



# WIPO GREEN: The Marketplace of Sustainable Technology

Trade and Environmental Sustainability Structured Discussions (TESSD)

TESS informal working group meetings

Working Group on Environmental Goods and Services

World Trade Organization

Geneva 20 Sept. 2023

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Green Technology and Research Manager

GLOBAL CHALLENGES DIVISION

WIPO

# WIPO GREEN Platform

The screenshot shows the WIPO GREEN website homepage. At the top, there is a navigation bar with links for 'Contact Us', 'My Account', and 'WIPO'. Below this is a dark green header with the WIPO GREEN logo and tagline 'The Marketplace for Sustainable Technology'. A secondary navigation bar includes links for 'Home', 'Database', 'Projects', 'Partners', 'Resources', 'IPO Green', and 'About', along with a search bar labeled 'Search WIPO GREEN'. The main content area features a heading 'WIPO GREEN – The Marketplace for Sustainable Technology' and a brief description of the platform's purpose. A 'FEATURED' section highlights the 'Green Technology Book 2022' with a 'Read the book' button. A 'News' section lists recent articles, and an 'Email updates' section offers a 'Sign up' button for the WIPO GREEN Newsletter.

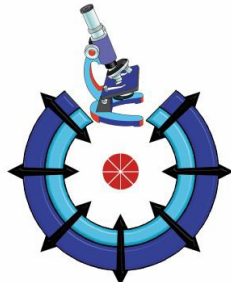
- WIPO GREEN platform, major visible implementation
- Combines all assets
  - Database
  - Projects
  - Partners
  - Resources / knowledge material
- Addresses a knowledge gap between needs and solutions
- IP a cornerstone of innovation ecosystems and technology transfer

# WIPO Green Technology Book

1<sup>st</sup> edition launched at COP27, 2022

## Solutions for Climate Change Adaptation

- >800.000 unique visitors since launch mid-Nov. 2022
- >19.000 full report downloads
- Strong developing country interest



أكاديمية البحث العلمي والتكنولوجيا  
Academy of Scientific Research  
and Technology



**CTCN**

CLIMATE TECHNOLOGY CENTRE & NETWORK

# The Green Technology Book shows solutions - a digital first publication



WIPO  
Publications / Green Technology Book

## Green Technology Book 2022 Solutions for climate change adaptation

- Table of contents
- Download
- Database

The Green Technology Book takes a look at the state of play of green technologies responding to some of the most critical challenges of climate change.

In the 2022 report, we present the technology trends and practical solutions to combat climate-change impact on agriculture and forestry, the water sector and cities.

**How can innovative technologies and the intellectual property system help us adapt to climate change?**

The Green Technology Book illustrates how healthy innovation ecosystems are generating a wealth of green technology solutions.

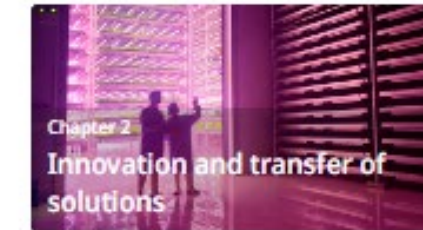
Drawing on a rich database of technologies - whether proven, frontier or still on the horizon - the report offers practical and inspiring examples of green technologies that can help people adapt to the reality of climate change.

**Executive summary**

**We should take encouragement - and inspiration - from the sheer range of transformational tools to help communities adapt to climate change.**

Daren Tang  
WIPO Director General

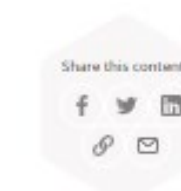
### Climate-change adaptation, technology and innovation



### Green technology solutions to our changing environment



### The future of climate-change adaptation



# 3 Technology areas: Agriculture & Forestry Water and Coastal Regions, Cities



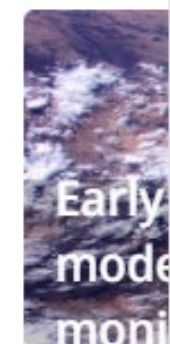
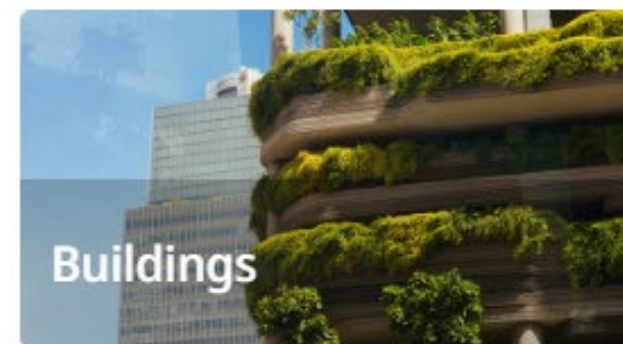
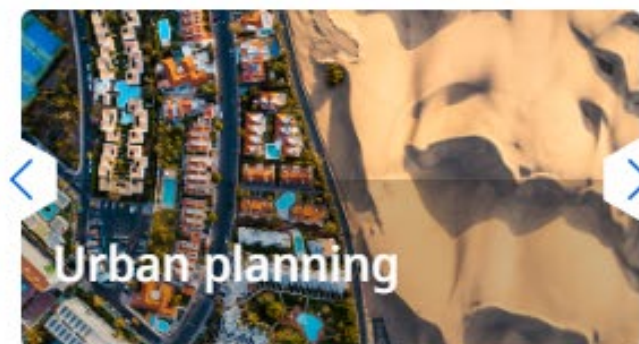
## Chapter 5 Cities

Today, over half the world lives in cities, and the number is growing. Climate impacts such as heatwaves, floods and extreme weather events are becoming more intense and frequent. Urban areas have been hit hard. As cities look toward increasing their preparedness and capacity to adapt, technologies are offering part of the solution.



From cooling buildings, rainwater harvesting, protecting critical infrastructure to warning residents about a flood, this section showcases some well-established solutions. It also introduces technologies as yet on the horizon, and presents examples of innovative ways of using technology for climate adaptation. Nature-based and engineered solutions all have their important role to play.

### Explore technologies



# 16 Technology sections



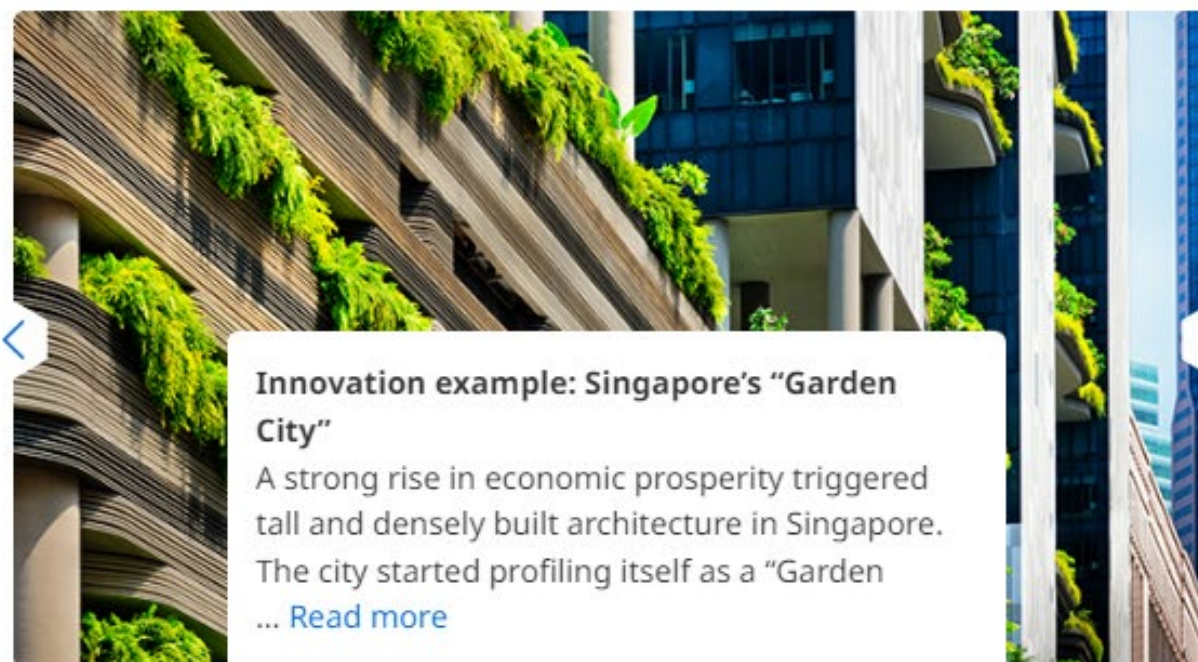
Chapter 5. Cities

## Buildings

Heatwaves are associated with increased mortality and health risks. The impact will be greatest on cities compared to rural areas due to the heat island effect. The need for buildings to offer heat relief has accelerated innovation in cooling technologies. At the same time, buildings themselves must stay protected from climate-related hazards such as floods.

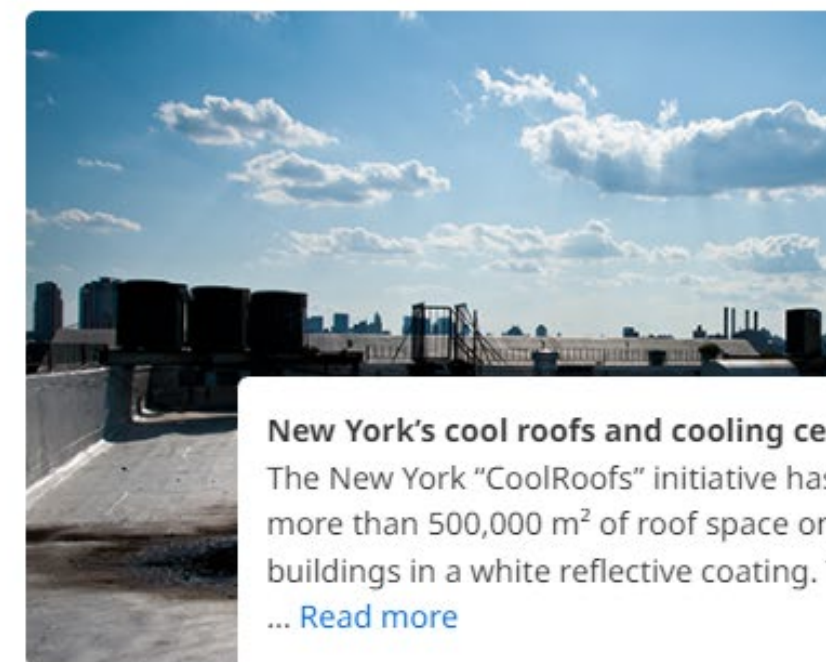


## Innovation examples



### Innovation example: Singapore's "Garden City"

A strong rise in economic prosperity triggered tall and densely built architecture in Singapore. The city started profiling itself as a "Garden ... [Read more](#)



**New York's cool roofs and cooling centers**  
The New York "CoolRoofs" initiative has covered more than 500,000 m<sup>2</sup> of roof space on city buildings in a white reflective coating. The ... [Read more](#)

# Examples and Proven, Frontier & Horizon groups



- Table of contents
- Download
- Database

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A strong rise in economic prosperity triggered tall and densely built architecture in Singapore. The city started profiling itself as a "Garden ... [Read more](#)

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## Proven technologies ^

**g**  
cated rainwater  
ited Kingdom. The  
nd residential

**Building envelope waterproofing and foundation drainage**  
A drain is installed along the foundation of a building to collect excess groundwater and drain it away from the building. Nilex's NuDrain Sheet ... [Read more](#)

**Double- and triple-paned windows with insulating gas**  
Among the window products provided by company SSG, the DuraComfort comprises two or more layers of insulating glass units with a cavity between. ... [Read more](#)

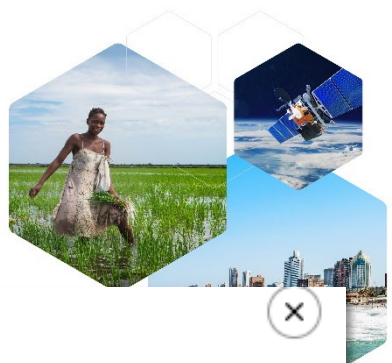
## Frontier technologies ^

**Mediterranean seagrass as insulation**  
Natural alternatives to synthetic insulation

**Thermocrete concrete with cooling effect**  
Thermocrete is a concrete mixed with Therm



# Individual solutions



WIPO



3. Agriculture and forestry / Irrigation / Proven technologies

## Smartphone control of alternative energy powered irrigation system

TECH-INNOV NIGER



The founder of the Tech-Innov company, Abdou Maman, has developed a remote-controlled irrigation system adapted to the semi-arid conditions of Niger in West Africa. It introduces the concepts of digital farms and tele-irrigation in support of agricultural development in the country. The company provides farmers with tools enabling them to move away from manual watering and reduce water waste. The system uses mobile devices so farmers can manage irrigation remotely and efficiently. It also integrates hydraulic and meteorological data so farmers can optimize water usage.

- Contracting type: For sale
- Technology level: Medium
- Country of origin: Niger
- Availability: Niger

WIPO



4. Water and coastal regions / Marine ecosystems / Proven technologies

## Artificial reefs

Reefmaker



Reefmaker's patented process for artificial reefs uses Florida limestone. This soft rock matches the pH levels of the ecosystems targeted and provides a good substrate for marine life, allowing it to grow naturally. The limestone is attached to a concrete structure in a sloping design to ensure durability while increasing surface area for reef. A special deployment vessel equipped with cranes has been designed for accurate placement of the artificial reefs out to sea. In addition to coral reef restoration, the limestone reefs can also be used for oyster reef restoration, wave attenuation and erosion control. Structures can be designed to fit along the length of permanently fitted vertical poles attached to the sea bed. The aim is to keep the concrete proud of the marine floor and firmly retain the artificial reefs during extreme events like hurricanes. More than 50,000 reefs have been deployed along the US coast.

- Contracting type: For sale
- Technology level: Medium
- Country of origin: United States
- Availability: United States

WIPO



5. Cities / Infrastructure and services / Proven technologies

## Decentralized water treatment and storage systems

Fluence Corporation



Resiliency in water infrastructure can be enhanced through decentralized water treatment and storage systems. Treating water at point of use can make water treatment more fit for purpose and effective compared to treating all water to a potable standard. Also decentralized water storage could be used for river flow management, irrigation or in emergency situations. Fluence is a company that provides modular, decentralized water and wastewater treatment solutions for remote locations. Water treatment systems are built into steel shipping containers. Transportation and site preparation is easy and installation quick. The technology has been developed for use in resorts and recreation sites. But similar solutions could potentially be used in emergency situations. For example, storms and hurricanes where central water supplies may be damaged or contaminated.

- Contracting type: For sale
- Technology level: Medium
- Country of origin: United States
- Availability: Worldwide



# Direct link to the WIPO GREEN Database



- Home
- Database
- Projects
- Partners
- Resources
- IPO Green
- About us

## Smartphone control of alternative energy powered irrigation system

FARMING & FORESTRY > IRRIGATION



Description Benefits Other Information

[Log in for access to additional information and attachments](#)

<b>ID</b>	147519
<b>Owner</b>	TECH-INNOV NIGER
<b>Uploaded by</b>	WIPO GREEN Admin
<b>Type</b>	Technology
<b>Source</b>	User uploads
<b>Published</b>	Oct 13, 2022
<b>Updated</b>	Oct 29, 2022

Remote-controlled irrigation system to manage irrigation remotely and efficiently.

The founder of the Tech-Innov company, Abdou Maman, has developed a remote-controlled irrigation system adapted to the semi-arid conditions of Niger in West Africa. It introduces the concepts of digital farms and tele-irrigation in support of agricultural development in the country. The company provides farmers with tools enabling them to move away from manual watering and reduce water waste. The system uses mobile devices so farmers can manage irrigation remotely and efficiently. It also integrates hydraulic and meteorological data so farmers can optimize water usage.

 EMAIL OWNER

 VISIT WEBSITE

TECH-INNOV NIGER

# WIPO GREEN Database a central tool

- Free UN-based public database
- Major repository of innovative green technologies and needs
- Automatic matchmaking
- 129.000 articles
- 3900 user uploads
- Simple registration and upload
- No fees
- Integrated experts database
- No fees
- Search “WIPO GREEN” and go to the database

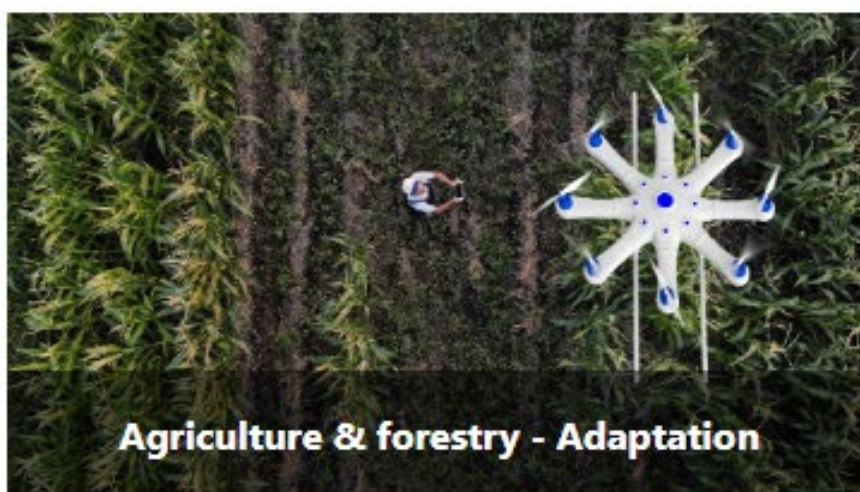
The screenshot displays the WIPO GREEN Database website. At the top, there is a navigation bar with links for Projects, Partners, Resources, IPO Green, About us, and Register. A search bar is prominently featured, with a 'Simple' dropdown menu, a search icon, and a 'Full Text Search' button. Below the search bar is a 'Register' button. The main heading reads 'WIPO GREEN Database of Innovative Technologies and Needs'. A descriptive paragraph follows, explaining the database's purpose and features. Below this, there are seven category icons: ENERGY, WATER, FARMING FORESTRY, POLLUTION WASTE, TRANSPORTATION, PRODUCTS MATERIALS PROCESSES, and BUILDING CONSTRUCTION. The 'Collections' section lists five featured collections: Green Technology Book, Feeding 9bn, POME Indonesia, LAC Climate Smart Agriculture, and China Cities. The 'Experts' section is partially visible at the bottom. On the right side, there are two sections: 'LATEST ENTRIES' with a list of recent updates (e.g., 'Mar 10, 2023: Automation of farming processes to fight food was...') and 'FEATURED ARTICLES' with a list of featured articles (e.g., 'Jun 22, 2021: SEPURAN® GREEN...').

# Green Technology Book

WIPO GREEN Database Collection



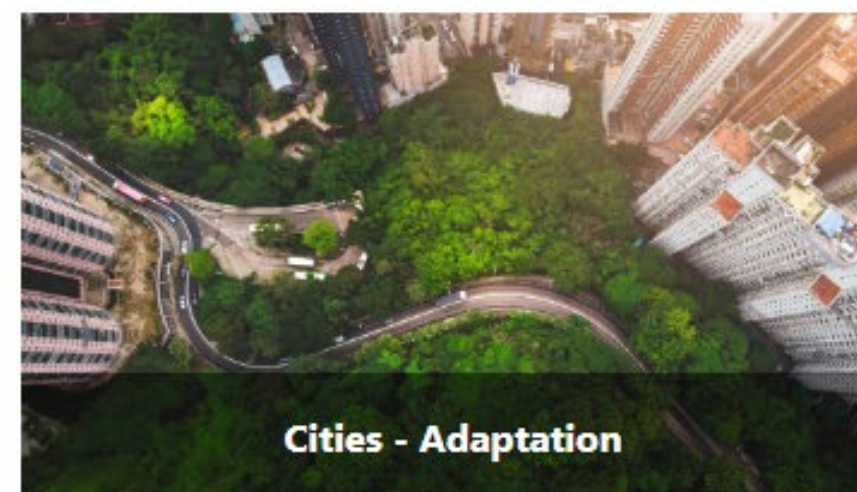
## Green Technology Book - Climate Change Adaptation



Agriculture & forestry - Adaptation



Water and coastal regions - Adaptation



Cities - Adaptation

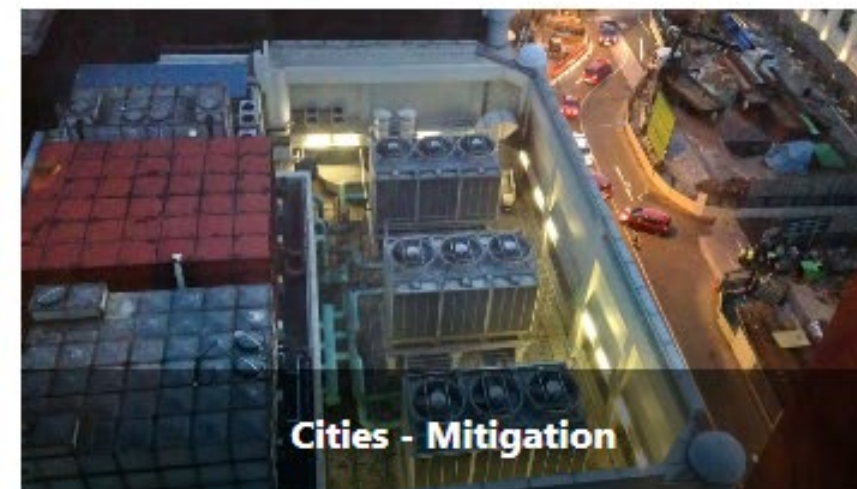
## Green Technology Book - Climate Change Mitigation - next edition for release in 2023



Agriculture & Forestry - Mitigation



Industry - Mitigation



Cities - Mitigation

# Database collection Mitigation



## Soils, land use change and forestry



Healthy soils contain large reservoirs of carbon. This can be maintained and increased to act as a carbon sink or it can be released when soils are cultivated unsustainably. Land use affects carbon emissions. Conversion of forests to fields and fields to built-up areas all have impacts.

PROVEN
 FRONTIER
 HORIZON



**Agrivoltaics: Solar Panels on Farm Land**

Solar Edge



**Biochar Production from EFB**

Agricultural Environmental Research Inst...



**Mix of cover crops in no-till in organic vegetable...**

Universidade Federal Rural do Rio de Jan...



**Soil Microbiology**

Duverde Eco Soluções



**Farmer Manager Natural Regeneration**

Farmer Manager Natural Regeneration



**Quantifying on-farm greenhouse gas emissions and s...**

The Cool Farm Alliance



**COMET-Farm: A Whole Farm and Ranch Carbon and GHG ...**



**Calculating greenhouse gas emissions using IPCC me...**



**Produce Organic Grade Fertilizer, Soil Conditioner...**



**Regenerative agriculture certificate**



**Implement for small family farms.**

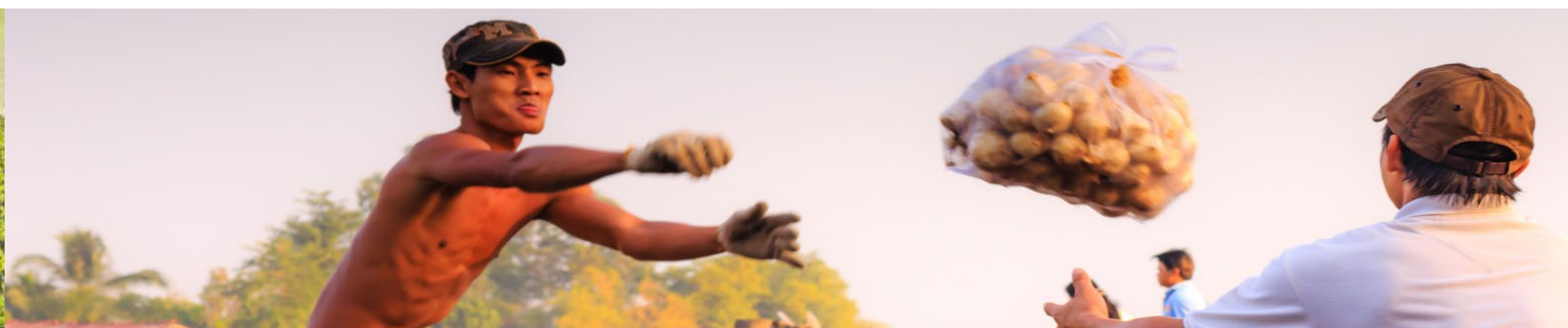


**Biostimulant to improve plat and soil health**

# WIPO GREEN Acceleration Projects

Acceleration Projects work with partners to explore local environmental challenges and green opportunities.

1. Climate Smart Agriculture in Latin America (Argentina, Brazil, Chile, Peru, Uruguay)
2. China Smart Cities
3. Treating and valorizing palm oil mill effluent in Indonesia



# Acceleration Project Indonesia

- Technological Options for Treatment & Valorization of POME in Indonesia
- Methane capture, biogas, solid separation for fertilizer, biochar, biodiesel, biohydrogen etc.
- Launched early March 2021. Winrock International implementing partner
- 19 needs & 24 technologies
- Solutions oriented technology catalogue

**TECHNOLOGICAL OPTIONS**  
For the Treatment and Valorization of Palm Oil Mill Effluent in Indonesia  
2021

WIPO GREEN  
The Marketplace for Sustainable Technology

WINROCK INTERNATIONAL

## BIOGAS SCRUBBERS

Raw Biogas → Scrubber & Dryer → Electricity  
Biogas Up-grading → Bio-CNG → Transportation

CAPEX	OPEX
USD 200 to 400 per Nm <sup>3</sup> biogas per hr.	USD 2,500 to 5,000 per year

As part of the biogas power plant system, a biogas scrubber is needed to reduce the hydrogen sulfide (H<sub>2</sub>S) content in the biogas when it is to be utilized as electricity by powering biogas engines. The H<sub>2</sub>S needs to be removed to prevent corrosion problems in engines and to reduce air pollution caused by sulfur oxides in the exhaust gas.<sup>20</sup> A biogas scrubber must reduce the H<sub>2</sub>S concentration to permissible levels, typically below 200 ppm. This optimizes operation and lengthens the lifetime of the biogas engines.

There are three kinds of scrubbers used to reduce H<sub>2</sub>S content from biogas; biological, chemical, and water. The biological scrubber uses special sulfur-oxidizing bacteria to convert H<sub>2</sub>S to sulfate (SO<sub>4</sub>) and is usually used for POME

Image: Biogas column scrubber (Source: biogasclean.com)

**OPPORTUNITIES**

- Producing clean biogas for gas engines and biogas-upgrading
- Profiting from the sale of generated electricity and waste biomass
- Earning Carbon Credits
- Saving on diesel costs

**CHALLENGES**

- High quality scrubbers come with high prices

21 TECHNOLOGICAL OPTIONS FOR THE TREATMENT AND VALORIZATION OF POME | 2021 | WIPO GREEN

## BPO

WPO ID | 23662

The BPO designs POME biogas digesters with proven long-term operational reliability and highly effective sludge handling capability. They deploy a CH<sub>4</sub> Generating Reactor (CGR) that is a low-rate - does not depend on methane-forming microorganisms - anaerobic, in-ground system used predominantly for biogas production. The CGR effluent is suitable for land discharge fertigation.

**COLLABORATION TYPE** For Sale  
**DEVELOPED IN** New Zealand  
**PREFERRED REGION** Indonesia, Southeast Asia  
**READINESS LEVEL (TRL)** Scaling Up (TRL 9)

**ADVANTAGES**

- Custom/fit-for-purpose projects
- Removes > 90 percent of COD and BOD
- Easy to meet effluent limits on a consistent basis
- Built-in equalization for any downstream aerobic system

**SERVICES OFFERED by BPO**

- Design/build solutions
- Process design and detailed engineering
- Wastewater testing
- Pilot studies
- System commissioning
- Operator training

**BPO-CGR Schematic Process**

**PT. Organics Bali**

WPO ID | 23713

Organics Bali designs and builds anaerobic digestion systems capable of producing biogas from a variety of waste streams. The goal of power plant systems is to leverage biogas production to treat the high levels of COD found in POME and ensure that the contribution of the methane gas produced to climate change is reduced.

**COLLABORATION TYPE** For Sale  
**DEVELOPED IN** United Kingdom  
**PREFERRED REGION** Southeast Asia  
**READINESS LEVEL (TRL)** Scaling Up (TRL 9)

**SERVICES OFFERED by PT Organics Bali**

- Design
- Installation
- Commissioning

**ADVANTAGES**

- Corrosion resistant
- Improvements on cover design with emphasis on safety
- Compact, integrated design of recycle and influent pumping station
- Long hydraulic and solids retention time
- No concerns on biomass retention
- High process stability after shock loading
- Versatile and adaptable to many different conditions
- Use of durable and UV stabilized materials

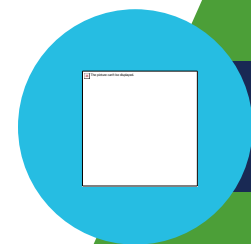
Image: Biogas plant at Simeas, Central Kalimantan (Source: Organics Bali)

18



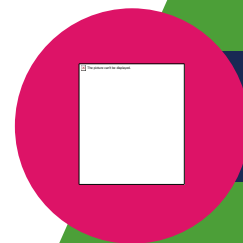
# Thank you !

[wipo.int/green](http://wipo.int/green)



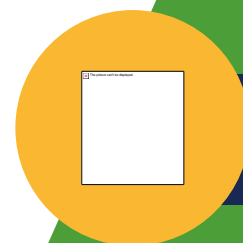
SEARCH

We invite you to search for technologies on our database.



UPLOAD

Register to be a WIPO GREEN user and upload your technology needs and solutions.



CONNECT

The automated matchmaking function on our database makes it easy to connect with technology seekers and providers.