



Egypt's STI Climate Change Action Plan: Road to COP27 and Beyond



وزارة التعليم العالي والبحث العلمي
MINISTRY OF HIGHER EDUCATION
AND SCIENTIFIC RESEARCH

Integrated National and International Action Plans for Climate Change Confrontation:

Now or Never



Where there's a will,
there's a way



Adaptation

Prof. Mahmoud Sakr

President, Academy of Scientific Research and Technology (ASRT), Egypt

RSS, London, 26 October 2022

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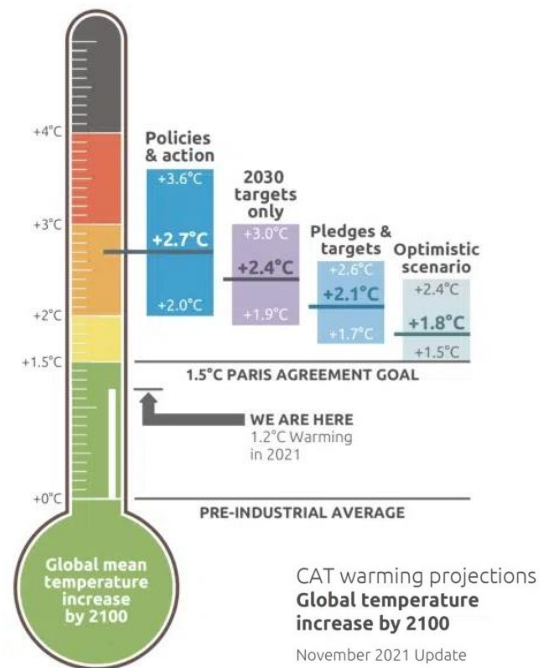
Vision for the future of climate change work

Climate Change

Although climate change is a global challenge, adaptation to its negative impacts varies from place to place, from developed to developing countries, and from North to South, depending on the geographical position, type, and severity of negative environmental impacts and economic status of the country.

Moreover, reports from the World Bank indicated very clearly that climate change is a challenge for sustainable development and increases the costs of sustainable development in developing countries.

Accordingly, developing countries need huge efforts and funds to develop infrastructures that are resilient to climate change, to achieve more efficient use of available water resources, cope with sea-level rise and salinization of groundwater and soil, to develop precision and smart agriculture systems for maximum crops per drop and to support social and institutional adaptation through education, awareness, new policies, and legislations.



Voice of the Global South

Reports of international organizations confirm that the unmatched impact of climate change already being felt across the world is burdening developing countries of the Global South, including Egypt. Due to their high levels of vulnerability, low adaptive capacity, and widespread poverty, these countries are particularly susceptible to extreme climate events. In such a catastrophic scenario, Egypt will have to respond and adapt immediately to the following challenges:

- Facing the consequences of losing more than 15% of its fertile land and 25 % of agricultural productivity
- Facing the consequences of the increased salinity of groundwater due to the interference of seawater with groundwater, beach erosion on the Mediterranean coast, sea level rise, drought, chronic water scarcity, ...etc.
- Addressing the rise in heat-related deaths, infectious diseases, ...etc.
- Facing the challenges of stopping hydroelectric power plants, threatening weak electricity networks due to rising temperatures, reducing the capacity of solar cells because of increased dirt and dust, ..etc.
- Facing the challenges of the increasing risks of climate change on the World Heritage sites (sinking, deterioration, and erosion of archaeological buildings due to air pollution, torrential water, and seas).

Strategic Objectives of Egypt's Vision for Sustainable Development 2030

- Creating an environment that encourages knowledge localization and production
- Preparing and improving an integrated national innovation system
- Linking Knowledge applications and innovation outcomes to national priorities



National Climate Change Strategy-2050

Objectives

1. Achieving sustainable economic growth by reducing CO2 emissions;
2. Enhancing adaptive capacity and resilience to climate change;
3. Enhancing climate change governance framework;
4. Enhancing infrastructure through bank financing of climate change projects;
5. Enhancing scientific research, technology transfer, knowledge, and public awareness for combating climate change

Sub-objectives

Provide new and renewable energy projects, work on reducing emissions, maximizing energy efficiency, and adopting sustainable consumption and production mechanism.

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Examples of Egyptian mega projects to confront climate change

Egypt has officially been selected to host the UN Climate Change Conference (COP 27) after years of significant work on countering climate change, including **political commitments**, implantation of mega projects, and heading the UN Biodiversity Conference from 2018 to 2021.



Examples of Egyptian mega projects to confront climate change

1. The government began to activate its plans to deal with climate change through several national projects, legislations, and laws, which emerged through the **expansion of metro networks, electrical trains, Monaural, and electric cars**, and the preparation of the necessary infrastructure for this, as well as the **establishment of smart and resilient cities, renovation of National roads network.**
2. Egypt is also implementing projects to rationalize water use, line canals, integrated coastal zone management, and a huge project to reclaim 1.5 million acres in the Western Desert and other governorates, which will have a significant impact on combating climate change and reducing CO2 emissions.
3. Established Benban Solar Park, a photovoltaic power station with a total capacity of 1650 MW. Benban is currently the 4th largest solar power plant in the world.
4. Established the biggest projects in the world for water treatment and recycling
5. Replacement of old outdated Cars with new cars that run on natural gas.....etc

THE BIG PICTURE OF CLIMATE CHANGE RESEARCH IN THE ARAB WORLD: INSIGHTS FROM BIBLIOMETRIC ANALYSIS

CLIMATE CHANGE, RESEARCH PRODUCTIVITY, BIBLIOMETRIC ANALYSIS, ARAB COUNTRIES



ABSTRACT

Global impacts of climate change are wide-ranging and unprecedented in scope, ranging from shifting weather patterns that threaten a permanent change of the eco system on earth (which may severely affect human life, including water and food security), to major events affecting directly human lives, such as natural / climate related disasters, rising sea levels, etc. With the organization of two successive Conference of the parties (COP) in the Arab region, it became evident that there is an extensive attention from governments and regional bodies in the Arab region towards issues related to climate change. In this study, we aim to analyze research performance of scientific publication in climate change, based on bibliometric analysis of published research articles in 22 Arab countries. We have used various tools data analysis and bibliometric indicators characterization. Many

indicators are used to examine scientific performance, as well as the trends of growing number of publications, number of citations, number of authors, etc. Using a predefined set of keywords related to climate change and UN climate change themes, we were able to assemble a dataset of 68,193 documents (published papers) that were further analyzed to set the scene and show the status of scholarly publications from authors of the Arab world. Saudi Arabia comes on top of the Arab countries in terms of number of publications in climate change research related publications, followed by Egypt, Morocco, and United Arab Emirates, while IEEE, Energy Procedia and Arabian journal of geosciences are the top three choices for publications related to climate change among the Arab researchers.



AUTHORS

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Egypt RDI Climate Change

Egypt set strategic objectives and policies aiming at directing RDI projects toward supporting Egypt's efforts to confront climate change

The plan dates back to early 2017 and pays too much attention:

1-Green Innovation

2-Renewable Energy & Water desalination

3-Recycling, Ecofriendly Textile and Biodegradable Plastics

4-Saline & Dryland Agriculture

5- Biodiversity and Nature Conservation

6-More Crops Per Drop

7- Blue Economy,

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Egypt Action Plan: Road to COP27 and Beyond



1- Strategic Studies,
Reports, and Policy Papers

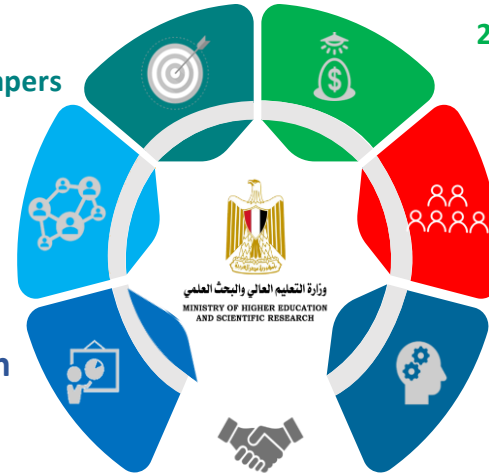
3-National &
International
Networking

5- Higher Education

2- National Green Fund

4-Societal and Institutional
Adaptation

6- Innovation 4 Climate



1- Policy Papers and Reports

- 1- Achieving food security under climate changes
- 2- Addressing climate change impacts on health
- 3- Voluntary lowering of carbon dioxide emission using innovative solutions and mindset transformation
- 4- Insight bibliometric analysis of climate change research in the Arab States
- 5- WIPO Green Technologies Book

Addressing Climate Change Impacts on Health

Policy Working Paper

September 2022

Key messages

- **Climate change is a global health emergency** that presents diverse risks to human lives including but not limited to heat exposure and heat stress; water scarcity, flooding and droughts; changing distribution of vector-borne and other infectious diseases; and food insecurity and malnutrition. Impacts are felt most intensely by vulnerable populations and communities, including those with pre-existing health conditions.
- **Effective adaptation and resilience-building** to the health risks posed by climate change will need to be tailored to local circumstances and capacities; integrated into wider plans for sustainable development, disaster risk reduction and health sector reform, and should involve collaboration between national and local governmental bodies, public health professionals, health-care providers and local households and communities
- **Aligning climate change adaptation and mitigation actions** is more likely to be effective than addressing these actions separately in reducing the health impacts of climate change. Emphasising the co-benefits to health from climate change mitigation can incentivise decision-makers to undertake climate action that directly benefits a country's own population in the near term whilst also contributing to global efforts to combat climate change.
- Addressing the complex interactions between health and climate change requires **multi-sectoral and whole systems approaches and policies** to assess health challenges, support the development and implementation of effective policy solutions, minimise trade-offs and identify actions that achieve objectives for health and climate change at the same time.
- **Coordinated and multidisciplinary monitoring, surveillance and reporting of disease** in crops, livestock, and human populations are important to reduce health risks, and require long-term investment and cross-border collaborations and partnerships. Effective surveillance can support early warning systems, recognising that people and animals will move across borders in new ways due to climate change.
- **Sustainable management of agriculture and water** is essential to reduce health risks from spread of disease in animals and crops, as well as risks to food security, water scarcity and nutrition that can cause harm to population health and economic sustainability. Promoting healthy dietary choices, including increased consumption of plant-based foods, can also reduce emissions from food systems alongside non-communicable disease risks.
- **Mobilisation of public and private finance** is vital to closing climate and health financing gaps, through delivery of the committed US\$100 billion in international climate finance to low and middle-income countries, combined with a doubling of adaptation finance by 2025.

Achieving Food Security under Climate Change

Policy Working Paper

September 2022

Key messages

- **A holistic approach** that recognises the need for climate finance, adaptation, loss and damage alongside climate mitigation is necessary to achieve sustainable food security under climate change.
- **The agricultural sector is one of those most vulnerable to climate change** while also being a major driver of greenhouse gas emissions (GHG). Food security in a world of climate change necessitates developing resilience to the effects of climate change as a risk multiplier, and a reduction in agriculturally related GHG emissions.
- **Data-driven approaches**, from precision agriculture and the use of artificial intelligence in agricultural production, to remote-sensing data to create integrated smart food and water management, can enhance the resilience of food systems under climate change.
- **Rapidly advancing biotechnological approaches** provide a mechanism to introduce or identify traits that introduce resilience to both biotic and abiotic stresses on crops from climate change. This will be possible only through fair access to genetic resources, sharing of benefits, mobilisation of resources and capacity-building in low- and middle-income countries.
- **Food security is underpinned by access to fresh water**, and climate change is increasing water scarcity in regions across the world. Developing smart water management practices that incorporate local, indigenous knowledge and are shaped to local conditions can help in addressing risks.
- **Agricultural extension services, citizen's science, social innovations, awareness-raising and engagement** with civil society institutions, women's groups, NGOs, and policymakers and local communities can support addressing climate change impacts on food production. Gender imbalances, economic inequality, and inequitable food distribution all shape access and attitudes to food and nutrition and must be considered in policies to facilitate behaviour change towards greater food security.
- **International collaboration to improve global food security** in a changing climate will need to minimise food loss and involve co-created, place-based initiatives that account for vulnerabilities and lack of access to nutritious food at sub-national and local scales, and which support investment in both new technological approaches and in-country capacity-building.
- **Integrating a focus on sustainable food systems into countries (NDCs)** as part of the Paris Agreement and in National Adaptation Plans can enable more joined-up actions to build resilience to climate change in food systems alongside reducing emissions from the sector.
- **Climate change impacts on food production present risks to agricultural trade**, which can amplify food insecurity. Multilateral coordinated responses through international bodies like the World Trade Organization (WTO) can help facilitate global food security under climate change through use of the international standards and guidelines.

2- ASRT Green Fund: Climate Change Adaptation and Nature Conservation

Thematic Areas:

1. Ecofriendly sustainable development of rural areas and coastal regions.
2. Support of National Breeding Programs (NBP) aiming at developing strategic crops tolerant to salinity, drought, high temperature and diseases.
3. Saline agriculture and future Crops.
4. Conservation of natural heritage and archeological areas.
5. Green innovation to mitigate the impact of climate change.
6. Conservation of natural genetic resources (Gene Banks, Botanical Gardens, Encyclopedia, National Biodiversity Records, etc.).
7. Economic, strategic and fore sighting studies addressing climate change challenges.
8. Using earth observation and modeling for real time monitoring, predict and better understand the impacts of climate change.
9. Red Sea Coral Reef bleaching problem and rehabilitation.
10. Solid and E- waste recycling.
11. Ecofriendly textiles.
12. Green infrastructure to promote urban resilience to climate changes.
13. Smart agriculture and emerging technologies aiming at more crops per drop.
14. Towards feasible, applicable and sustainable urban landscaping industry based on wild plants.

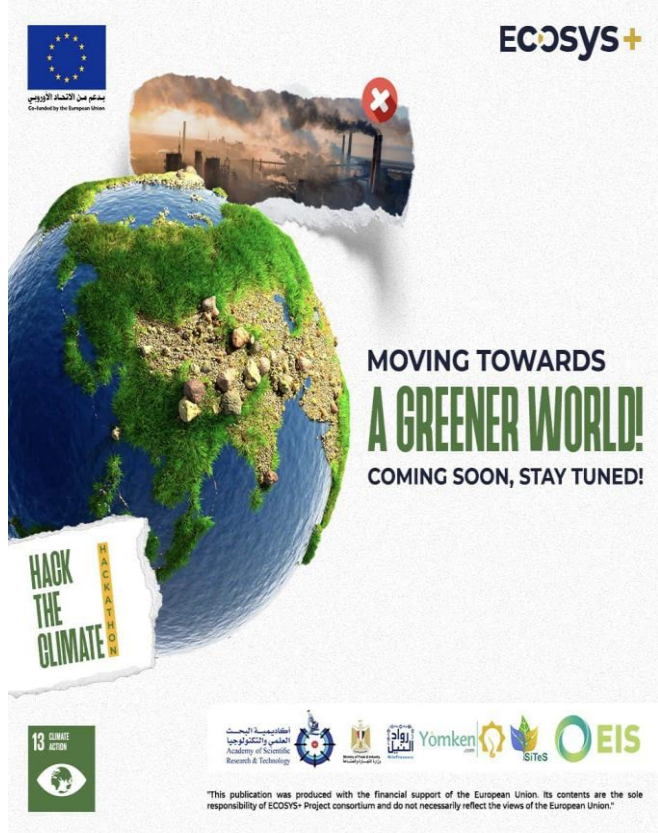
Number of funded Projects: 42

Total fund: 66 Million Egyptian Pound

About 3.3 Million Sterling Pound



3-5: Networking, Institutional Adaptation, Raising awareness and Education



ECOSYS+

ميدعم من الاتحاد الأوروبي
Co-funded by the European Union

**MOVING TOWARDS
A GREENER WORLD!
COMING SOON, STAY TUNED!**

HACK THE CLIMATE

13 CLIMATE ACTION

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التغير المناخي: المواجهة والتعايش
Climate Change: Confrontation and Coexistence



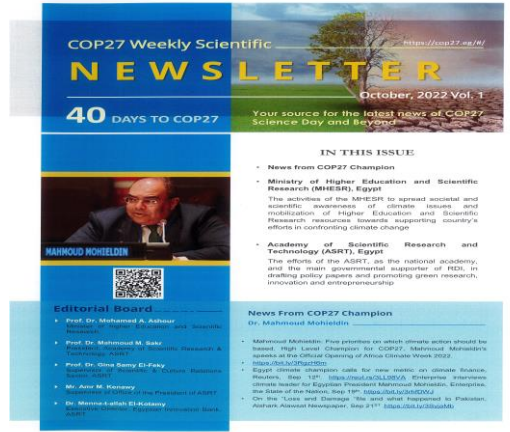
Run for the Climate

POWERED BY **CAIRO MUSEUMS**

The **BRITISH UNIVERSITY** IN EGYPT

UNDP

UNDER THE PATRONAGE OF

COP27 Weekly Scientific NEWS LETTER

October, 2022 Vol. 1

40 DAYS TO COP27

Your source for the latest news of COP27 Science Day and Beyond!

IN THIS ISSUE

- **News from COP27 Champion**
- **Ministry of Higher Education and Scientific Research (MHESR), Egypt**
The activities of the MHESR to spread societal and scientific awareness of climate issues and mobilization of Higher Education and Scientific Research resources towards supporting country's efforts in confronting climate change.
- **Academy of Scientific Research and Technology (ASRT), Egypt**
The efforts of the ASRT, as the national academy, and the state governmental supporter of R&D, in steering policy agenda and promoting green research, innovation and entrepreneurship.

News From COP27 Champion
Dr. Mahmoud Mohieldin

- **Mahmoud Mohieldin**: Five policies to which climate action should be based: High Level Overview for COP27: Mahmoud Mohieldin's speech at the official opening of Arab Climate Week 2022. <https://doi.org/10.3390/10305255>
- **Egypt**: Climate challenges and the role of science in climate research. <https://doi.org/10.3390/10305255>, Enterprise Research Institute hosted for Egyptian President Mahmoud Mohieldin, Secretary of State of the Nation, Reg 1st <https://doi.org/10.3390/10305255>
- **Climate**: Tackling and Changing the world. Reported to Publishers, Al-Ahram Al-Yousef Newspaper, Reg 2 1st <https://doi.org/10.3390/10305255>

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Midway Tangible Outcomes to bridge the gap between Academia and Policy Makers

As a result of the aforementioned efforts, Egypt now owns the biggest research, development, and innovation (RDI) and pilot plants facilities in renewable energy in the region belonging to ASRT; such as the MATS station for concentrated solar power and water desalination in Alexandria and China-Egypt Joint Lab for PV in Sohag (South of Egypt).

Moreover, ASRT has supported the implementation of national projects in the conservation of plant genetic resources (Encyclopedia of Wild Plants), reintegration of Mangrove Forest in the red sea, ...etc.

The Egyptian STI community published in the last five years more than 6722 international publications with more than 51,759 citations and FWCI 1.1, which makes Egypt, together with Saudi Arabia, the leading Arab country directing RDI to support state's efforts in climate change adaptation and mitigation.

Mangrove Story: An excellent example of a Nature-based solution, Citizen-based science, Community Engagement, Awareness, Sustainable development, and science communications [Mangarof.pdf](#)

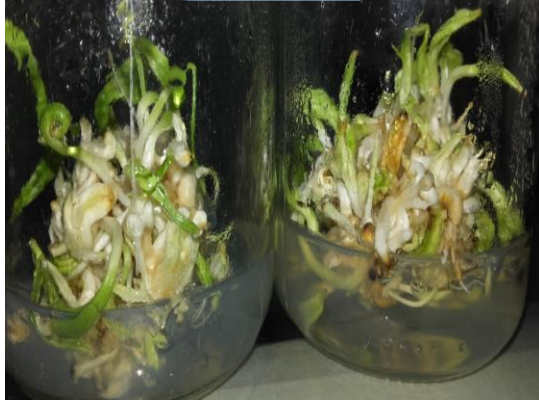
Improving Strategic Crops Productivity and water use efficiency



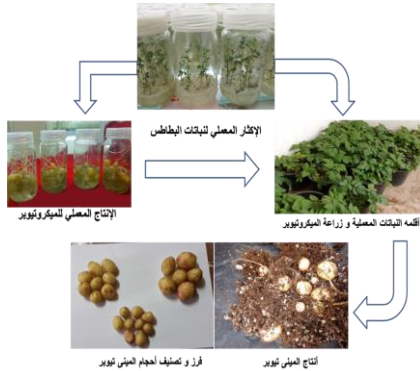
Improvement of Wheat Productivity and Storage

Hybrid Rice Production and Commercialization

National Seeds Production Program: Potato seeds and Date palm offshoots



Date Pam



Potato



Energy

Energy, Water and Food Nexus





www.asrt.sci.eg

MATS Pilot Plant for Concentrated Solar Power and Water Desalination



Energia: Nord Africa, inaugurato primo impianto solare termodinamico con tecnologia ENEA

01/03/2018

Uno spazio di 10mila m² - circa due campi da calcio - dove 18 specchi parabolici lunghi ciascuno 100 metri "captano" le radiazioni solari: questi i numeri della prima centrale solare termodinamica con tecnologia ENEA inaugurata in Nord Africa alla presenza dell'ambasciatore d'Italia al Cairo Giampaolo Cantini e dell'ambasciatore Ue Ivan Surkoo, dei ministri egiziani dell'Elettricità e Fonti rinnovabili, Mohamed Shaker, e dell'Università e Ricerca, Khalid Atef Abdul Ghaffar, e del presidente dell'Accademia per la ricerca scientifica d'Egitto (ASRT), Mahmoud Sakr.



Costruito all'interno del campus della "Città della Scienza e della Tecnologia" di Borg-el-Arab a circa 40 chilometri da Alessandria d'Egitto, l'impianto è stato realizzato dal progetto MATS (Multipurpose Applications by Thermodynamic Solar), coordinato dall'ENEA. La centrale è basata sulla tecnologia ideata dal premio Nobel Carlo Rubbia e sviluppata dalla stessa ENEA con l'uso di sali fusi alla temperatura massima di 550 °C come fluido di processo e un sistema di accumulo termico per distribuire l'energia anche in assenza di radiazione solare. Combinato con altri combustibili "tradizionali", l'impianto può fornire in modo stabile 5 MW di calore ad alta temperatura, fino a 1 MW di energia elettrica a circa 250 m³ al giorno di acqua dissalata, soddisfacendo i consumi di una comunità di oltre 1.000 abitanti. L'impianto è stato integrato nella rete locale di distribuzione di elettricità, gas e acqua anche se può lavorare anche off-grid.

"Il progetto MATS dimostra sia la validità della tecnologia tutta italiana, e in particolare di quella ENEA, del solare termodinamico, sia la capacità di ricerca, università e industria di mettere a sistema le proprie competenze

Maire Tecnimont, inaugurato in Egitto impianto solare "Mats"

Pubblicato il 27/03/2018
Ultima modifica il 27/03/2018 alle ore 16:52

TELEBORSA



L'impianto solare termodinamico a concentrazione MATS, il primo al mondo di questo tipo, è stato inaugurato oggi, 27 Febbraio, ufficialmente nell'area situata nella Città per la Scienza e la Tecnologia (SRTA-City) a Borg El-Arab, a 40 km da Alessandria d'Egitto.

Lo rende noto Maire Tecnimont, precisando che KT-Kinetics Technology, parte del Gruppo Maire Tecnimont, è stata coinvolta in questo progetto tecnologico come process engineering contractor.



ANEST

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A&E Energia

Animali Natura Clima Vivere Green Mobilità Rifiuti/Riciclo Energia Acqua Impugnatura Green Economy FOTO VIDEO

Abbonamenti: A&E Energia

In Egitto primo solare-desalinizzatore

Centrale sperimentale con tecnica termodinamica ideata da Rubbia

Redazione ANSA | IL CARO | 27 febbraio 2018 | 2007 | [Entra nella redazione](#) | [Stampa](#)

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AGENZIE

Maire Tecnimont

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27.02.2018 - CERIMONIA DI INAUGURAZIONE IN EGITTO DELL'INNOVATIVO IMPIANTO SOLARE TERMODINAMICO A CONCENTRAZIONE "MATS"

Altre notizie

- 2013
- 2014
- 2015
- 2017
- 2018

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Speciale energia: Egitto, inaugurato impianto solare multifunzione Mats finanziato da Unione Europea

Speciale energia

Speciale difesa

Speciale infrastrutture

Speciale It

TUTTE LE NOTIZIE SU...

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- ASIA
- AMERICHE

النشرة العربية

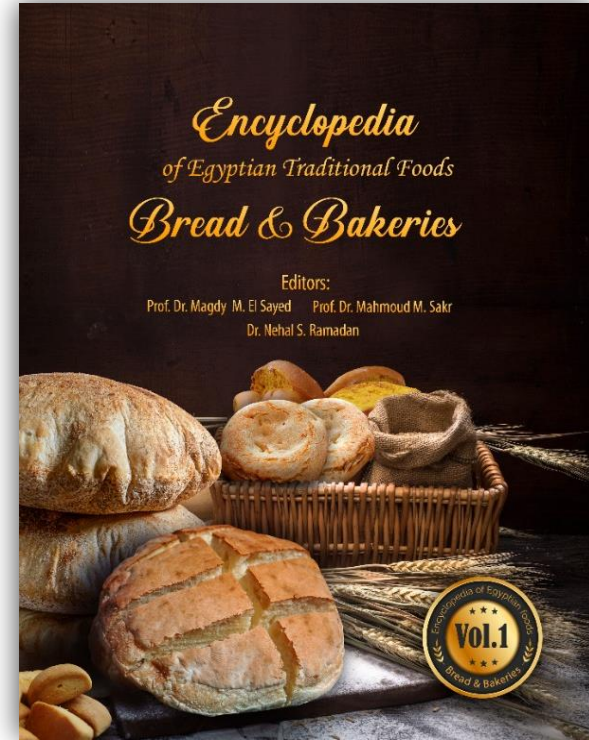
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- L'Esito ed Expo Astoria
- L'uscita fra Roma e Italia
- La Fyrom prova a ripartire
- Le relazioni Italia-Georgia
- Alba in Tunisia



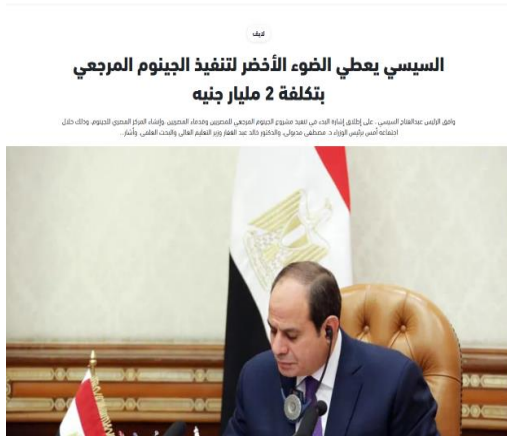
- 1- Encyclopedia of Wild Plants
- 2- Gene Banks
- 3- National Network of Herbaria
- 4- Encyclopedia of Egyptian Traditional Foods
- 5- Nature Conservation Conf.
- 6- Botanical Garden
- 7- National Network of Microbial Cultural Collections



Health and Cultural Heritage



Declared by the president of Egypt as
National Project on 1st March 2021



- Establishing the Egyptian Genome Center
- Early diagnosis and prediction of the most common diseases among Egyptians and early medical intervention, which leads to lowering the cost of medical care and improving the quality of life for Egyptians
- Establishing personalized medicine and opening the door to the application of gene therapy, the application of pharmacogenetics in treatment, and the rooting of drug design in line with the genetic determinants of the Egyptians
- Building a critical mass of Egyptian scientists in the field
- Exploring the genetic map of the ancient Egyptians

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The role of Research, Development, and Innovation in addressing climate change: Technology transfer and knowledge sharing

Innovation in technologies of climate change adaptation is much less in focus, though more pronounced than mitigation technologies. However, solutions to ease adaptation are extremely important for vital sectors of the economy, as well as for people's ability to cope with the rapid changes brought about by climate change.

REDIRECT is an initiative that brings together science academies, universities, research institutions, international organizations, industry, science funding organizations, and NGOs to integrate their efforts and redirect their RDI capabilities towards addressing and achieving SDGs under climate change in developing and least developing countries based on green technological and social innovations.

The main goal of REDIRECT is to support the efforts of vulnerable countries in climate change confrontation, adaptation, and coexistence via capacity building, providing innovative solutions, technology transfer and localization, knowledge sharing, public-private partnerships, and community engagement.

REDIRECT partners align themselves, through the high-level climate champions, to set regional priorities, and guide the local RDI community to secure green innovation funds.

The strategic objective of the initiative is to harmonize global and integrate regional and continental RDI efforts to help in realizing countries' commitments and pledges on tackling climate change and realizing a sustainable future for all through innovation for the climate.

WIPO GREEN TECHNOLOGY BOOK:

Better analysis of global green technologies and climate change research for better climate change adaptation, mitigation, and coexistence national plans.

The *Green Technology Book* is a perfect guide for individuals, organizations and policymakers. It highlights the technological solutions available to meet today's climate challenges, as well as analyzing important current and future innovation trends. This will have a direct impact, in particular on the implementation of adaptation solutions to climate change.

ASRT is proud of its partnership with WIPO and the United Nations in launching the first edition of this new annual Flagship publication promoting green technologies. Our hope is that this can be a vehicle for boosting Egypt's innovation system, at the same time creating a global awareness of Egypt's role in innovation.....**Climate Change Research Indicator**

Redesigning strategies in a changing world:

Possible voluntary lowering of carbon dioxide emissions and adaptation via green and social innovations, incentivizing local communities, and community mindset transformation.....**Farms for Climate**

5- Green Innovation Pavilion: Innovation 4 Climate



Wealth of Egypt: Mangrove Forest,
South East of Egypt, Red Sea Governorate
March, 2015
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Thank you
شكرا جزيلًا

