



International Center for Tropical Agriculture
Since 1967 / *Science to cultivate change*

Forage seed systems in eastern Africa: Challenges and opportunities

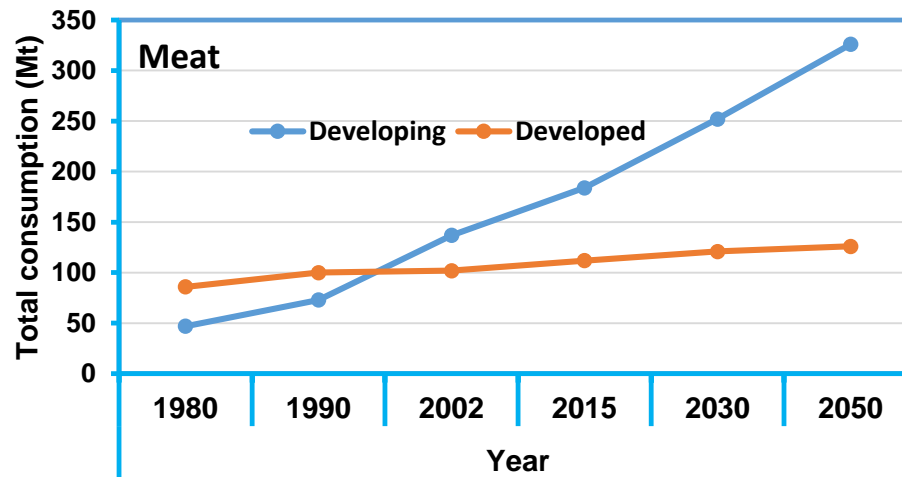
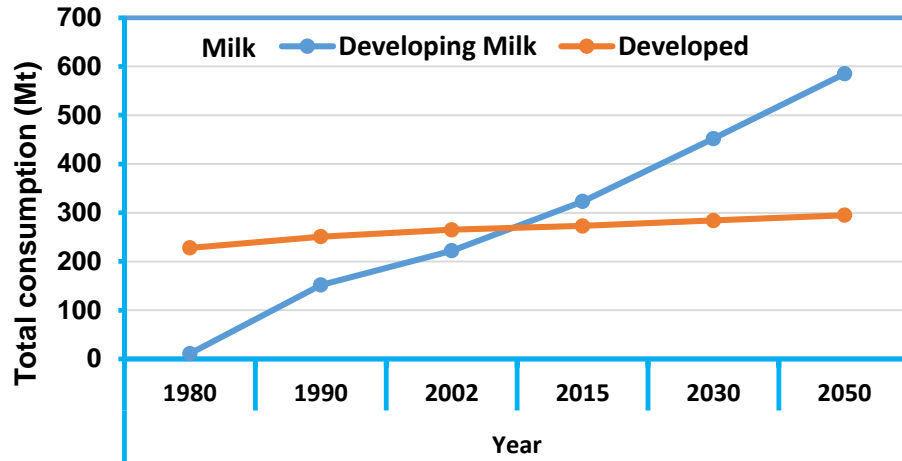
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M. ¹, Jones C. ²*



53rd Grassland Congress of South Africa
22 -27 July 2018, Pretoria South Africa

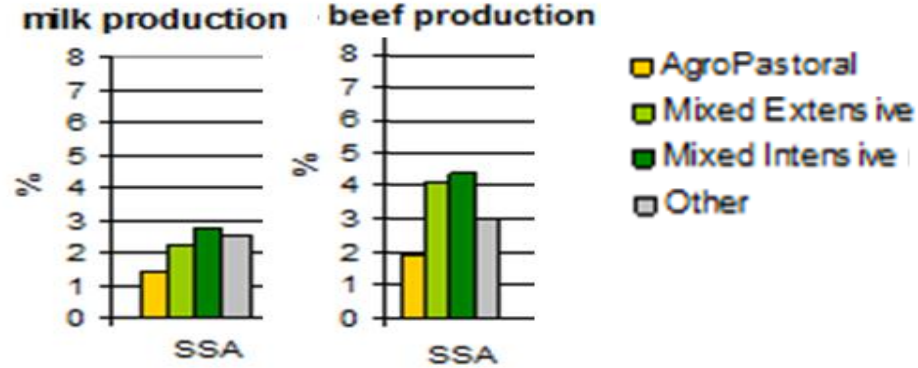
Introduction

Africa's Livestock revolution



Steinfeld et al 2006; FAO 2006

Annual rates of change 2000-2030



Herrero et al, 2008

Meat and milk in developing countries is predominantly produced in **mixed crop-livestock systems**, although productivity is still low



By 2050 the demand for meat, milk, eggs will have doubled

LivestockPlus – A concept

Forages for producing meat, milk, manure, and more.....

Approaches/ Innovations

Agroecological
crop-livestock-tree
systems

Genetic
yield, quality, stress
resistance

Social
creating enabling
environments, markets,
building social and human
capital

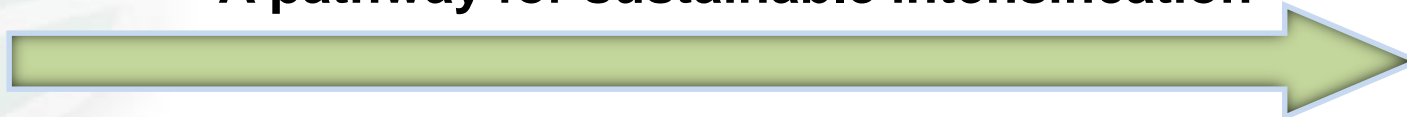
Livelihood benefits

- Milk
- Beef, meat
- Eggs
- Manure
- Adaptation to
climate change
- Food security
- Income generation
(+PES)
- Poverty alleviation
- Nutritional security

Environmental benefits

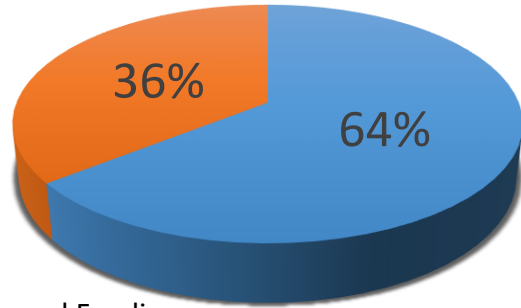
- Soil quality
- Resource use
efficiency
- Restoration of
degraded lands
- Mitigation of climate
change
- Biodiversity
conservation
- Other ecosystem
services

A pathway for sustainable intensification



Forage contribution to livestock productivity

Livestock production costs



■ Feeds and Feeding

■ Labour, health services, A.I etc.

Odero-Waitituh, 2017



Potential of improved forages in eastern Africa

- Current potential of mixed crop-livestock systems in e.g. SSA remains largely **underexploited**
- Recent **economic fore-sight** had shown for example **improved forages e.g. Brachiaria** has the potential to increase milk production by up to 40% - *Gonzales et al. 2016*

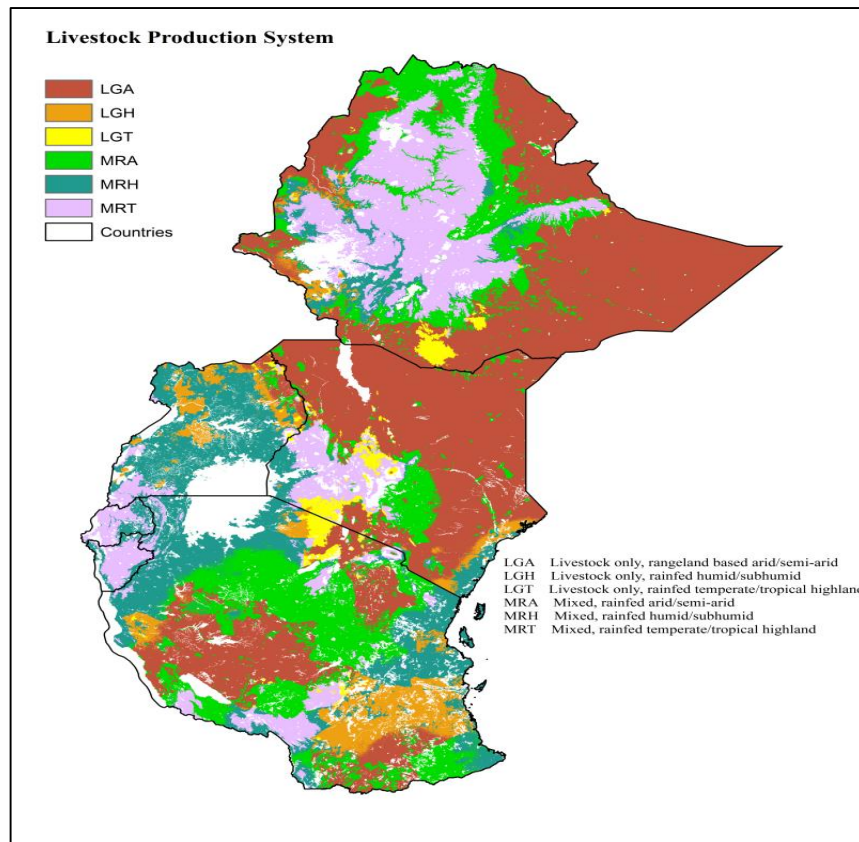
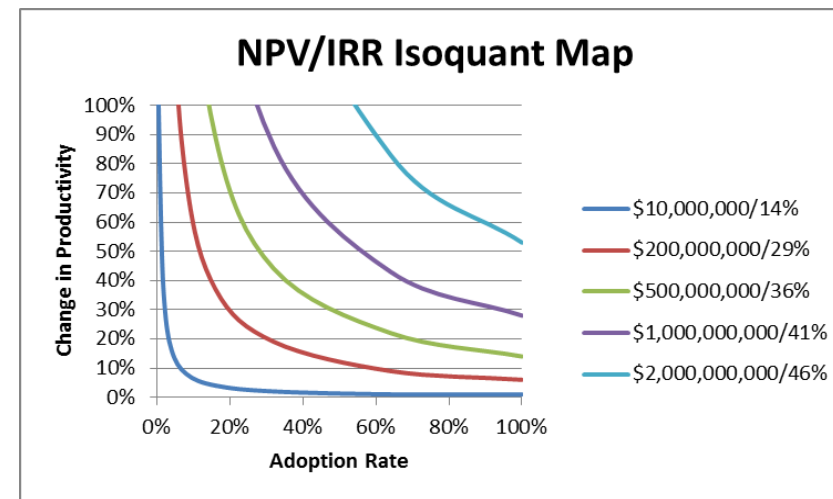


Figure 1: Production systems map of the study area.

Source: Authors' creation using data documented by Robinson et al. (2011).

	5%	8%	10%	13%	15%	18%	21%	23%	26%	29%	31%	34%	36%	39%	42%	44%	47%	50%	52%	55%	57%	60%
5%	-3,637	1,694	5,249	10,583	14,141	19,478	24,818	28,380	33,723	39,068	42,633	47,982	51,549	56,901	62,256	65,826	71,184	76,544	80,118	85,482	89,058	94,425
10%	5,249	15,920	23,038	33,723	40,851	51,549	62,256	69,398	80,118	90,847	98,004	108,747	115,913	126,669	137,433	144,614	155,392	166,178	173,374	184,174	191,379	202,192
15%	14,141	30,160	40,851	67,812	83,694	99,794	110,538	126,669	142,818	153,595	169,776	180,573	196,785	213,015	223,835	240,106	256,385	267,248	283,559	294,443	310,784	
20%	23,038	44,416	58,686	80,118	94,425	115,913	137,433	151,799	173,374	194,982	209,406	231,070	245,580	267,248	289,000	303,519	325,325	347,164	361,742	383,638	398,251	420,200
25%	31,942	58,686	76,544	103,374	121,290	148,206	175,173	193,180	220,234	247,339	265,437	292,628	310,784	338,061	365,389	383,636	411,050	438,516	456,855	484,406	502,802	530,440
30%	40,851	72,971	94,425	126,669	148,206	180,573	213,015	234,683	267,248	299,888	321,688	354,451	376,334	409,221	442,182	454,197	497,281	530,440	552,586	585,689	608,098	641,504
35%	49,765	87,270	112,329	150,002	175,173	213,015	250,957	276,307	314,418	352,629	378,160	416,539	442,182	480,730	519,378	545,200	584,018	622,936	648,937	688,024	714,137	753,392
40%	58,686	101,584	130,256	173,374	202,192	245,590	289,000	318,053	361,742	405,563	434,851	478,892	508,326	552,586	596,979	626,647	671,260	716,094	745,907	790,871	820,920	866,104
45%	67,612	115,913	148,206	196,785	229,263	278,120	327,144	359,919	409,221	458,690	491,762	541,509	574,766	624,791	674,984	708,538	759,008	809,645	843,496	894,411	928,447	979,641
50%	76,544	130,256	166,178	220,234	256,385	310,784	365,389	401,906	456,855	512,009	548,893	604,391	641,504	697,345	753,392	790,871	847,262	903,858	941,704	998,644	1,036,718	1,094,002
55%	85,482	144,614	184,174	243,722	283,559	343,522	403,735	444,015	504,643	565,521	606,244	667,537	708,538	770,246	832,204	873,648	936,021	998,644	1,040,531	1,103,569	1,145,733	1,209,187
60%	94,425	158,987	202,192	267,248	310,784	376,334	442,182	486,245	552,586	619,225	663,815	730,948	775,868	843,496	911,420	956,868	1,025,286	1,094,002	1,139,977	1,209,187	1,255,492	1,325,196
65%	103,374	173,374	220,234	290,814	338,061	409,221	480,730	528,595	600,684	673,122	721,607	794,624	843,496	917,094	991,040	1,040,531	1,115,057	1,189,932	1,240,042	1,315,497	1,365,994	1,442,029
70%	112,329	187,776	238,298	314,418	365,389	442,182	519,378	571,067	648,937	727,211	779,618	858,565	911,420	991,040	1,071,064	1,124,637	1,205,334	1,286,435	1,340,726	1,422,500	1,477,240	1,593,687
75%	121,290	202,192	256,385	338,061	392,768	475,217	558,128	613,660	697,345	781,493	837,849	922,770	979,641	1,065,334	1,151,491	1,209,187	1,296,116	1,383,510	1,442,029	1,530,195	1,589,230	1,678,169
80%	130,256	216,624	274,495	361,742	420,200	508,326	586,379	656,374	745,907	835,967	896,300	987,239	1,048,159	1,139,977	1,232,323	1,294,180	1,387,405	1,481,157	1,545,952	1,638,383	1,701,964	1,797,475
85%	139,228	231,070	292,628	385,462	447,682	541,509	635,931	699,210	794,624	880,634	954,971	1,051,974	1,116,973	1,214,968	1,313,558	1,379,616	1,479,199	1,579,377	1,646,493	1,747,664	1,815,442	1,917,605
90%	148,206	245,590	310,784	409,221	475,217	574,766	674,984	742,166	843,496	945,493	1,013,863	1,116,973	1,186,084	1,290,307	1,395,197	1,465,495	1,571,498	1,678,169	1,749,654	1,857,437	1,929,663	2,088,559
95%	157,189	260,005	328,963	430,019	502,802	608,098	714,137	785,243	892,522	1,000,545	1,072,974	1,182,237	1,255,492	1,365,994	1,477,240	1,551,818	1,664,304	1,777,533	1,853,433	1,967,939	2,044,629	2,160,338
100%	166,178	274,495	347,164	456,855	530,440	641,504	753,392	828,442	941,704	1,055,790	1,132,305	1,247,765	1,325,196	1,442,029	1,559,687	1,638,583	1,757,615	1,877,470	1,957,832	2,079,061	2,160,338	2,282,941



Example of forage seed uptake- Eastern Africa

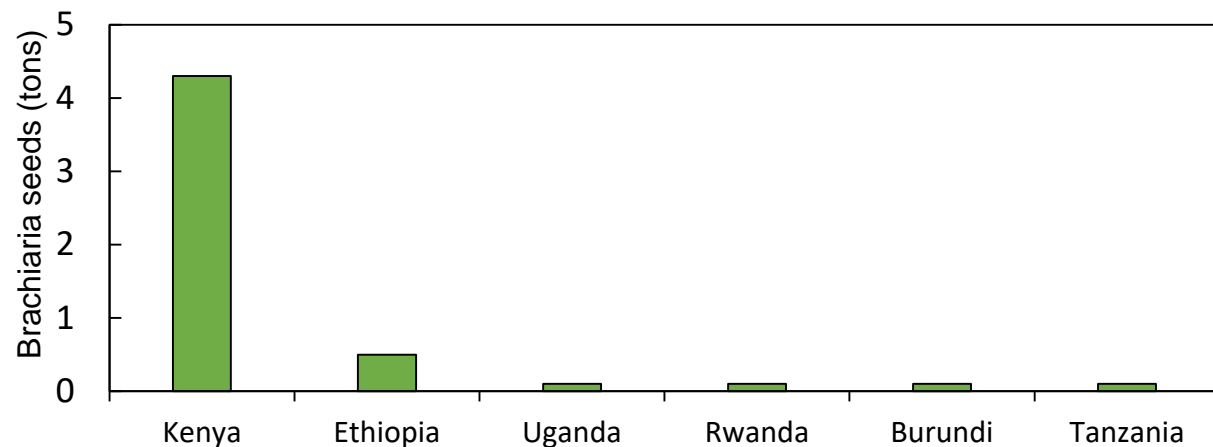


Fig. 1. *Brachiaria* seed (tons) sold across eastern African countries (2017-April 2018) from Advantage Crops Limited. (Data obtained from Advantage Crops Limited).

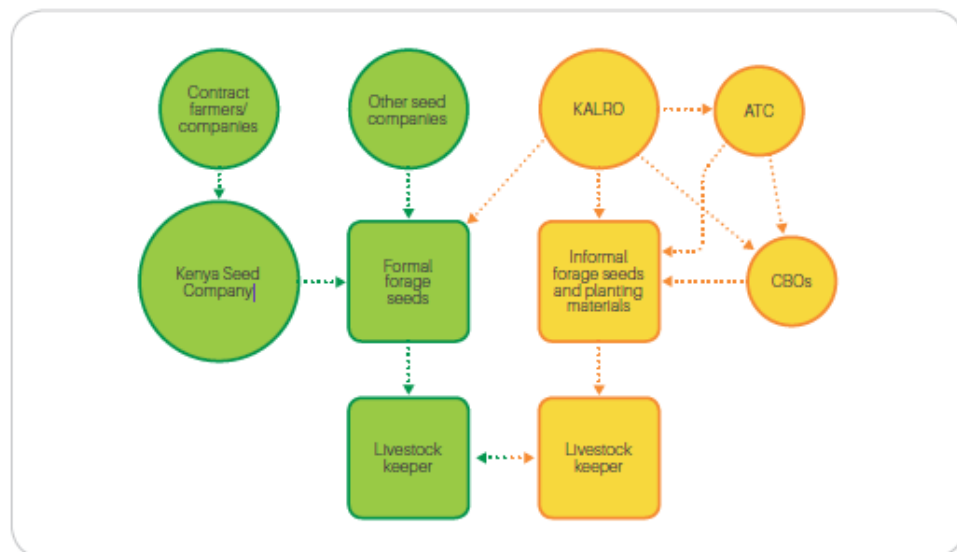



Figure 2. Conceptual model of formal and informal forage seed systems in Kenya. ATC Agricultural Training Center CBOs Community-based organizations KALRO Kenya Agricultural and Livestock Research Organization.

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Species: Pasture (*Brachiaria* spp.)

Variety Name	Release Name	Owner(s) License	Maintainer And Source	Area of Production	Maturity Duration	Yield (T/ha)	Special Attributes
Capman	Capman	Advantage seeds	ACL/Tropical Seeds LLC	Moderately fertile to fertile soils in areas with 500 mm seasonal rains	3.0 months 1.5 - 2.5 months for regrowth	10.5	<ul style="list-style-type: none"> An apomictic hybrid <i>Brachiaria</i> grass; high tolerance to drought and high persistence and can maintain over 85% seed cover even four years after establishment; high regrowth capacity; and good tolerance to waterlogging. Highly nutritional quality fodder; has good qualities for preservation in form of hay.

8th July, 2016 THE KENYA GAZETTE 2701

Variety Name	Release Name	Owner(s) License	Maintainer And Source	Area of Production	Maturity Duration	Yield (T/ha)	Special Attributes
Cobra	Cobra	Advantage seeds	ACL/Tropical Seeds LLC	Moderately fertile to fertile soils in areas with 500 mm seasonal rains	3.0 months 1.5 - 2.5 months for regrowth	9	<ul style="list-style-type: none"> Apomictic hybrid <i>Brachiaria</i> grass; high tolerance to drought; fast growing/maturing; erect growth habit with well-defined panicles, which is ideal for cut-and-carry systems. It also has good persistence; has good qualities for preservation in form of hay and silage.
Mulato II	Mulato II	Advantage seeds	ACL/Tropical Seeds LLC	Moderately fertile to fertile soils in areas with 500 mm seasonal rains	3.0 months 1.5 - 2.5 months for regrowth	8.7	<ul style="list-style-type: none"> It is an apomictic hybrid, high tolerance to drought, good adaptation to acid soils of medium to low fertility, fast growing/maturing, highly palatable and high in nutritional quality for livestock. It is easy to handle as a cut and carry for controlled grazing systems and has good qualities for preservation in form of hay.



Efforts contributing to seeds access



Netherlands Organisation for Scientific Research



Integrated Seed Sector Development

■ ISSD is a sector-wide inclusive approach that

- Builds seed programmes upon a diversity of seed systems
- Strengthens seed enabling environment

Creating vibrant, market-oriented and pluralistic seed sectors, enhancing farmers' access to quality seed of superior varieties, thereby contributing to food security and economic development

http://www.issdseed.org/sites/default/files/resource/introduction_to_issd_africa_-_bram_de_jonge_16_march_2016.pdf

By Bram De Jonge

7- Representation of farmers and civil society organisation in established seed agencies

- ▶ Seven countries (**Ghana, Kenya, Malawi, Rwanda, Senegal, South Africa and Uganda**) have clearly established national seeds committees, and/or variety release committees, or seed regulation committee in which farmers and/or NGOs are represented
- ▶ eleven countries (**Benin, Burkina Faso, Cote d'Ivoire, Madagascar, Mali, Mauritania, Mauritius, Morocco, Niger, Nigeria and Tanzania**) have established such committees in their laws or policies and either fail to enunciate their memberships or fail to include farmers or NGOs among the proposed members
- ▶ three countries (**Botswana, Zambia and Zimbabwe**) are silent on such committees in their existing seeds regulations
- ▶ Four countries (**Algeria, Burundi, Cameroon, Ethiopia**) have provided in their regulations that the setting up of such committees is subject separate regulations.

http://www.issdseed.org/sites/default/files/resource/issd_africa_draft_seed_law_survey_-_marcelin_mahop_16_march_2016.pdf

by Dr Marcelin Tonye Mahop



Factors likely catalyze forage seed demand

Eastern Africa (**Ethiopia, Uganda, Rwanda, Kenya & Tanzania**), is a home to an estimated **109.2** Million cattle, and cattle population is increasing.

Farmers understand use of improved forages(**Tekalign, 2014**),

- ▣ Results in increased productivity
- ▣ access to such material at affordable prices is a concern.

For example -Ethiopian Livestock Masterplan (**2014**),

- ▣ Estimated forage seed demand quantity within the country 2,200 tons
- ▣ Projected to increase by about **300%** by the year 2020.

Opportunity exists to double production in response to improved nutrition with these effects amplified when considering profitability (**Mayberry et al., 2017**).



High number of livestock keepers (millions)- (Steinfeld et al. 2006).

- ▣ Uganda 5.7 , ▣ Kenya 5.9,
- ▣ Rwanda 2.1, ▣ Tanzania 8.3,
- ▣ Ethiopia 15



Successful farmers' experience - achieve convincing results with the forages:

- ▣ demand for such species is likely to grow.
- ▣ Awareness creation for such forages grasses would be key.



Empowering livestock keepers – required information i.e. awareness creation -multiple avenues

- ▣ demonstration plots,
- ▣ media,
- ▣ field-days.

Challenges



Usually, farmers lack information and technical knowledge on how to access and grow (Franzel, 2014), and how to feed the animals appropriately.



Exploring forage seed business models is important - locally produced or through importation.



Lack of forages promotions – suitable in different systems and agro-ecologies. Weak or non-existent institutional linkages



Weak forage seed value chain. Inadequate forage seed research, lack of reliable forage seed production, processing and distribution schemes, poorly developed seed marketing systems and limited involvement of private seed



Producer–consumer linkages that would otherwise contribute to commodity flow connecting to the market for sustainability are lacking.



Although both formal and informal sectors are at play, with the informal involving farmers who grow forage seeds, there is a general lack of certified seeds and technology.



Some forage seeds require extra care especially during establishment.



If not addressed properly viability can be a constraint – i.e. low germination rates

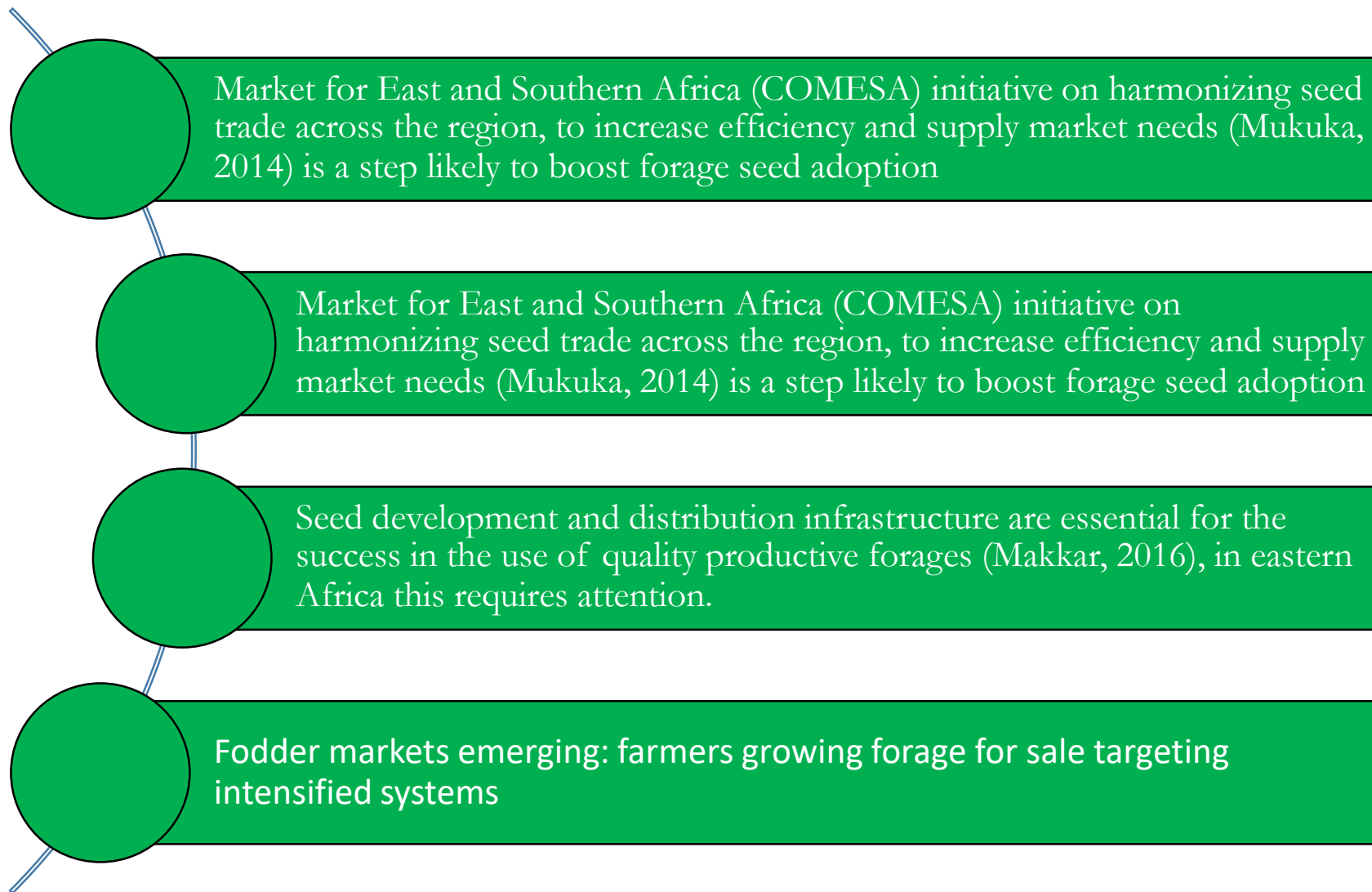
Opportunities

Worldwide, the global forage seed market has been growing. In 2014, the seed market was estimated at USD 10,789 million expected to reach about USD 17,508 million by 2020 (Transparency, 2015).

This reflects the importance they serve in the production of milk and meat for the global human population projected to reach about 9 billion by 2050 (World Bank, 2014).

It is likely, that the forage seed demand in eastern Africa will grow over time driven by the livestock revolution - increase in demand for animal source foods.

The human population in SSA has been increasing steadily at $\approx 3\%$ (World Bank, 2014) and by 2016 had reached a billion. In addition, cattle numbers have also been increasing implying more forage requirements.



Conclusions

Evidence of improved animal performance would contribute to forage uptake and increased forage seed demand.

The private sector get engaged if there are financial returns from forage seeds. However, not all seeds are likely to have the same business potential.

It is likely that both formal and informal approaches would remain functional and has the advantage of synergizing as some seeds have been found not to be profitable to companies.

The rise in demand for animal products in SSA will most likely lead to increased forage cultivation coupled with rising in demand for forage seeds in eastern Africa.

Facilitative policy on seed movement across countries in the eastern Africa will bolster forage adoption.

Grasses that form the basal diet are likely to trade in large volumes compared to legumes that are for supplementation. Opportunities that exist include the development of productive forage technologies coupled with awareness creation.