Mechanization technologies

Mechanization technologies refer to machines, equipment, and tools designed to automate or facilitate agricultural tasks such as plowing, planting, harvesting, and crop processing. These technologies aim to improve the efficiency, productivity, and profitability of agricultural operations by replacing or supplementing manual labor with mechanized processes.

17 TECHNOLOGIES | CREATED ON APR 15, 2024 BY TAAT PROFILING TEAM | LAST UPDATED APR 30, 2024

TECHNOLOGIES IN THIS TOOLKIT

EQUIPMENT

- **Rice Threshing and Polishing Machines**: Axial flow thresher and...
- **Motorized Planter and Fertilizer Applicator (Sénékéla)**: Mechaniz...
- **Combine Harvesters for Wheat and Fleet Management tool**
- **Mechanized Cassava Planting and Harvesting**
- **Cut and Bury**: Motorized weeders for rice production
- **MoneyMaker Solar pumps**: Mechanized irrigation pumps
- **Advanced Weed Management**: Mechanical and Chemical Weed...
- **Flour Milling and Blending Systems for Wheat, Sorghum a...**
- **GEM system**: Parboiling equipment for rice
- **GrainMate**: Grain Moisture Meter
- **Mechanized Defeathering and Egg Sorting**
- **Pneumatic Cassava Dryers**
- **Mechanized Threshing Operations**
- **Mobile Cassava Processing Plant**
- **Motorized Crop Residue Processing for Animal Feed**

DIGITAL APPLICATIONS

- **Hello Tractor**: Contract mechanization apps

PRACTICES

- **Mechanized Processing and Value Addition for Fish Products**

https://e-catalogs.taat-africa.org/toolkits/pfnwlx0larfhsdewep5x6zkhyoqlclrf

Rice Threshing and Polishing Machines: Axial flow thresher and improved quality polishing

Efficient rice threshing and polishing for premium quality grains, boosting income and market access in african communities.

Axial flow threshers utilize a rotating drum to separate rice grain from the surrounding husk, while abrasive polishers remove outer bran layers. Key parts are made of stainless steel for durability and hygiene. These equipment can be powered by diesel/petrol generators or solar installations for easy use in rural areas.

Africa Rice Center
Sali Atanga Ndindeng

This technology is TAAT1 validated.

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

Cost: $$$ **4500 USD**
Local thresher

20 %
Losses reduced

15000—20000 USD
Advanced polishers and whiteners

3000 USD
Small bench-top polishers

IP
Patent granted

Problem

- High grain losses due to manual threshing methods.
- Inefficiencies in the traditional polishing process, particularly manual rubbing.
- Time-consuming and labour-intensive artisanal practices.
- Difficulty in processing large volumes of rice in communities.

Solution

- The motorized axial flow threshers reduces grain breakage and loss compared to traditional manual methods.
- The mechanized equipment drastically reduces the time and labour required for threshing and polishing.
- The mobile units are designed to be highly mobile and can be easily transported to even remote rural areas.

Key points to design your business plan

The Axial flow thresher and improved quality polishing technology appeals to manufacturers, resellers, and users (farmers).

- Identify raw material suppliers and efficient transportation methods.
- Source equipment from reputable manufacturers and ensure proper transportation and storage.
- Determine costs and highlight benefits to attract farmers, development projects, and cooperatives.

Gender assessment 4

Climate impact 7

Technology from

ProPAS

Commodities

Rice

Sustainable Development Goals

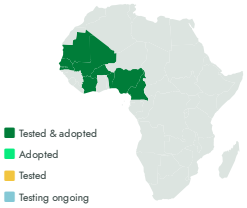
2 ZERO HUNGER

8 DECENT WORK AND ECONOMIC GROWTH

Categories

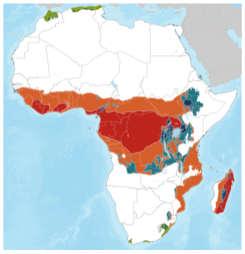
Harvest, Equipment, Post-harvest handling

Tested/adopted in



Where it can be used

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



Target groups

Farmers

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

1000 USD

Unit of Sénékéla

IP

Open source / open access

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 business plan

The Mechanized Tillers, Planters, and Fertilizer Applicators technology presents opportunities for manufacturers, resellers, and users (farmers) to enhance agricultural efficiency.

For Manufacturers:

- Identify suppliers of raw materials.
- Ensure efficient transportation and storage.
- Evaluate costs and target customers such as resellers, cooperatives, and agricultural associations.

For Resellers:

- Source equipment from reputable manufacturers.
- Arrange efficient transportation and storage.
- Consider costs and target customers like farmers, development projects, and cooperatives.

For Users:

- Utilize mechanized equipment to improve farming.
- Partner with sellers or equipment managers.
- Consider equipment costs and benefits.

Gender assessment 4

Climate impact 5

ICRISAT
INTERNATIONAL CROPS RESEARCH INSTITUTE FOR THE SEMI-ARID TROPICS

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

Technology from

ProPAS

Commodities

Sorghum/Millet

Sustainable Development Goals

2 ZERO HUNGER

8 DECENT WORK AND ECONOMIC GROWTH

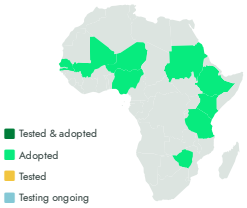
Categories

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

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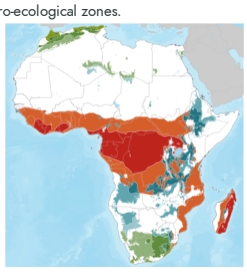


Combine Harvesters for Wheat and Fleet Management tool

Efficient Harvesting, Smarter Fleet Management

The combine harvester is a modern agricultural machinery designed to perform multiple harvesting operations as threshing, gathering, and winnowing, all in a single process. Available in various sizes, its suitable for crops like wheat, maize, rice, soybean, barley, sunflower, and more.

Combine harvester operating in Sudan

ICARDA
Science for resilient livelihoods in dry areas

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

This technology is TAAT1 validated.

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

Cost: $$$ **12,000—500,000 USD**
Unit of combine harvesters

35 %
Reduced harvest losses

56—63 USD
harvesting unit cost per Ha

IP
Unknown

Problem

- Traditional manual harvesting is time-consuming and demands significant labor.
- Conventional threshing methods are slow and risk potential grain loss.
- Manual separation of grain from chaff is inefficient, leading to impurities.
- Older methods may have limited capacity, resulting in slower operations.

Solution

- Combine harvesters automates the harvesting process, reducing the need for manual labor.
- Its offers threshing mechanisms, minimizing grain loss during harvesting.
- Its incorporate separation technologies, ensuring effective grain separation and reducing impurities.
- Help to increases harvesting capacity.

Key points to design your business plan

The Combine harvesters and fleet management technology cater to the interests of resellers, fleet managers, and users (farmers).

- They all benefit by addressing farmers' needs to reduce crop losses,
- contributing to global nutrition and empowering diverse farming communities.
- The Hello Tracteur app optimizes fleet management.

Gender assessment 4

Climate impact 6 1

Technology from

ProPAS

Commodities

Maize, Rice, Wheat, Soybean

Sustainable Development Goals

2 ZERO HUNGER

8 DECENT WORK AND ECONOMIC GROWTH

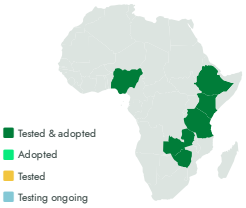
Categories

Harvest, Equipment, Land preparation

Best used with

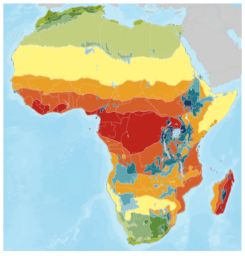
- Contract mechanization apps ›

Tested/adopted in



Where it can be used

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



Target groups

Farmers

Mechanized Cassava Planting and Harvesting

Empowering Cassava Farmers: More Yield, Less Labor, Better Quality

Mechanized cassava planting and harvesting technology is a specialized equipment of two-row planters and harvesters, typically operated by tractors. This technology improves the efficiency of cassava farming by reducing labor requirements.

International Institute of Tropical Agriculture (IITA)
Adebayo Abass

This technology is TAAT1 validated.

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

Cost: $$$ **367 USD**
Mechanical cassava production

50 %
Reduced of manual cost operation

13 USD/ha
Cost of mechanized planting

25 USD/ha
Cost of mechanized harvesting

IP
Open source / open access

Problem

- Low cassava yields (10 t/ha) compared to global competitiveness (minimum expected yield of 25 t/ha).
- Labour-intensive and time-consuming planting and harvesting operations.
- Lack of mechanization and use of modern agricultural technologies in cassava production.

Solution

- Increase productivity and efficiency in cassava farming. The yield from mechanically managed farm could increase by 38% over the yield in the manually managed farm.
- Reduce production costs associated with manual labor.
- Improve competitiveness of the cassava sub-sector by enhancing productivity and reducing costs through mechanized operations.

Key points to design your business plan

The Mechanized Cassava Planting and Harvesting technology presents opportunities for fleet managers and users (farmers).

To integrate it in your business,

- Source equipment from countries like Ethiopia, Kenya, Nigeria, Tanzania, Zambia, and Zimbabwe.
- Identify efficient transportation methods and suitable storage facilities.
- Determine costs based on technology size, including transport, import duties, and taxes.
- Consider cost structures, including self-contained planting and harvesting machines.

Gender assessment 4

Climate impact 7

Technology from

ProPAS

Commodities

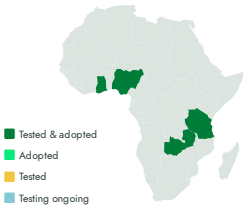
Cassava

Sustainable Development Goals

Categories

Production, Equipment, Land preparation

Tested/adopted in



Where it can be used

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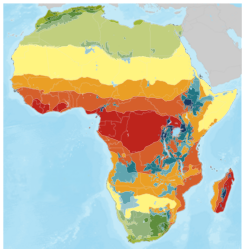


Target groups

Farmers

Cut and Bury: Motorized weeders for rice production

Effortless Weed Control for Bountiful Harvests

The Motorized Weeders for rice production (cut and bury) technology eliminate weeds in rice crops. The rotating blades of the weeders ensure effective weeding while minimizing damage to rice crops and soil. These machines can be used from the germination of rice plants until the canopy closes.

Africa Rice Center
Kalimuthu Senthilkumar

This technology is TAAT1 validated.

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

Cost: $$$ **550—750 USD**
Cut & bury with a 2-stroke petrol engine

ROI: $$$ **80 %**
Labour-saving for weeding.

IP
Open source / open access

Problem

- Labor-intensive manual clearing of paddy fields
- Inefficient weed control methods leading to reduced rice yields
- Limited access to affordable and effective mechanized weeders for smallholder rice farmers

Solution

- Introduction of motorized weeders for efficient clearing of paddy fields
- Adoption of mechanized weed control methods to increase rice yields
- Provision of affordable and effective mechanized weeders for smallholder rice farmers

Key points to design your business plan

The Motorized Weeders for rice production (cut and bury) technology appeals to manufacturers, resellers, and users (farmers).

For Manufacturers:

- Identify raw material suppliers and efficient transportation methods.
- Evaluate costs and target customers like resellers, cooperatives, and development projects.

For Resellers:

- Source equipment from reputable manufacturers and ensure proper transportation and storage.
- Determine costs and highlight benefits to attract farmers, development projects, and cooperatives.

For Users:

- Utilize motorized weeders to enhance farming efficiency.
- Partner with sellers.

Gender assessment 4

Climate impact 7

Technology from

ProPAS

Commodities

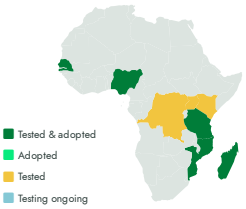
Rice

Sustainable Development Goals

Categories

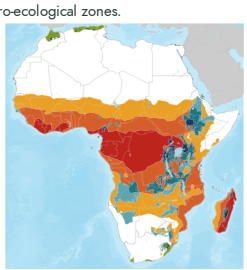
Production, Equipment, Land preparation, Weed control

Tested/adopted in



Where it can be used

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



Target groups

Farmers

MoneyMaker Solar pumps: Mechanized irrigation pumps

Low-cost and fast irrigation technologies for smallholder farmers.

The MoneyMaker Solar pump, weighing 2kg and complemented by a 60W solar panel, operates as a compact submersible pressure pump. This solar-powered solution offers a lightweight and efficient option for small-scale irrigation, reducing reliance on manual methods and traditional power sources.

This technology is pre-validated.

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

IP

Trademark

Problem

- Small-scale farmers in sub-Saharan Africa face challenges due to water scarcity.
- Labor-intensive irrigation methods such as bucket systems are inefficient and labor-intensive.
- Limited financial resources hinder smallholder farmers' adoption of modern irrigation technologies.

Solution

- MoneyMaker offer efficient and affordable solutions to address water scarcity.
- Replaces manual and labor-intensive irrigation techniques with more efficient and sustainable options.
- Provides affordable irrigation options like the Starter Pump, facilitating the transition from traditional methods to more productive practices for smallholder farmers.

Key points to design your business plan

The MoneyMaker Solar pump offers technology appeals to manufacturers, resellers, and farmers.

Manufacturers

- Identify reliable suppliers of raw materials.
- Establish efficient transportation methods.

Resellers

- Source pumps from reputable manufacturers.
- Develop efficient transportation channels.

Users

- Partner with experienced sellers or managers.
- Understand the cost of acquiring and operating pumps.

Gender assessment 4

Climate impact 7

KickStart International Inc.
Alan Spybey

Commodities

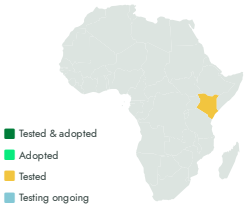
horticultural crops, Vegetable crop

Sustainable Development Goals

Categories

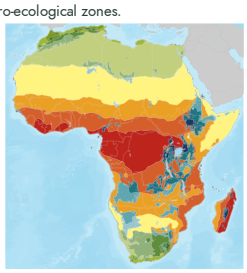
Production, Equipment, Land preparation

Tested/adopted in



Where it can be used

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



Target groups

Farmers, Manufactures

Advanced Weed Management: Mechanical and Chemical Weed Management

Mechanized weeders: A mini-tiller with vertical tines (left), a cutter with horizontal rotating blade (center), and a multi-purpose backpack weeder (right)

Weed Management for Optimal Yield

The Mechanical and Chemical Weed Management technology combines mechanical and chemical methods to control weeds in agricultural fields effectively. It aims to maximize crop yields by removing weeds throughout the growing season, improving crop health, and boosting agricultural productivity.

This technology is TAAT1 validated.

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

250—500 USD
Mechanical weeders/unit

ROI: $$$ **35 %**
Net profit from implementing the technology in Ethiopia

27 USD
Pre-emergent herbicide and labor/Ha

46 USD/ha
Equipment and labor

743 USD
Net profit per Ha from implementing the technology in Ethiopia

IP
Open source / open access

Problem

- Common beans suffer significant yield losses due to weed encroachment.
- Weeds compete with beans for resources, hindering root and shoot development.
- Weed infestation can lead to pest and disease issues for common beans.
- Allelopathic chemicals from weeds harm common bean root systems.
- Shading by tall weeds increases the risk of bean stem lodging.
- Manual weed removal is labor-intensive and costly, impacting bean farming productivity.

Solution

- Increased productivity and higher yields
- Reduced labor and costs compared to manual weed removal
- Enhanced crop health by eliminating weeds that harbor pests and diseases
- Adaptability to various common bean growing areas
- Improved profitability and economic sustainability for farmers

Key points to design your business plan

- Increased agricultural productivity, crop yields, and weed management efficiency
- Reduced labor and costs
- Enhanced food security and economic growth in farming communities
- Promotion of sustainable practices and better livelihoods for farmers
- Consideration of costs for herbicides, mechanical weeders, and maintenance
- Importance of training and delivery expenses
- Potential for higher profits with the implementation of weed management strategies

Gender assessment 4

Climate impact 7

Alliance

The Alliance of Bioversity International and the International Center for Tropical Agriculture (CIAT)
Justin Mabeya Machini

Technology from

ProPAS

Commodities

Common bean

Sustainable Development Goals

+ 1 more

Categories

Production, Equipment, Weed control

Best used with

- Integrated Management of Insects, Diseases and Weeds in common bean ›

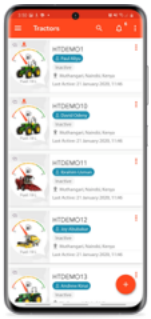
Tested/adopted in

Where it can be used

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

Hello Tractor: Contract mechanization apps

Enhance crop productivity, reduce labour costs, and increase incomes with Hello Tractor - the digital platform revolutionizing agricultural mechanization in Sub-Saharan Africa.



Hello Tractor is a digital platform facilitating the sharing of agricultural power equipment, connecting owners and smallholder farmers. It incorporates monitoring devices to gather vital data about tractors, harvesters, and other equipment, allowing for efficient management and optimization.

This technology is TAAT1 validated.

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

Cost: $$$ **75 - 210 USD**

Cost of getting the technology

60—70 USD

Cost of renting a four-wheel tractor for 4 hours

IP

Copyright

Problem

- Limited access to modern agricultural technologies for small-scale producers.
- High costs and risks associated with operating tractors and power equipment on farms.
- Inadequate information and communication channels for farmers to access mechanization services.
- Inefficient management of agricultural equipment, leading to underutilization and suboptimal performance.
- Limited scalability of mechanization services in smallholder farming communities.

Solution

- Access to modern agricultural technologies for small-scale producers
- Cost-effective and risk-minimized operation of agricultural equipment
- Improved information and communication channels for farmers
- Efficient management of agricultural equipment
- Scalability of mechanization services in smallholder farming communities

Key points to design your business plan

- Hello Tractor facilitates affordable mechanized farming, combating poverty and boosting agricultural productivity. Its digital platform enhances tractor efficiency, revolutionizing agriculture.
- Technology costs range from $75-$210, with additional expenses for training, phones, and data.
- The Pay-As-You-Go (PAYG) Financing Program allows new tractor owners to pay per acre serviced over 3-5 years, offering collateral-free financing and suitable implements like disc ploughs and harrows.
- Eligible participants include registered cooperatives and individuals meeting a 500 Ha threshold.

Gender assessment 4

Climate impact 7

Hello Tractor
Rispa Miliza

Technology from

ProPAS

Commodities

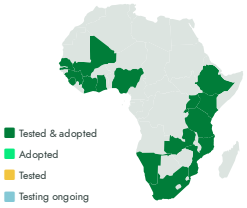
Maize, Rice, Wheat, Sorghum/Millet, Cowpea, Groundnut, + 5 more

Sustainable Development Goals

Categories

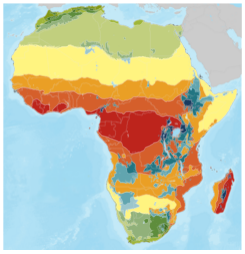
Production, Market, Digital applications, Supply chain management, Crop management

Tested/adopted in



Where it can be used

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



Target groups

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.

This technology is TAAT1 validated.

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

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

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 business plan

To use this technology, consider:

- Costs include around 3,500 USD for a small manual mill
- Approximately 38,000 USD for a fully automatic mill with a 30-ton daily capacity.
- Training on safety and quality is important, and key partners involve agro dealers or manufacturers.
- Estimating profit is crucial for implementation.

Gender assessment 4

Climate impact 3

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

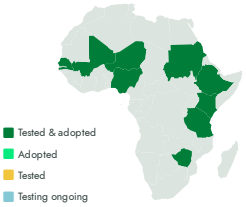
Categories

Transformation, Equipment, Agrifood processing

Best used with

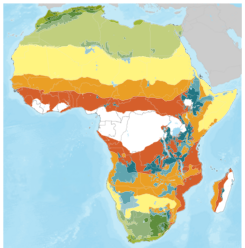
- Millet and Sorghum Varieties for Better Nutrition and Stress Resistance ›

Tested/adopted in



Where it can be used

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



GEM system: Parboiling equipment for rice

Reduce milling losses, enhance nutritional and organoleptic quality

The technology improves rice parboiling with a new design, replacing traditional methods prone to emissions. Tailored for small to medium-scale processors, it enhances efficiency and product quality, reducing steaming time and improving grain quality significantly.

Africa Rice Center
Sali Atanga Ndindeng

This technology is TAAT1 validated.

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

Cost: $$$ 5000 USD
Equipment

ROI: $$$ 70 %
Internal rate of return for a GEM parboiling system

0.64 USD
firewood per 100kg of rice

IP
Open source / open access

Problem

Traditional, Old-Fashioned Parboiling Methods are:

- Inefficiency and high labor requirements
- Excessive losses during dehulling
- Degradation of nutritional value
- Inferior sensory qualities

Solution

- Reduces steaming time to 20-25 minutes, minimizing emissions exposure.
- Improves grain translucency, reduces chalkiness, and boosts nutritional value.
- Provides low glycemic index, increased fiber, and higher vitamin B availability.
- Allows longer storage as rice flour, aiding food security.
- Made from simple, locally available materials, easily scalable in remote areas.

Key points to design your business plan

This technology is beneficial for three main groups: manufacturers, resellers, and end users (farmers).

Target wholesale distributors, development projects, and government agencies.

Costs vary; main expense is USD 500 for gasification stove installation.

GEM technology reduces firewood expenses from USD 1.83 to USD 0.64 per 100 kilograms of rice.

Gender assessment 4

Climate impact 4

Technology from

ProPAS

Commodities

Rice

Sustainable Development Goals

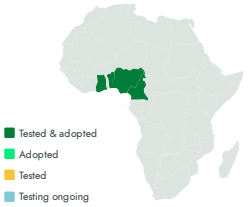
Categories

Transformation, Equipment, Agrifood processing

Best used with

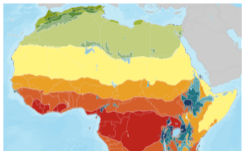
- Advanced rice varieties for Africa ›
- High yield rice varieties for Africa ›
- RiceAdvice digital support ›

Tested/adopted in



Where it can be used

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



GrainMate: Grain Moisture Meter

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

The GrainMate Moisture Meter is a portable instrument designed for measuring the moisture content of grains. It enables farmers and grain storage professionals to quickly and accurately assess the moisture levels in harvested crops, a critical factor in ensuring grain quality and preservation.

Sesi Technologies Limited
Isaac Sesi

This technology is pre-validated.

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

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

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

Problem

- Farmers lose grains because they don't dry them well after harvesting.
- It's hard for farmers to check if their grains are dry enough before putting them in storage.

Solution

- GrainMate measures how much moisture is in the grains, whether during or after drying.
- It helps farmers keep track of moisture levels, preventing losses after harvesting.
- GrainMate is a tool that is easy to get and simple to use, especially helpful for farmers in sub-Saharan Africa where losing grains after harvest happens often.

Key points to design your business plan

GrainMate Moisture Meter technology benefits both resellers and end users (farmers). For better integration in your business:

- Identify bulk sources for acquiring GrainMate Moisture Meters, available in Kenya, Rwanda, Ghana, Nigeria, Malawi, Zimbabwe.
- Optimize transportation and storage methods.
- Target customers include local retailers, development projects, farmers, and farmer cooperatives.
- Training is essential; operational details are available in the tool notice or tech profile.
- Estimate profits from using the product in your business.

Gender assessment 4

Climate impact 4

Commodities

Maize, Sorghum/Millet, Soybean, Wheat, Groundnut

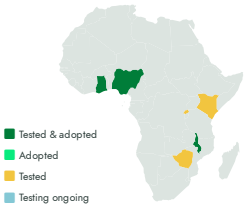
Sustainable Development Goals

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

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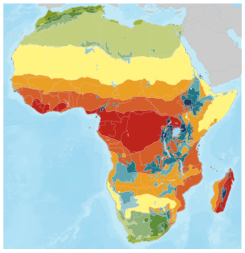


Target groups

Farmers, Processors

Mechanized Defeathering and Egg Sorting

Benchtop defeathering machine

Efficiency Unleashed: Poultry Processing, Simplified

Defeathering involves the use of machines with rotating metal discs and rubber fingers, efficiently removing feathers in 30 seconds. Egg sorting machines use weight-sensitive belts, ensuring precise grading based on quality parameters like weight, color, shape, and cracks.

International Livestock Research Institute (ILRI)
Adeniyi Adediran

This technology is TAAT1 validated.

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

Cost: $$$ **250—550 USD**
defeathering machine

ROI: $$$ **15—20 %**
ROI for defeathering business

5500—7000 USD
Egg sorting machine

IP
Copyright

Problem

- Time-consuming and inaccurate manual defeathering and egg sorting processes
- Delayed chicken processing reduces productivity, feed efficiency, and leads to rushed sales at lower prices, affecting profitability.
- Manual methods struggle to meet grade requirements for different poultry types and egg grades, impacting market acceptance.
- Manual egg sorting increases breakage risk, causing losses and affecting the overall quality of graded eggs.

Solution

- Mechanized machines remove feathers in 30 seconds, enhancing productivity.
- Quick defeathering maintains product quality, avoiding rushed sales.
- Automated sorting reduces costs, attracting premium prices for eggs.
- Machines efficiently handle various poultry types, reducing manual challenges.

Key points to design your business plan

Incorporating mechanized defeathering and egg sorting technology streamlines poultry processing, replacing labor-intensive manual methods with efficient automated processes. To integrate this technology, businesses need to:

- Invest in defeathering machines and egg sorting systems, ranging in cost depending on capacity and features.
- Evaluating the quantity of equipment needed based on production volume and collaborating with agricultural equipment suppliers or international resellers is essential.
- Technically competent personnel are required and ensure compliance with environmental regulations and waste management procedures.

Gender assessment 4

Climate impact 4

Technology from

ProPAS

Commodities

Poultry

Sustainable Development Goals

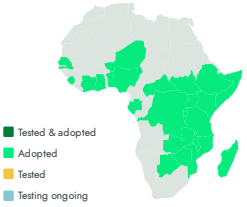
Categories

Transformation, Equipment, Land preparation

Best used with

- Processing chicken meat for cold storage ›

Tested/adopted in



Where it can be used

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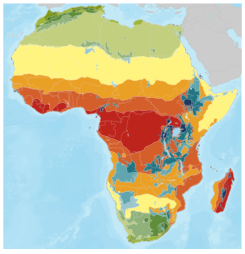


Target groups

Pneumatic Cassava Dryers

Low-cost mechanized drying of cassava using Flash Dryers

This technology promote the flash dryers which has the shortest residence time of drying, the most economical and widely used drying system for solids that have been dewatered or inherently have low moisture content. Thus, it's suitability for the production of starch, high-quality cassava flour (HQCF) and powdered fufu.

International Institute of Tropical Agriculture (IITA)
Adebayo Abass

This technology is **TAAT1 validated**.

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

IP

Open source / open access

Problem

- The challenge of efficient and cost-effective of dryers.
- Heat-sensitive materials
- High residence times of dryers.

Solution

- The Flash dryers have proven to be the most economical.
- They enable the production of starch, high-quality cassava flour (HQCF), and powdered fufu efficiently.
- This technology successfully addresses the challenges by providing a system that ensures a shorter residence time for drying and high drying rates.

Key points to design your business plan

The Mechanized drying of cassava using flash fryers technology presents opportunities for fleet managers and users (farmers). To integrate it in your business,

- Key partners include manufacturers of mechanized equipment specialized for this purpose.
- When assessing the cost structure, it's essential to consider expenses such as equipment procurement and maintenance, as well as additional costs like delivery, import duties, and taxes.

Gender assessment 4

Climate impact 5

Technology from

ProPAS

Commodities

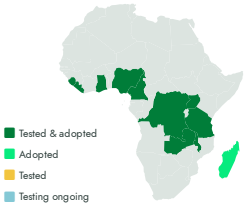
Cassava

Sustainable Development Goals

Categories

Transformation, Equipment, Agrifood processing

Tested/adopted in



Where it can be used

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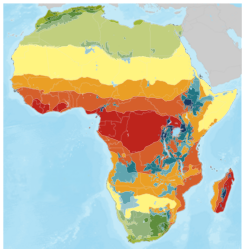


Target groups

Processors

Mechanized Processing and Value Addition for Fish Products

From Catch to Cuisine: Enhancing Fish Quality and Sustainability

Smoking kiln suitable for processed fish products

This technology is a fish processing and preservation method involving the use of equipment such as solar tent dryers and smoking kilns. Solar dryers offer a low-cost alternative to refrigeration, and smoking kilns utilize smoke to kill microorganisms while drying the fish.

WorldFish
Bernadette Fregene

This technology is TAAT1 validated.

8·7

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

1500 USD
Handheld electric fish scaler

1,000 USD	2,500 USD	2,000 USD	IP
Filleting equipment	Equipment for skinning and deboning 10 to 20 fish/minute	A greenhouse-style solar dryer 15 m × 8 m with capacity of 850 kg fish per batch	Patent granted

Problem

- Post-Harvest Losses, significant post-harvest losses occur due to bacterial activity and oxidation.
- High ambient temperatures in many regions accelerate the spoilage of fish,
- The availability of mechanized equipment and maintenance might pose challenges, particularly in resource-constrained areas.
- Traditional smoking kilns may consume significant energy and time.

Solution

- Fish processing and preservation technologies extend the shelf life of highly perishable fish, reducing post-harvest losses.
- These methods improve the palatability, taste, and nutritional value of fish products, enhancing their market acceptance.
- Solar tent dryers and smoking kilns are cost-effective and widely used, eliminating the need for refrigeration during transport and storage.

Key points to design your business plan

This technology benefits manufacturers, resellers, and end-users (farmers) in the fish processing industry.

- Key steps include sourcing raw materials, identifying efficient transportation methods, and exploring suitable storage facilities.
- Potential customers include wholesale distributors, development projects, and government agencies.
- Sourcing equipment from countries where technology is available, identifying efficient transportation methods, and exploring suitable storage facilities.
- Cost structure varies depending on equipment type and size, with initial investment offset by long-term savings in fuel costs.

Gender assessment 4

Climate impact 7

Technology from

ProPAS

Commodities

Fish

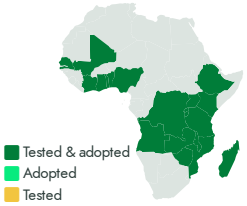
Sustainable Development Goals

2 ZERO HUNGER
3 GOOD HEALTH AND WELL-BEING
5 GENDER EQUALITY
12 RESPONSIBLE CONSUMPTION AND PRODUCTION

Categories

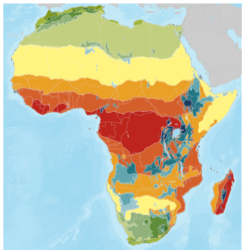
Transformation, Practices,
Agri-food processing

Tested/adopted in



Where it can be used

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



Target groups

Processors

Mechanized Threshing Operations

Efficient Threshing for Productive Farms

Mechanized Threshing Operations is equipment used to separate seeds or grains from harvested plants. It utilizes small petrol engines to process seeds and grains rapidly, offering a significant improvement in efficiency.

ImaraTech
Alfred Chengula

This technology is TAAT1 validated.

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

50 %
Threshing cost reduced

225 kg per hour
Maize processing

IP
No formal IP rights

Problem

- Manual threshing methods are inefficient, requiring approximately four hours of work to recover 100 kg of seed.
- Reliance on manual labor for threshing may limit agricultural productivity and efficiency.
- Limited availability or access to multi-crop threshers may hinder the processing of diverse crops.

Solution

- Different types of crops can be processed based on the screen mesh used in the thresher.
- Mechanized threshing is labor-efficient, processing 150 to 500 kg of saleable product per hour, depending on the crop.
- Processing times vary based on the size of the seed, with smaller seeds being processed more rapidly.

Key points to design your business plan

The mechanized threshing operations technology offers significant benefits to both fleet managers and users (farmers).

- Sourcing equipment from countries known for manufacturing or distributing mechanized threshers,
- Identifying efficient transportation methods and storage facilities, assessing costs, and enhancing fleet management with tools like the Hello Tracteur app.
- Additional considerations include operator charges and potential import duties and taxes when sourcing the technology from various countries.

Gender assessment 4

Climate impact 2 3

Technology from

ProPAS

Commodities

Common bean

Sustainable Development Goals

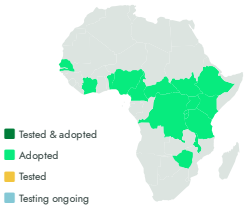
Categories

Prevention & storage, Equipment, Post-harvest handling

Best used with

- Hermetic Bags for Safe Storage of grain ›

Tested/adopted in



Where it can be used

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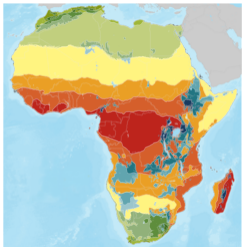


Mobile Cassava Processing Plant

Transforming Cassava, Mobile Processing for Sustainable Agriculture

The MCPP is a mobile unit equipped with machinery for processing cassava into products like high-quality cassava cake, wet fufu, and gari. It features a flatbed workspace formed by opening the back sides and tailgate, with standard operating procedures for specific products.

International Institute of Tropical Agriculture (IITA)
Adebayo Abass

This technology is TAAT1 validated.

6·6 Scaling readiness: idea maturity: 6/9; level of use: 6/9

Cost: $$$ **40000—48500** **USD**
Cost of a mobile processing factory

ROI: $$$ **156 %**
Gari production

52900 USD	**49386 USD**	**155 %**	**IP**
Startup Capital (gari production)	Startup capital (high-quality cassava cake)	ROI (high-quality cassava cake)	Open source / open access

Problem

- Limited market access for cassava farmers in rural areas due to inaccessible rural roads
- High risk of postharvest losses and transportation costs due to cassava's perishability and bulkiness
- Lack of necessary infrastructure (electricity, water, etc.) and labor in rural areas to attract investments in processing factories
- Inconsistent and inadequate supply of cassava roots for processors

Solution

- The MCPP is most useful for processing factory owners to process cassava at farm-gate into non-perishable semi-processed products that are 20-50% of the weight of fresh roots.
- The less bulky semi-processed products are transported from the farms at lower transportation cost to city-based factories for final drying and packaging at a competitive price and higher profitability.

Key points to design your business plan

Introducing the Mobile Cassava Processing Plant (MCPP) enhances cassava processing efficiency.

- Key partners include TAAT Cassava Compact.
- The estimated cost of a mobile processing factory ranges from 40,000 to 48,500 USD.
- Additionally, factor in supplementary expenses like delivery fees, import tariffs, and taxes, especially considering the technology may originate from Nigeria.

Gender assessment 4

Climate impact 4 1

Technology from

ProPAS

Commodities

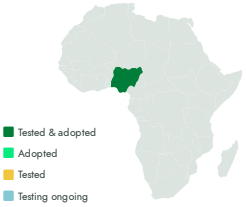
Cassava

Sustainable Development Goals

Categories

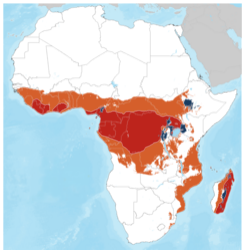
Transformation, Equipment, Agrifood processing

Tested/adopted in



Where it can be used

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



Target groups

Processors

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

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 that can handle all types of cereals	Unknown

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 business plan

For Manufacturers:
- To succeed, identify reliable suppliers for manufacturing machines and raw materials, considering transportation costs, import duties, and taxes.
- Potential customers include animal feed processing projects, farmers' cooperatives, and associations.

For Resellers:
- To enter the market effectively, identify reliable equipment sources, arrange transportation, and assess storage facilities.
- Costs vary by technology size, with self-contained stover chopping and crushing machines ranging from USD 1,250 to USD 1,700, and alternative cutters from USD 1,000 to USD 1,500. Consider additional expenses for transportation, import duties, and taxes.
- Target customers include farmers, development projects, and farmer cooperatives.

For Users:
- Key partners include sellers of crop residue processing for animal feed.
- Costs range from USD 1,000 to USD 1,700 for the technology, with potential additional expenses for transportation, import duties, and taxes.
- Optimal results can be achieved by integrating the technology with Dual-purpose Varieties for Crop and Livestock Integration.

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

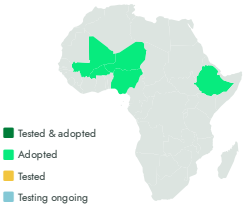
Categories

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

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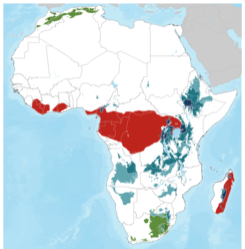

Gender assessment 4

Climate impact 6

Mechanization technologies

https://e-catalogs.taat-africa.org/toolkits/pfnwlx0larfhsdewep5x6zkhyoqlclrf

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).

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