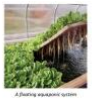


Water management technologies

These technologies aim to optimize the use of water for irrigation, improve soil moisture conservation, and enhance crop productivity while minimizing water wastage and environmental impact. They include techniques such as drip irrigation, rainwater harvesting, soil moisture sensors, and precision farming practices. Overall, these technologies help farmers make bett…

9 TECHNOLOGIES | CREATED ON APR 30, 2024 BY TAAT PROFILING TEAM | LAST UPDATED JUL 24, 2025




TECHNOLOGIES IN THIS TOOLKIT

- **Contour Bunding Technique (CBT)**: Contour Bunds for Water…
- **Precision Rice Irrigation and Surface Leveling**
- **Furrow Irrigated Raised Bed Wheat Production**
- **Aquaculture and vegetables Integration System**: Integrated…
- **MoneyMaker**: Low-cost irrigation pumps
- **MoneyMaker Solar pumps**: Mechanized irrigation pumps
- **Pond Liners to Save Water and Ease Maintenance**
- **Rice-fish culture**: Integrating rice and fish farming systems
- **DTMA & WEMA**: Drought Tolerant Maize Varieties and Water Efficie…

https://taat.africa/hnz

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

Cost: $$$ **9 USD**

Drawing contour line per ha

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

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 business plan

For farmers interested in the Contour Bunding Technique (CBT), here are the condensed steps:

1. **Learn**: Understand CBT's benefits for crop production and soil health.
2. **Train**: Attend sessions on bund construction techniques and land surveying.
3. **Plan**: Analyze your farm's landscape for optimal bund placement.
4. **Prepare**: Gather necessary resources for building and reinforcing bunds.
5. **Implement**: Construct bunds to create micro-catchments for water management.
6. **Evaluate**: Monitor your farm's progress and adjust as needed for continuous improvement.

Gender assessment 4

Climate impact 7

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

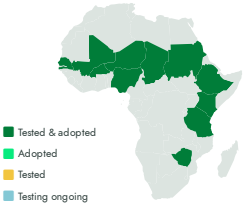
Categories

Production, Practices, Water management

Best used with

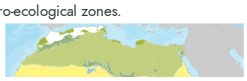
- Millet and Sorghum Varieties for Better Nutrition and Stress Resistance ›
- Precision Fertilizer Micro-Dosing for Millet and Sorghum Yield Enhancement ›
- Dual-purpose Millet Varieties for Crop and Livestock Integration ›

Tested/adopted in



Where it can be used

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



Precision Rice Irrigation and Surface Leveling

Level Up Rice Yields with Precision Irrigation and Resource Conservation

These technologies involve creating flat surfaces in rice fields and using pumps to evenly distribute water. This helps farmers save water, energy, and nutrients, improving rice growth and increasing yields.

This technology is TAAT1 validated.

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

Cost: $$$ **4 700—5 500 USD**

Add-on equipment

30—80 USD	**1 000 USD**	**800 USD**	**IP**
Hand-operated pumps	Solar-powered pump	High-pressure pumps	Unknown

Problem

- The variation in ground level significantly impacts rice yield, with a notable decrease.
- Leveling the land requires substantial effort from farmers.
- The irrigation methods employed by farmers can be costly and, at times, stress the plants.

Solution

- Engineered irrigation surfaces ensures a uniform distribution of water across the crop, optimizing growing conditions.
- Laser-guided systems and mechanized tools reduce the manual effort required, making the process more accessible for farmers.
- Water lifting technologies provide efficient water delivery also contributes to healthier plant growth, alleviating stress on the crops.

Key points to design your business plan

Engineered irrigation surfaces and water lifting technology are beneficial for fleet managers and farmers to reduce rice yield losses.

- Fleet managers should identify reliable sources for equipment, consider transportation methods, and explore storage facilities.
- Costs vary based on size, and potential customers include farmers, development projects, and cooperatives.
- For farmers, choosing the right equipment size is crucial, with costs ranging from 4,700 to 5,500 USD for small-scale soil leveling systems and 30 to 1,000 USD for water lifting tools.

Gender assessment 4

Climate impact 7

Africa Rice Center
Sali Atanga Ndindeng

Technology from

ProPAS

Commodities

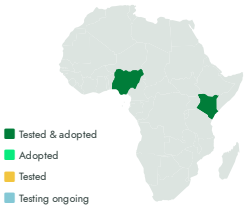
Rice

Sustainable Development Goals

Categories

Production, Practices, Water management

Tested/adopted in



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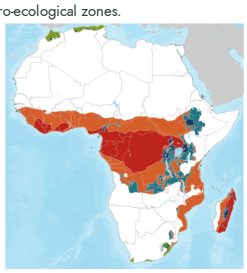


Target groups

Farmers

Furrow Irrigated Raised Bed Wheat Production

Smart Irrigation, Bountiful Harvests

This technique involves creating raised beds with furrows for planting crops, which ensures even irrigation and optimal soil moisture while reducing soil erosion and preventing waterlogging. It is effective with specific irrigated wheat varieties. In Ethiopia, suitable varieties include Amibera, Ga'ambo, Kakaba, Fentale-2, Shorima, Dandaa, and Ogolcho. In Nigeria, the varieties are Attila,...

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

This technology is TAAT1 validated.

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

Cost: $$$ **300 USD**
labor and input per ha

360 USD	**100—250 USD**	**IP**
sheet plastic per ha	water from planting to harvest	Open source / open access

Problem

- **Flooding wastes water:** Raises production costs.
- **Scattered fertilizer:** Costs more, harms environment.
- **Uncontrolled moisture:** Lowers yields, hurts productivity.
- **Limited freshwater:** Weakens drought resistance, hurts yields.

Solution

- **Saves water:** Targets furrows for optimal soil moisture.
- **Protects crops:** Raised beds prevent waterlogging and improve drainage.
- **Reduces waste:** Precise fertilizer application minimizes cost and environmental harm.
- **Boosts harvests:** Rainwater harvesting and controlled irrigation maximize water use for resilient crops.

Key points to design your business plan

For Farmers

Furrow-Irrigated Raised Bed Wheat Production involves creating raised beds and furrows in your field (slope < 3%).

Key considerations:

- Land suitability: Sandy, loamy, and clay soils are ideal.
- Labor: Use hand tools or rent a tractor-drawn bed shaper.
- Crop selection: Choose wheat suited for furrow irrigation and your climate.
- Planting: Research best planting times for your region.
- Inputs: Secure seeds, fertilizers, and pest control in advance.
- Irrigation: Implement a system to direct water to furrows (ditches or pipes).
- Training: Look for programs to learn best practices.
- Marketing: Plan how you will sell your wheat crop at harvest.

Gender assessment 4

Climate impact 7

Technology from

ProPAS

Commodities

Wheat

Sustainable Development Goals

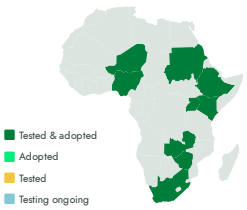
Categories

Production, Practices, Water management

Best used with

- Wheat Cultivation in Dryland through Winter Irrigation ›
- Minimal Tillage and Surface Mulching of Soils ›

Tested/adopted in



Where it can be used

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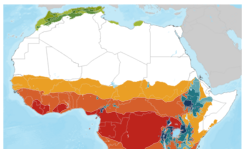


Aquaculture and vegetables Integration System: Integrated Aquaculture and Agriculture Systems

A floating aquaponic system

Aquaculture and Crops system for better yield

"Integrated Aquaculture and Agriculture Systems" is a method where fish and plants are co-cultivated. Fish waste serves as plant fertilizer, while plants purify the water for fish. This system optimizes resource use and enhances productivity in both aquaculture and agriculture.

This technology is **TAAT1 validated**.

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

2,000 USD
annual maintenance cost for 0.5 ha

50-100 USD	**2,466 USD**	**250,000 USD**	**IP**
one square metter of hydroponic plastic beds	average net income per acre	for 0.5 ha of fully equipped aquaponic system	Open source / open access

Problem

- Depleted soil: Reduced crop yields due to nutrient loss.
- Limited land: Difficulty expanding agriculture due to scarce arable land.
- Water competition: Farmers and fishers compete for water resources.
- Food insecurity: Difficulty accessing affordable protein.
- High feed costs: Traditional fish farming methods are expensive.

Solution

- Waste to Wealth: Fish waste nourishes crops, reducing fertilizer costs.
- Double Duty: Fish and crops share land, maximizing output.
- Water Sharing: Same water sustains both fish and crops.
- Protein on the Plate: Fish farming provides affordable protein.
- Feed Savings: Crop leftovers become fish food, lowering costs.

Key points to design your business plan

To integrate Aquaponics in Farm:

- Master aquaponics, research fish & plants for your region.
- Choose a sunny location with water access, design your system.
- Get essential components, source fish & seeds.
- Monitor water quality, manage nutrients, feed fish strategically.
- Research local preferences, identify buyers, plan transport & storage.
- Comply with any permits for aquaponics in your area.

Gender assessment 4

Climate impact 6

WorldFish
Bernadette Fregene

Technology from

ProPAS

Commodities

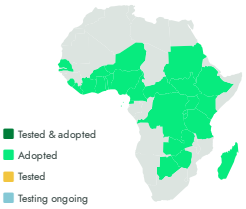
Vegetable crop, Fish

Sustainable Development Goals

Categories

Production, Practices, Yield improvement

Tested/adopted in



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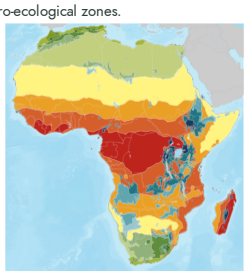


Target groups

Farmers

MoneyMaker: Low-cost irrigation pumps

Low-cost irrigation technologies for increasing incomes for smallholder farmers.

MoneyMaker offers a range of irrigation pumps suitable for small plots in sub-Saharan Africa, including the MoneyMaker Hip, Starter, and Max, with varying flow rates and capacities. These non-motorized pumps are compact and designed to support small-scale farmers in transitioning from rain-fed farming.

This technology is validated.

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

Cost: $$$ **50—90 USD**

Hip & Max Pumps cost

150 %

Farmer increases their farm produce

IP

Open source / open access

Problem

- Water scarcity affecting crop irrigation in small farms
- Challenges with manual and labor-intensive irrigation methods
- Financial barriers hindering adoption of modern irrigation technologies

Solution

- MoneyMaker irrigation pumps mitigate water scarcity by providing reliable water sources.
- They replace manual and labor-intensive methods, offering efficiency.
- Cost-effective solutions like the Starter Pump enable transition to sustainable practices.

Key points to design your business plan

The low-cost irrigation pumps 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 3

Climate impact 7

KickStart

KickStart International Inc.

Alan Spybey

Commodities

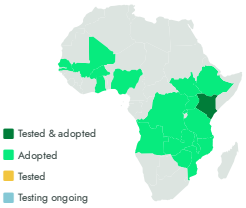
horticultural crops, Vegetable crop

Sustainable Development Goals

Categories

Production, Equipment, Irrigation

Tested/adopted in



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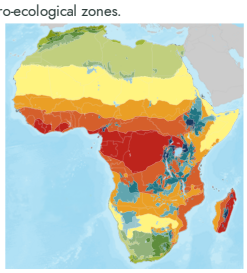


Target groups

Farmers, Manufactures

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

1.8 Liter/second
Water distribution

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

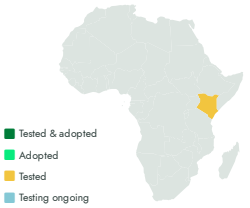
horticultural crops, Vegetable crop

Sustainable Development Goals

Categories

Production, Equipment

Tested/adopted in



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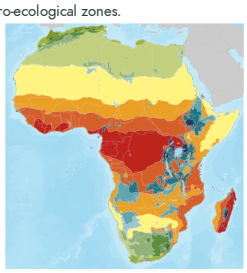


Target groups

Farmers, Manufactures

Pond Liners to Save Water and Ease Maintenance

Preserving Water, Pond Liners for Sustainable Fish Farming.

Pond liners, made of materials like PVC or polyethylene, act as synthetic geomembranes, preserving water, enhancing biosecurity, and simplifying pond maintenance. They are adaptable to various pond sizes and shapes, with plastic liners being robust but slightly harder to install in smaller ponds.

Excavated pond with liner

WorldFish
Bernadette Fregene

This technology is TAAT1 validated.

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

Cost: $$$ **500 USD**
a 15m x 10m x 1m pond.

ROI: $$$ **50 %**
reduction in water-related costs

2 - 3.5 USD/square meter
Sheet plastic

IP
Open source / open access

Problem

- Water seepage on porous soils like sands and silts causes significant water loss in ponds.
- Evaporation, especially in hot climates, further reduces water availability for fish farming.
- Algal blooms due to excessive nutrient levels can degrade water quality, affecting fish health and productivity.
- Inefficient nutrient cycling between water and sediment occurs without pond liners, necessitating intensive maintenance.
- Sandy soils and regions with limited access to freshwater are particularly vulnerable to water loss, worsening water scarcity for fish farmers.

Solution

- Prevents water loss and reduces evaporation by creating impermeable barriers.
- Enhances water quality by preventing algal blooms and promoting nutrient cycling.
- Facilitates pond construction in areas with porous soils or limited freshwater access.
- Offers flexibility in pond size and shape, accommodating different landscapes.
- Provides options for different liner materials, thicknesses, and installation techniques to suit diverse needs.

Key points to design your business plan

- Technology reduces water seepage and evaporation, conserving resources and cutting aquaculture costs.
- Promotes responsible water management, maintaining optimal water levels and preventing contamination.
- Aids in mitigating climate change impacts by conserving water and reducing emissions.
- Consider variable investment costs and delivery expenses for effective implementation.
- Context-specific methods should be identified for land leveling and water lifting.
- Key figures include plastic sheet costs, ranging from USD 2 to 3.50 per square meter.
- Plastic liner with sealing and installation costs around USD 500 for a 15 m x 10 m x 1 m pond.
- Rubber sheet lining can decrease water loss by up to 50%.
- Collaboration with aquaculture stakeholders is crucial for successful implementation.

Gender assessment 3

Climate impact 7

Technology from

ProPAS

Commodities

Fish

Sustainable Development Goals

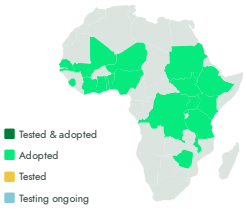
6 CLEAN WATER AND SANITATION

12 RESPONSIBLE CONSUMPTION AND PRODUCTION

Categories

Production, Equipment, Water management

Tested/adopted in



Where it can be used

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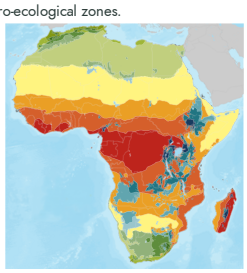


Target groups

Fish Farmers

Rice-fish culture: Integrating rice and fish farming systems

Rice-Fish System Boosts Profits, Enhances Lowland Land Use for Food Security and Prosperity

Rice-fish co-culture integrates rice and fish farming, boosting food security and farmers' income while ensuring environmental safety by eliminating agrochemicals. It's an innovative approach for food security, economic stability, and environmental sustainability.

AfricaRice

Africa Rice Center
Ephraim Sekyi-Annan

This technology is pre-validated.

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

Cost: $$$ **5,428 USD**
Initial Cost per Ha

ROI: $$$ **115 %**
Benefit

3,016 USD
Operating Cost

18,188 USD/ha
Benefit

IP
Open source / open access

Problem

- **Food insecurity:** Limited access to nutritious food, resulting in nutritional deficiencies.
- **Market vulnerability:** Dependence on rice exposes farmers to market fluctuations, contributing to economic instability.
- **Environmental pollution:** Overuse of agrochemicals leads to soil and water pollution, harming biodiversity and ecosystem health.

Solution

- **Enhanced profitability:** Rice-fish co-culture improves economic viability with a higher benefit-to-cost ratio (2.2), addressing food insecurity.
- **Market resilience:** Rice-fish farmers demonstrate greater resilience to market shocks due to diversified income sources, ensuring economic stability.
- **Nutrition security:** Fish consumption directly tackles nutritional deficiencies, enhancing food security with a diverse and nutritious diet.

Key points to design your business plan

- Rice-fish co-culture technology offers increased profitability, diversified income, improved food security, and enhanced climate resilience.
- Integration of fish farming with rice cultivation leads to higher economic returns and a more diverse diet.
- Initial cost: US$ 5,428 per hectare; Operating cost: US$ 3,016 per hectare.
- Training is crucial and should be planned for; a team of trainers can provide support during business installation.
- Key partners include fish farmers (fry sellers) and veterinarians.
- The technology has the potential to generate a profit of USD 18,188 per hectare, with a return on investment of 115%.

Inclusion assessment 4

Climate impact 6 1

Commodities

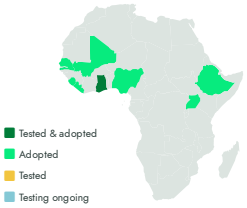
Rice, Fish

Sustainable Development Goals

Categories

Production, Practices, Water management, Production system

Tested/adopted in



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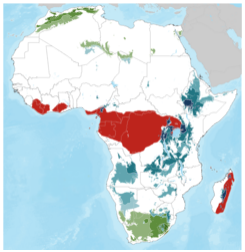


Target groups

Farmers, Fish Farmers

DTMA & WEMA: Drought Tolerant Maize Varieties and Water Efficient Maize Varieties

Enhance farm's resilience with DTMA and WEMA maize varieties, ensuring consistent yields even in unpredictable weather.

These seed technologies, developed conventionally and biotechnologically, enhance maize resilience to soil dryness and water scarcity, outperforming traditional varieties across various water stress levels in both dry and intermittently wet climates.

African Agricultural Technology Foundation (AATF)
Jonga Munyaradzi

This technology is TAAT1 validated.

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

Inclusion assessment 5

Climate impact 7

Problem

- **Dependence on Rainfall:** Over 90% of African maize farming is rainfed, leaving crops vulnerable to unpredictable weather patterns.
- **Yield Instability:** Conventional varieties are highly sensitive to water availability, leading to inconsistent yields.
- **Crop Failure Risk:** Insufficient rainfall can result in complete crop loss, jeopardizing livelihoods.

Solution

- **Enhanced Resilience:** DTMA and WEMA outperform conventional varieties under various water stress levels.
- **Increased Productivity:** Adoption of these varieties leads to substantial increases in maize grain production.
- **Improved Crop Resilience:** Crops become more robust, with heightened resistance to dry spells and low rainfall.

Key points to design your project

- Estimate seed quantity needed (0.8 to 1.2 USD per kg, 25 kg/ha).
- Factor in delivery costs, import duties (available in Kenya, Malawi, etc.).
- Arrange training and post-training support.
- Develop communication materials (flyers, videos, radio).
- Optimize with complementary techniques (e.g., IR maize, fertilizer blending).
- Collaborate with agricultural institutes and seed companies for implementation.

Cost: $$$ **0.8—1.2 USD/kg**	ROI: $$$ **240 USD**
Seed selling cost	Income per Ha
0.6 ton/Ha	**20—30 %**	**IP**
Yield increase	Larger grain harvest than common type	Unknown

Technology from

ProPAS

Commodities

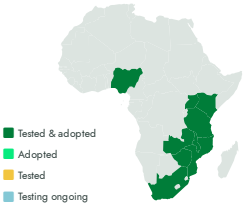
Maize

Sustainable Development Goals

Categories

Production, Improved varieties, Disease resistance, Yield improvement

Tested/adopted in



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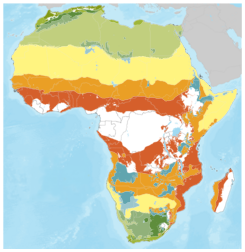

Target groups

Farmers

Water management technologies

https://taat.africa/hnz

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

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