Sorghum and Millet 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...

12 TECHNOLOGIES | CREATED ON JUN 10, 2024 BY TAAT PROFILING TEAM | LAST UPDATED OCT 24, 2025

TECHNOLOGIES IN THIS TOOLKIT

- **Precision Fertilizer Micro-Dosing for Millet and Sorghum Yield**...
- **Demi-lune technology**: Rainwater harvesting method
- **Motorized Crop Residue Processing for Animal Feed**
- **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**
- **Zaï Pits**: Water Harvesting and Soil Improvement

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.

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

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

Technology from

ProPAS

Commodities

Sorghum/Millet

Sustainable Development Goals

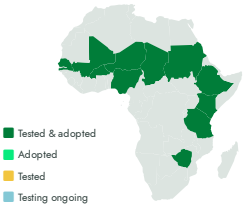
Categories

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.

Demi-lune technology: Rainwater harvesting method

Catch the Rain, Grow with the Grain!

The Demi-lune (Half-moon) technology is a simple rainwater harvesting method for dry regions. Farmers dig semi-circular pits (2–3 meters wide, 15–30 cm deep) to trap rainwater and enrich the soil with compost. This boosts crop growth, restores degraded land, reduces erosion, and improves soil fertility, making drylands productive again.

This technology is TAAT1 validated.

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

Inclusion assessment 4

Climate impact 7

Problem

- Scarce and erratic rainfall limits crop growth and productivity.
- Severe soil degradation and erosion reduce land fertility.
- Low crop yields threaten food security and economic stability.
- Lack of irrigation infrastructure leaves farmers reliant on unpredictable rainfall.
- Nutrient-poor soils hinder healthy plant development.

Solution

- Captures rainwater to boost water availability during dry spells.
- Prevents soil erosion and restores soil fertility.
- Increases crop yields and farming resilience.
- Low-cost, accessible alternative to irrigation.
- Enhances soil nutrients with organic matter.
- Restores vegetation and supports biodiversity.
- Strengthens food security and farmer livelihoods.
- Promotes sustainable, eco-friendly farming.

Key points to design your project

The **Half-Moon Implementation Framework** offers a structured approach to scale the use of half-moon pits for land restoration and climate-resilient agriculture. It focuses on integrating financial, technical, and capacity-building strategies to ensure sustainable, community-driven interventions in dryland areas.

Key Steps:

1. **Define Objectives**: Align with national priorities such as land restoration and climate adaptation.
2. **Develop Financial Plan**: Mobilize resources and promote farmer-driven scaling.
3. **Assess Capacity**: Provide necessary training for efficient implementation.
4. **Conduct Needs Assessment**: Tailor solutions to local conditions.
5. **Implement Monitoring**: Track progress on yields, soil health, and water retention.
6. **Evaluate and Refine**: Regularly assess impacts and adjust based on feedback.

This framework helps promote sustainable, scalable solutions to improve soil fertility, food security, and climate resilience in vulnerable regions.

IP

Open source / open access

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

Commodities

Sorghum/Millet, Maize, Cowpea, Common bean

Sustainable Development Goals

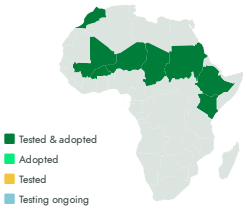
Categories

Production, Practices, Water management, Soil fertility

Best used with

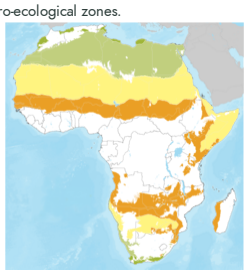
Water Harvesting and Soil Improvement, Contour Bunds for Water Harvesting
See all 2 technologies online

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

2 ZERO HUNGER · 13 CLIMATE ACTION · 15 LIFE ON LAND

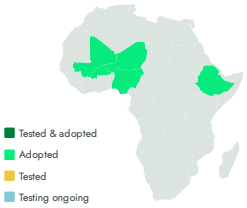
Categories

Pre-production, Equipment, Animal feed production

Best used with

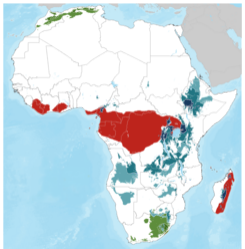
- Dual-purpose Millet Varieties for Crop and Livestock Integration ›

Tested/adopted in



Where it can be used

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



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

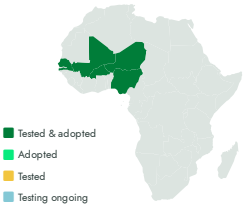
Categories

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

Inclusion 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.

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

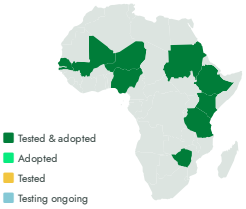
Categories

Post-production, Equipment, Agrifood processing

Best used with

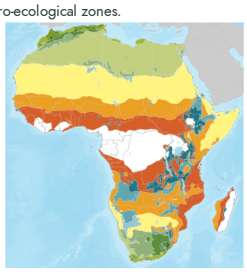
Millet and Sorghum Varieties for Better Nutrition and Stress Resistance
See all 1 technologies online

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

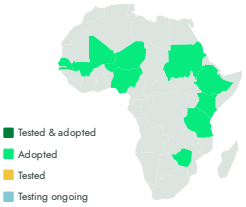
Categories

Production, Equipment, Land preparation

Best used with

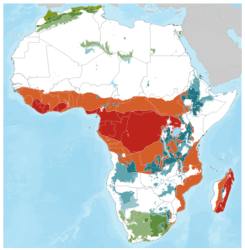
- Precision Fertilizer Micro-Dosing for Millet and Sorghum Yield Enhancement ›

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

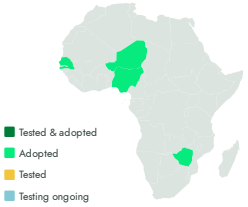
Sorghum/Millet

Sustainable Development Goals

Categories

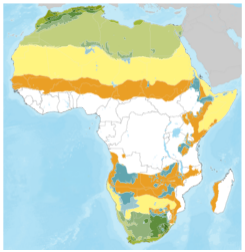
Production, Inputs, Natural Enemies

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

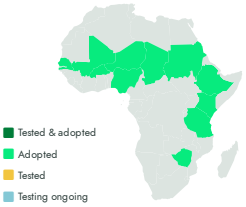
Categories

Production, Practices, Weed management

Best used with

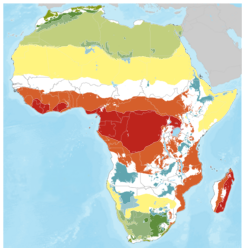
- Precision Fertilizer Micro-Dosing for Millet and Sorghum Yield Enhancement ›

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

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

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

Technology from

ProPAS

Commodities

Sorghum/Millet

Sustainable Development Goals

2 ZERO HUNGER

13 CLIMATE ACTION

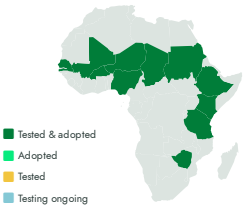
Categories

Production, Practices, Water management

Best used with

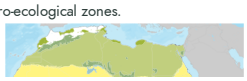
- Millet and Sorghum Varieties for Better Nutrition and Stress Resistance ›
- Precision Fertilizer Micro-Dosing for Millet and Sorghum Yield Enhancement ›
- Dual-purpose Millet Varieties for Crop and Livestock Integration ›

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

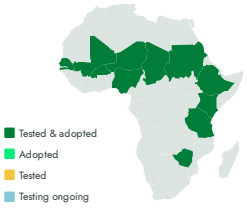
Categories

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)

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

Zaï Pits: Water Harvesting and Soil Improvement

Zaï pits are a traditional Sahelian technique for restoring degraded land by capturing rainwater and nutrients. Farmers dig small basins (20–40 cm wide, 10–20 cm deep) during the dry season, creating 12,000–25,000 pits per hectare to enhance water retention. Organic matter and 5–6 g of NPK or DAP per pit improve soil fertility, supporting millet and sorghum growth. This method boosts water infiltration, soil structure, and crop resilience in arid areas. Zaï pits can be combined with other dryland techniques like stone bunds and tied ridges for greater land restoration and productivity.

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

This technology is TAAT1 validated.

Scaling readiness: idea maturity unknown; level of use unknown

Inclusion assessment 4

Climate impact 7

Problem

- **Low rainfall and frequent droughts** in the Sahel reduce crop yields and threaten food security.
- **Soil degradation and crust formation** limit water infiltration and plant growth.
- **Nutrient-poor soils** hinder crop productivity, making farming unsustainable.
- **Runoff and erosion** lead to further soil loss and reduce available moisture for crops.

Solution

- **Increases crop resilience** by improving moisture availability during dry periods.
- **Boosts yields** by 60–90% for millet and sorghum compared to flat cultivation.
- **Restores degraded lands**, making marginal soils productive again.
- **Optimizes local resources** by incorporating organic and mineral fertilizers.
- **Is cost-effective and easy to adopt**, requiring only manual labor.

Key points to design your project

The **Zaï Pit Implementation** provides a structured approach for scaling up **Zaï pits** as a **land restoration and climate-resilient farming solution**. It integrates **financial, institutional, capacity-building, and technical aspects** to ensure sustainability and impact.

Key Steps:

1. **Define Objectives** – Align Zaï pit adoption with **national priorities** like food security and climate resilience.
2. **Financial Plan** – Secure funding through **government programs, NGOs, and climate funds**.
3. **Capacity Building** – Train **farmers and extension officers** on best practices.
4. **Needs Assessment** – Adapt **Zaï designs** based on local soil, rainfall, and cropping systems.
5. **Data & Governance** – Monitor **yields, soil health, and water retention** to guide policies.
6. **Impact Evaluation** – Track adoption and adjust strategies for **long-term sustainability**

60 - 90 %
Yield Improvement

IP
Open source / open access

Commodities

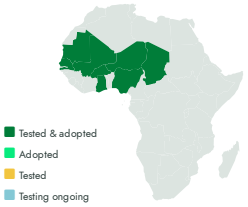
Sorghum/Millet

Sustainable Development Goals

Categories

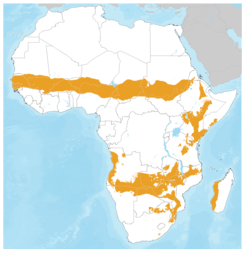
Production, Practices, Water management

Tested/adopted in



Where it can be used

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



Target groups

Farmers

Sorghum and Millet 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.