THE ATHENS INSTITUTE FOR EDUCATION AND RESEARCH

Abstract Book

6th Annual International Conference on Geology & Earth Science

15-18 July 2019, Athens, Greece

Edited by
Gregory T. Papanikos

2019

Abstracts
6th Annual International Conference on Geology & Earth Science

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(In Alphabetical Order by Author's Family name)

Preface

This book includes the abstracts of all the papers presented at the *6th Annual International Conference on Geology & Earth Science (15-18 July 2019)*, organized by the Athens Institute for Education and Research (ATINER).

In total 29 papers were submitted by 30 presenters, coming from 18 different countries (Algeria, Brazil, China, Costa Rica, Czech Republic, Egypt, France, Israel, Italy, Kuwait, Mexico, Romania, South Africa, Taiwan, The Netherlands, Turkey, UAE and USA). The conference was organized into 10 sessions that included a variety of topic areas. A full conference program can be found before the relevant abstracts. In accordance with ATINER's Publication Policy, the papers presented during this conference will be considered for inclusion in one of ATINER's many publications.

The purpose of this abstract book is to provide members of ATINER and other academics around the world with a resource through which to discover colleagues and additional research relevant to their own work. This purpose is in congruence with the overall mission of the association. ATINER was established in 1995 as an independent academic organization with the mission to become a forum where academics and researchers from all over the world could meet to exchange ideas on their research and consider the future developments of their fields of study.

It is our hope that through ATINER's conferences and publications, Athens will become a place where academics and researchers from all over the world regularly meet to discuss the developments of their discipline and present their work. Since 1995, ATINER has organized more than 400 international conferences and has published nearly 200 books. Academically, the institute is organized into 6 divisions and 37 units. Each unit organizes at least one annual conference and undertakes various small and large research projects.

For each of these events, the involvement of multiple parties is crucial. I would like to thank all the participants, the members of the organizing and academic committees, and most importantly the administration staff of ATINER for putting this conference and its subsequent publications together. Specific individuals are listed on the following page.

Gregory T. Papanikos
President

6th Annual International Conference on Geology & Earth Science
15-18 July 2019, Athens, Greece

Scientific Committee

All ATINER's conferences are organized by the Academic Council. This conference has been organized with the assistance of the following academics, who contributed by a) setting up the program b) chairing the conference sessions, and/or c) reviewing the submitted abstracts and papers:

1. Gregory T. Papanikos, President, ATINER & Honorary Professor, University of Stirling, UK.
2. Saif Uddin, Director, Center for Environmental Pollution, Climate & Ecology (CEPCE) & Senior Research Scientist, Kuwait Institute for Scientific Research, Kuwait.
3. Juan Martinez Solis, Professor, Chapingo Autonomous University, Mexico.
4. Javier M. Obando-Ulloa, Academic Member, ATINER & Professor, Costa Rica Institute of Technology, Costa Rica.
5. Lal Almas, Associate Dean and Regents Professor, West Texas A&M University, USA.
6. Silvia Salustiano, Professor, Federal Institute of Education, Science and Technology of Goiano, Brazil.
7. Ibrahim Hassan, Professor, Alexandria University, Egypt.
8. Leonard Sciorra, Professor, Saint Peter's University, USA.
9. Mohammad Al-Murad, Research Scientist, Kuwait Institute for Scientific Research, Kuwait.
10. Nosiseko Mashiyi, Remote Sensing Scientist, South African National Space Agency, South Africa.
11. Olga Gkounta, Researcher, ATINER.

FINAL CONFERENCE PROGRAM

6th Annual International Conference on Geology & Earth Science, 15-18 July 2019, Athens, Greece

Conference Venue: Titania Hotel, 52 Panepistimiou Avenue, Athens, Greece (close to metro station *Panepistimio*)

Monday 15 July 2019

07:50-08:40 Registration and Refreshments

08:50-09:15 (Room A - 10th Floor): Welcome and Opening Address by Gregory T. Papanikos, President, ATINER.

09:15-11:00 Session I (Room B - 10th Floor): Global Concerns: Food Security and Climate Change

Chair: Olga Gkounta, Researcher, ATINER.

1. Lal Almas, Associate Dean and Regents Professor, West Texas A&M University, USA, Hame Abdou Kadi Kadi, PhD Student, West Texas A&M University, USA & Bonnie Pendleton, Professor, West Texas A&M University, USA. Food Security Aspects in Niger - Challenges and Opportunities.
2. Javier M. Obando-Ulloa, Professor, Costa Rica Institute of Technology, Costa Rica, Stephanie Oviedo-Ortega, Student, Costa Rica Institute of Technology, Costa Rica & Tomás de Jesús Guzmán-Hernández, Professor, Costa Rica Institute of Technology, Costa Rica. Use of Thermal Solar Systems as a Tool for the Improvement of Pepper Blanching Process (Piper nigrum L.) to Reduce Greenhouse Gas Emissions.
3. Ahmed Alhuseen, Postdoctoral Fellow, Czech Academy of Sciences, Czech Republic, Pavel Cudlin, Head of Landscape Carbon Capture Department, Czech Academy of Sciences, Czech Republic, Mahmoud Makki, Senior Researcher, Institute of Economics and Agricultural Policies, Sudan , Mária Kozová, Chairperson, Catholic University, Slovakia & Ismail Ilsafi, Dean of Faculty of Education, University of Gadarif, Sudan. Capacity Needs Assessment for National Adaptation Plan of Sudan.
4. Nosiseko Mashiyi, Remote Sensing Scientist, South African National Space Agency, South Africa & Mahlatse Kganyago, Remote Sensing Scientist, South African National Space Agency, South Africa. Role of Earth Observation in Agriculture and Food Security: AfriCultuReS Project.

11:00-12:30 Session II (Room B - 10th Floor): Plant Physiology and Genetic Analyses

Chair: Ibrahim Hassan, Professor, Alexandria University, Egypt.

1. Margarita Gisela Pena Ortega, Professor, Chapingo Autonomous University, Mexico, Jesus Axayacatl Cuevas Sanchez, Professor, Chapingo Autonomous University, Mexico, Juan Martinez Solis, Professor, Chapingo Autonomous University, Mexico & Araceli Munguía Mendez, Graduate Student, Chapingo Autonomous University, Mexico. Molecular Characterization of two Mexican Orchid Species (*Chysis bractescens* and *Rhyncholaelia glauca*) through ISSR.
2. Chung-Feng Kao, Assistant Professor, National Chung Hsing University, Taiwan, Hao-Ling Chu, Research Assistant, National Chung Hsing University, Taiwan, Jen-Ren Chen, Assistant Researcher, Taiwan Seed Improvement and Propagation Station, Taiwan & Chun-Ruei Cho, Undergraduate Student, National Chung Hsing University, Taiwan. Pathway and Network Analysis of Sex-Determination Genes in Papaya.
3. Juan Martinez Solis, Professor, Chapingo Autonomous University, Mexico. Use of Values of Germinated Wheat Seeds (*Tritricum aestivum* L.) in the First Count in a Standard Germination Test for Certification Purposes.

12:30-14:00 Session III (Room B - 10th Floor): Water Quality & Pollution

Chair: Juan Martinez Solis, Professor, Chapingo Autonomous University, Mexico.

1. Zheng Zheng, Professor, Fudan University, China & Qi Li, Student, Fudan University, China. Applying Eucalyptus to Eliminate Algae in Water.
2. Mohammad Al-Murad, Research Scientist, Kuwait Institute for Scientific Research, Kuwait & Saif Uddin, Senior Research Scientist, Kuwait Institute for Scientific Research, Kuwait. Assessment of Urbanization Impacts on Subsurface Groundwater Levels and Quality in Kuwait.
3. Qi Li, Student, Fudan University, China & Zheng Zheng, Professor, Fudan University, China. Response of Submerged Macrophytes and Periphyton Biofilm to Water Flow in Eutrophic Environment: Plant Structural, Physicochemical and Microbial Properties.

14:00-15:00 Lunch

15:00-16:30 Session IV (Room B - 10th Floor): Earth Science

Chair: Mohammad Al-Murad, Research Scientist, Kuwait Institute for Scientific Research, Kuwait.

1. Thanos Papanicolaou, Professor and Goodrich Endowed Chair of Excellence, University of Tennessee, USA. A Model for Knickpoint Migration in Small Alluvial Streams.
2. Massimo Moroni, Geologist, Geoex srls – Radon Lab Service, Italy. Radon Risk Assessment for Urban Planning and GIS Data Processing.
3. Onur Alkac, PhD Student, Fırat University, Turkey & Ercan Aksoy, Professor, Fırat University, Turkey. Facies Analysis and Paleoenvironmental in Interpretation of Kirkgeçit Formation, East Anatolian, Turkey.

16:30-17:30 Session V (Room B - 10th Floor): Biology

Chair: Leonard Sciorra, Professor, Saint Peter's University, USA.

1. Sabry El-Naggar, Professor, Tanta University, Egypt. Beneficial Effect of Paclitaxel as a Tumor Priming Drug for Pancreatic Cancer Gene Therapy.
2. Gad Degani, Professor, MIGAL Galilee Research Institute, Israel. The Involvement of Hormones in Fish: Basic and Applied Aspects.

21:00-23:00 Greek Night and Dinner

Tuesday 16 July 2019

08:00-11:00 Session VI: An Educational Urban Walk in Modern and Ancient Athens

Group Discussion on Ancient and Modern Athens.
Visit to the Most Important Historical and Cultural Monuments of the City (be prepared to walk and talk as in the ancient peripatetic school of Aristotle)

11:15-13:00 Session VII (Room B - 10th Floor): Water: Management, Uses, and Law

Chair: Lal Almas, Associate Dean and Regents Professor, West Texas A&M University, USA.

1. Sabrina Joseph, Professor and Dean, School of Arts & Sciences, American University in Dubai, UAE. Water for Oil: Experts, British Colonial Authorities and the Formation of a Modern State: The Case of the Trucial States, 1930-1960s.
2. Yasar Selman Gultekin, Assistant Professor, Düzce University, Turkey. Stakeholder Analysis and Water Management Model for Melen River System and its Basin.
3. Mehmet Altingoz, PhD Student, University of Delaware, USA & Sebnem Sahin, Lead Development Economist, The World Bank, USA. Economic Consequences of Unsustainable Management of Transboundary Waters in South Asia: Lessons from the Indus Example.
4. Nicole Friedrich Neumann, Master Student, IHE Delft Institute for Water Education, The Netherlands & Jorge Manuel Rodrigues Tavares, Researcher, University of Lisbon, Portugal. Implementation of "Efficient Water Use" Concept in a Commercial Dairy Cattle Farm in Brazil.

13:00-14:30 Session VIII (Room B - 10th Floor): Special Topics

Chair: Nosiseko Mashiyi, Remote Sensing Scientist, South African National Space Agency, South Africa.

1. Silvia Salustiano, Professor, Federal Institute of Education, Science and Technology of Goiano, Brazil & Natalia Barbosa, Professor, University of Minho, Portugal. Efficiency and Subsidies: Mapping and Multidisciplinary Analysis.
2. Pinar Gultekin, Assistant Professor, Düzce University, Turkey. Evaluation of Soundscape in University Campuses: The Case Study of Düzce University.
3. Cosmin Vancea, Lecturer, Politehnica University Timisoara, Romania, Marius Jurca, Lecturer, Politehnica University Timisoara, Romania, Petru Negrea, Professor, Politehnica University Timisoara, Romania, Iosif Hulka, Researcher, Politehnica University Timisoara, Romania, Maria Mihailescu, Researcher, Politehnica University Timisoara, Romania, Alexia Balafa, Student, Politehnica University Timisoara, Romania & Adina Negrea, Associate Professor, Politehnica University Timisoara, Romania. Glass Foams Insulating Materials for Green Passive Buildings Adapted to the Current Climate Changes.

14:30-15:30 Lunch

15:30-16:30 Session IX (Room B - 10th Floor): Biotechnology & Plant Production

Chair: Javier M. Obando-Ulloa, Professor, Costa Rica Institute of Technology, Costa Rica.

1. Magali Mariani, Research Engineer, Pascal Paoli University of Corsica, France. Use of Biocatalytic Processes for Production of Value-Added Compounds from Vegetable Oils.
2. Radia Lourkisti, PhD Student, Pascal Paoli University of Corsica, France, Yann Froelicher, UMR Agap - Cirad, France, Jérémie Santini, Pascal Paoli University of Corsica, France & Liliane Berti, Professor, Pascal Paoli University of Corsica, France. Study of Tolerance to Low Temperature in Innovative Triploid Citrus Varieties and Monitoring of Primary Metabolism in Fruits.

16:30-18:30 Session X (Room B - 10th Floor): Plant Growth & Phytopathology

Chair: Silvia Salustiano, Professor, Federal Institute of Education, Science and Technology of Goiano, Brazil.

1. Ibrahim Hassan, Professor, Alexandria University, Egypt & Rehab El Dakak, Lecturer, Alexandria University, Egypt. Radish (*Raphanus sativus* L.) Cultivar-Specific Response to O_3: Patterns of Biochemical and Plant Growth Characteristics.
2. Ofir Degani, Research Group Leader and Head Researcher, MIGAL Galilee Research Institute, Israel, Shlomit Dor, MIGAL Galilee Research Institute, Israel & Daniel Regev, MIGAL Galilee Research Institute, Israel. The Hidden Life of the Maize Pathogen, *Harpophora Maydis*.
3. Cheng-Yuan Lai, Master Student, National Chung Hsing University, Taiwan & Hsim-Mei Ku, Professor, National Chung Hsing University, Taiwan. Integrated Transcriptome and Network Analysis to Explore *Chenopodium Quinoa*-virus Interaction.
4. Lila Abidi, Teacher / Researcher, Djilali Bounaama University of Khemis Miliana, Algeria, Sid Ahmed Snoussi, Teacher / Researcher, Djilali Bounaama University of Khemis Miliana, Algeria & Maria Stela Bradea, Teacher / Researcher, University Saad Dahleb, Algeria. Effect of Seaweed Liquid Fertilizer on Chlorophyll Concentration and Growth of Tomato (*Solanum lycopersicum* L.).
5. Nadia Tirchi, Teacher / Researcher, Djilali Bounaama University of Khemis Miliana, Algeria, Ricardo Holgado, Research Professor, Norwegian Institute of Bioeconomy Research – Nibio, Norway & Aissa Mokabli, Teacher / Researcher, Djilali Bounaama University of Khemis Miliana, Algeria. Farmers Acquaintance on Management of Potato Cyst Nematodes *Globodera* spp. in the Province of Ain Defla in Algeria.

20:30-22:00 Dinner

Wednesday 17 July 2019
Mycenae and Island of Poros Visit
Educational Island Tour

Thursday 18 July 2019
Delphi Visit

Friday 19 July 2019
Ancient Corinth and Cape Sounion

Lila Abidi
Teacher / Researcher, Djilali Bounaama University of Khemis Miliana, Algeria
Sid Ahmed Snoussi
Teacher / Researcher, Djilali Bounaama University of Khemis Miliana, Algeria
&
Maria Stela Bradea
Teacher / Researcher, University Saad Dahleb, Algeria

Effect of Seaweed Liquid Fertilizer on Chlorophyll Concentration and Growth of Tomato (*Solanum lycopersicum* L.)

Seaweeds bio fertilizers are considered as a promising bioresource to meet the nutrient requirement of crops, contrary to chemical agriculture that degrade the fertility of the soil by making it toxic to plants. The main purpose of this study is to improve the tomato by estimating and comparing the effect of various treatments with a liquid bio fertilizer, on growth parameters and photosynthetic pigments, on a variety of truck-farming tomato (Saint-Pierre) cultivated under greenhouse. For that, foliar applications of the bio fertilizer were tested in four doses (25%, 50%, 75%, and 100%) and compared with a control at various periods of development of tomatoes. The results showed that the treatments of brown seaweeds extract bio fertilizer on the culture improved the following parameters: the rates of chlorophyll (a), (b) and (c), the total height of plants, the distance between tomato bouquets, and the diameter of stalks. The best treatments were observed in the dose of 100% for the biochemical parameter and in the doses of 50% (1.5mL/L), 75% (2.5mL/L) and 100% (3mL/L) for the growth parameters.

Mohammad Al-Murad
Research Scientist, Kuwait Institute for Scientific Research, Kuwait
&
Saif Uddin
Senior Research Scientist, Kuwait Institute for Scientific Research, Kuwait

Assessment of Urbanization Impacts on Subsurface Groundwater Levels and Quality in Kuwait

Urbanization has a paramount ecological, economical and social implications, and one of them is the impact on the levels and quality of the subsurface groundwater. Kuwait City and its suburbs have faced this problem since the early 1980s. In this study the components of the urbanization process, which effected and still affecting the subsurface groundwater levels were evaluated from mid 1980s to 2018. The goal was to define the main components, which impacted the subsurface groundwater levels and quality in Kuwait City and other cities, and to propose the possible solutions to elevate the impacts of the problems on the levels and quality. Available data of subsurface groundwater and quality were collected since 1987, conventional monitoring and multi-channel wells were constructed, subsurface groundwater samples were collected and analyzed, the data were geostatistically mapped. Estimation of the subsurface groundwater levels from 1987 to 2014 indicated that subsurface groundwater was rising in Kuwait, and its suburbs. In 2015 the subsurface groundwater levels started to decline almost everywhere in Kuwait City and its suburbs. Cities on high land will not face the effect of subsurface groundwater rise except Sabah Al-Ahmad, and Al-Wafra cities. Main sources of subsurface groundwater rise and water quality changes were, discharges of produced water in Al-Burgan Oilfield, leakage from connections between freshwater network and houses, leakage from underground storage reservoirs of desalinated water, irrigation of the gardens. Dewatering projects in sites of constructing the high towers mainly in Kuwait City are the main discharging source of the groundwater and changes in groundwater quality. Injecting contaminated subsurface groundwater in the oil wells to provide additional oil and gas recovery in the Burgan Oilfield is a solution to elevate the impacts of the disposed produced water on the ground surface. Changing the materials of the connecting devises between the freshwater network and the houses is a necessity to reduce the leakage from the network. Continuous monitoring of the subsurface groundwater system and interpretation of the results are major tasks in the management of the water system in urban areas.

Ahmed Alhuseen
Postdoctoral Fellow, Czech Academy of Sciences, Czech Republic
Pavel Cudlin
Head of Landscape Carbon Capture Department, Czech Academy of Sciences, Czech Republic
Mahmoud Makki
Senior Researcher, Institute of Economics and Agricultural Policies, Sudan
Mária Kozová
Chairperson, Catholic University, Slovakia
&
Ismail Ilsafi
Dean of Faculty of Education, University of Gadarif, Sudan

Capacity Needs Assessment for National Adaptation Plan of Sudan

Sudan's commitment to the United Nations Framework Convention on Climate Change (UNFCCC) has remarkably boosted its efforts to adapt the country's natural and productive systems to the adverse impacts of climate change. National and local governmental units, local and international Non-Governmental Organizations (NGOs) have all been engaged in formulating, planning and implementing a National Adaptation Programme (NAP) targeting the most vulnerable sectors in the country to climate change. NAP has achieved steps forward so far; however, numbers of institutional gaps and needs still exist; which if overlooked may lead to undermining the goal that NAP has been designed for.

This paper aims to identify current gaps, strengths, and needs of particular governmental units and other relevant stakeholders, involved in the NAP formulation and implementation in Sudan, through a participatory institutional capacity needs assessment. The paper has adopted the quantitative and qualitative methods approach to fulfilling its aim. Literature review and sociological methods focused group discussion; interviews and experts' opinion were used to obtain the results of this study. Officials in twenty-five planning and executive governmental bodies, local and international Non-Governmental Organizations (NGOs) have been interviewed. The interview form assessed the capacity of climate change and risk assessment information, long-term vision and mandate, planning and implementation, and coordination and partnering. The assessment of each functional capacity has addressed the enabling environment, the organization, and individual capacities.

The results showed Sudan has a moderate-to-high overall functional capacity, with obvious gaps in the enabling environment for climate

change information and risk assessment and the implementation and planning of NAP. Lack of funding was stated as the main reason behind these gaps. Establishment of dissemination and capacity building unit within the Higher Council of Environment and Natural Resources was one of the main recommendations from this study.

Onur Alkac
PhD Student, Fırat University, Turkey
&
Ercan Aksoy
Professor, Fırat University, Turkey

Facies Analysis and Paleoenvironmental in Interpretation of Kirkgeçit Formation, East Anatolian, Turkey

The Kırkgeçit Formation (47.8 to 27 Ma) was composed of deposits subsidance of a basin that occured depending on N-S directional tectonic stress on the Eastern Taurus Orogenic Belt during the Arabian plate in South subduction under the Eurasian plate to the North begining of Middle Eocene. It consists of deep marine deposits which has a wide scaled outcropes at NE-SW direction in the Southwest Baskil (Elazığ, Eastern Turkey). The Kırkgeçit Formation shows different lithological features in the investigation area. From bottom to upper part of lithologies are; unorganised, poorly rounded and sorted, chaotic conglomerates, channel fill deposits having sandstone-conglomerate lithologies with well rounded, poorly sorted conglomerates occurs sandstones, clastic limestone with generally bentic foraminifera, pebbly sandstone and slope deposits which have claystone/shale lithologies.

The spatial changes in facies and architecture are investigated coarse grained rich deepwater clastic system of the Kırkgeçit Formation within the subsidance of Basin at southwest Baskil. The facies identified in the measurement sections from different outcropes are classified by Mutti and Ricci Lucchi, 1975; Stow, 1985 and Pickering et all., 1986 (A, B, C, D, E, F Facies codes).

Paleocurrent measurements taken from the conglomerates which show well organised, well rounded and poorly sorted, have long axis imbrication and also sandstones have sole marks (fluid marks, current ripples and lingoidal ripples). General feding directions of paleocurrent belonging to Kırkgeçit Formation at southwest part of Baskil has been assigned as northeast to southwest (220°-230°).

This study is supported by Fırat University Scientific Research Projects with Project number MF.17.02.

Lal Almas
Associate Dean and Regents Professor, West Texas A&M University, USA
Hame Abdou Kadi Kadi
PhD Student, West Texas A&M University, USA
&
Bonnie Pendleton
Professor, West Texas A&M University, USA

Food Security Aspects in Niger – Challenges and Opportunities

Niger is a landlocked country in West Africa. It has a total area of 1,267,000 km^2, with 21.48 million total population in 2017 and a population growth rate of 3.89%. Agriculture contributes 35-40% to the Niger gross domestic product. Eighty-five percent of the population are rural farmers whose survival depends solely on subsistence agriculture. Pearl millet (*Pennisetum glaucum*) and sorghum (*Sorghum bicolor*) are the main staple crops produced with low soil fertility and low yields. Agriculture is practiced in harsh environments mainly degraded by human activities leading to drought and other natural disasters. That affects agricultural production and the capability of Niger to produce enough food, resulting in food shortages and more spent to buy grain. Historically, production and yields were proportional to total areas harvested that showed an upward trend over time. Overall, growth rate of the Niger population was much greater than increase in cereal production from 2000 to 2017. Effects of natural disasters that are frequent in Niger might cause low cereal production rates. It is reported that about 20 percent of Niger's cereal needs are met through imports from Nigeria. Only during the 2006-2008 period was there a positive gap of about 175,200 tons of cereal for a period of food auto-sufficiency in Niger. Total cereal production demands are projected to be 34,817,400 and 447,627,700 tons for 2050-2052 and 2068-2070, respectively. The study is a diagnosis of different aspects of food security and provides valuable information about the challenges and opportunities for agricultural production in Niger.

Mehmet Altingoz
PhD Student, University of Delaware, USA
&
Sebnem Sahin
Lead Development Economist, The World Bank, USA

Economic Consequences of Unsustainable Management of Transboundary Waters in South Asia: Lessons from the Indus Example

The majority of global water resources cross country borders (e.g. the Columbia, the Danube, the Nile), often referred to as transboundary waters (Wolf, 2007). Due to their international nature, management of these rivers require international arrangements. Studies show that cooperation between sharing countries is the appropriate management, as it enables countries to use their cumulative technical and financial resources to increase their collective capacity for sustainable management of their transboundary waters (UN, 2013). In addition, it enables them to obtain technical and financial support from international organizations such as the European Union, United Nations, and World Bank, as the international organizations are the main institutions offering support and they usually demand international cooperation (UN, 2013).

Water availability issues has become problematic around the world. One of the regions water scarcity has been severely challenging is the South Asia Region (SAR), consisted of Afghanistan, Bangladesh, Bhutan, Maldives, Nepal, India, Pakistan, and Sri Lanka. In addition, it is likely to be even worse in the future since populations and demand for water increase (Markandya et al., 2018). Inefficient management of water resources in SAR are projected to have tremendous consequences, one of the main ones of which is substantial decrease in GDP by 2050 (Markandya et al., 2018). SAR needs to improve its water sustainability. However, it contains thirteen transboundary river basins, covering the majority of the region. Therefore, for water sustainability in SAR, transboundary water cooperation is necessary, which has been little so far in the region. In this paper, we offer guidelines to be utilized to combat this issue.

First the future economic consequences of uncooperative management of transboundary waters in SAR is argued by utilizing the World Bank report authored by Markandya et al. (2018). Next, the Indus water management is analyzed to derive lessons, as it a good representative of the regional water context as well as it has been successfully conducted despite severe stressors, e.g. conflicts between India and Pakistan. Then, lessons and recommendations derived for SAR are presented. In conclusion, we suggest making multilateral transboundary water

agreements in SAR by using a polycentric approach while underlining the necessity of third-party input and future harms in case of non-cooperative behavior.

Gad Degani
Professor, MIGAL Galilee Research Institute, Israel

The Involvement of Hormones in Fish: Basic and Applied Aspects

Fish are a very large group, containing a large variety of over 33,000species. The scientific knowledge about the interaction between the somatic axis (SA) and the gonadotropic axis (GA) hormones, both of which function in the brain, the pituitary gonad axis (BPG) and control growth and reproduction, is vital for the domestication of fish in aquaculture. Many aspects aimed at improving the adaption and the production of European eel (Anguilla Anguilla) and Russian sturgeon (Acipenser gueldenstaedtii) have been studied for quite a long time. Two models, based on the results of our, and others' studies, describing the interaction between GA and SA during the oogenesis in these two different species have been suggested. In European eel, maintained in artificial conditions at a low density, the gonadotropin-releasing hormone (GnRH) affected the secretion of follicle stimulation hormone (FSH) by the pituitary, which in turn, caused steroidogenesis [which includes aromatase (CYP19) synthesizing 17β-estradiol (E2) from testosterone], and ovary development. The E2 ovary secretion, which affected the adenylate cyclase-activating polypeptide (PACAP), the growth hormone (GH) and the insulin-like growth factor (IGF), stimulated rapid growth in females. On the other hand, the growth of eels at a high density caused the pituitary gland to secrete FSH at a lower level, and CYP19 was not synthesized in the gonads, for male development. In the male eel's, differentiation to testis, Kt-11 is secreted and the somatic axis inhibits growth rate. In Russian sturgeon, GnRH has a moderate effect on VTL and the E2 of six-year-old females, but no effect was found in LH. The mRNA relative level of FSH during vitellogenesis (VTL) was higher in females than in males, affecting VTL secretion of vitellogenin (Vg); however, it was lower in the pre-vitellogenic stage than in VTL. No difference was found in the mRNA levels of luteinizing hormone (LH) in Russian sturgeon during the first four years of growth. During its first five years of growth, GH mRNA was higher in females than in males, but , due to the high standard deviation of the mean, the difference was not significant. IGF-I mRNA expression differed between the various tissues.

Ofir Degani
Research Group Leader and Head Researcher, MIGAL Galilee Research Institute, Israel
Shlomit Dor
MIGAL Galilee Research Institute, Israel
&
Daniel Regev
MIGAL Galilee Research Institute, Israel

The Hidden Life of the Maize Pathogen, *Harpophora Maydis*

The late wilt disease causal agent, the fungus *Harpophora maydis*, is a vascular pathogen that causes severe damage to sensitive maize hybrids, at the ripeness stage, throughout Israel, Egypt, India, Spain, and other countries. It can undergo pathogenic variations and survive as spores, sclerotia or mycelia on plant residues, in the soil, or inside seeds. Maize, *Lupinus termis* (lupine) and apparently cotton, are the only known hosts of *H. maydis*. Identification of other plant hosts that can assist in the survival of the pathogen is an essential step in restricting the disease outbreak and spread. Here, a field survey and growth chamber pathogenicity trial series accompanied by Real-Time PCR tracking confirmed the presence of the fungus' DNA inside the roots of cotton (Pima cv.) plants grown in infested soil. Moreover, we identified the presence of *H. maydis* DNA in the grass *Setaria viridis* (green foxtail) and watermelon (Malali cv.). Infected watermelon plants had delayed emergence and development, were shorter, and had reduced root and shoot biomass. *H. maydis* infection also damaged root biomass and phenological development of cotton plants but caused only mild symptoms in *S. viridis*. In minimal liquid medium, *H. maydis* growth was enhanced in the presence of maize or cotton root powder. While watermelon root powder had a minor influence on fungal dry weight, it caused a dramatic increase in pathogen laccase production. These findings are an important step towards uncovering the host range and endophytic behavior of *H. maydis* and encourage expanding this evaluation to other plant species.

Sabry El-Naggar
Professor, Tanta University, Egypt

Beneficial Effect of Paclitaxel as a Tumor Priming Drug for Pancreatic Cancer Gene Therapy

Pancreatic cancer continues to be a challenging therapeutic problem and has an extremely poor prognosis. Right now, there is no effective treatment for late stage and metastatic of this disease. Therefore, new anti-tumor therapies are sorely needed. Gene therapy is a promising approach for pancreatic cancer treatment; however, there are limitations in efficient expression of the therapeutic target gene. Our aim in this work is to address the direct effect of paclitaxel (PTX) as a tumor-priming drug, which could facilitate the gene therapy treatment with CaSm gene. To this end, we tested the effect of PTX at different concentrations (1-100ng/ml) *in vitro* on the apoptosis rate, cell cycle, the proliferation (anchorage-dependent and anchorage-independent) and cytotoxicity of panc02 cells. Currently we have established a liver metastasis model of pancreatic cancer by which we are able to monitor the tumor growth and survival rate after treatment. By using this model, we have tested the efficacy of PTX treatment (10 mg/kg, or 20mg/kg) to induce tumor apoptosis. Furthermore, we have tested the efficacy of the sh.RNA plasmid to knockdown the CaSm expression by western blotting methods. Our results showed that PTX induced about 15% apoptosis in panc02 cells after 48hrs of treatment with 40ng/ml, and this percentage increased in time dependent manner. The in vitro studies showed that treatment with PTX decreased G1 and increased G2 in the cell cycle of panc02 cells. In addition, it has found that PTX decreased the proliferation of panc02 cells in anchorage dependant and independent manner. Our data showed that PTX increased the cytotoxicity of panc02 cells starting from 10 ng/ml for 48hrs treatment *in vitro*. Our *in vivo* studies showed that the treatment with PTX increased the tumor apoptotic cells in the pancreatic liver metastasis model. Panc02 cells transfected with plasmids encoding CaSm sh.RNA shows a decrease in the level CaSm gene expression and the level of CaSm protein in transiently and stable transfected cells. Taken together, PTX could be important for tumor priming which might be help to improve the gene therapy in the pancreatic tumor.

Nicole Friedrich Neumann
Master Student, IHE Delft Institute for Water Education, The Netherlands
&
Jorge Manuel Rodrigues Tavares
Researcher, University of Lisbon, Portugal

Implementation of "Efficient Water Use" Concept in a Commercial Dairy Cattle Farm in Brazil

Dairy cow farming is one of the most important economic activities in the world, contributing in Brazil approximately 72% of the total profit in the agricultural sector in 2017. However, milking production also presents high risks to the environment due to the great water disappearance observed during the process: 100 L per cow per day. The demand of water in a production system is relevant, being constituted by animal watering, cleaning and hygiene of the facilities and equipment, and thermal comfort. The present study aimed to identify and quantify the water uses during the milk production process in a farm in southern Brazil and propose measures to minimize them considering the elaboration and posterior implementation of educational and structural measures for the efficient water use and final disposal of manure produced. The farm (56 ha) is located in Campo Largo/PR, Brazil and contain 53 production cows (Jersey and Holstein Friesian breeds) and an average milk production of 24.1 L/cow/d. To determine the water consumption in both preparation and milking rooms, two sensors were installed by the producer. After obtaining the data, some measures were implemented to minimize the water use on the farm: 1) reduction of daily washes, from three to one, in the milking room; 2) introduction of a flow controller at store water tank; 3) change on the washing equipment (high pressure and low flow); 4) deviation of rainwater from the manure system. For 6 months, the water meters were monitored, and their levels were recorded daily by producer and analyzed through statistical tests (multiple linear regression and Pearson correlation) using the software SigmaPlot©. The results showed, on average, higher water consumption per cow/d (84.1 L) when compared to literature, and almost 80% correspond to activities performed in the preparation room. Among the variables evaluated, the number of washes had the highest impact on the reduction of water use. Given that, when applied the reduction of daily washes, from three to one, was observed a total saving of 8.48 L of water per day. Both the temperature and relative humidity also presented a great importance, explained by the thermal stress felt by the dairy cattle during the hot days at the farm. The potential saving of all the measures was of 17.32 L cow/d; extrapolating to a Federal level, almost 3.72x109L cow/d could be saved. A management plan was designed to make efficient use of water, considering the major

subjects related to the different uses of water during the milk production on the farm: 1) catchment (protection of the water springs, system of capture); 2) cleaning process (rainwater storage); 3) climatization (evaporative cooling mechanism); 4) and disposal (horizontal subsurface flow wetland).

Pinar Gultekin
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Evaluation of Soundscape in University Campuses: The Case Study of Düzce University

Soundscape can be defined as independent of the positive or negative judgments of the auditory media formed by multiple sound sources and environmental interaction. Soundscape consists of events not seen. Image is the sum of visual interactions. The soundscape is the sum of the heard events.

The concept of soundscaping is concerned with researching and analyzing the spatial relationships of sound and aura and is also part of the socio-cultural systems. Interpretation of sounds that are heard or heard in certain sections is a key to solving important codes of social structure. The soundscape of today is rough and noisy, according to many experts, it is inevitable to face global deafness if no measures are taken. The noise problem will continue as long as the soundscaping is not addressed in its entirety. In this sense, the concept of soundscape planning, soundscape management is gaining importance.

Within the scope of the study, the awareness of the young generation in the 18-24 age range related to the soundscape on the university campuses where they spend all their days were evaluated. Sound walks were made at Düzce University campus and the sound classification was made. At 12 different points, 244 university students studying in different departments were asked to describe soundscapes as positive or negative. The answers were analyzed with IBM Statistics SPSS 22 program and evaluated by using descriptive statistical methods. In line with the results obtained, the expectations of sound landscapes on university campuses were revealed and sonic image and sonic barrier maps were obtained. While reducing the noise from traffic and industrial noise, suggestions have been made regarding the planning and management of the soundscape, which allows more sounds to be heard.

Yasar Selman Gultekin
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Stakeholder Analysis and Water Management Model for Melen River System and its Basin

Changes in nature and differences in human use are recorded by rivers. Each river system has unique combinations of channel morphology, streamside vegetation, hydrology, geology and soils. So that river systems and riperian areas should be evaluated and managed taking into account their unique characteristics. Riperian areas are faced with a variety of negative interference in Turkey so these areas cannot fulfill their functions adequately. Management of these areas and the creation of a healthy riperian zones have a great importance nowadays. The study area was choosen as Buyuk Melen River which is 180 km away from Mega city İstanbul. It is regarded as the major water resource that can compensate Istanbul's water demand in the future. It is estimated that more than 52% of Istanbul's water will be supplied by the Buyuk Melen.

In this study, firstly riperian zone stakeholder analysis was conducted, benefits, priorities, behaviors and values of each stakeholder were determined and mutual goals and purposes were established. Then riperian zone stakeholders for the Big Melen River system were divided into three groups. In the first stage of the stakeholders, the target group was defined at national stakeholders. Regional stakeholders were second target group. As a last stage of the stakeholders local people were defined. The study method was implemented by using questionnaires for three groups of the stakeholders. Three different type of questionnaires were developed for the each stakeholder group. The results obtained were evaluated using SPSS 22.0 program. One way ANOVA, cross- tab analysis, factor analysis and means were consulted as statistical methods.

As a result of the study, data obtained from surveys serves as important input for riperian zone usage decisions in Turkey. Opinions of the stakeholders who participated in the survey can be summarized as below: Local community in Duzce and Sakarya cities think optimistically towards to the protection of Melen River. There are deficiencies about infrastructure and superstructure in the study area and that all these problems can be worked out through coordinated work of all stakeholders who may participate in riperian zone protection and rehabilitation activities. In the light of all assessments, riperian zone management model which includes different stages was improved for Düzce Melen basin. Stakeholders of different stages will increase the efficiency of the decisions and the riperian zone management model reflects in the Melen Watershed which is the most important water source of İstanbul.

Ibrahim Hassan
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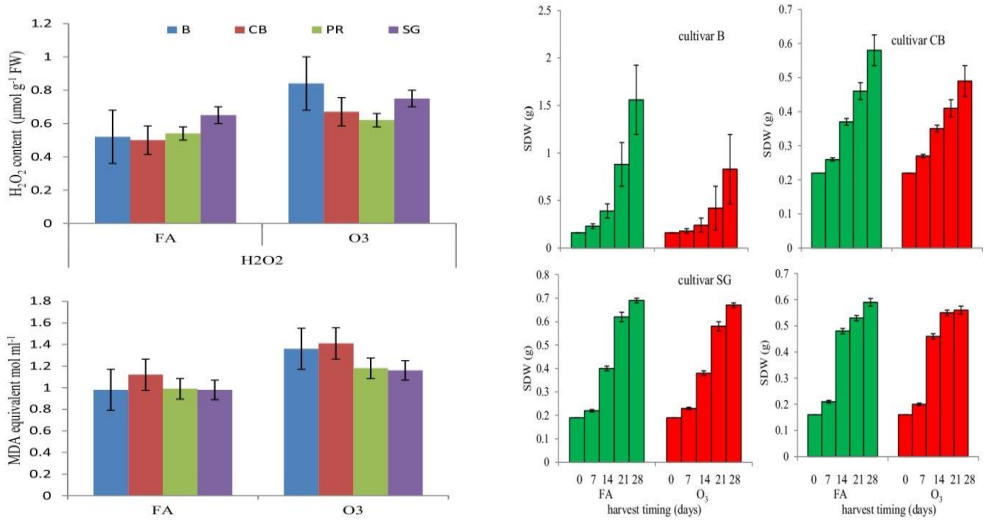
Radish (*Raphanus sativus* L.) Cultivar-Specific Response to O_3: Patterns of Biochemical and Plant Growth Characteristics

The sensitivity of four radish (*Raphanus sativus* L.) cultivars, Baladey "B", Cherry Belle "CB", Prinz Rotin "PR" and Scarlet Globe "SG" to 80 nL L^{-1} ozone was assessed in fumigation chambers. O_3 visible injury symptoms appeared as brown spots to chlorotic areas, but the response was cultivar-specific. O3 induces higher content of H_2O_2 and lipid peroxidation (it was estimated as malondialdehyde (MDA) content) leading to drastic visible injury symptoms in B compared to the other cultivars. Root and shoot dry weights, Chlorophyll a, net photosynthetic rates and chlorophyll fluorescence were reduced in B to a greater extent than the other cultivars. On the other hand, stomatal conductance increased in B and CB (+52 and +24%, respectively) due to O_3-exposure, while it was decreased by 35% in PR and SG. Exposure to O_3 generates oxidative stress leading to stimulation of antioxidative defense systems. SG showed the highest induction of catalase (CAT), superoxide dismutase (SOD) and glutathione reductase (GR), while B had the lowest activities of these antioxidative enzymes, but had the highest H_2O_2 and MDA content. The higher accumulation of H_2O_2, poor induction of antioxidative enzymes and increased stomatal conductance led to severe visible injury and drastic inhibition in photosynthetic rates and growth in B than other cultivars depicting its higher sensitivity towards O_3. Therefore, it could be used as a bioindicator for O_3 pollution worldwide.



Sabrina Joseph
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Water for Oil: Experts, British Colonial Authorities and the Formation of a Modern State: The Case of the Trucial States, 1930-1960s

The discovery of oil during the 1950s and 1960s in what is today the United Arab Emirates forever changed the economy and landscape of this desert region. During the early part of the twentieth century, exploration for oil was intertwined with efforts on the part of experts and British colonial authorities to locate new sources of water. In the process of searching for water, these experts—including military personnel, explorers, surveyors, and geologists—'mapped' the physical landscape of the region, providing new information on the area's natural environment and interior areas. This scientific data on the region's geography and resources shed light on the desert landscape and human ecology, and informed development agendas, ultimately contributing to the increasing centralization of state power. By mediating and controlling the relationship of experts with local sheikhs, the British residency in the Trucial States, particularly after the 1930s, was able to consolidate its influence and power over key local rulers and, in turn, the latter's control over natural resources, including water. Thus, the search for water combined with the ecological knowledge it generated altered the political landscape and paved the way for the discovery of oil, the delineation of boundaries, the expansion of agriculture, the reallocation of resources, and the consolidation of power by coastal sheikhs over interior tribes.

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Pathway and Network Analysis of Sex-Determination Genes in Papaya

Papaya (*Carica papaya L.*) is the sole species of Carica genus, family Caricaceae. Papaya is a polygamous plant species in tropical region with three primary sex forms: male (staminate), female (pistillate), and hermaphrodite (bisexual). Only hermaphrodite plants are demanded by the market because of their commercial characteristics. However, sex type identification in papaya is a costly and time-consuming process. The efficiency of papaya sex determination is currently limited because papaya usually flowers 3-6 months after transplanting. Early sex identification in papaya still remains challenging. The present study is aimed at identifying sex determination genes to develop a fast-precision breeding platform in selecting hermaphroditic plants in the early stage of seedling or growth. Three types of papaya can be distinguished by flower number, pedical, inflorescence and fruit type. We applied big data analytic strategies to mine papaya sex determination related data across different data sources in the NCBI. We integrated and prioritized genetic data that related to papaya sex determination, using a framework of big data meta-analysis and gene prioritization procedure. As a result, we selected 35 prioritized sex determination genes (SDgenes) of papaya. The SDgenes were related to MADS-box, flowering regulatory, stress responses and regulation of RNA transcription. Furthermore, we utilized systems biology to identify 10 sex determination related pathways, which play important role in the regulation of floral organ identity and flowers mature related mechanisms. Our results can provide valuable information for further studies in early papaya sex determination. We believe that our developed fast-precision breeding platform can help to speed up the efficiency of sex determination in papaya, which is commercial value added.

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Integrated Transcriptome and Network Analysis to Explore *Chenopodium Quinoa*-virus Interaction

Chenopodium quinoa, native to Peruvian Andes, is an annual herbaceous plant. *C. quinoa* is an idea model to study the mechanisms of plant-virus interactions, *C. quinoa* only causes local lesions rather than systemic infections when invaded by viruses from a broad range of genus. To investigate the resistance mechanisms of *C. quinoa*, RNA-seq was performed and the assembly *C. quinoa* transcriptomes was based on reference genome available in NCBI. The identification of the differentially expressed genes (DEGs) was conducted by comparing between viruses including *Tobacco mosaic virus* (TMV) and *Zucchini yellow mosaic virus* (ZYMV) inoculated quinoa plants with mock controls. We obtained 101,592 transcripts, and 1,335 and 173 DEGs of TMV vs mock and those of ZYMV vs mock were identified. Gene ontology (GO) enrichment analysis showed that these DEGs significantly enriched in pathogen-induced response and programmed cell death (PCD) pathway. Finally, we conducted correlation network analysis (GCNA) and protein-protein interaction (PPI) network analysis to confirm a set of important transcripts that were dramatically associated with plant defense responses. Our findings suggest that the use of systems biology may bring novel results and opens a window to further understand possible mechanisms of quiano-virus interactions.

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Response of Submerged Macrophytes and Periphyton Biofilm to Water Flow in Eutrophic Environment: Plant Structural, Physicochemical and Microbial Properties

The integrated effects of water flow on submerged macrophytes (Vallisneria natans) and leaf biofilms were comprehensively investigated in eutrophic enviroment. Changes in aquatic environmental factors were also analyzed and water flow was found to elevated eutrophic water quality, especially in terms of TP removal. The removal efficiency of TP was 78.95% in flowing water, which was more than 10 times compared with the static water. Water flow altered the morphological and physiological characteristics of plants, decreasing the cell wall thickness and rate of photosynthesis, while promoting the accumulation of soluble sugar and protein in leaves. The starch content was also accumulated with water flow, and significantly larger starch granules were observed in chloroplast. Furthermore, oxidative damage was evidenced by the consistently higher content of malondialdehyde in flowing water. Superoxide dismutase (SOD), peroxidase (POD) and Catalase (CAT) were induced with water flow as an antioxidant response of plant. The results of 16S rRNA high-throughput sequencing analysis showed that the structure of the biofilm microbial community changed in response to water flow. These results expand the understanding of the effects of water flow on submerged macrophytes and periphyton biofilms in eutrophic environment.

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Study of Tolerance to Low Temperature in Innovative Triploid Citrus Varieties and Monitoring of Primary Metabolism in Fruits

Thanks to favorable pedoclimatic conditions, citrus production is extensively developed in Mediterranean are and mostly focused on fresh-fruit market. Particularly, in Corsica, clementine production represents 25.000 t per year, and 90% of Corsican production is exported. Climate change is a worldwide problem (global warming, significant temperature fluctuation, drought episode increasing…) that can affect negatively citrus production and reduce fruit quality. In Corsica, the main economic and environmental issues is the maintaining of citrus fruit production with nutritional and organoleptic quality despite climatic changes. Thus, the aim will be to segment market with production of innovative seedless fruits to answer to consumer expectations and diversify production when clementine isn't produced anymore.

Polyploidy is an important determinant in plant evolution, facilitating the capacity to successfully grow up in habitats characterized by strong fluctuating environmental conditions. Polyploid plants are for these reasons widely studied in vegetal production under environmental constrains.

Many studies demonstrated that tetraploid genotypes showed an enhance stress tolerance to abiotic stresses. However, few studies focused on the behaviour of triploid variety subjected to unfavourable environment. The use of triploid plants could improve tolerance to abiotic stress and allows the production of seedless fruits. In this study, we will compare the behavior of diploid and triploid citrus from the same crossing (Fortune mandarin x Tangor Ellendale). The response to natural chilling stress will be evaluated by measuring various physiological and biochemical parameters. Net photosynthesis, stomatal conductance, transpiration and chlorophyll fluorescence will be monitored. Antioxidant defenses mechanisms will be characterized by monitoring the activities of superoxide dismutase, catalase, ascorbate peroxidase, dehydroascorbate reductase and the content in ascorbic acid and proline. Cellular damages

will also be recorded thanks to malondialdehyde, a marker of lipid peroxidation, and hydrogen peroxide. The impact of stress on citrus fruit quality will be evaluated through the determination of sugars (glucose, fructose and sucrose) and organic acids levels (malate and citrate). Activities of the enzymes involved in primary metabolism (phosphofructokinase, cytoplasmic isocitrate dehydrogenase, malic enzyme) will also be monitored to clarify the biochemical pathways involved during low temperatures.

Taken together, the excepted results will enable us to propose an alternative to improve stress tolerance, maintain and develop a sustainable and efficient citrus crops. The first results will be presented at the conference.

Magali Mariani
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Use of Biocatalytic Processes for Production of Value-Added Compounds from Vegetable Oils

The volatile compounds, responsible for the fresh odor of cut grass known as "green note", have a particularly interest for flavor and food industries. These compounds (hexanal, 3Z-hexenal and 2E-hexenal) are naturally synthesized in higher plants through the lipoxygenase pathway. The lipoxygenase catalyzes, first, the oxygenation of linoleic and linolenic acids to form fatty acid hydroperoxides, which are then cleaved by hydroperoxide lyase (HPL) to generate short-chain aldehydes and oxoacids.

Unfortunately, the amount of these compounds is too low to consider their extraction from raw plant, and the processes of production currently used are highly polluting or lead to a low yield. To overcome these drawbacks, the use of recombinant, or commercial enzymes, in such processes constitutes an attractive alternative because they would allow producing these molecules in a more effective way, while benefiting from the "natural" label.

The combined action of a Candida rugosa lipase and a soybean 13-lipoxygenase was performed on sunflower or linseed oils. The first one oil, which contains around 67 grams of linoleic acid for 100 grams of oil and traces of linolenic acid, was used to produce 13-hydroperoxides of linoleic acid. The second oil, which contains around 56 grams of linolenic acid and 15.5 grams of linoelic acid for 100 grams of oil, was used to produce mainly a large amount of 13-hydroperoxides of linolenic acid but a smaller amount of 13-hydroperoxides of linoleic acid is also produced.

There is no commercial 13-Hydroperoxyde lyase available, so we have produced and purified an olive recombinant 13-Hydroperoxyde lyase (HPLwt) and then used it in several experimental conditions. We have obtained conversion yields of 93% and 73% for hexanal and 3Z-hexenal productions respectively. The both steps of the process were optimized in a laboratory scale. In order to raise the quantities of green note compounds produced (for an industrial application), the optimization of a process combining the commercial lipase, the 13-lipoxygenase and the 13-hydroperoxide lyase will be conducted in a bioreactor. Furthermore, during enzymatic reaction, the hydroperoxide lyase products another compound, a bi-functional compound (oxoacids with 12 carbon atoms), particularly interesting for production of biolubricants and biomaterials. The ongoing research (PO FEDER AGRIEX project) aims to developing a biocatalytic process for production of these added-value compounds.

Juan Martinez Solis
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Use of Values of Germinated Wheat Seeds (*Tritricum aestivum* L.) in the First Count in a Standard Germination Test for Certification Purposes

In order to define if the number of germinated seeds during the first count in a standard germination test can be used to certified germination of seed stocks, it was evaluated the relationship between the number of germinated seeds of wheat during the first count in a standard germination test and the percentage of normal seedling reported at the end of the test. An experiment was carried out in the seeds laboratory in the Crop Science Department at the Autonomous University Chapingo. Fourteen experimental wheat lines were providing by the National Institute of Research on Forestry, Agriculture, and Livestock (INIFAP), produced during 2016 in Santa Lucia, Mexico. A standard germination tests and emergence on polystyrene trays with "Peat Moss" were carried out under a completely randomized experimental design with four repetitions of one hundred seeds each. After four days (first count), it was recorded normal and abnormal seedlings, as well as vigor parameters as seedling and radicle length, and fresh and dry weight of the aerial shoot and radicle. Statistical analysis included analysis of variance, Tukey means comparisons ($\alpha = 0.5$) and Pearson's correlation test. Since there is a positive correlation between germinated seeds during the first count and the percentage of normal seedlings, the former value can be used for seed certification.

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&
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Role of Earth Observation in Agriculture and Food Security: AfriCultuReS Project

Achieving food security to address the demand of exponentially growing population in midst of climate change remains a global challenge. In order to achieve globally set mandates and policy frameworks such as the United Nations Sustainable Development Goals (UN-SDGs), concerted effort involving multidisciplinary research and multi-national cooperation. UN-SDG, Goal 2 (Zero hunger) aims to end hunger, achieve food security, improve nutrition, and promote sustainable agriculture by 2030. As such, timely and accurate information on weather conditions, crop health and carrying capacity, among others, is needed at local to regional scales to support policy and decision making for optimizing crop and livestock productivity and ensure sustainable agricultural land management. The use of Earth observation data for mapping, assessment and monitoring of crop conditions and grazing resources is well established in literature. This has, in part, been enabled by the availability of free and open datasets such as from MODIS, Landsat, Copernicus Sentinels, etc. that characterizes the Earth's surface in varying detail (i.e. spatial resolution) and frequency (i.e. temporal resolution). In addition, the availability of free and open software tools such as SNAP and SEN2AGRI presents prospects for operationalization of research and development of decision-support tools and early warning systems that seamlessly integrate various EO and in-situ data to provide timely, actionable and reliable information that will aid precision farming, and promote informed decision and policy making to address food security challenges, especially in data scarce, poor and disaster prone regions such as sub-Saharan Africa. Through a funded project, namely; Enhancing Food Security in AFRIcan AgriCULTUral Systems with the Support of REmote Sensing (AfriCultuReS), seven (7) African and eight (8) European organizations are currently working collaboratively to design, implement and demonstrate an integrated agricultural monitoring and early warning system that will enrich multi-level decision-making and risk assessment for tackling food insecurity challenges in Africa. The project will deliver a broad range of climatic, production, biophysical and economic information, for various regions in Africa characterized by different agro-

climatic zones and agricultural production systems, through the exploitation and integration of free and open, multi-sensor Earth observation data and other geospatial technologies. A number of satellite-based products will be developed that categorized into five (5) agricultural services, i.e. weather, water, livestock, land and drought. This study aims to discuss the role of EO in addressing food security challenges in Africa. In the context of AfriCultuReS project, we present the results of users' needs assessment conducted with stakeholders in South Africa, as well as preliminary products at South African test sites.

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Radon Risk Assessment for Urban Planning and GIS Data Processing

Natural sources of radiation is a big part of the total radiation exposure that humans receive in their lifetime. The majority of this natural radiation is harmless to humans in the ambient environment. However, radon, a large component of the natural radiation that humans are exposed to (greater than sixty percent), can pose a threat to the public health when radon gas accumulates in poorly ventilated residential and workplaces spaces.

According to the World Health Organization: "Indoor radon gas is a serious health problem that can be better addressed by spreading right informations through local Authorities to motivate individuals to fix their homes. Millions of homes in the world are infact estimated to have elevated radon levels. Fortunately, the solution to this problem is quite simple. As well as the hazards from smoking, the health risks of radon can be reduced."

In this paper we report the activities of Municipality of Pomezia, a medium size Town near Rome Italy. To cope with local Radon risk the local administration have created a Radon Front office supplying radon passive detectors free of charge to families to map the risk.

Resulting data are then plotted through an open source Geographical Information System to help Urban planners and regulators to reduce the risk.

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Use of Thermal Solar Systems as a Tool for the Improvement of Pepper Blanching Process (Piper nigrum L.) to Reduce Greenhouse Gas Emissions

Blanching is a bottleneck in the processing of pepper (*Piper nigrum* L.) in the plant of the Association of Pepper Producers of Sarapiquí (APROPISA). Pepper is sunk in water at 80 °C in metal baskets, previously heated in metal containers on liquefied petroleum gas (LP gas) burners. These conditions expose the workers to emissions of burned gas, physical effort to manipulate the baskets, low productivity, and poor process efficiency. In addition, the use of LP gas in APROPISA increased the emissions of greenhouse gases [GHG; carbon dioxide (CO_2), methane (CH4) and nitrous oxide (N_2O)], which have been linked to global warming. To improve the environmental effect of APROPISA, the Institute of Rural Development (INDER) asked the Research Group on Thermal Solar Systems for Agriculture of the Doctorate Program on Natural Science for the Development (DOCINADE) at the Local Technology Campus of the Costa Rica Institute of Technology (SSC-ITCR) to design a solar thermal system for the blanching process of pepper. On this concern, the aim of this work was to evaluate the reduction of the greenhouse gas inventory after the implementation of the solar thermal system in APROPISA. For the inventory of the GHG in APROPISA, LP gas consumption billing data was collected before the implementation of the thermal solar system, while the thermal solar system automatically registered the LP gas consumption. Then, the GHG emission was calculated according to the "Guide to design a manual that allows SMEs to make carbon neutral declarations under the INTE 12.01.06 standard to inventory greenhouse gases", considering the global warming potential and the emission factors of the National Meteorological Institute of Costa Rica. According to the results, the pepper blanching processing in APROPISA emitted 12.52 tons of carbon dioxide equivalent (CO_2e) from 2015 to July 2018, while the solar thermal system was able to reduce the GHG emissions by 0.21 CO_2 after 3 months (August-October 2018) of its implementation at APROPISA. If this trend continues, this system would mitigate 90% (2.52 ton CO_2e) of the GHG annual emissions from the processing plant of APROPISA. These results prove that the

implementation of solar thermal technologies is a viable option for agriculture activities and for processing agricultural products. In addition, the use of this technology could be a parameter for an environmental certification to distinguish this product in the national and international markets at using a renewable energy source in its elaboration.

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A Model for Knickpoint Migration in Small Alluvial Streams

We introduce a new theoretical framework for knickpoint migration in unventilated flows prevalent in channelized semi-cohesive first and second order streams characterized by a sequence of constrictions and expansions in the channel cross-section. A key feature of the framework is the inclusion of shear-induced fluvial erosion due to flow suction at the nappe as the key mechanism driving migration. Channel surveys, water stage, time-lapse photography and laser scans from Mud Creek, Iowa, USA, confirm this unventilated erosive mechanism and reveal a dual advective-diffusive mode of retreat. We treat the fluvial bed shear stress as being similar to the flow on the lee side of a submerged obstacle and derive a governing equation which is a generalized Burgers' equation. The equation is solved to successfully simulate knickpoints monitored in two sites (Iowa, Mississippi), and a modified Peclet number is used to analyze the advective-diffusive nature of the knickpoint migration.

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Molecular Characterization of two Mexican Orchid Species (*Chysis bractescens* and *Rhyncholaelia glauca*) through ISSR

The importance of *Orchidaceae* family resides in its use as ornamental plants, and also due to its role in the dynamics and diversity of ecosystems. *Chysis bractescens* Lindl. (1840) belongs to the category of threatened Mexican species, and *Rhynchoaelia glauca* (Lindl.) Schltr. (1918) has high economic potential. The objective of this research was to obtain the genomic fingerprinting of both species through Inter Simple Sequence Repeats (ISSR) molecular markers for plant protection purposes. DNA extraction was performed with the CTAB method from young leaves. The amplification was carried out by the use of 15 ISSR primers. To visualize them, the samples were amplified in a 2% agarose gel. General DNA polymorphism obtained was 96.5%, and cluster analysis allowed the correct separation of samples according to their species. AMOVA analysis showed that higher genetic variability (51.96%) occurred within tested species rather than between species. Shannon-Weaver diversity index was 5.11, which suggests high genetic variability present in these species. Obtained results showed that ISSR molecular markers were able to genetically differentiate between these two species of orchids, and therefore, achieved genetic fingerprints could be used for protection purposes of these valuable Mexican plant genetic resources.

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Efficiency and Subsidies: Mapping and Multidisciplinary Analysis

This study aims to assess the roots, the evolution and the influence of literature on subsidies and efficiency in a variety of areas of knowledge such economics, management, business, agricultural policy and environmental sciences. By analyzing 1,507 articles authored by 3,410 scientists and with 47,028 cited references and by using co-word analysis tools, different themes dealt with the relationship between subsidies and efficiency were disclosed and examined. The results have shown that efficiency and energy are the two themes that stand out, while subsidies are a secondary theme with a strong connection with efficiency research. Evidence shows that the literature on subsidies and efficiency embodies a relatively new field, which has remarkably consolidated over the last ten years as a research area. However, the roots of this literature are found in articles published between 1971 and 1998. Looking at the most influential authors, 67% are affiliated to USA institutions and 27% to the European ones. Their empirical work addresses different areas of knowledge such as environment, energy and public transport, which are topical issues on the current research agenda and which could generate important societal impacts. In fact, this strand of research has been instrumental in drafting policies and improving the productive sector over the past ten years, which is why the international agenda has consistently geared and substantially increased this kind of studies. Nonetheless, other important sectors seem to be neglected on the research agenda related to subsidies and efficiency. In particular, the co-word analysis carried out suggests there is a lack of empirical works examining the relationship between subsidies and efficiency in the agribusiness and the agricultural sector, even though subsidies stand out as an important agricultural policy. At that time, the theoretical studies, mainly in the area of economics, have defined the main econometric models currently used in several areas of knowledge, including the measurement of subsidies effects on efficiency.

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Farmers Acquaintance on Management of Potato Cyst Nematodes *Globodera* spp. in the Province of Ain Defla in Algeria

Potato is an important food source worldwide. The province of Ain Defla is one of the major potato producing area in Algeria. Previous studies have revealed the occurrence of potato cyst nematodes (PCN) *Globodera* spp. in several potato fields. Our analyses showed that in some fields, the population densities were high. The species identification showed that *Globodera rostochiensis* and *Globodera pallida* occurs separately or in mixed populations. The management of PCN requires knowledge by farmers to avoid their multiplication and further dissemination. To have information if farmers are knowledgeable about the presence of (PCN) and how could be managed; a survey was conducted in different localities of the province in cooperation with the Regional Station of Plant Protection of Chlef in charge of the PCN analyses in Ain Defla. Several interviews were undertaken. The inquiry form was addressed to farmers and to persons responsible for 34 agricultural exploitations, particularly, those having a production system where the potato takes a considerable importance. The main objectives of this study were: to increase the current information on the infestation by PCN on potato fields and how the mode of cultivation have an impact on the development of PCN, evaluating the current methods used for their management and inform to personal involved in potato production on PCN. The results of the survey revealed that little knowledge of farmers about PCN, are one of the reasons which contribute to the dissemination and multiplication of PCN. The survey also showed that there are several inadequate cultural practices, as some techniques for soil preparation, choice of the varieties, rotation type, irrigation etc., which help to the multiplication and to the dissemination of PCN. Additionally, farmers have limited level of formation on nematological issues and it is reflected on their decisions concerning the pest management of their exploitations. This is also reflected the poor success of the courses of capacitation performed by personal of

agricultural advisory and services concerning PCN that are a quarantine parasites and have an economical importance. Our results indicated also, that governmental organisms as the Plant Protection Services and the Direction of the Agricultural Services need to increase their effort, in order to educate potato farmers for managing PCN, especially, to the farmers that produce seed potatoes. Also, it exists the needs to improve the soil analyses for PCN by the Regional Stations of Plant Protection in the province, in order to establish appropriated PCN managements programs.

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Glass Foams Insulating Materials for Green Passive Buildings Adapted to the Current Climate Changes

Glass foams are highly valuable solution for thermal and acoustic insulation, having a generally higher mechanical, chemical and thermal stability than the polymeric and fiber materials foams currently employed.

Glass foams are obtained from glass powder using foaming agents able to release gases due to decomposition at temperatures higher than the glass softening point. The principle of the glass foaming process, is that between 700-900°C, the glass powder forms a viscous liquid and then the foaming agent decomposes to form a gas that, in turn, forms bubbles.

The distinct advantages over polymeric materials: low flammability, thermal stability and high chemical durability are compensating the high production costs. Considering all these advantages, the foam glass is used to create a complete building envelope including external and internal insulation systems, roof insulation, perimeter insulation, floor and below ground insulation etc. The foam glass fulfils all the physical, chemical and ecological requirements for the construction of passive buildings having low environmental footprint.

The aim of this paper is to study the correlation between the glass waste type and foaming agent, the thermal treatment conditions and the properties of the obtained glass foams. The apparent porosity and density, optical microscopy, hydrolytic and chemical stability, as well as thermal conductivity were used in order to characterize the obtained glass foams as insulator materials for the building industry.

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Applying Eucalyptus to Eliminate Algae in Water

Toxic cyanobacteria blooms are bringing about a growing worse threat to public health and safety with the rapid development of society. It seems to be clear that merely suppressing or killing cyanobacteria as a mitigative course of action in an attempt to prevent the occurrence of cyanobacteria blooms, would not alone result into an effective and long-lasting solution. Therefore, this should be done in conjunction with accelerating the biogeochemical cycle of nutrients in a lake in order to fully mitigate the cyanobacteria blooms.

For the first time, we used Eucalyptus to control algae blooms. Firstly, we evaluated the inhibitory performance of Eucalyptus leaves extracts towards the M. aeruginosa in water. Although the good inhibitory performance was obtained, it couldn't cycle the nutrients in the reaction system, which may further lead to second algae bloom.

Considering the quick absorption of Eucalyptus towards the nutrients, we further carried out a series of experiments that directly planting Eucalyptus in the simulated reaction setup containing the water sample from Taihu lake. Results show that Eucalyptus not only controlled the growth of Algae through allelopathy but also quickly absorbed nutrients from the system, thus achieving the effect of thoroughly controlling algal blooms.

The inhibitory mechanism was further revealed through evaluating the photosynthetic activity, cell membrane integrity, and enzyme activity of M. aeruginosa. Moreover, we also obtained the nutrients absorption rate by conducting a series of nutrients competition experiments, which further confirmed the importance of nutrient cycling in controlling the algae blooms. The detection results towards the microbial community structures in the different treated groups confirmed that planting Eucalyptus didn't play an extremely negative effect towards other species in the system. Therefore, applying Eucalyptus to control algal blooms will be an essentially promising ecological approach.