



Kenya Climate Smart
Agriculture Project

Inventory of Climate Smart Agriculture Technologies, Innovations and Management Practices for Cassava Value Chain



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DISCLAIMER

The information presented in this inventory of Cassava Technologies, Innovations and Management Practices (TIMPs) book is for advisory use only. Users of this book should verify site specific details that relate to their agro-climatic zones from their area agricultural extension officers.

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FOREWORD

Kenya Climate-Smart Agriculture Project (KCSAP) tasked the Kenya Agricultural and Livestock Research Organization (KALRO) with the implementation of the project's Component 2 on 'Strengthening Climate-Smart Agricultural Research and Seed Systems'. The component activities are geared towards the development, validation, adoption and delivery of context specific climate smart agriculture (CSA) technologies, innovation and management practices (TIMPs). It is also responsible for development of sustainable seed production and distribution systems of priority agricultural value chains to enhance availability and access improved seeds, animal breeds and fingerlings by target beneficiaries. Against this background, KALRO and her National Agricultural Research System (NARS) partners have developed, validated and availed CSA TIMPs for dissemination and adoption. This document provides a detailed inventory of TIMPs that have been developed in Cassava value chain.

Extensive information from research and background data has been used to develop this TIMPs inventory. To disseminate the TIMPs, a Training of Trainers (ToT) manual has been developed. The design of the manual takes into consideration the delivery system, partners and their roles, duration of training and logical flow of the modules. The training modules have uniform outline that ensures every aspect of the TIMPs are fully covered in way that the trainees can absorb and relate to. Various delivery methods are deployed and where possible demonstrations and practical work are incorporated to enable the trainees learn by participating in the actual field activities. The use of this TIMPs inventory is expected to contribute to achievement of the envisaged KCSAP's project 'Triple Wins' of increased productivity, enhanced resilience and reduction of greenhouse gases emissions. Thus, this TIMPs inventory is to be used in conjunction with the respective Cassava ToT Manual.

Finally, I am greatly indebted to the value chain leaders and all those who participated in the preparation of this inventory of TIMPs. It is expected to herald new ways of delivering training content that will enable realization of the project objectives and aspirations.

Eliud K. Kireger, PhD, OGW
Director General, KALRO

PREFACE

The Kenya Climate-Smart Agriculture Project (KCSAP) is a Government of Kenya project with support from both the World Bank and the government. The project runs for five years and implemented in 24 counties, mainly in the arid and semi-arid lands (ASALs), at an approximate cost of KES 25 billion. The project development objective (PDO) is “to increase agricultural productivity and build resilience to climate change risks in the targeted smallholder farming and pastoral communities, and in the event of an Eligible Crisis or Emergency, to provide immediate and effective response.” This objective is to be achieved through the implementation of five key components, which are: 1) Upscaling Climate-Smart Agricultural Practices, 2) Strengthening Climate-Smart Agricultural Research and Seed Systems, 3) Supporting Agro-weather, Market, Climate, and Advisory Services, 4) Project Coordination and Management and 5) Contingency Emergency Response.

Component 1 involves facilitating the empowering of farmers and communities to adopt technologies, innovations and management practices (TIMPs) to achieve the Climate Smart Agriculture (CSA) triple-wins of; increased productivity, enhanced resilience (adaptation), and reduced Greenhouse gas (GHG) emissions (mitigation). Component 2 is tasked with the responsibility of providing the TIMPs. Therefore, it supports the development, validation, and adoption of context specific CSA TIMPs to target beneficiaries under Components 1 and 3.

To catalyze uptake of TIMPs, Kenya Agricultural and Livestock Research Organization (KALRO) in conjunction with partners in the National Agricultural Research Systems (NARS) and Consultative Group for International Agricultural Research (CGIAR) compiled inventories of TIMPs for the prioritized value chains. The crop-based value chains are 19 and include roots and tubers (cassava, potato), pulses (dry beans, green gram and pigeon peas), vegetables (tomato, onion, indigenous vegetables, kale and mango), cereals (sorghum, millet, maize, teff) nuts (mango nut), fruits (banana, mango, water melon) and fibre (cotton). Those that are animal production based are five (5) and include apiculture, indigenous chicken (meat and eggs), dairy (cattle and camel), red meat (cattle, sheep and goats) and aquaculture. Also, there are three (3) cross cutting themes on pastures and fodder, natural resource management, and animal health. The TIMPs have been categorized into those ready for upscaling and those requiring validation. Furthermore, gaps that required further research and development of TIMPs have been identified. Training of Trainers’ (ToT) manuals focusing on TIMPs that are ready for upscaling for each of the value chains have been subsequently developed to form the basis of training county extension staff, service providers and lead farmers. Those trained are in turn expected to cascade the training to beneficiaries in the targeted smallholder farming, agro-pastoral and pastoral communities in the 24 project counties of Marsabit, Isiolo, Tana River, Garissa, Wajir, Mandera, West Pokot, Baringo, Laikipia, Machakos, Nyeri, Tharaka Nithi, Lamu, Taita Taveta, Kajiado, Busia, Siaya, Nyandarua, Bomet, Kericho, Kakamega, Uasin Gishu, Elgeyo Marakwet and Kisumu.

KALRO, having the responsibility of implementing the activities under Component 2, has been instrumental in using its information resources and those of partners and collaborators to come up with the inventories of TIMPs and corresponding ToT manuals. Use of these information resources coupled with the accompanying training and contribution of the other

project components will go a long way in enabling KCSAP to meet its development objectives.

The National Project Coordination Unit is grateful to all who participated in the development and production of this TIMPs inventory for Cassava value chain. It is my hope that counties and other users will put this resource to good use as they transform and reorient their agricultural systems to make them more productive and resilient while minimizing GHG emissions under the new realities of the changing climate.

Francis Muthami
National Project Coordinator
Kenya Climate-Smart Agriculture Project

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ABBREVIATIONS AND ACRONYMS

KALRO
GAPS

1.0 Definition of terms and summary tables of cassava Technologies, Innovations and Management Practices (TIMPS)

1.1 Definition of terms

Technology: This is defined as an output of a research process which is beneficial to the target clientele (mainly farmers, pastoralists, agro-pastoralists and fisher folk for KCSAP's case), can be commercialized and can be patented under intellectual property rights (IPR) arrangements. It consists of research outputs such as tools, equipment, genetic materials, breeds, farming and herding practices, gathering practices, laboratory techniques, models etc.

Management practice: This is defined as recommendation(s) on practice(s) that is/are considered necessary for a technology to achieve its optimum output. These include, for instance, different agronomic and practices (seeding rates, fertilizer application rates, spatial arrangements, planting period, land preparation, watering regimes, etc.), protection methods, for crops; and feed rations, management systems, disease control methods, etc. for animal breeds. This is therefore important information which is generated through research to accompany the parent technology before it is finally released to users and the technology would be incomplete without this information.

Innovation: This is defined as a modification of an existing technology for an entirely different use from the original intended use. (e.g. fireless cooker modified to be used as a hatchery)

1.2 Summary of Inventory of TIMPs in the Cassava Value Chain

The inventory process resulted in a total of 35 TIMPs including 32 technologies, 1 innovation and 2 management practices, distributed among the 5 sub-themes, as indicated in Table 1

Table 1:

Commodity/VC	Sub-Theme	Technologies	Innovations	Management Practices
Cassava	Improved varieties	13	0	0
Cassava	Agronomic practices	8	0	1
Cassava	Seed technologies	1	0	0
Cassava	Management Pests and diseases	7	1	1
Cassava	Value addition	3	0	0
Overall Total		32	1	2

1.3 Summary of Status of TIMPs in Cassava Value Chain

The inventory process resulted in a total of 32 TIMPs that are ready for up-scaling, 17 TIMPs that require validation and 18 TIMPs that require further research in the sub-themes, as indicated in Table 2.

Table 2. Number of TIMPs ready for upscaling, require validation or further research

Commodity/VC		Ready for upscaling	Require validation	Further Research
Cassava	Improved varieties	13	6	3
Cassava	Agronomic practices	8	3	1
Cassava	Seed technologies	1	2	1
Cassava	Pests and diseases	7	3	0
Cassava	Value addition	3	3	3
Overall Total		32	17	18

Table 3: Inventory of Cassava TIMPs by Category and Status

TIMPs SubTheme	TIMPs Title	TIMPs Category	Status
2.1 Improved varieties	2.1.1 Cassava variety MM95/0183	Technology	Ready for upscaling
	2.1.2 Cassava variety Katsuhanzala (990132)	Technology	Ready for upscaling
	2.1.3 Cassava variety KME-3	Technology	Ready for upscaling
	2.1.4 Cassava variety Katune (990005)	Technology	Ready for upscaling
	2.1.5 Cassava variety KME-2	Technology	Ready for upscaling
	2.1.6 Cassava variety Migyera	Technology	Ready for upscaling
	2.1.7 Cassava variety Shibe	Technology	Ready for upscaling
	2.1.8 Cassava variety Karembo	Technology	Ready for upscaling
	2.1.9 Cassava variety Tajirika	Technology	Ready for upscaling
	2.1.10 Cassava variety MM98/3567	Technology	Ready for upscaling

	2.1.11 Cassava variety MM96/4271	Technology	Ready for upscaling
	2.1.12 Cassava variety MM98/0291	Technology	Ready for upscaling
	2.1.13 Cassava variety MM96/7151	Technology	Ready for upscaling
	2.1.14 Developing early bulking varieties	Technology	Research
	2.1.15 Pyramiding Brown streak tolerance, Mosaic virus and high yield	Technology	Research
	2.1.16 Developing varieties for (Variety, introduction, profiling and breeding for specific market niche)	Technology	Research
2.2 Agronomic practices	2.2.1 Ridging to break hard pan	Management practice	Ready for upscaling
	2.2.2 Fertilizer use	Management practice	Ready for up-scaling
	2.2.3 Intercropping	Management practice	Validation and up scaling
	2.2.4 Liming	Management practice	Validation and up scaling
	2.2.5 Irrigation	Management practice	Up-Scaling
	2.2.6 Conservation Agriculture	Management practice	Validation and up scaling
	2.2.7 Planting	Management practice	Validation and up scaling
	2.2.8 Weed management	Management practice	Up-Scaling
	2.2.9 Harvesting Technics	Management practice	Validation and up scaling
	2.2.10 Storage	Management practice	Validation and up scaling
2.3 Seed Production	2.3.1 Community based seed production system (Rapid Seed Multiplication techniques - Mini-stem, Seed cleaning, Seed management agronomy Seed	Management practices	Validation and upscaling

	certification Seed harvesting, packaging and storage)		
2.4 Management of pests and diseases	2.4.1 Integrated management of cassava mosaic diseases (CMD) caused by <i>Begomovirus</i>	Management Practice	Ready for upscaling
	2.4.2 Integrated management of cassava brown streak disease (CBSD) caused by <i>Ipomovirus</i>	Management Practice	Ready for upscaling
	2.4.3 Integrated management of cassava bacterial blight (CBB) caused by <i>Xanthomonas Manihot</i> bacteria	Management Practice	Ready for upscaling
	2.4.4 Integrated management of cassava anthracnose caused by fungus	Management Practice	Ready for upscaling
	2.4.5 Integrated management of cassava green mite (CGM) caused <i>Mononychellus tanajoa</i> (Bondar)	Management Practice	Ready for upscaling
	2.4.6 Integrated management of cassava Mealy Bug, <i>Phenacoccus manihoti</i> MatileFeraro	Management Practice	Ready for upscaling
	2.4.7 Integrated management of whitefly, <i>Bemisia tabaci</i>	Management Practice	Ready for upscaling
	2.4.8 Integrated management of cassava red spider mite, <i>Tetranychus urticae</i>	Management Practice	Ready for upscaling
	2.4.9 Integrated management of cassava white scales, <i>Aonidomytilus albus</i>	Management Practice	Ready for upscaling
	2.4.10 Integrated management of cassava mammalian pests e.g. Moles	Management Practice	Ready for upscaling
	2.4.11 Surveillance, development and promotion of IPM on emerging pest and disease	innovation	Research
2.5 Value addition	Cassava food / utilization products		

	(i) Cassava processing techniques		
	2.5.4 Cyanide poisoning reduction techniques	Innovation	Ready for up-scaling
	2.5.5 Cassava cleaning, Cassava peeler, chipper, graters, driers and miller,		
	2.5.6 Research cassava flour blending with other cereal flours for nutrition and value addition	Innovation	Research
	(ii) Development, consumer evaluation, promotion and dissemination of cassava processed products		
	2.5.1 Cassava/wheat Chapati	Innovation	Ready for up-scaling
	2.5.2 Cassava/maize Ugali	Innovation	Ready for up-scaling
	2.5.3 Cassava/Millet Ugali	Innovation	Ready for up-scaling
	2.5.5 Cassava/pigeon pea porridge	Innovation	Ready for up-scaling
	2.5.6 Cassava post-harvest Mechanization	Innovation	Validation and Upscaling
	2.5.7 Cassava products: Cassava boards, Glue, Starch, Sugar, Ethanol and animal feed Animal feed	Innovation	Validation and Upscaling
2.6 Marketing	2.6.1 Identification of existing marketing strategies for cassava produce and products	GAP	Validation and Upscaling
	2.6.2 Scoping and profiling existing cassava markets commercial villages and innovation platforms for scaling-up	GAP	Validation and Upscaling
	2.6.3 Prioritization of viable cassava products, Consumer tastes and preferences – consumer analysis	GAP	Validation and Upscaling

2.6.4 Business plans, Registration, branding and advertising	GAP	Validation and Upscaling
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2.0 Detailed Cassava Value chain

2.1 Improved varieties

2.1.1 TIMP Name	Cassava variety MM95/0183
Category	<ul style="list-style-type: none"> • Technology
A: Description of the technology, innovation or management practice	
Problem addressed	Limited high yielding varieties that are tolerant/resistant to cassava mosaic disease (CMD), cassava brown streak disease (CBSD), cassava bacterial blight (CBB), cassava mealybugs (CMB), cassava green mites (CGM with early to medium maturity).
What is it	Cassava variety MM95/0183 is mid-maturing ready for harvest from 8-12 months after planting, medium/high yielding 25-62 t/ha and is sweet tasting (low cyanide content of 7.9mg/100g). It's also tolerant to CBSD, CBB, CMD, CMB and CGM with 26% dry matter. Performs well in optimal environmental conditions of 800-1200 mm rainfall annually, altitude range of 800-1500 m.a.s.l., temperature ranging from 14 -30° C and well-drained sandy loam soils.
Justification	Farmers are cultivating low yielding cassava varieties that are late maturing and susceptible to pests and diseases. KARLO has developed an improved cassava variety, MM95/0183 with tolerance to both pests and diseases, medium to high yield, medium maturity and good root quality. This variety is likely to be adopted to replace existing late maturing low yielding varieties susceptible to pests and diseases.
B: Assessment of dissemination and scaling up/out approaches	
Users of TIMP	<ul style="list-style-type: none"> • Farmers, processors, extension providers, consumers, researchers and seed producers
Approaches to be used in dissemination	<ul style="list-style-type: none"> • Farmers field days, demonstration plots, on-farm trials, brochures and agricultural shows
Critical/essential factors for successful promotion	<ul style="list-style-type: none"> • Preferred traits by farmers, consumers and market niches • Selection and use of most effective promotion method • Involve all cassava stakeholders in the promotion chain
Partners/stakeholders for scaling up and their roles	<ul style="list-style-type: none"> • KALRO-Avail breeder's seed and technical backstopping

	<ul style="list-style-type: none"> • Universities-Technical backstopping and tissue culture services • National and County Ministry of Agriculture, Livestock, Fisheries & Irrigation-Extension services • Kenya Plant Health Inspectorate Services (KEPHIS)- Seed inspection • CBOs, NGO's- Seed multiplication and technology dissemination • Processors: Create demand for variety • Farmers: Test/validate and produce • CGIARS e.g IITA: Donors: Funding and technical backstopping
C: Current situation and future scaling up	
Counties where already promoted, if any	<ul style="list-style-type: none"> • Busia, Bungoma, Kakamega, Vihiga, Siaya Homabay and Kisumu,
Counties where TIMP will be upscaled /Validated	<ul style="list-style-type: none"> • To be upscaled in Busia and Kisumu and validated in Lamu county
Challenges in dissemination	<ul style="list-style-type: none"> • Seed unavailability • Livestock and wildlife destruction in the field • Inadequate extension providers • Poor perception towards new cassava varieties
Suggestions for addressing the challenges	<ul style="list-style-type: none"> • Establish working seed systems • Involve local administration to ensure harmony between livestock and cassava farmers • Support and improve extension services • Campaign for attitude change
Lessons learned in upscaling, if any	<ul style="list-style-type: none"> • Successful variety promotion requires availability of quality seed and consistent market for anticipated increased production and root quality similar to their preferred varieties
Social, environmental, policy and market conditions necessary) for development and upscaling	<ul style="list-style-type: none"> • Farmers' willingness to adopt the variety • Favorable weather conditions • Availability of consistent market • Favorable policies to support seed/production, marketing and value addition
D: Economic, gender, vulnerable and marginalized groups (VMGs) considerations	
Basic costs	<ul style="list-style-type: none"> • • Approximate KES 46,850 per acre
Estimated returns	<ul style="list-style-type: none"> • • 50 t/acre @ 5 per Kg farm gate= 203,150.00

Gender issues and concerns in development, dissemination adoption and scaling up	<ul style="list-style-type: none"> • Women and youth's limited access to production resources such as land, knowledge, information, extension training, credit and quality seed.
Gender related opportunities	<ul style="list-style-type: none"> • Youth and women groups to produce quality/certified seed • Women cottage industries to process, value add and market cassava products
VMG issues and concerns in development, dissemination, adoption and scaling up	<ul style="list-style-type: none"> • Limited access to production resources such as land, knowledge, information, extension training, credit and quality seed. • Limited participation in decision making at community and County level
VMG related opportunities	<ul style="list-style-type: none"> • VMG groups to produce quality/certified seed • VMG cottage industries to process, value add and market cassava products
E: Case studies/profiles of success stories	<ul style="list-style-type: none"> •
Success stories from previous similar projects	<ul style="list-style-type: none"> • Establishment of cassava commercial villages at Mbuvo in Makueni, and Tangakona in Busia County, • Improved income generation from adoption of Tajirika variety in Kilifi County
Application guidelines for users	
F: Status of TIMP readiness (1-ready for upscaling; 2-requires validation; 3-requires further research)	<ul style="list-style-type: none"> • Ready for up-scaling in Busia and Kisumu Counties • Requires validation in Lamu County
G: Contacts	Institute Director Non Ruminant Research Institute Box 169 - 50100 Tel 05631753 or 05630031. Email: NRRI@kalro.org
Lead organization and scientists	KALRO Kivuva B. M., Munga T.L and Woyengo V.W
Partner organizations	<ul style="list-style-type: none"> • KALRO-Avail breeder's seed and technical backstopping • Universities-Technical backstopping and tissue culture services • National and County Ministry of Agriculture, Livestock, Fisheries & Irrigation-Extension services
	<ul style="list-style-type: none"> • Kenya Plant Health Inspectorate Services (KEPHIS) Seed certification • CBOs, NGO's- Seed multiplication and technology dissemination • Processors: Create demand for variety • Test/validate and produce • CGIARS e.g IITA- Funding and technical backstopping

2.1.2 TIMP Name	Cassava variety Katsuhanzala (990132)
Category	Technology
A: Description of the technology, innovation or management practice	
Problem addressed	Low cassava yields ranging 5-9 t/ha caused by growing low yielding, late maturing varieties susceptible to drought, pests (CGM, CMB and CS) and CMD.
What is it	Katsuhanzala (990132) cassava variety yields 36.7t/ha, matures in 8-10 months, is resistant to CMD and tolerant to CBSD, CGM and CMB with a cream root flesh colour. It has a dry-matter 29% and is adapted to wide agroecological zones ranging from the lowlands of the coastal region to the highland coffee zones. The variety is a moderate yielder (36.7 t/ha) and does well at altitude range of 200-1500 m.a.s.l. and soils well-drained sandy loam with rainfall range of 500-1000mm annually and mean annual temperature of 24-to 27 °C
Justification	Low cassava yields may be increased by growing improved high yielding and drought tolerant varieties resistant/tolerant to major pests and diseases with good root quality for consumption and industrial use. Being a medium yielding with tolerance to CBSD and pests and resistance CMD variety, has a high possibility of being adopted to replace existing varieties
B: Assessment of dissemination and scaling up/out approaches	
Users of TIMP	<ul style="list-style-type: none"> • Farmers, processors, extension providers, consumers, researchers and seed producers
Approaches to be used in dissemination	<ul style="list-style-type: none"> • Farmers field days, demonstration plots, on-farm trials and agricultural shows
Critical/essential factors for successful promotion	<ul style="list-style-type: none"> • Preferred traits by farmers, consumers and market niches • Promotion methods used • Involve all cassava stakeholders in the promotion chain
Partners/stakeholders for scaling up and their roles	<ul style="list-style-type: none"> • KALRO-Avail breeder's seed and technical backstopping • Universities-Technical backstopping and tissue culture services • National and County Ministry of Agriculture, Livestock, Fisheries & Irrigation-Extension services • Kenya Plant Health Inspectorate Services (KEPHIS)- Seed inspection • CBOs, NGO's- Seed multiplication and technology dissemination • Processors: Create demand for variety • Farmers: Test/validate and produce • CGIARS e.g IITA: Donors: Funding and technical backstopping

C: Current situation and future scaling up	
Counties where already promoted, if any	<ul style="list-style-type: none"> • Busia, Bungoma, Kakamega, Vihiga, Siaya Homabay, Kisumu, Machakos Makueni, Kitui, Tharaka and Taita Taveta
Counties where TIMP will be upscaled / Validated	<ul style="list-style-type: none"> • Upscaled in Busia and Kisumu Counties and validated in Lamu County
Challenges in dissemination	<ul style="list-style-type: none"> • Seed unavailability • Livestock destruction • Limited extension providers and financial support • Poor perception towards new cassava varieties
Suggestions for addressing the challenges	<ul style="list-style-type: none"> • Establish working seed system • Use local administration to ensure harmony between livestock and cassava farmers • Support improved extension services • Campaign for attitude change
Lessons learned in upscaling, if any	<ul style="list-style-type: none"> • Successful variety promotion requires availability of ready and consistent market for anticipated increased production and root qualities similar to their preferred varieties
Social, environmental, policy and market conditions necessary) for development and upscaling	<ul style="list-style-type: none"> • Favorable policies to support seed/root production, marketing and value addition • Availability of market for anticipated yield increase • Favorable weather Favorable policies to support seed/production, marketing and value addition
D: Economic, gender, vulnerable and marginalized groups (VMGs) considerations	
Basic costs	<ul style="list-style-type: none"> • Approximate KES 46,850 per acre
Estimated returns	<ul style="list-style-type: none"> • 36.7 t/acre @ 5 per Kg farm gate= 136,650
Gender issues and concerns in development, dissemination, scaling up and adoption	<ul style="list-style-type: none"> • Women and youth 's limited access to production resources such as land, knowledge, information, extension training, credit and quality seed.
VMG issues and concerns in development, dissemination, scaling up and adoption	<ul style="list-style-type: none"> • Limited access to production resources such as land, knowledge, information, extension training, credit and quality seed. • Limited participation in decision making at community and County level
VMG related opportunities	<ul style="list-style-type: none"> • VMG individuals/ groups to produce quality/certified seed • VMG individuals/groups cottage industries to process, value add and market
E: Case studies/profiles of success stories	
Success stories from previous similar projects	<ul style="list-style-type: none"> • Establishment of cassava commercial villages at Mbuvo in Makueni, and Tangakona in Busia County,


	<ul style="list-style-type: none"> Improved income generation from adoption of Tajirika variety in Kilifi County
Application guidelines for users	<ul style="list-style-type: none"> Cassava Good agricultural practices and variety catalogue manuals
F: Status of TIMP readiness (1-ready for upscaling; 2-requires validation; 3-requires further research)	<ul style="list-style-type: none"> Ready for up-scaling in Lamu, Busia and Kisumu Counties
G: Contacts	Institute Director AMRI Katumani Box 169 - 50100 Tel 05631753 or 05630031. Email: director.amri@kalro.org
Lead organization and scientists	KALRO <ul style="list-style-type: none"> Kivuva B. M., Munga T.L and Woyengo V.W
Partner organizations	<ul style="list-style-type: none"> KALRO-Avail breeder's seed and technical backstopping Universities-Technical backstopping and tissue culture services National and County Ministry of Agriculture, Livestock, Fisheries & Irrigation-Extension services Kenya Plant Health Inspectorate Services (KEPHIS)- Seed certification CBOs, NGO's- Seed multiplication and technology dissemination Processors: Create demand for variety Test/validate and produce CGIARS e.g IITA- Funding and technical backstopping

2.1.3 TIMP Name	Cassava variety KME-3
Category	<ul style="list-style-type: none"> Technology
A: Description of the technology, innovation or management practice	
Problem addressed	Limited high yielding varieties that are pest (CGM, CGM and cassava scales (CS) tolerant and CMD resistant with desirable attributes.
What is it	KME-3 is a drought tolerant, medium yielder resistant to cassava mosaic disease, early maturing variety, with low CNP, sweet and easy to mash. Its root flesh is creamy-coloured with dry matter of 29%. The variety does well in warm, semi-arid areas, 200-2000 m.a.s.l with rainfall range of 500-1000 mm per year and yields 40 t/ha.
Justification	Farmers are growing low yielding cassava varieties that are late maturing and susceptible to pests and diseases resulting in a yield

	<p>gap of 81 t/ha compared to the crop potential yield. KALRO had developed KME-3 variety yielding 40 t/ha with good root quality, tolerance to drought and pests and resistance to CMD and medium maturity. Disseminating and upscaling to farmers will enhance cassava yield.</p> <p>This variety is drought tolerant medium yielder resistant to cassava mosaic disease. In addition, it is early maturing, sweet and easy to mash.</p>
B: Assessment of dissemination and scaling up/out approaches	
Users of TIMP	<ul style="list-style-type: none"> • Farmers, processors, extension providers, consumers, researchers and seed producers
Approaches to be used in dissemination	<ul style="list-style-type: none"> • Farmers field days, demonstration plots, on-farm trials • Agricultural information innovation and digital platforms and agricultural shows
Critical/essential factors for successful promotion	<ul style="list-style-type: none"> • Preferred traits by farmers, consumers and market niches • Use of appropriate dissemination and promotion n methods • Involve all cassava stakeholders in the promotion chain
Partners/stakeholders for scaling up and their roles	<ul style="list-style-type: none"> • KALRO-Avail breeder’s seed and technical backstopping • Universities-Technical backstopping and tissue culture services • National and County Ministry of Agriculture, Livestock, Fisheries & Irrigation-Extension services • Kenya Plant Health Inspectorate Services (KEPHIS)- Seed inspection • CBOs, NGO’s- Seed multiplication and technology dissemination • Processors: Create demand for variety • Farmers: Test/validate and produce • CGIARS e.g IITA: Donors: Funding and technical backstopping
C: Current situation and future scaling up	
Counties where already promoted, if any	<ul style="list-style-type: none"> • • • Busia, Bungoma, Kakamega, Vihiga, Siaya, Homabay, Kisumu, Machakos Makueni, Kitui, Tharaka , Taita Taveta
Counties where TIMP will be upscaled / Validated	<ul style="list-style-type: none"> •• To be validated in Busia, Kisumu and Lamu Counties
Challenges in dissemination	<ul style="list-style-type: none"> • Seed unavailability • Livestock destruction • Limited extension providers • Poor perception towards new cassava varieties

Suggestions for addressing the challenges	<ul style="list-style-type: none"> • Establish working seed system • Use local administration to ensure harmony between livestock and cassava farmers • Support improved extension services • Campaign for attitude change
Lessons learned in upscaling, if any	<ul style="list-style-type: none"> • • Successful variety promotion requires availability of ready and consistent market for anticipated increased production and root qualities similar to their preferred varieties
Social, environmental, policy and market conditions necessary) for development and upscaling	<ul style="list-style-type: none"> • Farmers' willingness to adopt new varieties • Favorable weather conditions • Availability of consistent market • Favorable policies to support seed/production, marketing and value addition
D: Economic, gender, vulnerable and marginalized groups (VMGs) considerations	
Basic costs	<ul style="list-style-type: none"> • • Approximate KES 46,850 per acre
Estimated returns	<ul style="list-style-type: none"> • 40 t/acre @ 5 per Kg farm gate= 153,150
Gender issues and concerns in development, dissemination, scaling up and adoption	<ul style="list-style-type: none"> • Women and youth's limited access to production resources such as land, knowledge, information, extension training, credit and quality seed.
Gender related opportunities	<ul style="list-style-type: none"> • Youth and women groups to produce quality/certified seed • Women cottage industries to process, value add and market cassava products
VMG issues and concerns in development, dissemination, scaling up and adoption	<ul style="list-style-type: none"> • Limited access to production resources such as land, knowledge, information, extension training, credit and quality seed. • Limited participation in decision making at community and County level
VMG related opportunities	<ul style="list-style-type: none"> • VMG groups to produce quality/certified seed • VMG cottage industries to process, value add and market
E: Case studies/profiles of success stories	
Success stories from previous similar projects	<ul style="list-style-type: none"> • Establishment of cassava commercial villages at Mbuvo in Makueni, and Tangakona in Busia County, • Improved income generation from adoption of Tajirika variety in Kilifi County
Application guidelines for users	<ul style="list-style-type: none"> • Updated National Variety list-Kenya
F: Status of TIMP readiness (1-ready for upscaling;, 2-requires validation; 3-requires further research)	<ul style="list-style-type: none"> • Require validation in Lamu, Busia and Kisumu Counties

G: Contacts	Institute Director AMRI Katumani Box 169 - 50100 Tel 05631753 or 05630031. Email: director.amri@kalro.org
Lead organization and scientists	KALRO Kivuva B. M., Munga T.L and Woyengo V.W
Partner organizations	<ul style="list-style-type: none"> • KALRO-Avail breeder’s seed and technical backstopping • Universities-Technical backstopping and tissue culture services • National and County Ministry of Agriculture, Livestock, Fisheries & Irrigation-Extension services • Kenya Plant Health Inspectorate Services (KEPHIS)- Seed certification • CBOs, NGO’s- Seed multiplication and technology dissemination • Processors: Create demand for variety, test/validate and produce • CGIARS e.g IITA- Funding and technical backstopping

2.1.4 TIMP Name	Cassava variety Katune (990005) 
Category	Technology
A: Description of the technology, innovation or management practice	
Problem addressed	Lack of high yielding varieties that are pest (CGM, CGM and cassava scales (CS), CMD resistant early maturing in 6 to 8 months after planting (MAP) and drought tolerant.
What is it	Katune is a creamy root flesh coloured variety that matures in 8-10 months. It has a dry-matter 36% and is adapted to wide agro-ecological zones ranging from the lowlands of the coastal region to the highland coffee zones. The variety is a moderate yielder (37.1t/ha) that is resistant to cassava mosaic disease and tolerant to

	drought, CGM, CMB and CS. It does well at altitude range of 200-1500 m.a.s.l. and in well-drained sandy loam soils with rainfall range of 500-1000mm annually and temperature of 24-27 °C.
Justification	Low yielding late maturing cassava varieties with susceptibility to pests and diseases cassava varieties grown by farmers contribute to low productivity. Being medium yielding, resistant to CMD, and tolerant to pests, diseases and drought the variety is likely to be adopted to replace other low yielding susceptible varieties.
B: Assessment of dissemination and scaling up/out approaches	
Users of TIMP	<ul style="list-style-type: none"> • Farmers, processors, extension providers, consumers, researchers and seed producers
Approaches to be used in dissemination	<ul style="list-style-type: none"> • Farmers field days, demonstration plots, on-farm trials • Agricultural information innovation and digital platforms and agricultural shows
Critical/essential factors for successful promotion	<ul style="list-style-type: none"> • Preferred traits by farmers, consumers and market niches • Use of appropriate promotion methods • Involve all cassava stakeholders in the promotion chain
Partners/stakeholders for scaling up and their roles	<ul style="list-style-type: none"> • KALRO-Avail breeder’s seed and technical backstopping • Universities-Technical backstopping and tissue culture services • National and County Ministry of Agriculture, Livestock, Fisheries & Irrigation-Extension services • Kenya Plant Health Inspectorate Services (KEPHIS)- Seed inspection • CBOs, NGO’s- Seed multiplication and technology dissemination • Processors: Create demand for variety • Farmers: Test/validate and produce • CGIARS e.g IITA: Donors: Funding and technical backstopping
C: Current situation and future scaling up	
Counties where already promoted, if any	<ul style="list-style-type: none"> • Busia, Bungoma, Kakamega, Vihiga, Siaya, Homabay, Kisumu, Machakos Makueni, Kitui, Tharaka and Taita-Taveta County
Counties where TIMP will be upscaled / Validated	<ul style="list-style-type: none"> • To be upscaled in Busia, Kisumu and Lamu Counties
Challenges in dissemination	<ul style="list-style-type: none"> • Seed unavailability • Livestock destruction • Limited extension providers • Poor perception towards new cassava varieties

Suggestions for addressing the challenges	<ul style="list-style-type: none"> • Establish working seed system • Use local administration to ensure harmony between livestock and cassava farmers • Support improved extension services • Campaign for attitude change
Lessons learned in upscaling, if any	<ul style="list-style-type: none"> • Successful variety promotion requires availability of ready and consistent market for anticipated increased production and root qualities similar to their preferred varieties
Social, environmental, policy and market conditions necessary) for development and upscaling	<ul style="list-style-type: none"> • Farmers' willingness to adopt new varieties • Favorable weather conditions • Availability of consistent market • Favorable policies to support seed/production, marketing and value addition
D: Economic, gender, vulnerable and marginalized groups (VMGs) considerations	
Basic costs	<ul style="list-style-type: none"> • Approximate KES 46,850 per acre
Estimated returns	<ul style="list-style-type: none"> • 37.1 t/acre @ 5 per Kg farm gate= 138,650
Gender issues and concerns in development, dissemination adoption and scaling up.	<ul style="list-style-type: none"> • Women and youth's limited access to production resources such as land, knowledge, information, extension training, credit and quality seed.
Gender related opportunities	<ul style="list-style-type: none"> • Youth and women groups to produce quality/certified seed • Women cottage industries to process, value add and market cassava products
VMG issues and concerns in development, dissemination adoption and scaling up.	<ul style="list-style-type: none"> • Limited access to production resources such as land, knowledge, information, extension training, credit and quality seed. • Limited participation in decision making at community and County level
VMG related opportunities	<ul style="list-style-type: none"> • VMG groups to produce quality/certified seed • VMG cottage industries to process, value add and market
E: Case studies/profiles of success stories	<ul style="list-style-type: none"> •
Success stories from previous similar projects	<ul style="list-style-type: none"> • Establishment of cassava commercial villages at Mbuvo in Makueni, and Tangakona in Busia County, • Improved income generation from adoption of Tajirika variety in Kilifi County
Application guidelines for users	<ul style="list-style-type: none"> •
F: Status of TIMP readiness (1-ready for upscaling;, 2-requires	<ul style="list-style-type: none"> • Require validation in Lamu, Busia and Kisumu Counties

validation; 3-requires further research)	
G: Contacts	Institute Director AMRI Katumani Box 169 - 50100 Tel 05631753 or 05630031. Email: director.amri@kalro.org
Lead organization and scientists	<ul style="list-style-type: none"> • KALRO • Kivuva B. M., Munga T.L and Woyengo V.W
Partner organizations	<ul style="list-style-type: none"> • KALRO-Avail breeder's seed and technical backstopping • Universities-Technical backstopping and tissue culture services • National and County Ministry of Agriculture, Livestock, Fisheries & Irrigation-Extension services • Kenya Plant Health Inspectorate Services (KEPHIS)- Seed certification • CBOs, NGO's- Seed multiplication and technology dissemination • Processors: Create demand for variety • Farmers: Test/validate and produce • CGIARS e.g IITA- Funding and technical backstopping • Donors: Funding

2.1.5 TIMP Name	Cassava variety KME-2
Category	<ul style="list-style-type: none"> • Technology
A: Description of the technology, innovation or management practice	
Problem addressed	Improved cassava yield is limited by lack of high yielding varieties that are pest and disease tolerant.
What is it	KME-2 is a drought tolerant medium yielder (40 t/ha) resistant to CMD, early maturing variety with low CNP, sweet and poundable. Root flesh is creamy-coloured with dry matter of 29%. The variety does well in warm, semi-arid areas, 200-2000 m.a.s.l with rainfall range of 500-1000 mm per year.
Justification	KME-2 is drought tolerant medium yielder resistant to cassava mosaic disease. In addition, it is medium maturing, sweet and easy to mash and there is a high possibility that it will be adopted to replace the low yielding varieties susceptible pests and diseases.
B: Assessment of dissemination and scaling up/out approaches	
Users of TIMP	<ul style="list-style-type: none"> • Farmers, processors, extension providers, consumers, researchers and seed producers

Approaches to be used in dissemination	<ul style="list-style-type: none"> • Farmers field days, demonstration plots, on-farm trials • Agricultural information innovation and digital platforms and agricultural shows
Critical/essential factors for successful promotion	<ul style="list-style-type: none"> • Preferred traits by farmers, consumers and market niches • Promotion methods used • Involve all cassava stakeholders in the promotion chain
Partners/stakeholders for scaling up and their roles	<ul style="list-style-type: none"> • KALRO-Avail breeder's seed and technical backstopping • Universities-Technical backstopping and tissue culture services • National and County Ministry of Agriculture, Livestock, Fisheries & Irrigation-Extension services • Kenya Plant Health Inspectorate Services (KEPHIS)-Seed inspection • CBOs, NGO's- Seed multiplication and technology dissemination • Processors: Create demand for variety • Farmers: Test/validate and produce • CGIARS e.g IITA: Donors: Funding and technical backstopping
C: Current situation and future scaling up	
Counties where already promoted, if any	<ul style="list-style-type: none"> • • In eastern and coastal Kenya
Counties where TIMP will be upscaled / Validated	<ul style="list-style-type: none"> • To be upscaled in Lamu and validated Busia and Kisumu Counties
Challenges in dissemination	<ul style="list-style-type: none"> • Seed availability • Livestock destruction • Limited extension providers • Poor perception towards new cassava varieties
Suggestions for addressing the challenges	<ul style="list-style-type: none"> • Establish working seed system • Use local administration to ensure harmony between livestock and cassava farmers • Support improved extension services • Campaign for attitude change
Lessons learned in upscaling, if any	<ul style="list-style-type: none"> • Successful variety promotion requires availability of ready and consistent market for anticipated increased production and root qualities similar to their preferred varieties

Social, environmental, policy and market conditions necessary) for development and upscaling	<ul style="list-style-type: none"> • Farmers’ willingness to adopt new varieties • Favorable weather conditions • Availability of consistent market • Favorable policies to support seed/production, marketing and value addition
D: Economic, gender, vulnerable and marginalized groups (VMGs) considerations	
Basic costs	<ul style="list-style-type: none"> • •Approximate KES 46,850 per acre
Estimated returns	<ul style="list-style-type: none"> • 40. t/acre @ 5 per Kg farm gate= 153,150
Gender issues and concerns in development, dissemination adoption and scaling up.	<ul style="list-style-type: none"> • Women and youth’s limited access to production resources such as land, knowledge, information, extension training, credit and quality seed.
Gender related opportunities	<ul style="list-style-type: none"> • Youth and women groups to produce quality/certified seed • Women cottage industries to process, value add and market cassava products
VMG issues and concerns in development, dissemination, adoption and scaling up.	<ul style="list-style-type: none"> • Limited access to production resources such as land, knowledge, information, extension training, credit and quality seed. • Limited participation in decision making at community and County level
VMG related opportunities	<ul style="list-style-type: none"> • VMG groups to produce quality/certified seed • VMG cottage industries to process, value add and market
E: Case studies/profiles of success stories	
Success stories from previous similar projects	<ul style="list-style-type: none"> • Establishment of cassava commercial villages at Mbuvo in Makueni, and Tangakona in Busia County, • Improved income generation from adoption of Tajirika variety in Kilifi County
Application guidelines for users	<ul style="list-style-type: none"> • Updated National Variety list-Kenya
F: Status of TIMP readiness (1-ready for upscaling;, 2-requires validation; 3-requires further research)	<ul style="list-style-type: none"> • Require validation in Busia and Kisumu and scaling up in Lamu Counties
G: Contacts	Institute Director AMRI Katumani Box 169 - 50100 Tel 05631753 or 05630031. Email: director.amri@kalro.org
Lead organization and scientists	KALRO Kivuva B. M., Munga T.L and Woyengo V.W
Partner organizations	<ul style="list-style-type: none"> • KALRO-Avail breeder’s seed and technical backstopping


	<ul style="list-style-type: none"> • Universities-Technical backstopping and tissue culture services • National and County Ministry of Agriculture, Livestock, Fisheries & Irrigation-Extension services • Kenya Plant Health Inspectorate Services (KEPHIS)- Seed certification • CBOs, NGO's- Seed multiplication and technology dissemination • Processors: Create demand for variety • Farmers: Test/validate and produce • CGIARS e.g IITA- Funding and technical backstopping • Donors: Funding
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2.1.6 TIMP Name	Cassava variety Mygera
Category	<ul style="list-style-type: none"> • Technology
A: Description of the technology, innovation or management practice	
Problem addressed	<ul style="list-style-type: none"> • Low cassava productivity of 5 to 9 t/ha against the yield potential of 90 t/ha is attributed to crop growing varieties susceptible to CMD, CBSD, CBB, CMB, CGM, and inadequate high yielding varieties with early to medium maturity
What is it	<ul style="list-style-type: none"> • Mygera is mid-maturing ready for harvest from 10-12 months after planting and yields 20-43 t/ha. It's also tolerant to diseases such as CBSD, CBB, CMD and pests like CMB and CGM. This variety is sweet tasting (low cyanide content of 1.6-15.4 mg/100g) and has 24-52.5% dry matter. Optimal environmental conditions are 500-1200 mm rainfall annually, altitude range of 800-1750 m.a.s.l.
Justification	<ul style="list-style-type: none"> • Cassava yield in farmers' fields range from 5-9 t/ha compared to the crop potential 90 t/ha due their preference for late maturing and pests and diseases susceptible varieties. Mygera variety developed by KALRO yields 20-43 t/ha, has good root quality and is resistant to CMD and tolerant to pests. Availing this variety would improve cassava yield if adopted.
B: Assessment of dissemination and scaling up/out approaches	
Users of TIMP	<ul style="list-style-type: none"> • Farmers, processors, extension providers, consumers, researchers and seed producers

Approaches to be used in dissemination	<ul style="list-style-type: none"> • Farmers field days, demonstration plots, on-farm trials • Agricultural information innovation and digital platforms and agricultural shows
Critical/essential factors for successful promotion	<ul style="list-style-type: none"> • Preferred traits by farmers, consumers and market niches • Promotion methods used • Involve all cassava stakeholders in the promotion chain
Partners/stakeholders for scaling up and their roles	<ul style="list-style-type: none"> • KALRO-Avail breeder's seed and technical backstopping • Universities-Technical backstopping and tissue culture services • National and County Ministry of Agriculture, Livestock, Fisheries & Irrigation-Extension services • Kenya Plant Health Inspectorate Services (KEPHIS)-Seed inspection • CBOs, NGO's- Seed multiplication and technology dissemination • Processors: Create demand for variety • Farmers: Test/validate and produce • CGIARS e.g IITA: Donors: Funding and technical backstopping
C: Current situation and future scaling up	
Counties where already promoted, if any	<ul style="list-style-type: none"> • Busia, Bungoma, Kakamega, Vihiga, Siaya, • Homabay, Kisumu, Machakos Makueni, Kitui, Tharaka , • Taita Taveta
Counties where TIMP will be upscaled / Validated	<ul style="list-style-type: none"> • • To be upscaled in Busia and Kisumu and validated in Lamu County
Challenges in dissemination	<ul style="list-style-type: none"> • Seed un availability • Livestock destruction • Limited extension providers • Poor perception towards new cassava varieties
Suggestions for addressing the challenges	<ul style="list-style-type: none"> • Establish working seed system • Use local administration to ensure harmony between livestock and cassava farmers • Support improved extension services • Campaign for attitude change
Lessons learned in upscaling, if any	<ul style="list-style-type: none"> • Successful variety promotion requires availability of ready and consistent market for anticipated increased production and root qualities similar to their preferred varieties
Social, environmental, policy and market conditions necessary) for development and upscaling	<ul style="list-style-type: none"> • Farmers' willingness to adopt new varieties • Favorable weather conditions • Availability of consistent market

	<ul style="list-style-type: none"> • Favorable policies to support seed/production, marketing and value addition
	<ul style="list-style-type: none"> • Favorable policies to support seed/production, marketing and value addition
D: Economic, gender, vulnerable and marginalized groups (VMGs) considerations	
Basic costs	<ul style="list-style-type: none"> • Approximate KES 46,850 per acre
Estimated returns	<ul style="list-style-type: none"> • 20 t/acre @ 5 per Kg farm gate= 53,150
Gender issues and concerns in development, dissemination adoption and scaling up.	<ul style="list-style-type: none"> • Women and youth 's limited access to production resources such as land, knowledge, information, extension training, credit and quality seed.
Gender related opportunities	<ul style="list-style-type: none"> • Youth and women groups to produce quality/certified seed • Women cottage industries to process, value add and market cassava products •
VMG issues and concerns in development, dissemination adoption and scaling up.	<ul style="list-style-type: none"> • Limited access to production resources such as land, knowledge, information, extension training, credit and quality seed. • Limited participation in decision making at community and County level
VMG related opportunities	<ul style="list-style-type: none"> • VMG groups to produce quality/certified seed • VMG cottage industries to process, value add and market
E: Case studies/profiles of success stories	
Success stories from previous similar projects	<ul style="list-style-type: none"> • Establishment of cassava commercial villages at Mbuvo in Makueni, and Tangakona in Busia County, • Improved income generation from adoption of Tajirika variety in Kilifi County
Application guidelines for users	
F: Status of TIMP readiness (1-ready for upscaling;, 2-requires validation; 3-requires further research)	<ul style="list-style-type: none"> • Ready for up-scaling in Busia and Kisumu Counties • Requires validation in Lamu County
G: Contacts	Institute Director Non Ruminant Research Institute Box 169 - 50100 Tel 05631753 or 05630031. Email: NRRI@kalro.org
Lead organization and scientists	KALRO Kivuva B. M., Munga T.L and Woyengo V.W


Partner organizations	<ul style="list-style-type: none"> • KALRO-Avail breeder’s seed and technical backstopping • Universities-Technical backstopping and tissue culture services • National and County Ministry of Agriculture, Livestock, Fisheries & Irrigation-Extension services • Kenya Plant Health Inspectorate Services (KEPHIS)- Seed certification
	<ul style="list-style-type: none"> • CBOs, NGO’s- Seed multiplication and technology dissemination • Processors: Create demand for variety • Farmers: Test/validate and produce • CGIARS e.g IITA- Funding and technical backstopping • Donors: Funding

2.1.7 TIMP Name	<p>Cassava variety Shibe</p> 
Category	<ul style="list-style-type: none"> • Technology
A: Description of the technology, innovation or management practice	
Problem addressed	<p>Limited early maturing high yielding pest (CGM and CMB) and disease (CMD and CBSD) tolerant/resistant varieties resulting in low cassava productivity of 5 to 9 t/ha against the crop potential yield of 90 t/ha</p>
What is it	<p>Shibe is a high yielder (70 t/ha) and medium maturing (8 to 12 months) variety that is resistant to CMD and tolerant to CBSD. The variety has straight stems ideal for intercropping that does well in altitudes 15-</p>

	1200masl with a rainfall range of 500 mm- 1000mm and annual temperature of 24-to 27°C
Justification	Cassava yield is low because farmers are growing varieties with low yield potential, late maturity and susceptible to pests and diseases. Shibe variety is high yielding, tolerant to CBSD, CMB and CGM with resistance to CMD and early-medium maturing. There is a high possibility that it will be adopted to replace the low yielding varieties susceptible pests and diseases and contribute to improved yield.
B: Assessment of dissemination and scaling up/out approaches	
Users of TIMP	<ul style="list-style-type: none"> • Farmers, processors, extension providers, consumers, researchers and seed producers
Approaches to be used in dissemination	<ul style="list-style-type: none"> • Farmers field days, demonstration plots, on-farm trials • Agricultural information innovation and digital platforms and agricultural shows
Critical/essential factors for successful promotion	<ul style="list-style-type: none"> • Preferred traits by farmers, consumers and market niches • Promotion methods used • Involve all cassava stakeholders in the promotion chain
Partners/stakeholders for scaling up and their roles	<ul style="list-style-type: none"> • KALRO-Avail breeder's seed and technical backstopping • Universities-Technical backstopping and tissue culture services • National and County Ministry of Agriculture, Livestock, Fisheries & Irrigation-Extension services • Kenya Plant Health Inspectorate Services (KEPHIS)- Seed inspection • CBOs, NGO's- Seed multiplication and technology dissemination • Processors: Create demand for variety • Farmers: Test/validate and produce
	<ul style="list-style-type: none"> • CGIARS e.g IITA: Donors: Funding and technical backstopping
C: Current situation and future scaling up	
Counties where already promoted, if any	<ul style="list-style-type: none"> • Kilifi, Kwale, Lamu, Machakos, Makueni, Kitui, Tharaka, Taita Taveta
Counties where TIMP will be upscaled / Validated	<ul style="list-style-type: none"> • Validated in Busia and Kisumu and upscaled in Lamu County
Challenges in dissemination	<ul style="list-style-type: none"> • Seed unavailability • Livestock destruction • Limited extension providers • Poor perception towards new cassava varieties
Suggestions for addressing the challenges	<ul style="list-style-type: none"> • Establish working seed system • Use local administration to ensure harmony between livestock and cassava farmers

	<ul style="list-style-type: none"> • Support improved extension services • Campaign for attitude change
Lessons learned in upscaling, if any	<ul style="list-style-type: none"> • Successful variety promotion requires availability of quality and certified seed, ready and consistent market for anticipated increased production and root qualities similar to their preferred varieties
Social, environmental, policy and market conditions necessary) for development and upscaling	<ul style="list-style-type: none"> • Farmers' willingness to adopt new varieties • Favorable weather conditions • Availability of consistent market • Favorable policies to support seed/production, marketing and value addition
D: Economic, gender, vulnerable and marginalized groups (VMGs) considerations	
Basic costs	<ul style="list-style-type: none"> • Approximate KES 46,850 per acre
Estimated returns	<ul style="list-style-type: none"> • 70.1 t/acre @ 5 per Kg farm gate= 301,650
Gender issues and concerns in development, dissemination adoption and scaling up.	<ul style="list-style-type: none"> • Women and youth 's limited access to production resources such as land, knowledge, information, extension training, credit and quality seed.
Gender related opportunities	<ul style="list-style-type: none"> • Youth and women groups to produce quality/certified seed • Women cottage industries to process, value add and market cassava products
VMG issues and concerns in development, dissemination adoption and scaling up.	<ul style="list-style-type: none"> • Limited access to production resources such as land, knowledge, information, extension training, credit and quality seed. • Limited participation in decision making at community and County level
VMG related opportunities	<ul style="list-style-type: none"> • VMG groups to produce quality/certified seed • VMG cottage industries to process, value add and market
E: Case studies/profiles of success stories	<ul style="list-style-type: none"> •
Success stories from previous similar projects	<ul style="list-style-type: none"> • Establishment of cassava commercial villages at Mbuvo in Makueni, and Tangakona in Busia County, • Improved income generation from adoption of Tajirika variety in Kilifi County
Application guidelines for users	Muli M.B., Saha, H.M., Shuma, J and Weru S.M. (2008) New cassava varieties for coastal Kenya. KARI information brochure series / 58 /2008
F: Status of TIMP readiness (1ready for	<ul style="list-style-type: none"> • Ready for up-scaling in Busia and Kisumu Counties • Requires validation in Lamu County


upscaling; 2-requires validation; 3-requires further research)	
G: Contacts	Director Industrial Crops Research Institute Box 16 - 80109 Email: director.ICRI@kalro.org
Lead organization and scientists	KALRO Munga T.L, Muli, B.M and Weru S
Partner organizations	<ul style="list-style-type: none"> • KALRO-Avail breeder's seed and technical backstopping • Universities-Technical backstopping and tissue culture services • National and County Ministry of Agriculture, Livestock, Fisheries & Irrigation-Extension services • Kenya Plant Health Inspectorate Services (KEPHIS)- Seed certification • CBOs, NGO's- Seed multiplication and technology dissemination • Processors: Create demand for variety • Farmers: Test/validate and produce • CGIARS e.g IITA- Funding and technical backstopping • Donors: Funding

2.1.8 TIMP Name	<p>Cassava variety Tajirika</p> 
Category	<ul style="list-style-type: none"> • Technology
A: Description of the technology, innovation or management practice	
Problem addressed	Limited early-medium maturing, high yielding, pest (CGM and CGM), disease (CMD and CBSD) resistant and drought tolerant cassava varieties.
What is it	Tajirika is an early maturing variety (8 MAP) and a high yielder (63.3t/ha) that is not only resistant to CMV but also tolerant to CBSD. Its straight stems allow for intercropping. It performs well in altitudes 15-1200mls,

	rainfall of 500-1000mm per year, well drained sandy loam soils and temperature range of 24-to 27°C.
Justification	As a high yielder (63.3t/ha) resistant to CMV and tolerant to CBSD, Tajirika variety is a good bet for farmers faced with the challenges of low cassava yielding varieties that are susceptible to pests and diseases.
B: Assessment of dissemination and scaling up/out approaches	
Users of TIMP	<ul style="list-style-type: none"> Farmers, processors, extension providers, consumers, researchers and seed producers
Approaches to be used in dissemination	<ul style="list-style-type: none"> Farmers field days, demonstration plots, on-farm trials Agricultural information innovation and digital platforms and agricultural shows
Critical/essential factors for successful promotion	<ul style="list-style-type: none"> Preferred traits by farmers, consumers and market niches Promotion methods used Involve all cassava stakeholders in the promotion chain
Partners/stakeholders for scaling up and their roles	<ul style="list-style-type: none"> KALRO-Avail breeder's seed and technical backstopping Universities-Technical backstopping and tissue culture services National and County Ministry of Agriculture, Livestock, Fisheries & Irrigation-Extension services Kenya Plant Health Inspectorate Services (KEPHIS)- Seed inspection CBOs, NGO's- Seed multiplication and technology dissemination Processors: Create demand for variety Farmers: Test/validate and produce CGIARS e.g IITA: Donors: Funding and technical backstopping
C: Current situation and future scaling up	
Counties where already promoted, if any	<ul style="list-style-type: none"> Kilifi, Kwale , lamu, Machakos Makueni, Kitui, Tharaka , Taita-Taveta
Counties where TIMP will be upscaled / Validated	<ul style="list-style-type: none"> To be validated in Busia and Kisumu and upscaled in Lamu county
Challenges in dissemination	<ul style="list-style-type: none"> Seed un availability Livestock destruction Limited extension providers Poor perception towards new cassava varieties
Suggestions for addressing the challenges	<ul style="list-style-type: none"> Establish working seed system Use local administration to ensure harmony between livestock and cassava farmers Support improved extension services Campaign for attitude change
Lessons learned in upscaling, if any	<ul style="list-style-type: none"> Successful variety promotion requires availability of ready and consistent market for anticipated increased production and root qualities similar to their preferred varieties

Social, environmental, policy and market conditions necessary) for development and upscaling	<ul style="list-style-type: none"> • Farmers' willingness to adopt new varieties • Favorable weather conditions • Availability of consistent market • Favorable policies to support seed/production, marketing and value addition
D: Economic, gender, vulnerable and marginalized groups (VMGs) considerations	
Basic costs	<ul style="list-style-type: none"> • Approximate KES 46,850 per acre
Estimated returns	<ul style="list-style-type: none"> • 63.3 t/acre @ 5 per Kg farm gate= 269,650
Gender issues and concerns in development, dissemination adoption and scaling up.	<ul style="list-style-type: none"> • Women and youth's limited access to production resources such as land, knowledge, information, extension training, credit and quality seed.
Gender related opportunities	<ul style="list-style-type: none"> • Youth and women groups to produce quality/certified seed • Women cottage industries to process, value add and market cassava products • Variety provides for opportunity to intercrop for additional food security and increased income
VMG issues and concerns in development, dissemination adoption and scaling up.	<ul style="list-style-type: none"> • Limited access to production resources such as land, knowledge, information, extension training, credit and quality seed. • Limited participation in decision making at community and County level
VMG related opportunities	<ul style="list-style-type: none"> • VMG groups to produce quality/certified seed • VMG cottage industries to process, value add and market • Variety provides for opportunity to intercrop for additional food security and increased income
E: Case studies/profiles of success stories	<ul style="list-style-type: none"> •
Success stories from previous similar projects	<ul style="list-style-type: none"> • Establishment of cassava commercial villages at Mbuvo in Makueni, and Tangakona in Busia County, • Improved income generation from adoption of Tajirika variety in Kilifi County
Application guidelines for users	<ul style="list-style-type: none"> • Muli M.B. , Saha, H.M., Shuma, J and Weru S.M. (2008) New cassava varieties for coastal Kenya. KARI information brochure series / 58 /2008
F: Status of TIMP readiness (1ready for upscaling;, 2-requires	<ul style="list-style-type: none"> • Ready for up-scaling in Busia and Kisumu Counties • Requires validation in Lamu County


validation; 3-requires further research)	
G: Contacts	Director Industrial Crops Research Institute Box 16 - 80109 Email: director.ICRI@kalro.org
Lead organization and scientists	KALRO Munga T.L, Muli, B.M and Weru S
Partner organizations	<ul style="list-style-type: none"> • KALRO-Avail breeder's seed and technical backstopping • Universities-Technical backstopping and tissue culture services • National and County Ministry of Agriculture, Livestock, Fisheries & Irrigation-Extension services • Kenya Plant Health Inspectorate Services (KEPHIS)- Seed certification • CBOs, NGO's- Seed multiplication and technology dissemination • Processors: Create demand for variety • Farmers: Test/validate and produce • CGIARS e.g IITA- Funding and technical backstopping • Donors: Funding

2.1.10 TIMP Name	Cassava variety Nzalauka 
Category	<ul style="list-style-type: none"> • Technology
A: Description of the technology, innovation or management practice	
Problem addressed	Limited early-medium maturing, high yielding, pest (CGM and CGM), disease (CMD and CBSD) resistant and drought tolerant cassava varieties resulting in low cassava productivity of 5-9 t/ha in farmers' fields compared to 90 t/ha potential yield..
What is it	Nzalauka is resistant to CMD, tolerant to CBSD with straight stems ideal for intercropping and yields 52.9 t/ha. It matures between 6-8 months. Its Optimal production ecological environment is altitude 15-1200mls, temperature range 24-to 27 °C and rainfall amount of 500-1000mm/year.

Justification	Low yielding late maturing cassava varieties with susceptibility to pests and diseases contribute to low productivity. Nzalauka is an early maturing medium yielder resistant to CMD and tolerant to pests with good root quality. This variety is likely to be adopted to replace other low yielding late maturing varieties susceptible to pests and diseases.
B: Assessment of dissemination and scaling up/out approaches	
Users of TIMP	<ul style="list-style-type: none"> • Farmers, processors, extension providers, consumers, researchers and seed producers
Approaches to be used in dissemination	<ul style="list-style-type: none"> • Farmers field days, demonstration plots, on-farm trials • Agricultural information innovation and digital platforms and agricultural shows
Critical/essential factors for successful promotion	<ul style="list-style-type: none"> • Preferred traits by farmers, consumers and market niches • Promotion methods used • Involve all cassava stakeholders in the promotion chain
Partners/stakeholders for scaling up and their roles	<ul style="list-style-type: none"> • KALRO-Avail breeder's seed and technical backstopping • Universities-Technical backstopping and tissue culture services • National and County Ministry of Agriculture, Livestock, Fisheries & Irrigation-Extension services
	<ul style="list-style-type: none"> • Kenya Plant Health Inspectorate Services (KEPHIS)- Seed inspection • CBOs, NGO's- Seed multiplication and technology dissemination • Processors: Create demand for variety • Farmers: Test/validate and produce • CGIARS e.g IITA: Donors: Funding and technical backstopping
C: Current situation and future scaling up	
Counties where already promoted, if any	Kilifi, Kwale , lamu, Machakos Makueni, Kitui, Tharaka , Taita Taveta
Counties where TIMP will be upscaled / Validated	<ul style="list-style-type: none"> • To be validated in Busia and Kisumu and upscaled in Lamu county
Challenges in dissemination	<ul style="list-style-type: none"> • Seed unavailability • Livestock destruction • Limited extension providers • Poor perception towards new cassava varieties
Suggestions for addressing the challenges	<ul style="list-style-type: none"> • Establish working seed system • Use local administration to ensure harmony between livestock and cassava farmers • Support improved extension services

	<ul style="list-style-type: none"> • Campaign for attitude change
Lessons learned in upscaling, if any	<ul style="list-style-type: none"> • Successful variety promotion requires availability of ready and consistent market for anticipated increased production and root qualities similar to their preferred varieties
Social, environmental, policy and market conditions necessary) for development and upscaling	<ul style="list-style-type: none"> • Farmers' willingness to adopt new varieties • Favorable weather conditions • Availability of consistent market • Favorable policies to support seed/production, marketing and value addition
D: Economic, gender, vulnerable and marginalized groups (VMGs) considerations	
Basic costs	<ul style="list-style-type: none"> • • Approximate KES 46,850 per acre
Estimated returns	<ul style="list-style-type: none"> • • 52.9 t/acre @ 5 per Kg farm gate= 217,650
Gender issues and concerns in development, dissemination, adoption and scaling up.	<ul style="list-style-type: none"> • Women and youth's limited access to production resources such as land, knowledge, information, extension training, credit and quality seed.
Gender related opportunities	<ul style="list-style-type: none"> • Youth and women groups to produce quality/certified seed • Women cottage industries to process, value add and market cassava products • Variety provides for opportunity to intercrop for additional food security and increased income
VMG issues and concerns in development, dissemination adoption and scaling up.	<ul style="list-style-type: none"> • Limited access to production resources such as land, knowledge, information, extension training, credit and quality seed. • Limited participation in decision making at community and County level
VMG related opportunities	<ul style="list-style-type: none"> • VMG groups to produce quality/certified seed • VMG cottage industries to process, value add and market • Variety provides for opportunity to intercrop for additional food security and increased income
E: Case studies/profiles of success stories	
Success stories from previous similar projects	<ul style="list-style-type: none"> • Establishment of cassava commercial villages at Mbuvo in Makueni, and Tangakona in Busia County, • Improved income generation from adoption of Tajirika variety in Kilifi County
Application guidelines for users	<ul style="list-style-type: none"> • • Muli M.B. , Saha, H.M., Shuma, J and Weru S.M. (2008) New cassava varieties for coastal Kenya. KARI information brochure series / 58 /2008


F: Status of TIMP readiness (1-ready for upscaling; 2-requires validation; 3-requires further research)	<ul style="list-style-type: none"> • Ready for up-scaling in Busia and Kisumu Counties • Requires validation in Lamu County
G: Contacts	Director Industrial Crops Research Institute Box 16 - 80109 Email: director.ICRI@kalro.org
Lead organization and scientists	KALRO Munga T.L, Muli, B.M and Weru S
Partner organizations	<ul style="list-style-type: none"> • KALRO-Avail breeder’s seed and technical backstopping • Universities-Technical backstopping and tissue culture services • National and County Ministry of Agriculture, Livestock, Fisheries & Irrigation-Extension services • Kenya Plant Health Inspectorate Services (KEPHIS)-Seed certification • CBOs, NGO’s- Seed multiplication and technology dissemination • Processors: Create demand for variety • Farmers: Test/validate and produce • CGIARS e.g IITA- Funding and technical backstopping • Donors: Funding

2.1.11 TIMP Name	<p>Cassava variety Siri</p> 
Category	<ul style="list-style-type: none"> • Technology
A: Description of the technology, innovation or management practice	
Problem addressed	Limited early-medium maturing, high yielding, pest (CGM and CGM), disease (CMD and CBSD) resistant and drought tolerant cassava varieties resulting in low productivity of 5-9 t/ha in farmers’ fields compared to 90 t/ha potential yield.

What is it	The variety is resistant to CMD, tolerant to CBSD, high branching which is good for intercropping, matures between 8-12 months and yields 57.7 t/ha. Its Optimal production ecological environment is 15-1200 mls, rainfall, 400-1000mm/year and temperature 24-27°C.
Justification	Low yielding late maturing with susceptibility to pests and diseases cassava varieties grown by farmers contribute to low productivity. Being medium yielding, resistant to CMD, and tolerant to pests variety Siri is likely to be adopted to replace other low yielding varieties susceptible to pests and diseases.
B: Assessment of dissemination and scaling up/out approaches	
Users of TIMP	<ul style="list-style-type: none"> • Farmers, processors, extension providers, consumers, researchers and seed producers
Approaches to be used in dissemination	<ul style="list-style-type: none"> • Farmers field days, demonstration plots, on-farm trials • Agricultural information innovation and digital platforms and agricultural shows
Critical/essential factors for successful promotion	<ul style="list-style-type: none"> • Preferred traits by farmers, consumers and market niches • Promotion methods used • Involve all cassava stakeholders in the promotion chain
Partners/stakeholders for scaling up and their roles	<ul style="list-style-type: none"> • KALRO-Avail breeder's seed and technical backstopping • Universities-Technical backstopping and tissue culture services • National and County Ministry of Agriculture, Livestock, Fisheries & Irrigation-Extension services • Kenya Plant Health Inspectorate Services (KEPHIS)- Seed inspection • CBOs, NGO's- Seed multiplication and technology dissemination • Processors: Create demand for variety • Farmers: Test/validate and produce • CGIARS e.g IITA: Donors: Funding and technical backstopping
C: Current situation and future scaling up	
Counties where already promoted, if any	<ul style="list-style-type: none"> • Kilifi, Kwale , lamu, Machakos Makueni, Kitui, Tharaka , Taita-Taveta
Counties where TIMP will be upscaled / Validated	<ul style="list-style-type: none"> • To be validated in Busia and Kisumu and upscaled in Lamu County
Challenges in dissemination	<ul style="list-style-type: none"> • Seed availability • Livestock destruction • Limited extension providers • Poor perception towards new cassava varieties

Suggestions for addressing the challenges	<ul style="list-style-type: none"> • Establish working seed system • Use local administration to ensure harmony between livestock and cassava farmers • Support improved extension services
	<ul style="list-style-type: none"> • Campaign for attitude change
Lessons learned in upscaling, if any	<ul style="list-style-type: none"> • Successful variety promotion requires availability of ready and consistent market for anticipated increased production and root qualities similar to their preferred varieties
Social, environmental, policy and market conditions necessary) for development and upscaling	<ul style="list-style-type: none"> • Farmers' willingness to adopt new varieties • Favorable weather conditions • Availability of consistent market • Favorable policies to support seed/production, marketing and value addition
D: Economic, gender, vulnerable and marginalized groups (VMGs) considerations	
Basic costs	<ul style="list-style-type: none"> • Approximate KES 46,850 per acre
Estimated returns	<ul style="list-style-type: none"> • 57.7 t/acre @ 5 per Kg farm gate= 241,650
Gender issues and concerns in development, dissemination adoption and scaling up.	<ul style="list-style-type: none"> • Women and youth's limited access to production resources such as land, knowledge, information, extension training, credit and quality seed.
Gender related opportunities	<ul style="list-style-type: none"> • Youth and women groups to produce quality/certified seed • Women cottage industries to process, value add and market cassava products • Variety provides for opportunity to intercrop for additional food security and increased income
VMG issues and concerns in development, dissemination adoption and scaling up.	<ul style="list-style-type: none"> • Limited access to production resources such as land, knowledge, information, extension training, credit and quality seed. • Limited participation in decision making at community and County level
VMG related opportunities	<ul style="list-style-type: none"> • VMG groups to produce quality/certified seed • VMG cottage industries to process, value add and market • Variety provides for opportunity to intercrop for additional food security and increased income
E: Case studies/profiles of success stories	
Success stories from previous similar projects	<ul style="list-style-type: none"> • Establishment of cassava commercial villages at Mbuvo in Makueni, and Tangakona in Busia County,


	<ul style="list-style-type: none"> Improved income generation from adoption of Tajirika variety in Kilifi County
Application guidelines for users	Muli M.B. , Saha, H.M., Shuma, J and Weru S.M. (2008) New cassava varieties for coastal Kenya. KARI information brochure series / 58 /2008
F: Status of TIMP readiness (1ready for upscaling;, 2-requires validation; 3-requires further research)	<ul style="list-style-type: none"> Ready for up-scaling in Busia and Kisumu Counties Requires validation in Lamu County
G: Contacts	Director Industrial Crops Research Institute Box 16 - 80109 Email: director.ICRI@kalro.org
Lead organization and scientists	KALRO Munga T.L, Muli, B.M and Weru S
Partner organizations	<ul style="list-style-type: none"> KALRO-Avail breeder's seed and technical backstopping Universities-Technical backstopping and tissue culture services National and County Ministry of Agriculture, Livestock, Fisheries & Irrigation-Extension services Kenya Plant Health Inspectorate Services (KEPHIS)- Seed certification CBOs, NGO's- Seed multiplication and technology dissemination Processors: Create demand for variety Farmers: Test/validate and produce CGIARS e.g IITA- Funding and technical backstopping Donors: Funding

2.1.12 TIMP Name	<p>Cassava variety Karibuni</p> 
Category	<ul style="list-style-type: none"> • Technology
A: Description of the technology, innovation or management practice	
Problem addressed	<p>Limited early-medium maturing, high yielding, pest (CGM and CGM), disease (CMD and CBSD) resistant and drought tolerant cassava varieties resulting in low productivity of 5-9 t/ha in farmers' fields compared to 90 t/ha potential yield.</p>
What is it	<p>The variety is resistant to CMD, matures between 8 months and yields 68.2 t/ha. Optimal environmental conditions are altitude 15-1200m, rainfall amount of 400-1000mm per year and temperature range 24-27°C.</p>
Justification	<p>Low yielding late maturing with susceptibility to pests and diseases cassava varieties grown by farmers contribute to low productivity. Being early maturing, high yielding, resistant to CMD, and tolerant to pests Karibuni cassava variety is likely to be adopted to replace other late maturing, low yielding varieties susceptible to pests and diseases.</p>
B: Assessment of dissemination and scaling up/out approaches	
Users of TIMP	<ul style="list-style-type: none"> • Farmers, processors, extension providers, consumers, researchers and seed producers
Approaches to be used in dissemination	<ul style="list-style-type: none"> • Farmers field days, demonstration plots, on-farm trials Agricultural information innovation and digital platforms and agricultural shows
Critical/essential factors for successful promotion	<ul style="list-style-type: none"> • Preferred traits by farmers, consumers and market niches • Promotion methods used • Involve all cassava stakeholders in the promotion chain
Partners/stakeholders for scaling up and their roles	<ul style="list-style-type: none"> • KALRO-Avail breeder's seed and technical backstopping • Universities-Technical backstopping and tissue culture services

	<ul style="list-style-type: none"> • National and County Ministry of Agriculture, Livestock, Fisheries & Irrigation-Extension services • Kenya Plant Health Inspectorate Services (KEPHIS)- Seed inspection • CBOs, NGO's- Seed multiplication and technology dissemination • Processors: Create demand for variety • Farmers: Test/validate and produce • CGIARS e.g IITA: Donors: Funding and technical backstopping
C: Current situation and future scaling up	
Counties where already promoted, if any	Kilifi, Kwale , Lamu, Machakos Makueni, Kitui, Tharaka and Taita Taveta Counties
Counties where TIMP will be upscaled / Validated	<ul style="list-style-type: none"> • To be validated in Busia and Kisumu and upscaled in Lamu county
Challenges in dissemination	<ul style="list-style-type: none"> • Seed unavailability • Livestock destruction • Limited extension providers • Poor perception towards new cassava varieties
Suggestions for addressing the challenges	<ul style="list-style-type: none"> • Establish working seed system • Use local administration to ensure harmony between livestock and cassava farmers • Support improved extension services • Campaign for attitude change
Lessons learned in upscaling, if any	<ul style="list-style-type: none"> • Successful variety promotion requires availability of ready and consistent market for anticipated increased production and root qualities similar to their preferred varieties
Social, environmental, policy and market conditions necessary) for development and upscaling	<ul style="list-style-type: none"> • Farmers' willingness to adopt new varieties • Favorable weather conditions • Availability of consistent market • Favorable policies to support seed/production, marketing and value addition
D: Economic, gender, vulnerable and marginalized groups (VMGs) considerations	
Basic costs	<ul style="list-style-type: none"> • Approximate KES 46,850 per acre
Estimated returns	<ul style="list-style-type: none"> • 68.2 t/acre @ 5 per Kg farm gate= 294,000

Gender issues and concerns in development, dissemination adoption and scaling up.	<ul style="list-style-type: none"> • Women and youth's limited access to production resources such as land, knowledge, information, extension training, credit and quality seed.
Gender related opportunities	<ul style="list-style-type: none"> • Youth and women groups to produce quality/certified seed • Women cottage industries to process, value add and market cassava products • Variety provides for opportunity to intercrop for additional food security and increased income
VMG issues and concerns in development, dissemination adoption and scaling up.	<ul style="list-style-type: none"> • Limited access to production resources such as land, knowledge, information, extension training, credit and quality seed. • Limited participation in decision making at community and County level
VMG related opportunities	<ul style="list-style-type: none"> • VMG groups to produce quality/certified seed • VMG cottage industries to process, value add and market • Variety provides opportunity to intercrop for additional food security and increased income
E: Case studies/profiles of success stories	
Success stories from previous similar projects	<ul style="list-style-type: none"> • Establishment of cassava commercial villages at Mbuvo in Makueni, and Tangakona in Busia County, • Improved income generation from adoption of Tajirika variety in Kilifi County
Application guidelines for users	<ul style="list-style-type: none"> • Muli M.B. , Saha, H.M., Shuma, J and Weru S.M. (2008) New cassava varieties for coastal Kenya. KARI information brochure series / 58 /2008
F: Status of TIMP readiness (1-ready for upscaling; 2-requires validation; 3-requires further research)	<ul style="list-style-type: none"> • Ready for up-scaling in Busia and Kisumu Counties • Requires validation in Lamu County
G: Contacts	Director Industrial Crops Research Institute Box 16 - 80109 Email: director.ICRI@kalro.org
Lead organization and scientists	KALRO Munga T.L, Muli, B.M and Weru S

Partner organizations	<ul style="list-style-type: none"> • KALRO-Avail breeder’s seed and technical backstopping • Universities-Technical backstopping and tissue culture services • National and County Ministry of Agriculture, Livestock, Fisheries & Irrigation-Extension services • Kenya Plant Health Inspectorate Services (KEPHIS)- Seed certification • CBOs, NGO’s- Seed multiplication and technology dissemination • Processors: Create demand for variety • Farmers: Test/validate and produce • CGIARS e.g IITA- Funding and technical backstopping • Donors: Funding
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2.1.13 TIMP Name	<p>Cassava variety Siri</p> 
Category	<ul style="list-style-type: none"> • Technology
A: Description of the technology, innovation or management practice	
Problem addressed	<p>Limited early-medium maturing, high yielding, pest (CGM and CGM), disease (CMD and CBSD) resistant and drought tolerant cassava varieties resulting in low productivity of 5-9 t/ha in farmers’ fields compared to 90 t/ha potential yield..</p>
What is it	<p>The variety is resistant to CMD, tolerant to CBSD, very short and non-branching. It matures between 8-12 months and yields 57.7 t/ha. The variety optimal environmental ecology is altitude 15-1200masl, rainfall of 400-1000mm per year, and temperature range of 24-27°C.</p>

Justification	Limited early-medium maturing varieties with high yield, pest and disease tolerance/resistance results in low cassava yields. As a medium yielder (57.7 t/ha) resistant to CMD and tolerant to CBSD, variety Siri is likely to be adopted where farmers face challenges of low cassava yielding varieties that are late maturing and susceptible to pests and diseases.
B: Assessment of dissemination and scaling up/out approaches	
Users of TIMP	<ul style="list-style-type: none"> • Farmers, processors, extension providers, consumers, researchers and seed producers
Approaches to be used in dissemination	<ul style="list-style-type: none"> • Farmers field days, demonstration plots, on-farm trials Agricultural information innovation and digital platforms and agricultural shows
Critical/essential factors for successful promotion	<ul style="list-style-type: none"> • Preferred traits by farmers, consumers and market niches • Promotion methods used • Involve all cassava stakeholders in the promotion chain
Partners/stakeholders for scaling up and their roles	<ul style="list-style-type: none"> • KALRO-Avail breeder's seed and technical backstopping • Universities-Technical backstopping and tissue culture services • National and County Ministry of Agriculture, Livestock, Fisheries & Irrigation-Extension services • Kenya Plant Health Inspectorate Services (KEPHIS)- Seed inspection • CBOs, NGO's- Seed multiplication and technology dissemination • Processors: Create demand for variety • Farmers: Test/validate and produce • CGIARS e.g IITA: Donors: Funding and technical backstopping
C: Current situation and future scaling up	
Counties where already promoted, if any	<ul style="list-style-type: none"> • Kilifi, Kwale , Lamu, Machakos Makueni, Kitui, Tharaka and Taita Taveta.
Counties where TIMP will be upscaled / Validated	<ul style="list-style-type: none"> • To be validated in Busia and Kisumu and upscaled in Lamu county
Challenges in dissemination	<ul style="list-style-type: none"> • Seed unavailability • Livestock destruction • Limited extension providers • Poor perception towards new cassava varieties
Suggestions for addressing the challenges	<ul style="list-style-type: none"> • Establish working seed system • Use local administration to ensure harmony between livestock and cassava farmers • Support improved extension services • Campaign for attitude change

Lessons learned in upscaling, if any	<ul style="list-style-type: none"> • Successful variety promotion requires availability of ready and consistent market for anticipated increased production and root qualities similar to their preferred varieties
Social, environmental, policy and market conditions necessary) for development and upscaling	<ul style="list-style-type: none"> • Farmers' willingness to adopt new varieties • Favorable weather conditions • Availability of consistent market • Favorable policies to support seed/root production, marketing and value addition
D: Economic, gender, vulnerable and marginalized groups (VMGs) considerations	
Basic costs	<ul style="list-style-type: none"> • Approximate KES 46,850 per acre
Estimated returns	<ul style="list-style-type: none"> • 57.7 t/acre @ 5 per Kg farm gate= 238,150
Gender issues and concerns in development, dissemination, adoption and scaling up.	<ul style="list-style-type: none"> • Women and youth's limited access to production resources such as land, knowledge, information, extension training, credit and quality seed.
Gender related opportunities	<ul style="list-style-type: none"> • Youth and women groups to produce quality/certified seed • Women cottage industries to process, value add and market cassava products
VMG issues and concerns in development, dissemination adoption and scaling up.	<ul style="list-style-type: none"> • Limited access to production resources such as land, knowledge, information, extension training, credit and quality seed. • Limited participation in decision making at community and County level
VMG related opportunities	<ul style="list-style-type: none"> • VMG groups to produce quality/certified seed • VMG cottage industries to process, value add and market
E: Case studies/profiles of success stories	
Success stories from previous similar projects	<ul style="list-style-type: none"> • Establishment of cassava commercial villages at Mbuvo in Makueni, and Tangakona in Busia County, • Improved income generation from adoption of Tajirika variety in Kilifi County
Application guidelines for users	Muli M.B. , Saha, H.M., Shuma, J and Weru S.M. (2008) New cassava varieties for coastal Kenya. KARI information brochure series / 58 /2008
F: Status of TIMP readiness (1ready for upscaling;, 2-requires	<ul style="list-style-type: none"> <input type="checkbox"/> Ready for up-scaling in Busia and Kisumu Counties Requires <input type="checkbox"/> validation in Lamu County

validation; 3-requires further research)	
G: Contacts	Director Industrial Crops Research Institute Box 16 - 80109 Email: director.ICRI@kalro.org
Lead organization and scientists	KALRO Munga T.L, Muli, B.M and Weru S
Partner organizations	<ul style="list-style-type: none"> • KALRO-Avail breeder’s seed and technical backstopping • Universities-Technical backstopping and tissue culture services • National and County Ministry of Agriculture, Livestock, Fisheries & Irrigation-Extension services • Kenya Plant Health Inspectorate Services (KEPHIS)- Seed certification • CBOs, NGO’s- Seed multiplication and technology dissemination • Processors: Create demand for variety • Farmers: Test/validate and produce • CGIARS e.g IITA- Funding and technical backstopping • Donors: Funding

GAP IN VARIETIES TECHNOLOGIES

1. Most varieties not validated in all cassava growing counties
2. Reaction of some varieties to emerging diseases such as CBSD and pests (whiteflies) is not known
3. Market niche for processed products not known
4. National performance trials for advanced potential varieties is required to have better varieties
5. Introgression of CMD and CBSD resistance in released susceptible high yielding varieties is required
6. There are no early bulking varieties with both CMD and CBSD **resistance** hence the need to develop early bulking varieties (6-8 months) for food and processing
7. So far there are no bio-fortified cassava varieties; there is need to develop varieties biofortified with Vitamin A, Fe and Zn

2.2 Agronomic Practices

2.2.1: Planting time

2.2.1 TIMP Name	Planting time
Category (i.e. technology, innovation or management practice)	Management practice
A: Description of the technology, innovation or management practice	

Problem addressed	Due to its nature of propagation (vegetative) and long time to maturity, farmers tend to plant cassava at any time during the year. Untimely planting of cassava vis-e-vis rainfall season leads to poor crop germination, establishment and yield
What is it? (TIMP description)	Timely planting of cassava in relation to the onset of rainfall season is critical to cassava production. Poor soil moisture at planting and during the first 3 months severely affects germination, crop establishment and thus yield. Cassava should be planted at the onset of rainfall seasons in the cassava growing regions. In the Coastal Counties, the onset of the long rain season is in March-April. In Eastern Counties onset is in September-October while in Western Counties we have long and short rain seasons with rainfall onsets in March-April and August-September, respectively.
Justification	Poor soil moisture during early stage of cassava development leads to poor germination, establishment, root formation and development leading to depressed yields.
B: Assessment of dissemination and scaling up/out approaches	
Users of TIMPs	Cassava farmers, and extension agents
Approaches to be used in dissemination	On-farm demonstrations, Field days, Farmers field and business schools, Digital platforms, Agricultural Innovation platforms, farmer to farmer, and farmer exchange visits
Critical/essential factors for successful promotion	Farmer organizations for participatory promotion Predictable rainfall season
Partners/stakeholders for scaling up and their roles	Farmers, Extension agents
C: Current situation and future scaling up	
Counties where already promoted, if any	All major cassava growing counties (Machakos, Kitui, Tharaka Nith, Taita Taveta, Kilifi, Lamu, Kwale Makueni, Bungoma, Busia, Kisumu, Homa Bay Counties)
Counties where TIMP will be up-scaled	All major cassava growing counties
Challenges in dissemination	Unpredictable rain season Lack of organized farmers and farmer groups
Suggestions for addressing	Use weather prediction apps Establish farmer groups, FFS, AIPs etc
Lessons learned in upscaling if any	Limited knowledge on the effect of low soil moisture on cassava yields
Social, environmental policy and market conditions necessary for development and upscaling	Unpredictable weather pattern due to Climate change Poor preparedness by farmers due to lack of capital land preparation, acquisition of seed, lack of labour etc
D: Economic, gender, vulnerable and marginalized groups (VMGs) considerations	
Basic costs	
Estimated returns	

Gender issues and concerns in development and dissemination	<p>Women and youth have less access to extension training</p> <p>Women and youth have less access to knowledge and information on new weather apps</p> <p>Women and youth have less access to capital to prepare land early, smart phones, access to media etc</p>
Gender related opportunities	<p>Women and youth have opportunity to provide labour to foster timely planting</p> <p>Women and youth have opportunity to produce and sell seed (seed producers)</p> <p>Women and youth have opportunity to start cottage industries produce value added products resulting from enhanced yields</p> <p>Youth have opportunity in transportation and marketing of root tubers</p> <p>Youth have opportunity to use ICT to advise farmers on weather related issues</p>
VMG issues and concerns in development and dissemination	<p>VMG have less access to extension training</p> <p>VMG have less access to knowledge and information</p> <p>VMG have less access to ICT to predict onset of rainfall seasons</p> <p>VMG have less access to capital to prepare land early, smart phones to predict weather, access to media etc</p>
	<p>VMG have opportunity to produce and sell clean seed (seed producers)</p> <p>VMG have opportunity to start cottage industries produce value added products</p> <p>VMG have opportunity in transportation and marketing of root tubers</p>
E: Case studies/profiles of success stories	
Success stories from previous similar projects	
Application guidelines for users	Cassava production manual by AFA
F: Status of TIMP readiness (1-ready for upscaling; 2-requires validation; 3-requires further research)	Ready for upscaling
G: Contacts	<p>Institute Director, AMI - KALRO -Katumani, P.O. Box 340-90100, Machakos Email kalro.katumani. kalro.org Telephone. 0710906600</p> <p>Institute Director ICRI- KALRO –Mtwapa, P.O. Box 16 – 80109, Mtwapa Email kalro.mtwapa. kalro.org Telephone.</p> <p>Institute Director NRI-KALRO -Kakamega,</p>

	P.O. Box 169-50100, Kakamega Email kalro.kakamega.kalro.org Telephone. 05630301
Lead organization and scientists	Kivuva B. M, Munga T.L. and Woyengo V.W.
Partner organizations	Extension providers eg NGOs CBOs eg. Tangakona Commercial Village, National and County Ministry of Agriculture, Universities

2.2.2 TIMP Name	Fertilizer use
Category (i.e. technology, innovation or management practice)	Management practice
A: Description of the technology, innovation or management practice	
Problem addressed	Poor yields due to low soil fertility
What is it? (TIMP description)	Application of appropriate fertilizers, at appropriate time and rates is important in replenishment of the depleted soil nutrients in order to attain maximum yield
Justification	Most of the soils where cassava is grown are exhausted. Availability of adequate plant nutrients in the soil is a pre-requisite good yields. There is therefore need to replenish the depleted soil nutrients through timely application of appropriate fertilizer at appropriate rate in order to obtain maximum yields
B: Assessment of dissemination and scaling up/out approaches	
Users of TIMPs	Cassava farmers, researchers and extension agents
Approaches to be used in dissemination	On-farm demonstrations, Field days, Farmers field and business schools, Digital platforms, Agricultural Innovation platforms, farmer to farmer, and farmer exchange visits
Critical/essential factors for successful promotion	Farmers and Farmer organizations for participatory promotion Recommended fertilizer formulations Soil testing results
Partners/stakeholders for scaling up and their roles	Farmers, Extension agents Fertilizer manufacturers Agro dealers
C: Current situation and future scaling up	
Counties where already promoted, if any	All major cassava growing counties like Machakos, Kitui, Tharaka Nithi, Taita Taveta, Kilifi, Lamu, Kwale Makueni, Bungoma, Busia, Siaya Kisumu, Homa Bay Counties
Counties where TIMP will be up-scaled	All major cassava growing counties
Challenges in dissemination	Weak collaboration among stakeholders Lack of demo funds Scarcity in recommended fertilizer formulation

	Need to soil test to inform the application rate, excess fertilization has negative effect on root yield
Suggestions for addressing the challenges	Strengthen collaboration Create or use technology dissemination channels like farmer groups, Farmers Field and Business schools, AIPs, digital platforms etc Source for funding Involve fertilizer manufacturers
Lessons learned in upscaling, if any	Farmers are not willing to invest in fertilizer use in cassava
Social, environmental, policy and market conditions necessary for development and upscaling	Excess use of fertilizer has negative impact on yield and environmental Create market channels of the recommended fertilizer formulation
D: Economic, gender, vulnerable and marginalized groups (VMGs) considerations	
Basic costs	
Estimated returns	Increased yield by proper fertilizer application
Gender issues and concerns in development and dissemination	Women and youth have less access to extension training Women and youth have less access to knowledge and information on fertilizer use
Gender related opportunities	Women and youth have opportunity to provide sell fertilizer Women and youth have opportunity to start cottage industries produce value added products resulting from enhanced yields Youth have opportunity in transportation and marketing of root tubers Youth have opportunity to read and interpret soil test results to farmers
VMG issues and concerns in development and dissemination	VMG have less access to extension training VMG have less access to knowledge and information on fertilizer use
VMG related opportunities	Open agro dealers' shops to supply fertilizer Start cottage industries to process proceeds from enhanced yields Create employment through marketing of tuberous roots
E: Case studies/profiles of success stories	
Success stories from previous similar projects	None
Application guidelines for users	Cassava production manual by AFA
F: Status of TIMP readiness (1-ready for upscaling; 2-requires validation; 3-requires further research)	Ready for upscaling
G: Contacts	Institute Director, AMI - KALRO -Katumani, P.O. Box 340-90100, Machakos Email kalro.katumani. kalro.org Telephone. 0710906600

	<p>Institute Director ICRI- KALRO –Mtwapa, P.O. Box 16 – 80109, Mtwapa Email kalro.mtwapa. kalro.org Telephone.</p> <p>Institute Director NRI-KALRO -Kakamega, P.O. Box 169-50100, Kakamega Email kalro.kakamega. kalro.org Telephone. 05630301</p>
Lead organization and scientists	Kivuva B. M, Munga T.L. and Woyengo V.W.
Partner organizations	Extension providers eg NGOs CBOs eg. Tangakona Commercial Village, National and County Ministry of Agriculture, Universities

2.2.3 TIMP Name	Integrated Weed Management
Category (i.e. technology, innovation or management practice)	Management practice
A: Description of the technology, innovation or management practice	
Problem addressed	Poor weed management practices resulting in low production
What is it? (TIMP description)	Integrated Weed Management (IWM) is the use more than one approaches to manage weeds. This include: Cultural control method eg crop rotation, intercropping. Preventive control method eg planting in a weed free prepared land, use of mulch (biodegradable or synthetic). Chemical control method eg use of herbicides for specific weed. Physical control method which involves physical removal of weeds either manually or mechanically eg hand weeding or mowing. In manual weeding weeds are removed. Proper weed identification guides on which management approach to be employed. However, one method will be effective on managing some species and not others therefore the need for integrated approach for effective management and a profitable cassava.
Justification	Weeds compete cassava plants for soil nutrients, water and sun light. These effects reduce yields and can cause up to 50% yield loss in crops. Weeds also reduce the quality of the tuberous roots and become unmarketable. Due to the wide spacing used and the long period it takes to mature, weed management one of the highest production costs in cassava production. An effective integrated weed management should be effective and efficient in terms of costs, minimizing cassava-weed competition

	while ensuring environmental safety and sustainability leading to increase in yield.
B: Assessment of dissemination and scaling up/out approaches	
Users of TIMPs	Cassava farmers, researchers, extension agents and agro-dealers
Approaches to be used in dissemination	On-farm demonstrations, Field days, Farmers field and business schools, Digital platforms, Agricultural Innovation platforms, farmer to farmer, and farmer exchange visits
Critical/essential factors for successful promotion	Farmers and Farmer organizations for participatory promotion Demonstration farms for training and promotion of integrated weed management (IWM). Address environmental and safety concerns related to the use of herbicides. Availability of key components of IWM like appropriate herbicides Training on safe use of pesticides/herbicides
Partners/stakeholders for scaling up and their roles	Farmers: validate and adopt the IWM technologies Researchers: package and train IWM protocols Extension service providers eg (NGOs, CBOs and National and County ministry of agriculture livestock, fisheries and irrigation staff): Training (extension) Agro dealers: To train and avail appropriate herbicides
C: Current situation and future scaling up	
Counties where already promoted, if any	All major cassava growing counties like Machakos, Kitui, Tharaka Nithi, Taita Taveta, Kilifi, Lamu, Kwale Makeni, Bungoma, Busia, Siaya Kisumu, Homa Bay Counties
Counties where TIMP will be upscaled	All major cassava growing counties
Challenges in dissemination	Lack of established platforms to facilitate interaction of farmers with relevant stakeholders Lack of funds to demonstrate and practice Limited knowledge and availability of appropriate products for some of the IWM eg herbicides Lack of packaged information Concerns about use of herbicide on environment, health, and soil residues can hinder adoption
Suggestions for addressing the challenges	Establish platforms eg FFBS, AIPS, digital platforms Source for funding Carry out validation trials, promote/avail the effective ones and package information for fact sheet, brochure, media and mobile app Train farmers on safe use of herbicides
Lessons learned in upscaling, if any	Weed management is an expensive activity in cassava production If backed up with proper trainings, use of herbicides may be the most preferred cost effective weed management approach
Social, environmental, policy and market conditions necessary) for	Train farmers on integrated weed management bllprogram. Address the environmental and social concerns related to use of herbicides.

development and upscaling	Create functional agro dealer network to supply the products when required by the farmers.
D: Economic, gender, vulnerable and marginalized groups (VMGs) considerations	
Basic costs	
Estimated returns	Increased yield by proper weed management practices
Gender issues and concerns in development and dissemination	Women and youth have limited access to production resources such as land, capital to purchase herbicides Women and youth have limited access to education, training and extension services Women have limited access to markets Women have less access to agricultural information, technology and knowledge on IWM
Gender issues and concerns in adoption and scaling up	Women and youth have less access to extension training Women and youth have less access to knowledge and information on IWM
Gender related opportunities	Women and youth to generate income from weeding Women and youth to generate income from agro dealer business Women and youth to generate income by starting cortege value addition factories due to enhanced yield Youth to generate income form spray herbicides Youth to generate income from marketing tuberous roots
VMG issues and concerns in development and dissemination	VMG have less access to extension training VMG have less access to knowledge and information on IWM VMG have less access to capital to purchase herbicides
VMG issues and concerns in adoption and scaling up	VMG have less access to extension training VMG have less access to knowledge and information on IWM
VMG related opportunities	VMG to generate income from agro dealer business VMG to generate income by starting cortege value addition factories due to enhanced yield VMG to generate income form spray herbicides VMG to generate income from marketing tuberous roots
E: Case studies/profiles of success stories	
Success stories from previous similar projects	None
Application guidelines for users	Cassava production manual by AFA
F: Status of TIMP readiness (1-ready for upscaling; 2-requires validation; 3-requires further research)	Ready for upscaling Institute Director, AMI - KALRO -Katumani, P.O. Box 340-90100, Machakos

	<p>Email kalro.katumani. kalro.org Telephone. 0710906600</p> <p>Institute Director ICRI- KALRO -Mtwapa, P.O. Box 16 – 80109, Mtwapa Email kalro.mtwapa. kalro.org Telephone.</p> <p>Institute Director NRI-KALRO -Kakamega, P.O. Box 169-50100, Kakamega Email kalro.kakamega. kalro.org Telephone. 05630301</p>
G: Contacts	Kivuva B. M, Munga T.L. and Woyengo V.W.
Lead organization and scientists	Extension providers eg NGOs CBOs eg. Tangakona Commercial Village, National and County Ministry of Agriculture, Universities
Partner organizations	, Extension providers eg NGOs CBOs eg. Tangakona Commercial Village, National and County Ministry of Agriculture

2.2.6 TIMP Name	Intercropping
Category (i.e. technology, innovation or management practice)	Management practice
A: Description of the technology, innovation or management practice	
Problem addressed	Low resilience to crop losses arising from climate change effects contributing to low returns per unit input used (land, capital and labour).
What is it? (TIMP description)	Planting cassava alongside other crops in the same field at the same time
Justification	Cassava is planted at a wide spacing that remain open in the early stage of the crop development. This increase growth rate of weeds as well as uneconomic use of land. Planting short season crop in this space not only increase income but keeps weeds at bay. Cassava monocropping expose farmers to high risk in case of crop loss due natural calamity. Intercropping spreads and minimize this risk shielding the farmer against total loss. Moreover, intercropping increases nutrition security, .improves resilience to climate change, increases overall production therefore improved income.
B: Assessment of dissemination and scaling up/out approaches	
Users of TIMPs	Cassava farmers and extension agents
Approaches to be used in dissemination	On-farm demonstrations, Field days, Farmers field and business schools, Digital platforms, Agricultural Innovation platforms, farmer to farmer, and farmer exchange visits

Critical/essential factors for successful promotion	Farmers and Farmer organizations for participatory promotion Seed of various crops for intercropping Knowledge on crop husbandry of the intercropped crops Demonstration fields/farms Production resources/funds
Partners/stakeholders for scaling up and their roles	Farmers: validate and adopt the intercropping technologies Researchers: package and train intercropping protocols Extension service providers eg (NGOs, CBOs and National and County ministry of agriculture livestock, fisheries and irrigation staff): Training (extension)
C: Current situation and future scaling up	
Counties where already promoted, if any	All major cassava growing counties like: Machakos, Kitui, Tharaka Nithi, Taita Taveta, Kilifi, Lamu, Kwale Makueni, Bungoma, Busia, Siaya Kisumu, Homa Bay Counties
Counties where TIMP will be upscaled	All major counties where cassava is grown
Challenges in dissemination	Lack of established platforms to facilitate interaction of farmers with relevant stakeholders Lack of funds to carry out demonstrations and practical Limited knowledge and availability of appropriate products for some of the preferred crops for intercropping Lack of packaged technical information
Suggestions for addressing the challenges	Establish platforms eg FFBS, AIPS, digital platforms Source for funding Carry out validation trials, promote/avail the effective ones Package information in fact sheets, brochures, media and mobile apps Poor choice of crop to be intercropped with cassava
Lessons learned in upscaling, if any	Weed management is an expensive activity in cassava production If backed up with proper trainings, use of herbicides may be the most preferred cost effective weed management approach
Social, environmental, policy and market conditions necessary) for development and upscaling	Train farmers on choices of crops for intercropping. Intercropping with a good cover crop reduces soil erosion thus reducing soil and environment degradation Need to develop markets for intercropped crop yield
D: Economic, gender, vulnerable and marginalized groups (VMGs) considerations	
Basic costs	
Estimated returns	Increased returns per unit input through intercropping. Returns depend on crop intercrop
Gender issues and concerns in development and dissemination	Women and youth have limited access to production resources such as land, capital to purchase seeds of crop in the intercrop Women and youth have limited access to education, training and extension services Women have limited access to markets of increased crop yields

	Women have less access to agricultural information, technology and knowledge on appropriate crops to be intercropped
Gender issues and concerns in adoption and scaling up	Women and youth have less access to extension training Women and youth have less access to knowledge and information
Gender related opportunities	Women and youth to generate income from selling seed of intercrop Women and youth to generate income from selling proceed from intercrop Women and youth to generate income by starting cortege value addition factories due to enhanced yield Youth to generate income from marketing tuberous roots
VMG issues and concerns in development and dissemination	VMG have less access to extension training VMG have less access to knowledge and information on intercropping VMG have less access to capital seed for intercropping
VMG issues and concerns in adoption and scaling up	VMG have less access to extension training VMG have less access to knowledge and information on intercropping
VMG related opportunities	VMG to generate income from agro dealer business VMG to generate income by starting cortege value addition factories due to enhanced yield VMG to generate income form spray herbicides VMG to generate income from marketing tuberous roots
E: Case studies/profiles of success stories	
Success stories from previous similar projects	Intercropping cassava and pigeon pea in Machakos county led to increased household income, food and nutrition security
Application guidelines for users	Cassava production manual by AFA
F: Status of TIMP readiness (1-ready for upscaling; 2-requires validation; 3-requires further research)	Ready for upscaling
G: Contacts	Institute Director, AMI - KALRO -Katumani, P.O. Box 340-90100, Machakos Email kalro.katumani. kalro.org Telephone. 0710906600 Institute Director ICRI- KALRO -Mtwapa, P.O. Box 16 – 80109, Mtwapa Email kalro.mtwapa. kalro.org Telephone. Institute Director NRI-KALRO -Kakamega,

	P.O. Box 169-50100, Kakamega Email kalro.kakamega. kalro.org Telephone. 05630301
Lead organization and scientists	Kivuva B. M, Munga T.L. and Woyengo V.W.
Partner organizations	Extension providers eg NGOs CBOs eg. Tangakona Commercial Village, National and County Ministry of Agriculture, Universities

2.2.7 TIMP Name	Harvesting and post-harvest handling
Category (i.e. technology, innovation or management practice)	Management practice
A: Description of the technology, innovation or management practice	
Problem addressed	Poor harvesting and post-harvest handling methods resulting in crop losses.
What is it? (TIMP description)	Appropriate timely harvesting according to maturity period and handling to cost and yield loss
Justification	Unlike other crops that dry or shade-off leaves at maturity, cassava does not have any physical feature a farmer can use to indicate maturity. Harvesting cassava early before maturity reduce yield and quality of the tubers while late harvesting increase production cost in time and reduces root quality. The harvested cassava roots are bulky and have a very short shelf life. There is need therefore for farmers to deploy appropriate harvesting and post-harvest handling techniques so that they can maximize quality and quantity of the harvested roots thus maximizing profit.
B: Assessment of dissemination and scaling up/out approaches	
Users of TIMPs	Cassava farmers, Cassava marketers, and extension agents
Approaches to be used in dissemination	On-farm demonstrations, Field days, Farmers field and business schools, Digital platforms, Agricultural Innovation platforms, farmer to farmer, and farmer exchange visits
Critical/essential factors for successful promotion	Farmers and Farmer organizations for participatory promotion Demonstration fields/farms and equipments Production resources/funds
Partners/stakeholders for scaling up and their roles	Farmers: participate in validation and adopt the technologies Researchers: package and train intercropping protocols Extension service providers eg (NGOs, CBOs and National and County ministry of agriculture livestock, fisheries and irrigation staff): Training (extension)
C: Current situation and future scaling up	
Counties where already promoted, if any	Major cassava growing counties like Machakos, Kitui, Tharaka Nithi, Taita Taveta, Kilifi, Lamu, Kwale Makueni, Bungoma, Busia, Siaya Kisumu, Homa Bay Counties

Counties where TIMP will be upscaled	Major cassava growing counties
Challenges in dissemination	Lack of established platforms to facilitate interaction of farmers with relevant stakeholders Lack of funds to carry out demonstrations and practical Unavailability of appropriate products for harvesting and post-harvest handling eg harvesting machines, post-harvest storing equipment. Lack of packaged technical information
Suggestions for addressing the challenges	Establish platforms eg FFBS, AIPS, digital platforms Source for funding Carry out validation trials, promote/avail the effective ones Package information in fact sheets, brochures, media and mobile apps
Lessons learned in upscaling, if any	Harvesting and post-harvest handling are expensive activity in cassava production that require effective and efficient technologies If backed up with proper trainings, use of herbicides may be the most preferred cost effective weed management approach
Social, environmental, policy and market conditions necessary) for development and upscaling	Train farmers on harvesting and handling after harvest. Need to have markets before harvest to minimize post-harvest losses
D: Economic, gender, vulnerable and marginalized groups (VMGs) considerations	
Basic costs	
Estimated returns	
Gender issues and concerns in development and dissemination	Division of roles and responsibilities management and harvesting. Women and youth have limited access to production resources such as land, credit Women and youth have limited access to education, training and extension services Women have limited access to markets to sell surplus yields Women have less access to agricultural information, technology and knowledge
Gender issues and concerns in adoption and scaling up	Women and youth have less access to extension training Women and youth have less access to knowledge and information
Gender related opportunities	Women and youth to generate income from sell surplus harvest Women and youth to generate income by starting cortege value addition factories due to enhanced yield Youth to generate income from marketing tuberous roots
VMG issues and concerns in development and dissemination	VMG have less access to extension training VMG have less access to knowledge and information VMG have less access to capital

VMG issues and concerns in adoption and scaling up	VMG have less access to extension training VMG have less access to knowledge and information
VMG related opportunities	VMG to generate income by starting cortege value addition factories due to enhanced yield VMG to generate income from marketing tuberous roots
E: Case studies/profiles of success stories	
Success stories from previous similar projects	Adoption has led to increased cassava yield in cassava growing counties
Application guidelines for users	Cassava production manual by AFA
F: Status of TIMP readiness (1-ready for upscaling; 2-requires validation; 3-requires further research)	Ready for upscaling
G: Contacts	Institute Director, AMI - KALRO -Katumani, P.O. Box 340-90100, Machakos Email kalro.katumani. kalro.org Telephone. 0710906600 Institute Director ICRI- KALRO -Mtwapa, P.O. Box 16 – 80109, Mtwapa Email kalro.mtwapa. kalro.org Telephone. Institute Director NRI-KALRO -Kakamega, P.O. Box 169-50100, Kakamega Email kalro.kakamega. kalro.org Telephone. 05630301
Lead organization and scientists	Kivuva B. M, Munga T.L. and Woyengo V.W.
Partner organizations	Extension providers eg NGOs CBOs eg. Tangakona Commercial Village, National and County Ministry of Agriculture, Universities

GAPS IN AGRONOMIC PRACTICES TECHNOLOGIES

1. Due to climate change leading to changes in onset, distribution, amount of rainfall and temperatures, there is need to determine appropriate time of planting and the effects of late planting customized per region and variety
2. Variation in plant architecture of newly developed varieties to optimize production
3. Fertilizer is not used in cassava production in Kenya but its use in other cassava growing regions has contributed to yield increases hence the need to validate fertilizer use for improved production

2.3.1 TIMP Name	Community based clean seed system
Category (i.e. technology, innovation or management practice)	Innovation
A: Description of the technology, innovation or management practice	
Problem addressed	Low productivity due disease damage arising from infected planting materials..... Inadequate availability of clean cassava seed is caused by lack of adequate clean cassava seed, and Lack of seed multiplication structures which include;Virus cleaning, Tissue culture units, Hardening units, Stock mother plants conservation units, primary, secondary and tertiary multipliers, Seed inspection, Seed marketing and distribution.
What is it? (TIMP description)	Farming community seed delivery system that involves: Stock mother plants conservation units, Virus cleaning, Rapid multiplication through Tissue culture units, Hardening units, and primary, secondary and tertiary multipliers, Registration of multipliers, Seed inspection, Seed marketing and distribution.
Justification	<input type="checkbox"/> Lack of clean planting material at planting leads to recycling the previous crop hence transmitting viral diseases to next crop. This enhances pests and disease buildup and drastically reduces the yield
B: Assessment of dissemination and scaling up/out approaches	
Users of TIMP	<input type="checkbox"/> Cassava farmers, researchers, seed multipliers
Approaches to be used in dissemination	<input checked="" type="checkbox"/> Awareness creation and training of farmer groups <input checked="" type="checkbox"/> Media? <input checked="" type="checkbox"/> Field days? <input type="checkbox"/>
Critical/essential factors for successful promotion	<input checked="" type="checkbox"/> Availability of foundation seed <input checked="" type="checkbox"/> Adequate promotion through demos and field days <input checked="" type="checkbox"/> Farmers willingness to participate
Partners/stakeholders for scaling up and their roles	<input type="checkbox"/> Extension service providers (NGOs, CBOs) National and county ministry of agriculture, Researchers, seed multipliers and KEPHIS
C: Current situation and future scaling up	
Counties where already promoted, if any	Cassava growing counties: Machakos, Kitui, Tharaka Nithi, Taita Taveta, Kilifi , Lamu, Kwale Makueni, Bungoma, Busia, Siaya Kisumu, Homa Bay Counties
Counties where TIMP will be up scaled	Busia, Kisumu and Lamu


Challenges in dissemination	<ul style="list-style-type: none"> ❖ Lack of basic clean seed from breeders ❖ Poor seed multiplication and distribution structures ❖ Poor Management of demos due to limited funds ❖ Poor mobilization of farmers and seed multipliers
Suggestions for addressing the challenges	<ul style="list-style-type: none"> <input type="checkbox"/> Promote seed cleaning through tissues culture and thermotherapy <input type="checkbox"/> Support breeder seed multiplication blocks on research station in each cassava growing regions <input type="checkbox"/> Identify and train farmers/NGOs on seed production to be run as SMEs <input type="checkbox"/> Mobilize farmers and seed multipliers to come together and produce seed
Lessons learned in upscaling, if any	<ul style="list-style-type: none"> <input type="checkbox"/> Distribution of clean planting materials to farmers without sustainable seed multiplication and delivery system has not been successful
Social, environmental, policy and market conditions necessary for development and upscaling	<ul style="list-style-type: none"> <input type="checkbox"/> Willingness of farmers and seed multipliers <input type="checkbox"/> Favorable weather conditions <input type="checkbox"/> Government policy on seed certification and seed production should be relaxed to allow quality declared standard seed (QDS) certification class (minimum requirements) <input type="checkbox"/> Commercialization of cassava seed
D: Economic, gender, vulnerable and marginalized groups (VMGs) considerations	
Basic costs	<input type="checkbox"/> KES 58,350 per acre
Estimated returns	<input type="checkbox"/> KES 261,650 per acre
Gender issues and concerns in development, dissemination, adoption and scaling up	<ul style="list-style-type: none"> ❖ Females mainly do the crop husbandry while men do the sales ❖ Gender disparity in management of production and sales of the seed
	<input type="checkbox"/>
Gender related opportunities	<input type="checkbox"/> Lead members of the community organizations both men and women are trained as seed inspectors and given certificate of practice creating income generation among men, Women and youth leading to their improved livelihood

VMG issues and concerns in development, dissemination, adoption and scaling up	<input type="checkbox"/> Due to prejudice associated with their social status, VMGs are excluded from access to and benefits from improved technologies. Thus, affirmative action is required to promote the crop for the VMGs including value addition aspects.
VMG issues and concerns in	<input type="checkbox"/> None
VMG related opportunities	<input type="checkbox"/> opportunities for income generation
E: Case studies/profiles of success stories	
Success stories from previous similar projects	<ul style="list-style-type: none"> ❖ KALRO and KEPHIS have been training farmers on clean seed production and seed inspection ❖ TangaKona Commercial Village farmers have successful community seed production system. ❖ KALRO has been contracting cassava seed producers
Application guidelines for users	<ul style="list-style-type: none"> ❖ Apply GAP manual on seed production ❖ Follow Seed quality certification protocol ❖ All seed should be inspected by trained seed inspectors
F: Status of TIMP readiness (1-ready for upscaling;, 2requires validation; 3-requires further research)	Ready for upscaling in Kisumu, needs validation in Lamu
Contacts	<p>KALRO -Katumani, P.O. Box 340-90100, Machakos Email kalro.katumani. kalro.org Telephone. 0710906600</p> <p>KALRO -Mtwapa, P.O. Box 16 – 80109, Mtwapa Email kalro.mtwapa. kalro.org Telephone.</p> <p>KALRO -Kakamega, P.O. Box 169-50100, Kakamega Email kalro.kakamega. kalro.org Telephone. 05630301</p>
Lead organization and scientists	KALRO-Katumani, KALRO-Mtwapa and KALRO-Kakamega Kivuva B. M, Munga T.L. and Woyengo V.W.
Partner organizations	Extension Service providers (NGOs e.g. Self Help Africa (SHA)), CBOs e.g. Tangakona Commercial Village, IITA, KEPHIS.

GAPS IN SEED SYSTEMS TECHNOLOGY

1. Need to validate and customize tissue culture protocol for released cassava varieties
2. Validate the module of community seed systems used in Tanzania
3. Lobby for finalization and enactment of the quality declared seed standards for clonally propagated crops-Cassava

2.4 Management of pests and diseases

2.4.1 TIMP Name	Control of Cassava Mosaic Disease (CMD) caused by <i>Begomoviruses</i> 
Category (i.e. technology, innovation or management practice)	Management Practice
A: Description of the technology, innovation or management practice	
Problem addressed	Low productivity due to cassava Mosaic virus disease
What is it? (TIMP description)	It is the application of various management practices to control the CMD. These involve the use of clean planting materials, planting tolerant varieties, control of cross boundaries movement of planting materials among others.
Justification	<input type="checkbox"/> Cassava mosaic disease (CMD) is one of the major causes of low cassava productivity in East and Central Africa. Most farmers are unaware of the disease and its management. Due to its mode of transmission, i.e. through planting materials, white flies vector, the effect of the disease is catastrophic. There is therefore need to control the disease if sustainable production is to be achieved.
B: Assessment of dissemination and scaling up/out approaches	
Users of TIMP	<ul style="list-style-type: none"> • Cassava farmers, researchers, and extension service providers
Approaches to be used in dissemination	<ul style="list-style-type: none"> • On-farm trials, demo plots, ASK shows, print media, brochures, conferences and journals
Critical/essential factors for successful promotion	<ul style="list-style-type: none"> • Awareness of the benefits of the management practice • Willingness of stakeholders to participate


Partners/stakeholders for scaling up and their roles	<ul style="list-style-type: none"> • Scientists: packaging of and training on the technology • Extension agents (both private and public): • mobilization/sensitization of farmers and extension of the technology • Farmers: participate in trainings and adoption of the technology
C: Current situation and future scaling up:	
Counties where already promoted, if any	Counties in Western, Eastern and Coastal Kenya
Counties where TIMP will be upscaled	Busia, Kisumu and Lamu
Challenges in dissemination	Unwillingness of farmers/stakeholders to participate and adopt the technology
Suggestions for addressing the challenges	Proper sensitization of farmers
Lessons learned in upscaling, if any	Uptake is very high but needs to be accompanied by functional seed system
Social, environmental, policy and market conditions necessary for development and upscaling	Willingness of stakeholders to participate Favorable environmental conditions
D: Economic, gender, vulnerable and marginalized groups (VMGs) considerations	
Basic costs	-
Estimated returns	-
Gender issues and concerns in development, dissemination adoption and scaling up	Decisions on which variety to grow are made by women Men women and youth Women
Gender related opportunities	Traditionally, cassava cultivation is a woman's activity and therefore, women farmers have better opportunities in the management and income generation of cassava crop. Increased productivity improves household income and create employment
VMG issues and concerns in adoption and scaling up	
VMG related opportunities	Increased yield improves household income and food security
E: Case studies/profiles of success stories	
Success stories	????
Application guideline for users	

F: Status of TIMP readiness (1-ready for upscaling; 2-requires validation; 3-requires further research)	Ready for upscaling
G: Contacts	KALRO -Katumani, P.O. Box 340-90100, Machakos Email kalro.katumani. kalro.org Telephone. 0710906600 KALRO -Mtwapa, P.O. Box 16 – 80109, Mtwapa Email kalro.mtwapa. kalro.org Telephone. KALRO -Kakamega, P.O. Box 169-50100, Kakamega Email kalro.kakamega. kalro.org Telephone. 05630301
Lead organization and scientists	KALRO-Katumani, KALRO-Mtwapa and KALRO-Kakamega Kivuva B. M, Munga T.L. and Woyengo V.W.
Partner organizations	Extension providers eg NGOs CBOs eg. Tangakona Commercial Village, National and County Ministry of Agriculture

2.4.1 TIMP Name	Control of Cassava Brown Streak Disease (CBD)  <p>Source; IITA</p>
Category (i.e. technology, innovation or management practice)	Management Practice
A: Description of the technology, innovation or management practice	
Problem addressed	Low productivity due to cassava CBDSD disease


What is it? (TIMP description)	Management of CBSD to minimize reduction in cassava productivity
Justification	<ul style="list-style-type: none"> • CBSD is one of the major causes of low cassava productivity in East and Central Africa. • Most farmers are un aware of the disease and its management • Due to its mode of transmission, ie through planting materials, white flies vector, the effect of the disease is catastrophic • There is need to develop and disseminate IPM practices for CBSD management
B: Assessment of dissemination and scaling up/out approaches	
Users of TIMP	Cassava farmers, researchers, and extension service providers
Approaches to be used in dissemination	On-farm trials, demo plots, ASK shows, print media, brochures, conferences and journals
Critical/essential factors for successful promotion	Willingness of stakeholders to participate
Partners/stakeholders for scaling up and their roles	<p>Scientists: packaging and training of the technology Extension agents (both private and public): mobilization/sensitization of farmers and extension of the technology Farmers: participate in trainings and adoption of the technology</p>
C: Current situation and future scaling up:	
Counties where already promoted, if any	Counties in Western, Eastern and Coastal Kenya
Counties where TIMP will be upscaled	Busia, Kisumu and Lamu
Challenges in dissemination	Willingness of farmers/stakeholders to participate and adopt the technology
Suggestions for addressing the challenges	Proper sensitization of farmers
Lessons learned in upscaling, if any	Uptake is very high but needs to be accompanied by functional seed system
Social, environmental, policy and market conditions necessary for development and upscaling	Willingness of stakeholders to participate Favorable environmental conditions
D: Economic, gender, vulnerable and marginalized groups (VMGs) considerations	
Basic costs	-
Estimated returns	-

Gender issues and concerns in development and dissemination	Insure gender balance during trainings Decisions on which variety to grow are made by women
Gender issues and concerns in adoption and scaling up	
Gender related opportunities	Women farmers have better opportunities in the management of cassava crop. Traditionally, cassava cultivation is a woman's activity. Increased productivity increase household income and create employment
VMG issues and concerns in adoption and scaling up	
VMG related opportunities	Increased yield increase household income, food security and employment
E: Case studies/profiles of success stories	
Success stories from previous similar projects	
Application guideline for users	
F: Status of TIMP readiness (1-ready for upscaling; 2-requires validation; 3-requires further research)	Ready for upscaling
G: Contacts	KALRO -Katumani, P.O. Box 340-90100, Machakos Email kalro.katumani. kalro.org Telephone. 0710906600 KALRO -Mtwapa, P.O. Box 16 – 80109, Mtwapa Email kalro.mtwapa. kalro.org Telephone. KALRO -Kakamega, P.O. Box 169-50100, Kakamega Email kalro.kakamega. kalro.org Telephone. 05630301
Lead organization and scientists	KALRO-Katumani, KALRO-Mtwapa and KALRO-Kakamega Kivuva B. M, Munga T.L. and Woyengo V.W.
Partner organizations	Extension providers eg NGOs CBOs eg. Tangakona Commercial Village, National and County Ministry of Agriculture

2.4.1 TIMP Name	Control of Cassava Anthracnose (<i>Colletotrichum gloeosporioides f.sp. manihotis</i>)  Source: IITA
Category (i.e. technology, innovation or management practice)	Management Practice
A: Description of the technology, innovation or management practice	
Problem addressed	Low productivity due to Cassava Anthracnose disease
What is it? (TIMP description)	Management of Cassava Anthracnose disease to minimize reduction in cassava productivity
Justification	<ul style="list-style-type: none"> • Cassava Anthracnose disease is one of the major causes of low cassava productivity in East and Central Africa. • Most farmers are un aware of the disease and its management • Due to its mode of transmission, ie through planting materials, white flies vector, the effect of the disease is catastrophic • There is need to develop and disseminate IPM practices for Cassava Anthracnose management
B: Assessment of dissemination and scaling up/out approaches	
Users of TIMP	Cassava farmers, researchers, and extension service providers
Approaches to be used in dissemination	On-farm trials, demo plots, ASK shows, print media, brochures, conferences and journals
Critical/essential factors for successful promotion	Willingness of stakeholders to participate
Partners/stakeholders for scaling up and their roles	Scientists: packaging and training of the technology Extension agents (both private and public): mobilization/sensitization of farmers and extension of the technology Farmers: participate in trainings and adoption of the technology
C: Current situation and future scaling up:	


Counties where already promoted, if any	Counties in Western, Eastern and Coastal Kenya
Counties where TIMP will be upscaled	Busia, Kisumu and Lamu
Challenges in dissemination	Willingness of farmers/stakeholders to participate and adopt the technology
Suggestions for addressing the challenges	Proper sensitization of farmers
Lessons learned in upscaling, if any	Uptake is very high but needs to be accompanied by functional seed system
Social, environmental, policy and market conditions necessary for development and upscaling	Willingness of stakeholders to participate Favorable environmental conditions
D: Economic, gender, vulnerable and marginalized groups (VMGs) considerations	
Basic costs	-
Estimated returns	-
Gender issues and concerns in development and dissemination	Insure gender balance during trainings Decisions on which variety to grow are made by women
Gender issues and concerns in adoption and scaling up	
Gender related opportunities	Women farmers have better opportunities in the management of cassava crop. Traditionally, cassava cultivation is a woman's activity. Increased productivity increase household income and create employment
VMG issues and concerns in adoption and scaling up	
VMG related opportunities	Increased yield increase household income, food security and employment
E: Case studies/profiles of success stories	
Success stories from previous similar projects	
Application guideline for users	
F: Status of TIMP readiness (1-ready for upscaling;, 2-requires validation; 3-requires further research)	Ready for upscaling

G: Contacts	<p>KALRO -Katumani, P.O. Box 340-90100, Machakos Email kalro.katumani. kalro.org Telephone. 0710906600</p> <p>KALRO -Mtwapa, P.O. Box 16 – 80109, Mtwapa Email kalro.mtwapa. kalro.org Telephone.</p> <p>KALRO -Kakamega, P.O. Box 169-50100, Kakamega Email kalro.kakamega. kalro.org Telephone. 05630301</p>
Lead organization and scientists	<p>KALRO-Katumani, KALRO-Mtwapa and KALRO-Kakamega Kivuva B. M, Munga T.L. and Woyengo V.W.</p>
Partner organizations	<p>Extension providers eg NGOs CBOs eg. Tangakona Commercial Village, National and County Ministry of Agriculture</p>

2.4.1 TIMP Name	<p>Control of cassava bacterial blight disease (<i>Xanthomonas manihotis</i> pv. <i>manihotis</i>)</p> 
Category (i.e. technology, innovation or management practice)	Management Practice
A: Description of the technology, innovation or management practice	
Problem addressed	Low productivity due to cassava bacterial blight disease
What is it? (TIMP description)	Management of cassava bacterial blight disease to minimize reduction in cassava productivity

Justification	<ul style="list-style-type: none"> • cassava bacterial blight disease is one of the major causes of low cassava productivity in East and Central Africa. • Most farmers are un aware of the disease and its management • Due to its mode of transmission, ie through planting materials, white flies vector, the effect of the disease is catastrophic • There is need to develop and disseminate IPM practices for cassava bacterial blight management
B: Assessment of dissemination and scaling up/out approaches	
Users of TIMP	Cassava farmers, researchers, and extension service providers
Approaches to be used in dissemination	On-farm trials, demo plots, ASK shows, print media, brochures, conferences and journals
Critical/essential factors for successful promotion	Willingness of stakeholders to participate
Partners/stakeholders for scaling up and their roles	<p>Scientists: packaging and training of the technology</p> <p>Extension agents (both private and public): mobilization/sensitization of farmers and extension of the technology</p> <p>Farmers: participate in trainings and adoption of the technology</p>
C: Current situation and future scaling up:	
Counties where already promoted, if any	Counties in Western, Eastern and Coastal Kenya
Counties where TIMP will be upscaled	Busia, Kisumu and Lamu
Challenges in dissemination	Unwillingness of farmers/stakeholders to participate and adopt the technology
Suggestions for addressing the challenges	Proper sensitization of farmers
Lessons learned in upscaling, if any	Uptake is very high but needs to be accompanied by functional seed system
Social, environmental, policy and market conditions necessary for development and upscaling	Willingness of stakeholders to participate Favorable environmental conditions
D: Economic, gender, vulnerable and marginalized groups (VMGs) considerations	
Basic costs	-
Estimated returns	-
Gender issues and concerns in development and dissemination	<p>Insure gender balance during trainings</p> <p>Decisions on which variety to grow are made by women</p>


Gender issues and concerns in adoption and scaling up	
Gender related opportunities	Women farmers have better opportunities in the management of cassava crop. Traditionally, cassava cultivation is a woman's activity. Increased productivity increase household income and create employment
VMG issues and concerns in adoption and scaling up	
VMG related opportunities	Increased yield increase household income, food security and employment
E: Case studies/profiles of success stories	
Success stories from previous similar projects	
Application guideline for users	
F: Status of TIMP readiness (1-ready for upscaling;, 2-requires validation; 3-requires further research)	Ready for upscaling
G: Contacts	KALRO -Katumani, P.O. Box 340-90100, Machakos Email kalro.katumani. kalro.org Telephone. 0710906600 KALRO -Mtwapa, P.O. Box 16 – 80109, Mtwapa Email kalro.mtwapa. kalro.org Telephone. KALRO -Kakamega, P.O. Box 169-50100, Kakamega Email kalro.kakamega. kalro.org Telephone. 05630301
Lead organization and scientists	KALRO-Katumani, KALRO-Mtwapa and KALRO-Kakamega Kivuva B. M, Munga T.L. and Woyengo V.W.
Partner organizations	Extension providers eg NGOs CBOs eg. Tangakona Commercial Village, National and County Ministry of Agriculture

<p>2.4.2 TIMP Name</p>	<p>Integrated pest management for Whiteflies (<i>Bemisia tabaci</i>)</p> 
<p>Category (i.e. technology, innovation or management practice)</p>	<p>Management Practice</p>
<p>A: Description of the technology, innovation or management practice</p>	
<p>Problem addressed</p>	<p>Low productivity in cassava is due to white flies attacks, Household food insecurity, Low family incomes, Limited utilization of cassava which is a cheaper source of carbohydrates in human and animal feed production, Environmentally safe insect pest management practices that enhance cassava productivity and Inadequate cassava processed products</p>
<p>What is it? (TIMP description)</p>	<p>Farmers and Extension staff will be trained on IPM package that prevents/reduces infestations of the cassava by the green mites. The technology involves pruning and destroying infested parts, application of non-toxic recommended products as well as biological control options and value addition during processing.</p>
<p>Justification</p>	<p>Cassava Pests and diseases are a major challenge in its production aggravated by farmers recycling seed cuttings from the previous season's crop. These cuttings are known to carry insect pests and diseases from the previous crop and also, farmers lack the knowhow of pest and diseases management on cassava in Kenya. With insect pest and diseases free planting materials from KALRO to trained farmers at a fee, losses due to green mites will be minimal. Training of spray service providers on best IPM options will create employment as well as achieving pest management targets efficiently. This coupled with capacity building to farmers on good agricultural practices on cassava production</p>

	and entrepreneurship will lead to establishment of cassava as a high value crop in areas suitable for its production
B: Assessment of dissemination and scaling up/out approaches	
Users of TIMP	Cassava farmers, researchers, environmentalists, county governments, processors, input stockists, industrialists and policy makers
Approaches to be used in dissemination	Extension staff – ToTs, On-farm trials, demo plots, ASK shows, print media, brochures, posters, conferences and journals
Critical/essential factors for successful promotion	<input type="checkbox"/> Recruitment of cassava growing farmer groups <input type="checkbox"/> Registration of farmers by KEPHIS as seed multipliers <input type="checkbox"/> support for companies and SMEs to enter seed production; value addition and product diversification <input type="checkbox"/> funding by government to promote production and distribution of seed of selected cassava varieties <input type="checkbox"/> Formation of spray service providers (teams) to manage green mites at a fee
Partners/stakeholders for scaling up and their roles	<input type="checkbox"/> MoALF&I <input type="checkbox"/> KEPHIS <input type="checkbox"/> County Governments <input type="checkbox"/> NGO's working with farmers <input type="checkbox"/> CIP <input type="checkbox"/> FAO, <input type="checkbox"/> Private seed multipliers <input type="checkbox"/> Farmers <input type="checkbox"/> Processors
C: Current situation and future scaling up	
Counties where already promoted, if any	–
Counties where TIMP will be up scaled	Need to promote to all cassava growing regions

Challenges in dissemination	<ul style="list-style-type: none"> • Inadequate supply of certified pest free cassava seeds. • Unwillingness of farmers to serve as seed multipliers due to uncertainty of returns • Challenges in meeting the requirements for registration as seed multipliers • Inadequate knowledge on IPM strategies on insect pests infesting cassava and losses attributed to them • Poor linkages in cassava value chain
	<ul style="list-style-type: none"> • Costs associated with certified seed production • Cultural perceptions that cassava is a poor mans' food
Suggestions for addressing the challenges	<ul style="list-style-type: none"> • Registration of seed production farmers • Training of stakeholders in IPM options for white flies • Train consumers on nutritional value of cassava • Training of stakeholders on value addition and processing
Lessons learned in upscaling, if any	<ul style="list-style-type: none"> • Sensitization is necessary for people to appreciate the use of cassava and its products as food and feed. • There is need to create linkages in cassava value chain to maximize production and optimize use
Social, environmental, policy and market conditions necessary for development and upscaling	
D: Economic, gender, vulnerable and marginalized groups (VMGs) considerations	
Basic costs	-
Estimated returns	
Gender issues and concerns in development and dissemination	Gender sensitive especially on spray chemical application associated with men
Gender issues and concerns in adoption and scaling up	Gender sensitive
Gender related opportunities	Gender sensitive
VMG issues and concerns in adoption and scaling up	All-inclusive (women, Men and youth) affair for proper adoption and up-scaling
VMG related opportunities	More household income from increased yield
E: Case studies/profiles of success stories	

Success stories from previous similar projects	–
Application guideline for users	Need for training on establishment of cassava crops, IPM applications, good agricultural practices, processing and marketing of products in a business oriented approach
F: Status of TIMP readiness (1-ready for upscaling; 2-requires validation; 3-requires further research)	Ready for up scaling
G: Contacts	KALRO - Kabete P.O. Box 14733 – 00800, Waiyaki way, Westlands 0710808312 Email cd.narl@ kalro.org
Lead organization and scientists	KALRO Kabete (Joseph Mulwa, Miriam Otipa, Abel Too & Ruth Amata)
Partner organizations	All Counties, CBOs and NGOs

2.4.2 TIMP Name	<p>Integrated pest management for White scales (<i>Aonidomytilus albus</i>)</p> 
Category (i.e. technology, innovation or management practice)	Management Practice
A: Description of the technology, innovation or management practice	


Problem addressed	Low productivity in cassava is due to white scales attacks, Household food insecurity, Low family incomes, Limited utilization of cassava which is a cheaper source of carbohydrates in human and animal feed production, Environmentally safe insect pest management practices that enhance cassava productivity and Inadequate cassava processed products
What is it? (TIMP description)	Farmers and Extension staff will be trained on IPM package that prevents/reduces infestations of the cassava by the green mites. Severe attacks causes the terminal leaves to die and drop, and the shoot tip looks like a "candle stick". This causes a reduction in tuber yield. The technology involves pruning and destroying infested parts, application of nontoxic recommended products as well as biological control options and value addition during processing
Justification	Cassava is the third most important source of calories in the tropics after rice and corn. Its production is possible under semi-arid conditions and infertile soils. Pests are a major challenge in its production since farmers are known to use cuttings from the previous season's crop. These cuttings are known to carry insect pests from the previous crop and also, farmers are not known to manage any pest on cassava in Kenya. With insect pest free planting materials from KALRO to trained farmers at a fee, losses due to green mites will be minimal. Training of spray service providers on best IPM options will create employment as well as achieving pest management targets efficiently. This coupled with capacity building to farmers on good agricultural practices on cassava production and entrepreneurship will lead to establishment

	cassava as a high value crop in areas suitable for its production
B: Assessment of dissemination and scaling up/out approaches	
Users of TIMP	Cassava farmers, researchers, environmentalists, county governments, processors, input stockists, industrialists and policy makers
Approaches to be used in dissemination	Extension staff – ToTs, On-farm trials, demo plots, ASK shows, print media, brochures, posters, conferences and journals

Critical/essential factors for successful promotion	<input type="checkbox"/> Recruitment of cassava growing farmer groups <input type="checkbox"/> Registration of farmers by KEPHIS as seed multipliers <input type="checkbox"/> support for companies and SMEs to enter seed production; value addition and product diversification <input type="checkbox"/> funding by government to promote production and distribution of seed of selected cassava varieties <input type="checkbox"/> Formation of spray service providers (teams) to manage green mites at a fee
Partners/stakeholders for scaling up and their roles	<input type="checkbox"/> MoALF&I <input type="checkbox"/> KEPHIS <input type="checkbox"/> County Governments <input type="checkbox"/> NGO's working with farmers <input type="checkbox"/> CIP <input type="checkbox"/> FAO, <input type="checkbox"/> Private seed multipliers <input type="checkbox"/> Farmers <input type="checkbox"/> Processors
C: Current situation and future scaling up	
Counties where already promoted, if any	–
Counties where TIMP will be up scaled	Need to promote to all cassava growing regions
Challenges in dissemination	<ul style="list-style-type: none"> • Inadequate supply of certified pest free cassava seeds. • Unwillingness of farmers to serve as seed multipliers due to uncertainty of returns • Challenges in registration as seed multipliers • Inadequate knowledge on IPM strategies on insect pests infesting cassava and losses attributed to them • Poor linkages in cassava value chain • Costs associated with certified seed production
	<input type="checkbox"/> Cultural thoughts that cassava is a poor mans' food

Suggestions for addressing the challenges	<ul style="list-style-type: none"> • Registration of seed production farmers • Training of stakeholders in IPM options for white flies • Train consumers on nutritional value of cassava • Training of stakeholders on value addition and processing
Lessons learned in upscaling, if any	<ul style="list-style-type: none"> • Cassava is a high source of nutrition but highly under utilized • Sensitization is necessary for people to appreciate the use of cassava and its products as food and feed. • Inputs in cassava production are less and cheap • There is need to create linkages in cassava value chain to maximize production and optimize use
Social, environmental, policy and market conditions necessary for development and upscaling	Well-coordinated value chain and objective geared approach
D: Economic, gender, vulnerable and marginalized groups (VMGs) considerations	
Basic costs	-
Estimated returns	Severe infestations can cause 20-100% reduction in tuber yield especially during the dry season
Gender issues and concerns in development and dissemination	Gender sensitive
Gender issues and concerns in adoption and scaling up	Gender sensitive
Gender related opportunities	Gender sensitive
VMG issues and concerns in adoption and scaling up	All-inclusive affair for proper adoption and up-scaling
VMG related opportunities	More household income
E: Case studies/profiles of success stories	
Success stories from previous similar projects	-
Application guideline for users	Need for training on establishment of cassava crops, IPM applications, good agricultural practices, processing and marketing of products in a business oriented approach


F: Status of TIMP readiness (1-ready for upscaling;, 2-requires validation; 3-requires further research)	Ready for upscaling
G: Contacts	KALRO -Kabete P.O. Box 14733 -00800 Email cd.narl@ kalro.org
Lead organization and scientists	KALRO Kabete (Joseph Mulwa, Miriam Otipa, Abel Too & Ruth Amata)
Partner organizations	All Counties, CBOs and NGOs

2.4.2 TIMP Name	Integrated Pest Management Package for green mites in cassava 
Category (i.e. technology, innovation or management practice)	Management Practice
A: Description of the technology, innovation or management practice	
Problem addressed	Low productivity in cassava is due to green mites attacks, Household food insecurity, Low family incomes, Limited utilization of cassava which is a cheaper source of carbohydrates in human and animal feed production, Environmentally safe insect pest management practices that enhance cassava productivity and Inadequate cassava processed products

What is it? (TIMP description)	Farmers and Extension staff will be trained on IPM package that prevents/reduces infestations of the cassava by the green mites. Severe attacks causes the terminal leaves to die and drop, and the shoot tip looks like a "candle stick". This causes a reduction in tuber yield. The technology involves pruning and destroying infested parts, application of nontoxic recommended products as well as biological control options and value addition during processing
Justification	Cassava is the third most important source of calories in the tropics after rice and corn. Its production is possible under semi-arid conditions and infertile soils. Pests are a major challenge in its production since farmers are known to use cuttings from the previous season's crop. These cuttings are known to carry insect pests from the previous crop and also, farmers are not known to manage any pest on cassava in Kenya. With insect pest free planting materials from KALRO to trained farmers at a fee, losses due to green mites will be minimal. Training of spray service providers on best IPM options will create employment as well as achieving pest
	management targets efficiently. This coupled with capacity building to farmers on good agricultural practices on cassava production and entrepreneurship will lead to establishment cassava as a high value crop in areas suitable for its production
B: Assessment of dissemination and scaling up/out approaches	
Users of TIMP	Cassava farmers, researchers, environmentalists, county governments, processors, input stockists, industrialists and policy makers
Approaches to be used in dissemination	Extension staff – ToTs, On-farm trials, demo plots, ASK shows, print media, brochures, posters, conferences and journals
Critical/essential factors for successful promotion	<ul style="list-style-type: none"> <input type="checkbox"/> Recruitment of cassava growing farmer groups <input type="checkbox"/> Registration of farmers by KEPHIS as seed multipliers <input type="checkbox"/> support for companies and SMEs to enter seed production; value addition and product diversification <input type="checkbox"/> funding by government to promote production and distribution of seed of selected cassava varieties <input type="checkbox"/> Formation of spray service providers (teams) to manage green mites at a fee

Partners/stakeholders for scaling up and their roles	<input type="checkbox"/> MoALF&I KEPHIS <input type="checkbox"/> <input type="checkbox"/> County Governments <input type="checkbox"/> NGO's working with farmers <input type="checkbox"/> CIP <input type="checkbox"/> FAO, <input type="checkbox"/> Private seed multipliers <input type="checkbox"/> Farmers <input type="checkbox"/> Processors
C: Current situation and future scaling up	
Counties where already promoted, if any	–
Counties where TIMP will be up scaled	Need to promote to all cassava growing regions
Challenges in dissemination	<ul style="list-style-type: none"> • Inadequate supply of certified pest free cassava seeds. • Unwillingness of farmers to serve as seed multipliers due to uncertainty of returns • Challenges in registration as seed multipliers
	<ul style="list-style-type: none"> • In adequate knowledge on IPM strategies on insect pests infesting cassava and losses attributed to them • Poor linkages in cassava value chain • Costs associated with certified seed production • Cultural thoughts that cassava is a poor mans' food
Suggestions for addressing the challenges	<ul style="list-style-type: none"> • Registration of seed production farmers • Training of stakeholders in IPM options for white flies • Train consumers on nutritional value of cassava • Training of stakeholders on value addition and processing
Lessons learned in upscaling, if any	<ul style="list-style-type: none"> • Cassava is a high source of nutrition but highly under utilized • Sensitization is necessary for people to appreciate the use of cassava and its products as food and feed. • Inputs in cassava production are less and cheap • There is need to create linkages in cassava value chain to maximize production and optimize use
Social, environmental, policy and market conditions necessary for development and upscaling	Well-coordinated value chain and objective geared approach


D: Economic, gender, vulnerable and marginalized groups (VMGs) considerations	
Basic costs	-
Estimated returns	Severe infestations can cause 20-100% reduction in tuber yield especially during the dry season
Gender issues and concerns in development and dissemination	Gender sensitive
Gender issues and concerns in adoption and scaling up	Gender sensitive
Gender related opportunities	Gender sensitive
VMG issues and concerns in adoption and scaling up	All-inclusive affair for proper adoption and up-scaling
VMG related opportunities	More household income
E: Case studies/profiles of success stories	
Success stories from previous similar projects	-
Application guideline for users	Need for training on establishment of cassava crops, IPM applications, good agricultural practices, processing and marketing of products in a business oriented approach
F: Status of TIMP readiness (1ready for upscaling;, 2-requires validation; 3-requires further research)	Ready for upscaling
G: Contacts	KALRO -Kabete P.O. Box 14733 -00800 Email cd.narl@ kalro.org
Lead organization and scientists	KALRO Kabete (Joseph Mulwa, Miriam Otipa, Abel Too & Ruth Amata)
Partner organizations	All Counties, CBOs and NGOs
2.4.3 TIMP Name	Integrated Pest Management Package for mealybugs in cassava

		
Category (i.e. technology, innovation or management practice)	Management Practice	
A: Description of the technology, innovation or management practice		
Problem addressed	Low productivity in cassava is due to mealy bug attacks, Household food insecurity, Low family incomes, Limited utilization of cassava which is a cheaper source of carbohydrates in human and animal feed production, Environmentally safe insect pest management practices that enhance cassava productivity and Inadequate cassava processed products	
What is it? (TIMP description)	Cassava cuttings will be sourced from KALRO centres. Farmers will be trained on IPM package that prevents infestations of the cassava by mealybugs which suck plant sap causing wilting of the plant and vectoring of diseases hence low production. The technology involves pruning, application of non-chemical products as well as biological control options and value addition	
Justification	Cassava is an important crop whose production is possible under low erratic rainfall conditions and infertile soils. Pests are a major challenge in its production since farmers are known to use cuttings from the previous season's crop, which most of the time have insect pests. A supply of insect pest free planting materials from KALRO to trained farmers every 3 years at a fee can greatly minimize losses from mealybugs. The farmers multiplying seed will be registered and licensed by KEPHIS. This coupled by capacity building of farmers on good agricultural practices on cassava production and entrepreneurship will lead to establishment of the crop as a high value crop in areas suitable for its production	
B: Assessment of dissemination and scaling up/out approaches		

Users of TIMP	Cassava farmers, researchers, environmentalists, county governments, processors, input stockists, industrialists and policy makers
Approaches to be used in dissemination	Extension staff – ToTs, On-farm trials, demo plots, ASK shows, print media, brochures, posters, conferences and journals
Critical/essential factors for successful promotion	<ul style="list-style-type: none"> • Recruitment of cassava growing farmer groups • Registration of farmers by KEPHIS as seed multipliers • support for companies and SMEs to enter seed production; value addition and product diversification • funding by government to promote production and distribution of seed of selected cassava varieties
Partners/stakeholders for scaling up and their roles	<ul style="list-style-type: none"> • MoALF&I • KEPHIS • County Governments • NGO's working with farmers • CIP • FAO, • Private seed multipliers • Farmers • Processors
C: Current situation and future scaling up	
Counties where already promoted, if any	Busia and Makueni
Counties where TIMP will be up scaled	Busia, Kisumu, Makueni and Lamu
Challenges in dissemination	<ul style="list-style-type: none"> • Inadequate supply of certified pest free cassava seeds. • Unwillingness of farmers to serve as seed multipliers due to uncertainty of returns • Challenges in registration as seed multipliers • In adequate knowledge on IPM strategies on insect pests infesting cassava and losses attributed to them • Poor linkages in cassava value chain • Costs associated with certified seed production
Suggestions for addressing the challenges	<ul style="list-style-type: none"> • Registration of seed production farmers, • Training of stakeholders in IPM options for mealybugs • Training of stakeholders on value addition and processing
Lessons learned in upscaling, if any	<ul style="list-style-type: none"> • Cassava is a high source of nutrition but highly under utilized • Sensitization is necessary for people to appreciate the use of cassava and its products as food and feed. • Inputs in cassava production are less and cheap • There is need to create linkages in cassava value chain to maximize production and optimize use

Social, environmental, policy and market conditions necessary for development and upscaling	Well-coordinated value chain and objective geared approach
D: Economic, gender, vulnerable and marginalized groups (VMGs) considerations	
Basic costs	-
Estimated returns	30-50% crop losses have been reported
Gender issues and concerns in development and dissemination	All issues will be incorporated; all gender will participate in development and dissemination of the management practice
Gender issues and concerns in adoption and scaling up	New skills concerning the management should be focused on women since traditionally, it is women who mostly plant cassava
Gender related opportunities	Women farmers have better opportunities in the management of cassava crop. Traditionally, cassava cultivation is a woman's activity.
VMG issues and concerns in adoption and scaling up	All-inclusive affair for proper adoption and up-scaling
VMG related opportunities	More household income
E: Case studies/profiles of success stories	
Success stories from previous similar projects	
Application guideline for users	Need for training on establishment of cassava crops, IPM applications, good agricultural practices, processing and marketing of products in a business oriented approach
F: Status of TIMP readiness (1ready for upscaling;, 2-requires validation; 3-requires further research)	Ready for upscaling
G: Contacts	KALRO -Kabete P.O. Box 14733 -00800 Email cd.narl@ kalro.org
Lead organization and scientists	KALRO Kabete (Joseph Mulwa, Miriam Otipa, Abel Too & Ruth Amata)
Partner organizations	All Counties

2.4.4 TIMP Name	Integrated Pest Management Package for moles in cassava Moles (<i>Tachyoryetes splendens</i>) in cassava
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	 <p>Cassava plant stems with soil mounds due to moles</p> <p>Source: J. Mulwa</p>
Category (i.e. technology, innovation or management practice)	Management Practice/ Technology
A: Description of the technology, innovation or management practice	
Problem addressed	<ul style="list-style-type: none"> • Low productivity due to mole attacks • Household food insecurity • Low family incomes • Limited utilization of cassava which is a cheaper source of carbohydrates in human and animal feed production • Environmentally safe insect pest management practices that enhance cassava productivity <p>Inadequate cassava processed products</p>
What is it? (TIMP description)	Farmers and Extension staff will be trained on IPM package that prevents/reduces infestations of the cassava by the moles. Severe attacks on roots cause rots and decays. This causes a reduction in tuber yield. The technology involves trapping and other mechanical as well as physical methods and value addition during processing
Justification	Cassava is the third most important source of calories in the tropics after rice and corn. Its production is possible under semi-arid conditions and infertile soils. Pests are a major challenge in its production since farmers are not known to manage any pest on cassava in Kenya. Training of cassava farmers on best IPM options to deal with moles will create employment as well as achieving pest management targets efficiently. This coupled with capacity building to farmers on good agricultural practices on cassava production and entrepreneurship will lead to establishment of cassava as a high value crop in areas suitable for its production
B: Assessment of dissemination and scaling up/out approaches	
Users of TIMP	Cassava farmers, researchers, environmentalists, county governments, processors, input stockists, industrialists and policy makers
Approaches to be used in dissemination	Extension staff – ToTs, On-farm trials, demo plots, ASK shows, print media, brochures, posters, conferences and journals

Critical/essential factors for successful promotion	<ul style="list-style-type: none"> • Recruitment of cassava growing farmer groups • Registration of farmers by KEPHIS as seed multipliers • support for companies and SMEs to enter seed production; value addition and product diversification funding by government to promote production and distribution of seed of selected cassava varieties • Formation of mole management teams to manage moles at a fee
Partners/stakeholders for scaling up and their roles	<ul style="list-style-type: none"> • MoALF&I • KEPHIS • County Governments • NGO's working with farmers • CIP • FAO, • Private seed multipliers • Farmers • Processors
C: Current situation and future scaling up	
Counties where already promoted, if any	–
Counties where TIMP will be up scaled	There is need for promotion in all cassava growing regions in Kenya
Challenges in dissemination	<ul style="list-style-type: none"> • Inadequate supply of certified pest free cassava seeds. • Unwillingness of farmers to serve as seed multipliers due to uncertainty of returns • Challenges in registration as seed multipliers • In adequate knowledge on IPM strategies on insect pests infesting cassava and losses attributed to them • Poor linkages in cassava value chain • Costs associated with certified seed production <p>Cultural thoughts that cassava is a poor mans' food</p>
Suggestions for addressing the challenges	<ul style="list-style-type: none"> • Registration of seed production farmers • Training of stakeholders in IPM options for white flies • Train consumers on nutritional value of cassava <p>Training of stakeholders on value addition and processing</p>
Suggestions for addressing the challenges	<ul style="list-style-type: none"> • Registration of seed production farmers • Training of stakeholders in IPM options for white flies • Train consumers on nutritional value of cassava <p>Training of stakeholders on value addition and processing</p>
Lessons learned in upscaling, if any	<ul style="list-style-type: none"> • Cassava is a high source of nutrition but highly under utilized

	<ul style="list-style-type: none"> • Sensitization is necessary for people to appreciate the use of cassava and its products as food and feed. • Inputs in cassava production are less and cheap <p>There is need to create linkages in cassava value chain to maximize production and optimize use</p>
Social, environmental, policy and market conditions necessary for development and upscaling	Well-coordinated value chain and objective geared approach
D: Economic, gender, vulnerable and marginalized groups (VMGs) considerations	
Basic costs	-
Estimated returns	Infestations can cause tuber yield reduction of up to 25%.
Gender issues and concerns in development and dissemination	Gender sensitive
Gender issues and concerns in adoption and scaling up	Gender sensitive
Gender related opportunities	Gender sensitive
VMG issues and concerns in adoption and scaling up	All-inclusive affair for proper adoption and up-scaling
VMG related opportunities	More household income
E: Case studies/profiles of success stories	
Success stories from previous similar projects	–
Application guideline for users	Need for training on establishment of cassava crops, IPM applications, good agricultural practices, processing and marketing of products in a business oriented approach
F: Status of TIMP readiness (1ready for upscaling;, 2-requires validation; 3-requires further research)	Ready for upscaling
G: Contacts	KALRO –Kabete P.O. Box 14733 -00800 Email cd.narl@ kalro.org
Lead organization and scientists	KALRO Kabete (Joseph Mulwa, Miriam Otipa, Abel Too & Ruth Amata)
Partner organizations	All Counties, CBOs and NGOs

2.4.5 TIMP Name	for two spotted
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Integrated Pest Management Package spider mites in cassava	
Category (i.e. technology, innovation or management practice)	Management Practice
A: Description of the technology, innovation or management practice	
Problem addressed	<input type="checkbox"/> Low productivity due to white two spotted spider mites attacks <ul style="list-style-type: none"> <input type="checkbox"/> old food insecurity <input type="checkbox"/> family incomes <input type="checkbox"/> reduced utilization of cassava which is a cheaper source of carbohydrates in human and animal feed products <input type="checkbox"/> environmentally safe insect pest management practices <input type="checkbox"/> enhance cassava productivity <input type="checkbox"/> Inadequate cassava products
What is it? (TIMP description)	Farmers and Extension staff will be trained on IPM package that prevents/reduces infestations of the cassava by the two spotted spider mites. Attacks on cassava cause leaf curling & subsequent wilting of the plant and vectoring of diseases hence low production. The technology involves pruning and destroying infested parts, application of non-chemical products as well as biological control options and value addition during processing
Justification	Cassava is an important crop whose production is possible under low erratic rainfall conditions and infertile soils. Pests are a major challenge in its production since farmers are known to use cuttings from the previous season's crop. These cuttings are known to insect pests from the previous crop and
	also, farmers are known not to manage any pest on cassava in Kenya. With insect pest free planting materials from KALRO to trained farmers every 3 years at a fee can greatly minimize losses from two spotted spider mites. Training of spray service providers will create employment as well as achieving pest management targets efficiently. This coupled by capacity building of farmers on good agricultural practices on cassava production and entrepreneurship will lead to establishment of cassava as a high value crop in areas suitable for its production
B: Assessment of dissemination and scaling up/out approaches	
Users of TIMP	Cassava farmers, researchers, environmentalists, county governments, processors, input stockists, industrialists and policy makers

Approaches to be used in dissemination	Extension staff – ToTs, On-farm trials, demo plots, ASK shows, print media, brochures, posters, conferences and journals
Critical/essential factors for successful promotion	<input type="checkbox"/> Recruitment of cassava growing farmer groups <input type="checkbox"/> Registration of farmers by KEPHIS as seed multipliers <input type="checkbox"/> support for companies and SMEs to enter seed production; value addition and product diversification <input type="checkbox"/> funding by government to promote production and distribution of seed of selected cassava varieties <input type="checkbox"/> Formation of spray service providers (teams) to manage two spotted spider mites at a fee
Partners/stakeholders for scaling up and their roles	<ul style="list-style-type: none"> • MoALF&I • KEPHIS • County Governments • NGO's working with farmers • CIP • FAO, • Private seed multipliers • Farmers • Processors
C: Current situation and future scaling up	
Counties where already promoted, if any	–
Counties where TIMP will be up scaled	Should be promoted in all major cassava growing areas in Kenya
Challenges in dissemination	<ul style="list-style-type: none"> • Inadequate supply of certified pest free cassava seeds. • Unwillingness of farmers to serve as seed multipliers due to uncertainty of returns • Challenges in registration as seed multipliers • In adequate knowledge on IPM strategies on insect pests infesting cassava and losses attributed to them • Poor linkages in cassava value chain • Costs associated with certified seed production • Cultural thoughts that cassava is a poor mans' food
Suggestions for addressing the challenges	<ul style="list-style-type: none"> • Registration of seed production farmers • Training of stakeholders in IPM options for white flies • Train consumers on nutritional value of cassava • Training of stakeholders on value addition and processing
Lessons learned in upscaling, if any	<ul style="list-style-type: none"> • Cassava is a high source of nutrition but highly under utilized

	<ul style="list-style-type: none"> • Sensitization is necessary for people to appreciate the use of cassava and its products as food and feed. • Inputs in cassava production are less and cheap • There is need to create linkages in cassava value chain to maximize production and optimize use
Social, environmental, policy and market conditions necessary for development and upscaling	Well-coordinated value chain and objective geared approach
D: Economic, gender, vulnerable and marginalized groups (VMGs) considerations	
Basic costs	-
Estimated returns	It is estimated that two spotted spider mites may cause 2080% crop loss depending on infestation levels
Gender issues and concerns in development and dissemination	Gender sensitive
Gender issues and concerns in adoption and scaling up	Gender sensitive
Gender related opportunities	Gender sensitive
VMG issues and concerns in adoption and scaling up	All-inclusive affair for proper adoption and up-scaling
VMG related opportunities	More household income
E: Case studies/profiles of success stories	
Success stories from previous similar projects	-
Application guideline for users	Need for training on establishment of cassava crops, IPM applications, good agricultural practices, processing and marketing of products in a business oriented approach
F: Status of TIMP readiness (1-ready for upscaling; 2-requires validation; 3-requires further research)	Ready for upscaling
G: Contacts	KALRO -Kabete P.O. Box 14733 -00800 Email cd.narl@ kalro.org
Lead organization and scientists	KALRO Kabete (Joseph Mulwa, Miriam Otipa, Abel Too & Ruth Amata)
Partner organizations	All Counties, CBOs and NGOs

2.4.6 TIMP Name	Integrated Pest Management Package for white scales in cassava
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Category (i.e. technology, innovation or management practice)	Management Practice
A: Description of the technology, innovation or management practice	
Problem addressed	<ul style="list-style-type: none"> • Low productivity due to white scales attacks • Household food insecurity • Low family incomes • Limited utilization of cassava which is a cheaper source of carbohydrates in human and animal feed production • Environmentally safe insect pest management practices that enhance cassava productivity • Inadequate cassava processed products
What is it? (TIMP description)	Farmers and Extension staff will be trained on IPM package that prevents/reduces infestations of the cassava by the white scales. Sap sucking by this pest causes wilting of the plant and vectoring of diseases hence low production. The technology involves pruning and destroying infested parts, application of non-chemical products as well as biological control options and value addition during processing
Justification	Cassava is the third most important source of calories in the tropics after rice and corn. Its production is possible under semi-arid conditions and infertile soils. Pests are a major challenge in its production since farmers are known to use cuttings from the previous season's crop. These cuttings are known to insect pests from the previous crop and also, farmers are known not to manage any pest on cassava in Kenya. With insect pest free planting materials from KALRO to trained farmers at a fee, losses due to white scale will be minimal. Training of spray service providers will create employment as well as achieving pest management targets efficiently. This coupled with capacity building to farmers on good agricultural practices on cassava production and entrepreneurship will lead to establishment of cassava as a high value crop in areas suitable for its production
B: Assessment of dissemination and scaling up/out approaches	
Users of TIMP	Cassava farmers, researchers, environmentalists, county governments, processors, input stockists, industrialists and policy makers
Approaches to be used in dissemination	Extension staff – ToTs, On-farm trials, demo plots, ASK shows, print media, brochures, posters, conferences and journals
Critical/essential factors for successful promotion	<ul style="list-style-type: none"> • Recruitment of cassava growing farmer groups • Registration of farmers by KEPHIS as seed multipliers

	<ul style="list-style-type: none"> • support for companies and SMEs to enter seed production; value addition and product diversification • funding by government to promote production and distribution of seed of selected cassava varieties • Formation of spray service providers (teams) to manage white at a fee
Partners/stakeholders for scaling up and their roles	<ul style="list-style-type: none"> • MoALF&I • KEPHIS • County Governments • NGO's working with farmers • CIP • FAO, • Private seed multipliers • Farmers • Processors
C: Current situation and future scaling up	
Counties where already promoted, if any	Busia and Makueni
Counties where TIMP will be up scaled	Busia, Kisumu, Makueni, Machakos and Lamu
Challenges in dissemination	<ul style="list-style-type: none"> • Inadequate supply of certified pest free cassava seeds. • Unwillingness of farmers to serve as seed multipliers due to uncertainty of returns • Challenges in registration as seed multipliers • In adequate knowledge on IPM strategies on insect pests infesting cassava and losses attributed to them • Poor linkages in cassava value chain • Costs associated with certified seed production • Cultural thoughts that cassava is a poor mans' food
Suggestions for addressing the challenges	<ul style="list-style-type: none"> • Registration of seed production farmers • Training of stakeholders in IPM options for white flies • Train consumers on nutritional value of cassava
	<input type="checkbox"/> Training of stakeholders on value addition and processing
Lessons learned in upscaling, if any	<ul style="list-style-type: none"> • Cassava is a high source of nutrition but highly under utilized • Sensitization is necessary for people to appreciate the use of cassava and its products as food and feed. • Inputs in cassava production are less and cheap • There is need to create linkages in cassava value chain to maximize production and optimize use

Social, environmental, policy and market conditions necessary for development and upscaling	Well-coordinated value chain and objective geared approach
D: Economic, gender, vulnerable and marginalized groups (VMGs) considerations	
Basic costs	-
Estimated returns	These are minor pests but attacks during the dry season can cause serious losses
Gender issues and concerns in development and dissemination	Gender sensitive
Gender issues and concerns in adoption and scaling up	Gender sensitive
Gender related opportunities	Gender sensitive
VMG issues and concerns in adoption and scaling up	All-inclusive affair for proper adoption and up-scaling
VMG related opportunities	More household income
E: Case studies/profiles of success stories	
Success stories from previous similar projects	-
Application guideline for users	Need for training on establishment of cassava crops, IPM applications, good agricultural practices, processing and marketing of products in a business oriented approach
F: Status of TIMP readiness (1ready for upscaling;, 2-requires validation; 3-requires further research)	Ready for upscaling
G: Contacts	KALRO -Kabete P.O. Box 14733 -00800 Email cd.narl@ kalro.org
Lead organization and scientists	KALRO Kabete (Joseph Mulwa, Miriam Otipa, Abel Too & Ruth Amata)
Partner organizations	All Counties, CBOs and NGOs

2.4.7 TIMP Name	Integrated Pest Management Package for white flies in cassava
Category (i.e. technology, innovation or management practice)	Management Practice
A: Description of the technology, innovation or management practice	
Problem addressed	• Low productivity due to white flies attacks

	<ul style="list-style-type: none"> • Household food insecurity • Low family incomes • Limited utilization of cassava which is a cheaper source of carbohydrates in human and animal feed production • Environmentally safe insect pest management practices that enhance cassava productivity • Inadequate cassava processed products
What is it? (TIMP description)	Cassava cuttings will be sourced from KALRO centres. Farmers will be trained on IPM package that prevents/reduces infestations of the cassava by white flies which suck plant sap causing wilting of the plant and vectoring of diseases hence low production. The technology involves pruning, application of non-chemical products as well as biological control options and value addition
Justification	Cassava is an important crop whose production is possible under low erratic rainfall conditions and infertile soils. Pests are a major challenge in its production since farmers are known to use cuttings from the previous season's crop, which most of the time have insect pests. A supply of insect pest free planting materials from KALRO to trained farmers every 3 years at a fee can greatly minimize losses from white
	flies. The farmers multiplying seed will be registered and licensed by KEPHIS. This coupled with capacity building of farmers on good agricultural practices on cassava production and entrepreneurship will lead to establishment of cassava as a high value crop in areas suitable for its production
B: Assessment of dissemination and scaling up/out approaches	
Users of TIMP	Cassava farmers, researchers, environmentalists, county governments, processors, input stockists, industrialists and policy makers
Approaches to be used in dissemination	Extension staff – ToTs, On-farm trials, demo plots, ASK shows, print media, brochures, posters, conferences and journals
Critical/essential factors for successful promotion	<ul style="list-style-type: none"> • Recruitment of cassava growing farmer groups • Registration of farmers by KEPHIS as seed multipliers • support for companies and SMEs to enter seed production; value addition and product diversification • funding by government to promote production and distribution of seed of selected cassava varieties • Formation of spray teams to manage white flies at a fee
Partners/stakeholders for scaling up and their roles	<ul style="list-style-type: none"> • MoALF&I • KEPHIS • County Governments

	<ul style="list-style-type: none"> • NGO's working with farmers • CIP • FAO, • Private seed multipliers • Farmers • Processors
C: Current situation and future scaling up	
Counties where already promoted, if any	Busia and Makueni
Counties where TIMP will be up scaled	Busia, Kisumu, Makueni, Machakos and Lamu
Challenges in dissemination	<ul style="list-style-type: none"> • Inadequate supply of certified pest free cassava seeds. • Unwillingness of farmers to serve as seed multipliers due to uncertainty of returns • Challenges in registration as seed multipliers • In adequate knowledge on IPM strategies on insect pests infesting cassava and losses attributed to them
	<ul style="list-style-type: none"> • Poor linkages in cassava value chain • Costs associated with certified seed production • Cultural thoughts that cassava is a poor mans' food
Suggestions for addressing the challenges	<ul style="list-style-type: none"> • Registration of seed production farmers • Training of stakeholders in IPM options for white flies • Train consumers on nutritional value of cassava • Training of stakeholders on value addition and processing
Lessons learned in upscaling, if any	<ul style="list-style-type: none"> • Cassava is a high source of nutrition but highly under utilized • Sensitization is necessary for people to appreciate the use of cassava and its products as food and feed. • Inputs in cassava production are less and cheap • There is need to create linkages in cassava value chain to maximize production and optimize use
Social, environmental, policy and market conditions necessary for development and upscaling	Well-coordinated value chain and objective geared approach
D: Economic, gender, vulnerable and marginalized groups (VMGs) considerations	
Basic costs	-
Estimated returns	Estimated 30-40% crop loss due to white flies infestation
Gender issues and concerns in development and dissemination	Gender sensitive
Gender issues and concerns in adoption and scaling up	Gender sensitive

Gender related opportunities	Gender sensitive
VMG issues and concerns in adoption and scaling up	All-inclusive affair for proper adoption and up-scaling
VMG related opportunities	More household income
E: Case studies/profiles of success stories	
Success stories from previous similar projects	–
Application guideline for users	Need for training on establishment of cassava crops, IPM applications, good agricultural practices, processing and marketing of products in a business oriented approach
F: Status of TIMP readiness (1-ready for upscaling;, 2-requires validation; 3-requires further research)	Ready for upscaling
G: Contacts	KALRO –Kabete P.O. Box 14733 -00800 Email cd.narl@ kalro.org
Lead organization and scientists	KALRO Kabete (Joseph Mulwa, Miriam Otipa, Abel Too & Ruth Amata)
Partner organizations	All Counties, CBOs and NGOs

GAPS IN DISEASES AND PESTS MANAGEMENT TECHNOLOGIES

1. There is no pest and disease surveillance. Therefore, there is need for regular surveillance for early warning system
2. There are a number of individual disease and pest management manuals for specific diseases. There is need to compile them in one pest and disease management manual for cassava??
3. There is an online pest and disease diagnostic kit for cassava. There is need to customize it to Kenyan condition and champion for its application by cassava farmers in the Lamu, Kisumu and Busia

2.5 Value addition

2.5.1 TIMP name	Cassava/wheat <i>chapati</i>
Category (i.e. technology, innovation or management practice)	Innovation
A: Description of the technology, innovation or management practice	
Problem addressed	Low uptake of cassava and low incomes from raw cassava

What is it? (TIMP description)	<input type="checkbox"/> Cassava/wheat <i>chapatti</i> made from composite flour of 25% cassava and 75% wheat flour.
Justification	Blending cassava with wheat flour will reduce the cost of <i>chapati</i> and diversify the use of cassava. This will create demand for increased cassava production for enhanced food security and income generation. It will also save on money used to import wheat
B: Assessment of dissemination and scaling up/out approaches	
Users of TIMP	<ul style="list-style-type: none"> • Small scale farmers • Small-scale processors • Restaurants
Approaches to be used in dissemination	<ul style="list-style-type: none"> • ToT • Farmer Participatory Evaluation exercises • Field days • Exhibitions • Agricultural shows • MoA/Extension officers • Partners • Mobile phone text initiative • Farmer to farmer • Mass media • Trainings • Promotional materials (posters/brochures/leaflets)
Critical/essential factors for successful promotion	<ul style="list-style-type: none"> • Existence of effective extension services to demonstrate the technology • Availability of high quality cassava flours • Availability of quality standards and markets e.g. the Crops (Composite and Blended Flours) Act, 2019 • Government policy encouraging consumption of indigenous foods
Partners/stakeholders for scaling up and their roles	<ul style="list-style-type: none"> • MoA: Train and exhibit on chapatti preparation • NGOs / CBOs: Train and exhibit • Cooperatives: Provide funding for women and youth groups • KEBS: Certification
C: Current situation and future scaling up	
Counties where already promoted, if any	<input type="checkbox"/> Coastal lowlands of Kenya
Counties where TIMP will be upscaled	<input type="checkbox"/> Busia, Kisumu and Lamu

Challenges in dissemination	<ul style="list-style-type: none"> Limited awareness of the product by farmers and consumers Limited processing skills at the household level Limited market Negative attitude/ perception towards the product
Suggestions for addressing the challenges	<ul style="list-style-type: none"> <input type="checkbox"/> Awareness creation about the product and its benefit to farmers, consumers and other value chain actors <input type="checkbox"/> Capacity building of farmers on how to prepare product Persistently train and demonstrate and exhibit the products <input type="checkbox"/> Exchange visits to bench mark
Lessons learned in upscaling, if any	<ul style="list-style-type: none"> <input type="checkbox"/> Partnership is important in technology dissemination <input type="checkbox"/>
Social, environmental, policy and market conditions necessary) for development and upscaling	<ul style="list-style-type: none"> Socially acceptable Favorable perception of the product Enabling policy and standards that encourage cassava blending
D: Economic, gender, vulnerable and marginalized groups (VMGs) considerations	
Basic costs	Not determined
Estimated returns	Not determined
Gender issues and concerns in development, dissemination adoption and scaling up	<ul style="list-style-type: none"> Women and youth are the key adopters, children, youth, men and women the key consumers.
	<ul style="list-style-type: none"> <input type="checkbox"/>
Gender related opportunities	<ul style="list-style-type: none"> Women and youth stand to benefit in production and trade in the product
VMG issues and concerns in development, dissemination, adoption and scaling up	<ul style="list-style-type: none"> Due to prejudice associated with their social status, VMGs are excluded from access to and benefits from improved technologies. Thus, affirmative action is required to promote the crop for the VMGs including value addition aspects. VMGs stand to gain from improved food security and enhanced incomes.
VMG related opportunities	<ul style="list-style-type: none"> Opportunity to produce, trade in, and consume locally produced nutritious food products
E: Case studies/profiles of success stories	

Success stories from previous similar projects	None
Application guidelines for users	Cassava chapatti production leaflet
F: Status of TIMP readiness (1-ready for upscaling; 2-requires validation; 3-requires further research)	Ready for upscaling
G: Contacts	C. K. Katama c/o Centre Director KALRO - Mtwapa P.O. Box 16-80109 Email kalro.mtwapa@kalro.org Telephone. 0710906600
Lead organization and scientists	C. K. Katama, R. W Muiga
Partner organizations	Ministry of Agriculture

2.5.2 TIMP name	Cassava/ Ugali
Category (i.e. technology, innovation or management practice)	Technology
A: Description of the technology, innovation or management practice	
Problem addressed	Limited use of cassava
What is it? (TIMP description)	Cassava/maize ugali made from composite flour of 25% cassava and 75% maize flour.
Justification	Blending cassava flour with maize flour at 25% for preparing ugali will diversify the use of cassava and reduce the overdependence on maize flour. This will create demand for increased cassava production for enhanced food security and income generation.
B: Assessment of dissemination and scaling up/out approaches	
Users of TIMP	<ul style="list-style-type: none"> • Small scale farmers • Small-scale processors • Restaurants

Approaches to be used in dissemination	<ul style="list-style-type: none"> • ToT • Farmer Participatory Evaluation • Field days • Exhibitions • Agricultural shows • Mobile phone text initiative • Farmer to farmer • Mass media • Trainings • Promotional materials (posters/brochures/leaflets)
Critical/essential factors for successful promotion	<ul style="list-style-type: none"> • Existence of effective extension services to demonstrate the technology • Availability of high quality cassava flours • Availability of quality standards and markets e.g. the Crops (Composite and Blended Flours) Act, 2019 • Government policy encouraging consumption of indigenous foods
Partners/stakeholders for scaling up and their roles	<ul style="list-style-type: none"> • MoALFI: Mobilize, train and exhibit the products • NGOs / CBOs: -Mobilize, train and exhibit the products • Cooperatives: Register and train youth/women groups and give loans • KEBS: certification
C: Current situation and future scaling up	
Counties where already promoted, if any	<ul style="list-style-type: none"> • Cassava growing counties in Kenya
Counties where TIMP will be upscaled	<ul style="list-style-type: none"> • Busia, Kisumu and Lamu
Challenges in dissemination	<ul style="list-style-type: none"> • Limited awareness of the product by farmers and consumers • Limited processing technologies at the household level – Known use is boiling and roasting

Suggestions for addressing the challenges	<ul style="list-style-type: none"> • Awareness creation about the product to farmers, consumers and other value chain actors • Capacity building of farmers on how to prepare the product • Information dissemination – postharvest handling, value addition, and nutritional attributes of the product • Scaling up participation of end-user in technology development, on-farm activities/adaptive research/extension activities • Promoting awareness to the Government on the savings from foreign exchange used to import wheat, as a result of blending and/or compositing with cassava flour which is locally available.
Lessons learned in upscaling, if any	<ul style="list-style-type: none"> • Partnership is important in technology dissemination • Making <i>ugali</i> from cassava blended flour has made the product cheaper and more available for sale to rural communities contributing to poverty reduction and increased income generation. • Diversified use of cassava reduces competition maize
Social, environmental, policy and market conditions necessary) for development and upscaling	<ul style="list-style-type: none"> • Favorable consumer’s perception on acceptability of the product • Supportive policy in place e.g. the Country is in the process of developing the Crops Act (Composite and Blended Flours) 2019. • Ability to meet KEBS quality standards
D: Economic, gender, vulnerable and marginalized groups (VMGs) considerations	
Basic costs	Not determined
Estimated returns	Not determined
Gender issues and concerns in development and dissemination	<ul style="list-style-type: none"> • Processing is mainly done by women, who have limited access and control of resources. Men, women and youth should participate in technology development and dissemination
Gender issues and concerns in adoption and scaling up	<ul style="list-style-type: none"> • Processing is mainly done by women, who have limited access and control of resources. Men, women and youth should participate in technology adoption and scaling up
Gender related opportunities	<ul style="list-style-type: none"> • Ugali from blended cassava flour is cheaper and thus more profitable and also ensure food security
VMG issues and concerns in development and dissemination	<ul style="list-style-type: none"> • None
VMG issues and concerns in adoption and scaling up	<ul style="list-style-type: none"> • None.

VMG related opportunities	<ul style="list-style-type: none"> • None
E: Case studies/profiles of success stories	
Success stories from previous similar projects	None
Application guidelines for users	Cassava ugali production leaflet
F: Status of TIMP readiness (1-ready for upscaling; 2-requires validation; 3-requires further research)	Ready for upscaling
G: Contacts	Christine Katama c/o Centre Director, KALRO - Mtwapa, P.O. Box 16-80109 Email kalro.mtwapa. kalro.org Telephone. 0710906600
Lead organization and scientists	C. K. Katama, R. W. Muiga,
Partner organizations	Ministry of Agriculture, Livestock, Fisheries and Irrigation, Farmers

2.5.2 TIMP name	Cassava/ maizeUgali
Category (i.e. technology, innovation or management practice)	Technology
A: Description of the technology, innovation or management practice	
Problem addressed	Limited use of cassava
What is it? (TIMP description)	Cassava/maize ugali made from composite flour of 25% cassava and 75% maize flour.
Justification	Blending cassava flour with maize flour at 25% for preparing ugali will diversify the use of cassava and reduce the overdependence on maize flour. This will create demand for increased cassava production for enhanced food security and income generation.
B: Assessment of dissemination and scaling up/out approaches	
Users of TIMP	<ul style="list-style-type: none"> • Small scale farmers • Small-scale processors • Restaurants
Approaches to be used in dissemination	<ul style="list-style-type: none"> • ToT • Farmer Participatory Evaluation • Field days

	<ul style="list-style-type: none"> • Exhibitions • Agricultural shows • Mobile phone text initiative • Farmer to farmer • Mass media • Trainings • Promotional materials (posters/brochures/leaflets)
Critical/essential factors for successful promotion	<ul style="list-style-type: none"> • Existence of effective extension services to demonstrate the technology • Availability of high quality cassava flours • Availability of quality standards and markets e.g. the Crops (Composite and Blended Flours) Act, 2019 • Government policy encouraging consumption of indigenous foods
Partners/stakeholders for scaling up and their roles	<ul style="list-style-type: none"> • MoALFI: Mobilize, train and exhibit the products • NGOs / CBOs: -Mobilize, train and exhibit the products • Cooperatives: Register and train youth/women groups and give loans • KEBS: certification
C: Current situation and future scaling up	
Counties where already promoted, if any	<input type="checkbox"/> Cassava growing counties in Kenya
Counties where TIMP will be upscaled	<input type="checkbox"/> Busia, Kisumu and Lamu
Challenges in dissemination	<ul style="list-style-type: none"> • Limited awareness of the product by farmers and consumers • Limited processing technologies at the household level – Known use is boiling and roasting
Suggestions for addressing the challenges	<ul style="list-style-type: none"> • Awareness creation about the product to farmers, consumers and other value chain actors • Capacity building of farmers on how to prepare the product • Information dissemination – postharvest handling, value addition, and nutritional attributes of the product • Scaling up participation of end-user in technology development, on-farm activities/adaptive research/extension activities • Promoting awareness to the Government on the savings from foreign exchange used to import wheat, as a result of • blending and/or compositing with cassava flour which is locally available.
Lessons learned in upscaling, if any	<ul style="list-style-type: none"> • Partnership is important in technology dissemination

	<ul style="list-style-type: none"> • Making <i>ugali</i> from cassava blended flour has made the product cheaper and more available for sale to rural communities contributing to poverty reduction and increased income generation. • Diversified use of cassava reduces competition maize
Social, environmental, policy and market conditions necessary) for development and upscaling	<ul style="list-style-type: none"> • Favorable consumer's perception on acceptability of the product • Supportive policy in place e.g. the Country is in the process of developing the Crops Act (Composite and Blended Flours) 2019. • Ability to meet KEBS quality standards
D: Economic, gender, vulnerable and marginalized groups (VMGs) considerations	
Basic costs	It reduces basic cost by 25%
Estimated returns	Gain by 25%
Gender issues and concerns in development and dissemination	<input type="checkbox"/> Processing is mainly done by women, but eaten by men, women and the youth. All should participate in technology demonstrations
Gender issues and concerns in adoption and scaling up	<input type="checkbox"/> Promote the product by communicating its importance in diet
Gender related opportunities	Ugali from blended cassava flour is cheaper and thus more profitable and also ensure food security
VMG issues and concerns in development and dissemination	<input type="checkbox"/> None
VMG issues and concerns in adoption and scaling up	<input type="checkbox"/> None.
VMG related opportunities	<input type="checkbox"/> None
E: Case studies/profiles of success stories	
Success stories from previous similar projects	None
Application guidelines for users	Cassava ugali production leaflet
F: Status of TIMP readiness (1-ready for upscaling;, 2-requires validation; 3-requires further research)	Ready for upscaling
G: Contacts	Christine Katama c/o Centre Director, KALRO - Mtwapa, P.O. Box 16-80109 Email kalro.mtwapa.kalro.org Telephone. 0710906600

Lead organization and scientists	C. K. Katama, R. W. Muiga,
Partner organizations	Ministry of Agriculture, Livestock, Fisheries and Irrigation, Farmers

2.5.3 TIMP name	Cassava/millet <i>Ugali</i>
Category (i.e. technology, innovation or management practice)	Technology
A: Description of the technology, innovation or management practice	
Problem addressed	Limited use of cassava
What is it? (TIMP description)	Cassava/millet ugali made from composite flour of 30% cassava and 70% millet flour.
Justification	Blending cassava flour with millet flour at 30% for preparing ugali will diversify the use of cassava and reduce the overdependence on maize flour. This will create demand for increased cassava production for enhanced food security and income generation.
B: Assessment of dissemination and scaling up/out approaches	
Users of TIMP	<ul style="list-style-type: none"> • Small scale farmers • Small-scale processors • Restaurants
Approaches to be used in dissemination	<ul style="list-style-type: none"> • ToT • Farmer Participatory Evaluation • Field days • Exhibitions • Agricultural shows • Mobile phone text initiative • Farmer to farmer • Mass media • Trainings • Promotional materials (posters/brochures/leaflets)
Critical/essential factors for successful promotion	<ul style="list-style-type: none"> • Existence of effective extension services to demonstrate the technology • Availability of high quality cassava flours • Availability of quality standards and markets e.g. the Crops (Composite and Blended Flours) Act, 2019 • Government policy encouraging consumption of indigenous foods

Partners/stakeholders for scaling up and their roles	<ul style="list-style-type: none"> • MoALFI: Mobilize, train and exhibit the products • NGOs / CBOs: -Mobilize, train and exhibit the products
	<ul style="list-style-type: none"> • Cooperatives: Register and train youth/women groups and give loans • KEBS: certification
C: Current situation and future scaling up	
Counties where already promoted, if any	<ul style="list-style-type: none"> • Cassava growing counties in Kenya
Counties where TIMP will be upscaled	<ul style="list-style-type: none"> • Busia, Kisumu and introduced and validated in Lamu
Challenges in dissemination	<ul style="list-style-type: none"> • Limited awareness of the product by farmers and consumers • Limited processing technologies at the household level • Unavailability of millet in Lamu
Suggestions for addressing the challenges	<ul style="list-style-type: none"> • Awareness creation about the product to farmers, consumers and other value chain actors • Capacity building of farmers on how to prepare the product • Information dissemination – postharvest handling, value addition, and nutritional attributes of the product • Scaling up participation of end-user in technology development, on-farm activities/adaptive research/extension activities • Promoting awareness to the Government on the savings from foreign exchange used to import maize as a result of blending and/or compositing with millet flour which is locally available in western Kenya and can be grown in drought prone areas.
Lessons learned in upscaling, if any	<ul style="list-style-type: none"> • Partnership is important in technology dissemination • Making <i>ugali</i> from cassava blended with millet flour has made the product cheaper and more available for sale to rural communities contributing to poverty reduction and increased income generation. • Diversified use of cassava reduces competition for maize
Social, environmental, policy and market conditions necessary) for development and upscaling	<ul style="list-style-type: none"> • Favorable consumer’s perception on acceptability of the product • Supportive policy in place e.g. the Country is in the process of developing the Crops Act (Composite and Blended Flours) 2019. • Ability to meet KEBS quality standards
D: Economic, gender, vulnerable and marginalized groups (VMGs) considerations	
Basic costs	Not determined
Estimated returns	Not determined

Gender issues and concerns in development and dissemination	<ul style="list-style-type: none"> Processing is mainly done by women, but eaten by men, women and the youth. All should participate in technology demonstrations
Gender issues and concerns in adoption and scaling up	<ul style="list-style-type: none"> Promote the product by communicating its importance in diet
Gender related opportunities	<ul style="list-style-type: none"> Ugali from blended cassava flour is cheaper and thus more profitable and also ensure food security
VMG issues and concerns in development and dissemination	<ul style="list-style-type: none"> None
VMG issues and concerns in adoption and scaling up	<ul style="list-style-type: none"> None.
VMG related opportunities	<ul style="list-style-type: none"> Enhanced food and Nutrition security
E: Case studies/profiles of success stories	
Success stories from previous similar projects	None
Application guidelines for users	Cassava/millet Ugali production leaflet
F: Status of TIMP readiness (1-ready for upscaling; 2-requires validation; 3-requires further research)	Ready for upscaling
G: Contacts	Rhoda Nungo c/o Centre Director, KALRO - Alupe, P.O. Box 278-Busia Kenya Email kalro.alupe@ kalro.org
Lead organization and scientists	Rhoda Nungo
Partner organizations	Ministry of Agriculture, Livestock, Fisheries and Irrigation, Farmers

2.5.4 TIMP name	Cassava pigeon-pea porridge
Category (i.e. technology, innovation or management practice)	Technology
A: Description of the technology, innovation or management practice	
Problem addressed	Limited use of cassava

What is it? (TIMP description)	Cassava pigeon-pea porridge made from composite flour of 80% cassava and 20% pigeon pea millet flour with two spoonful of millet flour.
Justification	Blending cassava flour with millet flour at 30% for preparing ugali will diversify the use of cassava and reduce the overdependence on maize flour. This will create demand for increased cassava production for enhanced food security and income generation.
B: Assessment of dissemination and scaling up/out approaches	
Users of TIMP	<ul style="list-style-type: none"> • Small scale farmers • Small-scale processors • Restaurants
Approaches to be used in dissemination	<ul style="list-style-type: none"> • ToT • Farmer Participatory Evaluation • Field days • Exhibitions • Agricultural shows • Mobile phone text initiative • Farmer to farmer • Mass media • Trainings • Promotional materials (posters/brochures/leaflets)
Critical/essential factors for successful promotion	<ul style="list-style-type: none"> • Existence of effective extension services to demonstrate the technology • Availability of high quality cassava flours • Availability of quality standards and markets e.g. the Crops (Composite and Blended Flours) Act, 2019 • Government policy encouraging consumption of indigenous foods
Partners/stakeholders for scaling up and their roles	<ul style="list-style-type: none"> • MoALFI: Mobilize, train and exhibit the products • NGOs / CBOs: -Mobilize, train and exhibit the products • Cooperatives: Register and train youth/women groups and give loans • KEBS: certification
C: Current situation and future scaling up	
Counties where already promoted, if any	<ul style="list-style-type: none"> • Cassava growing counties in western Kenya
Counties where TIMP will be upscaled	<ul style="list-style-type: none"> • Busia, Kisumu and introduced and validated in Lamu
Challenges in dissemination	<ul style="list-style-type: none"> • Limited awareness of the product by farmers and consumers • Limited processing technologies at the household level

Suggestions for addressing the challenges	<ul style="list-style-type: none"> • Awareness creation about the product to farmers, consumers and other value chain actors • Capacity building of farmers on how to prepare the product • Information dissemination – postharvest handling, value addition, and nutritional attributes of the product • Scaling up participation of end-user in technology development, on-farm activities/adaptive research/extension activities
Lessons learned in upscaling, if any	<ul style="list-style-type: none"> • Partnership is important in technology dissemination • Making <i>uji</i> from cassava blended with pigeon pea flour has made the product more nutritive hence enhancing food security and nutrition to rural communities as well as increasing income generation. • Diversified use of cassava reduces competition for maize
Social, environmental, policy and market conditions necessary) for development and upscaling	<ul style="list-style-type: none"> • Favorable consumer’s perception on acceptability of the product • Supportive policy in place e.g. the Country is in the process of developing the Crops Act (Composite and Blended Flours) 2019. • Ability to meet KEBS quality standards
D: Economic, gender, vulnerable and marginalized groups (VMGs) considerations	
Basic costs	Not determined
Estimated returns	Not determined
Gender issues and concerns in development and dissemination	<input type="checkbox"/> Processing is mainly done by women, but eaten by men, women and the youth. All should participate in technology demonstrations
Gender issues and concerns in adoption and scaling up	<input type="checkbox"/> Promote the product by communicating its importance in diet
Gender related opportunities	<i>Uji</i> from enriched cassava flour is more nutrition and food secure
VMG issues and concerns in development and dissemination	<input type="checkbox"/> None
VMG issues and concerns in adoption and scaling up	<input type="checkbox"/> None.
VMG related opportunities	<input type="checkbox"/> <i>Uji</i> from enriched cassava flour is more nutrition and food secure
E: Case studies/profiles of success stories	
Success stories from previous similar projects	None
Application guidelines for users	Cassava pigeon-pea porridge leaflet

F: Status of TIMP readiness (1-ready for upscaling; 2-requires validation; 3-requires further research)	Ready for upscaling
G: Contacts	Rhoda Nungo c/o Centre Director, KALRO - Alupe, P.O. Box 278-Busia Kenya Email kalro.alupe@ kalro.org
Lead organization and scientists	Rhoda Nungo
Partner organizations	Ministry of Agriculture, Livestock, Fisheries and Irrigation, Farmers

2.5.4 TIMP name	Gari (Witabix Mtaani)
Category (i.e. technology, innovation or management practice)	Technology
A: Description of the technology, innovation or management practice	
Problem addressed	Limited cassava products
What is it? (TIMP description)	Gari (Witabix Mtaani) is a ready to use food product made from pan roasted fermented, grated cassava mixed with soya bean flour.
Justification	Grating and fermenting grated cassava mixed with soya flour will diversify cassava use and improve nutritive value. This will create demand for increased cassava production and enhance food and nutrition security and income generation.
B: Assessment of dissemination and scaling up/out approaches	
Users of TIMP	<ul style="list-style-type: none"> • Small scale farmers • Small-scale processors • Restaurants
Approaches to be used in dissemination	<ul style="list-style-type: none"> • ToT • Farmer Participatory Evaluation • Field days • Exhibitions • Agricultural shows • Mobile phone text initiative • Farmer to farmer
	<ul style="list-style-type: none"> • Mass media • Trainings

	<ul style="list-style-type: none"> Promotional materials (posters/brochures/leaflets)
Critical/essential factors for successful promotion	<ul style="list-style-type: none"> Existence of effective extension services to demonstrate the technology Availability of high quality cassava flours Availability of quality standards and markets □ Favorable policy
Partners/stakeholders for scaling up and their roles	<ul style="list-style-type: none"> MoALFI: Mobilize, train and exhibit the products NGOs / CBOs: -Mobilize, train and exhibit the products Cooperatives: Register and train youth/women groups and give loans KEBS: certification Supermarkets to accept and stock product for sale
C: Current situation and future scaling up	
Counties where already promoted, if any	<ul style="list-style-type: none"> Cassava growing counties in western Kenya
Counties where TIMP will be upscaled	<ul style="list-style-type: none"> Busia, Kisumu and introduced and validated in Lamu
Challenges in dissemination	<ul style="list-style-type: none"> Limited awareness of the product by farmers and consumers Limited processing technologies at the household level Irregular supply of fresh tubers
Suggestions for addressing the challenges	<ul style="list-style-type: none"> Awareness creation about the product to farmers, consumers and other value chain actors Capacity building of farmers on how to prepare the product Information dissemination – postharvest handling, value addition, and nutritional attributes of the product Scaling up participation of end-user in technology development such as demonstrations and training activities Promote cassava production all year round
Lessons learned in upscaling, if any	<ul style="list-style-type: none"> Partnership is important in technology dissemination Diversified use of <i>Witabixmtaani</i> reduces competition for wheat
Social, environmental, policy and market conditions necessary) for development and upscaling	<ul style="list-style-type: none"> Favorable consumer’s perception on acceptability of the product Supportive policy in place Ability to meet KEBS quality standards
D: Economic, gender, vulnerable and marginalized groups (VMGs) considerations	
Basic costs	Not determined
Estimated returns	Not determined
Gender issues and concerns in development and dissemination	<ul style="list-style-type: none"> Processing is mainly done by women. Involving the youth and men will reduce drudgery for women.

Gender issues and concerns in adoption and scaling up	<ul style="list-style-type: none"> Promote the product by involving youth men and traders such as supper markets owners and food processors to enhance acceptability
Gender related opportunities	<ul style="list-style-type: none"> Potential for job creation for youth and enhanced food security
VMG issues and concerns in development and dissemination	<ul style="list-style-type: none"> None
VMG issues and concerns in adoption and scaling up	<ul style="list-style-type: none"> None.
VMG related opportunities	<ul style="list-style-type: none"> <i>None</i>
E: Case studies/profiles of success stories	
Success stories from previous similar projects	Product is very popular in Busia Town
Application guidelines for users	<i>Witabixmtaani</i> leaflet
F: Status of TIMP readiness (1-ready for upscaling; 2-requires validation; 3-requires further research)	Ready for upscaling
G: Contacts	Rhoda Nungo c/o Centre Director, KALRO - Alupe, P.O. Box 278-Busia Kenya Email kalro.alupe@ kalro.org
Lead organization and scientists	Rhoda Nungo
Partner organizations	Ministry of Agriculture, Livestock, Fisheries and Irrigation, Farmers

2.5.3 TIMP name	Cassava Crackies
Category (i.e. technology, innovation or management practice)	Technology
A: Description of the technology, innovation or management practice	
Problem addressed	Limited use of cassava
What is it? (TIMP description)	Cassava Crackies is a deep fried snack made from cassava dough passed through nodule machine
Justification	There a narrow range of cassava processed products. Processing cassava to crackies will diversify cassava use, improve nutritive

	value and create demand for increased cassava production. This will enhance food security, income generation and job creation
B: Assessment of dissemination and scaling up/out approaches	
Users of TIMP	<ul style="list-style-type: none"> • Small scale farmers • Small-scale processors • Restaurants
Approaches to be used in dissemination	<ul style="list-style-type: none"> • ToT • Farmer Participatory Evaluation • Field days • Exhibitions • Agricultural shows • Mobile phone text initiative • Farmer to farmer • Mass media • Trainings • Promotional materials (posters/brochures/leaflets)
Critical/essential factors for successful promotion	<ul style="list-style-type: none"> • Existence of effective extension services to demonstrate the technology • Regular availability fresh cassava roots • Availability of quality standards and assured markets <input type="checkbox"/> • Favorable policy
Partners/stakeholders for scaling up and their roles	<ul style="list-style-type: none"> • MoALFI: Mobilize, train and exhibit the products • NGOs / CBOs: -Mobilize, train and exhibit the products • Cooperatives: Register and train youth/women groups and give loans • KEBS: certification • Supermarkets to accept and stock product for sale
C: Current situation and future scaling up	
Counties where already promoted, if any	<ul style="list-style-type: none"> • Cassava growing counties in western Kenya
Counties where TIMP will be upscaled	<ul style="list-style-type: none"> • Busia, Kisumu and introduced and validated in Lamu
Challenges in dissemination	<ul style="list-style-type: none"> • Limited awareness of the product by farmers and consumers • Limited processing technologies at the household level • Irregular supply of fresh tubers
Suggestions for addressing the challenges	<ul style="list-style-type: none"> • Awareness creation about the product to farmers, consumers and other value chain actors • Capacity building of farmers on how to prepare the product • Information dissemination – postharvest handling, value addition, and nutritional attributes of the product

	<ul style="list-style-type: none"> • Scaling up participation of end-user in technology development such as demonstrations and training activities • Promote cassava production all year round
Lessons learned in upscaling, if any	<ul style="list-style-type: none"> • Partnership is important in technology dissemination • Regular supply of fresh roots important availing product all year round
Social, environmental, policy and market conditions necessary) for development and upscaling	<ul style="list-style-type: none"> • Favorable consumer's perception on acceptability of the product • Supportive policy in place • Ability to meet KEBS quality standards
D: Economic, gender, vulnerable and marginalized groups (VMGs) considerations	
Basic costs	Not determined
Estimated returns	Not determined
Gender issues and concerns in development and dissemination	<ul style="list-style-type: none"> • Processing is mainly done by women. Involving the youth and men will reduce drudgery for women.
Gender issues and concerns in adoption and scaling up	<ul style="list-style-type: none"> • Promote the product by involving youth men and traders such as supper markets owners and food processors to enhance acceptability and job creation for youth.
Gender related opportunities	<ul style="list-style-type: none"> • Potential for job creation for youth and enhanced food security
VMG issues and concerns in development and dissemination	<ul style="list-style-type: none"> • None
VMG issues and concerns in adoption and scaling up	<ul style="list-style-type: none"> • None.
VMG related opportunities	<ul style="list-style-type: none"> • <i>None</i>
E: Case studies/profiles of success stories	
Success stories from previous similar projects	Product is very popular in Busia Town
Application guidelines for users	<i>Cassava crackies</i> leaflet
F: Status of TIMP readiness (1-ready for upscaling;, 2-requires validation; 3-requires further research)	Ready for upscaling

G: Contacts	Rhoda Nungo c/o Centre Director, KALRO - Alupe, P.O. Box 278-Busia Kenya Email kalro.alupe@ kalro.org
Lead organization and scientists	Rhoda Nungo
Partner organizations	Ministry of Agriculture, Livestock, Fisheries and Irrigation, Farmers

2.5.3 TIMP name	High quality cassava flour
Category (i.e. technology, innovation or management practice)	Technology
A: Description of the technology, innovation or management practice	
Problem addressed	Cassava roots have a short shelf life resulting high losses.
What is it? (TIMP description)	High quality cassava flour is fine flour produced from wholesome freshly harvested and rapidly processed cassava roots. The flour is white or cream in color, odorless, bland or sweet in taste, and free from adulterants, insect infestation, sand, peel fragments, dust, and any other impurities.
Justification	Fresh cassava roots are highly perishable. Processing of cassava into high quality cassava flour will extend the shelf life and reduce content of the cyanogenic glucosides to safe limits. High quality and safer cassava flour will ensure consumer confidence in processed products. Cassava flour can be used to partially substitute other flours or starches in bakery products, pastes, noodles, processed or canned meats and diversify cassava use. This will enhance food security, income generation and job creation
B: Assessment of dissemination and scaling up/out approaches	
Users of TIMP	<ul style="list-style-type: none"> • Small scale farmers • Small-scale processors • Food processors

Approaches to be used in dissemination	<ul style="list-style-type: none"> • ToT • Field days • Exhibitions • Agricultural shows • Mobile phone text initiative • Farmer to farmer • Mass media • Trainings • Promotional materials (posters/brochures/leaflets)
Critical/essential factors for successful promotion	<ul style="list-style-type: none"> • Existence of effective extension services to demonstrate the technology • Regular availability fresh cassava roots • Availability of quality standards and assured markets • Favorable policy to promote use of blended flour
Partners/stakeholders for scaling up and their roles	<ul style="list-style-type: none"> • MoALFI: Mobilize, train and exhibit the products • NGOs / CBOs: -Mobilize, train and exhibit the products • Cooperatives: Register and train youth/women groups and give loans • KEBS: certification • Processors: To use high quality flour in blended products • Supermarkets to accept and stock product for sale
C: Current situation and future scaling up	
Counties where already promoted, if any	<ul style="list-style-type: none"> • Cassava growing counties in western Kenya
Counties where TIMP will be upscaled	<ul style="list-style-type: none"> • Busia, Kisumu and introduced and validated in Lamu
Challenges in dissemination	<ul style="list-style-type: none"> • Limited awareness of the product by farmers and consumers • Limited processing technologies at the household level • Irregular supply of fresh tubers • Limited use by processors
Suggestions for addressing the challenges	<ul style="list-style-type: none"> • Awareness creation about the product to farmers, consumers and other value chain actors • Capacity building of farmers on how to prepare the product • Information dissemination – postharvest handling, value addition, and nutritional attributes of the product • Scaling up participation of end-user in technology development such as demonstrations and training activities • Promote cassava production all year round • Create an enabling environment for blending

Lessons learned in upscaling, if any	<ul style="list-style-type: none"> It has created demand for cassava and increased farm gate price of fresh root
Social, environmental, policy and market conditions necessary) for development and upscaling	<ul style="list-style-type: none"> Favorable consumer's perception on acceptability of the product Supportive policy in place Ability to meet KEBS quality standards
D: Economic, gender, vulnerable and marginalized groups (VMGs) considerations	
Basic costs	Not determined
Estimated returns	Not determined
Gender issues and concerns in development and dissemination	<ul style="list-style-type: none"> Processing is mainly done by women and require processing machines. Women do have limited access to funds. Affirmative action is needed to finance acquisition of processing equipment to women and youth. This will reduce drudgery for women and job creation.
Gender issues and concerns in adoption and scaling up	<ul style="list-style-type: none"> Processing is mainly done by women and require processing machines. Women do have limited access to funds. Affirmative action is needed to finance acquisition of processing equipment to women and youth. This will reduce drudgery for women and job creation.
Gender related opportunities	<ul style="list-style-type: none"> Potential for job creation for youth and enhanced food security
VMG issues and concerns in development and dissemination	<ul style="list-style-type: none"> None
VMG issues and concerns in adoption and scaling up	<ul style="list-style-type: none"> None.
VMG related opportunities	<ul style="list-style-type: none"> <i>None</i>
E: Case studies/profiles of success stories	
Success stories from previous similar projects	Product is very popular in Busia Town
Application guidelines for users	<i>Cassava crackies</i> leaflet
F: Status of TIMP readiness (1-ready for upscaling; 2-requires validation; 3-requires further research)	Ready for upscaling

G: Contacts	Rhoda Nungo c/o Centre Director, KALRO - Alupe, P.O. Box 278-Busia Kenya Email kalro.alupe@ kalro.org
Lead organization and scientists	Rhoda Nungo
Partner organizations	Ministry of Agriculture, Livestock, Fisheries and Irrigation, Farmers

2.6 Marketing of cassava product

Timps 2.6.1	Identification of existing marketing strategies for cassava produce and products
Category (i.e. technology, innovation or management practice)	<input type="checkbox"/> Innovation
Problem addressed	Reduced uptake of cassava produce and product due to low or no marketing promotion
What is it? (TIMP description)	To identify the most appropriate strategies for use in up-scaling cassava produce and products
Justification	Promotion of cassava produce and its products will lead to increased uptake by the consumers, hence commercialize cassava production.
B: Assessment of dissemination and scaling up/out approaches	
Users of TIMPs	<input type="checkbox"/> Cassava farmers, researchers and extension officers
Approaches to be used in dissemination	<ul style="list-style-type: none"> • On-farm demonstrations • Training • Agricultural shows and fairs and exhibitions <input type="checkbox"/> Publications
Critical/essential factors for successful promotion	<ul style="list-style-type: none"> • Ability of the farmers to purchase and adoption of the technology by farmers • Availability of funds for fabrication of the technologies and conduct evaluation both on station and on farm demonstration
Partners/stakeholders for scaling up and their roles	<ul style="list-style-type: none"> • Researchers: test, evaluate, train and disseminate • Farmers: adopt • Extension service providers: Participate in TOT and train
C: Current situation and future scaling up	
Counties where already promoted, if any	<ul style="list-style-type: none"> • Makueni, Busia, Machakos
Counties where TIMP will be up scaled	<ul style="list-style-type: none"> • Lamu, Busia, Kisumu

Challenges dissemination	in	<ul style="list-style-type: none"> • Weak collaboration among stakeholders involved in agricultural mechanization • Lack of funds for demonstration in the counties •
Suggestions addressing the challenges	for	<ul style="list-style-type: none"> • Strengthen collaboration between the stakeholders involved • Provision of a reliable source for funding • Package the technology appropriately (manuals, fact sheet, brochure and mobile app)
Social, environmental, policy and market conditions necessary) for development and up scaling		<ul style="list-style-type: none"> • Willingness by stakeholders
D: Economic, gender, vulnerable and marginalized groups (VMGs) considerations		
Estimated returns		<ul style="list-style-type: none"> • Increased shelf life by chipping/grating and drying
Gender issues and concerns in development and dissemination		<ul style="list-style-type: none"> • Appropriate package and communication media
Gender issues and concerns in adoption and scaling up		<ul style="list-style-type: none"> • Training to be inclusive men and women in a language that they understand • Training schedule should be sensitive to gender roles and socio-cultural believes of the participants
Gender related opportunities		<ul style="list-style-type: none"> • Enhances food security, income and job creation
Application guidelines for users		<ul style="list-style-type: none"> • Use of training manuals brochures and leaflets
Lead organization and scientists		KALRO-AMRI – Katumani Mr. Charles Bett
Partner organizations		Farmers, Researchers, Extension providers eg Ministry of Agriculture both at national and county levels, NGOs CBOs, Processors, supermarkets

Timps 2.6.2	Scoping and profiling existing cassava markets commercial villages and innovation platforms for scaling-up
Category (i.e. technology, innovation or management practice)	Innovation

Problem addressed	Reduced uptake of cassava produce and product due to low or no marketing promotion
What is it?	Demand for cassava and its products is key to improved production to meet the supply. To increase demand there is need
(TIMP description)	to identify potential markets for cassava produce and products, which will lead to increased production to meet the demand.
Justification	Promotion of cassava produce and its products will lead to increased uptake by the consumers, hence commercialize cassava production.
B: Assessment of dissemination and scaling up/out approaches	
Users of TIMPs	<ul style="list-style-type: none"> • Cassava farmers, researchers and extension officers
Approaches to be used in dissemination	<ul style="list-style-type: none"> • On-farm demonstrations • Training • Agricultural shows and fairs and exhibitions • Publications
Critical/essential factors for successful promotion	<ul style="list-style-type: none"> • Ability of the farmers to purchase and adoption of the technology by farmers • Availability of funds for fabrication of the technologies and conduct evaluation both on station and on farm demonstration
Partners/stakeholders for scaling up and their roles	<ul style="list-style-type: none"> • Researchers: test, evaluate, train and disseminate • Farmers: adopt • Extension service providers: Participate in TOT and train
C: Current situation and future scaling up	
Counties where already promoted, if any	❖ Makeni, Busia, Machakos
Counties where will be up scaled	<ul style="list-style-type: none"> • Lamu, Busia, Kisumu
Challenges in dissemination	<ul style="list-style-type: none"> • Weak collaboration among stakeholders involved in agricultural mechanization • Lack of funds for demonstration in the counties
Suggestions for addressing the challenges	<ul style="list-style-type: none"> • Strengthen collaboration between the stakeholders involved • Provision of a reliable source for funding • Package the technology appropriately (manuals, fact sheet, brochure and mobile app)

Social, environmental, policy and market conditions necessary) for development and up scaling	<ul style="list-style-type: none"> • Willingness by stakeholders
D: Economic, gender, vulnerable and marginalized groups (VMGs) considerations	
Estimated returns	<ul style="list-style-type: none"> • Increased shelf life by chipping/grating and drying
Gender issues and concerns in development and dissemination	<ul style="list-style-type: none"> • Appropriate package and communication media
Gender issues and concerns in adoption and scaling up	<ul style="list-style-type: none"> • Training to be inclusive men and women in a language that they understand • Training schedule should be sensitive to gender roles and socio-cultural believes of the participants
Gender related opportunities	<ul style="list-style-type: none"> • Enhances food security, income and job creation
Application guidelines for users	<ul style="list-style-type: none"> • Use of training manuals brochures and leaflets
Lead organization and scientists	KALRO-AMRI – Katumani Mr. Charles Bett
Partner organizations	Farmers, Researchers, Extension providers eg Ministry of Agriculture both at national and county levels, NGOs CBOs, Processors, supermarkets

Timps 2.6.3	Prioritization of viable cassava products, Consumer tastes and preferences – consumer analysis
Category (i.e. technology, innovation or management practice)	Innovation
Problem addressed	Reduced uptake of cassava produce and product due to low or no marketing promotion

What is it? (TIMP description)	While there exists many cassava products not all of them maybe ready and viable for commercialization
Justification	Promotion of cassava produce and its products will lead to increased uptake by the consumers, hence commercialize cassava production.
B: Assessment of dissemination and scaling up/out approaches	
Users of TIMPs	<ul style="list-style-type: none"> • Cassava farmers, researchers and extension officers
Approaches to be used in dissemination	<ul style="list-style-type: none"> • On-farm demonstrations • Training
	<ul style="list-style-type: none"> • Agricultural shows and fairs and exhibitions • Publications
Critical/essential factors for successful promotion	<ul style="list-style-type: none"> • Ability of the farmers to purchase and adoption of the technology by farmers • Availability of funds for fabrication of the technologies and conduct evaluation both on station and on farm demonstration
Partners/stakeholders for scaling up and their roles	<ul style="list-style-type: none"> • Researchers: test, evaluate, train and disseminate • Farmers: adopt • Extension service providers: Participate in TOT and train
C: Current situation and future scaling up	
Counties where already promoted, if any	<ul style="list-style-type: none"> • Makueni, Busia, Machakos
Counties where TIMP will be up scaled	<ul style="list-style-type: none"> • Lamu, Busia, Kisumu
Challenges in dissemination	<ul style="list-style-type: none"> • Weak collaboration among stakeholders involved in agricultural mechanization • Lack of funds for demonstration in the counties
Suggestions for addressing the challenges	<ul style="list-style-type: none"> • Strengthen collaboration between the stakeholders involved • Provision of a reliable source for funding • Package the technology appropriately (manuals, fact sheet, brochure and mobile app)
Social, environmental, policy and market conditions necessary) for development and up scaling	<ul style="list-style-type: none"> • Willingness by stakeholders
D: Economic, gender, vulnerable and marginalized groups (VMGs) considerations	

Estimated returns	<ul style="list-style-type: none"> Increased shelf life by chipping/grating and drying
Gender issues and concerns in development and dissemination	<ul style="list-style-type: none"> Appropriate package and communication media
Gender issues and concerns in adoption and scaling up	<ul style="list-style-type: none"> Training to be inclusive men and women in a language that they understand Training schedule should be sensitive to gender roles and socio-cultural believes of the participants
Gender related opportunities	<ul style="list-style-type: none"> Enhances food security, income and job creation
Application guidelines for users	<ul style="list-style-type: none"> Use of training manuals brochures and leaflets
Lead organization and scientists	KALRO-AMRI – Katumani Mr. Charles Bett
Partner organizations	Farmers, Researchers, Extension providers eg Ministry of Agriculture both at national and county levels, NGOs CBOs, Processors, supermarkets

Timps 2.6.4	Business plans, Registration, branding and advertising
Category (i.e. technology, innovation or management practice)	Innovation
Problem addressed	Reduced uptake of cassava produce and product due to low or no marketing promotion
What is it? (TIMP description)	The consumer preferred identified products will form a basis for developing business plans by commercial villages. The commercial villages or innovation platforms will chose the products that have a comparative advantage and then register, brand and promote them.
Justification	Promotion of cassava produce and its products will lead to increased uptake by the consumers, hence commercialize cassava production.
B: Assessment of dissemination and scaling up/out approaches	
Users of TIMPs	❖ Cassava farmers, researchers and extension officers
Approaches to be used in dissemination	<ul style="list-style-type: none"> On-farm demonstrations Training Agricultural shows and fairs and exhibitions Publications

Critical/essential factors for successful promotion	<ul style="list-style-type: none"> • Ability of the farmers to purchase and adoption of the technology by farmers • Availability of funds for fabrication of the technologies and conduct evaluation both on station and on farm demonstration
Partners/stakeholders for scaling up and their roles	<ul style="list-style-type: none"> • Researchers: test, evaluate, train and disseminate • Farmers: adopt • Extension service providers: Participate in TOT and train
C: Current situation and future scaling up	
Counties where already promoted, if any	<ul style="list-style-type: none"> • Makueni, Busia, Machakos
Counties where TIMP will be up scaled	<ul style="list-style-type: none"> • Lamu, Busia, Kisumu
Challenges in dissemination	<ul style="list-style-type: none"> • Weak collaboration among stakeholders involved in agricultural mechanization • Lack of funds for demonstration in the counties
Suggestions for addressing the challenges	<ul style="list-style-type: none"> • Strengthen collaboration between the stakeholders involved • Provision of a reliable source for funding • Package the technology appropriately (manuals, fact sheet, brochure and mobile app)
Social, environmental, policy and market conditions necessary) for development and up scaling	<ul style="list-style-type: none"> • Willingness by stakeholders
D: Economic, gender, vulnerable and marginalized groups (VMGs) considerations	
Estimated returns	<ul style="list-style-type: none"> • Increased shelf life by chipping/grating and drying
Gender issues and concerns in development and dissemination	<ul style="list-style-type: none"> • Appropriate package and communication media
Gender issues and concerns in adoption and scaling up	<ul style="list-style-type: none"> • Training to be inclusive men and women in a language that they understand • Training schedule should be sensitive to gender roles and socio-cultural believes of the participants
Gender related opportunities	<ul style="list-style-type: none"> • Enhances food security, income and job creation
Application guidelines for users	<ul style="list-style-type: none"> • Use of training manuals brochures and leaflets

Lead organization and scientists	KALRO-AMRI – Katumani Mr. Charles Bett
Partner organizations	Farmers, Researchers, Extension providers e.g. Ministry of Agriculture both at national and county levels, NGOs CBOs, Processors, supermarkets

GAPS

Research cassava flour blending with other cereal flours for nutrition and value addition