

[View this email in your browser](#)



Newsletter Vol.36

CSA technologies at the NARIS due for commercialization

Dear AR4D colleagues,

ASARECA in collaboration with KALRO held a “Dialogue on Commercialization of Climate-Smart Agricultural Technologies, Innovations and Management Practices in Eastern & Central Africa” from March 15th to 18, 2022.

The overall objective of the dialogue was to promote commercialization of climate-relevant agricultural TIMPs in Eastern and Central Africa. The specific objectives were to:

- To raise awareness on the CAADP-XP4 and AICCRA projects
- To identify and document the digital climate advisory capacity gaps among farmer organizations, private sector, and policy makers
- To facilitate dialogue between policy makers and private sector partners in enhancing integration of national (e-) extension system for widespread dissemination.
- To discuss with the private sector, agree and document the best bet climate-smart priority agricultural TIMPs with regional importance and for commercialization and scaling
- To discuss and agree with the private sector on strategies to commercialize and scale-out the prioritized TIMPs
- To discuss with key stakeholders, the barriers and mechanisms for addressing barriers to exchange of TIMPs in ECA.
- To establish an Agricultural Technology and Innovations Commercialization Platform for ECA.



The dialogue targeted private sector, farmer organizations, policy makers, extension workers, climate scientists, research organizations and media from ASARECA's 14 member states namely: Uganda, Kenya, Tanzania, Rwanda, Burundi, Ethiopia, Eritrea, South Sudan, Sudan, Central African Republic, Republic of Congo, Cameroon, Madagascar, and Democratic Republic of Congo.

In this issue of our newsletter, we share with you some of the best bet Climate Smart Agriculture technologies that our NARIs are offering for commercialization by the private sector, and ultimately for uptake.

Best-bet climate smart technologies ready for commercialization

BURUNDI (ISABU)

Burundi's National Agricultural Research Institute (ISABU) has the mandate to: Conduct research in seed production for different crops; research on new varieties to improve adaptability; research in tissue culture technologies; engage in greenhouse production for roots and tubers; manage plant diseases; produce bio fertilizers for legume crops; undertake small scale irrigation for vegetable crop; fodder production technologies; pig breeding; and artificial insemination among others.

Priority commodity	Name of CSA Technology Innovation	Year of release	CSA Attributes	Status of commercialisation	Contacts
Crops					
PDT	Early maturing low land potato varieties	2019-2020	climate resilience and food security	Low land ware potato producers	ISABU/Potato team/ 79439473
	The use of Rest Breaking agents (super grow and other technologies) on potato dormancy release	2020-2021	climate resilience and food security	Private Potato seeds producers	ISABU/Potato team/ 79914457
	Disease-free potato minitubers production under greenhouses	2015-2021	climate resilience seeds production and food security	Private potato seeds producers of early generations: ADPR, INYOMI, SOVERT, AGRINODE, Francois	ISABU Potato team/ 79914457
	Organo-mineral potato fertilization	2021	climate resilience seeds production and food security	Private potato seeds producers; All Farmers	ISABU Potato team/ 79914457
Beans	MAGORORI	2015	Biofortied and early maturing	Commercialised by seed company	ISABU, bean Team
	RUFUTAMADEN	2015	High market value	Commercialised by seed company	ISABU, bean Team
	KANEZA	2015	Biofortied and early maturing	Commercialised by seed company	ISABU, bean Team

Mechanisation					
Multi-crop thresher	Multi-crop thresher	2019	Labour saving	Commercialised by artisans	Pasteur, ETS Kamenge
Value addition technologies					
Bean flour	Bean flour	2019	Rich nutrients	Commercialized by the bean processors across the country	Totahara Regerubuzima, Kaflobe factoraies

UGANDA

Name of CSA TIMP	Year of release	CSA attributes	Status of commercialization	Contacts of scientists and institution that developed this technology
Fast growing Nile Tilapia strains	2016	Faster growth rates at an average of 2.47g per day hence a short production cycle, thus efficient use of resources		NARO-National Fisheries Resources Research Institute
NARO- anti-Helminth (Dewormer)	2017	Efficient use of natural resources. Causes 94% mortality of nematode larvae in 24 hours which ensures normal growth of goats		NARO- National Livestock resources Research Institute
NARO- Mubende Elite (Goat)	2017	Faster growth, 90% twinning ability and tolerant to diseases		NARO- National Livestock resources Research Institute
NAROCicks	2017	High feed use efficiency; higher growth rates (cocks attain 2kg in 4 months), hen attain 1.5 kg in 4 months and tolerant to diseases		NARO- National Livestock resources Research Institute
Un-extruded floating insect-meal based fish feed	2021	Sustainable and efficient use of natural resources	Still under incubation	NARO-NaFIRRI)

Mechanization CSAs

Name of CSA TIMP	Year of release	CSA attributes	Status of commercialization	Contacts of scientists and institution that developed this technology
NARO lightweight Rice Thresher LWR1	2013	Threshing output 550-700kg/liter with threshing efficiency of 99.9%		NARO- Agricultural Engineering and Appropriate Technology Research Center

		-The rice thresher is energy efficient uses 50% energy		
Biomass Stove	2013	Efficiency in combusting low porosity biomass including agro-wastes saves 2.7-3kg of firewood per hour. The biomass stove uses 50% energy		NARO- Agricultural Engineering and Appropriate Technology Research Center
NARO-briquette machine	2017	Increases utilization of wood waste as source of cooking reducing pressure on forests for fuel wood		NARO- National Forestry Resources Research Institute
Compressed Biogas (Alternative for Liquefied petroleum gas)	2020	Less methane emissions into the environment; 8 alternative products from bio-slurry e.g. liquid soap, bio-electricity, bio-fertilizer, sulphuric acid, etc.		NARO – National Livestock Resources Research Institute
NARO RAMP-2 (Ram pump)	2020	Pump is powered by energy flowing waterfall therefore it is environmentally friendly and has low operational cost. Enables smallholder farmers along rivers/ streams with waterfalls to produce crops especially vegetables all year round	Not yet, still prototype	NARO- Agricultural Engineering and Appropriate Technology Research Center
NAROFIK-3-D6 (Fish Kiln)	2020	Reduces amount of firewood and charcoal required for smoking fresh fish by 50% and significantly reduces smoking time to just 10-14 hours from 48-72 hours taken by the traditional methods of chokiri kilns.		NARO- Agricultural Engineering and Appropriate Technology Research Center

Value addition and food processing

Name of CSA TIMP	Year of release	of CSA attributes	Status of commercialization	Contacts of scientists and institution that developed this technology
NARO-KUMA fuel lighters	2017	Easy and fast to light fuel with minimum smoke; environmentally friendly		NARO- National Forestry Resources Research Institute
Bio-degradable nano-surface package from agricultural waste (cassava & banana		Bio-degradable, environmentally friendly		NARO-National Agricultural Research Laboratories, Kawanda

peels, rice & wheat straws, etc.)				
Aflasafe		Aflasafe is a mycotoxin-binding technology that deploys non-toxigenic fungi to control aflatoxin contamination in cereals and pulses		IITA & NARO - (NaCRRRI) & NaLIRRI

UGANDA (NARO HOLDINGS)

Name of technology innovation	CSA or Year of release	CSA Attributes	Is the technology already commercialized	Contacts
Crops				
<ul style="list-style-type: none"> Improved crop varieties (groundnuts, beans, maize, rice, sorghum, finger millet, cowpea, sesame, greengram, pastures) 	2015-2019	<ul style="list-style-type: none"> Drought tolerance, early maturity, short cooking time, high yielding, water use efficiency 	<ul style="list-style-type: none"> Exclusive, semi-exclusive and non-exclusive licenses with 13 seed companies Local Seed Business (LSB) groups 	<ul style="list-style-type: none"> NARO-National Semi-Arid Resources Research Institute (NaSARRI) and National Crop Resources Research Institute (NaCRRRI)
<ul style="list-style-type: none"> Bio-fertilizers and bio-pesticides 	<ul style="list-style-type: none"> 2020 	<ul style="list-style-type: none"> Eco-friendly & sustainable 	<ul style="list-style-type: none"> NARO Holdings Ltd; Bumi Hijau (U) Ltd 	<ul style="list-style-type: none"> NARO – National Agricultural Research Laboratories (NARL), Kawanda
Livestock				

<ul style="list-style-type: none"> Improved grass (Cenchrus, Brachiaria, Chloris gayana) and legume pasture species 		<ul style="list-style-type: none"> Drought resilient forage species with low carbon footprints; tannin & saponin based feed supplements reduce GHG emissions by ruminants; high FUE 	<ul style="list-style-type: none"> NARO Holdings Ltd; 	<ul style="list-style-type: none"> Improved grass (Cenchrus, Brachiaria, Chloris gayana) and legume pasture species
Mechanisation				
<ul style="list-style-type: none"> Solar grain dryers 	2021	<ul style="list-style-type: none"> Uses solar energy; low cost technology 	<ul style="list-style-type: none"> NARO Holdings Ltd 	<ul style="list-style-type: none"> NARO-AEATRE C
<ul style="list-style-type: none"> Use of hermetic silo structures for storage of maize 	2015	<ul style="list-style-type: none"> Cheap, eco-friendly and re-usable over a long time. 	<ul style="list-style-type: none"> NARO Holdings Ltd 	<ul style="list-style-type: none"> NARL Kawanda
<ul style="list-style-type: none"> Animal drawn potato digger 	2017	<ul style="list-style-type: none"> Environmentally friendly 	<ul style="list-style-type: none"> NARO Holdings Ltd 	<ul style="list-style-type: none"> Buginyanya ZARDI
Climate Smart Management practices				
<ul style="list-style-type: none"> Agro-ecology specific shade tree species for various coffee agro-ecologies of Uganda 	2016	<ul style="list-style-type: none"> Comprises of only shade trees that are not alternative host/source of BCTB, provide effective and efficient shade and mulch that increases coffee yield by 20-50% 	<ul style="list-style-type: none"> NARO Holdings Ltd 	<ul style="list-style-type: none"> NARO-NaCORI
<ul style="list-style-type: none"> Plantation Carbon Sequestration InfoPak (PCS InfoPak) 	2017	<ul style="list-style-type: none"> First documentation of quantity of carbon sequestered in 3, 5 & 8 year old clonal eucalyptus and 3, 7 & 11 year old pine plantations in Uganda 	<ul style="list-style-type: none"> NARO Holdings Ltd 	<ul style="list-style-type: none"> NARO-NaFORRI

<ul style="list-style-type: none"> Hydrogel AppRate 	<ul style="list-style-type: none"> 2017 	<ul style="list-style-type: none"> Techniques for application of hydrogel to enhance water retention for tree seedling survival under water stressed environments. 10 g of hydrogel per plant applied during planting at the onset of rains increases tree survival to 90% compared to 50% under no hydrogel 	<ul style="list-style-type: none"> NARO Holdings Ltd 	<ul style="list-style-type: none"> NARO-NaFORRI
<ul style="list-style-type: none"> NARO-CAST Carboniser Stove 	<ul style="list-style-type: none"> 2017 	<ul style="list-style-type: none"> Reduces carbon monoxide emissions and produces high-quality charcoal. The stove uses 66% less wood fuel than the 3-stone stove which is used by 80% of Uganda's households. It cooks twice as fast as the 3-stone stove 	<ul style="list-style-type: none"> NARO Holdings Ltd 	<ul style="list-style-type: none"> NARO-NaFORRI

KENYA (KALRO)

- Some of the TIMPs are strong on adaptation and mitigation.
- There are many CSA TIMPs in KALRO, probably several hundred across various value chains and also agricultural production systems.
- The CSA TIMPS are a product of collaborative research with other NARS, CGIAR centers and the Private sector.
- The issue of attribution and co-ownership of patents often emerges at the stage of dissemination.
- Most of the technologies are complementary and cannot stand alone.

Name of CSA TIMP	Year of release	of CSA attributes	Status of commercialization	Contacts of scientists institution developed technology	of and that this	Name of CSA TIMP
------------------	-----------------	-------------------	-----------------------------	---	------------------	------------------

Beans	KAD 02 Nyota		Drought tolerant; Early maturing – 65-70 days; yields 15% more yield than other varieties; Micronutrient rich bean, high grain iron content; high zinc grain content; cooks fast; 1.4-2.2T/Ha	KALRO	
Green grams	Ndengu Tasha	2017	Early maturing (65 –70 days); high yielding – 1.8-2.3Tons/Ha; grows in a wide range of climatic conditions – 0-1600 masl; heat and drought tolerant; temp range 25- 350C; 400-550 mm rainfall.		
Maize	KDH414-05-09 (Ukamez-1 to 5) variety	2019	Drought tolerant; 3.6-4.5 months; three-way Hybrid; resistance to GLS, MSV; good ear cover; good husk cover; 3.5-9.5Tons/Ha		
Rice	IR-05N221 - Komboka variety	2015	Irrigated and rain-fed lowland ecosystems; Aromatic paddy Rice; good milling quality; moderate tolerant to some RYMV and blast disease strains; 2.5-3 months; 4.0-6.7Tons/Ha		
Beef/Dairy	Use of Probiotics to improve feed efficiency	2022	Enhance nutrient absorption – normal microbes can't do; reduces methane emission – contribute to mitigation; Improves immunity and health – contribute to adaptation and productivity		
Poultry	KARI Improved Indigenous Chicken (KC 1 and 2)	2018	Growth rate faster – 4-4.5 to egg production, others 8 months; 2kgs by 4 months; 250-280 eggs/ year – others 80-100; well adapted to many climates		
Pastures	Brachiaria spp. Var. Toledo, Piata, MG-4 and Basilisk	2021	high-quality feed, increase livestock productivity and also improve farmers' income and livelihoods; milk production 15-40%; drought resilient; water efficient; deep root system – carbon sequestration; highly digestible – low methane production; are able to convert nitrogen into nitrates - mitigation		
Soil health	Nutrient Scanner		Supports farmers with instant, on-the-spot monitoring of nutrients in soil, feed and leaf.; checks for NPK and pH values – soil health and	AgroCARE	

			fertility – right decisions with respect to inputs, crops and planning. This service has mitigation potential	
Water management	Solar irrigation kits - RainMaker2		Intelligent solar-powered irrigation solution; Household energy needs; solar energy for irrigation;	Sun Culture
Maize	Aflasafe KE01™	2020	All-natural biocontrol product; drastically reduces aflatoxin accumulation in maize; cost-effective providing high returns on investment and health benefits; reduces aflatoxin by 80% to 99%	

ETHIOPIA (EIAR)

Ethiopia pursues agricultural intensification, diversification and commercialization as engine of economic growth and development. Ethiopia also mainstreams climate resilient green economy strategy to achieve food security and poverty alleviation. This direction is based on three pillars namely: Productivity, adaptation, and mitigation. EIAR plays a key enabling role in CSA transformation efforts, through technologies, knowledge and information to various users.

Commodity	Name of CSA TIMP	Year of release	CSA attributes	Status of commercialisation
Teff	Kora	2014	Yield, DD resistance, maturity days	Commercialised
	Tesfa	2016	Yield, DD resistance, maturity days	commercialized
	Estube,	2019	Yield, DD resistance, maturity days	commercialized
Maize	Bako hybrids	2013	Yield, DD resistance, maturity days	commercialized
	Melkessa-1	2015	Yield, DD resistance, maturity days	commercialized
Wheat	Hidase	2014	Yield, DD resistance, maturity days	commercialized
	2014		Yield, DD resistance, maturity days	commercialized
	Ogolcho	2015	Yield, DD resistance, maturity days	commercialized
	Deka	2020	Yield, DD resistance, maturity days	commercialized
Sorghum	Assosa	2015	Yield, DD resistance, maturity days	commercialized
	Argiti	2017		commercialized
	Jiru and Bonsa	2017		commercialized
Malt Barlet	HB 1963			commercialized

	Ibon			commercialized
Livestock breed improvement and diversification,	Crossing, Selection	2014	Milk and beef productivity	commercialized
Forage development:	DZF-552 (alfalfa)	2014		commercialized
	Temesgen (copea)	2014		commercialized
	Sweet blue Lupin	2014		commercialized
	Pigeon pea	2014		commercialized
Poultry on farm	Koekoek	2015		commercialized
Fish fingerlings and feed		2015		Commercialized
Two wheel tractors models DF15 DF 12		2013	less cost	
Manual lime spreader		2017	manageable at household level	Commercialized
High capacity maize Sheller, released 2016, reclaim soil acidity		2016	Reclaim soil acidity	Commercialized
Metal silo released		2015	PHL	Commercialized
Front pack six row teff planter		2017	PHL	Commercialized
Rice milling machine		2018	market	Commercialized

SOUTH SUDAN (MINISTRY OF AGRICULTURE)

Agriculture is the backbone of South Sudan our rural economy and directly affects the livelihoods of more than 90 % of the population. While South Sudan's agriculture faces acute low productivity, there is very little research conducted in agriculture. The research directorate in the Ministry of Agriculture basically promotes breeding, adaptation and adoption of new and improved crop varieties.

Name of TIMPS	Year release	CSA attributes	Name of CSA TIMP
Palotaka1H (Maize hybrid)	2015	Medium maturity (75 – 80 days), high yield , tolerance to foliar diseases and pests and tolerance to drought as well. Wide range of soil adaptation.	Dr. Luka Awata
AGRAC116 (Cowpea)	2016	Early maturity, high yield , and tolerance to foliar diseases and pests. Big in size and white in colour.	Dr. Tony Ngalamu

AGRAC216 (Cowpea)	2016	Early maturity, high yield (), tolerance to aphids, thrips and bacterial blight. Small size and white in colour	Dr. Tony Ngalamu
AGRAC316 (Cowpea)	2016	Early maturity, high yield () and tolerance to drought, foliar diseases, pests and brown rust. Small size and brown in colour	Dr. Tony Ngalamu
YEIPA2 (Groundnut)	2018	Medium maturity, high yield and tolerance to foliar diseases and pests	Nancy Lino
SESO3 (Sorghum)	2012	Medium Maturity, High Yield And Tolerance To Drought, Foliar Diseases And Pests	Victor Bennet
MAAG191 (Common beans)	2019	Early maturity, high yield and tolerance to foliar diseases and pests	Susan Ayot
PAYE1	2015	Medium maturity, high starch content and tolerance to foliar diseases	George Tadu
Irrigation (Farrow system), adapted from old Sudan Water harvest (small scale)		Been practiced since old Sudan (Dr. Adam Juma)	Been practiced since old Sudan (Dr. Adam Juma)
Fruit processing Mango Juice	2016	Commercial, but shortage in provision of mangoes.	Egyptian company

RWANDA (RAB)

The Rwandan agricultural sector is highly vulnerable to climate and weather-related risks including: prolonged droughts (especially in the eastern and south-eastern regions); erratic rains, floods, hailstorms and mudslides (particularly in the northern and western regions). Therefore, CSA practices are deliberately deployed to cause important adaptation and productivity benefits to agriculture in Rwanda.

The key areas of CSA adaptation include:

1. Investing in land husbandry, water harvesting, and hillside irrigation to increase resilience to climate change, reduce water erosion and soil loss, halt land degradation, and increase land productivity.
2. Development and commercialization of early maturing, fertilizer use efficient and drought resistant crop varieties
3. Radical terraces: Radical terraces controls soil erosion and Improve soil fertility resulting in greater farm productivity
4. Agroforestry practices: Reduce soil erosion, increase crops yield and Carbon sequestration and provide options for production of green manure and fruits.
5. Irrigation: Irrigation increases crop and land productivity.
6. Drought resistant crop varieties
7. Crop varieties that are resistant to various pests and diseases.
8. Early maturing crop varieties
9. Rapid and clean multiplication of cassava
10. Rapid and Clean multiplication of potato and Banana
11. Maize drying innovations
12. Application in bio-control: Production and use of antomo-pathogenic nematodes.

13. Swine semen collection and distribution
14. Cow semen collection and conservation
15. Valley dams for reserving water for livestock
16. Zero Grazing, which is very important climate change adaptation.
17. Use of improved climate smart forages to produce forage during drought.
18. Hay making and fodder storage.

SUDAN (ARC)

Commodity or TIMP	Year of release/	of CSA attributes	Status of commercialisation	Contacts
Crops				
Climate-smart innovation package for enhancing Rain-fed groundnut productivity	2018	<ul style="list-style-type: none"> ○ Climate- smart, nutrition and gender insensitive package : ○ Early maturity (85 days) ○ Terminal drought tolerance ○ ○ Water harvesting package suitable for marginal rain-fed areas (< 350 mm) ○ NPK Fertilizer micro dose ○ Chemical weed control ○ Highly nutritious <p>-Gender sensitive crop for both small scale and large scale mechanization scenarios</p>	RANS for agriculture and investment. 002499123 15654	Dr Elgailani Adam Abdalla Elgailani_ers@hotmail.com
Climate-smart innovation package for enhancing Rain-fed cowpea productivity	2018	<ul style="list-style-type: none"> • Climate- smart, nutrition and gender sensitive package : • Early maturity (55 days) • Drought tolerance • NPK Fertilizer micro dose • Inter-cropping • Water harvesting package suitable for marginal rain-fed areas (< 350 mm) • Clay and light soils • Chemical weed control <p>Highly nutritious</p> <ul style="list-style-type: none"> • Gender sensitive crop for both small scale and large scale mechanization scenarios 	RANS for agriculture and invesment. 002499123 15654	Dr Elgailani Adam Abdalla Elgailani_ers@hotmail.com

<p>Climate-smart innovation package for enhancing Rain-fed sorghum productivity</p>	<p>2000</p>	<ul style="list-style-type: none"> • Climate- smart, nutrition and gender sensitive package : • Early maturity (85 days) • Drought tolerance • NPK and urea Fertilizer micro dose • Inter-cropping • Water harvesting package suitable for marginal rain-fed areas (< 350 mm) • Clay and light soils • Chemical weed control • Highly nutritious • Gender sensitive crop for both small scale and large scale mechanization scenarios 	<p>RANS for agriculture and investment. 002499123 15654</p>	<p>Dr Elgailani Adam Abdalla Elgailani_ers@hotmail.com</p>
<p>4 Aerobic rice (water-saving & drought tolerant) varieties</p>	<p>2010</p>	<p>Adoption of innovative of water saving techniques are absolutely essential for maintaining the food security , due to increasing <u>water scarcity</u> under the changing climate scenario. Also, water savings in rice farming through different approaches and adoption of any of these practices will transform into saving of larger quantity of water, since huge quantities of fresh water is used for rice cultivation.</p>	<p>Public</p>	<p>Khalid A. Osman Agricultural Research Corporation (ARC), Sudan WNRS Kosti P.O Box 123 khalrice@gmail.com +249123788103 +249911399162</p>
<p>Dry-direct seeding rice practices In irrigated upland areas.</p>	<p>2014</p>	<p>Dry direct seeding rice can be applied in rain-fed and irrigated upland areas, its a crop establishment practice wherein seeds are sown directly into the dry soil. Which were helping farmers address the high labor cost in rice production, to increase resilience by reduce water consumption. to reduced climate change impacts.</p>		<p>Khalid A. Osman Agricultural Research Corporation (ARC), Sudan WNRS Kosti P.O Box 123 khalrice@gmail.com +249123788103 +249911399162</p>
<p>New Sesame varieties 1/ Um Shagara 2/ Gedarif Assessment of New Promising Sesame Cultivars</p>	<p>2003</p>	<p>Um Shagara as medium maturing variety ; Gedarif 1 as medium to late maturing variety</p>	<p>Seed Companies</p>	<p>Mohamed Elhassn Ahmed, Musa Babiker Taha and Khafafalla Ahmed A khalafallali@yahoo.com</p>

for The Central Rain Land and Irrigated System.			
New Sesame variety name as El Gezeoli Proposal for the Release of New Elite Sesame Genotypes for Rain-fed.	2012	El Gezeoli as medium maturing variety	Seed Companies Khalafalla A. Ali and Mohamed Elhasn Ahmed khalafallali@yahoo.com
Extending of sesame sowing date up to the end of July Response of three improved sesame (Sesamum indicum L.) varieties to sowing dates under rain-fed conditions in north of Gedarif.	2013	Considering late starting of rain fall	Khalafalla, A. Ali., M. E. Ahmed and A. H. AbuAssar khalafallali@yahoo.com
Recommendation of 12.5 Kg Urea/feddan Effect of nitrogen and phosphorus fertilizers on growth and yield of sesame (Sesamum indicum L.) under rain-fed of Gedarif State	2015		Ali E Toum Hassan, Khalafalla A. Ali and Ibrahim A. Eldukheri khalafallali@yahoo.com
<ul style="list-style-type: none"> • Sowing date of faba bean • Organic fertilizer of faba bean • Butana 	2017		Abedlhadi Mozamil (0922656572) Bakri Ahmed Ali (0912416699) Aza Hamad Abdella Hamad azahamad16@yahoo.com 0918310546

• AG-8	2017		Abazer Mostafa (0994337158) Abelrahim Hussien (0122992048)	Aza Hamad Abdella Hamad azahamad16@yahoo.com 0918310546
	2008	Yes early maturing	Yes , Arab Sudanese Seed Company (ASSCO)	Dr/ Ibrahim N. Elzein
	2009	Yes early maturing	Yes , Arab Sudanese Seed Company (ASSCO)	Prof/ Abdalla E.Mohammed Abdallahassan2002@yahoo.com
<ul style="list-style-type: none"> • Parbahani chakti • Water harvesting techniques (chisel, ridge/terreces) • Fertilization • Amonium Nitrate45kg/fedd 	2022	Yes high Iron and Zinc, contribute to human health for children and women	Yes , Arab Sudanese Seed Company (ASSCO)	Dr/ Mohammed H. Mohammed Phone : +249115063284 E.mail elgadahanza@yahoo.com
	2004	Yes ,conserve soil moisture, improving crop productivity and soil physical properties		Prof / Mekki A. Omer
	2014	Yes, improve yield and soil properties		Prof/ Ali E.hassan Alimusa125@yahoo.com
<ul style="list-style-type: none"> • DAP 16 kg/fed+30 kg urea/fedd • TSP + 40kg urea/fedd • Urea 40kg/fed for north Gedarif area • Plant 	2014	Yes, improve yield and soil properties		Prof/ Ali E.hassan Alimusa125@yahoo.com
	2009	Yes, improve yield and soil properties		Prof/ Ali E.hassan Alimusa125@yahoo.com
	2008	Yes, improve yield and soil properties		Prof/ Ali E.hassan Alimusa125@yahoo.com

spacing for varieties AG-8, Butana and W. Ahmed	2019	Yes , Maintain soil moisture and increase crop yield		Prof/ Ali E.hassan Alimusa125@yahoo.com
	2010	Yes, improve soil physical characteristics and remove weeds		Prof/ Ali E.hassan Alimusa125@yahoo.com
<ul style="list-style-type: none"> Mixed cropping cowpea+sorghum Plant density of the varieties AG-8, Butana and W.Ahmed Seed dressing (Apron star and Gauchu) Wad elbasheir faris Dhana chakti 	2007	Yes for water retention and striga control		Prof/ Ali E.hassan Alimusa125@yahoo.com
	2007	Yes, optimized crop yield		Prof/ Ali E.hassan Alimusa125@yahoo.com
		Yes, controlling insect pest / diseases		Salah M. Eltayeb +249122268240
	2012	Yes early maturing	Yes , Arab Sudanese Seed Company (ASSCO)	Dr/ Gailani A. Abdalla elgailaniers@hotmail .com
	2018	Yes early maturing	Yes , Arab Sudanese Seed Company (ASSCO)	Dr/ Adam M. Ali alkabashe@gmail .com
	2022	Yes high Iron and Zinc, contribute to human health for children and women	Yes , Arab Sudanese Seed Company (ASSCO)	Dr/ Adam M. Ali alkabashe@gmail .com
<ul style="list-style-type: none"> Water harvesting techniques (chisel, ridge/terrace) Fertilizer micro dosing 	2004	Yes , conserve soil moisture,improving crop productivity		Prof / Mekki A. Omer
	2010	Yes, improve yield and soil properties		Prof/ Abdelrahman k. Osman +249918092678
	2010	Yes enhance seed germination		Prof/ Abdelrahman k.

<ul style="list-style-type: none"> (NPK) • Seed priming • Seed dressing (Apron star) 				<p>Osman +249918092678</p>
		<p>Yes, control insect ,diseases and improving seedling vigour</p>		<p>Salah M. Eltayeeb +249122268240</p>
<ul style="list-style-type: none"> • Plant population (inter and intra row spacing) 75x50 cm • Dry sowing before rain fall onset 		<p>Maintain soil moisture and increas crop yield under light and sandy soil</p>		<p>Dr/ Hassan O. Ahmed</p>
<ul style="list-style-type: none"> • Dry sowing before rain fall onset • Modification and evaluation of a row crop planter for mixed cropping system 	<p>2011, Meeting No 51 (29 Dec.2011)</p>	<p>Enhanced early crop establishment</p> <p>1. Seeding two crops in the same row simultaneously. 2. Increasing the land value and reducing the risks associated with single crop 3. Improve crops yields</p>	<p>Not yet</p>	<p>Dr/ Sawsan. K.hassan +249911106052</p>
<ul style="list-style-type: none"> • Design, development and testing of water harvesting in rows planter (WaHIP) for marginal rain-fed areas 	<p>2012, Meeting No 52 (21 June 2012)</p>	<p>1. It used for seeding sorghum in the bottom of the ridges for the purpose of soil moisture conservation in marginal rainfed areas. 2. It improved sorghum yield. 3. It is technically feasible, economically profitable and socially acceptable.</p>	<p>Draot Agric. & Public Health Services, Gedarif, Sudan. General manager: Abdelhamid Salih Mohamed Email: eldroat@hotmail.com eldroatagro services@hotmail.com Tel: +249912343343</p>	<p>Lotfie A. Yousif lotfie.yousif@yahoo.com Telephone: +249123176834 +249121355569 (WhatsApp)</p>

Modification of a seeder for in situ water harvesting and tree seeding	2013	1. A seeder for constructing ditch and putting tree seeds in the furrows was developed. 2. It harvested rainwater and regulated the spacing between tree seeds (Hashab and Tali) in the bottom of the ditch for forest plantations. 3. It saved much tree seeds and it economically feasible compared to the traditional tree seeds seeding method.	Not yet	Lotfie A. Yousif lotfie.yousif@yahoo.com Telephone: +249123176834 +249121355569 (WhatsApp)
Modification of a seeder for in situ water harvesting and tree seeding	2013,	1. A seeder for constructing ditch and putting tree seeds in the furrows was developed. 2. It harvested rainwater and regulated the spacing between tree seeds (Hashab and Tali) in the bottom of the ditch for forest plantations. 3. It saved much tree seeds and it economically feasible compared to the traditional tree seeds seeding method	Not yet	lotfie.yousif lotfie.yousif@yahoo.com Telephone: +249123176834 +249121355569 (WhatsApp)

TANZANIA (TARI)

TARI works in 17 centres across the country researchig on various crops and related technologies. The main mandate of TARI is to develop and disseminate appropriate technologies, innovations and good agricultural practices for increased productivity, production and profitability.

Commodity	Name of CSA TIMP	Year of release	CSA attributes	Status of commercialisation	Contacts
Maize	UHS 401	2014	Optimal production; Altitude 500-1500m; Maturity: 91 days at medium altitude and 158 days at high altitude level; Tolerant to Maize Streak Virus (MSV); Tolerant to Grey Leaf spot; Tolerant to drought	Not commercialized	Ready for commercialization TARI Uyole, Dr Anord Mushongi, 0753358712

	WE 3117, WE 3102, WE3113	2014	Optimal production (4-9t/ha); Altitude 0-1500m; Maturity: 120 – 130 days; Resistant to Leaf rust, Leaf blight and Maize streak virus diseases; Tolerant to drought, It is a three way hybrid	Not commercialized	Ready for commercialization TARI Ilonga Ismail Ngolinda, 0754447871
	T105	2016	Optimal production; Altitude 600-1500m; High yielding; Tolerant to grey leaf spot; Tolerant to drought	Not commercialized	Ready for commercialization TARI TUMBI, Dr Atugonza Bilaro, 0655763022
Maize	WE 5135, WE 5141, WE 7133, WE 7118,	2019	Tolerant to MLND and drought, High yielding, optimal production, altitude Low to mid altitude up to 1500 masl. It is a three way hybrid	Not commercialized	Ready for commercialization TARI Ilonga Ismail Ngolinda, 0754447871
	UH6305	2020	High grain yield; Potential in its areas of adaptation (7-10), High grain yield potential; Early maturing variety; Large cob size and two cobs per plant; Strong stalk and Medium height 1200-2000	Not commercialized	Ready for commercialization TARI - Uyyole
2.Sunflower	TARI- ILO2019	2020	High yielding, OPV varieties (1.5-2t/ha); High oil content (35%); Early maturity; optimal production; altitude Low to mid altitude up to 0-2000 masl	Ready for commercializati on	TARI Ilonga, Frank Reuben, 0759703615
	TARI- NAL2019	2021	High yielding, OPV varieties (1.6 -2t/ha); High oil content (35%); Early maturity; optimal production; altitude Low to mid altitude up to 0-2000 masl	Ready for commercializati on	TARI Ilonga, Frank Reuben, 0759703615
3.Sorghum	TARISOR1	2020	Drought resistant; Bird resistant; Tolerant to striga spp; Yield 3.6t/ha; days to maturity 112; Mid to high altitude (800-1500m)	Ready for commercializati on	TARI Tumbi Dr Emmanuel Mrema; 0786371964, email: mremaemmanuel1 977@gmail.com
	TARISO2	2021	Drought resistant; Bird tolerant; Tolerant to striga spp, Yield 3.2t/ha; days to maturity 110; Grows at medium and high altitude (800-1500m)	Ready for commercializati on	TARI Tumbi, Dr Emmanuel Mrema; 0786371964, email: mremaemmanuel1 977@gmail.com

Mechanisation Farm Machinery	Tractor ripping hire service provision model	2018	Minimum tillage -In situ rain	Ready for commercialized	TARI Uyole and Conservation Farming Unit(CFU)
Oxenization	Ox-ripping	2018	Minimum tillage	Ready for commercialized	TARI Uyole; Dr Mlengera, and Conservation Farming Unit(CFU)
1.Postharvest	Multi-Crop Thresher (MCT)	2017	Reduced human farm work load; Reduced cost of casual labor;	Commercialized	Commercialized to Imara Tech, P.O. Box 11105, Arusha, TZ, +255 752 750 122 / www.imaratech.co / info@imatech.co
2.Grapes and Horticulture crops	Walk in Solar Tunnel Drier	2018	Eco-friendly practice Preserve quality of products (sensory, nutrients	Ready for commercialization	TARI Makutupora FELISTA MPORE; Tel: 0759051134; mporefelista@yahoo.com

ERITREA (NARI)

1. Improved crop varieties after successful research studies and qualified the standard requirement of the regulatory services
2. Maize, sorghum, pearl millet, wheat, barley, potato and some others
3. Tissue culture developed crop seeds
4. Banana, potato and date palm
5. Food technologies
6. Value added local foods and fruits (performing through in different type of meals)
7. Integrated crop and livestock production
8. Dairy production and processing on forage base, avoiding any growth promoters (mostly organic)

New CSA Technologies:

1. Production and promotion of liquid fertilizers
2. Fish amino acid (FAA)
3. Sea weed extract (SWE) are completely organic and its contents analyzed in laboratories (ERI and Sudan). It became effective and productive as vegetables.

Large scale operation of FAA and SWE

- For larger production a machine (fish chopper) was developed, and can chop 10quintals of fish per/hour and all the needed materials for fermentation purposes are also ready.
- It is producing 10,000litres/month of biological liquid fertilizers.
- It is tasted by the national laboratory for plant and animal health for safety.
- Production and promotion of Compost (organic fertilizer)

- Production and promotion of Biopesticides
 - Mass production trial on entomopathogenic fungi *Metarhizium acridum* and used in controlling desert locusts and grass hoppers.
-

DEMOCRATIC REPUBLIC OF CONGO (INERA)

The Democratic Republic of Congo (DRC) Agricultural Potential

- Land availability and accessibility: 80 million of hectares for agriculture, forest and savannahs is available for use
- World Reserve of biosphere: 2nd after the Amazonia (Brazil)
- Diversity of climate and soils variability: diversified agricultural production,
- Enormous hydrographic network (lakes and rivers): sources of water for irrigation and hydro-electric energies.

Constraints to DRC Agriculture

- Climate adversity: Irregularity and distribution of rainfall, alternative scenarios of drought and floods.
- Irrational exploitation of natural resources.
- Low genetic potential and gain for crops varieties, livestock's and fishes
- Lack of basic agricultural infrastructure

Crops Production

The following key systems are being utilised in DRC: Use of improved varieties (short-cycle and/or drought- and/or disease-resistant varieties); improved production systems; localized irrigation (drip or microdiffuser); sowing management (reseedling, over seeding, false sowing, dry sowing, change of sowing date); valuing underused and/or neglected crops

Livestock Production

The following key systems are being utilised in DRC: Introduction of improved breeds, crossing with locals for good resistance to diseases; establishment of feeds reserves for the dry season (hay, silage, etc.); use of new feeds sources (shrub legumes, rice straw, etc.); crops of resistant fodder varieties: *Bracharias*, Kikuyu grass; seasonal livestock mobility practice.

Fishes Production

The following key systems are being utilised in DRC: Fish farming in tanks and basins; introduction of short-cycle fish strains (tilapia); above ground bins (BHS); floating cages and fish pens; fertilization of fish ponds; diversification and valorisation of new fish specie

Forestry

The following key systems are being utilised in DRC: Plantations/reforestation (state, communal or large-scale, including mangroves using mangroves and fast-growing species; improved management practices (ploughing, mowing, thinning, control of animal and plant pests) of plantations and forest parks; Alleys cropping/agroforestry (annual crops between rows of trees; domestication and planting of local fruit species adapted to the climate

5. Water and soil conservation.

Development of added value chains

The following measures are underway to develop value chains: Manufacture and promotion of new agri-food products (precooked beans, composite porridges for children, biscuits, cakes, jams, fruit juices, vinegar, pineapple alcohol, etc.); use of new sources of organic matter for domestic energy (rice husks, palm kernel shell,

sawdust); traditional improved cookers; steamer for local dishes (e.g. Ablo); solar dryers; manufacture and promotion of the feed mill (Poultry, livestock, fish).

Crop	SCA (Varieties	Release year	Attributes	Commercialisation	Scientist/Institution
Crops Production : 4 Technologies under commercialization					
Biofortified Maize (OPV) SAM4-VITA 2016 Precocity	SAM4-VITA	2016	Precocity FAW Tolérant	FERKAL FAS BIODEV	Antoine LUBOBO (CIAT Harvest Plus) Luciens NYEMBO (UNILU)
biofortified Beans (bush)	Hm 21-7	2014	Precocity Drought Tolérant	EDMAR FERKAL	Antoine LUBOBO (CIAT Harvest Plus) Telesphore MIRINDI (INERA)
Biofortified Beans (climbing)	CODMMLB 059	2018	Diseases and pest Resistant	EDMAR FAS	Antoine LUBOBO (CIAT Harvest Plus) Telesphore MIRINDI (INERA)
QPM maize	Mudishi 1	2017	Precocity FAW Tolérant	FERKAL	Aman MBUYA (INERA)
Crops Production :3 Technologies ready for commercialisation					
Maïs Biofortifié (OPV)	PVA Syn 13	2020	Precocity FAW Toléran		Antoine LUBOBO (CIAT Harvest Plus) Luciens NYEMBO (UNILU) Aman MBUYA (INERA)
Haricot Biofortifié (Nain)	CODMLB 104	2021	Precocity Drought Tolérant		Antoine LUBOBO (CIAT Harvest Plus) Telesphore MIRINDI (INERA)
Haricot Biofortifié (Nain)	HARLUB 20	2018	Diseases and pest Resistant Precocity		Antoine LUBOBO (CIAT HarvestPlus) Telesphore MIRINDI (INERA)
Fisheries production (3)					
Tilapia	Tilapia Kipopo	2018	Precocity	FERKAL	André Kabey (INERA) Auguste CHOCHA (UNILU)
Clarias	Clarias BEZHU 1	2017	Precocity	FERKAL	August CHOCHA (UNILU)

Lates mandachoharius	Manda-Chocha 202	2021	Diseases/pest tolerant or Resistant	BEZHU	Beauchet MNDA (UNILU)
----------------------	------------------	------	-------------------------------------	-------	-----------------------

t

Climate smart technologies that have been commercialized by the Private sector: A case of Ethio Veg Fru PLC in Ethiopia: (Fikodu Temesgen)

Ethio Veg Fru PLC is a private farm in Oromia region in Ethiopia in an area of 150 ha with 100ha under production, 40 ha protected forest area and 10ha covered by infrastructure.

Products

- Tomato (Galilya and shanty)
- Onion (Ruset, red wave and neptun)
- Hot pepper (Serande, vigro)
- Cabbage (Gloria)
- Lettuce (Aviram, cartagenes)
- Cauliflower (snow ball, Nevada, agazeen)
- Squash (Amanda, cv 3122)
- Green chilli (Demonia, Red tender)
- Broccoli (Agasi)
- Maize seed multiplication MH 140 and BH661.

Collaboration with research

The farm is undertaking multiplication and screening of maize seeds in collaboration with CIMMYT and the Ethiopian Institute of Agricultural Research for higher yields, drought tolerance, low nitrogen and stress tolerant.

The farm is also involved in registration and transfer of onion seed to the farmers through collaboration with a foreign company (Bejo). The red wave, red nice, and basic onion F1 varieties have been adapted, registered and are being transferred to local farmers.

Climate smart technologies that have been commercialized by the private sector: Experience from the Seed Trade Association of Kenya (STAK)

Introduction

STAK was founded in 1982 with membership covering commodity associations, National Potato Council of Kenya (NPCK), the Cereal Growers Association (CGA), and the Fresh Produce Association of Kenya (FPEAK)

Strategies for commercialization

STAK works in partnership and collaboration with the Africa Seed Trade Association (AFSTA), the International Seed Federation (ISF), and Ministry of Agriculture, Livestock, Fisheries and Cooperatives

STAK works with the following regulatory, support and process organisations: Seeds Regulations Committee; National Accelerated Agricultural Inputs Access Programme (NAAIAP); Kenya Cereals Enhancement Programme (KCEP); National Performance Trial Committee (NPTC); National Variety Release Committee (NVRC); Kenya Climate Smart Agriculture Programme (KCSAP); Kenya Plant Health Inspectorate Service (KEPHIS); the African Seed Access Index (TASAI); Kenya Agricultural and Livestock Research Organization (KALRO); Kenya Private Sector Alliance/Agriculture Sector Network; Agriculture sector boards; Ministerial Round

Table meeting; Members of Parliament round table; senate round table; Presidential round table; and some CGIAR centres.

Climate smart technologies for commercialisation

Priority TIMPs	Name of CSA TIMP	Year released	CSA attributes	Status of commercialization	Contacts
Bush bean	Kazuri	2021	<ul style="list-style-type: none"> • Wide adaptability • Medium maturing • Drought Tolerant 	Simlaw seed Co. Ltd	Simlaw seed Co. Ltd
Bush bean	Saitoti	2021	<ul style="list-style-type: none"> • Indeterminate growth habit • Drought Tolerant 	No	KALRO KITALE
Bush bean	Tatton Bean	2021	<ul style="list-style-type: none"> • Low flatulence and acid • High Fe and Zinc • Good for bean flour and bean soup • High yielding • Tolerant to halo blight • Tolerant to Rust • Drought Tolerant 	Egerton University	Egerton University
Bush bean	Zebra	2021	<ul style="list-style-type: none"> • Early maturity • Drought tolerant 	Agrosoy seed company	Agrosoy seed company
Finger millet	KAK-WIMBI 5	2021	<ul style="list-style-type: none"> • Medium maturity • Drought Tolerant 	No	KALRO (Dr. Chrispus .O.A. Oduori)
Finger millet	KAK-WIMBI 6	2021	<ul style="list-style-type: none"> • <i>Striga</i>, and lodging resistant • Drought tolerant; • Early maturity 	No	KALRO (Dr. Chrispus .O.A. Oduori)
Finger millet	KIS-WIMBI 1	2021	<ul style="list-style-type: none"> • Drought tolerant; • High yield. • Early maturity 	No	KALRO (Dr. Chrispus .O.A. Oduori)
Finger millet	Mavuno	2021	<ul style="list-style-type: none"> • Resistant to lodging, birds and blast disease • Drought Tolerant 	Agrosoy Seed Company	Agrosoy Seed Company

Finger millet	Lama Finger Millet	2021	<ul style="list-style-type: none"> • Early maturity, • High in Ca and Fe • Drought Tolerant 	Egerton University	Egerton University
Finger millet	KAK-WIMBI 5	2021	<ul style="list-style-type: none"> • Medium maturity • Drought Tolerant 	No	KALRO (Dr. Chrispus .O.A. Oduori)
Finger millet	KAK-WIMBI 6	2021	<ul style="list-style-type: none"> • <i>Striga</i>, and lodging resistant; • Drought tolerant • Early maturity 	No	KALRO (Dr. Chrispus .O.A. Oduori)
Finger millet	KIS-WIMBI 1	2021	<ul style="list-style-type: none"> • Drought tolerant; • High yield. • Early maturity 	No	KALRO (Dr. Chrispus .O.A. Oduori)
Finger millet	Mavuno	2021	<ul style="list-style-type: none"> • Resistant to lodging, birds and blast disease • Drought Tolerant 	Agrosoy Seed Company	Agrosoy Seed Company
Finger millet	Lama Finger Millet	2021	<ul style="list-style-type: none"> • Early maturity, • High in Ca and Fe • Drought Tolerant 	Egerton University	Egerton University
Finger millet	Snapping finger millet green	2019	<ul style="list-style-type: none"> • Can be harvested by hand • Adaptable to sandy clay soil and loamy soil • Early maturing • Drought Tolerant 	Egerton University	Egerton University
Cowpea	Kunde tumaini	2019	<ul style="list-style-type: none"> • Drought tolerant • Dual purpose (grain and vegetable) • Drought Tolerant 	KALRO Katumani	KALRO Katumani
Maize (Early kit)	SC DUMA 441	2019	<ul style="list-style-type: none"> • Tolerant to Maize Lethal Necrosis (MLND) (score of 1-3 in the scale of 1-9) • Drought tolerant hybrid 	SEED CO	SEED CO / CIMMYT
Maize (Early kit)	SWARA PLH 457	2019	<ul style="list-style-type: none"> • Drought tolerant • Early maturing • Good standability • Good husk cover 	PEAL AGRO SERVICES	PEAL AGRO SERVICES

Maize (Transitional kit)	SY6250	2021	<ul style="list-style-type: none"> • Wide adaptation over region • Excellent ear rot tolerance • Drought tolerant 	No	Syngenta E.A Ltd
Maize (Transitional kit)	SY5054	2021	<ul style="list-style-type: none"> • Wide adaptation over region • Very good Grey leaf spot (GLS) tolerance • Drought tolerant 	No	Syngenta E.A Ltd
Maize (Transitional kit)	SY 4150	2021	<ul style="list-style-type: none"> • Above average root lodging resistance • Excellent GLS & Turcicum tolerance • Drought tolerant 	No	Syngenta E.A Ltd
Maize (Transitional kit)	SY 6350	2020	<ul style="list-style-type: none"> • Drought tolerant hybrid • Good ear rot tolerance • Average Turcicum and GLS tolerance, Good common rust tolerance 	No	Syngenta E.A Ltd
Maize (Transitional kit)	SY 6450	2020	<ul style="list-style-type: none"> • Good GLS & Turcicum tolerance • Drought tolerant hybrid 	No	Syngenta E.A Ltd
Maize (Transitional kit)	SY 4150	2020	<ul style="list-style-type: none"> • Excellent GLS tolerance • Average Turcicum blight tolerance • Drought tolerant hybrid 	No	Syngenta E.A Ltd
Maize (Early kit)	PAN 4M-11	2020	<ul style="list-style-type: none"> • Good ear rot tolerance • Drought tolerant hybrid 	No	PIONEER Hi-Bred ZIMBABWE
Maize (Transitional kit)	P2848W	2020	<ul style="list-style-type: none"> • Grain-semi flint • Tolerance to MSV and leaf blight • Good husk cover • Good cob placement 	No	PIONEER Hi-Bred ZIMBABWE

Maize (Transitional kit)	PAN 4M-23	2020	<ul style="list-style-type: none"> • Good grain quality • Tolerance to MSV • Drought tolerance • Good cob placement 	No	PANNAR SEED
Maize (Transitional kit)	SC 443	2020	<ul style="list-style-type: none"> • Good grain quality • Tolerance to MSV and leaf blight • Good cob placement • Drought tolerant hybrid 	No	Seedco
Maize (Transitional kit)	SC 445	2020	<ul style="list-style-type: none"> • High tolerance to MLND • Good standability hence less lodging • Highly tolerant to leaf diseases like blight, MSV and • Drought tolerant hybrid 	No	Seedco
Maize (Transitional kit)	EASZm-H5-504	2019	<ul style="list-style-type: none"> • Strong stalks (reduced lodging) • Drought tolerant 	No	East African Seed Company Limited
Maize (Transitional kit)	WE6108	2019	<ul style="list-style-type: none"> • The hybrid is drought tolerant • High yielder under optimum and drought conditions • Resistant to major leaf diseases such as gray leaf spot, turcicum leaf blight & maize streak virus 	No	African Agricultural Technology Foundation (AATF)
Maize (Transitional kit)	WE6101	2019	<ul style="list-style-type: none"> • The hybrid is drought tolerant • resistant to major leaf diseases such as gray leaf spot, Turcicum leaf blight and maize streak virus 	No	AATF
Maize (Transitional kit)	PLH458	2019	<ul style="list-style-type: none"> • Drought tolerant • Early maturing • Good stand ability • Excellent tolerant to grey 	PEAL AGRO SERVICES	CIMMYT-ZIMBABWE

			<ul style="list-style-type: none"> leaf spot • Good husk cover • Double cobber 		
Garden pea	Molo super	2021	<ul style="list-style-type: none"> • Dual purpose both when fresh and dry • Drought tolerant 	Simlaw seed co. Ltd	Simlaw seed co. Ltd
Maize(early kit)	P2848W	2020	<ul style="list-style-type: none"> • Good grain quality • Tolerance to MSV • Drought tolerance 	PIONEER Bred	PIONEER Hi-Bred ZIMBABWE
Groundnut	Egerton GN-1(L)	2019	<ul style="list-style-type: none"> • Adaptable to sandy clay soil and loamy soil • Early maturing 	Egerton University	Egerton University
Groundnut	Egerton GN-2(R)	2019	<ul style="list-style-type: none"> • Medium seeded • The seed is red in color • Adaptable to sandy clay soil and loamy soil • Preferable for oil extraction 	Egerton University	Egerton University
Pigeon pea	Egerton Mbaazi 3	2019	<ul style="list-style-type: none"> • Medium seed size • Adaptable to sandy clay soil and loamy soil • Medium maturing • Good ratoonability 	Egerton University	Egerton University
Pigeon pea	Egerton Mbaazi 4	2019	<ul style="list-style-type: none"> • Medium seed size • Adaptable to sandy clay soil and loamy soil • Medium maturing • Good ratoonability 	Egerton University	Egerton University
Sorghum	Kamani	2019	Drought tolerant	Sorghum	Kamani

Climate smart technologies that have been commercialized by the private sector: Experience from Dal Group Sudan (Elmuiz Mohamed O Ibrahim)

Introduction

Dal Group Sudan is Sudan's largest, most diversified conglomerate. It undertakes one of the largest milling operations in the region with 1 million ton capacity a day, produced 1 million litres of drinks daily, employs 5,000 workers drawn world wide, has trained over 220,00 home bakers at its facilities, works in partnership with global companies such as coca cola, SAP, Buhler, Tetra Pak etc.)

CSA TIMPs Within DAL Food Portfolio

Commodity	Name of CSA Technology	Year of release	CSA attributes	Status of Commercialization
Crop				
• Wheat, corn & fodder	• Under Pivot Irrigation	2014	• Efficient water use, proper fertilization plan and micro-climate control	• Commercialized
• Groundnuts	• Aflatoxin control	2013	• Land utilization	• Not commercialized
• Wheat and sorghum	• Straw baling	2015	• Emission reduction	• Commercialized
• All	• Solar Energy	2017	• Emission and cost reduction	• Commercialized
• Livestock				
• Cattle diary	• Fodder production	2013	• Higher yield	• Commercialised
• Cattle (meat)	• Breed improvement	2019	• Higher yield	• Not Commercialized
• Cattle (Meat)	• Farming	2012	• Enhanced production system	• Commercialized
• Cattel manure	• Compost	2012	• Emission and cost reduction	• Commercialized

CSA TIMPs Commercialized By The Private Sector In Uganda (NARO Holdings)

Name of CSA technology innovation	Year of release	CSA Attributes	Is the technology already commercialized	Contacts
Crops				
• Improved crop varieties (groundnuts,	2015-2019	• Drought tolerance, early maturity, short cooking time, high	• Exclusive, semi-exclusive	• NARO-National Semi-

beans, maize, rice, sorghum, finger millet, cowpea, sesame, greengram, pastures)		yielding, water use efficiency	and non-exclusive licenses with 13 seed companies • Local Seed Business (LSB) groups	Arid Resources Research Institute (NaSARRI) and National Crop Resources Research Institute (NaCRRRI)
• Bio-fertilizers and bio-pesticides	• 2020	• Eco-friendly sustainable	• NARO Holdings Ltd; Bumi Hijau (U) Ltd	• NARO – National Agricultural Research Laboratories (NARL), Kawanda
Livestock				
• Improved grass (Cenchrus, Brachiaria, Chloris gayana) and legume pasture species		• Drought resilient forage species with low carbon footprints; tannin & saponin based feed supplements reduce GHG emissions by ruminants; high FUE	• NARO Holdings Ltd;	• Improved grass (Cenchrus, Brachiaria, Chloris gayana) and legume pasture species
Mechanisation				
• Solar dryers grain	2021	• Uses solar energy; low cost technology	• NARO Holdings Ltd	• NARO-AEATREC
• Use of hermetic silo structures for	2015	• Cheap, eco-friendly and re-usable over a	• NARO Holdings Ltd	• NARL Kawanda

storage of maize		long time.		
• Animal drawn potato digger	2017	• Environmentally friendly	• NARO Holdings Ltd	• Buginyanya ZARDI
Climate Smart Management practices				
• Agro-ecology specific shade tree species for various coffee agro-ecologies of Uganda	2016	• Comprises of only shade trees that are not alternative host/source of BCTB, provide effective and efficient shade and mulch that increases coffee yield by 20-50%	• NARO Holdings Ltd	• NARO-NaCORI
• Plantation Carbon Sequestration InfoPak (PCS InfoPak)	2017	• First documentation of quantity of carbon sequestered in 3, 5 & 8 year old clonal eucalyptus and 3, 7 & 11 year old pine plantations in Uganda	• NARO Holdings Ltd	• NARO-NaFORRI
• Hydrogel AppRate	• 2017	• Techniques for application of hydrogel to enhance water retention for tree seedling survival under water stressed environments. 10 g of hydrogel per plant applied during planting at the onset of rains increases tree survival to 90% compared to 50% under no hydrogel	• NARO Holdings Ltd	• NARO-NaFORRI
• NARO-CAST Carboniser Stove	• 2017	• Reduces carbon monoxide emissions and produces high-quality charcoal. The stove uses 66% less wood fuel than the	• NARO Holdings Ltd	• NARO-NaFORRI

		3-stone stove which is used by 80% of Uganda's households. It cooks twice as fast as the 3-stone stove		

CSA TIMPs commercialized or ready for commercialization for Private Sector in Rwanda

The Private Sector Federation – Rwanda (PSF) is a professional organization, dedicated to promote and represent the interests of the Rwandan business community. It was established in December 1999, replacing the former Rwanda Chamber of Commerce and Industry. It is an umbrella organization that groups professional 5 clusters: Agriculture and Livestock, Industry, Trade, Services and a special cluster for Women, Youth and People with Disabilities (PWDs)

Climate-smart technologies/innovations available

- Introduction of Postharvest technologies through PPP model (40% Grant /under IFAD fund and 60% private contribution investment) in order to reduce production losses and improve quality.
- Driers (fixed and mobile driers) for grains especially maize
- Construction of Hangars across the country to support farmers in post-harvest activities
- These CSA started to be established under IFAD project in 2017, priority crops : Maize

Impact

- Post-harvest losses reduction and increase of profits
- Reach the goal of Zero aflatoxins and more safety
- Increase quality and value of product

Mobile drier

- Establishment of use of Greenhouses to mitigate for climate changes
- This technology transfer is done by both private entities and public institutions
- Private entities sell the equipment and install it.
- The technology transfer innovation to farmers is done mostly by the public sector though Rwanda-Israel Center of Excellency (RAB)
- Priority commodities: tomato, capsicum, sweet melon
- Green houses of Rwanda –Israel Horticulture Center of Excellence for transfer of CSA technologies.

Rwanda –Israel Horticulture Center of Excellency

- The Rwanda –Israel HCoE was established in 2016
- HCoE is co-financed by the State of Israel and the Government of Rwanda to create a self-sustaining center
- The project is designed such that other development partners can be invited to contribute in order to create synergies and experience sharing as well for transfer of CSA innovations
- Since September 2017, about 10 different types of vegetables made of 30 different varieties of vegetables were tested in 3 cycles for adaptability to Rwandan conditions.

- Capsicum grown in green houses using irrigation system
- Sweet melon grown in GH
- Water treatment at Coffee washing station using solar power
- initiative is done for recycling water used in washing of coffee cherries so that to reduce cost of water and to protect environment
- Few coffee washing stations are using this technology as it is costly.

List of the best-bet technologies/innovations available in South Sudan and are commercialized, The case of Gumbo Glow Company, Seed Producer

Introduction

Started in 2016, as an out- grower, the company produces seed. The company was registered in 2018 and is located in the Eastern Bank of Juba in the Central Equatoria State. The company mainly produces certified or quality declared Seeds sauced from Research and from Uganda.

CSA Technologies

TIMP	Year of release	CSA attributes	Private sector player involved in commercialization of TIMP	Name of scientist or contact person currently promoting this technology	Contact
NARD 1 (Maize OPV)	2012	Medium maturity, high grain yield (t/ha) and tolerance to foliar diseases and pests	<p>Companies involved in all</p> <p>Masco Seed Co. +211921701611; mascoseedscold@gmail.com)</p> <p>Pro Seeds Ltd +211926512468; proseedsltd@gmail.com</p> <p>Seed Grow Seed Co +211920197495; Seed.grow@yahoo.com</p> <p>Gumbo Glow Seed Co Ltd 211928351106; gumbogloseeds@gmail.com</p> <p>Green Horizon Seed</p>	Luka Awata	+211923648250; lukatwok11@gmail.com

Sesso2	2012	Medium maturity, high grain yield (t/ha) and tolerance to foliar diseases and pests		Victor Bennet	+211924295401 Bennetv1962@gmail.com
SESO3 (Sorghum)	2012	Medium maturity, high grain yield (t/ha) and tolerance to foliar diseases and pests		Victor Bennet	+211924295401 Bennetv1962@gmail.com
WAD AHMED (Sorghum)	2012	Medium maturity, high grain yield (t/ha) and tolerance to foliar diseases and pests		Victor Bennet	+211924295401 Bennetv1962@gmail.com
AGRA C116 (Cowpea)	2016	Early maturity, high yield (t/ha) and tolerance to foliar diseases and pests		Tony Ngalamu	
AGRA C216 (Cowpea)	2016	Early maturity, high yield (t/ha) and tolerance to foliar diseases and pests		Tony Ngalamu	
AGRA C316 (Cowpea)	2016	Early maturity, high yield (t/ha) and tolerance to foliar diseases and pests		Tony Ngalamu	
YEIPA 1 (Groundnut)	2018	Medium maturity, high yield (t/ha) and tolerance to foliar diseases and pests		Innocent Kitara	211920555956; ikitara72@gmail.com
YEIPA 2 (Groundnut)	2018	Medium maturity, high yield (t/ha) and		Innocent Kitara	211920555956; ikitara72@gmail.com

dn ut)		tolerance to foliar diseases and pests			ail.c om
YEIPA 3 (Groun dn ut)	2018	Medium maturity, high yield (t/ha) and tolerance to foliar diseases and pests		Innocent Kitara	21192055595 6; ikitara72@gm ail.c om
MAAG 191 (Comm on beans)	2019	Early maturity, high yield (t/ha) and tolerance to foliar diseases and pests		Susan Ayot	21192015778 3; susantokwiny @g mail.com
MAAG 192 (Comm on beans)	2019	Early maturity, high yield (t/ha) and tolerance to foliar diseases and pests		Susan Ayot	
MAAG 193 (Comm on beans)	2019	Early maturity, high yield (t/ha) and tolerance to foliar diseases and pests		Susan Ayot	
PAYE1	2019	Medium maturity, high starch content (t/ha) and tolerance to foliar disease		George Tadu	+2119212883 31;
PAYE2	2015	Medium maturity, high starch content (t/ha) and tolerance to foliar disease		George Tadu	georgetadu57 @g mail.com

Climate smart technologies that have been commercialised by the private sector: Experience from Nirex Cameroon

Introduction

Nirex is engaged in production of catfish and tilapia mono sex male fingerlings; table fish (Tilapia and catfish); import and distribute fish feed; training fish farmers in collaboration with IRAD and the Ministry of livestock using the farmer to farmer approach; works with World fish through the TAAT project to disseminate proven technologies in the fish sector, works with the Ministry of livestock on aquaculture entrepreneurship supported by IFAD; and with World fish, IRAD and the Ministry of livestock to co-creation of a Private Public Partnership for fish breeding centre in Cameroon.

Climate smart technologies commercialized

Nirex is mainly involved in animal feed production (excluding pasture improvement), domestication of technologies in cane rats and snails. Most of the technologies commercialized in Cameroon are imported

Some climate smart technologies in the aquaculture sector

Commodity	TIMP	Source	Year adapted
Tilapia:	YY-male technology,	Imported from Til-aqua	2018
	GIFT	Imported from Asia	2019
	Tilapia cage culture	Currently being introduced	2018
Fish feed	Locally produced pelleting machines		2020
	Aquaponics	150 and 250 sq m sets produced and commercialized	2018
Catfish infrastructure	Tarpaulin fish tanks	Importation from Nigeria and China	2016
	Smoking/drying kilns	Locally fabricated by some start ups	2017

Climate smart technologies that have been commercialised by the private sector: Experience from Eritrea

Introduction

To use and adapt CSA related agricultural technologies released by the MoA in scaling up. And the private sectors to act as a demonstration hub for practical training to nearby local farmers. Most private enterprises intensively work under the consultation of agricultural experts.

Dairy production and processing activities for CSA related Technologies in private sectors

Forage based production

Evaluated based on

1. Drought tolerance and ease of establishment
2. Disease and pest tolerant
3. Palatability
4. Biomass and ground cover scores
5. Phenology and seed setting ability

Improved Forage Seeds Released by NARI So far that are Commercialized:

Temperate forages, Tropical legume, Tropical grasses, Fodder trees, and Sweet potato
This is being Practiced and Adapted by all private farm enterprises.

Technologies used and adapted on Concentrate feeds:

- Based on feed formulation techniques adapted from NARI
- Local feed ingredient materials
- Maize
- Sorghum, and
- Wheat bran

Dairy cows technologies released by NARI used and adapted:

Adaptation of AI

- Feed additives like vitamins and minerals
- Introducing technologies on protecting diseases like foot root disease, mastitis, and others through lime bath, and sanitary measures in order to avoid using antibiotics)

Fattening technologies released:

- Feed based instead of growth promoters

Technologies in farm productivity improvement

- Back use of Farm Yard Manure, manure as organic fertilizers on irrigated farms.
- Production of compost in large scale operation on the technologies released by NARI, should be also certified for application.
- These have been Commercialized (Certified compost).

Milk processing technologies (adapted):

- Starter cultures (probiotics) are imported, but the MoA is trying to practice and produce starter cultures and rennet locally (on process)

MIHAP (Minimum integrated household agricultural packages)

- Technology released to farmers as a package in two regions and became successful and easily adapted by the farmers through technical assistance of the private enterprises
- Now it is on the way of extending to the other regions.
- To be the beneficiary: you must have at least 500m2 farm land, water for irrigation, and the government provide cow, hen, improved forage seeds, crop seeds, fruit seedlings(all in one package system)



*Copyright © *2019*ASARECA*, All rights reserved.*

Association for Strengthening Agricultural Research in Eastern and Central Africa (ASARECA)

Plot 5, Mpigi Road | P. O. Box 765, Entebbe, Uganda

Tel: +256 414 320 556, +256 414 321 885

Email: newsletter@asareca.org/Website: www.asareca.org

Want to change how you receive these emails?

You can [update your preferences](#) or [unsubscribe from this list](#).

Disclaimer. Reasonable care has been taken to ensure that the information provided in ASARECA Newsletter is accurate. However, ASARECA does not vouch for the accuracy of information provided on websites to which the Newsletter links. Opinions shared on external sites and ASARECA Newsletter as well as articles, editorials, news, comments and reviews, reflect the individual views of the authors and should not be construed to be those of ASARECA or its partners.

|IF:REWARDS| *|HTML:REWARDS|* *|END:IF|*