and policymakers with a set of stakeholders' validated performance indicators
- Use data and information to identify where interventions could be targeted
- Compare and track changes across years

Study Approach

- Review of existing indices (TASAI, EBA, ASI)
- Literature review of forage seed sector in Ethiopia
- Develop a framework for forage seed system
- Construct a survey instrument to gather information for identified indicators
- Identify and conduct key stakeholder interviews to collect data and information
- Finalize and present metrics

Comparison with TASAI (The African Seed Access Index)

TASAI

- Does not include all crops. Does not include forages
- Does not include volume of price of EGS
- Does not include alternative seed quality mechanisms (such as QDS)
- Focus is more on seed companies

S34D Framework

- Contains only forages
- Includes volumes and prices of EGS
- Includes information on both certified and QDS schemes
- Information and data on forages from coops and unions is included

Caveats

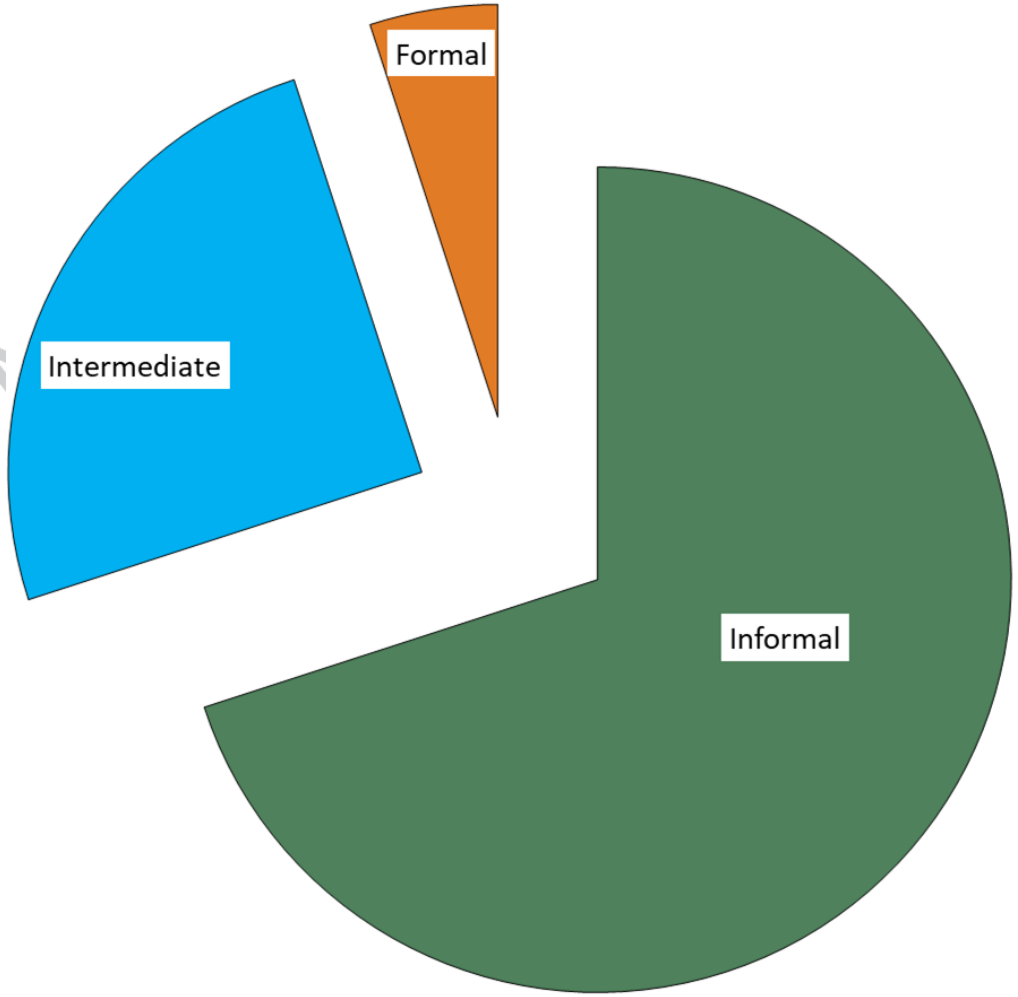
The present framework did not duplicate metrics on systemic issues – such as, length of variety release process, status of seed policy framework, quality of seed regulations and enforcement etc. These indicators are captured by TASAI. We have assumed they would not change for forage seed systems.

Differences between forage crops and other food/cash crops

	Food crops	Forage crops
Value chain	More efficient and better networked	weak and poorly networked
Seed supply	dominated by formal seed system	dominated by Informal/intermediary system
Variety development Allocation of land	comparatively adequate number of breeders	Inadequate number of breeders
Seed multiplication	planned based seed production	Opportunistic based seed production, specialized plots by Gos & NGOs
Seed supply	Mostly formal with active participation of private	contract seed production by farmers and/or farmer's cooperatives
Handling	Management and handling is easier	Post-harvest handling for most perennial species are difficult and require special skills and knowledge
Quality assurance	formal with CoC holders	mainly with QDS system
Productivity	Comparatively high	lack of promotion of forages
Marketing		Poor
Price	Comparatively low price	high seed price
Promotion by extension	Better adoption rate by farmers	limited adoption rate by farmers

Forage seed systems of Ethiopia

- A pluralistic seed system
- Limited role of formal system actors (Hanson and Tedla 2010, Assefa et al. 2012, Turner et al. 2019).
- Intermediate (QDS) system play some role with community-based schemes.
- Informal production and supply dominate the forage seed system in Ethiopia (Hanson and Tedla 2010, Assefa et al. 2012, Mengistu et al. 2016).



Forage seed system performance - Framework

Performance indicators	Regulatory/policy framework	System Actors	Impacts of positive change
Variety development and maintenance	Variety development and registration procedures, human capacity development strategy, a policy for strong and accessible forage germplasm stock	MoA, RARIs, EIAR, Universities, CG centers (ILRI), Private (EFORE AGRO S.L.)	High yielding, strongly completive forage varieties available for use by farmers
Strength of forage breeding programs			
EGS availability	Multi-actor EGS production through decentralization, market incentives for private sector involvement in forage seed production, forage seed extension strategy	RARIs, EIAR, Universities, CG centers (ILRI)	Healthy functioning forage seed system in place; vibrant private sector providing farmers with multiple choice of seed sources realized. High livestock productivity achieved.
Involvement of seed producers		BoA, Public and private seed companies, community based producers, farmers	
Forage seed promotion and marketing			
Seed quality assurance	Ethiopian Seed Standards, QDS standards, seed certification laboratories	Ethiopian Agricultural Authority (EAA), Regional Regulatory Agencies	Farmers access best quality forage seed.

Overview of forage seed system performance indicators

Name of indicator	Definition	Desired directional change	Unit of measurement	Data Source
1. Variety development and maintenance	Number of varieties released by year by forage species (last 5 years)	(+)	Number	Secondary datal collection from CVR (MoA)
2. Strength of forage breeding programs	2.1. Available germplasm/accession collection (local, international stock)	(+)	Number of accessions	Secondary data collection from EBI/ILRI
	2.2. Number of active breeders disaggregated by age by sex in the current year	(+)	Number	Secondary data collection from EIAR/RARIs
3. EGS availability	3.1. Volume of EGS produced by forage species (average by species for the last 2 years)	(+)	Tons (MT)	Secondary datal collection from EIAR/RARIs
	3.2. Share of EGS produced sold	(+)	Number	Secondary datal collection from EIAR/RARIs
	3.3Price at which it is sold,		Birr/Kg	
4. Involvement of seed producers	4.1. Volume of certified forage seed produced in the last 2-3 years. 4.2. # of entinities producing forage seed	(+) (+)	MT Number	Secondary datal collection from ESA/MoA/BoA
5. Forage seed promotion and marketing	5.1. Percentage share of forage seed produced that is sold (2 years if possible)	(+)	Tons	Secondary datal collection from SEs/EIAR/RARIs
	5.2. Average Forage seed price by species per kg (disaggregated by forage species)	(-)	Birr (USD) per Kg	Survey or Assessment
	5.3. Number of development agents trained in forages in general in the last two years. Should be gender and age disaggregated, if possible.	(+)	Number	Secondary datal collection from MoA, BoA
6. Seed quality assurance	6.1. Number of forage crops for which seed production standards available /used.	(+)	Number	Secondary datal collection from Ethiopian Standards and regulatory agencies
	6.3. Number forage crops with declared seed (QDS) standards	(+)	Number	Secondary datal collection from MoA (Seed Regulatory), BoA

Indicator 1: # of varieties released

Opportunities

- Forage biodiversity
- Diverse agro-ecology of Ethiopia
- Large collections at CG
- High demand for livestock products

Challenges

- Human capital – Forage breeders
- Competition from food crops

No	Forage species	2020	2019	2018	2017	2016	Total
1	Oats	2	1	1		1	5
2	Elephant grass				2		2
3	Mission grass			1			1
4	Cowpea			2			2
5	Tree lucerene		2	1		2	5
7	Pigeon pea				2		2
8	Sesbania			3			3
Total		**2**	**3**	**8**	**4**	**3**	**20**

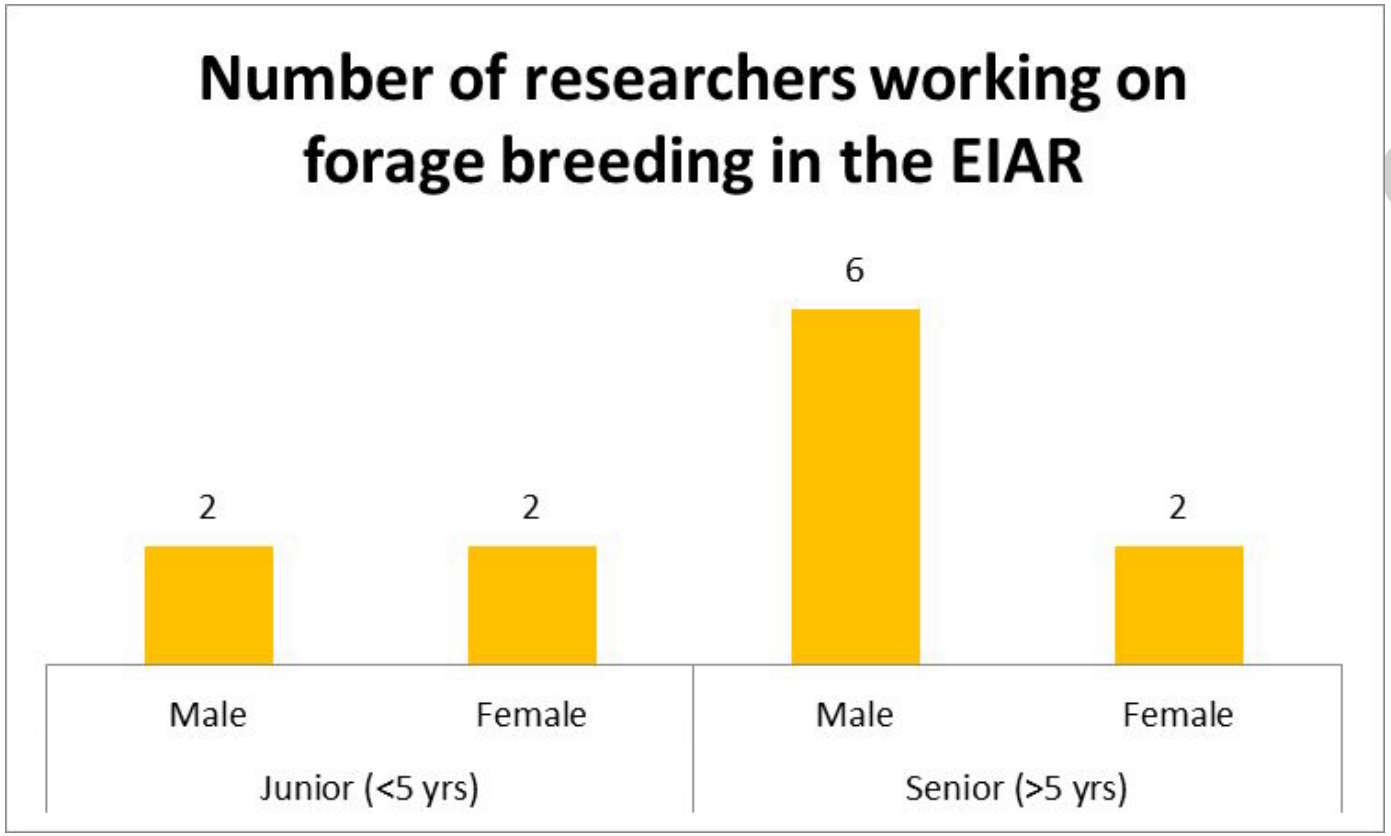
Source: MoA, Crop Variety Register (2017- 2021)

Indicator 2.1: Available germplasm

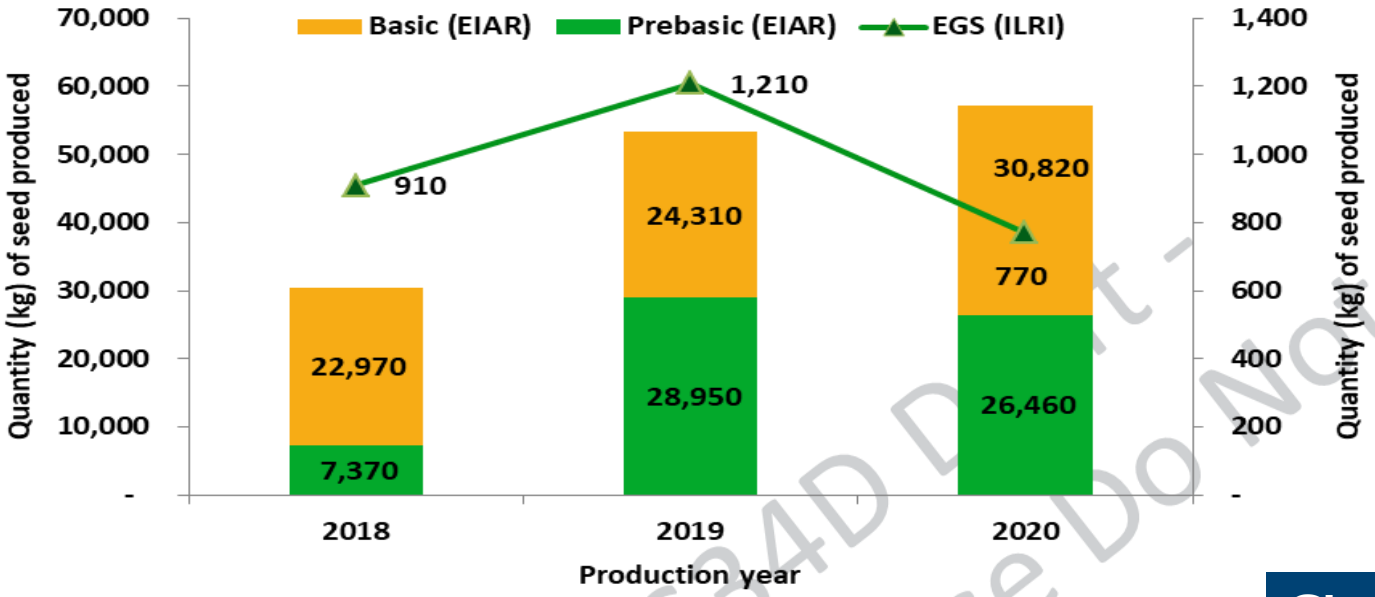
Forage crops	Number of germplasms
Oats (Avena sativa)	122
Phalaries (Phalaries aquatica)	11
Elephant grass (Pennisetum purpureum)	60
Rhode (Chloris gayana)	69
Panicum (Panicum colloratum)	19
Panicum maximum	102
Andropogon (Andropogon gayanus)	48
Vetch (Vicia villosa L.)	12
Vetch (Vicia sativa L.)	198
Alfalfa (Medicago sativa L.)	54
Dolicos lablab (Lablab purpureus)	311
Cow pea (Cowpea unguiculata)	692
Trifolium (Trifolium quartinianum)	41
Pigeon pea (Cajanus cajan L.)	137
Sesbania (Sesbania spp)	596
Total	**2472**

Source: ILRI Feed and Forage Development program, 2021

Indicator 2.2 – Number of active breeders



Indicator 3.1: Volume of EGS (kg)



Research centers are main sources of EGS

Opportunities

- Diverse agro-ecology of Ethiopia
- High demand for livestock products

Challenges

- Limited skill in forage seed production
- Competition from food crops
- Large number of species in the list
- No incentive to EGS production by public research centers

Pre-basic and basic seed production (kg), EIAR (2017 to 2020)

Crop	Pre-basic seed (kg)				Basic seed (kg)			
	2017/18	2018/19	2019/20	Average	2017/18	2018/19	2019/20	Average
Alfalfa (Medicago sativa)	300	16000	2450	6250	1970	5700	2920	3530
Brachiaria mulato (Brachiaria spp.)	200	0	5000	1733	0	50	120	57
Cowpea (Vigna unguiculata)	200	0	0	67	400	0	0	133
Green leaf desmodium	920	630	0	517	0	30	70	33
Lablab (Lablab purpureus)	1120	630	0	583	0	0	0	0
Oats (Avena sativa)	2190	11700	18990	10960	18900	4690	21340	14977
Panicum colloratum (Panicum spp)	500	0	0	167	200	0	1310	755
Rhode grass (Chloris gayana)	500	0	0	167	700	13040	4530	6090
Buffel grass (Cenchrus ciliaris)	1250	0	30	427	400	0	0	133
Vetch (Vicia spp)	200	0	0	67	400	820	530	583
Total	7370	28950	26460	20927	22970	24310	30820	26033

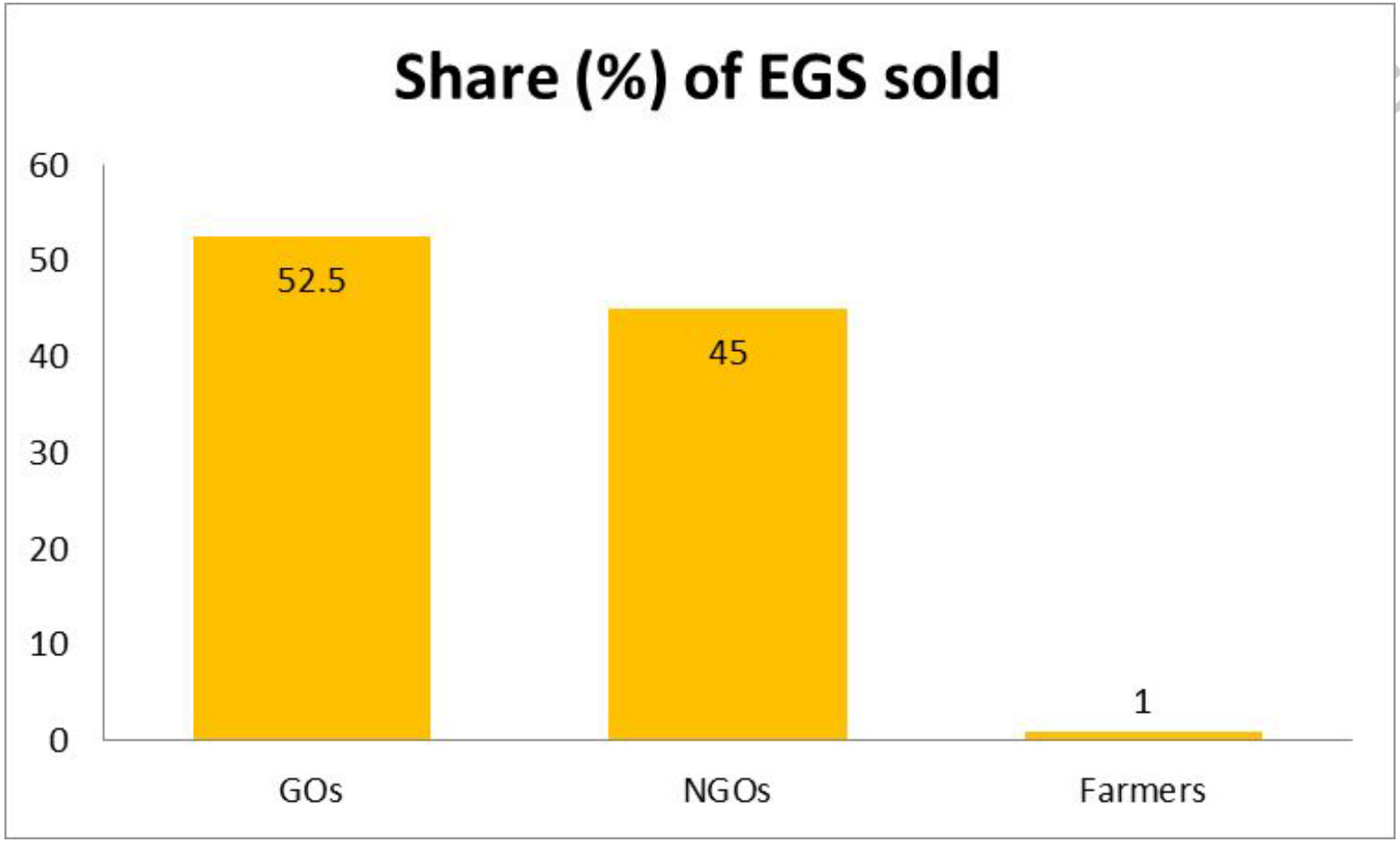
Source: EIAR EGS database, 2021

Early generation seed production (kg), ILRI Ethiopia (2018 - 2020

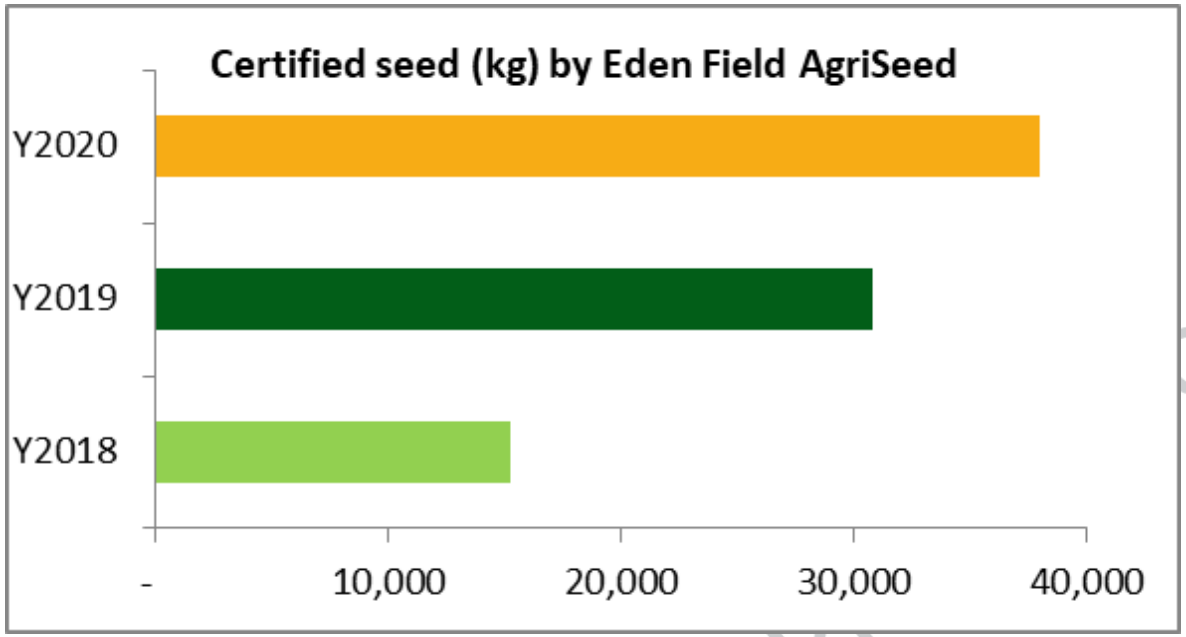
Forage crops	2018	2019	2020	Average(kg)
Oats (*Avena sativa*)	140	100	10	83
Rhode (*Chloris gayana*)	10	10	10	10
Panicum (*Panicum colloratum*)	0	10	10	7
Panicum maximum	10	20	10	13
Vetch (*Vicia dasycarpa*)	160	100	200	153
Vetch (*Vicia villosa* L.)	300	390	230	307
Vetch (*Vicia sativa* L.)	30	60	40	43
Vetch (*Vicia narbonensis*)	80	180	130	130
Dolicos lablab (*Lablab purpureus*)	0	250	30	93
Cow pea (*Vigna unguiculata*)	180	70	50	100
Trifolium (*Trifolium quartinianum*)	0	0	20	7
Pigeon pea (*Cajanus cajan* L.)	0	50	0	17
Sesbania (*Sesbania spp*)	0	0	40	13
Total	910	1210	770	963

Source: ILRI Feed and Forage Development

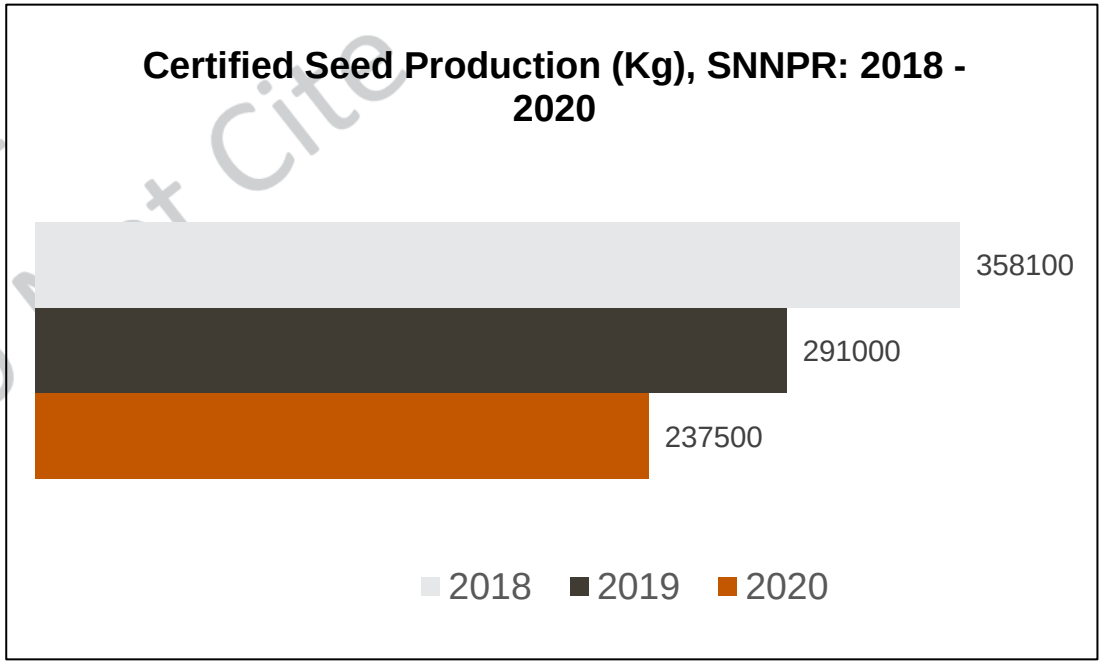
Indicator 3.2 – Share of EGS sold



Indicator 4.1- Volume of certified seed produced



Source: Company database, 2021



Source: SNNPR, 2021

Volume of certified forage seed produced (kg), Eden Fields (2018-2020)

No	Forage crops	2020	2019	2018	Average (kg)
1	Oats (*Avena sativa*)	2800	3200	1800	2600
2	Rhodes (*Chloris gayana*)	3200	2300	1600	2367
3	Panicum (*Panicum antidotal*)	2100	1800	1100	1667
4	Vetch (*Vicia dasycarpa*)	3800	2200	1700	2567
5	Vetch (*Vicia villosa* L.)	800	1200	800	933
6	Dolicos lablab (*Lablab purpureus*)	3500	3200	1600	2767
7	Cowpea (*Cowpea unguiculata*)	6700	4200	2400	4433
8	Tree lucerne (*Chamaecytis* spp)	900	1200	800	967
9	Pigeon pea (*Cajanus cajan* L.)	6000	4800	2700	4500
10	Sesbania (*Sesbania* spp)	800	1200	700	900
11	Alfalfa	200	500	0	233
12	Fodder beet	500	800	0	433
13	Siratro	700	1000	0	567
14	Sudangrass	6000	3200	0	3067
Total		38000	30800	15200	**280000**

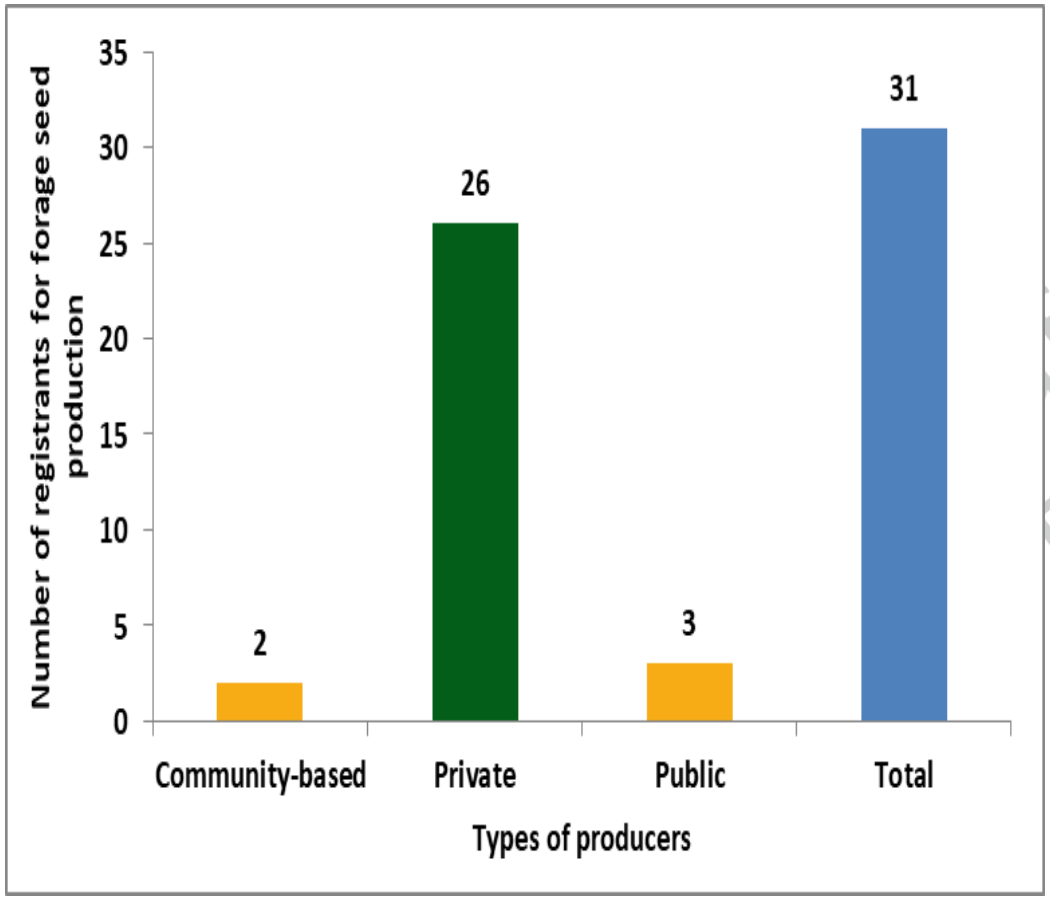
Source: Company database, 2021

Volume of certified forage seed produced (kg), SNNPR (2018-2020)

Forage crops	2020	2019	2018	Annual Average
Panicum	5,000	9,000	9,500	7,833
Cowpea	20,000	32,000	35,000	29,000
Pigeon pea	88,000	95,000	85,200	89,400
Rhodus grass	3,000	3,500	5,000	3,833
Desmodium	3,500	4,300	6,000	4,600
Siratori	1,000	1,500	14,500	5,667
Lucinia	2,300	13,400	13,000	9,567
Sesbania	4,500	6,000	14,000	8,167
Tree lucerene	5,200	5,000	11,500	7,233
Oats	80,000	95,100	122,100	99,067
Lablab	3,000	6,500	15,200	8,233
Sudan grass	7,000	5,000	3,500	5,167
Vetch	10,000	7,000	11,500	9,500
Alfalfa	5,000	7,700	12,100	8,267

Source: SNNPR, 2021

Indicator 4.2: # of entities registered for forage seed production



Source: MoA and BoAs, Certification Database, 2021

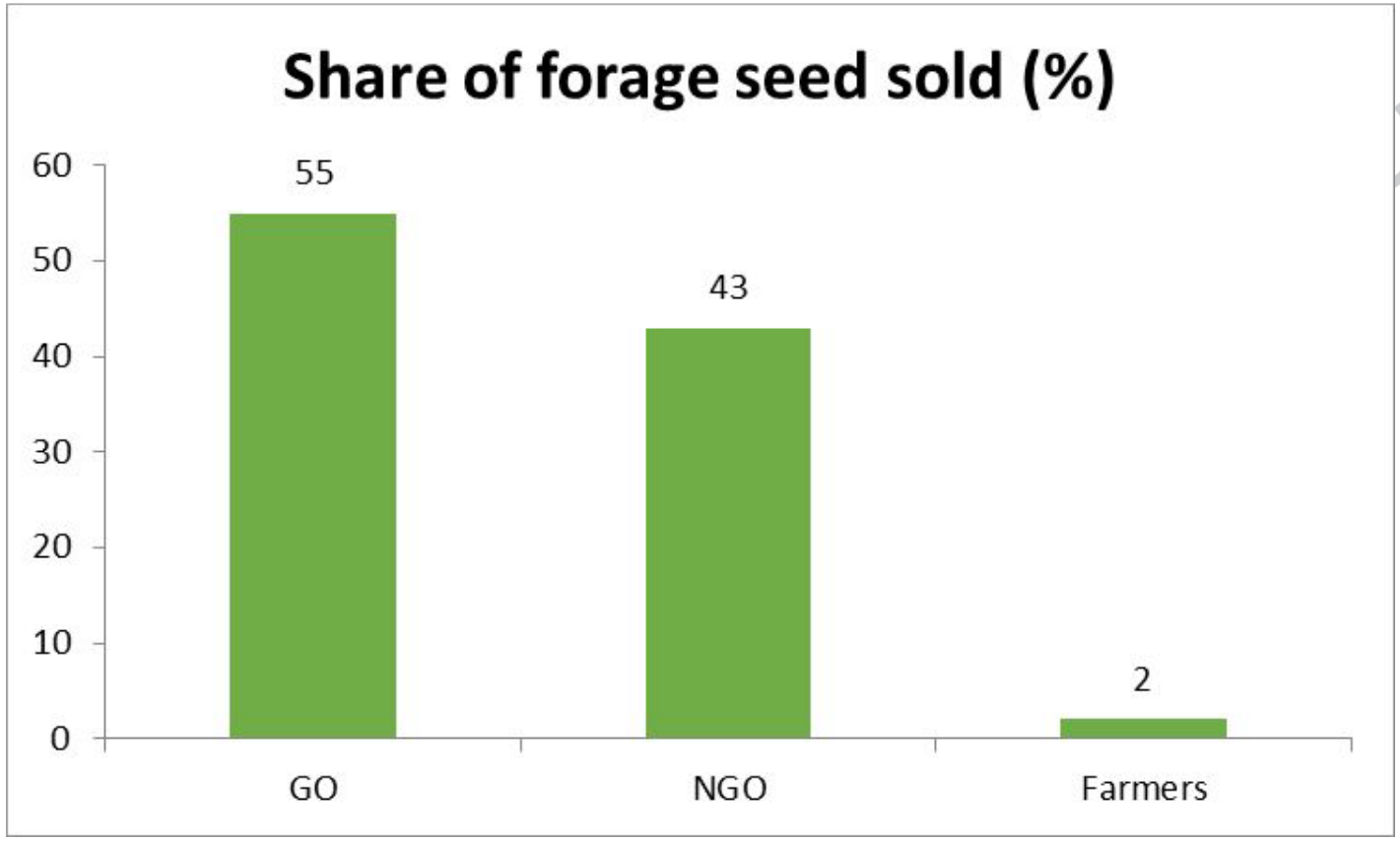
31 registered forage seed producers across Amhara, Oromia and SNNPR

Opportunities

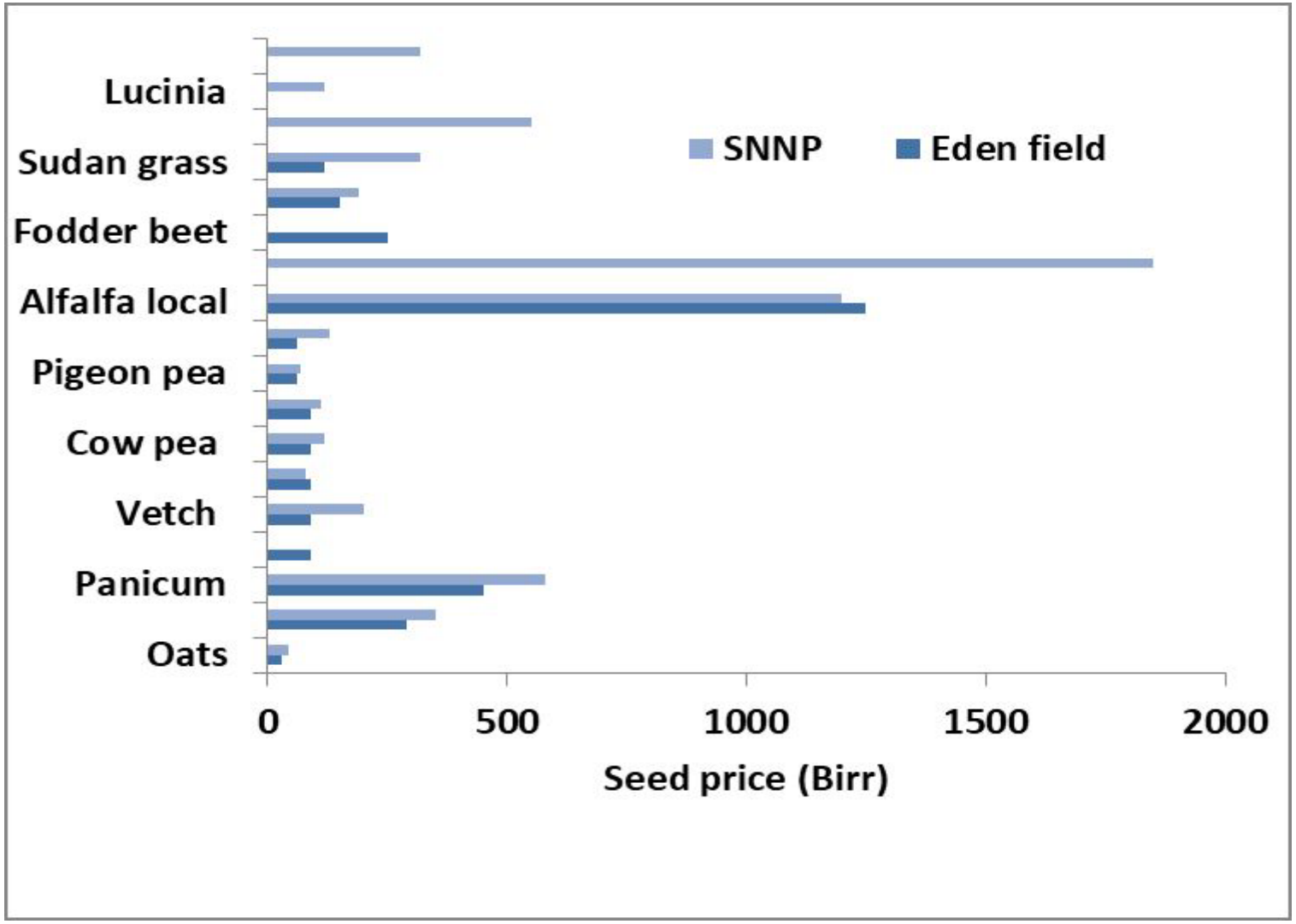
Diverse agro-ecology of Ethiopia

High demand for livestock products

Indicator 5.1: Share of forage seed produced sold



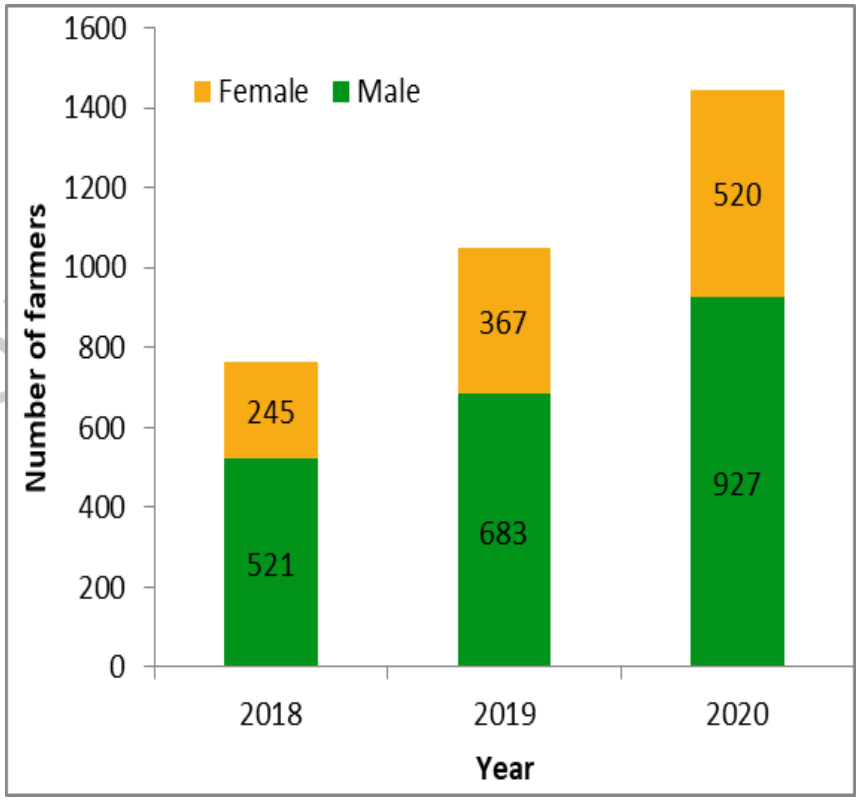
Indicator 5.2 – Price of certified seed (Birr/Kg)



Indicator 5.3 – Number of individuals trained on forage extension

Issues / Challenges

- Limited adoption by farmers
- Competition from food crops
- Limited awareness on commercial benefits of forage crops
- Lack of the culture to purchase forage seed
- High forage seed price
- Training and extension services on the use of cultivated forages



Source: SNNPR, BoA

Indicator 6.1 and 6.2 : # of forage crops with QDS standards

Issues

- Priority to the food crops
- **Seed standards for 13 of the registered forage species**
- difficult or impossible to implement or enforce with the facilities
- no inspectors specified for forage seed field inspection
  --- diversity in nature of forage crops
- Quality Declared Seed (QDS)

5 - forage crops with QDS standards

- (Dolicos lablab (*Lablab purpureus*),
- Andropogon (*Andropogon gayanus*),
- Clover (*Trifolium quartinianum*),
- Elephant grass (*Pennisetum purpureum*),
- Phalaries (*Phalaris aquatica*))

Key Takeaways

- The gene bank conserves diverse collections of forage species. that could offer the possibility of developing high yielding forage varieties.
- However, the forage breeding program lacks adequate number of active breeders, as well as physical capacity.
- The available data shows that the volume of forage EGS has increased over the years. However, the EGS is not produced for the latest released varieties.
- There are not that many forage seed standards. Unavailability of standards limit commercial seed production of a range of varieties.
- Although there are CoC holders who indicate they are producing forages among other crops, it is not known with certainty whether and how much actual forage seed they are producing.
- The forage seed marketing system exhibits forage seed distribution and not marketing. Need to form market linkages to create incentives for forage seed production as a business.
- The forage extension service as well as seed inspection needs to be strengthened.

Way Forward

- Establish an incentive mechanism for strong engagement of the private and public sector in forage seed production and marketing.
- Establish a strong and specialized seed certification (including QDS mechanisms) and marketing system that can address the specific nature of forage seeds.
- Strengthen the extension system for forages, as well as seed inspection services
- Establish a strong evidence knowledge that compels the comparative economic benefit and role of cultivated forages in a sustainable livestock production systems.
- Recently Ethiopian Forage Seed Association was established (2021). Strengthen the capacity of the association so there is better coordination and collaboration on the ground.


Questions?

Speakers Bios

Dr. Bhramar Dey (Senior Technical Advisor, S34D CRS) brings a unique blend of project design, management, and analytical skills focusing on country-led interventions in data, policy, monitoring and evaluation, and agricultural input systems. She has over 18 years of experience in data and regulatory reform analyses, and designing, managing large client and stakeholder-oriented projects. Prior to joining CRS, Dr. Dey worked at the Bill and Melinda Gates Foundation (BMGF) - Agriculture initiative. Born and raised in India, Bhramar holds a Ph.D. in Applied Economics from Clark University.

Dr. Karta Kaske Kalsa (Senior Researcher, Seed Science and Technology, EIAR). He received his Ph.D. in Postharvest Technology (Seed Storage) from Bahir Dar University, Ethiopia. He has 19 years research experience in seed science and technology (including forage seed systems). He served in various development projects financed by the World Bank, African Development Bank, GIZ, and USAID. He led research at different capacities. Currently, he is Director of Technology Multiplication and Seed Research Directorate of Ethiopian Institute of Agricultural Research.

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