



INVENTORY OF CLIMATE SMART AGRICULTURE INDIGENOUS POULTRY TECHNOLOGIES, INNOVATIONS & MANAGEMENT PRACTICES

Compiled by

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Kenya Agricultural and Livestock Research Organization

Under

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1.0 Definition of terms and summary tables of Climate Smart Agriculture Indigenous 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 Indigenous Chicken Value Chain

The inventory process resulted in a total of 13 TIMPs including 9 technologies, 0 innovations, and 4 management practices, distributed among the 8 sub-themes, as indicated in Table 1.

Table 1: Sub themes and TIMPs

Commodity/VC	Sub-Theme	Technologies	Innovations	Management Practices
Indigenous chicken	Breeds	1	0	0
Indigenous chicken	Housing	1	0	0
Indigenous chicken	Feeding equipment	1	0	0
Indigenous chicken	Hatching and brooding	1	0	2
Indigenous chicken	Feeds	2	0	0
Indigenous chicken	Management of diseases	2	0	1
	Manure management	0	0	1
Indigenous chicken	Mobile phone application for dissemination of indigenous chicken technologies	1	0	0
Overall Total		9	0	4

1.3 Summary of Status of TIMPs in Indigenous Poultry Value Chain

The inventory process resulted in a total of 10 TIMPs that are ready for upscaling, 2 TIMPs that require validation and 1 TIMP 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	Sub-Theme	Ready for upscaling	Require validation	Further Research
Indigenous chicken	Breeds	1	0	0
Indigenous chicken	Housing	0	1	0
Indigenous chicken	Feeding equipment	1	0	0
Indigenous chicken	Hatching and brooding	2	1	0

Indigenous chicken	Feeds	1	0	1
Indigenous chicken	Disease management	3	0	0
Indigenous chicken	Manure management	1	0	0
Indigenous chicken	Information dissemination technology	1	0	0
Overall Total		10	2	1

Table3: Inventory of Indigenous Chicken TIMPs by Category and Status

TIMPs Sub-Theme	TIMPs Title	TIMPs Category	Status
2.1 Breeds	2.1.1 KARI Improved indigenous Chicken (KC)	Technology	Ready for upscaling
2.2 Housing	2.2.1 Semi range housing for Indigenous chicken	Technology	Requires validation
2.3 Feeding equipment	2.3.1 Naivasha long feed trough	Technology	Ready for upscaling
2.4 Hatching and brooding	2.4.1 Improved hatching management practices	Management	Ready for upscaling
	2.4.2 Selection and grading of table eggs	Management	Ready for upscaling
	2.4.3 Hay box brooder	Technology	Requires validation
2.5 Feeds	2.5.1 Black soldier flies (BSF): alternative protein source	Technology	Ready for upscaling
	2.5.2 Evaluate new feed additive technologies	Technology	Need for adaptive research
2.6 Disease management	2.6.1 Thermostable New Castle Disease vaccines	Technology	Ready for upscaling
	2.6.2 Gumboro disease control in chicken for increased food and nutrition security in Kenya	Technology	Ready for upscaling
	2.6.3 Improved biosecurity practices for food and feed safety	Management	Ready for upscaling
2.7 Manure management	2.7.1 Integrated poultry manure management for crop and dairy production	Management	Ready for upscaling
2.8 Information dissemination technology	2.8.1 KALRO-Indigenous chicken Mobile application	Technology	Ready for upscaling

2. Detailed Indigenous Chicken (meat and eggs) Value chain TIMPS

2.1 Breeds

2.1.1 TIMP name	KARI Improved Indigenous Chicken (KC)
Category (i.e. technology, innovation or management practice)	Technology
A: Description	
Problem to be addressed	Low productivity of indigenous chicken (meat and egg) value chain
What is it? (TIMP description)	<p>A dual-purpose bird with improved productivity</p> <ol style="list-style-type: none"> 1. High growth rate and age at first egg - 4.5 months 2. Age at 2 kg for cocks - 4 months 3. Produce 200-230 eggs per bird 4. Egg size 50-60 g 5. Can scavenge for part of its feed 6. Less than 10% will go broody <p>Requires improved management</p>
Justification	Demand for Indigenous Chicken (IC) products is ever increasing due to urbanization, increasing human population, decreasing agricultural land and consumer preference. Despite the increasing demand, production output from the IC value chain is still low, hence limiting their contribution to development. This technology will increase agricultural productivity and incomes of target groups, build resilience to climate change and reduce greenhouse emissions
B: Assessment of dissemination and scaling up/out approaches	
Users of TIMP	Farmers, women, youth and VMGs
Approaches to be used in dissemination	Mass media print media (brochures, posters and pamphlets), social media, public functions, Agricultural shows and exhibitions, farmer field schools as well as farmer to farmer extension and Indigenous chicken management trainings.
Critical/essential factors for successful promotion	<ul style="list-style-type: none"> • Favorable market for IC is sustained • Develop a PPP model to improve chick availability
Partners/stakeholders for scaling up and their roles	<ul style="list-style-type: none"> • KALRO - source of technology • Multipliers/hatcheries to take up the germplasm for multiplication and avail to farmers • Engagement of County governments to take up the technology and avail it to farmers as a tool for poverty alleviation
C: Current situation and future scaling up	
Counties where already promoted	Kiambu, Kakamega, Machakos, Makueni, Murang'a,
Counties where TIMPS will be disseminated	Machakos, Makueni, Taita, Taveta, Kericho, Bomet, Isiolo, Busia, Baringo, Tharaka Nithi, Siaya, Nyandarua, Elgeyo

	Marakwet, Kakamega, Kisumu, Laikipia, Nyeri, Tana River, Uasin Gishu, Wajir, West Pokot
Challenges in dissemination	<ul style="list-style-type: none"> • Inadequate outreach options • Irregular supply of day-old chicks • Counterfeit multipliers and suppliers of KC • Limited IC management skills • Lack of coordination among key interest groups • Poor disease reporting due to weak public-private sector linkages • Limited knowledge sharing platforms • Limited availability of tailor-made affordable credit facilities • Poor infrastructure for product distribution • Poor quality assurance and controls
Suggestions for addressing the challenges in upscaling if any	<ul style="list-style-type: none"> • Allocation of more funds for continued research and dissemination of this technology to enhance uptake. • Improve KALRO capacity to produce grandparent stock • PPP for production of chicks in different regions • Enhanced collaboration with the County Governments would enhance uptake of the technology • There is need for a quality assurance and control protocol
Lessons learned in upscaling if any	<ul style="list-style-type: none"> • There is need to sensitize farmers in IC management skills • Initiate PPP collaboration to eliminate counterfeit suppliers.
Social, environmental, policy and market conditions necessary for development and upscaling	<ul style="list-style-type: none"> • Reliable markets channels and stable prices • Need to encourage value addition. • Increase production scale • Need for regulation on electricity cost, price and quality of feeds • Use of alternative sources of fuel to replace charcoal for brooding of chicks
D: Economic, gender, vulnerable and marginalized groups (VMGs) considerations	
Basic costs	<p>KES 100 per day old chick KES 250 per month old chick KES 1000 per tray of 30 fertile eggs KES 1200 per breeding cock</p>
Estimated returns	Depended on production system and geographical location of the enterprise
Gender issues and concerns in development, dissemination adoption and scaling up	This is a technology that can be easily adopted by women and youth
Gender related opportunities	The enterprise acted as a source of income and livelihood for women and youth
VMG issues and concerns in development, dissemination adoption and scaling up	None

VMG related opportunities	The enterprise acted as a source of income and livelihood
E: Case studies/profiles of success stories	
Success stories	Farmers who adopted this technology reported sustained source of income and livelihood
Application guidelines for users	Proper housing, feeds and feeding, strict biosecurity procedures for disease prevention, adherence to vaccination guidelines and record keeping
F: Status of TIMPS readiness (1. Ready for upscaling; 2: Requires validation; 3. Requires further Research)	1 3. Further research is required to enable sexing at day old and the development of an egg and meat line
G: Contacts	
Contacts	Director Non-Ruminant Research Institute (KALRO)-P.O. Box 25-20117, Naivasha directornnri@kalro.org ; kalropoultry@gmail.com
Lead organization and scientists	(KALRO); Dr. Ann Wachira, David M. Mwangi, Evans Ilatsia, Paul Leparmarai, Peter Alaru, Ludovicus. Okitoi, Tobias K'Oloo, Sophie Miyumo and Ochieng Ouko
Partner organizations and their roles	<ul style="list-style-type: none"> • KALRO – source of improved IC • Farmer organizations – mobile farmers and follow up on implementations • County Governments – mobilize farmers and provide extension service for follow ups.

Gaps

1. Development of descriptors and stabilize the bird inspection and registration of IC breed lines.
2. Determination of the protocol for sexing of day-old chicks using morphological markers
3. Improve KALRO capacity to carry out research (infrastructure development)
4. Development and dissemination of new climate-smart IC breed lines among smallholder and disadvantaged actors in the IC subsector (1 dual purpose line is ready for upscaling but two line (egg and meat) will be developed)
5. Production and multiplication of parental stock for the developed IC breed lines
6. Identification of disease and parasite parameters to enhance survival
7. Conservation of selected IC ecotype to form a sustainable diverse gene pool for introgression into developed IC breed lines
8. Evaluate consumer preference based on both meat and egg quality attributes
9. Need to validate housing in different environments
10. Black soldier fly based feed ready for upscaling, but more research required on two other insect-based feeds

2.2 Housing

2.2.1 TIMP name	Semi range housing for indigenous chicken
Category (i.e. technology, innovation or management practice)	Technology
A: Description of the technology	

Problem addressed	Inadequate knowledge on chicken housing
What is it? (TIMP description)	A chicken house with the following specifications: <ol style="list-style-type: none"> 1. Stocking density: 100 layers 2. Iron sheets: 5 m x 3 m x 30 G 3. Floor-made of wire mesh 4. Sides made of chicken wire 5. House floor raised
Justification	Appropriate housing design, construction and management is key in chicken production. This is also critical in the advent of commercialization in the IC value chain
B: Assessment of dissemination and scaling up/out approaches	
Users of TIMP	Smallholder farmers
Approaches used in dissemination	Social media, public functions, agricultural shows and exhibitions, farmer field schools as well as farmer to farmer extension and Indigenous chicken management trainings
Critical/essential factors for successful promotion	<ul style="list-style-type: none"> • Availability of raw materials for construction • Organize effective training programs for farmers and service providers. • Collaboration with County Governments that selected IC as their value chain
Partners/stakeholders for scaling up and their roles	<ul style="list-style-type: none"> • KALRO source of technology • Kenyatta University – part of the core training team • Local artisans – will carry out the construction of the poultry house • Farmer organizations – mobile farmers and follow up on implementations • County Governments – mobilize farmers and provide extension service for follow ups.
C: Current situation and future scaling up	
Counties where already promoted	
Counties where TIMPS will be disseminated	Machakos, Makueni, Taita, Taveta, Kericho, Bomet, Isiolo, Busia, Baringo, Tharaka Nithi, Siaya, Nyandarua, Elgeyo Marakwet, Kakamega, Kisumu, Laikipia, Nyeri, Tana River, Uasin Gishu, Wajir, West Pokot
Recommendations for addressing the challenges	<ul style="list-style-type: none"> • Enhance community policing • Increased awareness on importance of proper chicken housing. • Need for regulation on cost of construction materials • Advocacy on farmer training before initiation of construction of chicken house.
Lessons learned	There is need for sensitization on importance of the technology
Social, environmental, policy and market conditions necessary	Attractive dissemination methods that are in line with varied culture among chicken farming communities.
D: Economic, gender, vulnerable and marginalized groups (VMGs) considerations	

Basic costs	The cost of construction varies depending on geographical location
Estimated returns	Not computed
Gender issues and concerns in development, dissemination adoption and scaling up	Easily disseminated to both gender
Gender related opportunities	Youth and women can establish proper chicken houses for increased production of IC
VMG issues and concerns in development, dissemination adoption and scaling up	This is a simple technology that can be carried out by vulnerable and marginalized groups
VMG related opportunities	VMG can establish black soldier fly production units and sell to other chicken farmers or feed manufacturers
E: Case studies/profiles of success stories	
Success stories	Not documented
Application guidelines for users	Use of locally available materials in construction of chicken house without compromising on environment and health of chicken.
F: Status of TIMPS readiness (1. Ready for upscaling; 2: Requires validation; 3. Requires further Research)	1. 2 Requires the validation in different agro-ecologies
G: Contacts	
Contacts	Director Non-Ruminant Research Institute (KALRO)-P.O. Box 25-20117, Naivasha directornnri@kalro.org ; kalropoultry@gmail.com
Lead organization and scientists	(KALRO); Ann Wachira, David M. Mwangi, Prof. Lucy Kabuage, Evans Ilatsia, Paul Leparmarai, Peter Alaru, Ludovicus. Okitoi, Tobias K'Oloo, Sophie Miyumo and Ochieng Ouko
Partner organizations	Kenyatta University

Gaps

1. Need to adapt the house to fit different agro-ecologies including parasite control
2. Need to ascertain availability of construction materials within different locality and estimate cost of construction
3. Establishment of a demonstration unit for affordable chicken house.
4. Need to organize and implement dissemination programs that is accessible to VGMs.

2.3 Feeding equipment

2.3.1 TIMP name	Naivasha Long Feed Trough
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Category(i.e. technology, innovation or management practice)	Technology
A: Description of the technology, innovation or management practice	
Problem addressed	Feed wastage and losses among poultry farmers
What is it? (TIMP description)	Feeder made of galvanized flat iron sheets (8" x 4") and timber Smoothened round stick handle that spins to discourage bird parching (31 ft long) Improved feeder which minimizes chicken feed wastage
Justification	Feed wastage and contamination are major challenges faced by chicken farmers that lead to increased cost of production. It is estimated that up to 20% of feeds is wasted during feeding. The feed trough is easy to fabricate and can be used for a longer duration.
B: Assessment of dissemination and scaling up/out approaches	
Users of TIMP	Small-scale, medium and large scale chicken farmers
Approaches to be used in dissemination	Demonstrations, Agricultural shows and exhibitions, farmer field schools as well as farmer to farmer extension
Critical/essential factors for successful promotion	<ul style="list-style-type: none"> • Favourable Market for Indigenous chicken is sustained • Develop a PPP model to enhance availability feeders to the farmers
Partners/stakeholders for scaling up and their roles	<ul style="list-style-type: none"> • KALRO – source of technology • County governments to mobilize farmers and follow up extension services • Poultry farmer groups – farmer mobilization and stocking of the feeder Local artisans who will be trained on the production of the Naivasha Long feeder
C: Current situation and future scaling up	
Counties where already promoted	Nakuru county (Naivasha sub-county), Laikipia
Counties where TIMPS will be disseminated	Machakos, Makueni, Taita, Taveta, Kericho, Bomet, Isiolo, Busia, Baringo, Tharaka Nithi, Siaya, Nyandarua, Elgeyo Marakwet, Kakamega, Kisumu, Laikipia, Nyeri, Tana River, Uasin Gishu, Wajir, West Pokot
Challenges in Dissemination	Small number of trained artisans who can make the Naivasha long feeder
Suggestions for addressing the challenges	Train artisans in all counties where the technology will be disseminated
Lessons learned in upscaling if any	
Social, environmental, policy and market conditions necessary	Reliable markets for indigenous chicken products and stable prices Harmonize trade regulations between the County Governments to enable easy flow of the chicken products
D: Economic, gender, vulnerable and marginalized groups (VMGs) considerations	
Basic costs	KES 800 per Naivasha long feeder

Estimated returns	Not documented
Gender issues and concerns in development, dissemination adoption and scaling up	This is a technology that can be easily adopted by women and youth
Gender related opportunities	Youth can establish workshops to fabricate Naivasha long feed trough and sell to chicken farmers
VMG issues and concerns in development, dissemination adoption and scaling up in development and dissemination	This is a technology that can easily be carried out by vulnerable and marginalized groups
VMG related opportunities	The VMG can establish a workshop to manufacture feed troughs and sell to other farmers
E: Case studies/profiles of success stories	
Success stories from previous similar projects	Farmers who adopted this technology have reported substantial reduction in feed losses
Application guidelines for users	Put the feeder in upright position Always fill the feeder to $\frac{2}{3}$ full The round stick handle should spins to discourage bird parching.
F: Status of TIMPS readiness (1. Ready for upscaling; 2: Requires validation; 3. Requires further Research)	1
G: Contacts	
Contacts	Director Non-Ruminant Research Institute (KALRO)-P.O. Box 25-20117, Naivasha directornri@kalro.org ; kalropoultry@gmail.com
Lead organization and scientists	KALRO; Rahab Muinga, Miheso, Ann Wachira, David M. Mwangi, Peter Alaru, Tobias K'Oloo, Sophie Miyumo, Ochieng Ouko
Partner organizations	

Gaps

1. Dissemination of the technology to the rural farmers.
2. Design and produce a feed saving feeder for chicks
3. Train artisans on its fabrication

2.4 Hatching and brooding

2.4.1 TIMP name	Improved hatching management practices
Category (i.e. technology, innovation or management practice)	Management practices
A: Description of the technology, innovation or management practice	

Problem addressed	Poor hatchability rate of indigenous chicken eggs
What is it? (TIMP description)	<ul style="list-style-type: none"> • Selection and storage of hatching eggs • Candling to determine if the eggs are fertile and should be at 7 and 18 days (early and late embryo development stages and detection of meat spots). Use the meat spot to cull birds that produce this type of eggs as it is passed on to her progeny.
Justification	<p>Low hatching rates and identification of birds that should be culled from the flock.</p> <p>Proper feeding and health of laying hens to enhance quality of hatching eggs and higher hatchability</p>
B: Assessment of dissemination and scaling up/out approaches	
Users of TIMP	Small, medium and large-scale poultry farmers using their own eggs for hatching.
Approaches to be used in dissemination	Hands-on training, demonstrations agricultural shows and exhibitions, farmer field schools as well as farmer to farmer extension, social media
Critical/essential factors for successful promotion	<ul style="list-style-type: none"> • Hands on training during demonstrations
Partners/stakeholders for scaling up and their roles	<ul style="list-style-type: none"> • KU part of the core training team • County Governments to mobilize the farmers and provide follow up extension services
C: Current situation and future scaling up	
Counties where already promoted if any	A 3-day training at KALRO Naivasha but this has only reached only about 30 farmers per year
Counties where TIMPS will be upscaled	Machakos, Makueni, Taita, Taveta, Kericho, Bomet, Isiolo, Busia, Baringo, Tharaka Nithi, Siaya, Nyandarua, Elgeyo Marakwet, Kakamega, Kisumu, Laikipia, Nyeri, Tana River, Uasin Gishu, Wajir, West Pokot
Challenges in dissemination	
Suggestions for addressing the challenges	
Lessons learned in upscaling if any	Make sure hands demonstration are carried out in the training
Social, environmental, policy and market conditions necessary	
D: Economic, gender, vulnerable and marginalized groups (VMGs) considerations	
Basic costs	Cheap equipment like candles and torches can be used
Estimated returns	
Gender issues and concerns in development, dissemination adoption and scaling up	Easily disseminated to both gender

Gender related opportunities	Better hatching rates will improve the income of women and youth and improve household nutrition
VMG issues and concerns in development, dissemination adoption and scaling up	It can be easily carried out by VMGs and therefore need for promotion
VMG related opportunities	VMG can use the practices easily without worrying of cost implications.
E: Case studies/profiles of success stories	
Success stories	Not yet documented
Application guidelines for users	
F: Status of TIMPS readiness (1. Ready for upscaling; 2: Requires validation; 3. Requires further Research)	1
G: Contacts	
Contacts	Director Non-Ruminant Research Institute (KALRO)-P.O. Box 25-20117, Naivasha directornri@kalro.org ; kalropoultry@gmail.com
Lead organization and scientists	KALRO/KU; Prof. Kabuage, David M. Mwangi, Evans Ilatsia, Paul Leparmarai, Peter Alaru, Ochieng Ouko, Tobias K'Oloo
Partner organizations	<ul style="list-style-type: none"> Kenyatta University

Gaps

Need to disseminate the information

Determine the weight of eggs and what should be incubated

2.4.2 TIMP name	Selection and grading of table eggs
Category (i.e. technology, innovation or management practice)	Management practice
A: Description of the technology, innovation or management practice	
Problem addressed	Different products for the market and therefore get better prices for the farmers
What is it? (TIMP description)	Select and grade eggs based external and interior factors like weight, cracks, meat and blood spots
Justification	Differentiation of poultry products
B: Assessment of dissemination and scaling up/out approaches	
Users of TIMP	Small, medium and large-scale poultry farmers using their own eggs for hatching.
Approaches to be used in dissemination	Hands-on trainings, demonstrations, agricultural shows and exhibitions, farmer field schools as well as farmer to farmer extension, social media

Critical/essential factors for successful promotion	<ul style="list-style-type: none"> Hands on training during demonstrations more effective
Partners/stakeholders for scaling up and their roles	<ul style="list-style-type: none"> KALRO – source of technology KU part of the core trainers County Governments to mobile farmers and provide follow up extension services
C: Current situation and future scaling up	
Counties where already promoted	A 3-day training at KALRO Naivasha but this has only reached only about 30 farmers per year
Counties where TIMPS will be promoted	Machakos, Makueni, Taita, Taveta, Kericho, Bomet, Isiolo, Busia, Baringo, Tharaka Nithi, Siaya, Nyandarua, Elgeyo Marakwet, Kakamega, Kisumu, Laikipia, Nyeri, Tana River, Uasin Gishu, Wajir, West Pokot
Challenges in dissemination	
Suggestions for addressing the challenges	
Lessons learned in upscaling	Make sure hands demonstration are carried out in the training
Social, environmental, policy and market conditions necessary	Poultry demand continues growing
D: Economic, gender, vulnerable and marginalized groups (VMGs) considerations	
Basic costs	Cheap equipment like candles and torches can be used
Estimated returns	
Gender issues and concerns in development, dissemination adoption and scaling up	Easily disseminated to both gender
Gender related opportunities	Better hatching rates will improve the income of women and youth and improve household nutrition
VMG issues and concerns in development, dissemination adoption and scaling up	It can be easily carried out by VMGs and therefore need for promotion
VMG related opportunities	VMG can use the practices easily without worrying of cost implications.
E: Case studies/profiles of success stories	
Success stories	Not yet documented
Application guidelines for users	
F: Status of TIMPS readiness (1. Ready for upscaling; 2: Requires validation; 3. Requires further Research)	1
G: Contacts	

Contacts	Director Non-Ruminant Research Institute (KALRO)-P.O. Box 25-20117, Naivasha directornri@kalro.org ; kalropoultry@gmail.com
Lead organization and scientists	KALRO; Ann Wachira, David M. Mwangi, Prof. Kabuage, Evans Ilatsia, Paul Leparmarai, Peter Alaru, Ochieng Ouko, Tobias K'Oloo and Sophie Miyumo
Partner organizations	<ul style="list-style-type: none"> Kenyatta University

Gaps

Need to disseminate the information

2.4.3 TIMP name	Hay Box Brooder
Category (i.e. technology, innovation or management practice)	Technology
A: Description of the technology, innovation or management practice	
Problem addressed	Mortality related losses during brooding stage
What is it? (TIMP description)	Hay box brooder is a brooding technology that can be used by small scale farmers Simple fabrication of timber, hay and wire mesh. Available in different dimensions based on number of chicks
Justification	Limitation of power in rural areas present a challenge in chick brooding. Smallholder farmers incur great losses of chicks due to predation. The hay box brooder provides shelter for chicks against predators during the day and warmth during the night
B: Assessment of dissemination and scaling up/out approaches	
Users of TIMP	Small-scale chicken farmers
Approaches to be used in dissemination	Demonstrations, Agricultural shows and exhibitions, farmer field schools and farmer to farmer extension
Critical/essential factors for successful promotion	<ul style="list-style-type: none"> Favourable Market for Indigenous chicken is sustained Develop a PPP model to enhance availability of hay box brooders to farmers
Partners/stakeholders for scaling up and their roles	<ul style="list-style-type: none"> KALRO- source of technology Artisans to make the hay box brooders and avail to farmers Engagement of County governments extension staff to disseminate the technology to farmers
C: Current situation and future scaling up	
Counties where already promoted	Machakos, Kakamega, Nakuru
Counties where TIMPS will be disseminated	Machakos, Makueni, Taita, Taveta, Kericho, Bomet, Isiolo, Busia, Baringo, Tharaka Nithi, Siaya, Nyandarua, Elgeyo Marakwet, Kakamega, Kisumu, Laikipia, Nyeri, Tana River, Uasin Gishu, Wajir, West Pokot
Challenges in dissemination	Not many artisans trained on how to make the brooders

Recommendations for addressing the challenges	<ul style="list-style-type: none"> • Train local artisans in all counties where the technology will be disseminated • Use PPP to avail the brooders
Lessons learned in upscaling if any	The need to train people in the local community
Social, environmental, policy and market conditions necessary	Reliable markets for indigenous chicken products and stable prices
D: Economic, gender, vulnerable and marginalized groups (VMGs) considerations	
Basic costs	Based on the size of hay box brooder
Estimated returns	Not documented
Gender issues and concerns in development, dissemination adoption and scaling up	This is a low-cost technology that can be easily adopted by women and youth
Gender related opportunities	Youth and women can establish a workshop to make hay-box brooders and sell to other chicken farmers
VMG issues and concerns in development, dissemination adoption and scaling up	This is a technology that can be easily carried out by Vulnerable and marginalized groups
VMG related opportunities	The VMG can establish a workshop to manufacture hay-box brooders and sell to other farmers
E: Case studies/profiles of success stories	
Success stories	Farmers who adopted this technology have reported substantial reduction of chick losses during brooding
Application guidelines for users	Place the brooder with the chicks in the open during the day and relocate them indoors at night
F: Status of TIMPS readiness (1. Ready for upscaling; 2: Requires validation; 3. Requires further Research)	1
G: Contacts	
Contacts	Director Non-Ruminant Research Institute (KALRO)-P.O. Box 25-20117, Naivasha directornnri@kalro.org ; kalropoultry@gmail.com
Lead organization and scientists	KALRO; Ann Wachira, L. Okitoi, David M. Mwangi, Peter Alaru, Tobias K'Oloo, Sophie Miyumo, Ochieng Ouko
Partner organizations	

Gaps

1. Need for sensitization / awareness creation on how to use hay-box brooders
2. Need for creation of partnerships with carpenters to manufacture the hey box brooders
3. Partnership with County governments to promote and enhance the uptake of the technology
4. Comparative study on box brooders using different designs and insulation materials

2.5 Feeds

2.5.1 TIMP name	Black soldier fly larvae (BSF): alternative protein source
Category (i.e. technology, innovation or management practice)	Technology
A: Description of the technology, innovation or management practice	
Problem addressed	High cost of protein in IC feeds
What is it? (TIMP description)	Black soldier flies are environment friendly insects whose larvae is used as an alternative feed and source of high quality protein for chicken. 100 g of eggs can produce 2 kg of BSF larvae within 96 hours They have high quality protein (Up to 44%) and 38% fat
Justification	Alternative and cheap source of protein, which when incorporated into feeds can greatly reduce the cost of production and enhance a faster growth rate and increased productivity
B: Assessment of dissemination and scaling up/out approaches	
Users of TIMP	Farmers of IC and feed manufacturers
Approaches to be used in dissemination	Demonstrations, agricultural shows Farmer field schools
Critical/essential factors for successful promotion	<ul style="list-style-type: none"> • High cost of feeds • Favorable Market for Indigenous chicken is sustained • Design and implement an elaborate training curriculum
Partners/stakeholders for scaling up and their roles	<ul style="list-style-type: none"> • KALRO – source of technology • ICIPE – provide start-up BSF colonies and part of core training team • County governments to mobilize farmers and provide follow up extension services • Poultry farmer groups to mobilize farmers
C: Current situation and future scaling up	
Counties where already promoted	Kakamega, Kiambu
Counties where TIMPS will be disseminated	Machakos, Makueni, Taita, Taveta, Kericho, Bomet, Isiolo, Busia, Baringo, Tharaka Nithi, Siaya, Nyandarua, Elgeyo Marakwet, Kakamega, Kisumu, Laikipia, Nyeri, Tana River, Uasin Gishu, Wajir, West Pokot
Challenges in dissemination	<ul style="list-style-type: none"> • Lack of starter BSF stocks • Lack of demonstration units
Suggestions for addressing the challenges	<ul style="list-style-type: none"> • Work with ICIPE to get starter BSF stocks • Start demonstration units in Naivasha and Kakamega. This units will also provide BSF starter colonies
Social, environmental, policy and market conditions necessary	Reliable markets for indigenous chicken products and stable prices Elimination of prejudice of BSF and BSF products

D: Economic, gender, vulnerable and marginalized groups (VMGs) considerations	
Basic costs	The cost of constructing the multiplication unit varies depending on materials used
Estimated returns	Not yet computed
Gender issues and concerns in development, dissemination adoption and scaling up	None
Gender related opportunities	Youth and women can establish black soldier fly production units and sell to other chicken farmers
VMG issues and concerns in development, dissemination adoption and scaling up	The technology that can be easily carried out by Vulnerable and marginalized groups
VMG related opportunities	VMG can establish black soldier fly production units and sell to other chicken farmers or feed manufacturers
E: Case studies/profiles of success stories	
Success stories	Not yet documented
Application guidelines for users	Need for training on how to establish black soldier fly multiplication/production unit
F: Status of TIMPS readiness (1. Ready for upscaling; 2: Requires validation; 3. Requires further Research)	1 3 Further research required on use of other substrates and other insects
G: Contacts	
Contacts	Director Non-Ruminant Research Institute (KALRO)-P.O. Box 25-20117, Naivasha directornri@kalro.org ; kalropoultry@gmail.com
Lead organization and scientists	ICIPE; C. Tanga, David M. Mwangi, Evans Ilatsia, Paul Leparmarai, Peter Alaru, M Githinji Tobias K'Oloo, Sophie Miyumo, Ochieng Ouko
Partner organizations	• ICIPE

Gaps

1. Need to evaluate different substrates depending on the locality
2. Need to exploit utilization of other insects e.g. silkworms, earth worms
3. Establishment of a demonstration unit for black soldier fly production
4. Development, validation and dissemination of affordable feed rations developed using black soldier fly larvae and other alternative protein sources in poultry and pigs
5. Consumer preferences and organoleptic tests

2.5.2 TIMP name	Evaluate new feeding additive technologies
Category (i.e. technology, innovation or management practice)	Technology
A: Description of the technology, innovation or management practice	

Problem addressed	Poor utilization of available feeds
What is it? (TIMP description)	These are technologies are classified like feed additives that improve utilization of nutrients to produce poultry products. Probiotics and prebiotics for improved gut health, hence enhanced feed utilisation to enhance feed and energy utilisation; enzymes, e.g., phytase to break down phytates, and for other anti-nutritional factors in plant based feedstuffs; Also to degrade non-starch polysaccharides (NSPs) in crop by-products; Food and feed safety products like mycotoxin binders
Justification	The improved indigenous chicken are high producing and will benefit from these technologies, however, they have not been tested in the Kenya
B: Assessment of dissemination and scaling up/out approaches	
Users of TIMP	Small, medium and large-scale poultry farmers using their own eggs for hatching.
Approaches to be used in dissemination	Agricultural shows and exhibitions, farmer field schools as well as farmer to farmer extension, social media
Critical/essential factors for successful promotion	Availability of the products in local agrovets
Partners/stakeholders for scaling up	<ul style="list-style-type: none"> • KALRO – source of technology • KU part of the core training team and will be involved in the research required • County Governments to mobilize farmers and provide follow up extension services • Local agrovets
C: Current situation and future scaling up	
Counties where already promoted if any	None
Counties where TIMP will be upscaled	Machakos, Makueni, Taita, Taveta, Kericho, Bomet, Isiolo, Busia, Baringo, Tharaka Nithi, Siaya, Nyandarua, Elgeyo Marakwet, Kakamega, Kisumu, Laikipia, Nyeri, Tana River, Uasin Gishu, Wajir, West Pokot
Challenges in dissemination	
Suggestions for addressing the challenges	
Lessons learned in upscaling	
Social, environmental, policy and market conditions necessary	Demand for poultry products continue being high
D: Economic, gender, vulnerable and marginalized groups (VMGs) considerations	
Basic costs	Not determined
Estimated returns	
Gender issues and concerns in development,	Easily disseminated to both gender

dissemination and scaling up	adoption	
Gender opportunities	related	Better hatching rates will improve the income of women and youth and improve household nutrition
VMG issues and concerns in dissemination and scaling up	development,	It can be easily carried out by VMGs and hence for promotion
VMG opportunities	related	VMG can use the practices easily without worrying of cost implications.
E: Case studies/profiles of success stories		
Success stories		Not yet documented
Application guidelines for users		
F: Status of TIMPS readiness (1. Ready for upscaling; 2: Requires validation; 3. Requires further Research)		3
G: Contacts		
Contacts		Director Non-Ruminant Research Institute (KALRO)-P.O. Box 25-20117, Naivasha directornnri@kalro.org ; kalropoultry@gmail.com
Lead organization and scientists		KALRO/KU; Prof. Kabuage, David M. Mwangi, Evans Ilatsia, Peter Alaru, Ochieng Ouko, Tobias K'Oloo and Sophie Miyumo
Partner organizations		Kenyatta University

Gaps

Lack of data on the efficacy of these products in Kenya. There is need to research on the efficacy of these products before they are disseminated.

2.6 Management of diseases

2.6.1 TIMP name	Thermostable New Castle Disease vaccines
Category (i.e. technology, innovation or management practice)	Technology
A: Description of the technology, innovation or management practice	
Problem addressed	Low level of vaccination coverage in remote areas due to lack of refrigeration services
What is it? (TIMP description)	The thermostable vaccine remains viable for up to one year when stored at 4 °C and 8 weeks when stored at room temperature (up to 28 °C) It remains potent for two days after reconstitution. Reconstitute with non-chlorinated water.

Justification	Low level of vaccination coverage in remote areas mainly due to lack of awareness on the existence of thermostable vaccine against New Castle Disease
B: Assessment of dissemination and scaling up/out approaches	
Users of TIMP	Small, medium and large scale farmers in remote areas
Approaches to be used in dissemination	Demonstrations, agricultural shows and exhibitions, farmer field schools as well as farmer to farmer extension
Critical/essential factors for successful promotion	<ul style="list-style-type: none"> • Favourable Market for Indigenous chicken is sustained
Partners/stakeholders for scaling up and their roles	<ul style="list-style-type: none"> • KALRO – source of technology • KEVEVAPI will produce the vaccines and participate in the training • County governments to mobilize farmers and provide follow up extension services • Poultry farmer groups to mobilize farmers
C: Current situation and future scaling up	
Counties where already promoted	Kakamega, Kiambu
Counties where TIMPS will be disseminated	Machakos, Makueni, Taita, Taveta, Kericho, Bomet, Isiolo, Busia, Baringo, Tharaka Nithi, Siaya, Nyandarua, Elgeyo Marakwet, Kakamega, Kisumu, Laikipia, Nyeri, Tana River, Uasin Gishu, Wajir, West Pokot
Challenges in dissemination	<ul style="list-style-type: none"> • Minimum vaccine package is 100 does and farmers have small flocks • Lack of awareness of the administration procedure
Suggestions for addressing the challenges	<ul style="list-style-type: none"> • Organize farmers into groups that can vaccinate their chicken at the same time
Estimated returns	Has not computed
D: Economic, gender, vulnerable and marginalized groups (VMGs) considerations	
Gender issues and concerns in development, dissemination adoption and scaling up	This is a technology that can be easily adopted by women and youth
Gender related opportunities	Youth and women can vaccinate their flocks against NCD to avoid losses. Increased income for women and youth and better nutrition for families
VMG issues and concerns in development, dissemination adoption and scaling up	It is a technology that can be easily carried out by vulnerable and marginalized groups The uptake by VMG is still low hence the need for promotion
VMG related opportunities	VMG can vaccinate their flock and sustain their
E: Case studies/profiles of success stories	
Success stories	Not yet documented

Application guidelines for users	Need for training on how to establish black soldier fly multiplication/production unit
F: Status of TIMPS readiness (1. Ready for upscaling; 2: Requires validation; 3. Requires further Research)	1 2. Requires validation in areas where the temperature is higher than 28°C
G: Contacts	
Contacts	Director Non-Ruminant Research Institute (KALRO)-P.O. Box 25-20117, Naivasha directornri@kalro.org ; kalropoultry@gmail.com
Lead organization and scientists	KALRO; Ann Wachira, Jane Wachira, David M. Mwangi, Evans Ilatsia, Paul Leparmarai, Peter Alaru, Ochieng Ouko, Tobias K'Oloo and Sophie Miyumo
Partner organizations	KEVEVAPI

Gaps

1. Awareness creation to promote the uptake especially in remote areas
2. There is need to relook at guidelines of vaccine administration based on NCD prevalence in specific areas
3. There is need to evaluate efficacy of vaccine in areas with temperatures above 28 °C

2.6.2 TIMP name	Gumboro disease control in chicken for increased food and nutrition security in Kenya
Category (i.e. technology, innovation or management practice)	Technology
A: Description of the technology, innovation or management practice	
Problem addressed	High mortality of chicks
What is it? (TIMP description)	Gumboro vaccine recommendations based on virus typing (hot, intermediate or mild)
Justification	Gumboro disease is a major cause of mortality in both commercial and local chicken despite vaccination.
B: Assessment of dissemination and scaling up/out approaches	
Users of TIMP	Small, medium and large scale poultry farmers
Approaches to be used in dissemination	Demonstrations, Field trials, Field days, vaccination booklets, agricultural shows and vaccination campaigns.
Critical/essential factors for successful promotion	Demand for poultry products continue to increase at stable prices
Partners/stakeholders for scaling up and their roles	<ul style="list-style-type: none"> • KALRO - source of technology • County Livestock/Veterinary departments to mobilize farmers and provide follow up extension services • KEVEVAPI to produce the vaccines and as part of the core training team
C: Current situation and future scaling up	

Counties where already promoted if any	None
Counties where TIMP will be upscaled	Machakos, Makueni, Taita, Taveta, Kericho, Bomet, Isiolo, Busia, Baringo, Tharaka Nithi, Siaya, Nyandarua, Elgeyo Marakwet, Kakamega, Kisumu, Laikipia, Nyeri, Tana River, Uasin Gishu, Wajir, West Pokot
Challenges in dissemination	.smallest package is 100 does and farmers have small flocks
Suggestions for addressing the challenges	Organize farmers so that can vaccinate their chicken together
Lessons learned in upscaling	None
Social, environmental, policy and market conditions necessary	Reliable markets for poultry products at stable prices
D: Economic, gender, vulnerable and marginalized groups (VMGs) considerations	
Basic costs	Decreased cost of production due to reduced treatment from Gumboro related diseases
Estimated returns	> 50% savings from lowered mortality
Gender issues and concerns in development, dissemination adoption and scaling up	Minimal negative gender issues
Gender related opportunities	<ul style="list-style-type: none"> • Quick returns to investments • Opportunity for youth trained in animal health to take up vaccine/vaccinating as a business
VMG issues and concerns in development, dissemination adoption and scaling up	The vulnerable and marginalized groups can use poultry production for income generation, food and nutrition security
VMG related opportunities	Increased business opportunity in buying and selling poultry production inputs and products
E: Case studies/profiles of success stories	
Success stories	Survival rates of >95% in Gumboro free flocks
Application guidelines for users	Matching region with vaccine virus strain
F: Status of TIMPS readiness (1. Ready for upscaling; 2: Requires validation; 3. Requires further Research)	3
G: Contacts	
Contacts	Director Non-Ruminant Research Institute (KALRO)-P.O. Box 25-20117, Naivasha directornri@kalro.org ; kalropoultry@gmail.com
Lead organization and scientists	KALRO/KEVEVAPI; Ann Wachira; Jane Wachira, David M. Mwangi
Partner organizations	KEVEVAPI, Director of Veterinary Services

GAPS

1. Gumboro virus characterization in each region not known
2. Vaccine recommendation based on virus not available
3. Efficacy of available vaccines not known
4. Poor vaccines storage, handling and administration
5. Use of recombinant vaccines still low.

Match vaccine level strains with the circulating field virus strains

2.6.3 TIMP name	Improved biosecurity practices on poultry farms, food and feed safety
Category (i.e. technology, innovation or management practice)	Management practices
A: Description of the technology, innovation or management practice	
Problem addressed	The presence of zoonotic disease agents in some poultry products
What is it? (TIMP description)	A set of biosecurity measures on the farm and along the indigenous chicken value chain, including slaughter facilities, and those hatching own eggs, so as to improve productivity of indigenous chicken and reduce the risk of zoonotic diseases, e.g., Salmonellosis, mycoplasmosis, Campylobacter and E. coli spp. Chicks can contract diseases through egg contamination due to unhygienic conditions during incubation e.g. omphalitis (yolk sac infection) causing mortality.
Justification	Reduce the risk of Zoonotic diseases and low productivity of indigenous chicken
B: Assessment of dissemination and scaling up/out approaches	
Users of TIMP	Small, medium and large-scale poultry farmers using their own eggs for hatching.
Approaches to be used in dissemination	Demonstrations, agricultural shows and exhibitions, farmer field schools as well as farmer to farmer extension, social media
Critical/essential factors for successful promotion	<ul style="list-style-type: none"> • Availability of products in the counties where technology will be promoted
Partners/stakeholders for scaling up	<ul style="list-style-type: none"> • KALRO – source of technology and training • KU part of the core training and research team • County Governments mobile farmers and provide follow up extension services
C: Current situation and future scaling up	
Counties where already promoted if any	None
Countries where TIMP will be upscaled	Machakos, Makueni, Taita, Taveta, Kericho, Bomet, Isiolo, Busia, Baringo, Tharaka Nithi, Siaya, Nyandarua, Elgeyo Marakwet, Kakamega, Kisumu, Laikipia, Nyeri, Tana River, Uasin Gishu, Wajir, West Pokot

Challenges in dissemination	
Suggestions for addressing the challenges	
Lessons learned in upscaling	
Social, environmental, policy and market conditions necessary	Improved biosecurity on poultry farmers, slaughter facilities and disposal of waste
D: Economic, gender, vulnerable and marginalized groups (VMGs) considerations	
Basic costs	Not available
Estimated returns	Not determined
Gender issues and concerns in development, dissemination adoption and scaling up	Easily disseminated to both gender
Gender related opportunities	Better hatching rates will improve the income of women and youth and improve household nutrition
VMG issues and concerns in development, dissemination adoption and scaling up	It can be easily carried out by VMGs and hence need for promotion
VMG related opportunities	VMG can use the practices easily without worrying of cost implications.
E: Case studies/profiles of success stories	
Success stories	Not yet documented
Application guidelines for users	
F: Status of TIMPS readiness (1. Ready for upscaling; 2: Requires validation; 3. Requires further Research)	1
G: Contacts	
Contacts	Director Non-Ruminant Research Institute (KALRO)-P.O. Box 25-20117, Naivasha directornri@kalro.org ; kalropoultry@gmail.com
Lead organization and scientists	KALRO/KU; David M. , Prof. Kabuage, Dr. Evans Ilatsia, Peter Alaru, Ochieng Ouko, Tobias K'Oloo and Sophie Miyumo
Partner organizations	Kenyatta University

Gaps

Need to evaluate different production systems including scavenging and non-scavenging birds to determine the effect of the same on presence of zoonotic disease agents in poultry products

2.7 Manure management

2.7.1 TIMP name	Integrated poultry manure management for crop and dairy production
Category (i.e. technology, innovation or management practice)	Management practice
A: Description of the technology, innovation or management practice	
Problem addressed:	<p>Land degradation characterized by the declining soil fertility, low yields, increased soil moisture stress, increased soil erosion and poor soil health</p> <p>Poor manure management and handling leading to increased GHG emissions and leads to water pollution</p> <p>Poultry manure can be used as a protein source in dairy cattle production with proper handling, storage and treatment</p>
What is it? (TIMP description)	<p>Integrated Manure Management (IMM) is the optimal, site-specific handling of poultry manure from collection, through treatment and storage up to application to crops (and aquaculture).</p> <p>Poultry manure as a source on Non protein nitrogen (NPN) in dairy cattle</p>
Justification	<ul style="list-style-type: none"> • The decline in soil fertility in smallholder system is a major factor inhibiting agricultural development on farms • It is estimated that soils are being depleted at annual rate of 22 kg/ha for nitrogen, 2.5 kg/ha for phosphorous, and 15 kg/ha for potassium. • Manure plays an essential role in the nutrient cycle where crops grow on land to feed livestock, which in return feeds the land with their manure. Recycling the (macro and micro) nutrients in manure reduces the need for additional fertilizer purchase • Adding manure to soils enhances soil fertility and soil health that leads to increased agricultural productivity, improved soil structure and biodiversity • Given the acute poverty and limited access to mineral fertilizers, manure has the potential providing the limiting nutrient, and improving the soil health • Nitrogen is a major component in dairy production and ingredients are expensive and can be replaced with poultry manure
B: Assessment of dissemination and scaling up/out approaches	
Users of TIMP	Farmers
Approaches to be used in dissemination	Open and field days, Agricultural shows, Farmer Field Schools, Mass and social media, Chief's Baraza, Exchange visits, Demonstration farms
Critical/essential factors for successful promotion	<ul style="list-style-type: none"> • Training on poultry feeding, management and use of poultry manure as a fertilizer and as a feed • Dissemination approach used to reach target farmers • Model demonstration plots using cereal crops

	<ul style="list-style-type: none"> • Changing the mindset on feeding of poultry waste to cattle
Partners/stakeholders for scaling up and their roles	KALRO – source of technology County governments – to mobilize farmers and provide follow up extension services
C: Current situation and future scaling up	
Counties where already promoted if any	None
Counties where TIMP will be upscaled	Machakos, Makueni, Taita, Taveta, Kericho, Bomet, Isiolo, Busia, Baringo, Tharaka Nithi, Siaya, Nyandarua, Elgeyo Marakwet, Kakamega, Kisumu, Laikipia, Nyeri, Tana River, Uasin Gishu, Wajir, West Pokot
Challenges in dissemination	The key challenge constraining the dissemination of manure for soil fertility improvement include: Lack of model demonstration farms Lack of continuity in training of extension and farmers in the skill for manure management Mindset on feeding poultry waste to dairy cattle
Suggestions for addressing the challenges	<ul style="list-style-type: none"> • Establishment of many demonstration plot by counties • Capacity building of pastoral communities on manure management and its benefit • Continuous capacity building of demonstration farmers and extension workers • Demonstrate the use of the manure in dairy cattle production
Lessons learned in upscaling	Need to demonstrate the effect of poultry manure on crop yield and as a feed
Social, environmental, policy and market conditions necessary	Applying poultry manure to soils saves on purchase of synthetic fertilizer, increases crop yield and saves water. Manure can harbor pathogens which can cause disease outbreaks and contaminate of water sources by leaching of nutrients.
D: Economic, gender, vulnerable and marginalized groups (VMGs) considerations	
Basic costs	Not determined Proper handling of poultry manure needs labour for collecting the manure, transporting and applying it field which take a lot of effort and time Applying poultry manure to soils saves on purchase of synthetic fertilizer,
Estimated returns	Returns dependent on crop and crop varieties in the value chain and the profitability of the dairy enterprise
Gender issues and concerns in development, dissemination adoption and scaling up	-It is labour intensive in terms of handling and application hence a disadvantage to women -Change of mindset on the use on use of manure for dairy cattle
Gender related opportunities	Manure is locally available for farm households with poultry
VMG issues and concerns in development,	It is labour intensive in terms of handling and application hence a disadvantage VMGs

dissemination adoption and scaling up	Lack of manure since they are resource poor and might only have small flocks
VMG related opportunities	Manure is locally available for farm households with poultry
E: Case studies/profiles of success stories	
Success stories	Farmers who adopt manure management practice have reported improved soil health and increased crop yield, and sustainable source of income. Poultry manure has been effectively used as a nitrogen source in dairy production with no adverse effects on the cattle
Application guidelines for users	The guideline should focus on the following area:- Use of poultry manure as dairy cattle feed Poultry housing and manure collection Manure handling, storage to preserve nutrient and avoid losses Manure treatment for ease of transport and application in the field Timing of application for maximum utilization by the crop Anaerobic digestion for biogas production Regular analysis of manure to ascertain the quality
F: Status of TIMPS readiness (1. Ready for upscaling; 2. Requires validation; 3. Requires further Research)	1
G: Contacts	
Contacts	Director Non-Ruminant Research Institute (KALRO)-P.O. Box 25-20117, Naivasha directornnri@kalro.org ; kalropoultry@gmail.com
Lead organization and scientists	KALRO; Ischah Sanda, David M. Mwangi, Ann Wachira, Peter Alaru
Partner organizations and their roles	County government – to mobilize the farmers and provide follow up extension services

Gaps

Need to determine the pathogens and nutrients contained in poultry manure produced from different production systems

2.8 Information dissemination technology

2.8.1 TIMP name	KALRO-Indigenous chicken Mobile application
Category (i.e. technology, innovation or management practice)	Technology
A: Description of the technology, innovation or management practice	
Problem addressed	Low level of access to extension services
What is it? (TIMP description)	This is a mobile application that works under the android operating system. It has summary details on feeding, vaccination, housing, breeding and selection, economics and other general information on chicken production.
Justification	Low level of access to information on chicken farming and related services

B: Assessment of dissemination and scaling up/out approaches	
Users of TIMP	Small, medium and large scale farmers; extension personnel and service providers.
Approaches to be used in dissemination	Demonstrations, agricultural shows and exhibitions, farmer field schools as well as farmer to farmer extension, social media
Critical/essential factors for successful promotion	<ul style="list-style-type: none"> • Availability and ability to use smart phone • Internet access
Partners/stakeholders for scaling up and their roles	<ul style="list-style-type: none"> • KALRO – technology development and hosting • Mobile service providers to provide smart phones • County Governments to mobilize the farmers and provide follow up extension services
C: Current situation and future scaling up	
Counties where already promoted if any	None but over 10,000 users have already downloaded the app.
Counties where the TIMP will be upscaled	Machakos, Makueni, Taita, Taveta, Kericho, Bomet, Isiolo, Busia, Baringo, Tharaka Nithi, Siaya, Nyandarua, Elgeyo Marakwet, Kakamega, Kisumu, Laikipia, Nyeri, Tana River, Uasin Gishu, Wajir, West Pokot
Challenges in dissemination	<ul style="list-style-type: none"> • Limited internet access in remote areas • Limited access to smart phones
Suggestions for addressing the challenges	<ul style="list-style-type: none"> • Enhanced awareness creation about the technology • Link up with mobile service providers to provide smart phones and internet access
Lessons learned in upscaling if any	There is need to sensitize farmers on availability of the TIMP to enable extended utilization
Social, environmental, policy and market conditions necessary	Include features in the TIMP to make it more attractive to the youth; who are the major users.
D: Economic, gender, vulnerable and marginalized groups (VMGs) considerations	
Basic costs	Free application
Estimated returns	None
Gender issues and concerns in development, dissemination adoption and scaling up	Easily disseminated to both gender
Gender related opportunities	The TIMP is gender friendly
VMG issues and concerns in development, dissemination adoption and scaling up	It can be easily carried out by VMGs The uptake by VMG is still low hence the need for promotion
VMG related opportunities	VMG can use the TIMP easily without worrying of cost implications
E: Case studies/profiles of success stories	
Success stories	Not yet documented
Application guidelines for users	Have a smart phone and internet access

F: Status of TIMPS readiness (1. Ready for upscaling; 2: Requires validation; 3. Requires further Research)	1
G: Contacts	
Contacts	Director Non-Ruminant Research Institute (KALRO)-P.O. Box 25-20117, Naivasha directornnri@kalro.org ; kalropoultry@gmail.com
Lead organization and scientists	KALRO; Mulwa, Irene Kimani, David M. Mwangi, Evans Ilatsia, Peter Alaru, Ochieng Ouko, Tobias K'Oloo and Sophie Miyumo
Partner organizations	

GAPS

1. Awareness creation to promote the uptake
2. Include dynamic features in the TIMP such as; feed formulation and cost benefit analysis.
3. Need for regular updates.
4. Track and analyse data on who and where they are downloading app from. Analyze the characteristics of the users.

Annexes

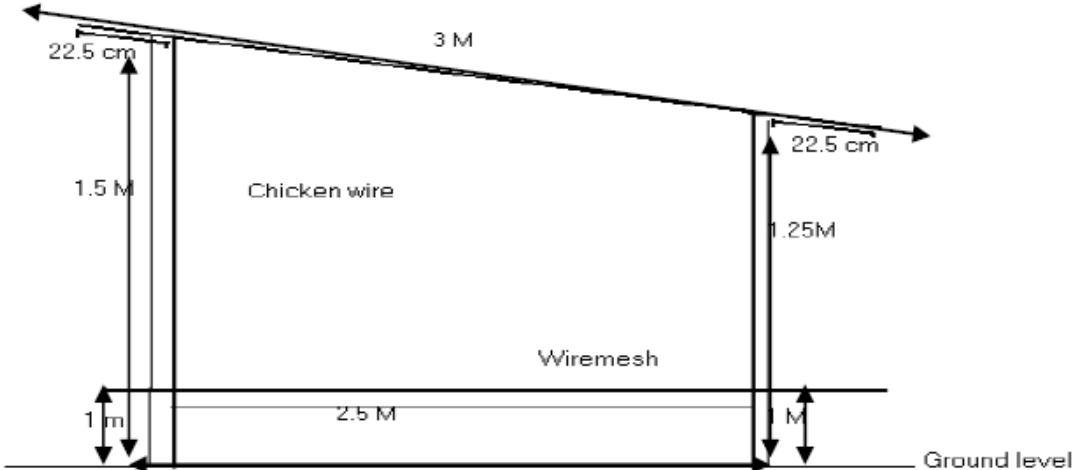


Plate 1 KC 1 Black Spotted growers

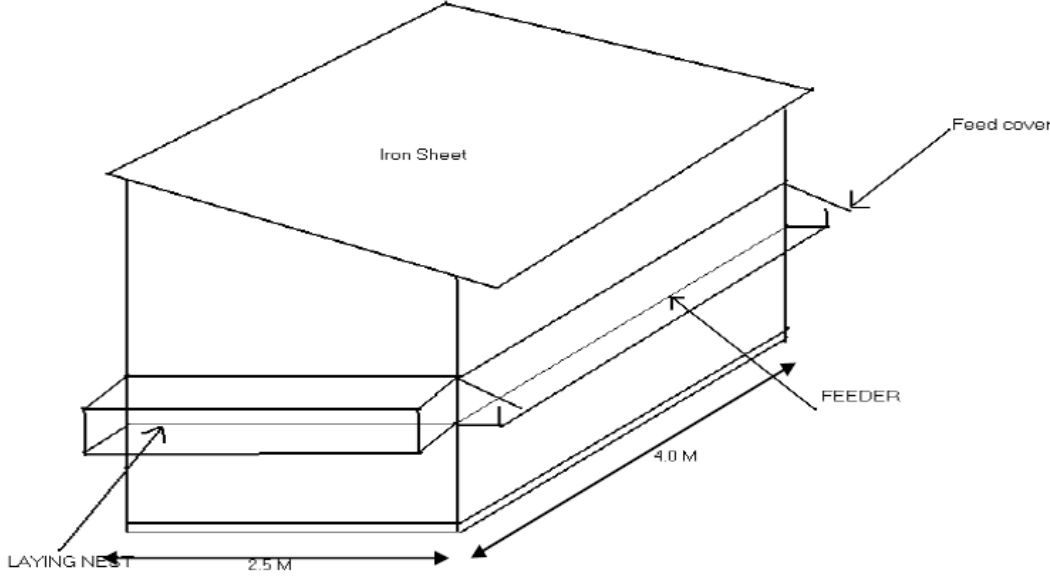


Plate 2. KC 2. Black hens

SEMI RANGE HOUSING PLAN FOR INDIGENOUS CHICKEN



SIDE ELEVATION



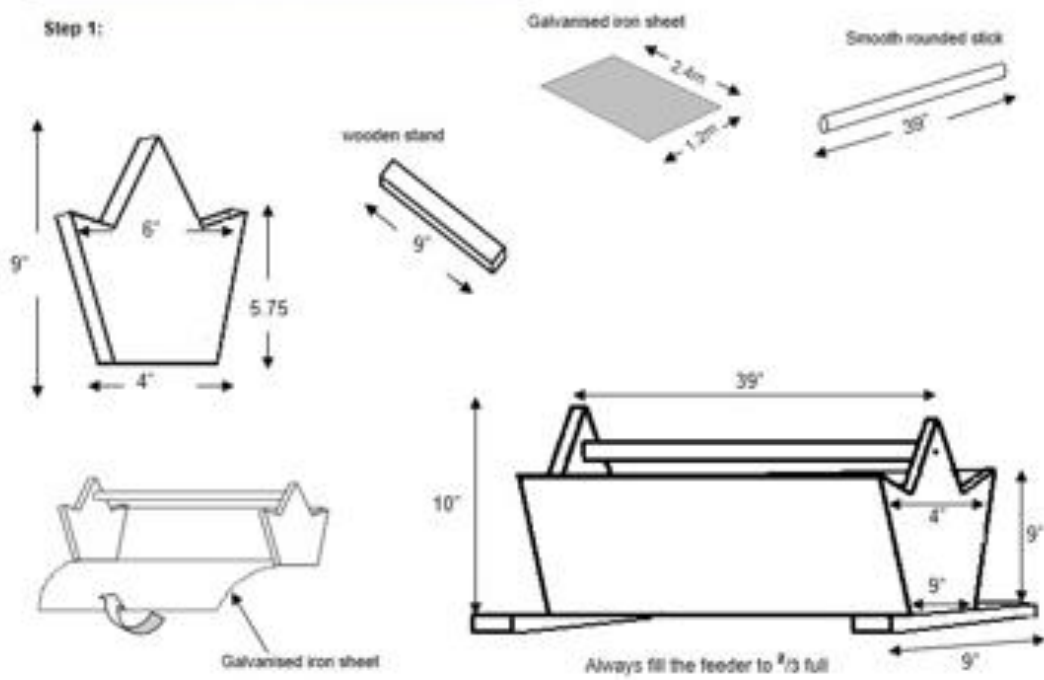
HOW TO MAKE A NAIVASHA LONG FEED TROUGH

Materials

Materials	size	Quantity
Galvanized fat iron sheets	8" x 4"	1
Timber	6" x 1' 10ft long	1
	2" x 2" 12ft long	1
	3ft long	1
Smoothened round stick		1
Nails	1"	20
	2"	6
	3"	2



Step 1:



HAY BOX BROODER



SPECIFICATION OF THE HAY BOXES FOR 10-70 CHICKS		
No. Chicks	Box Dimension(cm)	Run Dimension(cm)
10	30× 26 × 26	30× 56 × 56
20	30× 37 × 37	30× 80 × 80
30	30× 45 × 45	30× 98 × 98
40	30× 52 × 52	30× 113 × 113
60	30× 63 × 63	30× 139 × 139
70	30× 68 × 68	30× 150 × 150



AVIVAX I-2

Newcastle disease vaccine



GUIDELINES

Guidelines



Poultry Housing



Poultry Brooding



Feeds and Feeding



Disease Control



Breeding and Selection



Economics of KC



Social Media