WIPO innovation driven activities in Green Technology of S-S / Δ relevance

Roundtable on Fostering South-South and Triangular Cooperation in Intellectual Property and Innovation. 15th May 2023
Session 1 WIPO’s Work on South-South and Triangular Cooperation – where are we heading?

Peter Oksen, PhD (peter.oksen@wipo.int)
Green Technology and Research Manager
GLOBAL CHALLENGES DIVISION

WIPO
The evolving risk landscape 2007-20

Top 5 Global Risks in Terms of Likelihood

1st: Infrastructure breakdown
2nd: Climate change
3rd: Geopolitical conflict
4th: Cyberattacks
5th: Global governance gaps

Source: Global Risks Report 2019, World Economic Forum

Top 5 Global Risks in Terms of Impact

1st: Climate action failure
2nd: Food crises
3rd: Water crises
4th: Financial failure
5th: Natural disasters

Source: Global Risks Report 2019, World Economic Forum
### Global risk assessment 2023

**Global risks ranked by severity over the short and long term**

*Please estimate the likely impact (severity) of the following risks over a 2-year and 10-year period*

<table>
<thead>
<tr>
<th>Short term</th>
<th>Long term</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Cost of living crisis</td>
<td>1. Failure to mitigate climate change</td>
</tr>
<tr>
<td>2. Natural disasters and extreme weather events</td>
<td>2. Failure of climate change adaptation</td>
</tr>
<tr>
<td>3. Geopolitical conflict</td>
<td>3. Natural disasters and extreme weather events</td>
</tr>
<tr>
<td>5. Extreme price volatility</td>
<td>5. Failure to mitigate climate change</td>
</tr>
<tr>
<td>6. Inflation and interest rate hikes</td>
<td>6. Erosion of social cohesion and societal polarization</td>
</tr>
<tr>
<td>7. Large-scale involuntary migration</td>
<td>7. Failure of climate change adaptation</td>
</tr>
<tr>
<td>8. Large-scale environmental damage incidents</td>
<td>8. Widespread cybercrime and cyber insecurity</td>
</tr>
<tr>
<td>10. Large-scale involuntary migration</td>
<td>10. Large-scale environmental damage incidents</td>
</tr>
</tbody>
</table>

### Risk categories

- **Economic**
- **Environmental**
- **Geopolitical**
- **Societal**
- **Technological**
IPCC Major Report

• Assessment Report 6, Working Group II – Adaptation
• Main message – it’s bad and already happening

**SPM.B.1** Human-induced climate change, including more frequent and intense extreme events, has caused widespread adverse impacts and related losses and damages to nature and people, beyond natural climate variability. Some development and adaptation efforts have reduced vulnerability. Across sectors and regions the most vulnerable people and systems are observed to be disproportionately affected. The rise in weather and climate extremes has led to some irreversible impacts as natural and human systems are pushed beyond their ability to adapt. *(high confidence)* (Figure SPM.2) {1.3, 2.3, 2.4, 2.6, 3.3, 3.4, 3.5, 4.2, 4.3, 5.2, 5.12, 6.2,
Solar PV Price Development

Solar photovoltaic (PV) module prices (measured in 2016 US$ per watt-peak) versus cumulative installed capacity (measured in megawatts-peak, MWp). This represents the ‘learning curve’ for solar PV and approximates a 22% reduction in price for every doubling of cumulative capacity.

Source: Lafond et al. (2017); IRENA; SolarServer
Your Country has made Commitments

- NDC (iNDC) - Nationally Determined Contributions – Paris accord 2015
- NAP - National Adaptation Plans (developing countries)
- Methane pledge – brand new
- SDGs – 2030 Agenda for Sustainable Development (replaced Millennium Dev. Goals)
- CBD - Convention on Biological Diversity
- FAO International Code of Conduct on the Distribution and Use of Pesticides
- International Treaty on Plant Genetic Resources for Food and Agriculture
- International Tropical Timber Agreement (ITTA)
- Minamata Convention on Mercury,
- Montreal Protocol on Substances that Deplete the Ozone Layer
- Stockholm Convention on Persistent Organic Pollutants
- United Nations Convention to Combat Desertification
- Convention on the Protection and Use of Transboundary Watercourses and International Lakes
- + many regional agreements

+ many more…
Greentech market regional

FIGURE 2.4. Clean technology market size by region, and the shares of SMEs and non-SME ($ trillion)

Greentech opportunities global

FIGURE 2.5. Top three regional opportunities for SMEs

Greentech PCT patent filings 2019
WIPO GREEN Platform

- Green technology matchmaking initiative
- Increase understanding of innovative potential
- Deploy innovation in the field
- WIPO GREEN platform, visible implementation
- WIPO GREEN platform, major visible implementation
- Combines all assets
  - Database
  - Projects
  - Partners
  - Resources / knowledge material
WIPO Green Technology Book
1st edition launched at COP27, 2022

Solutions for Climate Change Adaptation

- ½ million unique visitors since launch mid-Nov. 2022
- 11,500 full report downloads
- Strong developing country interest
The Green Technology Book shows solutions - a digital first publication
3 Technology areas: Agriculture & Forestry
Water & Coastal Regions, Cities

Chapter 3
Agriculture and forestry

Climate change is leading to multi-billion dollar losses in crop yield and affecting the health of forest ecosystems. Technology can help farmers and forest managers monitor crop and forest health, adapt their practices, use resources more efficiently and manage climate risk.

This chapter presents solutions within agriculture and forestry that respond to climate change impact on food security. It explores proven, frontier and horizon technologies ranging from local and indigenous techniques to urban farming, hydroponics and high-tech digital solutions. Sections take a look at technologies for climate-resilient plants, healthy soils, irrigation, livestock and forest protection. Because the right information at the right time can be vital, the chapter also looks at early warning systems and solutions for monitoring and forecasting climate change impact.

Explore technologies

- Climate-resilient plants
- Healthy soils
- Farming technologies
- Irrigation
16 Technology sections

Chapter 3. Agriculture and forestry

Farming technologies

Since the Green Revolution of the 1960s, technological change has played a key role in maintaining agricultural productivity and resilience. Faced by an increasingly complex climate landscape, innovations such as vertical farming and precision farming are attracting interest. The world is now in expectation of what is likened to a fourth agricultural revolution.
Examples and Proven, Frontier & Horizon groups

Proven technologies

Floating gardens of Bangladesh
Around a quarter of Bangladesh is flooded for several months of the year. This causes soil salinity and disruption to agriculture. Floating ...

Digital farming technologies in Africa
Farming technologies that rely on robotic indoor farming systems and biotechnologies yet to reach mass scale in Africa. However ...

Precision agriculture through IoT technology and sensors
Libelium provides a wireless sensor network platform whose many uses includes precision agriculture. The technology uses Internet of things (IoT) ...

Robotic farming technologies for precision agriculture
Autonomous robotic farming technologies developed by SwarmFarm Robotics enable the precision application of nutrient and crop protection inputs. The ...

Frontier technologies

Horizon technologies
Individual solutions

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

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

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
Smartphone control of alternative energy powered irrigation system

**Farming & Forestry > Irrigation**

<table>
<thead>
<tr>
<th>Description</th>
<th>Benefits</th>
<th>Other Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Log in for access to additional information and attachments.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**ID**: 147519  
**Owner**: TECH-INNOV NIGER  
**Uploaded by**: WIPO GREEN Admin  
**Type**: Technology  
**Source**: User uploads  
**Published**: Oct 13, 2022  
**Updated**: 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.
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 – livestock section

Despite demand expected to double by 2050, livestock is expected to decline globally. Technologies and climate adaptation solutions often relate to developing resilient feed crop and livestock breeds, pasture rehabilitation and optimizing feed and production systems. This section also presents advances in heat stress detection and management, and digital technologies for livestock monitoring and precision ranching.

- **PROVEN**
  - Livestock misting and fogging systems
    - Traemiet
  - Feed additive and monitoring app for heat stress management
    - Thermo
  - Infrared thermography for heat stress detection
    - Teledyne FLIR
  - Conservation of climate-resilient indigenous breed...
    - AgTech Inc.
  - Hydrogen vertical greenhouse livestock feed farm...
    - CubicFarm Systems
  - Croc Trough Pumps
    - Croc Trough

- **FRONTIER**
  - Technology
    - Improved forage through Chinese Juncao technology
      - Chinese National Engineering Research Center for Animal Husbandry
  - Smart tags for livestock monitoring
    - Ceres Tag
  - Livestock control with virtual fencing
    - Vence
  - Improved forage through Chinese Juncao technology
    - National Engineering Research Center for Animal Husbandry

- **HORIZON**

See in Database...
Conclusions drawn from the work

• Adaptation solutions available, but less accessible

• Innovation mostly in a few developed countries and transfer low

“Adaptation technologies from developing countries seem to be far less visible. This may be because they are simpler, less commercially oriented and developed with a local context in mind. However, such solutions may be exactly what is needed in many other places. Therefore there may be a need for a stronger exposure of adaptation technologies from developing countries.”
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
Simple keyword search

- Thumbnails, sorting, book marks
List of search results

- Thumbnails, sorting, bookmarks
Full-text AI-Assisted Search

- Input long text, Document, Webpage
- AI extracts keywords
- Search database
- Adjust
Patent2Solution

AI-assisted search for commercial applications of a patent

CONTROLLING THE SYNTHESIS GAS COMPOSITION

POLLUTION & WASTE > RECYCLING & REUSE

An improved, economical alternative is accomplished by a combination of the feedstock for the SMR by removing reforming, condensation removal, temperature above the boiling point. An embodiment, a method is provided by adjusting the hydrogen feed and SMR.

ID 52432

Applicant THE REGENTS OF THE UNIVERSITY OF CALIFORNIA

Uploaded by WIPO GREEN

Patent2Solution

Patent2Solution is a unique search function providing links to commercial sites which may be related to the patent chosen. It applies due to the variety and complexity of patents. It may not always produce useful results. The emphasis is on providing a combination likelihood of finding an exact match decreases.

Patent2Solution is developed by WIPO GREEN and is provided for assistance only. Feedback on how you use this function and winfo@wipo.green.

Disclaimer

Hyperlinks to other websites are provided as a convenience only and are not responsible for or approval of the information contained express or implied, as to the accuracy, availability, reliability or content of such information, text, graphics and hyperlinks. WIPO has no representations as to the quality, safety, reliability, or suitability of such software.

Results related to CONTROLLING THE SYNTHESIS GAS COMPOSITION OF A STEAM

Editable keywords used: CONTROLLING SYNTHESIS GAS COMPOSITION STEAM petroluem engines resources

(54) Total results

Page 1 of 6 1 2 3 4 5

regents.universityofcalifornia.edu

UC Regents

Board of Regents ... On August 20, Governor Newsom appointed Jose Hernandez as a UC Regent. Regent Hernandez is the p

en.wikipedia.org/wiki/Regents_of_the_University_of_California

Regents of the University of California - Wikipedia

Regent Richard C. Blum, financial and husband to Sen. Dianne Feinstein, currently serves on the board of regents Investment

regents.universityofcalifornia.edu/about/index.html

About the Regents | Board of Regents

The University is governed by The Regents, which under Article IX, Section 9 of the California Constitution has 'full powers of

www.universityofcalifornia.edu/subject/term/uc-regents

UC regents | University of California

The University of California Board of Regents was assisted by AI assisted search software. All information is made available

WIPO GREEN Acceleration projects

2015
- Indonesia, Philippines, Viet Nam
  - Topic: Wastewater treatment
  - Participants: > 100
  - Needs identified: 45

2016
- Ethiopia, Kenya, Tanzania
  - Topic: Agriculture and water
  - Participants: > 350
  - Needs identified: 65

2017
- Switzerland
  - Topic: Water
  - Participants: > 400
  - Needs identified: 50

2018
- Cambodia, Indonesia, Philippines
  - Topic: Energy, clean air, water and agriculture
  - Participants: > 100
  - Needs identified: 45

2019
- Argentina, Brazil, Chile, Peru
  - Topic: Climate-smart agriculture
  - Ongoing

2021
- Indonesia
  - Topic: Palm Oil Treatment
  - Ongoing

2022
- China
  - Topic: China Cities
  - Ongoing
WIPO GREEN Acceleration Projects

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

- Active and focused matchmaking
- Identify needs and propose solutions
- Specific subject and location
- Work through local consultants
- Act as technology agent for need owners
- Matchmaking events as relevant
- Database is a central tool
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
LAC Climate Smart Agriculture project

- Argentina, Chile, Brazil, Peru
- Identify needs and propose solutions
- Sustainable agriculture, forestry, soil-recarbonization, zero-till, wine sector
- Launched 2019, created strong network of partners
- More than 200 stakeholders contacted, 185 uploads to database, 70 needs and 115 technologies
- Second & third phase with funding from the Government of Japan
Catalogues – widespread inspiration for others

GREEN TECHNOLOGIES

Dealing with the negative effects of climate change in the Chilean wine industry

Annex-1: Identified needs and seekers

Optimization of water resources

Lonconilla Winery Cooperative

The cooperatives work based on the local ecosystem, which only receive water from rain, and when the rains have drastically decreased, this climate effect impacts the productivity of the vineyards, affecting the production of grapes per hectare by 30%. The scarce existing water resources need to be optimized.

Lack of water and decrease in cold hours

Oátaburana Family Wines

Climate change has led to climate events that have also impacted the behavior of plants, thus, the lack of ice in cold hours, increases the production of grapes, which considerably reduces the yields of the vineyards.

Alternatives to handling phytosanitary product containers that impact the environment

Oátaburana Family Wines

The box in Chile is designed to carry out a triple washing of the phytosanitary product containers because they do not have a great impact on the environment and at the same time prevent an impact on public health because they are considered hazardous waste.

This risk is reduced with the triple wash procedure, however, the action is very cumbersome, large amounts of water and many men hours are used to carry out this work, as well as a considerable energy expenditure when transporting them in the collection places.

For this reason the containers are not being recycled enough, and a broader alternative is needed to reduce this impact and contribute to the development of a productive and sustainable viticulture.

Reuse of winemaking process waste

Oátaburana Family Wines

There are different types of waste generated in the winemaking process. Some are mixed, as is the case with好 vitas and grape worts, which are separated and sold only for compost, however, to increase reuse, a box and then an other variants that could be given a higher value.
China Cities Acceleration Project

- Preparation and testing phase 2021 with initial focus on Beijing
- Target environmental issues in large cities
- 10 needs and 32 technologies in database
- Development of “service package” with partners to facilitate deployment of green technologies
- Further upscaling in 2023 onwards
IPO Green

- Intellectual Property Offices can contribute to green economy transition
- IPO Green is an initiative to support them in this
- 13 concept notes developed
- Webinar series on-going
Thank you!

We invite you to search for technologies on our database.

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

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

wipo.int/green