


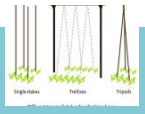


Alliance Bioversity and CIAT Technologies

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




TECHNOLOGIES IN THIS TOOLKIT

- **HIB varieties**: Biofortified Beans for Improved Nutrition
- **IPM**: Integrated Management of Insects, Diseases and Weeds in…
- **Advanced Weed Management**: Mechanical and Chemical Weed…
- **Low-Cost Staking for Climbing Beans**
- **Specialty Fertilizer Blends for Common Bean**
- **Low-dose pest control**: Seed dressing of Seed with Fungicide…
- **Climbing Bean with High Yield and N Fixation**
- **Bean Flour and Flour Products**: Bean processing process
- **Pre-Cooked Beans for Consumer Convenience**

https://taat.africa/lcg

HIB varieties: Biofortified Beans for Improved Nutrition

Fueling Health with Iron-Rich Beans

"Biofortified Beans for Improved Nutrition" technology develops high-iron bean varieties via biofortification to combat deficiencies in Sub-Saharan Africa. With 31 released varieties, it enhances regional food security and nutrition.

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

- Iron and zinc deficiencies leading to: Anemia, Impaired motor and cognitive development, Increased risk of maternal death and premature births, Low birth weight
- Weakened immune systems
- Increased susceptibility to infections
- Stunted growth

Solution

- Development of high-iron bean varieties through biofortification.
- Crossbreeding local elite lines with American bean varieties naturally rich in iron.
- Resulting in High-Iron Beans (HIB) with traits including: High productivity, Drought and disease tolerance, Preferred culinary characteristics, Quick cooking.
- Release of 31 HIB varieties in key production areas across Sub-Saharan Africa
- Enhanced food security and nutrition in the region.

Key points to design your project

Project activities include raising awareness, providing seeds, linking producers to markets, promoting demand, and establishing incentives.

Costs involve seed estimation, delivery, training, communication support, and collaboration with agricultural institutes and seed companies for implementation.

IP

Open source / open access

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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

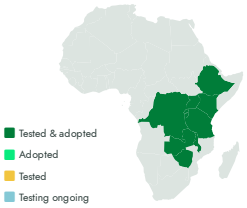
Categories

Production, Improved varieties, Quality improvement

Best used with

- Seed dressing of Seed with Fungicide and Insecticide ›
- Seed Inoculation with Rhizobia ›
- Specialty Fertilizer Blends for Common Bean ›

Tested/adopted in



Where it can be used

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

IPM: Integrated Management of Insects, Diseases and Weeds in common bean

Smart Solutions for Safer Farming

IPM is a holistic approach to managing pests, diseases, and weeds in common bean cultivation, emphasizing environmental sustainability and food safety. It reduces reliance on chemical pesticides and promotes natural control mechanisms for crop productivity and food security.

This technology is TAAT1 validated.

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

Gender assessment 4

Climate impact 6

Problem

- Common beans face threats from pests and diseases, affecting productivity.
- Chemical pesticides, though effective, pose health and environmental risks and can lead to pest resistance.
- Poor pest management can result in food insecurity and income loss for bean growers.
- Overreliance on pesticides disrupts natural ecological balance and control mechanisms.

Solution

- Holistic approach to crop protection
- Minimization of chemical pesticide usage
- Balanced ecosystems maintenance
- Understanding beneficial organisms' life cycles and interactions
- Utilization of strategies like natural predator release and cultural practices
- Effective against common bean pests, diseases, and weeds
- Adaptability to diverse soil and climate conditions

Key points to design your project

Integrated Pest Management (IPM) boosts crop productivity, ensures food security, and reduces pesticide-related health risks, promoting sustainability and biodiversity conservation. To integrate IPM into your project:

1. Identify pests and beneficial organisms, devising management strategies.
2. Understand short- and long-term benefits for pest control and costs.
3. Access control agents like predators and bio-pesticides, seeking guidance on their use.
4. Estimate needed quantities and provide proper training for application, factoring in training costs.
5. Develop communication materials and integrate IPM with other management practices.
6. Collaborate with agricultural institutes for successful implementation.

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

Installation of rearing colonies of parasitoid wasps

6,000 USD	**0.5 - 1 USD**	**25 - 35 USD/Ha**	**IP**
Operation cost per year	Coating 1kg of seed	Pre-emergence herbicides	Open source / open access

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Justin Mabeya Machini

Technology from

ProPAS

Commodities

Common bean

Sustainable Development Goals

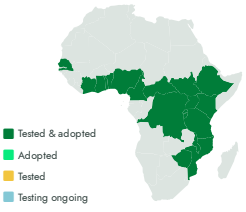
Categories

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

Best used with

- Mechanical and Chemical Weed Management ›
- Seed dressing of Seed with Fungicide and Insecticide ›

Tested/adopted in



Where it can be used

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

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

Gender assessment 4

Climate impact 7

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.
- 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 project

The technology enhances agricultural productivity, promotes food security, and creates employment while streamlining weed management and preserving land quality. To integrate it into your project:

- Raise awareness and provide capacity development.
- Facilitate access to financial support.
- Estimate costs for fertilizers and mechanical weeders.
- Consider delivery costs and import clearance.
- Provide training and post-training support.
- Develop communication materials.
- Integrate with other management practices.
- Collaborate with relevant institutions and suppliers.

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

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Justin Mabeya Machini

Technology from

ProPAS

Commodities

Common bean

Sustainable Development Goals

+ 1 more

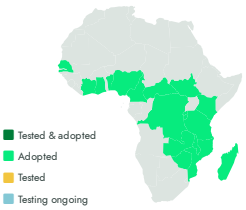
Categories

Production, Equipment, Weed control

Best used with

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

Tested/adopted in



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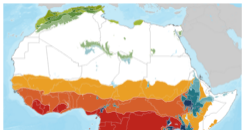
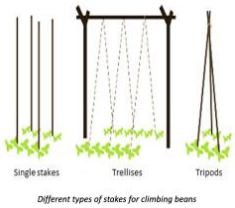


Low-Cost Staking for Climbing Beans

Empowering Beans, Sustaining Growth!



Different types of stakes for climbing beans

The Low-Cost Staking practice provides affordable solutions for supporting climbing bean cultivation, aiming to reduce reliance on wooden stakes and mitigate deforestation caused by their overharvesting.

This technology is TAAT1 validated.

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

Gender assessment 4

Climate impact 7

Problem

- Farmers face expense issues with plant support, leading to yield losses.
- Shortage of wooden stakes affects plant density and yield.
- Overharvesting of stakes harms forests and afforestation efforts.
- Knowledge of optimal density and stake length varies with method.

Solution

- Offers farmer-acceptable, lower-cost staking innovations.
- Utilizes tripod arrangements and string trellises to reduce wooden stakes.
- Recommends the use of agroforestry species and tall grasses for stakes.
- Improved yield and climbing bean production.

Key points to design your project

- The technology reduces bean cultivation costs, aiding poverty alleviation among small-scale farmers.
- It boosts food security with improved yields and creates job opportunities in rural areas.
- By promoting eco-friendly practices, it reduces reliance on deforestation for stakes and supports sustainability.
- Steps to integrate the technology include raising awareness, disseminating information, ensuring access to loans, and collaborating with agricultural institutions.
- Consider integrating complementary technologies for enhanced efficiency.

Cost: $$$

300 %	20,000—50,000 stakes per hectare	2 meters	~200,000 plants	IP
Increase in yields compared to bush beans	Staking density for highest yields	Height of stakes for highest yields	Plant population per hectare	Open source / open access

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Justin Mabeya Machini

Technology from

ProPAS

Commodities

Common bean

Sustainable Development Goals

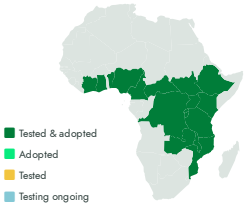
Categories

Production, Practices, Yield improvement, Production system

Best used with

- Climbing Bean with High Yield and N Fixation ›

Tested/adopted in



Where it can be used

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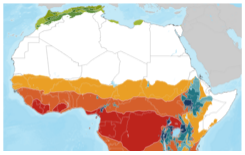

Specialty Fertilizer Blends for Common Bean

Boost your Bean Production Yield

Specialty Fertilizer Blends for Common Bean are custom fertilizers with essential nutrients like nitrogen, phosphorus, potassium, and sulfur. They address soil deficiencies in Sub-Saharan Africa and cater to the needs of common bean farming. This promotes efficient nutrient use, enhancing growth and overall crop health

Example of a fertilizer blend

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Boaz Waswa

This technology is TAAT1 validated.

Scaling readiness: idea maturity unknown; level of use unknown

Gender assessment 4

Climate impact 7

Problem

- **Soil Issues:** Many soils in Sub-Saharan Africa lack essential nutrients and suffer from low fertility, limiting the production of crops like common beans.
- **Insufficient Crop Resilience:** Crops like common beans are vulnerable to drought, pests, diseases, and stress, impacting their quality and yield. Specialty Fertilizer Blends for Common Bean are designed to address these issues.

Solution

- **Balanced Nutrient Provision:** Specialty fertilizers offer essential nutrients like nitrogen, phosphorus, potassium, and sulfur, addressing soil deficiencies in Sub-Saharan Africa.
- **Crop Health and Yield Enhancement:** The right nutrient mix boosts common bean productivity and resilience, helping them resist drought, pests, diseases, and stress.
- **Specific Crop Needs and Nutritional Value:** By blending various fertilizers, specific formulas for common beans are created, enhancing yield and nutritional value.

Key points to design your project

The "Specialty Fertilizer Blends for Common Bean" technology contributes to Sustainable Development Goals (SDGs) by improving bean yields and income, potentially empowering women in farming (SDG 5), positively impacting the climate (SDG 13), and enhancing productivity and resilience of common beans (SDGs 2 and 8).

To implement this technology:

- **Partnerships:** Identify fertilizer manufacturers interested in sustainable agriculture and improving bean yields.
- **Awareness:** Launch a campaign about the technology's benefits on bean yield and soil health.
- **Training:** Collaborate with the manufacturer to train farmers on using the technology effectively.
- **Product Development:** Develop the right fertilizer blends with the manufacturer based on local needs.
- **Distribution:** Utilize the manufacturer's network to make fertilizers accessible to farmers.
- **Demonstration Plots:** Showcase the technology's effectiveness.
- **Feedback:** Establish a mechanism to learn from farmers' experiences and improve the product.
- **Monitoring:** Regularly evaluate the technology's impact on bean yield and soil health.

IP

Unknown

Technology from

ProPAS

Commodities

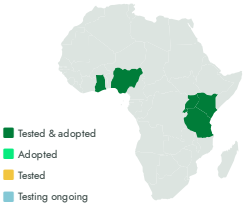
Common bean

Sustainable Development Goals

Categories

Production, Inputs, Fertilizer

Tested/adopted in



Where it can be used

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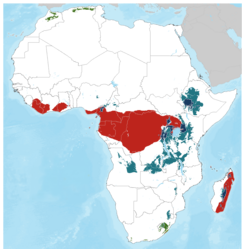

Target groups

Farmers

Low-dose pest control: Seed dressing of Seed with Fungicide and Insecticide

Pest control for optimum yields

Fungal wilting of seedling (left) and damage to bean sprout by stem maggots (right)

The "Seed Dressing with Fungicide and Insecticide" technology applies chemical agents to common bean seeds to combat fungal diseases and pests, boosting yields. This cost-effective and environmentally friendly method enhances crop protection making it widely applicable in agriculture.

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

- Common beans affected by fungal diseases (anthracnose, root rots) and insect pests (stem maggots), causing significant yield losses.
- Risk to profitability of improved crop varieties and farmers' investments in fertilizers.
- Diseases and pests harbored by seeds endanger the integrity of planting material stocks, jeopardizing future crops.
- Soil-borne diseases and insect pests pose severe risks, potentially leading to sparse plant density and crop failure, exacerbating food insecurity and economic instability.

Solution

- Dressing common bean seeds with chemical control agents presents an economical and eco-friendly method to prevent losses and boost production.
- This seed treatment approach leads to superior seedling emergence, reinforcing crop resilience throughout the growing season.
- Seed dressing ensures highly effective crop protection by uniformly applying control agents.
- Seed dressing offers a simple and adaptable solution that doesn't necessitate specialized equipment, making it easily implementable at farms and factories.

Key points to design your project

Identify and develop effective pesticides for seed treatment.

Estimate the quantity of pesticide needed.

Account for delivery costs to project sites and import clearance and duties if relevant, as the technology is available in various African countries.

Enhance the technology by associating it with other practices and technologies.

Collaborate with agricultural development institutes and seed multiplication companies to implement the technology effectively in your country.

0.5—1 USD

Fungicides and pesticides for 1-2 kg seed dressing

50 USD	500 USD	2,000 USD	IP
Equipment for manual application	Equipment for mechanized application for a small unit	Equipment for mechanized application for a large unit	Open source / open access

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Technology from

ProPAS

Commodities

Common bean

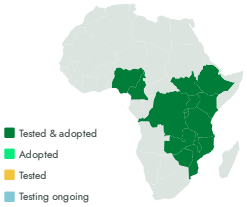
Sustainable Development Goals

Categories

Production, Practices,

Pest control (excluding weeds)

Tested/adopted in



Where it can be used

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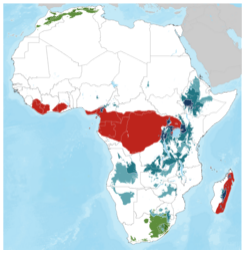

Climbing Bean with High Yield and N Fixation

Growing Prosperity: Climbing Beans for Food Security & Income Growth

Climbing beans, with their long vines and high growth, are a valuable crop for small-scale farmers in Sub-Saharan Africa. Improved varieties, bred for productivity, resilience, and superior nitrogen-fixing abilities, contribute significantly to food security and income in the region. These beans are also processed into various products for local and international markets.

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

- **Agricultural Challenges**: Limited yields and susceptibility to pests and diseases affect small-scale farmers.
- **Environmental Stresses**: Drought, poor soil quality, and nitrogen-depleted soils hinder bean cultivation.
- **Food Insecurity**: These challenges contribute to food insecurity and malnutrition in small-scale farming communities.

Solution

- **Higher Yields**: Climbing beans yield more than bush beans.
- **Pest/Disease Resistance**: These varieties resist common pests and diseases.
- **Stress Tolerance**: They thrive in adverse conditions.
- **Nitrogen Fixation**: The technology reduces fertilizer costs.
- **Food Security**: They provide a reliable food source for small-scale farmers.

Key points to design your project

To incorporate this technology into a project, the following steps are recommended:

1. **Promotion**: Highlight the benefits of improved climbing beans to attract interest.
2. **Seed Transfer**: Introduce elite varieties to seed multipliers for propagation and distribution.
3. **Market Connection**: Connect bean producers with buyers and food processors to ensure a ready market.
4. **Financial Support**: Provide financial aid to farmers for necessary investments in quality seed, fertilizer inputs, and staking.
5. **Streamlining Operations**: Make netting available to commercial producers to simplify trellising operations.

Additionally, consider the technology cost, seed requirements per hectare, delivery cost, import clearance, and duties. Training and communication support should be provided, and practices that enhance nitrogen fixation, pest and disease management, and drought resistance should be associated with this technology. Collaboration with agricultural development institutes and seed multiplication companies is recommended for implementation. The technology is available in various agroecosystems across Sub-Saharan Africa.

4.6 t/ha	92 kg	28 %	IP
Potential yield	N fixed per ha	Increase in bean consumption	Trademark

Alliance

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Josey Kamanda

Technology from

ProPAS

Commodities

Common bean

Sustainable Development Goals

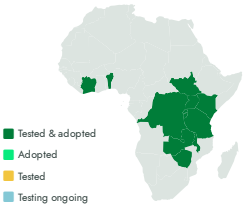
Categories

Production, Improved varieties, Disease resistance, Insect resistance

Best used with

- Low-Cost Staking for Climbing Beans ›
- Seed Inoculation with Rhizobia ›
- Seed dressing of Seed with Fungicide and Insecticide ›

Tested/adopted in



Where it can be used

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

Bean Flour and Flour Products: Bean processing process

Bean Flour Made Easy

The "Bean flour and flour-based products" technology processes common beans into flour, enhancing their nutrition and shelf life. It offers economic opportunities for farmers and businesses, with scalable equipment suitable for various production scales in both rural and urban settings.

This technology is TAAT1 validated.

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

Gender assessment 4

Climate impact 5 2

Problem

- Whole beans require significant time and energy for preparation, reducing appeal to urban consumers.
- Traditional bean preparation methods remain unattractive despite pre-cooked options due to time and energy constraints.
- Common beans contain substances that hinder protein, starch, and mineral absorption in the gut, affecting nutrition and digestibility.
- Processing newly harvested and tough-to-cook beans presents challenges in both palatability and preparation efficiency.

Solution

- Technology produces popular bean products in Sub-Saharan Africa.
- Begins with high-quality flour, reducing cooking time and costs.
- Processing boosts vitamin and nutrient availability.
- Methods like soaking and pressure cooking enhance bean digestibility.
- Bean flour prolongs product freshness.
- Provides lucrative markets for farmers and entrepreneurs.
- Opens new markets, reduces transportation costs, and enables new products.

Key points to design your project

To integrate this technology into your project:

- Conduct awareness campaigns on the benefits of bean flour technology.
- Collaborate with local farmers and agri-food companies for a steady bean supply.
- Establish processing plants with efficient equipment.
- Provide training programs for operators and workers on safety and quality use.
- Ensure regulatory compliance with food safety standards and licensing requirements.

Consider engaging a team of trainers for installation support, including costs for training and post-training assistance. Develop communication materials like flyers, videos, and radio broadcasts.

Additionally, consider incorporating "Biofortified beans for improved nutrition" into your project to address key challenges and contribute to a healthier, more resilient future.

Cost: $$$ **370 USD**

Small bean dehullers (50 kg/h)

4 USD	**1,500 USD**	**2,000 USD**	**IP**
Bean flour per kg	Soaking tanks of 500 liter	Mills with a capacity of 300 kg hour-1	Open source / open access

Alliance

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

Munthali Justice

Technology from

ProPAS

Commodities

Common bean

Sustainable Development Goals

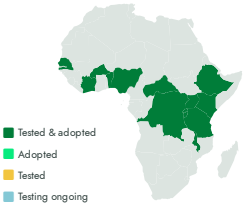
Categories

Transformation, Practices, Agri-food processing

Best used with

- Biofortified Beans for Improved Nutrition ›

Tested/adopted in



Where it can be used

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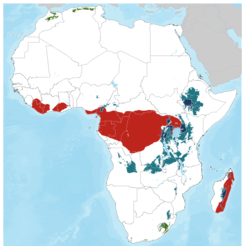

Pre-Cooked Beans for Consumer Convenience

Advanced approach for quick, convenient, and delicious bean

Pre-cooked whole beans are available in dried, canned, and frozen forms, offering quick preparation times of 10 to 30 minutes. The process involves sorting, washing, blanching, soaking, sterilizing, and cooking the beans before packaging. They can be marketed locally and for export.

This technology is TAAT1 validated.

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

Gender assessment 4

Climate impact 6

Problem

- Lengthy cooking time, high energy, and water needs discourage dried common beans consumption.
- Poorer households avoid dried beans due to time, fuel, and water constraints.
- Traditional bean prep methods hinder access to nutritious diets.
- Limited market opportunities and profits for farmers and processors in the bean value chain.

Solution

- Drastically reduces bean cooking time
- Cuts cooking costs by 90%, saving energy
- Boosts demand for farmers, improving market access
- Strengthens the bean value chain in Sub-Saharan Africa
- Convenient for homemakers and caterers
- Reduces wood and fuel usage, mitigating carbon emissions

Key points to design your project

This technology can be integrated into nutrition projects as an alternative protein source and presents opportunities for food processors and supermarkets.

To integrate the technology, activities include raising awareness, formulating product standards, ensuring reliable bean supply, installing efficient equipment, and providing training.

Collaboration with food processor companies is recommended for implementation.

1,500 USD
Per mall electric cooker system for making pre-cooked beans with a capacity of 100 liter

20,000 USD
Per large hot water boiler powered with petrol or natural gas with a capacity of 0.5 ton per hour

IP
Unknown

Alliance

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Justin Mabeya Machini

Technology from

ProPAS

Commodities

Common bean

Sustainable Development Goals

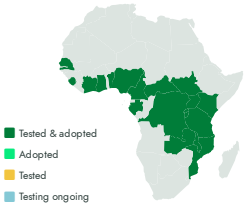
Categories

Transformation, Practices, Agri-food processing

Best used with

- Biofortified Beans for Improved Nutrition ›

Tested/adopted in



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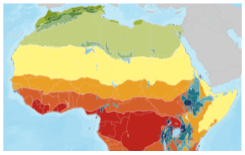

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https://taat.africa/lcg

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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