Millet and Sorghum Technologies Toolkit

This toolkit is a collection of technologies designed to optimize millet and sorghum cultivation across Africa. These technologies have been meticulously selected to address the challenges encountered in millet and sorghum production, processing, commercialization, and storage, ensuring a more resilient and profitable millet and sorghum sector. By integrating these...

15 TECHNOLOGIES | CREATED ON JUN 10, 2024 BY TAAT PROFILING TEAM | LAST UPDATED MAY 28, 2025

TECHNOLOGIES IN THIS TOOLKIT

- **Precision Fertilizer Micro-Dosing for Millet and Sorghum Yield**...
- **Motorized Crop Residue Processing for Animal Feed**
- **Herbicides Calculator**
- **GrainMate**: Grain Moisture Meter
- **Trace**: FairFood Traceability Solutions
- **Conservation agriculture**: Minimal Tillage and Surface Mulching of Soils
- **Warrantage Inventory and Credit System**
- **Flour Milling and Blending Systems for Wheat, Sorghum a**...
- **Motorized Planter and Fertilizer Applicator (Sénékéla)**: Mechaniz...
- **Biological Control of Sorghum and Millet Insect Pests with**...
- **Proactive Management of Striga Infestation**
- **Contour Bunding Technique (CBT)**: Contour Bunds for Water...
- **Millet and Sorghum Varieties for Better Nutrition and Stress**...
- **Dual-purpose Millet Varieties for Crop and Livestock Integration**
- **PICS**: Hermetic Bags for Safe Storage of grain

https://taat.africa/ubx

Precision Fertilizer Micro-Dosing for Millet and Sorghum Yield Enhancement

Smarter Fertilizer, Stronger Crops: Maximize Growth with Minimal Input

The Fertilizer Micro-Dosing for Enhanced Yield and Efficiency Technology is a practice that involves applying small amounts of fertilizer in shallow holes at the base of each plant. This precise method is low-risk, affordable, and efficient.

This technology is TAAT1 validated.

8·7 Scaling readiness: idea maturity 8/9; level of use 7/9

Gender assessment 4

Climate impact 7

Problem

- Nutrient deficiencies in millet and sorghum
- Inefficient and risky fertilizer application methods
- Insufficient nutrient replenishment and gradual soil fertility decline
- Crop failure risk due to drought discouraging fertilizer investment

Solution

- Addressing nutrient deficiencies in millet and sorghum
- Providing a low-risk and precise fertilizer application method
- Fostering rapid crop growth

Key points to design your project

Micro-Dosing addresses nutrient deficiencies in millet and sorghum with precise, low-risk fertilizer application, promoting rapid growth, reducing environmental impact, and benefiting women. It aligns with climate-smart practices, enhances agricultural efficiency, and reduces poverty.

To integrate Micro-Dosing:

- Identify suitable fertilizers: Millet (50 kg/ha, 16,666 plants), Sorghum (100 kg/ha, 26,666 plants). Use NPK (15-15-15) or DAP fertilizers.
- Plan logistics: Include delivery costs, import clearance, and distribution to project sites.
- Raise farmer awareness through training and communication tools (flyers, videos, radio).
- Combine with stress-resistant crop varieties and Striga management for better results.
- Partner with agricultural institutes and fertilizer distributors for implementation.

This technology is applicable in Chad, Ethiopia, Kenya, Sudan, Tanzania, Burkina Faso, Mali, Niger, Nigeria, Senegal, and Zimbabwe.

Cost: $$$ **43 USD/ha**
Application without equipment

ROI: $$$ **15—108 %**
Increase in yield

IP
Open source / open access

International Crops Research Institute for the Semi-Arid Tropics (ICRISAT)
Dougbedji Fatondji

Technology from

ProPAS

Commodities

Sorghum/Millet

Sustainable Development Goals

2 ZERO HUNGER · 12 RESPONSIBLE CONSUMPTION AND PRODUCTION · 13 CLIMATE ACTION

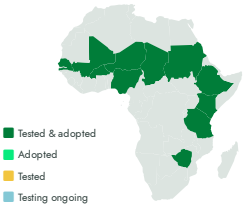
Categories

Production, Practices, Fertilizer management

Best used with

- Millet and Sorghum Varieties for Better Nutrition and Stress Resistance ›
- Dual-purpose Millet Varieties for Crop and Livestock Integration ›
- Proactive Management of Striga Infestation ›

Tested/adopted in



Where it can be used

This technology can be used in the colored agro-ecological zones.

Motorized Crop Residue Processing for Animal Feed

Powered Crop Residue Processing for Livestock Feed Enhancement

Use of motorized stover cutter (left) and mobile chopper (right)

This technology is a motorized equipment for processing millet and sorghum residues into animal feed. It's self-powered, cost-effective, and easily transportable, requiring only two operators. By efficiently processing crop residues, it integrates crop and livestock enterprises, enhancing resource efficiency. The machine can process 1 to 1.5 tons of stover per hour.

This technology is TAAT1 validated.

8·8 Scaling readiness: idea maturity 8/9; level of use 8/9

Gender assessment 4

Climate impact 6

Problem

- Manual processing of millet and sorghum stem residues is time-consuming.
- Unutilized residues are often burned, leading to soil carbon depletion and air pollution.
- Traditional feeding methods result in sub-optimal animal diets and digestion.
- Storage and preservation of feed face challenges.
- Dryland areas in Sub-Saharan Africa lack sufficient feed biomass due to low rainfall.

Solution

- Efficiently processes crop residues into feed or mulch
- Reduces wastage and maximizes livestock nutrition
- Enhances animal health and productivity
- Improves soil health and agricultural sustainability
- Compacts feed materials effectively, enhancing flavor and nutritive value
- Particularly beneficial for low rainfall regions in Sub-Saharan Africa

Key points to design your project

To integrate this technology into your project:

- Conduct community-level demonstration sessions to promote the stover chopper/crusher.
- Provide operators with training on machine maintenance and usage.
- Facilitate connections between community-based organizations, youth groups, and animal feed producers.

During implementation, consider:

- Determining the size and quantity of units needed.
- Budgeting for equipment purchase: USD 1,250 to USD 1,700 for self-contained stover choppers and USD 1,000 to USD 1,500 for alternative motorized cutters.
- Accounting for delivery costs and potential import duties based on the technology's source country.

Cost: $$$ **1250–1700 USD/unit**

Self-contained stover chopping and crushing machine

10 years	**22,000 USD**	**1,000–1,500 USD**	**IP**
Lifespan	Production value in 6 months	Alternative motorized cutters for cereals	Unknown

International Crops Research Institute for the Semi-Arid Tropics (ICRISAT)
Dougbedji Fatondji

Technology from

ProPAS

Commodities

Sorghum/Millet

Sustainable Development Goals

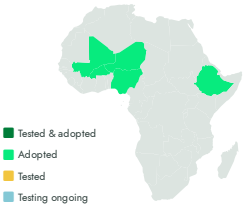
Categories

Pre-production, Equipment, Animal feed production

Best used with

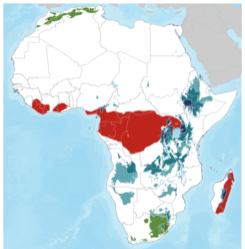
- Dual-purpose Millet Varieties for Crop and Livestock Integration ›

Tested/adopted in



Where it can be used

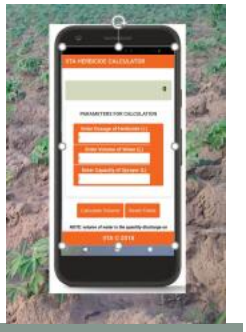
This technology can be used in the colored agro-ecological zones.



Herbicides Calculator

Reduce pesticide and herbicide losses with IITA's herbicide calculator

The IITA Herbicide Calculator is a digital tool that helps farmers figure out the right amount for backpack sprayers. This tool was developed using Java language, the Ionic framework, and Android Studio, ensuring its robustness and usability.



International Institute of Tropical Agriculture (IITA)
Godwin Atser

This technology is TAAT1 validated.

7·7 Scaling readiness: idea maturity 7/9; level of use 7/9

Gender assessment 4

Climate impact 6

Problem

- The widespread misuse of pesticides (including herbicides) due to poor calibration of spray tanks.
- Loss of inputs (pesticides or herbicides) during applications.
- Residue of chemical products in crops due to overdosing of pesticides or herbicides.

Solution

- The"IITA Herbicides Calculator" technology ensures the precise application of pesticides, mitigating issues related to over or under-dosing.
- Its promotes the effectiveness of herbicides, facilitating their optimal application.

Key points to design your project

To integrate this technology,

- Establish training programs and connect producers to financial support and markets.
- Estimate costs for the subscription to the IITA Herbicide calculator, android phones, data, training, and communication support.
- Collaborate with agricultural development institutes and seed multiplication companies.

30,000 USD

Cover training, android phones, data

IP

Open source / open access

Technology from

ProPAS

Commodities

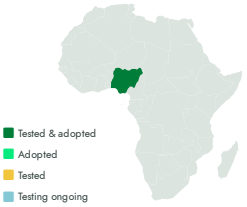
Maize, Rice, Sorghum/Millet, Cowpea, Soybean, Cassava, + 1 more

Sustainable Development Goals

Categories

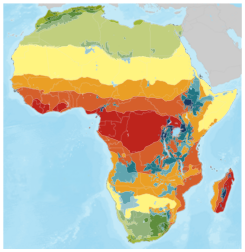
Production, Digital applications, Pest control

Tested/adopted in



Where it can be used

This technology can be used in the colored agro-ecological zones.



Target groups

Farmers

GrainMate: Grain Moisture Meter

Control the moisture content of grains and reduce post-harvest losses.

The Grain Moisture Meter helps African farmers prevent mold and post-harvest losses. Ministries of Agriculture, extension services, and food safety agencies use it to ensure quality control, improve storage, and enforce market standards. It supports fair trade, enhances food security, and boosts market value at both farmer and national levels.

Sesi Technologies Limited
Isaac Sesi

This technology is pre-validated.

8·7 Scaling readiness: idea maturity 8/9; level of use 7/9

Gender assessment 4

Climate impact 4

Problem

- **Grain Losses:** FAO reports 10–20% of grain is lost in Sub-Saharan Africa due to poor post-harvest handling.
- **Unreliable Methods:** Farmers use biting or tossing grains, which are inaccurate.
- **Lack of Moisture Meters:** Many farmers can't afford or find reliable grain moisture meters.
- **Mold Risk:** Grains above 13.5% moisture quickly develop mold.
- **Poultry Impact:** High-moisture grains reduce egg production and increase bird disease and deaths.

Solution

- **Eliminates Guesswork:** The meter replaces unreliable methods, enabling informed storage decisions.
- **Improves Accessibility:** Affordable and easy to use, priced at $60, it's accessible to many farmers.
- **Reduces Grain Losses:** It helps farmers measure moisture accurately, preventing post-harvest losses and ensuring food security.
- **Supports National Planning:** Reliable data aids governments in monitoring grain quality, predicting risks, and shaping food security policies.

Key points to design your project

The GrainMate Moisture Meter addresses challenges in traditional grain moisture measurement. To integrate this technology into your project, you mainly need to:

- Assess the quantity of GrainMate Moisture Meters needed,
- Account for delivery costs to your project site,
- Provide training.

Cost: $$$ **45—60 USD**
Price for resellers and users

ROI: $$$ **90 %**
Post-harvest losses reduced

Commodities

Maize, Sorghum/Millet, Soybean, Wheat, Groundnut

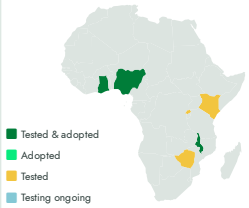
Sustainable Development Goals

2 ZERO HUNGER
3 GOOD HEALTH AND WELL-BEING
8 DECENT WORK AND ECONOMIC GROWTH

Categories

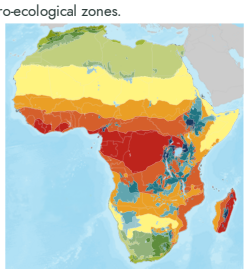
Prevention & storage, Equipment, Post-harvest handling

Tested/adopted in



Where it can be used

This technology can be used in the colored agro-ecological zones.



Target groups

Farmers, Processors, Warehouse Operators, Advisory and Extension Services

Trace: FairFood Traceability Solutions

Easy-to-use solution for food traceability

Trace technology is an advanced tracking solution for agricultural and food-related companies, offering transparency and sustainability. It enhances consumer trust by providing clear and verifiable data about a product's journey and ethical production practices.

This technology is pre-validated.

9·7 Scaling readiness: idea maturity 9/9; level of use 7/9

Gender assessment 3

Climate impact 6

Problem

- Agri-food companies struggle with risk mitigation in their operations.
- Transparent traceability of agri-food products is challenging to ensure.
- The food industry lacks sufficient tools for storing and managing essential data.

Solution

- Traceability solutions enable showcasing the precise origin of products.
- Transparent sharing of evidence supporting brand values with the public.
- FairFood's traceability solutions contribute to increased income for farmers.
- Foster transparency and trust, helping create fairer compensation mechanisms within the agri-food supply chain.

Key points to design your project

"FairFood Traceability Solutions" offers a digital platform to enhance transparency and trust in the agri-food supply chain. To integrate this technology into your project,

- Accessing the platform and installing the necessary software, considering associated costs.
- Configure the platform with relevant supply chain information and provide training and ongoing support to personnel.
- Utilize the platform to track product movement and share transparent information.

11,070 USD Initial investment	**110 USD** Social Return on Investment per farmer per YEAR
22.14 USD subscription/user/year	**3,320 USD** Operating Investment /YEAR
IP Open source / open access	

FAIRFOOD

Fairfood
Marten van Gils

Commodities

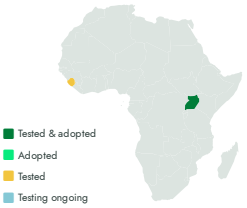
Common bean, Cassava, Cowpea, Leguminous, Maize, Sorghum/Millet, + 9 more

Sustainable Development Goals

Categories

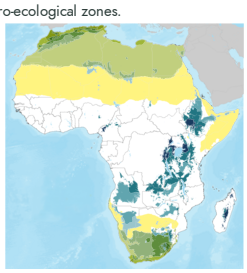
Production, Prevention & storage, Transformation, Market, Pre-production, Digital applications, + -3 more

Tested/adopted in



Where it can be used

This technology can be used in the colored agro-ecological zones.



Target groups

Breeders, Farmers, Processors, Fish Farmers, Sellers

Conservation agriculture: Minimal Tillage and Surface Mulching of Soils

Conservation Agriculture for Sustainable Farming

Later ripening and better grain filling of wheat due to water conservation in no-till system (middle)

International Center for Agricultural Research in the Dry Areas (ICARDA)
Zewdie Bishaw

Conservation agriculture (CA) includes minimal soil disturbance, surface residue retention, and crop rotation, proven effective in dryland wheat farming. It improves soil quality, water use efficiency, and yield stability, while reducing costs and energy. Additionally, CA enhances soil biodiversity, mitigates emissions, and sequesters carbon, benefiting both farmers and the environment.

This technology is TAAT1 validated.

8·7 Scaling readiness: idea maturity 8/9; level of use 7/9

Gender assessment 4

Climate impact 7

Problem

- Excessive tillage and limited organic matter degrade soil quality.
- Droughts, intense rains, and overuse limit water availability.
- Dryland farming yields are low and vulnerable to water scarcity.
- Agriculture contributes to emissions and affects carbon storage.
- Traditional tillage leads to weed competition and yield reduction.

Solution

- Minimal soil disturbance, surface residue retention, and crop rotation.
- Enhanced soil quality, water efficiency, and yield stability.
- Mitigates drought and heat stress on crops.
- Saves water and reduces herbicide usage.
- Manages soil nutrients and pests effectively.
- Suitable for various soil types and water conditions.
- Increases resilience to environmental stresses.

Key points to design your project

The Minimal Tillage and Surface Mulching of Soils technology boosts crop productivity and ensures food security by maintaining consistent yields while conserving water and soil health. This method reduces agriculture's environmental impact, aiding in poverty alleviation and promoting sustainable livelihoods for farmers. To integrate this technology, it is essential to raise awareness of its benefits, ensure equipment accessibility, implement incentives for agroecosystem services, establish connections with food industries for market access, allocate resources for training and ongoing support, collaborate with agricultural institutions, and explore integration with complementary technologies.

Cost: $$$ **740 USD/ha**

Three-year average total production under CA

15 - 22 %	**18 - 21 %**	**20 %**	**923 USD/ha**	**IP**
Increase in yield	water use efficiency	increase in income	Increase in profit from wheat production	Open source / open access

Technology from

ProPAS

Commodities

Wheat

Sustainable Development Goals

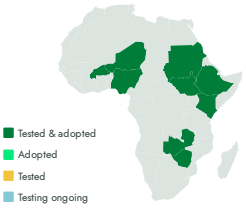
Categories

Production, Practices,
Pest control (excluding weeds),
Water management

Best used with

- Yellow Rust and Stem Rust Resistant wheat ›
- Hessian Fly Resistant Wheat Varieties ›

Tested/adopted in



Where it can be used

This technology can be used in the colored agro-ecological zones.

Warrantage Inventory and Credit System

Grain in the Bank: Future Assurance

Farmers deliver grain to warehouse, and an officer registers the quantity and quality

The warrantage inventory and credit system is a practical solution for small-scale farmers. It operates through a warehouse receipt mechanism, allowing farmers to store non-perishable crops (such as millet) in secure warehouses. In return, they receive inventory credit—loans against the stored grain.

International Crops Research Institute for the Semi-Arid Tropics (ICRISAT)
Dougbedji Fatondji

This technology is TAAT1 validated.

8·9 Scaling readiness: idea maturity 8/9; level of use 9/9

Gender assessment 4

Climate impact 1

Problem

- **Limited Access to Credit and Limited Market Access:** Smallholder farmers struggle to access credit and secure storage facilities, affecting their ability to get fair prices for their crops.
- **Price Volatility and Seasonal Cash Flow:** Fluctuating market prices and seasonal income variations make it challenging for farmers to manage expenses and plan for the future.

Solution

- **Credit Access:** Warrantage lets farmers use stored crops as collateral, providing credit and overcoming collateral barriers.
- **Price Stability & Market Access:** Warrantage allows storing crops during surplus for sale during favorable prices, reducing volatility impact and ensuring better market access.

Key points to design your project

The warrantage system offers a solution for Sub-Saharan African smallholder farmers lacking access to bank loans. Implementing it involves steps like:

- **Identify a group of interested farmers**.
- **Train them** on the system and crop storage.
- **Secure a warehouse** for crop storage.
- **Store the harvested crops** and record their details.
- **Obtain a loan** using the stored crops as collateral.
- **Invest the loan** in farming or other needs.
- **Sell the crops** when prices are favorable.
- **Repay the loan** with the sales proceeds. Share any remaining profit.

Cost: $$$ **0.25—0.5 USD**

Woven polypropylene 90-kg bags:

1—2 USD

90-kg hermetic bags

ROI: $$$ **52—34 %**

income increase

IP

Open source / open access

Technology from

ProPAS

Commodities

Sorghum/Millet

Sustainable Development Goals

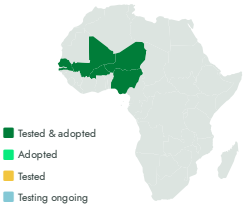
Categories

Prevention & storage, Market, Practices, Post-harvest management

Best used with

- Millet and Sorghum Varieties for Better Nutrition and Stress Resistance ›
- Precision Fertilizer Micro-Dosing for Millet and Sorghum Yield Enhancement ›

Tested/adopted in



Where it can be used

This technology can be used in the colored agro-ecological zones.

Flour Milling and Blending Systems for Wheat, Sorghum and Millet

Produce a premium wheat, sorghum and millet flour close to production areas

This technology comprises milling and blending systems that enable the production of premium flour products in both rural and urban areas. Different milling systems are available, meeting industry standards. An abrasive grain mill typically includes a feed-in hopper, roller table for grinding, rotary sieve for bran separation, and a conveyor belt.

This technology is TAAT1 validated.

7·7 Scaling readiness: idea maturity 7/9; level of use 7/9

Gender assessment 4

Climate impact 3

Problem

- The traditional grinding and cooking of millet and sorghum grains are associated with significant time, energy burden, and labor intensity.
- Transport and cost issues arise in the distribution of raw grain to rural consumers.
- A lack of value addition to raw grain for products sold in urban markets and food processing.

Solution

- The milling and blending systems automate the process, saving time, energy, and labor.
- They reduce the necessity to transport raw grain over long distances, lowering costs for rural consumers.
- The flour processing adds value to raw grain.

Key points to design your project

This technology can be integrated into nutrition projects, offering job opportunities. To implement it, focus on :

- Awareness,
- Product standards,
- Efficient production setups,
- Collaboration with food processor companies.

Cost: $$$ **3,500 USD**

For small flour mill machine with a capacity of 300 - 500 kg flour per hour

ROI: $$$ **12—15 %**

increase in milling yield

38,000 USD

Base price for a fully automatic flour mill with a capacity of 30 ton flour per day

80—82 %

maximal recovery of flour

18—20 %

maximal recovery of bran

IP

Open source / open access

International Crops Research Institute for the Semi-Arid Tropics (ICRISAT)
Dougbedji Fatondji

Technology from

ProPAS

Commodities

Sorghum/Millet, Wheat

Sustainable Development Goals

2 ZERO HUNGER

8 DECENT WORK AND ECONOMIC GROWTH

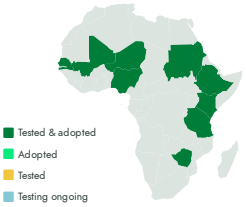
Categories

Transformation, Equipment, Agrifood processing

Best used with

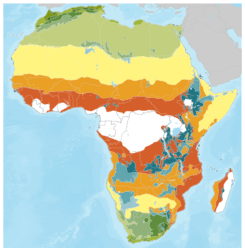
- Millet and Sorghum Varieties for Better Nutrition and Stress Resistance ›

Tested/adopted in



Where it can be used

This technology can be used in the colored agro-ecological zones.



Motorized Planter and Fertilizer Applicator (Sénékéla): Mechanized Tillers, Planters and Fertilizer Applicators

Make farming easier with planting and fertilizing machines

The motorized planter and fertilizer micro-dose applicator, known as "Sénékéla", provides precise and fast placement of seeds and mineral inputs on prepared soils or ridges. This technology is designed to reduce the workload for millet and sorghum producers.

This technology is TAAT1 validated.

8·8 Scaling readiness: idea maturity 8/9; level of use 8/9

Gender assessment 4

Climate impact 5

Problem

- Preparing the land, planting seeds and adding fertilizer by hand are too hard for farmers.
- It's take a lot of time to do and farmers spend much of money on animals or services to help

Solution

- Mechanizing farm activities to reduce the physical strain on farmers and lower the costs associated with maintaining animals or hiring services.
- It enables timely and efficient field operations, leading to increased crop productivity and higher profits.

Key points to design your project

The adoption of Mechanized Tillers, Planters, and Fertilizer Applicators offers a promising solution to enhance agricultural efficiency and reduce labor-intensive tasks. To integrate this technology, consider:

- Building public-private partnerships, demonstrating benefits to farmers,
- Providing training and technical support, linking to credit facilities,
- Evaluating equipment needs and costs and collaborating with agricultural institutes or fleet managers for implementation.

1000 USD

Unit of Sénékéla

IP

Open source / open access

International Crops Research Institute for the Semi-Arid Tropics (ICRISAT)
Dougbedji Fatondj

Technology from

ProPAS

Commodities

Sorghum/Millet

Sustainable Development Goals

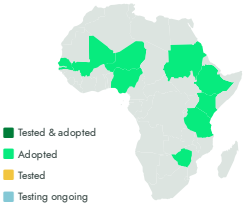
Categories

Production, Equipment, Land preparation

Best used with

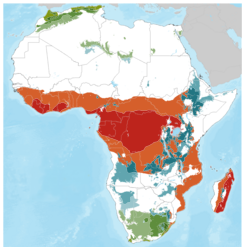
- Precision Fertilizer Micro-Dosing for Millet and Sorghum Yield Enhancement ›

Tested/adopted in



Where it can be used

This technology can be used in the colored agro-ecological zones.



Biological Control of Sorghum and Millet Insect Pests with Natural Enemies

Protect crops using natural pest allies for sustainable pest control in Africa

Biological control uses indigenous predators and parasitoids to combat pests like the Millet Head Miner and Fall Armyworm. Released into fields, these natural enemies prevent pest outbreaks and crop damage. This eco-friendly method enhances ecosystems and food security, reducing the need for chemical pesticides.

International Crops Research Institute for the Semi-Arid Tropics (ICRISAT)
Dougbedji Fatondji

This technology is TAAT1 validated.

7·7 Scaling readiness: idea maturity 7/9; level of use 7/9

Gender assessment 4

Climate impact 7

Problem

- Pests cause significant crop losses, threatening food security in Sub-Saharan Africa.
- Overuse of pesticides leads to environmental harm and health risks.
- Many farmers lack access to effective pest management solutions, increasing vulnerability to infestations.

Solution

- Parasitoid wasp *Habrobracon hebetor* targets pests' caterpillars.
- Biological control techniques reduce infestations and ensure food supply.
- Parasitoid wasp *Telenomus remus* prevents Fall Armyworm outbreaks.

Key points to design your project

Biological control aligns with SDGs 2, 12, and 15 by mitigating climate change, reducing pesticide use, and supporting biodiversity.

To integrate it into a project:

1. **Risk Assessment**: Identify pest levels and risks.
2. **Monitoring**: Establish protocols for parasitoid rearing and release.
3. **Awareness**: Run campaigns about biological control benefits.
4. **Training**: Educate agents and farmers on mass-rearing and release techniques.
5. **Resources**: Organize supply of materials for starter colonies.
6. **Evaluation**: Implement a system for project effectiveness and feedback.
7. **Partnerships**: Collaborate with local communities and organizations.
8. **Funding**: Estimate costs, secure funding, and consider long-term cost-effectiveness.

Cost: $$$ **5,000 USD**

establishment of parasitoïd colonies for 10,000 farmers

6,000 USD
per year for operation

3—4 USD
per "ready-to-use" bag

IP
Open source / open access

Technology from

ProPAS

Commodities

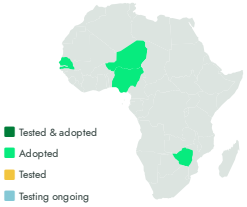
Sorghum/Millet

Sustainable Development Goals

Categories

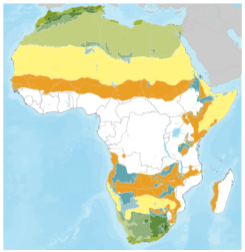
Production, Inputs, Natural Enemies

Tested/adopted in



Where it can be used

This technology can be used in the colored agro-ecological zones.



Target groups

Farmers

Proactive Management of Striga Infestation

Striga defended for farmers' empowerment

Sorghum severely infested by Striga

The technology for managing Striga infestation aims to tackle challenges like Striga weed and declining soil fertility. It involves simple farming methods like using less fertilizer, recycling organic matter, rotating crops, and planting Striga-tolerant varieties.

International Crops Research Institute for the Semi-Arid Tropics (ICRISAT)
Dougbedji Fatondji

This technology is TAAT1 validated.

8·8 Scaling readiness: idea maturity 8/9; level of use 8/9

Gender assessment 4

Climate impact 6

Problem

- Striga attaches to the roots of maize, millet, sorghum, and rice, extracting nutrients and water delayed crop growth.
- Its causes a significant reduction in crop yield.
- The presence of Striga in fields can contribute to soil impoverishment.

Solution

- This technology proposes various agronomic practices such as fertilizer micro-dosing, organic matter recycling, crop rotation, intercropping, the use of Striga-tolerant varieties, seed dressing, pre-emergence herbicides, and hand weeding.
- It has led to an increase in sorghum and pearl millet yields by up to 60% within four years.

Key points to design your project

To integrate the technology:

- One needs to estimate fertilizer quantities,
- Consider delivery costs, provide training,
- Develop communication support, and
- Consider collaboration with agricultural institutes for optimal implementation.

ROI: $$$ **60 %**

Yield increase within four year

IP

Open source / open access

Technology from

ProPAS

Commodities

Sorghum/Millet

Sustainable Development Goals

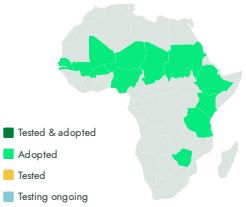
Categories

Production, Practices, Weed management

Best used with

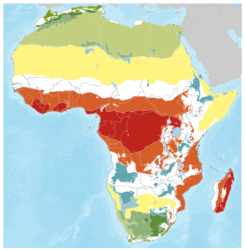
- Precision Fertilizer Micro-Dosing for Millet and Sorghum Yield Enhancement ›

Tested/adopted in



Where it can be used

This technology can be used in the colored agro-ecological zones.



Contour Bunding Technique (CBT): Contour Bunds for Water Harvesting

CBT: Nurturing Crops, Conserving Soil, and Cultivating Resilience

Semi-circular bunds reinforced with stones

International Crops Research Institute for the Semi-Arid Tropics (ICRISAT)
Dougbedji Fatondji

The "Contour Bunding Technique (CBT)" is a farming strategy used in Africa's dry areas. It uses small walls built along field curves to collect water, reduce runoff, and prevent soil erosion. This enhances the soil's water retention, making it a practical solution for water scarcity in dryland farming.

This technology is TAAT1 validated.

8·7 Scaling readiness: idea maturity 8/9; level of use 7/9

Gender assessment 4

Climate impact 7

Problem

- **Water Scarcity**: Dryland farming often faces water shortages, making crop growth challenging.
- **Soil Erosion**: In dry areas, soil erosion and gully formation degrade soil health and productivity.

Solution

- **Water Management**: CBT uses walls to capture and store rainwater, increasing crop yields.
- **Soil Conservation**: CBT slows water movement, reduces soil erosion, and improves soil fertility.

Key points to design your project

The Contour Bunding Technique (CBT) promotes inclusivity and mitigates climate change impacts, contributing to several Sustainable Development Goals (SDGs). It's a valuable tool for sustainable agriculture and climate resilience projects.

To integrate CBT into a project:

1. **Raise Awareness**: Educate the community about CBT's benefits.
2. **Train Stakeholders**: Train agents and farmers on cost-effective bund construction techniques.
3. **Consult Farmers**: Discuss with farmers to understand water movement and determine optimal bund placement.
4. **Provide Resources**: Ensure access to necessary resources for building and reinforcing bunds.
5. **Monitor and Evaluate**: Track the effects of CBT on crop yields and soil health for continuous improvement.
6. **Engage Community**: Involve the community to ensure project sustainability and foster ownership.

Cost: $$$ **9 USD**

Drawing contour line per ha

40 %	20 %	IP
Runoff reduction	Sediment loss dicrease	Open source / open access

Technology from

ProPAS

Commodities

Sorghum/Millet

Sustainable Development Goals

2 ZERO HUNGER

13 CLIMATE ACTION

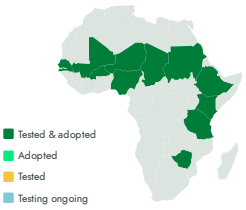
Categories

Production, Practices, Water management

Best used with

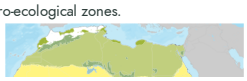
- Millet and Sorghum Varieties for Better Nutrition and Stress Resistance ›
- Precision Fertilizer Micro-Dosing for Millet and Sorghum Yield Enhancement ›
- Dual-purpose Millet Varieties for Crop and Livestock Integration ›

Tested/adopted in



Where it can be used

This technology can be used in the colored agro-ecological zones.



Millet and Sorghum Varieties for Better Nutrition and Stress Resistance

Strong Crops, Healthy People

Hybrid sorghum « Pablo »

The 'Millet and Sorghum Varieties for Better Nutrition and Stress Resistance' technology offers a game-changing solution for African agriculture. These highly nutritious and resilient varieties, fortified with elevated iron and zinc levels, thrive in challenging climate conditions, providing farmers with a reliable risk management strategy.

International Crops Research Institute for the Semi-Arid Tropics (ICRISAT)
Dougbedji Fatondji

This technology is TAAT1 validated.

7·7 Scaling readiness: idea maturity 7/9; level of use 7/9

Gender assessment 4

Climate impact 7

Problem

- **Low Yields, Food Insecurity:** Millet and sorghum in Africa yield below potential, leading to hunger and malnutrition, exacerbated by climate challenges.
- **Nutrient Deficiency, Limited Access:** Traditional millet and sorghum lack essential nutrients like iron and zinc, impacting nutrition.

Solution

- **Advanced Varieties:** New millet and sorghum strains are high-yielding, bio-fortified, and resilient to climate challenges, ensuring productivity and nutrition.
- **Expanded Access and Utilization:** Collaborative efforts have made these varieties widely available for farmers.

Key points to design your project

Improved millet and sorghum varieties that enhance nutrition, climate adaptation, and yield stability. They align with SDGs, including Zero Hunger, Climate Action, and Gender Equality.

Adoption Activities:

1. **Baseline Assessment**: Understand current practices and challenges.
2. **Awareness Campaign**: Educate farmers about benefits and access.
3. **Seed Distribution**: Provide high-quality seeds.
4. **Training Workshops**: Equip farmers with necessary skills.
5. **Demonstration Plots**: Showcase technology effectiveness.
6. **Field Days**: Engage farmers directly.
7. **Market Linkages**: Connect to buyers and processors.
8. **Scaling Up**: Expand adoption to more communities.

Cost: $$$

14 - 18 USD	8 - 12 USD	35 - 45 USD/Ha	120 - 150 USD/Ha
Seed for one hectare of land for sorghum	Seed for one hectare of land for pearl millet	A ton of animal manure cost	Inorganic fertilizer cost

Technology from

ProPAS

Commodities

Sorghum/Millet

Sustainable Development Goals

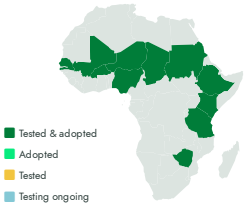
Categories

Production, Improved varieties, Drought tolerance, Heat tolerance

Best used with

- Precision Fertilizer Micro-Dosing for Millet and Sorghum Yield Enhancement ›
- Flour Milling and Blending Systems for Wheat, Sorghum and Millet ›
- Warrantage Inventory and Credit System ›
- Proactive Management of Striga Infestation ›
- Contour Bunds for Water Harvesting ›

Tested/adopted in



Dual-purpose Millet Varieties for Crop and Livestock Integration

Harvest More, Feed Better, Farm Smarter

"Dual-purpose Varieties for Crop and Livestock Integration" involves developing millet and sorghum varieties for both human food and animal fodder in African drylar challenges like overgrazing and soil degradation worsened by increasing livestock populations.

This technology is TAAT1 validated.

7·8 Scaling readiness: idea maturity 7/9; level of use 8/9

Gender assessment 4

Climate impact 7

Problem

- Growing livestock population exacerbating the demand for animal feed resources.
- Traditional millet and sorghum varieties unable to meet the dual requirements of human food and high-quality animal feed.
- Common millet and sorghum lines have higher lignin content, making them less digestible.

Solution

- Reduced lignin and tannin content for enhanced digestibility and palatability
- Greater fodder availability, especially during the dry season
- Increased manure availability for soil fertility management
- Sweet stover with high sugar concentration (around 15%)
- Suitable for syrup or bioethanol production

Key points to design your project

- To integrate this technology, awareness campaigns, investment frameworks, capacity building, and financial support are essential.
- Collaboration with seed companies, cooperatives, growers, and farmers is crucial for successful implementation.

Cost: $$$ **204 USD**

Production cost for seed, fertilizer, and labor per Ha

ROI: $$$ **31 %**

increase in yield

204 USD	**2.5—4 tons**	**10—15 tons**	**15 %**	
Per hectare for seed, fertilizer, and labor	Sorghum grain yield per Ha	Sorghum stover yield per Ha	Sugar concentration	No forr

ICRISAT
INTERNATIONAL CROPS RESEARCH INSTITUTE FOR THE SEMI-ARID TROPICS

International Crops Research Institute for the Semi-Arid Tropics (ICRISAT)

Doughnut Extended

Technology from

ProPAS

Commodities

Sorghum/Millet

Sustainable Development Goals

Sustainable Development Goal 1: no poverty

Sustainable Development Goal 2: zero hunger

Sustainable Development Goal 13: clima

Sustainable Development Goal 15: life on land

Categories

Production, Improved varieties, Quality improvement

Best used with

- Proactive Management of Striga Infestation ›
- Precision Fertilizer Micro-Dosing for Millet and Sorghum Yield Enhancement ›
- Motorized Crop Residue Processing for Animal Feed ›

Tested/adopted in

Where it can be used

This technology can be used in the colored agro-ecological zones.

Target groups

Farmers

PICS: Hermetic Bags for Safe Storage of grain

Low cost storage technologies for grain

Hermetic bags are like super-sealed containers that stop air and moisture from reaching the grains inside. This way, farmers can store their grains for up to two years without them getting bad. This is good for farmers because it means they always have enough food and can sell their grains for better prices.

PICS

Purdue Improved Crop Storage

PICS GLOBAL

Laurie Kitch

This technology is TAAT1 validated.

9·9 Scaling readiness: idea maturity 9/9; level of use 9/9

Inclusion assessment 4

Climate impact 5

Problem

- **Post-harvest losses**: Farmers in Sub-Saharan Africa lose over 25% of beans due to inadequate storage methods.
- **Pest infestations**: Weevils, moths, and mites damage stored beans, forcing farmers to sell at low prices immediately after harvest to minimize losses.
- **Fungal contamination**: Traditional storage can lead to fungal growth, such as aflatoxin, contaminating beans and reducing their quality.
- **Food security issues**: Ineffective storage hinders farmers' ability to keep enough beans for consumption between harvests, threatening food security and livelihoods.

Solution

- **Airtight sealing**: The multi-layer design blocks air and moisture, preventing pest infestations without chemicals.
- **Moisture control**: Hermetic bags maintain stable moisture levels, inhibiting fungal growth like aflatoxin.
- **Long-term preservation**: They preserve beans for up to two years, maintaining quality and cooking time.
- **High durability**: Made from strong, reusable materials, hermetic bags ensure reliable grain storage.

Key points to design your project

To integrate PICS bags into your project:

- **Cost Analysis**: Bags cost $1 to $1.5 each (50kg or 100kg capacity). Estimate the number needed.
- **Supply Chain**: Identify suppliers, including delivery costs and any import duties.
- **Training**: Budget for training sessions and ongoing support.
- **Communication**: Create promotional materials (flyers, videos, etc.).
- **Grain Preparation**: Ensure grains are properly dried before storage, using moisture measurement devices if necessary.

These steps will help enhance food security and reduce post-harvest losses.

Cost: $$$ **2—3 USD**
Bag cost for users

ROI: $$$ **90 %**
Reduction of loss

50 or 100 Kg
Bag capacity

2 year
Life span

IP
Trademark

Technology from

ProPAS

Commodities

Common bean, Rice, Wheat, Maize, Sorghum/Millet, Soybean

Sustainable Development Goals

Categories

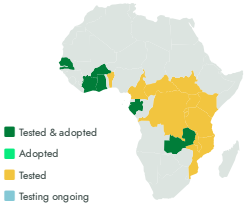
Prevention & storage, Equipment, Post-harvest handling

Best used with

Mechanized Threshing Operations

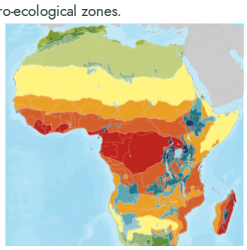
See all 1 technologies online

Tested/adopted in



Where it can be used

This technology can be used in the colored agro-ecological zones.



Millet and Sorghum Technologies Toolkit

https://taat.africa/ubx

ABOUT US

TAAT

TAAT, Technologies for African Agricultural Transformation, is an African Development Bank initiative to boost agricultural productivity by rapidly rolling out proven technologies to more than 40 million smallholder farmers.

TAAT aims to double crop, livestock, and fish productivity by 2025 by engaging both public and private sectors to expand access to productivity-increasing technologies across the continent.TAAT advises African government who receive funding from international financial institutions such as the African Development Bank to help them integrate the best agricultural technologies in their development projects. TAAT also offers technical assistance for the integration of these technologies, when needed.

TAAT Technologies

TAAT definition of agricultural technologies is very broad: they include improved varieties, inputs, equipment, agricultural infrastructure, practices and agricultural policies. In short, any solution to an agricultural constraint. TAAT technologies have been developed by a wide variety of organizations: the CGIAR, other international research institutions, national research organizations, or the private sector.

TAAT Clearinghouse

Within TAAT, the Clearinghouse has the remit to select, profile and validate agricultural technologies, and showcase them in online catalogs to support the advisory role that the Clearinghouse offers to governments and the private sector. The Clearinghouse strives to be an 'honest broker' of technologies through its selection, profiling, validation and advice.

TAAT e-catalogs

The e-catalogs are designed to be used by decision-makers within governments, private sector companies or development organizations. They facilitate the search for appropriate solutions that are adapted to local conditions and requirements, and provide all necessary information, presented in jargon-free and easy to analyze technology profiles. Once a decision-maker has selected a technology of interest, the e-catalogs facilitate their direct contact with those who can help them implement the technology, whether they are a research group or a private company.

TAAT Technology Toolkits

Technology toolkits are hand-picked selections of technologies from the TAAT e-catalogs. We offer some curated toolkits for specific cases, and registered users can create their own toolkits, showcasing their selection of technologies. Toolkits can be used online and shared as links, as mini e-catalogs, they can also be downloaded, saved, shared or printed as collections of technology pitches in PDF format (pitches are one-page summaries of technology profiles, available for all technologies on the e-catalogs).

CONTACT

Chrys Akem – TAAT Program Coordinator: +234 8169020531
Dr Solomon Gizaw – Head, TAAT Clearinghouse: +251 900461992
taat-africa@cgiar.org | https://e-catalogs.taat-africa.org

TAAT is funded by the African Development Bank, the TAAT Clearinghouse is co-funded by the Bill and Melinda Gates Foundation and the African Development Bank.