



# Bean technologies Toolkit

This toolkit is a collection of technologies designed to optimize bean cultivation across Africa. These technologies have been selected to address the challenges encountered in bean production, processing, and storage, ensuring a more resilient and profitable bean sector. By integrating these technologies into your projects or business plans, you can maximize yields while minimizing...

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



## TECHNOLOGIES IN THIS TOOLKIT

- **Trace:** FairFood Traceability Solutions
- **Hello Tractor:** Contract mechanization apps
- **HIB varieties:** Biofortified Beans for Improved Nutrition
- **Pre-Cooked Beans for Consumer Convenience**
- **Bean Flour and Flour Products:** Bean processing process
- **Climbing Bean with High Yield and N Fixation**
- **Seed Inoculation with Rhizobia**
- **Low-dose pest control:** Seed dressing of Seed with Fungicide and...
- **Specialty Fertilizer Blends for Common Bean**
- **Low-Cost Staking for Climbing Beans**
- **Advanced Weed Management:** Mechanical and Chemical Weed...
- **IPM:** Integrated Management of Insects, Diseases and Weeds in...
- **Mechanized Threshing Operations**
- **Soybean inoculant:** Rhizobium inoculant range, various strains
- **Turbocrop:** Field crop plant establishment biostimulant
- **PICS:** Hermetic Bags for Safe Storage of grain



<https://taat.africa/ddi>

# Trace: FairFood Traceability Solutions

Easy-to-use solution for food traceability

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


**FAIRFOOD**
**Fairfood**

Marten van Gils

Commodities

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

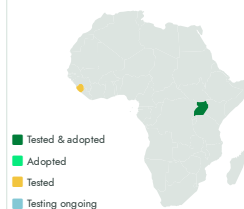
Sustainable Development Goals



Categories

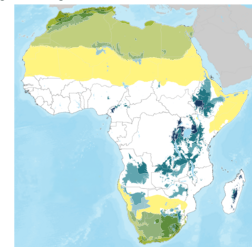
Production, Prevention & storage, Transformation, Market, Pre-production, Digital applications, + 3 more

Tested/adopted in



Where it can be used



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





Target groups

Breeders, Farmers, Processors, Fish Farmers, Sellers

 This technology is **pre-validated**.

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

Gender assessment  **3**

Climate impact  **6**

## Problem

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

## Solution

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

## Key points to design your project

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

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

**11,070 USD**

Initial investment

**110 USD**

Social Return on Investment per farmer per YEAR

**22.14 USD**

subscription/user/year

**3,320 USD**

Operating Investment /YEAR



Open source / open access


**Trace**
<https://taat.africa/gbu>

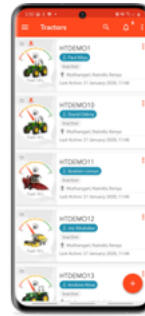
Last updated on 19 August 2024, printed on 15 May 2025

Enquiries [e-catalogs@taat.africa](mailto:e-catalogs@taat.africa)

# 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.



**Hello Tractor**  
Rispa Miliza

Technology from

[ProPAS](#)

Commodities

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

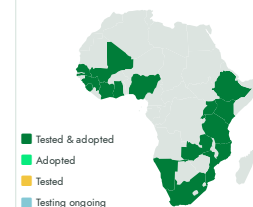
Sustainable Development Goals



Categories

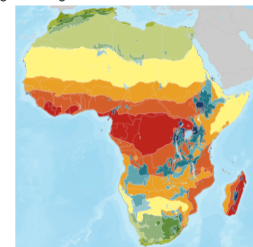
Production, Market, Digital applications,  
Supply chain management,  
Crop management

Tested/adopted in



Where it can be used

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



Target groups

✓ 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

- 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 project

- Hello Tractor revolutionizes agriculture by making mechanized farming affordable and efficient, thereby reducing poverty and combating hunger.
- It also promotes gender equality and stimulates rural economic growth by creating job opportunities.
- Through its digital platform, Hello Tractor innovates agriculture and enhances infrastructure efficiency.
- To integrate the technology, purchase smart devices, upload data, and monitor operations closely.
- Collaborate with relevant organizations and invest in training and communication materials for successful implementation.

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

Cost of getting the technology

**60—70 USD**

Cost of renting a four-wheel tractor for 4 hours



Copyright



**Hello Tractor**

<https://taat.africa/znc>

Last updated on 28 August 2024, printed on 15 May 2025

Enquiries [e-catalogs@taat.africa](mailto:e-catalogs@taat.africa)

# 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.



Open source / open access

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



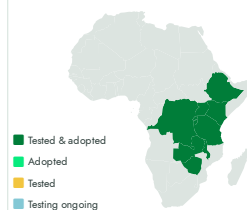
Categories

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.



HIB varieties

<https://taat.africa/pcw>

Last updated on 19 August 2024, printed on 15 May 2025

Enquiries [e-catalogs@taat.africa](mailto:e-catalogs@taat.africa)



# 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 small 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



Unknown

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



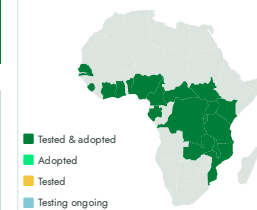
Categories

Transformation, Practices,  
Agri-food processing

Best used with

- [Biofortified Beans for Improved Nutrition >](#)

Tested/adopted in



Where it can be used

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



Pre-Cooked Beans for Consumer Convenience

<https://taat.africa/cvg>

Last updated on 22 May 2024, printed on 15 May 2025

Enquiries [e.catalogs@taat.africa](mailto:e.catalogs@taat.africa)

## 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**.



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

Gender assessment



Climate impact



### 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**

Bean flour per kg

**1,500 USD**

Soaking tanks of 500 liter

**2,000 USD**

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



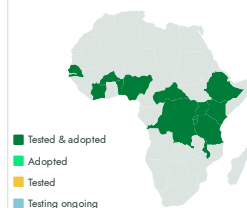
Categories

Transformation, Practices,  
Agri-food processing

Best used with

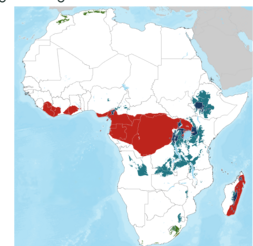
- [Biofortified Beans for Improved Nutrition >](#)

Tested/adopted in



Where it can be used

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



Bean Flour and Flour Products

<https://taat.africa/kdo>

Last updated on 10 April 2025, printed on 15 May 2025

Enquiries [e-catalogs@taat.africa](mailto:e-catalogs@taat.africa)

# 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

Potential yield

92 kg

N fixed per ha

28 %

Increase in bean consumption



Trademark

Alliance



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

Technology from

ProPAS

Commodities

Common bean

Sustainable Development Goals



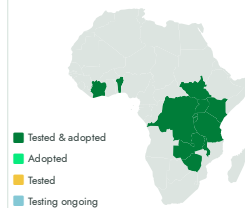
Categories

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.



Climbing Bean with High Yield and N Fixation

<https://taat.africa/sws>

Last updated on 20 September 2024, printed on 15 May 2025

Enquiries [e-catalogs@taat.africa](mailto:e-catalogs@taat.africa)

# Seed Inoculation with Rhizobia

Boosting Crops, Nourishing Communities

Seed inoculation with elite rhizobium strains boosts legume yields by addressing nitrogen limitations through Biological Nitrogen Fixation (BNF). This cost-effective practice enhances crop production on small-scale farms in Africa, reducing reliance on expensive fertilizers, promoting environmental sustainability, and ensuring food, nutrition, and income security for farmers.



**IITA**  
Transforming African Agriculture

**International Institute of  
Tropical Agriculture (IITA)**  
David Ojo

✓ This technology is **TAAT1 validated**.

7-7



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

Gender assessment

4

Climate impact

7

## Problem

- **Nitrogen Deficiency:** Soils often lack sufficient nitrogen for plant growth.
- **Incompatible Rhizobia:** Newly introduced legume species may not be compatible with local rhizobia, leading to low yields.
- **Soil Health:** Maintaining soil fertility and health is a constant challenge.
- **Plant Diseases:** Farmers constantly battle against diseases that can devastate crops.
- **Sustainability:** Balancing economic viability with environmental sustainability is a major concern.

## Solution

- **Biological Nitrogen Fixation:** Rhizobia address nitrogen deficiency.
- **Specific Strain Introduction:** Inoculation ensures the presence of the needed rhizobia.
- **Rhizobia Population Boost:** Inoculation guarantees optimal nodulation and nitrogen fixation.
- **Sustainable Farming:** Rhizobia promote sustainable agriculture.
- **Stress-Tolerant Strains Introduction:** Inoculation mitigates effects of stress on nitrogen-fixing symbiosis.

## Key points to design your project

Rhizobia inoculant technology is a win-win for Africa:

It boosts food security (SDG 2), increases legume yields mean more food and income for farmers, especially women (SDG 5). Climate-smart agriculture (SDG 13), less reliance on chemical fertilizers reduces emissions.

To integrate this tech in your project, consider:

- Partnering with experts for training and quality control.
- Selecting suitable legumes and effective, adaptable rhizobia strains.
- Ensuring cost-effectiveness and proper distribution with storage and quality checks.
- Educating farmers and monitoring project success.

Cost: \$\$\$ **15,000 USD**

Total cost of manufacturing one ton of dry inoculant



Unknown

Technology from

ProPAS

Commodities

Soybean, Common bean

Sustainable Development Goals



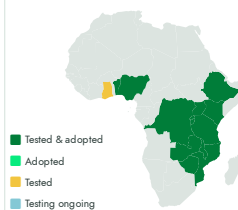
Categories

Production, Inputs, Inoculant

Best used with

- [Climbing Bean with High Yield and N Fixation >](#)
- [Biofortified Beans for Improved Nutrition >](#)
- [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.



Seed Inoculation with Rhizobia

<https://taat.africa/bjd>

Last updated on 2 October 2024, printed on 15 May 2025

Enquiries [e-catalogs@taat.africa](mailto:e-catalogs@taat.africa)

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

Pest control for optimum yields

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.



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



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**

Equipment for manual application

**500 USD**

Equipment for mechanized application for a small unit

**2,000 USD**

Equipment for mechanized application for a large unit



Open source / open access

Alliance



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

Technology from

ProPAS

Commodities

Common bean

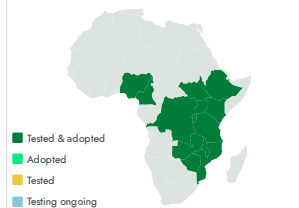
Sustainable Development Goals



Categories

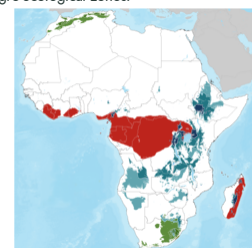
Production, Practices,  
Pest control (excluding weeds)

Tested/adopted in



Where it can be used

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



Low-dose pest control

<https://taat.africa/sdx>

Last updated on 27 March 2025, printed on 15 May 2025

Enquiries [e\\_catalogs@taat.africa](mailto:e_catalogs@taat.africa)

# 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

Alliance



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

Technology from

ProPAS

Commodities

Common bean

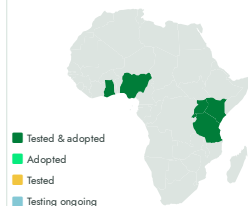
Sustainable Development Goals



Categories

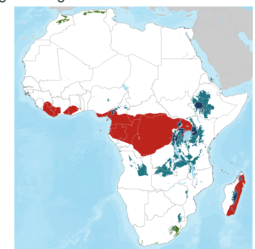
Production, Inputs, Fertilizer

Tested/adopted in



Where it can be used

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



Target groups

Farmers

## 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.



Unknown



Specialty Fertilizer Blends for Common Bean

<https://taat.africa/rnu>

Last updated on 22 May 2024, printed on 15 May 2025

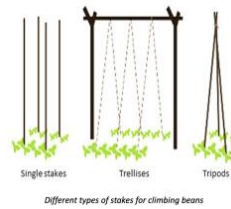
Enquiries [e-catalogs@taat.africa](mailto:e-catalogs@taat.africa)



# Low-Cost Staking for Climbing Beans

Empowering Beans, Sustaining Growth!

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 %

Increase in yields compared to bush beans

20,000—50,000

stakes per hectare

Staking density for highest yields

2 meters

Height of stakes for highest yields

~200,000

plants

Plant population per hectare



Open source / open access

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



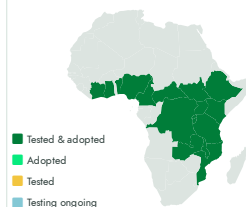
Categories

Production, Practices, Yield improvement, Production system

Best used with

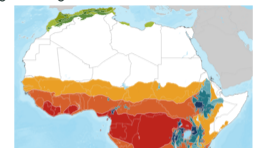
- [Climbing Bean with High Yield and N Fixation >](#)

Tested/adopted in



Where it can be used

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



Low-Cost Staking for Climbing Beans

<https://taat.africa/xsq>

Last updated on 22 May 2024, printed on 15 May 2025

Enquiries [e.catalogs@taat.africa](mailto:e.catalogs@taat.africa)



# Advanced Weed Management: Mechanical and Chemical Weed Management

## 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



Open source / open access

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

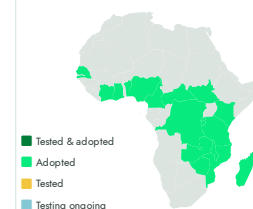
Categories

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.



Advanced Weed Management

<https://taat.africa/hco>

Last updated on 10 April 2025, printed on 15 May 2025

Enquiries [e-catalogs@taat.africa](mailto:e-catalogs@taat.africa)

# 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.



Alliance



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



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**

Operation cost per year

**0.5 - 1 USD**

Coating 1kg of seed

**25 - 35 USD/Ha**

Pre-emergence herbicides



Open source / open access

Technology from

ProPAS

Commodities

Common bean

Sustainable Development Goals



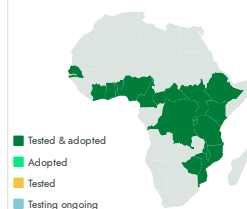
Categories

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.



IPM

<https://taat.africa/jtk>

Last updated on 6 November 2024, printed on 15 May 2025

Enquiries [e-catalogs@taat.africa](mailto:e-catalogs@taat.africa)

# 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

Gender assessment



Climate impact



## 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 project

The Mechanized Threshing Operations technology offers an efficient solution for separating seeds or grains from harvested plants, reducing labor requirements and costs. Key steps to integrate this technology into your project include

- Promoting awareness, providing training,
- Evaluating costs and quantities needed,
- Offering ongoing support, developing communication materials, and collaborating with relevant stakeholders.

**50 %**

Threshing cost reduced

**225 kg per hour**

Maize processing



No formal IP rights

Technology from

ProPAS

Commodities

Common bean

Sustainable Development Goals



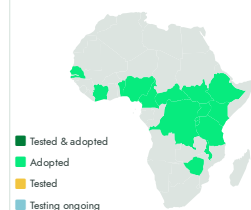
Categories

Prevention & storage, Equipment,  
Post-harvest handling

Best used with

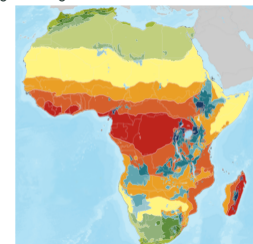
- [Hermetic Bags for Safe Storage of grain >](#)

Tested/adopted in



Where it can be used

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



Mechanized Threshing Operations

<https://taat.africa/nwf>

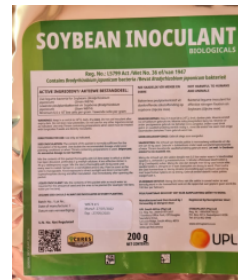
Last updated on 22 May 2024, printed on 15 May 2025

Enquiries [e.catalogs@taat.africa](mailto:e.catalogs@taat.africa)

# Soybean inoculant: Rhizobium inoculant range, various strains

N-fixing bacteria to reduce chemical fertilizer use

Stimuplant is a specialized range of inoculants designed for various legume crops. It capitalizes on a unique symbiotic relationship between the legume plants and a beneficial bacterium known as Rhizobia. This natural partnership results in the addition of significant nitrogen levels to the soil, ranging from 40 to 150 kg per hectare.



**Stimuplant company, UPL**  
Florent Clair

✓ This technology is **validated**.

9-9



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

Gender assessment

5

Climate impact

7

## Problem

- Nitrogen limitation hampers plant growth, particularly affecting legume crops.
- Soil degradation arises from excessive reliance on chemical fertilizers.
- These factors culminate in economic hardships and food insecurity among farmers.

## Solution

- UPL Powder Carrier Technology shields bacteria from harsh environmental conditions like high temperatures and pH fluctuations.
- It holds the CERES organic certification, meeting stringent organic standards.
- Tailored packaging suits the needs of smallholder farmers, enhancing accessibility.
- The powder formulation extends shelf life to 9 months, reducing wastage and improving efficiency.

## Key points to design your project

To integrate this technology into your project, follow these steps:

- Estimate the quantity of products needed based on a cost range of USD 15-25 per hectare.
- Consider the accessibility of the technology in South Africa and calculate delivery costs, including potential import clearance and duties.
- Arrange training and support from a team of trainers during installation, factoring in the associated costs.
- Develop communication materials such as flyers, videos, and radio broadcasts to raise awareness about the technology.
- Enhance the effectiveness of the improved maize variety by companion planting with soybean varieties resistant to pests and diseases, and focus on nutrient fertilization.
- Collaborate with agricultural development institutes and agro-dealers to facilitate technology implementation in your country.

Cost: \$\$\$ **15—25 USD**

Product cost /ha

ROI: \$\$\$ **35 %**

Yield increase



Open source / open access

### Commodities

Soybean, Groundnut, Cowpea,  
Common bean

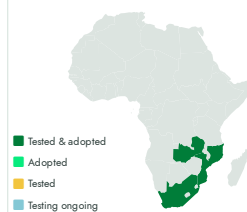
### Sustainable Development Goals



### Categories

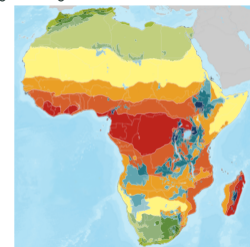
Production, Inputs, Inoculant

### Tested/adopted in



### Where it can be used

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



### Target groups

Farmers



Soybean inoculant

<https://taat.africa/pad>

Last updated on 17 March 2025, printed on 15 May 2025

Enquiries [e-catalogs@taat.africa](mailto:e-catalogs@taat.africa)

# Turbocrop: Field crop plant establishment biostimulant

Specialized biostimulant for root development and vegetative growth on field crops

Turbocrop is a specialized biostimulant product designed to enhance the development of roots and promote vegetative growth in crops. It is specifically formulated to improve plants' ability to withstand and cope with abiotic stress factors, such as extreme temperatures, drought, or nutrient deficiencies.



**UPL Ltd.**  
Florent Clair

## Commodities

Wheat, Maize, Groundnut, Common bean,  
Other commodity

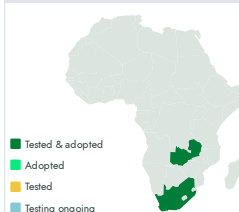
## Sustainable Development Goals



## Categories

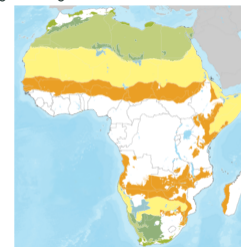
Production, Inputs, Fertilizer

## Tested/adopted in



## Where it can be used

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



## Target groups

Farmers

✓ This technology is **validated**.

9/9



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

Gender assessment



Climate impact



## Problem

- Imbalances in soil nutrients hinder optimal plant growth and productivity.
- Factors constrain the potential size and structure of plants, impacting overall yield.
- Restrictions in root development impede nutrient uptake, affecting plant health and productivity.
- Inefficiencies in nutrient absorption and utilization by plants result in suboptimal growth.
- Various factors contribute to limitations in crop yields, affecting agricultural productivity and food security.

## Solution

- Stimulates root hair formation for enhanced nutrient absorption.
- Promotes stem elongation and leaf growth, particularly during tillering.
- Provides a balanced blend of essential nutrients for optimal crop growth.
- Improves nutrient utilization efficiency for better plant performance.
- Offers a holistic approach to plant growth, addressing root development, stem elongation, leaf formation, and nutrient optimization.

## Key points to design your project

Turbocrop technology improves food security, nutrition, and climate resilience by boosting yields, enhancing nutrient absorption, and supporting sustainable, biodiverse farming.

### Integration steps:

- Align with project needs
- Estimate required quantity and costs (including training/support)
- Select reliable suppliers
- Plan for integration, staff training, and performance monitoring
- Promote the technology through communication efforts
- Collaborate with development institutes and agri-service partners for success

Cost: \$\$\$ **10 - 20 USD**

Fertilizer cost

**460 Kg/ha**

Yield increase

**170 USD/ha**

Benefit on maize in South Africa



Patent granted



**Turbocrop**

<https://taat.africa/pss>

Last updated on 14 April 2025, printed on 15 May 2025

Enquiries [e-catalogs@taat.africa](mailto:e-catalogs@taat.africa)

# PICS: Hermetic Bags for Safe Storage of grain

Low cost storage technologies for grain

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



# PICS

Purdue Improved Crop Storage

**PICS GLOBAL**

Laurie Kitch

Technology from

[ProPAS](#)

Commodities

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

Sustainable Development Goals



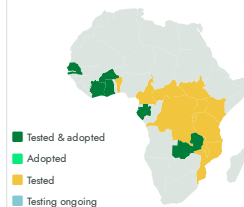
Categories

Prevention & storage, Equipment,  
Post-harvest handling

Best used with

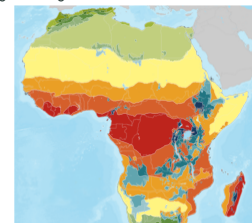
Mechanized Threshing Operations  
See all 1 technologies online

Tested/adopted in



Where it can be used

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



✓ This technology is **TAAT1 validated**.

9-9



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

Inclusion assessment

4

Climate impact

5

## Problem

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

## Solution

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

## Key points to design your project

To integrate PICS bags into your project:

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

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

Cost: \$\$\$ **2—3 USD**

Bag cost for users

ROI: \$\$\$ **90 %**

Reduction of loss

**50 or 100 Kg**

Bag capacity

**2 year**

Life span



Trademark



PICS

<https://taat.africa/oaw>

Last updated on 18 June 2025, printed on 18 June 2025

Enquiries [e.catalogs@taat.africa](mailto:e.catalogs@taat.africa)





# Bean technologies Toolkit

<https://taat.africa/ddi>

## 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

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✉ [taat-africa@cgiar.org](mailto:taat-africa@cgiar.org) <https://e-catalogs.taat-africa.org>

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