International Conference on Gender Action and Climate Change (IGCC2022)
24 March 2022 - Online

Istanbul Aydın University, Istanbul, TURKEY

24 March 2022

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Preface

The International Conference on Gender Action and Climate Change will be held at Istanbul Aydın University (IAU) in collaboration with the Organization for Women in Science for the Developing World (OWSD), Istanbul Technical University (ITU), Eurasian Universities Union (EURAS), UNESCO, OWSD Turkey National Chapter, IAU Environment and Human Health Center, Energy Politics and Markets Applied Research Center (EPPAM), and IAU UNESCO Chair in Education and Sustainability Peace. We have organized the international meetings and the panel to provide avenues for proper understanding of real-world problems providing some solutions in Science.

Organising Committee

Aim of the Conference

In order to continue the successful tradition of this Conference by giving the opportunity to the participants to discuss major issues of importance for integrated gender action plans on climate changing problem in case studies of different scientific theoretical and applied disciplines. The conference is addressed to provide the state of the art in worldwide climate changing and action plan the conference would be the occasion of young scientists to meet and discuss their experience with internationally famous scientists by providing opportunity to get in contact with scientists from different countries and to discuss on possible joint new projects at the virtual conference. The peer-reviewed papers and extended abstracts were published in the conference proceeding book.

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Invited Speakers

Dr. Mamta AGRAWAL,
VIT Bhopal University, India

Prof. Dr. Hasin ANUPAMA,
Asia and Pacific Region of OWSD,
Bangladesh

Prof. Dr. Rashmi BHARDWAJ,
Guru Gobind Singh Indraprastha University,
New Delhi, India

Dr. Tonya BLOWERS,
OWSD, ICTP,
Trieste, Italy

Prof. Dr. Enrico FEOLİ,
University of Trieste,
Trieste, Italy

Dr. Eren GÜLTEPE,
Southern Illinois University
Edwardsville,
United States of America

Em. Prof. Dr. Jennifer THOMSON
OWSD president
University of Cape Town (UCT)

Prof. Dr. Joyashree ROY
Jadavpur University, Kolkata in India

Ylann SCHEMM,
Director of Elsevier Foundation,
Chair, Executive Council of Research, Amsterdam, Holand

Prof. Dr. Yurdanur ÜNAL
Istanbul Technical University,
Department of Meteorology,
Turkey

Prof. Dr. Katherine VAMMEN
University of Central America,
Nicaragua

OWSD AWARD WINNERS

Abeer Ahmed Qaed Ahmed,

Al-Saeed University,

Yemen

Heyddy Calderon,

Instituto de Geología y Geofísica,

Nicaragua

Gawsia Wahidunnessa Chowdhury,

University of Dhaka,

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Flor de Mayo Gonzalez Miranda,

San Carlos University,

Guatemala

Myriam Mujawamariya,

University of Rwanda,

Rwanda

Ashani Ssavinda Ranathunga,

University of Moratuwa,

Sri Lanka

OPENING SPEECHs

Prof. Dr. Zafer ASLAN

Chair, Istanbul Aydın University, Türkiye

Dear Rector, Director, Coordinators, Distinguished Guests,

Welcome to International Conference on Gender Action and Climate Change (IGC2023).

Empowering women in STEM fields and ensuring their roles in the public and private sectors, industry and academia is becoming increasingly important with the two-year-long pandemic. The IPCC's Sixth Assessment Report, released on February 28, 2022, draws from 34,000 studies and involved 270 authors from 67 countries. Climate impacts are already more widespread and severe than expected. We are locked into even worse impacts from climate change in the near-term. Risks will escalate quickly with higher temperatures, often causing irreversible impacts of climate change. Inequity, conflict and development challenges heighten vulnerability to climate risks. Ahead of Paris, some scientists said that there was a chance that temperature could ultimately rise by up to 6^{o}C.

We have this opportunity to discuss together with six OWSD Award winners at their early career stage, invited lectures and guests by following UN Sustainable Development Goals.

We would like to thank for all of you for your participation and valuable contributions to this scientific event. With best wishes and regard,

Hikmet Eroglu

Head, Hikmet EROĞLU, TSMS, Türkiye

Good morning my dear colleagues. Dear distinguished academicians and participants I want to start my speech with the international conference gender actions on climate change for the invitation. I'm the head of the climate and agriculture meteorology department. I graduated from Istanbul Technical University in 1998 and I'm a mechanical engineer. I am very happy to see my two great teachers here today. Actually, our general director Volkan Mutlu ÇOŞKUN was going to attend the conference today but unfortunately, he couldn't because he had another conference in the Ministry. Behalf of him I'm entering his conference and I would like to state his respects and greetings to everyone.

The Turkish meteorological service of the minister of environment and organization of the climate change. The monitors watched the atmosphere continuously. The meteorological data gathered 2050 observation networks around the country. TSMS our organization, is the main responsible organization for the weather forecasting and early warning products. Our country, Turkey, is in the Mediterranean base. According to the inter gravity panel on climate change reports, because of our geographical position we will be the most affected by the adverse effect of the climate change. We're aware of that TSMS informs the public local authority and decision makers by doing better forecasts then early warning. These products contribute to reduce loss and damage from resulted extreme meteorological disasters. As known well climate change have been increased frequent except event day by day since 2000.

In other countries and the globe as well. For this reason, early warnings made by our institution out of vital importance in order to take precautions by vocal and government organizations. We experienced last two months in Istanbul in our country. Istanbul had great snow package last two months. In addition to weather forecasting at early warnings system we also call out climate studies. I will briefly talk about what we are doing for the climate change issues. The current situation of our country's

climate monthly seasonal and annual climate assessment reports is prepared and shared on our institutional website. These reports include temperature, precipitation, and exam even analysis and compares with the previous years. Let's say something about today's topic "Gender action on climate change". Dealing with the climate change is a mass topic. This is handled by the states and local authorities. In addition to that, individuals should be part of the climate adaptation and medication studies and processes. For this reason, gender equality is very important for the climate change, especially by highlighting the roles of women. In this context I must say clearly that our general director Volkan Mutlu Çoşkun has worked to increase the number of female managers in our institution in order to highlight the role of women in our organization.

The effects of the climate change differ on the gender X. We can clearly see that women are more vulnerable to the problems created by the climate change. There are many current examples on how climate change effects men and women. The number of women who died in 2004 tsunami in Russia was four times more than men. This is because of the family responsibilities and those responsibilities naturally attributed to the women. After these disasters such as flood, earthquake, drought and so on. Men are being displaced in exposed to violations of many different human rights. Beside of that women are in the role of education for their children and others. In other words, women shape our next generation. This is why women are very important in our society. Therefore, women play a huge role in development of children's awareness of climate change and meteorological awareness.

Another important issue medication climate change is water saving an energy efficient and agricultural application studies areas. These topics I mean to tackle the climate change issues cannot be achieved without participation of women. Women are half of world population as is our country. In other words, women represent the half of the power of the humanity. We have a saying if you give a house to a woman, she will give you a home. As a last word TSMS is ready to support and ensure that vulnerable groups are not affected by negative effects of climate change. (Thank you very much)

Prof. Dr. Yadigar IZMIRLI

Rector, Istanbul Aydın University, Türkiye,

Welcome to the International Conference on Gender and Climate Change.

The conference is organized with the cooperation of OWSD (Organization for Woman in Science for the Developing World). The conference was organized in cooperation with IAU, OWSD National Group (Turkey), IAU - UNESCO Education Chair for Sustainability, EURAS - EURASIA Universities Association, EPPAM – Applied Research Center for Energy Policies and Marketing, Applied Research Center for Environment and Human Health and Istanbul Technical University.

The conference was designed to raise awareness on Gender and Climate change. At the first two panels, presentations of 13 researchers will have a great contribution to science. At the third panel, OWSD President and Director of ELSEVIER Foundation will present awards to six researchers at their early academic career. At the meeting, the papers of researchers from 13 different countries will be presented for discussion.

We would like to thank IAU Faculty of Engineering - Computer Engineering Department, Applied Research Centers, Istanbul Technical University and UNESCO Chairs for their efforts in the organization of this conference. We would like to express our sincere thanks to those who contributed to the organization, those who contributed to the conference.

Dr. Tonya Blowers

OWSD Coordinator, Italy

Morning everybody, good afternoon, and good evening to some of you. Thank you so much for this wonderful collaboration professor, Aslan. We're really excited about this this special day. I'm just briefly introduce myself and my organization. I'm Tonya blowers and I'm the coordinator of the organization for women in science for the developing world. I'm actually from the UK but we're based in northern Italy on the boundaries with Slovenia and Austria (central Europe). We are a global organization and we actually have over 8000 members, these are all who are based throughout the world, living, and working in developing countries. These are all women who have at least a postgraduate degree in science subjects and social science subjects. So, you can see that's an incredible network to have.

We also have 44 national chapters also based in developing countries now a national chapter for our organization is a group of women who are OWSD members who decide that they want to get together to meet and discuss what the specific challenges there are that they face as women scientists in their country. They try and find some solutions and get some funding to run workshops, run conferences and gather data. In fact, I met Professor Aslan because she is a member of the executive committee of the OWSD Turkey national chapter and she's doing a fantastic job. It's because of her that we have this collaboration and that's this conference. We were talking a couple of years ago because Professor Aslan is also an associate fellow of the International Centre for theoretical physics. Which is based on the same campus where I'm based. We met and we talked. We also talked about how great it would be to do a conference together.

This year is the very first year for us that we are working on specific themes related to the SDG's. We thought because we had this contact with Professor Aslan and because she told me that the Aydin University always organizes a conference on climate change once a year to coincide with the world international meteorological

day. So, we thought it'd be really nice if we could try and do something together and put the emphasis on gender and climate change. So, you're the experts, you're the academic experts there in climate change and we have something I hope to bring to you on the gender aspect. It's not so easy to put those two things together actually and it was very wonderful to hear professor Eroglu talking about the impact of climate change on women specifically.

As we know and as it's so well described, women tend to be on the receiving end of climate change. The impact of climate change makes a much greater difference to women than to men because of the nature of cultural roles and routines. family life, education, and health responsibilities. On the one hand, if women can be involved in climate change research, they will bring different interests to bear and will also ensure that different aspects that impact women are included, and so I hope that's what we'll be able to focus on during this conference. And just to give you a brief idea of what else our organization does in case any of the participants or listeners would like to participate more in our organization, so the idea of host is really to ensure much greater participation of women scientists from developing countries in international scientific research and influence and we do that in different ways we have different programs. One of them is a PhD fellowship and again we have just set up a memorandum of understanding with Aydin University, through Professor Aslan. Where Aydin university will welcome our PhD fellows who come from least developed countries or countries that are scientifically lagging and they are selected very rigorous procedure. They are all excellent scientists, and they can choose to study anywhere in the world in another developing country. So, we really hope that we will have more fellows coming to Aydin university.

We also have an early career fellowship program which is $50,000 awarded up to 20 individual early career scientists, again from developing world from least developed countries. The idea is for them to set up a center of research excellence in their own home countries. Whereby definition they don't have the scientific resources that they need in order to do excellent research. So where is the PhD program encouraging women to leave their countries to get extra resources and extra

knowledge. Our hope is that they return and in fact the numbers are extremely impressive, something like 90%. Return rate and completion rate of all of our fellows and then the early career fellowship is to ensure that once a woman does return to her home country with all this knowledge and expertise, she can continue to do Advanced Research with support of this fellowship.

Those are our main programs, and you'll hear all about our third program which is an awards program this afternoon as Professor Aslan mentioned. We will also have the rector of the University, thank you so much also for your introduction. We have selected six outstanding women scientists working in climate change and they will each be presenting this afternoon on their research and also making the links between gender and climate change. I hope that you will all stay to listen to those presentations. I'm very excited to be here and to listen to the proceedings from now on so thank you once again and thank you for this fantastic collaboration.

I will read the professor's abstract. Professor Rashmi Batwa is unable to be here today. She very much wanted to be here, but she was not able to be here. She's a professor of mathematics at the University School of Basic and Applied Scientists, and she's also the head of the nonlinear dynamics research lab. She is based at the Guru Gobind Singh Indraprastha University in Dwarka, Delhi, India. You can see all of her publications on her orchid ID reference, and she wanted to talk to you today about challenges in science, technology, and entrepreneurship through a gender lens. She has really apologized for not being able to be here but has asked us to read this abstract. So, I will go ahead and read for you.

Prof. Dr. Jennifer Thompson

President OWSD, South Africa

Thank you, Tonya It's lovely to be with everybody. I'm speaking from Cape Town, and I'm going to tell you a little bit about my research and how it impacts women, and I'm also going to tell you a little bit about both our organizations for women in science in the developing world. 25 years ago, I was finishing up a project on the development using genetic engineering of maize, which is Africa's staple crop, maize resistant to a virus only found in Africa called Main Street virus, and my research was being funded by a private organization and the research was going to a seed company, so they had decided to end my research funding, which was quite understandable, and so they took me out to lunch and asked me, "Now what are you going to do?" Remember, this was 25 or nearly 30 years ago, and I mentioned drought-tolerant maize, and one of them might not have been the smartest physical people in the pod. But what if there aren't a draft and the other people around have never seen me stuck for words in their lives?

I began working with colleagues on the development of drought-tolerant plants many, many years ago, and we took our genes from A and then developed an indigenous plant called the resurrection plant that can tolerate a 95% loss of water and still survive and resurrect within 72 hours of being watered by us. It was a magical plant that proved to be and to cut a long story short, about eight years ago I approached the government for funding to take it to commercialization, and I'm happy to say that we are in collaboration with international agricultural organizations commercializing our potentially drought-tolerant ways, which will not only be useful in Africa. But, throughout, and in Cape Town about three years ago, we had such a bad drought that we were closer to zip desert than our tanks were, and the reservoirs were at 8% full, and if they went down to five, we were going to shut off all the taps. Fortunately, we

survived, but what I wanted to tell you is that because I'm a woman and ran an African lab, I was able to attract women who had never worked before.

There are many African women scientists who appear to be the ones who go to the wells to get drinking water; in rural Africa, women and children are the first people to be affected by this incredible climate change. I have to tell you that during my tenure as head of the laboratory at the University of Cape Town, I had scientists, but I also had a lot of male scientists from Mauritius, Botswana, Zimbabwe, Malawi, Kenya, and more.

Recently Ethiopia, so it is truly a cosmopolitan lab. The women have been very supportive. Then, about six years ago, I was persuaded to run for president of OST, and I was elected and re-elected for another five years last year. Just wanted to say how this completes my career and how being president of East is so fulfilling because of this organization and the things we have about it that I believe *Tonya* mentioned earlier. We have over 8000 members and we have regions; Africa is the biggest region, but we also have Arab states, Asia Pacific, Latin America, and the Caribbean.

We have 42 national chapters around the world. These are incredibly active, doing all sorts of things, from, you know, teaching girls about the importance of science to teaching boys about the importance of science. women in science because one of the first things I did when I became president was open certain categories of membership to men. Because we are interdependent, we need the support of the men, but just to give you a taste later on today, we're going to be celebrating the Elsevier Foundation host fellows, and they are prize winners every year, and I'm going to tell you more about that this afternoon, but that's one of the things that the programs that that host is involved with have: PhD fellowships, where women scientists can go and do their PhD in other developing countries. I used to find in the early days of my career that a lot of my students would go abroad to do their PHD's. When I was teaching undergraduates, they said no, we want to go to Europe or America to do our PHD's, and we'd never see them again, so it's so important to have this PhD program

where women go to other developing countries and then go back to work in their home country if that is possible sometimes in countries like Sudan. It's not that easy, but we also have early career fellowships.

Both of these programs are obviously funded by the Elsevier Foundation, which funds the prizes. The PhD is funded by Cedar from Sweden, and the early career is funded by the International Development Research Centre (IDRC) in Canada. That's a much newer program, and here we give grants to women who are in their early development because they need them when they finish their PHDs. They go back You know very often they're swamped with teaching, so we need to give them support in order to build up their labs, in order to buy equipment, in order to raise funds to help get technicians to run their equipment, and also information on how to run a lab. So, in a nutshell, that's my position and my position as host, and as a research scientist, I'd be well prepared to welcome any questions during the panel discussion. Thank you.

International Conference on Gender Action and Climate Change

24 March 2022 – Online Programme

10:00 – 16:00 Istanbul time*

*Please note that if you want to check the time in your own city you can go directly here ***https://www.timeanddate.com/worldclock/converter.html***

Please click the link below to join the conference:

https://us06web.zoom.us/j/81677781876?pwd=YWtLTk1vbnplY25HOWxxMGJxSXBVZz09

Zoom ID: 816 7778 1876

Passcode: 4441428

E-mail: igcc2022@aydin.edu.tr

10:00-10:30	**WELCOME REMARKS** -Prof. Dr. Zafer ASLAN, Chair, IAU, Türkiye -Gn. Director Volkan Mutlu COŞKUN, Head Hikmet EROĞLU, TSMS, Türkiye -Prof. Dr. Yadigâr İZMİRLİ, Rector, IAU, Türkiye -Assoc. Dr. Mustafa AYDIN, President, EURAS and IAU, Türkiye -Dr. Tonya Blowers, OWSD Coordinator, Introduction to conference, Italy -Prof. Dr. Jennifer THOMSON, President OWSD, South Africa

10.30-11:45	**PANEL SESSION 1** **How gender-aware methodologies impact climate change: PART ONE** **Chairs:** Tonya BLOWERS, Mikdat KADIOĞLU **Panellists** • **Rashmi BHARDWAJ, Professor of Mathematics, University School of Basic & Applied Sciences (USBAS), Head, Non-Linear Dynamics Research Lab, Guru Gobind Singh Indraprastha University, Delhi, India** Professor Bhardwaj uses mathematical modelling techniques to predict, for example, realtime temperature • **Mamta AGRAWAL, Professor of Mathematics, VIT Bhopal University, India** Professor Agrawal will discuss how her research interests in Applied Mathematics and Computational Biology are relevant to understanding and preventing the impact of environmental changes on human health. • **Hasin ANUPAMA, OWSD executive board member for Asia & Pacific, and Director, Centre for Biomedical Science and Engineering, United International University, Bangladesh** Professor Anupama has academic and clinical training in radiation oncology and diagnostic radiology from India, Germany and Italy. She will consider the impacts of climate change on medical health and their gender component • **Cemre ERCİYES, IAU, Türkiye,** Why is it Important to Teach Climate Change and Intersectionality to Health Sciences Students? • **Filiz KATMAN, Political Science and International Relations, Istanbul Aydın University, Türkiye** Dr. KATMAN will consider the geopolitical and security implications of climate change • **Jennifer THOMSON, OWSD President, emeritus professor in Molecular and Cell Biology, University of Cape Town, South Africa** Professor Thomson works on the development of genetically modified maize resistant to the African endemic maize streak virus and tolerant to drought **Panel Discussion & Questions**

13:00-14:15	**PANEL SESSION 2** **How gender-aware methodologies impact climate change: PART TWO** **Chair(s):** Jennifer THOMSON, Meral DEMİRTAŞ Panellist • **Oğuzhan AKYENER, President of Türkiye's Energy Strategy & Political Research Centre (TESPAM)** Reasonable Approach to the Climate Change Process, President AKYENER will describe the impact that climate change has had on Türkiye's energy programme • **Cemre Yürük SONUÇ and Yurdanur ÜNAL, Istanbul Technical University, Department of Meteorological Engineering, Türkiye** Convection Permitting Climate Simulations of Marmara Region in Türkiye, • **Enrico FEOLI, Prof. Life Sciences, University of Trieste, Italy** Biodiversity and climate change: important contributions of some women scientists • **Mehmet Barış KELEBEK İTÜ, Türkiye, Fulden BATIBENİZ, ETH Switzerland and Barış ÖNOL, İTÜ, Türkiye** Exposure Assessment of Climate Extremes over the Europe–Mediterranean Region • **Eren GÜLTEPE, Southern Illinois University Edwardsville, USA** Machine learning techniques applicable to environmental modelling • **Meral DEMİRTAŞ, Head, Assoc. Professor of Meteorology, Samsun University, Türkiye** Professor Demirtaş will consider Climate Change, Variability and High-Impact Weather Events • **Buğra ÇELİK, Kamil ERKAN and Mete TAYANÇ, Marmara University, Türkiye** ÇELİK will present some results on Investigation of Climate Change in Northwest Türkiye by Paleoclimatic Reconstruction of Well Temperatures **Panel Discussion Questions**
14:15-14:30	**BREAK**

14:30-16:00	**PANEL SESSION 3** **Early Career Women Scientists from Developing Countries Describe their Prize-Winning Research in Climate Change** **Chair:** Tonya BLOWERS, OWSD Coordinator **Introduction to the OWSD-Elsevier Foundation Awards** • Jennifer THOMSON, OWSD President • Ylann SCHEMM Director, Elsevier Foundation **Introduction to the Awardees and Panel Discussion** • Tonya BLOWERS Awardees present their work (5 minutes each) • **Myriam MUJAWAMARIYA, University of Rwanda** Dr Mujawamariya studies how various types of indigenous trees respond to different climate scenarios since erosion is a major environmental concern in Rwanda, and many efforts are being put into landscape restoration and ecosystem-based adaptation. • **Abeer Ahmed Qaed AHMED, Al-Saeed University, Yemen** Dr Ahmed is a biologist investigating different microbiology and nanotechnology-based solutions to carbon emissions, drug-resistant pathogens, and fossil fuel dependence. • **Gawsia Wahidunnessa CHOWDHURY, University of Dhaka, Bangladesh** Dr Chowdhury is committed to conserving the aquatic ecosystems and threatened species of Bangladesh with a focus on assessing the extent of and the risks from plastic pollution • **Heyddy CALDERON, the *Instituto de Geología y Geofísica,* Nicaragua Dr.** Calderon is working to provide secure and sustainable water sources for vulnerable populations in a region of Central America known as the Dry Corridor, spanning Guatemala, El Salvador, Honduras, Nicaragua, and Costa Rica.

	• **Ashani Savinda RANATHUNGA, University of Moratuwa, Sri Lanka** Dr Ranathunga turns industrial and agricultural waste into anthropogenic (man-made) soil for geotechnical engineering-related applications and is a proponent of the "waste to wealth" concept, producing green and value-added products from waste. • **Flor de Mayo Gonzalez MİRANDA, San Carlos University, Guatemala** Dr Miranda investigates how a specific grass prevents landslides in vulnerable areas in Guatemala since climate change is causing increasingly strong periods of rain in the country: the plants' roots alter the chemical, physical and mechanical behaviour of the soil, reducing the speed of soil infiltration as well as soil plasticity. **Panel Discussion & Questions**
16:0016:15	**CLOSING REMARKS** **Chairs: Tonya BLOWERS, Zafer ASLAN** Speakers and panellists provide their brief comments on the day's ideas, conversations and action points going forwards

Challenges in Sciences, Technology and Entrepreneurial- through Gender Lenses

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ABSTRACT

"A gender- equal society would be one where the word 'gender' does not exist: where everyone can be themselves." Gloria Steinem (March 1934)

Gender is a social construct that impacts attitudes, behaviour, roles and responsibilities pattern of boys and girls, men and women in all the societies. Global concerns and claims for creating better world have resolutely been shown by global community at many fora and through various initiatives in recent decades, *inter alia*, Development Planning and Community Development, Macnmara Plan of Target Approach, Need Based, Participatory, Right Based, Inclusive Development, Washington Consensus, MDGs, SDGs, etc. Significant rise in GDP of the world economy, production of wealth and increasing number of millionaires has been witnessed. Estimated investible surplus of USD one million and above has also been increasing significantly, which is reflected in growing per capita GDP but intraregional disparities in distribution of per capita GDP also remained a matter of serious concerns added with declining industrial employment along with increasing total labour force. Unemployment has been increasing Declining of poverty has been witnessed but majority of the poor people live in Sub-Saharan Africa, South Asia and East Asia & Pacific. Although, evidences of declining hunger of the world to some extent are soothing experiences, still facing serious hunger is a challenge. Therefore, question arises whether various development initiatives were effective to reduce global as well as regional social and economic inequalities?

The Gender Development Index (GDI) measures gender gaps in human development achievements by accounting for disparities between women and men in three basic dimensions of human development—health, knowledge and living

standards using the same component indicators as in the Human Development Index (HDI). The GDI is the ratio of the HDIs calculated separately for females and males using the same methodology as in the HDI. It is a direct measure of gender gap showing the female HDI as a percentage of the male HDI. The GDI shows how much women are lagging behind their male counterparts and how much women need to catch up within each dimension of human development. It is useful for understanding the real gender gap in human development achievements and is informative to design policy tools to close the gap.

This talk is an attempt to examine whether recent global initiatives have reduced global **disparity** and **inequality**. This exercise is based on secondary data from various global reports. Findings of this analysis suggest that inequality in distribution of **per capita income**, stunted children under 5 is yet to be contained despite many global interventions through various policies and programs.

Key words: Disparity, Poverty, Inequality. Per Capita Income, Infant Mortality, Wasting, Stunting, Literacy and Life Expectancy.

Effect of Climate on Human Health

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Climate change refers to long-term shifts in temperatures and weather patterns. These shifts may be natural, but since the 1800s, human activities have been the main driver of climate change, primarily due to the burning of fossil fuels (like coal, oil, and gas), which produces heat-trapping gases. İn addition, Climate change is already impacting human health. Changes in weather and climate patterns can put lives at risk.
Heat is one of the deadliest weather phenomena. As ocean temperatures rise, hurricanes are getting stronger and wetter, which can cause direct and indirect deaths. The main objective is to access the factors for climate change, its effects on health and ways to reduce.

Effects of climate change on health; The goals is to develop a broadly applicable model and support platform for decisions at the local scale considering the effects that climate change might have on human health endpoints and investigation of the effectiveness of mitigation options.
The desired model must be: Capable of addressing multi-stressor effects on human populations (e.g., heat stress, flooding, disease, changes in allergens, etc.), temporally and spatially explicit (and produce static and dynamic map output), scalable (to consider local–regional interactions).
Credible in assessing trade-offs among mitigation and adaptation scenarios, and easily used and interactive.
Transportable (from one community to another) and adaptable to new data and information.

Thermoregulation is core temperature (T_{CO}) is in dynamic equilibrium as a result of balance between heat gain and heat loss. Mean body temperature (T_{body}) represents an average of skin and internal temperatures. Hypothalamus acts as "thermostat" that makes thermoregulatory adjustments to deviations from temperature norm in the brain (37degreeC ± 1degreeC or 98.6 ±1.8 degree F)
Effectiveness of heat loss via conduction, convection, and radiation decreases. When ambient temperature exceeds body temperature, heat is gained. The only effective mechanism is evaporation of sweat and respiratory tract vaporization of water.

The core temperature of the human body is 37°C which mainly includes the organs of the thorax, abdomen and the head. This is where the vital organs are located. Their enzyme systems must operate in optimum conditions. The periphery of the body can withstand some deviation from the core temperature. The body must balance its heat budget; hence heat is either gained or loss by the body. Heat is gained by conduction from warm air surrounding the body and by the body's metabolic activity

which generates heat like when muscle move. While heat is lost by conduction and radiation to cold air (or water) and by evaporation of sweat from the body surface (c.f. properties of water). Humans can also affect their body temperature by changing their behaviour like wearing different clothes, seeking shade.

Human Temperature Regulation; Humans are “endothermic homeotherms”; i.e., we generate our own body heat and have the capacity to regulate body temperature. Body temperature is influenced by the environment, internal mechanisms (homeostasis), and behavioural adaptation (e.g., clothing, shelter, cooling and heating systems). Body temperature has two components: central (core) and peripheral (shell). The core temperature, average 37°C, is tightly controlled within a range of 33.2°C–38.2°C that ensures optimal physiological function. The core temperature fluctuates daily (i.e., circadian), monthly (e.g., during the menstrual cycle), and with aging. The hypothalamus is the coordinating center for body temperature regulation. A stable core temperature is achieved through homeostatic thermoregulatory mechanisms linking cold and warm receptors in the skin and brain to heat production from muscle and other organs. The peripheral (shell) temperature, measured in the skin, hands, and feet, is approximately 4°C lower than core temperature; hence the normal direction of heat transfer is from the body to the environment. In a warm environment, heat loss occurs from skin vasodilation and sweating. During cold exposure, the skin blood flow is decreased through vasoconstriction, leading to a decrease in peripheral temperature and preservation of core temperature. Extreme deviations from the normal core temperature, i.e., a dip below 27°C (hypothermia) or an increase above 42°C (hyperthermia) can be fatal. As discussed in the next section, extreme heat spurred by global warming poses an existential threat to human populations. Heat Loss at Ambient Temperatures causes effectiveness of heat loss via conduction, convection, and radiation decreases. When ambient temperature exceeds body temperature, heat is gained. The only effective mechanism is evaporation of sweat and respiratory tract vaporization of water. While heat loss at high Humidity causes total sweat vaporized from skin depends on: Surface area exposed to environment, temperature and humidity of ambient air, and convective air currents about the body. Most important factor is relative humidity. When relative humidity is high, the ambient water vapor pressure approaches that of the moist skin and evaporation is impeded.

Heat Balance Equation; Apart from individual factors (i.e., sweating, muscular activity and clothing), the heat balance equation that regulates body temperature is also affected by several climatic variables: air temperature radiant temperature surface temperature and air humidity wind speed. The core body temperature remains stable when the body heat produced by muscle activity and workload equals the heat lost from the body through conduction (the loss of heat from the skin to the environment through direct contact with a cooler object), convection (the transfer of heat from the skin to the environment through rising airflow, as it occurs in the case of a fan), radiation (the electromagnetic waves in the form of infrared radiation that transfer heat from the body to the environment), evaporation (any moisture present on the skin, such as sweating, that may evaporate to release heat from the body) and respiration (with the expired air up to 10% of the total body heat production may be lost).

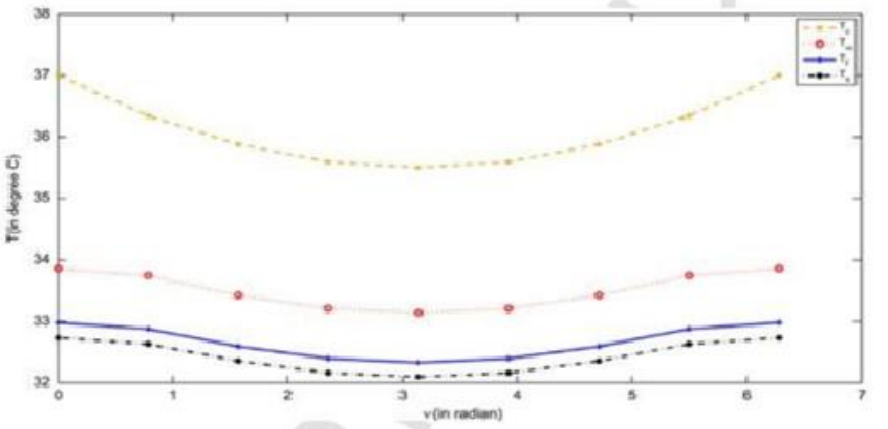
Overwhelming evidence suggests that the ongoing global warming has shifted the normal "bell-shaped distribution" temperature curve to include a statistically significant higher number of hot days and nights, that in the last ten years cover the 22.1% of the Earth's surface compared to the 0.1% of the land they used to cover in the second half of the 20th century.

The high levels of particulate air matter released by anthropogenic activities in densely populated urban areas in combination with the poor vegetation, the heat trapped in the cements of the buildings and sidewalks and the heat that is released by cars, air conditioners and other vehicles or engines, lead to the occurrence of higher temperatures in the cities than those observed in rural areas that make them prone to heat waves. In addition, as daytime and night-time temperatures increase, the oceans evaporate more moisture into the atmosphere, perpetuating further temperature increases.

Warmer air can hold a lot more water vapor. Interestingly, with each additional 1degree C of temperature, the atmosphere's capacity to hold water vapor increases by 7%.32 Actually, there is already 5% more water vapor over the oceans than there was only 30 years ago. Under weather extremes, body heat loss mechanisms become impaired and therefore human thermoregulation is adversely affected.

For example, when the ambient temperature exceeds skin temperature the body cannot dissipate heat through conduction, convection and radiation. Instead, the human body gains heat from the environment. Likewise, higher moisture in the environment than on skin impairs evaporative heat loss, whereas under extremely hot and humid conditions, extreme wind speed adversely affects both convective and evaporative heat losses.

The results:



Temperature distribution along angular direction at $r=0$, $T_a = 23\ ^{\circ}\mathrm{C}$ and $E = 0.0024\ \mathrm{kg/m^2\ min}$

Large urban areas are usually warmer than surrounding rural areas because of loss of vegetation, more pavement and buildings that absorb the sun's energy, reduced airflow in alleys, and heat generated by vehicles, air conditioners, and factories. Daytime temperatures in cities are higher than in rural surroundings, and the night-time temperature difference is even higher because of heat retained from the day. Cities are prone to heat waves, often associated with air pollution. Extreme heat and poor air quality both pose health risks to children, older people, those with chronic illnesses, and outdoor workers. High humidity is also a major contributor to high ambient temperature because water vapor prevents the human body from cooling effectively through sweating. The "heat index" indicates how hot it feels by factoring in effects of air temperature and humidity. For example, when the air temperature is 96°F and the humidity is 65%, the heat index is 121°F. Health warnings about extreme heat are based on the heat index exceeding 105°F–110°F for more than 2 consecutive days.

Heat Related Illness and Mortality

As heat waves become more common, more severe, and longer, we expect to see more heat-related illnesses and deaths, particularly in children, older people, those with chronic health conditions, and poor or underserved communities.

Heat cramps are associated with painful muscle spasms in the abdomen, arms, or legs caused by water and salt depletion. Heat exhaustion is a more severe illness that occurs from prolonged exposure to extreme heat, is associated with dehydration, and requires emergency treatment. The symptoms of heat exhaustion are excessive sweating, fatigue, headache, dizziness, irritability, nausea and vomiting, thirst, and decreased urination.

Heat stroke is the most serious heat-related illness, requiring emergency treatment. Heat stroke occurs when the body's thermoregulatory mechanisms fail and the core temperature rises to 41.1°C (106°F) or higher. Heat stroke may be preceded by heat cramps or heat exhaustion, but it can also happen suddenly. Excessive heat causes tissue injury, disrupts cellular processes, denatures proteins, and destabilizes cellular membranes. Above 49°C, cells undergo rapid death from necrosis. Symptoms and signs of heat stroke include profuse sweating, hot and dry skin, nausea and vomiting, hypotension, intense headache, mental confusion, and loss of consciousness.

In the United States, extreme heat causes more deaths than other weather-related hazards, i.e., cold, hurricanes, tornadoes, or floods. The annual heat-related death toll in the United States is approximately 1500. The July 1995 heat wave in Chicago claimed more than 700 lives. About 65,000 patients with acute heat-related illnesses are seen in the emergency room each summer in the United States. The August 2003 heat wave in Paris, France, killed nearly 15,000 people, mostly elderly and poor people.

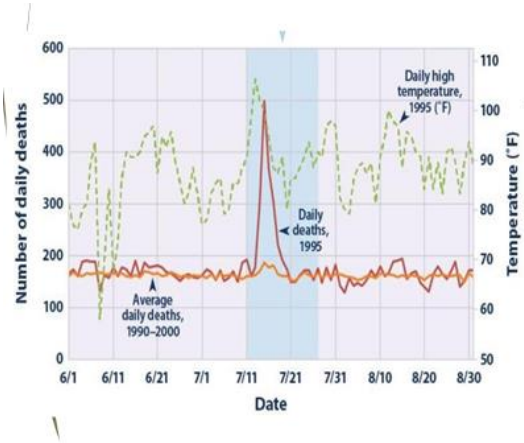
Temperature–mortality response functions

In our model, we used the heat waves and used the daily mean temperature time series to track when heat waves occurred, and calculated the additive relative mortality responses to the presence of a heat wave and its characteristics.

In this we analyse that relative mortality increases for all nonaccidental deaths per 10 F increases in apparent temperature. Apparent temperature is the perceived air temperature at a given humidity level and is calculated as:

$$AT=-2.653+ (0.994*Ta) + (0.153*Td^2)$$

Where, AT is apparent temperature, Ta is air temperature, and Td is dew point temperature, all expressed in F.



1 Thi figu sho th relations

2 Thlar spi i deati miJul

This figure shows the relationship 2. The large spike in deaths in mid-July between high temperatures and deaths Dr. Mamta Agrawal observed during the 1995 India heat wave. (red line) is much higher than the average number of deaths during that time of year (orange line), as well as the death rate before and after the heat wave.

Key Words: *Heat wave, climate, urban areas.*

Gender and Climate Change

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Presented at the on-line
International Conference on Gender Action and Climate Change (IGCC 2022)
24 March 2022

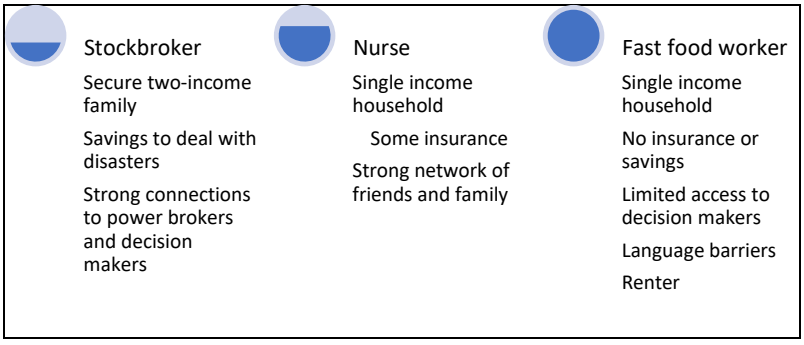
Extended Abstract:

Climate change is today recognized as a major global challenge and is, as such, much discussed at international level. The crucial links between gender, social equity, and climate change have historically been difficult for climate scientists, academics, and policymakers to draw. It's time to discuss the uneven effects of climate change and the connections between women's empowerment and effective, global climate action as more data and study show their evident correlation.

When we talk about climate change risk, scholars will refer to differential vulnerability. Vulnerability is the risk of being harmed as a result of a particular hazard. Vulnerability to climate change varies along lines of social difference – race, class, ability, age, and gender to name a few. This is because the social status is, generally speaking, a determinant of whether we are exposed to hazard, and whether we are harmed by that exposure.

Key Words: *Action on climate change and risk*

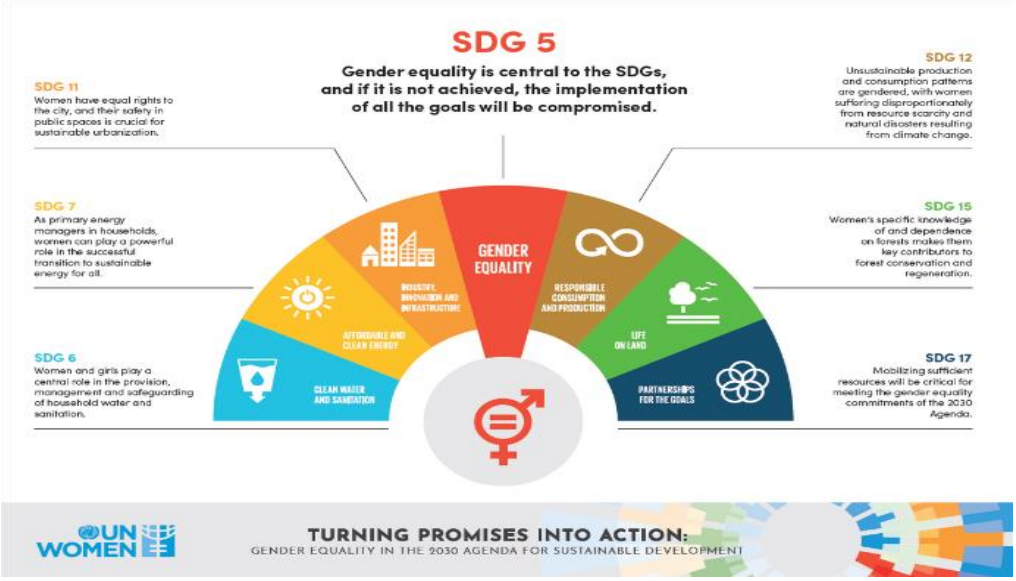
Differential vulnerability



Gender inequalities amplify vulnerability. People who are already marginalized [1] are more vulnerable to the negative effects of climate change. Fatma Denton describes

gender inequality as a 'layer' of differentiated vulnerability to climate change. Vulnerability also varies by location. Dangerous climate change affects people in the Global South more severely than it affects people in wealthy nations as people in the Global South have fewer resources to deal with climate impacts.

A climate-related disaster will affect these women unequally



In recent years, the United Nations has given these issues serious consideration and offered specific recommendations for action. In its annual meetings in 2002 and 2008, the United Nations Commission on the Status of Women (CSW) for instance, included the topic of climate change. In 2002, the emphasis on the issue of women and the environment included a reference to climate change. In 2008, the "Emerging Issue" theme for the Commission was determined to be climate change. The Commission emphasized that, contrary to what is commonly asserted, climate change cannot be deemed to be "gender neutral."

This writing aims to provide a global overview of gender equality issues in relation to climate change from a developing countries perspective. It was noticed that women are more susceptible to the effects of climate change in many regions of the world because of their significant roles and responsibilities, particularly for the cultivation of food crops, and their reliance on natural resources. The predicament of rural women and the specific vulnerability of indigenous women were underlined. Extreme weather occurrences are driving a large number of males

to move from rural to urban regions in search of work, leaving women in charge of the home and the land even though they may not have the legal or social authority to do so.

Child marriage, which is seen as a form of gender-based violence, has been seen in many communities as a way to cope in the event of a catastrophe. Child marriage, for instance, is a means of securing money or property as well as recouping damages brought on by climatically related catastrophes like drought, frequent flooding, and more violent storms.

Haiti, 2016. Aftermath of Hurricane Matthew. https://www.unwomen.org/en/news-stories/explainer/2022/02/explainer-how-gender-inequality-and-climate-change-are-interconnected; Bangladesh: https://www.google.com/search?q=photo+of+flood+in+bangladesh+women+condition%27&sxsrf=APwXEdceOl3ZJD

Some females are compelled to quit school in order to complete their daily obligations. Due to the detrimental impacts of climate change, it is now necessary for women and girls in some countries to go further from their houses in order to collect firewood and water for their family. These chores have historically been carried out by women and girls. As a result, they are exposed to more gender-based violence outside the home due to the lengthier commutes.

Men and women take different adaptation measures depending on the context; however, these actions do tend to differ due to the varying social statuses linked with gender inequality and may even get worse as a result of climate change. Women's knowledge is frequently essential for understanding climate issues because they are frequently the primary resource producers and have accumulated significant environmental knowledge.

We can observe, previously that despite attempts, gender equality issues are not taken into consideration in international discussions or in significant agreements like the Kyoto Protocol and the UN Framework Convention on Climate Change. One of the reasons for this may be that many climate change experts still see the issue primarily from a physical/technical standpoint and are unaware of or uninterested in important social issues, much alone those relating to gender equality. Now that this crucial stage has been finished, we may talk about gender-related concerns. In Nepal a study shows that how gender relations are influenced by wider socio-economic changes, and how alterations in gender relations shape responses to climate change using in-depth interviews with farmers and officials from government and non-government organizations [2]. In Bolivia the Noel Kempff project shows how climate mitigation results different outcomes for men and women which make links with global decision-making progress [3]. Studies on climate change typically divide gender into men and women, paying little to no regard to power dynamics and social and political relationships [4].

Research and data gathering, protocol and convention development, policy and strategy development, resource allocation, program and activity development for mitigation and adaptation, provision of training and other supportive inputs, such as access to appropriate technology, are critical processes that must be influenced from a gender equality perspective.

The development of suggestions and demands for action on gender equality and climate change has also received significant attention from non-governmental organizations (NGOs). Women are significant change agents who possess a wealth of pertinent knowledge. They have also recognized their leadership positions in their communities and pushed for grassroots support for grassroots women's projects. To effectively raise awareness of women's viewpoints and gender equality issues, all global, regional, and national climate change processes and instruments must be used.

The climate problem and gender inequality are two of today's most pressing issues. It's time to start working on solutions as we gain a deeper understanding of the crucial connections between gender, social equity, and climate change. Climate change is a problem that absolutely needs to be addressed in schools, along with its crucial gender equality perspectives. The ability to address gender inequality through new policy avenues provided by climate change is another benefit. In one study find that CO(2) emissions per capita are lower in nations where women have higher political status, controlling for GDP per capita, urbanization, industrialization, militarization, world-system position, foreign direct investment, the age dependency ratio, and level of democracy [5]. This finding suggests that efforts to improve gender equality around the world may work synergistically with efforts to curtail global climate change and environmental degradation more generally.

Recognizing the significant contributions of women as decision-makers, caregivers, stakeholders, experts, and educators across all sectors is essential to finding sustainable solutions. To name a few, Greta Thunberg, Christina Figueres, and Franny Armstrong have already taken the lead in advocating for long-term, sustainable solutions to the climate crisis.

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Why is it important to Teach Climate Change and Intersectionality to Health Sciences Students?

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Submitted for presentation at the on-line IGCC2022 Int. Conference panel "How gender- aware methodologies impact climate change: PART ONE" meeting, 24 March 2022.

Abstract:

When in 2017, I was asked to design an interdisciplinary faculty elective course in Health Sciences (targeting only high GPA students from the departments of Dietetics, Social Work, Nursing, Audiology, Physio-Therapy and Health Administration), at Istanbul Aydin University, where I had just started teaching, I decided to create a course that would transform the perception of all students about themselves, their discipline and the world. As a social scientist, I decided to introduce to the students, ideas of space, intersectionality and how these topics related to their own fields of study in health sciences. The course was named Space and Health, and in the 14 week plan it had an objective "to develop the critical thinking and increase awareness about the relation between space and health through an interdisciplinary lens" with "the use of space by different groups and its relation to health (children, disabled, elderly, women and LGBTI, migrants, prisoners) and things influencing health in everyday spaces (climate change, global warming, nuclear and environmental waste, pesticides, GMO, sounds, etc.)" as content [1]. But why is it important to teach health sciences' students climate change and intersectionality?

Key Words: Climate Changing, Space and health

First, we shall look at the relation of climate change and health sciences. There is a Global Consortium on Climate and Health Education (GCCHE) which has been established to help education of health professionals throughout the world, as they are "well placed to play a key role as change agents, through incorporating a climate and health lens in their professional practice and educating institutions, communities, and patients about climate and health while guiding policy transitions. As a trusted and respected source of knowledge, health professionals can advocate for

solutions which build resilience and decrease health impacts" [2]. In the core concepts for health professionals, which they update every 18 months to include current knowledge and perception there are 5 domains (knowledge and analytical skills, communication and collaboration, policy, public health practice, clinical practice) and 23 concepts. These concepts all define the relation of climate to health, such as direct impact of "planetary health" on "human health" (1.1.2) and "risks to health infrastructure" that impact "emergency and disaster planning" (1.5.1) as well as "disease emergence, distribution, and prevalence" that is directly affected by "climate change, biodiversity loss and rapid environmental change" (4.2.1). In this regard understanding the role of human in climate change (1.1.3) and changing impacts that "vary by location and geography" (1.1.4), as well as "policies that influence communities' access to resources and affect where they live" and in return impact "vulnerability and adaptive capacity" (3.2.1) is very crucial to be able to "employ best practices of sustainable healthcare delivery" (5.2.1) and "prepare for and respond to climate related health risks" (5.1.1). [2]

Second, as 3.2.1 of the core concepts suggest, vulnerability is influenced by policies and by geography, but studies also show that vulnerability is influenced also by individual physical and social characteristics. Disabilities, being a woman or LGBTI, having a migrant/asylum status, being a child or an elderly, not having either economic, legal or cultural freedom to move around and access health care, or other support systems even when they are available; are just some of the characteristics that influence vulnerability. These each can hinder equal access to resources but the concept of intersectionality a concept and theoretical lens coming from the feminist theory, is very crucial to include in the discussion of climate change and health as it "can address some of the important issues in the debates on vulnerability and adaptive capacity to climate change" [3] Intersectionality in its simplest form suggest that certain aspects of who somebody is and characteristics they have "interacting with and co-constituting one another to create unique social locations that vary according to time and place"[4], "will increase … access to the good things or … exposure to the bad things in life" [5]. Hence, an intersectional perception would equip students with climate change awareness and knowledge that will be useful in multiple spaces, as climate change influences everyone in every place differently.

The course Space and Health, started with a discussion about children and how there are differences among them in experiencing health issues, having access to health care and how, many cities and health care institutions, are not welcoming environments for them. In terms of crisis-such as a climate change triggered natural disaster- children were seen as the most vulnerable by the students as they were seen most "dependent" on others for survival, e.g. getting away from a disaster area, finding food, medical help and sustainability. Hence, as the weeks build on introducing the vulnerability of the disabled, elderly, migrants/minorities, women and

LGBTI, and how having a variety of these characteristics influences one's access to health care, they each started to realise how priorities will change according to the crisis, individual, community, available resources and institutions and their discipline. At the time of the mid-term examination, the students would start to see the whole picture and that intersectionality matters. Moving on to the second part of the course would introduce the students with concepts such as carbon-footprint, climate crisis, global warming, nuclear medicine, medical waste, GMO, pesticides, water contamination, food safety and all health issues and health care systems in relation to these concepts. When these topics were discussed, it was easier for students to comprehend that in times of crisis, there is an intersectional variety in terms of the distribution of health risks, health status, or in access to health care due to infrastructural or design conditions or due to cultural values or stigmatisation and discrimination.

When given an opportunity to work with students from other disciplines, students recognised that interaction without prejudice and communication (2.1.1 of core concepts) and working "collaboratively and across disciplines" (2.2.1) would give a possibility to be more adaptive at the "individual and population level" (1.3.3). Hence as years passed by students also transformed. In 2022 there were more students who knew and cared for their carbon-foot print, who were more aware of gender differences in the society that also affected access to health care and they felt more confident about their role as a future health care professional. But still, a commentary that one student said to me in my first year teaching this course, was repeated almost similarly in the final year, in my final lecture: "I had thought that I was a person who was aware of many things, you showed me that I knew nothing and I was prejudiced and I shall start changing the world from myself".

Looking at the case study of a single elective course in a Turkish university Health Sciences Faculty, brings up a discussion that has been repeated by others: "Given the scope of the challenges and opportunities presented by climate change, it is vital that a core set of climate and health educational goals, such as identifying key local effects of climate change on health and working with climate and health vulnerabilities" [6] with an intersectional lens, must be articulated in curricula in all fields of education with a priority in health sciences.

Acknowledgements

I am grateful to the students and scholars at the Faculty of Health Sciences at Istanbul Aydin University, where I designed and thought the Space and Health course between 2018-2022.

I am also grateful to Prof. Dr. Zafer Aslan of Istanbul Aydin University who motivated me in turning my experiences into a key discussion.

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Security Implications of Global Climate Crisis

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Abstract

Changing dynamics of the world reflect changes on security perspective as well. Since it is no longer one-sided approach that is sufficient to analyse ongoing developments in the world, security has also no longer a military but also economic, social, political, and also environmental aspects as well. Such a perspective challenge is earlier reflected by Copenhagen School as a comprehensive approach and sectors of security. Moreover, the actor perspective is also different, no longer autonomy of state as the main actor in the perspective but also multiple actors in different levels of International Relations namely individual, state and system. When these two perspectives are combined, analysis of threats also requires such multidimensional, multisectoral and multi-factorial approach necessitating multidisciplinary studies. In this paper, such a perspective will be used to analyse security implications of global climate crisis since it is a major threat to the survival. Thus, climate crisis is no longer a normal but securitised, meaning that it is subject to combatting policies to normalise. In security studies, in order to consider an issue of security, there should be a threat since security means freedom from concern/danger/threat. In global climate crisis, the threat is directly to the very existence of living creatures thus according to Maslow's Hierarchy of Needs, global climate crisis is primary and the most serious threats to security that cannot be rolled back; thus, it is very vital to take all necessary

precautions in timely manner in order to avoid severe and deadly implications or global climate crisis on security of living creatures.

Key Words: *Climate change, environment*

Global climate crisis is mainly perceived as an issue of environmental concern but due to the complex characteristics of the contemporary threats and interdependency it is also a very significant concern for sustainability. Such interconnected characteristics can be understood via the process of climate warming through greenhouse gases in unprecedented levels that severely challenge the very existence of living creatures through deterioration in air, ground, and water quality. According to the recent studies conducted by International Panel on Climate Change (IPCC), the projected deterioration can only be limited via taking serious policies on greenhouse gas emissions to the atmosphere increasing global temperature not more than 1.5 degree Celsius. Such policies also require new economic, energy and habit changes in individual, state and system levels. In order not to challenge economic security while securing environment, an interconnected approach in policy design is at utmost necessity. Since the main concern is the protection of global commons thus the counter-measures should also be as a global action. More emphasis should be devoted on the protection of global commons, and also on the shared global responsibility in accordance with the damage made by each country to the global commons.

Table 1: Impacts of Global Climate Change

Direct Impacts (Due to Changes in the frequency and the volumes of other abnormal air conditions)	**Indirect Impacts (Due to changes in the ecosystem)**	
Sudden diseases	Changes in the ecologies of water and food resources	Increase in contaminated diseases
Deaths	Deprivation in water resources	Increase in contaminated diseases

	Desertification	Rapid degradation of arable lands	Migration due to less agricultural areas
	Iceberg Meltdown and thermal expansion of sea water	Less salinization due to sea level increase	Deterioration in the ecosystem of the shores → increase in contaminated diseases due to deprivation in water and food resources → migration
	Increase in virulation and reproduction the volume of disease factors	Revival of diseases (Tbc, syphilis, HIV)	
	Increased change in vectors' life conditions	Malaria	Arbovirus infections (Viral ensefalit, doing fever)
	Changes in energy resources		

Considering the fact that survival is the primary concern for living creatures, it is inevitable to have a conflict in case of a threat towards it. In the case of global climate crisis, the threat towards air quality, plant quality, food quality, water quality, natural disasters, and energy resources are so significant and immediate that conflicts may reach to escalation of war. The impact of Covid-19 also accelerated the process of escalation together with extreme imbalances in the world leading to severe lacks in supplies of food and energy in affordable prices. Recent increase in food prices are the signals of instabilities in the world. When global climate crisis is combined with a Covid-19 pandemic, the urgency to take a global action is more necessary than ever in order to prevent further imbalances, risks and also for preparedness to unexpected

challenges that may occur due to vague characteristics of the contemporary threats of the 21st century.

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Genetically Modified Maize

Prof. Dr. Jennifer Thompson , President, OWSD, South Africa

Thank you, Tonya It's lovely to be with everybody. I'm speaking from Cape Town, and I'm going to tell you a little bit about my research and how it impacts women, and I'm also going to tell you a little bit about both our organizations for women in science in the developing world. 25 years ago, I was finishing up a project on the development using genetic engineering of maize, which is Africa's staple crop, maize resistant to a virus only found in Africa called Main Street virus, and my research was being funded by a private organization and the research was going to a seed company, so they had decided to end my research funding, which was quite understandable, and so they took me out to lunch and asked me, "Now what are you going to do?" Remember, this was 25 or nearly 30 years ago, and I mentioned drought-tolerant maize, and one of them might not have been the smartest physical people in the pod. But what if there aren't a draft and the other people around have never seen me stuck for words in their lives?

I began working with colleagues on the development of drought-tolerant plants many, many years ago, and we took our genes from A and then developed an indigenous plant called the resurrection plant that can tolerate a 95% loss of water and still survive and resurrect within 72 hours of being watered by us. It was a magical plant that proved to be and to cut a long story short, about eight years ago I approached the government for funding to take it to commercialization, and I'm happy to say that we are in collaboration with international agricultural organizations commercializing our potentially drought-tolerant ways, which will not only be useful in Africa. But, throughout, and in Cape Town about three years ago, we had such a bad drought that we were closer to zip desert than our tanks were, and the reservoirs were at 8% full, and if they went down to five, we were going to shut off all the taps. Fortunately, we survived, but what I wanted to tell you is that because I'm a woman and ran an African lab, I was able to attract women who had never worked before.

There are many African women scientists who appear to be the ones who go to the wells to get drinking water; in rural Africa, women and children are the first people to be affected by this incredible climate change. I have to tell you that during my tenure as head of the laboratory at the University of Cape Town, I had scientists, but I also had a lot of male scientists from Mauritius, Botswana, Zimbabwe, Malawi, Kenya, and more.

Recently Ethiopia, so it is truly a cosmopolitan lab. The women have been very supportive. Then, about six years ago, I was persuaded to run for president of OST, and I was elected and re-elected for another five years last year. Just wanted to say how this completes my career and how being president of East is so fulfilling because of this organization and the things we have about it that I believe *Tonya* mentioned earlier. We have over 8000 members and we have regions; Africa is the biggest region, but we also have Arab states, Asia Pacific, Latin America, and the Caribbean.

We have 42 national chapters around the world. These are incredibly active, doing all sorts of things, from, you know, teaching girls about the importance of science to teaching boys about the importance of science. women in science because one of the first things I did when I became president was open certain categories of membership to men. Because we are interdependent, we need the support of the men, but just to give you a taste later on today, we're going to be celebrating the Elsevier Foundation host fellows, and they are prize winners every year, and I'm going to tell you more about that this afternoon, but that's one of the things that the programs that that host is involved with have: PhD fellowships, where women scientists can go and do their PhD in other developing countries. I used to find in the early days of my career that a lot of my students would go abroad to do their PHD's. When I was teaching undergraduates, they said no, we want to go to Europe or America to do our PHD's, and we'd never see them again, so it's so important to have this PhD program where women go to other developing countries and then go back to work in their home country if that is possible sometimes in countries like Sudan. It's not that easy, but we also have early career fellowships.

Both of these programs are obviously funded by the Elsevier Foundation, which funds the prizes. The PhD is funded by Cedar from Sweden, and the early career is funded by the International Development Research Centre (IDRC) in Canada. That's a much newer program, and here we give grants to women who are in their early development because they need them when they finish their PHDs. They go back You know very often they're swamped with teaching, so we need to give them support in order to build up their labs, in order to buy equipment, in order to raise funds to help get technicians to run their equipment, and also information on how to run a lab. So, in a nutshell, that's my position and my position as host, and as a research scientist, I'd be well prepared to welcome any questions during the panel discussion. Thank you.

Impact of Climate Change on Energy Program in Türkiye

Oğuzhan Akyener, President, TESPAM, Türkiye

We are on our way to make the energy transition. There are lots of different things that we have considered, but the most im7portant item that we have to check, is the climate change and then the environmental issues regarding transition, which carbon dioxide emissions are the most important things and in this regards we are sure that climate change is a reality, and we need to decrease the carbon dioxide emissions. The cold is the first step, but we have lots of problems here. You can observe that IPCC main mitigation steps. There are lots of different steps.

However, again we have new question marks that we have to say, but in this regard, for example, we prove some targets regarding to limit the rise in the temperature, the global average temperature. But regarding with the financial side, the global cheap to find the global cheap technology, social awareness and the sanctions and the political club pressures, the existing energy hungers is mostly on undeveloped countries, this is also another important issue. The global conflicts and the currents, the war between Russia and Ukraine are another problem and using some governments to use the carbon dioxide as a political argument is another thing that we have to consider.

There are lots of words talked about regarding with the energy transition targets and the emission targets lots of budget was said, but the existing budgets and the words could not meet the further from. the previous year, the global dimensions changed through a new dynamic and from all the international events. we can say that energy climate and energy crisis put in the central of the global dynamics. And from NATO meetings G7, Afghanistan's removal and all the parts and COP26 and also the Russian and Ukrainian war can be putting in relation with the energy transition and the energy crisis, from the global site and the global effect.

The most important thing is who will pay the bill? But there are lots of misunderstandings and conflicts in this issue. the responsibility matrix and the capabilities are not completely defined and agreed globally. And someone has to pay the money, but no one wants to pay the money, unfortunately. Our estimations regarding with the budget that we need globally to reach the existing. The international emission targets are higher than the 300 trillion dollars. It's much more than the expectations and we have lots of questions to ask in this regard. For example, instead of completely even the hydrocarbon resources, don't we have a chance to focus on cheaper and cleaner technologies. Yes, we have.

Do we have enough adequate budget for global renewable energy transitions? no, we don't have that. Here you see lots of question marks to which target that's why we need and maybe more coherent and more reachable and maybe more justified targets for the climate change. For instant the demographic structure is also very important to understand the further energy, the balances, demand, center dynamics, these can be related in the gender dynamics as a subtopic. Of course, the income levels are very important, and the low-income countries are growing and they're energy demand is highly growing. Low consuming regions are the most growing regions, with the population. Low-income countries in the future, they need higher energy and more carbon dioxide. For example, India is a very important case to consider and there are huge problems and now India has to supportive policies. Unfortunate, then has a huge energy hunger but cannot solve the problems and for example, the social trend in India is to use. Instead of biomass using coal it's not easy. The people cannot find coal or fuel oil, lots of mainly in the cooking stages and kitchens. The women are making those activities and biomass are making carbon but increase the carbon emissions. Health problems for the website and these are the Indian case projections. These are our testimonies projections, long-term projections about the demand.

You see the energy renewable demand is increasing but under this is the total primary energy consumption. You can see the increase or the in the renewables but the age of gas and oil it may not be completed, and the cold consumption is going to decrease. But such India and India such companies will continue. We have to continue

to use coal. Another important issue you can see that the climate change makes lower crowd through life and the higher unrest and cost level, higher oppression of women and higher damage cost and also as we know. The woman is more vulnerable than these. Negative results of climate change will mostly affect the Roman dominated sectors, mostly in undeveloped countries. This is important and less or less new job availabilities and it is very important point and energy demand and growth problem.

Key Words: Energy, climate change

CONVECTION-PERMITTING CLIMATE SIMULATIONS OVER MARMARA REGION

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Abstract

This study presents the convection-permitting climate simulations (CPCSs) over the Marmara Region of Turkey for 1986-2005 reference period and selected future periods of 2031-40, 2051-60, 2071-80 and 2091-2100 under IPCC RCP8.5 scenario by using regional climate model COSMO-CLM (CCLM). The climate simulations are conducted at fine spatial resolution with grid spacing of 0.025° (≈2.8 km) over Marmara region by using MPI-ESM-LR as initial and boundary conditions. The model predicts prominent increase in annual mean temperature, yet decrease in total precipitation throughout the 21st century over the region. The warming rate of inlands is higher compared to the coastal areas especially at the end of 2100. Similarly, maximum temperature of warmest month increases faster than coldest month's minimum temperatures. The decrease in annual precipitation is expected to reach dramatic values during driest month and quarter.

Key words: COSMO-CLM, convection-permitting model, Marmara Region, MPI-ESM-LR, RCP8.5 scenario

INTRODUCTION

Regional climate models (RCMs) are used for assessment of the both current and future regional-to-local climate in higher resolutions since insufficiency of the results of climate models in global scale cannot extract more detailed features of the climate. The findings indicate that CPCSs demonstrate added value at smaller spatial and temporal scales compared to RCMs at 10 km and the coarser resolution especially in places and seasons where deep convection is noticeable [1]. Furthermore, CPCS improves the simulation of amplitude and phase of the diurnal cycle and frequency of heavy hourly precipitation events compared to coarser resolution [2]. The aim of this study is to obtain high resolution climate information over the Marmara Region of Turkey for the present conditions and future climate change under RCP8.5 scenario by using non-hydrostatic regional climate model CCLM [3].

RESULTS

The CPCSs are carried out for the reference period of 1986-2005 and selected four future periods under IPCC RCP8.5 scenario by applying stepwise approach in dynamical downscaling in order to reach convection-permitting (CP) scale. The three nested simulations at resolutions of 0.44°, 0.11° and 0.025° cover the part of Mediterranean, western Turkey and Marmara region, respectively (Figure 1).

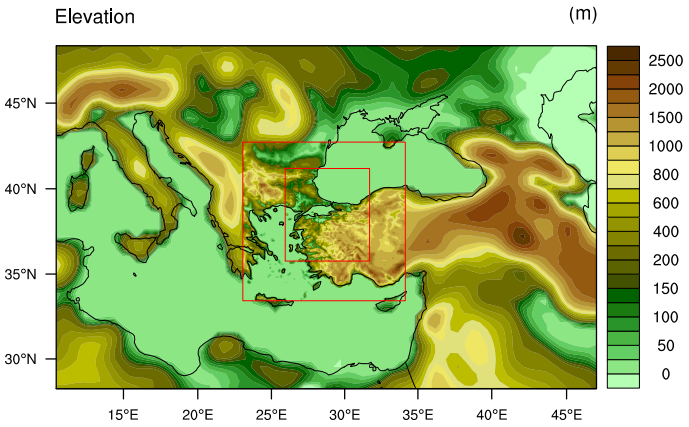
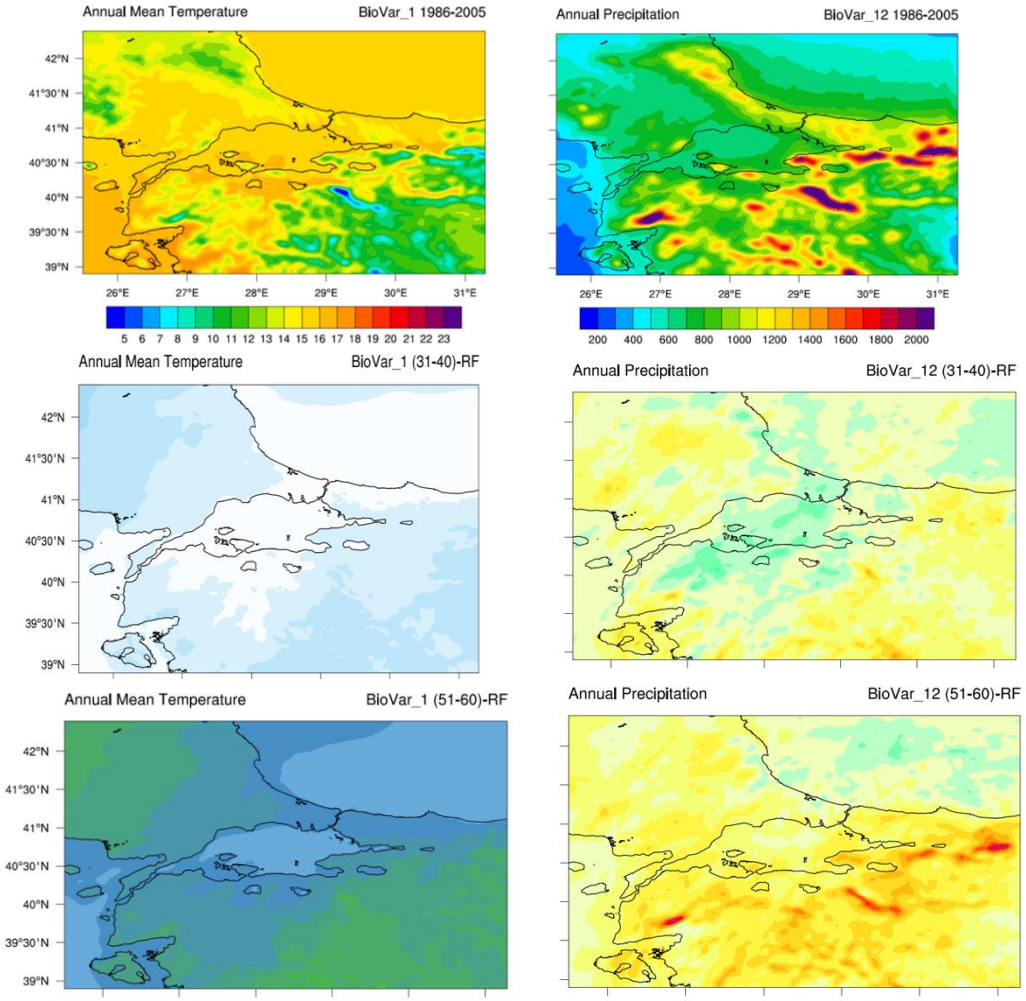


Figure 1: Model domain, nest structure and topography (given in meters).

Figure 2 shows the simulation results of average temperature and precipitation variables for the reference and for the selected future periods. On the one

hand, annual mean temperatures at high elevations drop to 4ºC, while they reach to 16-17ºC along the sea shores and at low elevations during the reference period. On the other hand, annual precipitation at low lying altitudes are between 700 mm and 900 mm with upper amounts along the Black Sea cost and lower amounts around inlands of Trace and Anatolian parts of Marmara region. Furthermore, the annual precipitation amounts exceed 1000 mm over mountainous regions such as Samanlı, Köroğlu, Uludağ and Kazdağı mountains and their skirts.



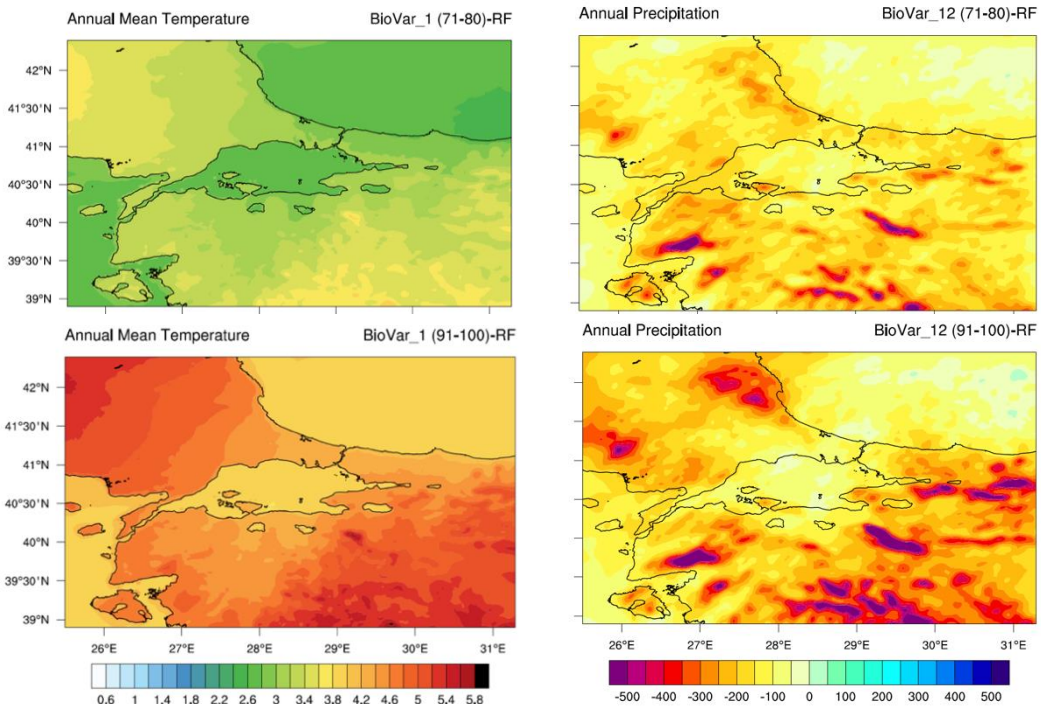


Figure 2: Projected changes in annual mean temperature (left column) and total precipitation (right column) relative to 1986-2005 (top row) for 2031-40, 2051-60, 2071-80 and 2091-2100 (remaining rows in order).

The expected changes throughout the 21st century are evaluated with respect to the current climate conditions mentioned above and the expected values averaged over the Marmara region are given in Table 1. Our CP climate projections for the Marmara region suggest that average annual mean temperature increases till 2100 and the warming at the last decade reaches to 4.6°C (Table 1). Additionally, the temperatures on the land areas adjacent to the seas remain at least half degree cooler than the inlands in the future (Figure 2). The warming rate of the warmest month's maximum temperature is almost twice as large as the coldest month's minimum temperatures (Table 1). According to the reference period, the wettest quarter warms 0.9 ºC in the middle of 21st century whereas 5.8ºC at the end. Similarly, the driest quarter warms 5.4ºC until 2100.

The annual mean precipitation decreases up to 23% till end of this century and the largest dryness will occur at high elevations. Northern latitudes and land areas along the Marmara Sea receive precipitation more than current conditions (Figure 2). The wettest month of Marmara is generally December and wettest-month monthly

total precipitation declines 10% at the end of century with the largest decreases occurring over Kazdağı, Uludağ, Sündiken mountains and on high elevations of south of Balıkesir province while the driest month of Marmara is August and the precipitation amount during this month decreases almost everywhere exceeding 87% at the end of the century (Table 1). The precipitation amounts for the both driest (summer) and wettest (winter) quarters reduce over Marmara till 2100 but the model projects dramatic decrease, reaching -70% in the driest quarter during the last 10 years of the 21st century.

Table 1: The projected changes averaged over Marmara Region for the future periods of 2031-2040, 2051-2060, 2071-2080 and 2091-2100 relative to 1986-2005 reference period.

Climate Projections	2031-2040	2051-2060	2071-2080	2091-2100
Annual Mean Temperature ºC	0.7	1.9	3.2	4.6
Max Temperature of Warmest Month ºC	1.6	2.6	3.9	6.3
Min Temperature of Coldest Month ºC	-0.8	1.7	2.4	3.8
Mean Temperature of Wettest Quarter ºC	0.0	0.9	3.6	5.8
Mean Temperature of Driest Quarter ºC	1.4	2.3	3.9	5.4
Annual Precipitation %	-3.3	-12.6	-18.6	-22.9
Precipitation of Wettest Month %	7.8	-0.5	-3.3	-10.4
Precipitation of Driest Month %	-64.2	-39.4	-71.1	-87.1
Precipitation of Wettest Quarter %	4.5	-5.5	-11.5	-17.5
Precipitation of Driest Quarter %	-44.9	-32.5	-60.9	-71.4

CONCLUSION

The current and future climate conditions under RCP.85 scenario at CP scale are simulated by using CCLM model over the Marmara region of Turkey. The findings indicate that the annual mean temperatures are increasing whereas annual total precipitation is decreasing gradually till 2100. Even though regional average of precipitation amount indicates a decreasing precipitation amount in the wettest month, northern latitudes of the region and land areas along the Marmara Sea will receive precipitation more than current conditions. Maximum and minimum temperatures of the warmest and coldest months warm up through the end of century. However, the maximum temperatures are warming faster than the minimum temperatures.

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Biodiversity and climate change: important contributions from some women scientists

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Abstract

The concept of biodiversity is shortly revisited under the perspective of climate change. I stress the importance of measuring biodiversity and modelling its changes in the ecosystems of the biosphere and I mention the relevant contributions developed by women scientists (M. Anand, M. Anderson, Z. Aslan, S. Diaz, P. Ganis, S. Lavorel, A. Magurran , S. Pavoine, E.C. Pielou and S. Sonak) in this scientific field.

Keywords: Complexity, ecosystems, mathematics, Anand, Anderson, Aslan, Diaz, Ganis, Lavorel, Magurran, Pavoine, Pielou, Sonak

Abstract

There would be no need to mention the scientific work of women in Ecological Sciences if there were not a low female participation in the World in this field of research. There is no doubt that global warming is continuing to rise [1] and that humans have their responsibilities in climate change (CC) [2]. Meantime also extreme events (EE) such as heatwaves, droughts, heavy precipitation and storms are increasing in frequency [3]. The scientist cannot be limited to observe the CC by measuring only the climate variables and registering the EE. Both, aquatic and terrestrial ecosystems are defined and structured mainly by the interaction between plants and physical chemical factors, being the plants the primary producers of the biosphere, however the final structure of ecosystems is defined by the response of all their species, from microorganism to man. It is not enough to say that CC and EE have different impacts on ecosystems and organisms as well as on human wellbeing, we need to develop scientific tools that are able to measure and explains the impacts that are going on in the different ecosystems of the world. Biodiversity is one of the conceptual tools that is essential to describe the effects of CC and EE. Research on the impacts of CC and EE on biodiversity of ecosystems are not yet developed with the intensity that it would be required to ensure efficient adaptive strategies to enhance the ecological resilience of our productive system. Biodiversity changes can have severe consequences on the stability of ecosystems and consequently on what we call

their “ecological services” (water and nutrient cycles and carbon sequestration, microclimate and macroclimate control, food production, medicines, fibres, soil protection). Conceptual and mathematical tools to understand the effects of CC and EE on the ecosystems have been developed by many scientists, and as science evolves they may improve. Among the scientists working on biodiversity and mathematical tools useful to measure the impact of CC and EE on ecosystems few of them are women. In this paper I will concentrate on the scientific relevant contributions from some of them after summarizing the fundamental conceptual tools that underlie the concept of biodiversity.

The word biodiversity is used to indicate in a very broad sense the immense variety of life forms on the Earth (and possibly outside the Earth). It is not a strict technical term as the word diversity is. In fact, diversity is used to indicate a measurable characteristic of any biological or a biological system. It is given by the number of different components (C) of which the system is composed and by their proportions. Diversity may be used also to measure the number of functional relationships (F) between the parts of a system and their proportional intensity. It is easy to understand that given a system with C components the number of relationships between them may vary between a minimum of C-1 (minimal connects) to a maximum value C^2. This last value is realised when all the components are interconnected in both directions and even each part has some relationship with itself (maximal connects).

Diversity can be calculated by many formulas that have been revised in important monographs by women scientists: Evelin C. **Pielou** [4] (she also introduced the use of the evenness as an important measure to use with the Shannon’s formula of entropy), Anne **Magurran** [5,6] who considered almost all the suggested formulas and methods, and by Paola **Ganis** [7] who following mainly **Magurran** [5], but stressing the importance of the Hill’s [8] series, developed a very comprehensive computer programs to calculate different indices of diversity.

A way to view plant biodiversity from the perspective of functional traits was significantly developed by **Sandra Diaz** and **Sandra Lavorel.** They have the merit to have promoted the shift of the biodiversity perspective based on species diversity to functional types diversity. This perspective offers a better possibility to model the vegetation climate interactions and to develop predictions on climate change over ecosystem services [9,10,11,12,13,14,15]. They have also some joint paper, and with many other Authors have contributed to promote the realization of the functional traits data base of the world TRY [16]. Their papers have a very high citation index proving that they have created great interest in the scientific world on the biodiversity concept and its application.

In line with the research of **Sandra Diaz** and **Sandra Lavorel**, **Sandrine Pavoine** contributed significantly to include the functional traits in measuring plant community diversity as an important step towards the searching for assembly rules of

different species [17]. She went further ahead by proposing to link the functional traits diversity with phylogenetic diversity [18].

As far as dealing with the complexity of biodiversity climate change relationships, **Madhur Anand** developed her research topic by coupling human-environment system across different spatial and time scales using information theory (communication-theoretical parsimonious code) [19]. She contributed to highlight the features of ecological complexity—such as diversity, cross-scale interactions, memory and environmental variability—that continue to challenge classical complex systems science. She recently stresses that the use of plant functional traits will improve measures of ecosystem service delivery with wide implications for developing accurate models of the effects of climate change, as the basis for well scientifically defensible policy [20]

Biodiversity may be measured at different levels of the life system, from the cell content to the biosphere. The biodiversity of ecosystems is mainly dependent by the integrity of vegetation cover. This can be registered by remote sensing using for example the various vegetation indices (NDVI is the most used one). The assessment of vegetation cover and its variation in function of climate is one of the first scientific activity that would be developed as the basic step on which to base the more detailed study on the effects of CC and EE on biodiversity. In this context I mention the research promoted by **Zafer Aslan** [21] on land cover climate interactions by introducing in the data analysis the joint use of wavelets and neural network.

We can say that the possibility to measure functional and/or phylogenetic diversity of the ecosystems of the World and to correlate biodiversity with vegetation cover and then with climate change, is the result of a classification process of species in functional or phylogenetic types, and communities in community types. The classification of plant community is a more common exercise than the classification of animal or human communities and this is an exercise that is following a process of calculating similarity between the objects that are classified [22]

The concept of similarity comes out from the comparison of objects or thoughts and started to be mathematically consistent after a botanist Jaccard [23] who was interested to compare list of plants of different localities. He introduced the first similarity measure as the ratio between the intersection and the union of sets [24]. Similarity may be measured by many mathematical functions called resemblance functions or similarity functions [25] and the functions can be used to transform the data matrices in similarity matrices, where the description of a set of objects, based on a set of characters is transformed into a description given by the similarities that each object has with the other objects of the set.

When we are dealing with climate change and we want to measure its effects on the ecosystems then we have to compare different states of the ecosystems in different times and /or in different climatic situations. This comparison may be done by different characters, species, functional and phylogenetic traits, chemical

compounds [26], **Marti Anderson** [27], introducing a new non-parametric method for multivariate analysis of variance, to provide an alternative and perhaps more intuitive formulation for ANOVA (based on sums of squared distances), has contributed to improve the use of the similarity functions for the classification purposes, showing the opportunity to test the significance of the differences between classes of a classification. Her method is an improvement on previous non-parametric methods because it allows a direct additive partitioning of variation for complex models that could not be handled in other ways rather than by "similarity functions" . The test implemented in the method is a multivariate analogue to Fisher's F-ratio and is calculated directly from any symmetric distance or dissimilarity matrix (P-values are obtained using permutations).

At the end I would like to mention the book edited by Sangeeta Sonak [28] "Multiple dimensions of global environmental change" since it is presenting the problem related to climate change in its "overall complexity" that cannot be afforded without considering the structure of the ecosystems where we are living that, thanks to their biodiversity, are offering what we are calling ecosystem services. As a matter of facts there is a project going on in Africa Called the Great Green Wall or Great Green Wall of the Sahara and the Sahel led by the African Union, that is a response to the combined effect of natural resources degradation and drought in rural areas. It seeks to help communities mitigate and adapt to climate change as well as improve food security i.e. to reconstruct the ecosystem services. In this project the importance of women work is evident!

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Assessment of modified Climate Extremes Index (mCEI) over the Europe-Mediterranean Region

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Abstract

Extreme climatic conditions affect the human environment and the natural ecosystem. Changes in the intensity of exposure to extreme conditions can be determined by using climate change indices. In addition, their combined effects can be investigated by developing a compact index. In this study, we calculated 10 different climate change indices for the 1979-2016 period, considering the temperature extremes, extreme precipitation, moisture surplus and drought over the Europe-Mediterranean region (EURO-MED). In addition, the modified Climate Extremes Index (mCEI) has been developed to obtain combined information on the different types of extremes [1]. As a holistic approach, mCEI provides detailed spatiotemporal information about combined extreme climatic conditions on an annual time scale. Moreover, high-resolution gridded data allow us to perform detailed country- and city-based analyses on the urban coverage of the EURO-MED. Figure 1 shows decadal trend of each extreme index. The results showed that while the high-temperature extremes increased significantly in the study area, the low-temperature extremes decreased. Extreme drought, on the other hand, has a significant increasing trend. Examining the extreme precipitation indices, it was determined that there was a low but significant increasing trend with regional differences. Although there are regional increasing signals on dry days, the overall change is not statistically significant.

Key Words: Climate change indices, drought

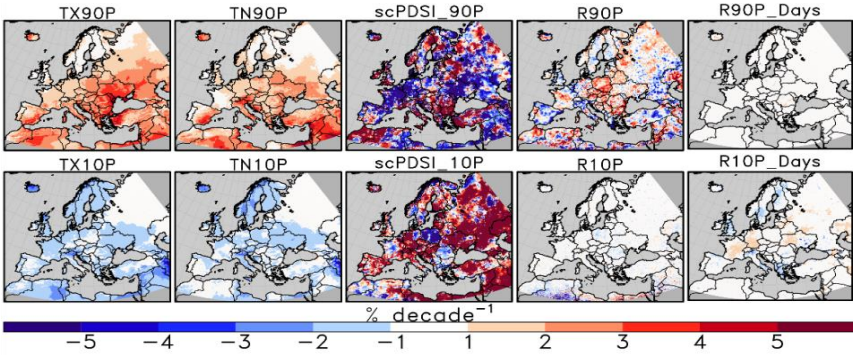

Figure 3. The decadal trend of the extreme indices.

According to mCEI, exposure to the combined effect of extreme conditions is highest in the southern parts of the EURO-MED, which is due to the high number of dry days per year in these regions. Trend analysis shows that mCEI has a significant increasing trend of 0.98%/decade when averaged over the study area. As a result of country-based analyses, it has been determined that 19 of the EURO-MED countries have a significant increasing trend (Table 1). The regions where extreme climatic conditions show the most pronounced increase in the mCEI are the Mediterranean coast, the Balkan countries, Eastern Europe except Poland and Moldova, Iceland, part of western Russia, part of Turkey and parts of Syria and Iraq, so-called the hot-spots.

Table 1. The decadal trend of mCEI for the hot-spot countries.

Country	mCEI Trend (%/decade)
Bulgaria	3.08
Israel	2.72
Hungary	2.41
Slovakia	2.39
Serbia	2.03
Austria	1.98
Cyprus	1.91
Estonia	1.8
Albania	1.77
Syria	1.72
Italy	1.71
Bosnia and Herzegovina	1.69
Turkey	1.61
Georgia	1.51
Croatia	1.45

Iceland	1.44
Ukraine	1.33
Belarus	1.3
Romania	1.25

In the study, we also identified the major urban areas of the EURO-MED to calculate the decadal trend of mCEI. Averaged over the urban extent of the EURO-MED, the mCEI was found to increase by 0.9%/decade. Furthermore, Fes, Izmir, Marseille and Aix-en-Provence, Tel Aviv, Tbilisi, Rostov-on-Don, Turin, Haifa, Ankara, Budapest, Kyiv, Casablanca, Beirut, Munich, Saint Petersburg, Hamburg, Zurich, Vienna, Bucharest, Alexandria, Gaziantep, Rome, Athens, Konya, Sofia, Antalya, Moscow and Minsk cities exhibit significant increasing trends greater than 1.5%/decade (Table 2).

The findings of this study support the results of previous studies examining the change in extreme climatic conditions over the EURO-MED. As a result of the study, it has been shown that the mCEI is a useful tool for analyzing the combined effects of climatic extremes at the country and city scale. In future studies, mCEI calculations using climate projection data would be beneficial for risk assessment and the development of adaptation strategies, given the exposure of communities to climate change.

Table 2. The decadal trend of mCEI for EURO-MED major hot-spot urban agglomerations.

Major Hot-spot Urban Agglomerations	**mCEI Trend (%/decade)**
Fes	4.94
Izmir	4.74
Marseille and Aix-en-Provence	3.84
Tel Aviv	3.58
Tbilisi	3.34
Rostov-on-Don	3.09
Turin	2.91

Haifa	2.9
Ankara	2.74
Budapest	2.68
Kiev	2.57
Casablanca	2.56
Beirut	2.43
Munich	2.34
Saint Petersburg	2.3
Hamburg	2.2
Zurich	2.15
Vienna	2.13
Bucharest	2.12
Alexandria	2.06
Gaziantep	2.02
Rome	1.96
Athens	1.91
Konya	1.84
Sofia	1.79
Antalya	1.79
Moscow	1.65
Minsk	1.64

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Machine Learning Techniques for Environmental Modelling

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This paper is about machine learning techniques applicable to environmental modelling. Today's environment a lot more dials being collected you know we have our traditional measurements pressure temperature relative humidity rain all that typical stuff. Now consider that we have this all across you know even dynamical parameters we have cloud microphysical parameters and imagine. Measuring this across different sites, different scales the question becomes how we use these measurements and how do we assimilate them. Concern that they come from heterogeneous sources and considering that we want to have a different outcome right sometimes you want to be able to model or predict let's say tornado or hurricane trajectory or provide some heuristic assessment. if we are doing forecasting right it's going to depend more on the actual conditions. Then we're going to repeat these initial conditions different circumstances to get some type of error the latest measurements well for doing climate change.

Key Words: Data Mining, Forecasting

What's going to be more about boundary conditions? we have this very expensive problem of how we combine all these different types of datasets. All these different types of sources of data as well. One of the main issues and one of the main driving factors is we can do these things locally. We can do them for certain areas, but these models are not typically designed to be considered at a large scale (basically on earth scale). To get around this issue we're going to have to unload some of this modelling from our ourselves to the machine and the best way to do this is with neural networks.

To the main techniques that are used currently in environmental modelling climate, modelling to overcome this hurdle of combine your coupling these different models together particularly numerical weather predictions is you do their own networks. Within neural networks you apply future learning. The scenario that's presented down here is what we have here for instance is let's say you consider feeding in different radar images. You're going to learn your features. This is the neural network component here going to learn your features and they may look like something like this(picture).

The most basic level of features that you might observe and get, then these features are used on your input data. Some of you perform some type of convolution somehow your map, your input images or your input data into a new feature space and you get this result here. This newly projected images or data is a more parsimonious representation. Let's say you have 20 different images or 20 different channels of data. Now you're presenting them in the way that the algorithms are able to utilize these features. So, this is the feature learning component learning what the features are the second component or the more important component that's used for predictions. Try and do these things overtime and that's called recurrent neural networks.

You can combine your features and you can combine them with the predictions overtime. Instead of having to go and fill around with initial boundary, initial conditions, and boundary conditions you let the neural network figure this out on its own. Representative analysis here is for instance you want to preserve geospatial locations, so you have your longitude points you have latitudinal points and then you have your temperature. For instance, you have your velocities right you'll have your humidity, and you can consider these as different channels. And your predictions your ground shots are going to be something similar. You want to be able to predict let's say trajectory, it ends up being the same thing and then you feed it through this complicated long network. What was on the previous slide is the idealized representation, but, in reality, it goes to this big, long process here. So, you feed your data at this stage and then you get your predictions here.

What are the implications? Well at the end we're able to do better risks. This risk assessments, for instance lead time for determining whether we need to do some changes that are oil rigs. We also extend the skill or not now casting forecasting models, and this is along the lines of the couple of numerical weather prediction systems, that's being driven by the unified forecast system. Buying all here in United States and again as long as your network models they allow for more accessibility across different people than different regions. That have varying levels of resources as well.

Climate Change, Climate Variability and High Impact Weather Events

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Abstract

Changes in climate mean and in variability may lead to the high impact weather events, which can be unusual and extreme than average weather conditions, such as anomalous heatwaves, severe droughts, extreme precipitation and devastating flash-floods. Due to the climate change induced climate variability, extreme swings from one extreme weather event to another one is sometimes referred as "climate whiplash" or "weather whiplash". The International Panel on Climate Change (IPCC) 2021 report provided changes in surface temperature with respected to the 1850 – 1900 reference climate (Figure 1). Surface temperature increase due to contributions from industrial activities are noticeable since 1980s is more than 1.0C compared to temperature increase due to natural effects (Figure 1). It is postulated that extremely warm temperatures have become more frequent and more intense across the world since the 1950s, with high confidence that human-induced climate change is the main driver of these changes [1].

***K*ey Words:** Climate Changing, extreme weather conditions

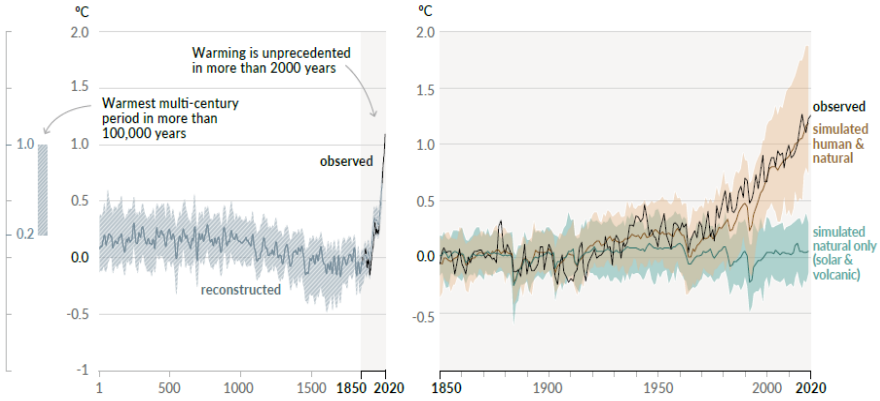

Figure 1. Changes in surface temperature in the last 2000 years with respected to the 1850 – 1900 reference climate. (Courtesy of *https://www.ipcc.ch/report/ar6/wg1/)*

According to the World Meteorological Organisation (WMO), among the seven consecutive warmest years; 2016, 2019 and 2020 are at the top three [2]. The 2021 was considered to be the 5th warmest year on record [3]. Being 1.11°C higher than the pre-industrial (1850-1900) climate average, the global average temperature of 2021 was near to the lower limit of global temperature increase of the Paris Agreement, which is 1.5°C. The frequency and intensity of heatwaves can change as a result of shifts in both climates mean and climate variability [1]. The effects of climate change are becoming more and more noticeable in each year. For example, in the summer of 2021, Turkey experienced various severe climate-weather whiplash events: (i) heavy rainfall in Rize, Giresun and Trabzon in July, which led to severe flooding events [4]; (ii) devastating floods in Kastamonu, Sinop and Bartın in August 2021, which paved the way for casualties and severe damages [5]; and the Western Mediterranean wildfires in late July and early August 2021, which affected many places and led to casualties.

Over a long period of warm and dry conditions lead to extreme dryness over the land that paves the way for the severe wildfires. Wildfires have become both more frequent and extreme, which is highlighted in the report of the International Panel on Climate Change (IPCC) and the report of United Nations Environment Program [6-7]. The year of 2021 was the second-worst wildfire season in Europe since 2000 [8]. Wildfire affected areas in the Euro-Mediterranean region in 2021 is depicted in Figure

2. Spain, Italy, Greece and in particular Turkey were very affected by wildfires for many consecutive days.

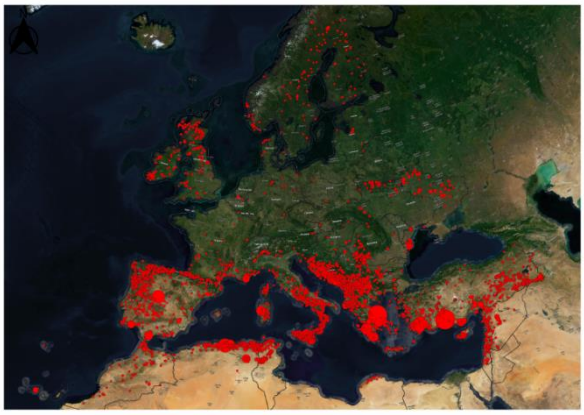

Figure 2. Wildfire affected areas in the Euro-Mediterranean region in 2021. (Courtesy of *https://joint-research-centre.ec.europa.eu/jrc-news/eu-2021-wildfire-season-was-second-worst-record-finds-new-commission-report-2022-03-21_en*)

In Turkey, 270 wildfires took place in 53 provinces across the western parts of the country in a period of 14 days [9]. Severe fires mostly affected Antalya, Adana, Isparta, Mersin, Muğla, and Osmaniye. Figure 3. depicts wildfires on the Mediterranean coastal side of the southern Turkey for 3 August 2021 [10].

Figure 3. Forest fires on the Mediterranean coastal side of the southern Turkey on 3 August 2021. (Courtesy of https://earthobservatory.nasa.gov/images/148650/fires-rage-in-turkey)

Acknowledgements

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Investigation of Climate Change in Northwest Türkiye by Paleoclimatic Reconstruction of Well Temperatures

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Abstract

Climate change is a global reality that affects our civilization and nature. The effects include increased extreme weather events, drying or overflowing of water bodies, accelerated extinction rate of species and disease outbreaks (Diffenbaugh et al., 2015; Wang et al., 2018; Román-Palacios and Wiens, 2020; Bryson et al., 2020). Instrumental recordings of the Earth's temperature have a limited time frame; therefore, proxy methods are required to gather information about the temperature history of a region. Reconstruction of borehole temperatures is an effective method to determine ground surface temperature (GST) history data.

Key Words: Climate Change, Surface Temperature

Temperature variations above surface level are imprinted on the subsurface layers of the earth. Temperature-depth profile of a borehole has a steady-state condition in deeper zones where temperature increases with depth in a steady rate (Figure 1). Temperature changes above the surface level causes shifts on the temperature gradient close to surface level. Long term changes (decades) affect deeper parts of the borehole whereas short term changes (daily, seasonal) dissipate near the surface (Pollack, 1993). This temperature-depth information can be processed by

utilizing Functional Space Inversion (FSI) algorithm to reconstruct GST histories (Shen and Back, 1991).

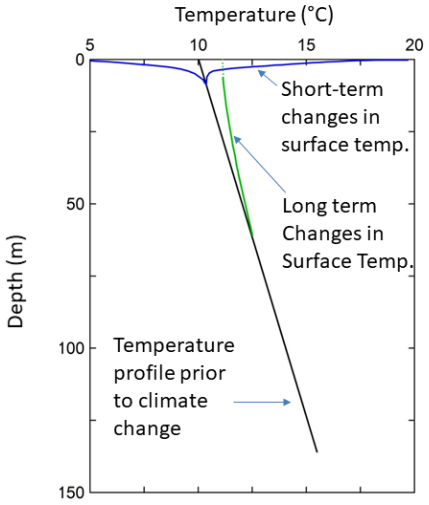

Figure 1 Temperature-depth profiles of boreholes

Temperature-depth data from a borehole located 12 km from Bartin city center was collected as a part of the study that aims to determine GST history of the past century. High precision temperature data collection was done by using a probe which equipped with a thermistor sensor (Erkan et al., 2017). Borehole was 215 meters deep and temperatures were recorded in 5-meter intervals. Rock structure in the borehole area was identified as marl.

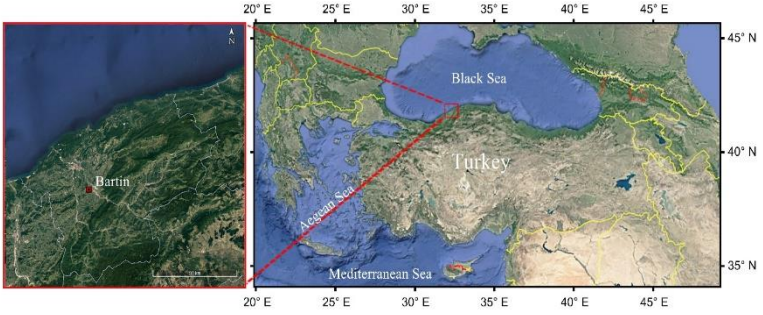

Figure 2 Location of study area

In order to reconstruct GST history, lithological information is needed as well as temperature-depth data of the borehole. Thermal conductivity (TK) of the rocks was estimated to be in 2-3 W/m/K range. FSI model covers 1900-2010 period based on the depth of the borehole. Results of the FSI model showed a warming of

1.4°C-1.67°C in ground surface temperatures in Bartin (Figure 3). Results are given as a range because of thermal conductivity values.

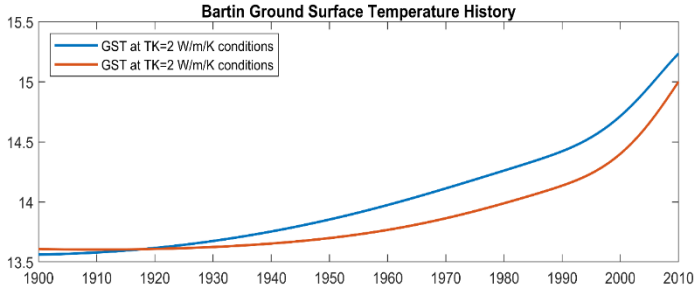

Figure 3 GST model results of Bartin

Results show that significant warming in GST has taken place in Bartin province. 50% of the warming occurred after 1980. Western Black Sea region has distinct geographical features and further studies in the area would increase our understanding of the local impacts of climate change.

Acknowledgements

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Various types of indigenous trees respond to different climate scenarios: Landscape restoration and ecosystem-based adaptation

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University of Rwanda

My name is Dr. *Myriam Majawamariya* I'm a lecturer at the University of Rwanda. It is located in central Africa. My research focus is on climate change and the triple trees, looking how indigenous trees respond to global warming. So that that can be hard for one that become resilient to climate change. Climate change is a major concern worldwide and in Rwanda we the major problem environment nowadays it's Russian. We also have flooding and landslides due to heavy rainfall. Rwanda has tried to restore ecosystems and the goal is to increase the use of native trees by research. Then comes to promote change in serious for Wanda and by this I look at the species climate sensitivity.

Which will be important for Wanda to address these issues? As I say to you have met you fought so that are going on translate restoration and it was still build that adaptation. I'll buy you studying this species. We want that make up best choice of tree species that wonder would be better prepared to face threats. Climate change support ecosystem services supplied by these. Streets so stabilization, capitalization by the rescue, by energy and many other products that are provided by indigenous treats. Our research is under a tropical mountain tree in Alabama word projects, and this uses our wonder to elevational gradient experiment. We name it Rwanda trip. One that edition experiment is an elevation gradient, that is. Future climate? And this is a plantation of 2093 species from high, and we are comprising of a successional species and repression of species. They are established at three sites in one. This is a troponin forests among the few remaining groups of.

Mountains, forests in Rwanda. And then we took native trees species from this higher vision, but also from immediate invasion. And this way I planted this the

map of Rwanda. The trees were planted at three sites. One innovation site has a control code. And later second intermediate sites under the lower side which is Walmart site. Decimals for SunTrust sticking from the mediates planted at elevation site. Also planted at an immediate site and at all elevation sites. Experimental design would wonder project, which is as I said at the sites along aviation, and it stepped down. Its elevation represents a possible warming scenario. We have treatments at each site whereby we have our water treatment Reynolds shelters taking out some water to have equal conditions at the intermediate and revision, but also have mitigation at Rama sites and the presentation sites who have equal conditions.

What's up with control codes? When you look at these three sites, the highest derivation sector has higher position but also wrote temperature and intermediate saving intermediate climate. Why would the lower sides be having the representation and also one temperature? It's a picture showing that the products at the three sides is one of the street sides showing the trees with different treatment. Raynaud shuttles with this side, white sheets under the control ones and dictation. as I said mitigations but to also take out what are from some clothes to see how the change in to see how the change in numbers dictation but also the change in climate is not. This elevation gradient can affect different species.

How do they the trees adapt different climate conditions? Oh, show few results about the Physiology forming responses. Although the queue is that shows that the synthesis of these trees is reduced that to one last side, while it's not reduced that crusades, but also this is different responses between erases. A bundle late successional species. We lost investigated the robotics and we have seen that routed duces from sentences. The green color is subscript emphasis in the very dry season, while the pink one is red dry season. It has been shown that. Reduced during crisis after 12 months. These are just like having dictation for forests, tree plantation, Wanda, pioneer. Species within warmer climate and species with higher temperatures are from most of on the sides then right. Vicious species hope better with the warning and the Pope Physiology and growth data suggests that go up your vision species would be best. Running beautiful sun export settings like our forestry where you

know, let's successional species may welcome to plantation forests for conservation and point.

I want to finish by showing how gender is included in. Actually, Wanda considers gender and environment and climate change as across cutting sector environmental and climate change policy of 2019 is also considering one agenda in wonder and these Arabs and approaches government of women. And also, young people into their environment and climate change management admission. Thank you very much for your question. Thank you so much, *Miriam*. And um indeed, from your last slide, we know that Rwanda is incredibly proactive and the head of the curve, in looking after, gender issues also in in Parliament, I think you have a very good record of representation of women in Rwanda. Thank you so much.

Key Words: Climate conditions, policy

Different microbiology and nanotechnology-based solutions to carbon emissions, drug-resistant pathogens, and fossil fuel dependence

Dr. Abeer Ahmed Qaed AHMED

Al-Saeed University, Yemen

I am head of the department and lecturer at aside university (Al-Saeed University Yemen). My research is focusing on harnessing the power of micro microorganism for sustainable development. I am a microbiologist which means that as a. Microbiologist so I can use microorganism to target. Many applications. Like in agriculture, bioremediation, climate change, but biodiesel and so on. One of my major research projects I'm focusing on is how to vegetate climate change. We all know that climate change can affect our planet negatively in many ways, which can impact humans, animals and also plants which can cause floods, hot heat, wave, drought and so on. In fact, we need to solve this problem. As some people they are proposing like to leave Earth and to go to Mars, but I think here, we all here on Earth we have a lot of work like solution here on Earth we can do, and we should do.

We all like the different major like as a chemist, biologics, social scientist and so on we can work to together so we can heal the earth and when we heal the earth we can heal ourselves as a David or said. Planet Earth have been always our past, also our present and also our future. In my major, like studying different biological processes, which can include plant animals' microorganism which we can see. It can transfer like the carbon storage from soil to atmosphere and also from atmosphere to soil. It's like in my major, it's like a focus on microorganism.

How can we increase the level of carbon from atmosphere to soil? The problem of climate change is the high level of atmosphere atmospheric carbon? Dark side. So, it's like the solution we are proposing. There is some we can use microbial

equivalents, which, like a microorganism, can sequester carbon from the atmospheric from the atmosphere to the soil in this way. We can meditate climate change and improve soil quality. When we study like microbial diversity, we have. Diverse microorganism species and also like genus, and we can match like the proper microorganism which it will be to the proper soil. We can accomplish our goal. We are proposing like to use agricultural land. And we have seen that when we used microbial enchant, it actually improved the crop yield. In this way, we actually achieved 2 targets which we achieved, sustainable agriculture and also climate change and vegetation. So in in my work in general, we have to target it like many of us, sustainable development. Well, which? It includes zero hunger. Also, like gender equality and climate action. Thanks for listening. This summarized my work on climate change. I'm sorry for the connection. Thank you so much.

Key Words: Climate change, micro organisims.

Aquatic ecosystems and threatened species of Bangladesh and the risks from plastic pollution

Dr. Gawsia Wahidunnessa CHOWDHURY

University of Dhaka, Bangladesh

Good afternoon I'm Gawsia Wahidunnessa Chowdhury. I'm working at the Department of Zoology, University of Tampa, and much from my career I have been teaching, working, doing research focusing on threatened species and aquatic ecosystem conservation here in Bangladesh today. I'm very pleased to be here and I'm going to share one of my research projects works that highlights the crowd. We have been importing women to tackle the abundant laws to and otherwise discarded fishing Nets.

Here in Bangladesh, I should mention that Bangladesh is a land of witness and Bangladesh is a land of wetlands and much of our reversal like the arteries of this nation and its a funded project and for Technical Support. We have been working closely with our advisor. Technical advisors are from Australia and the UK. In this project we are trying to develop a gender equitable. Secondary economic business plan that will try first the discarded fishing Nets for recycling, tackling, and tackling the plastic pollution. For introducing this project, I will go back to the background of this project because in 2019. I was really fortunate, to be the country leader of a National Geographic expedition right after Kansas, from the sea to source. In this project, we were trying to measure the loss of plastic, how much plastic is coming from the rivers.

That will shape, measure that empirically, but you get what try to look at the sources of plastic, loads of plastics next like this and the loose and falls through the system. It's like this. Through this project we interacted. We had water team, we had a land team, we had socioeconomic team, we have technologically export team and we try to interact with the people and to get their knowledge. At the same time, we

collected data from water. From the air and from the people to understand the connection between people and plastic bags like this, and we did the riverbank survey, we did the threat assessment for the aquatic species to understand how the plastic accumulation is affecting the aquatic species of the river Changes.

We must mention that river Ganges is one of the most polluted rivers in the world. So, we need the riverbank survey as I mentioned, these three points next like this. Yeah, this is some of the findings like how these are the species that are mostly affected. We did the net survey, and we analyzed the materials of the net. We reported that plastic rivers are acting as the plastic pollution pathways and horsepower. Some of the findings here as I mentioned, which already has been published in the science of the total environment. So, we reported that fishing gear is one of the most dangerous sources of plastic pollution for rivers as well. As for ocean it's like this. The city sources can't just expedition helped us to come up with this project. In 2021 we did a feasibility study to spoke and to understand the scope of the potential of the stablishing gender inclusive value changing in the coastal communities. Diverse food, fishing Nets from the ocean for recycling, capping plastic pollution and post fishing next cycles. This site shows the density of fishing net types in Bangladesh next like this.

This shows the diversity of fishing there's we have found about 20 to 25 different types of plastic made fishing lures that have been using for the fishing purpose here in Bangladesh. And this is showing the geographical variation in male female participation ratio in fisheries activities in Bangladesh. I mentioned at the beginning like Bangladesh is very bright country and fish Bangladeshi people are like synonymous so and the fishing.

Fishing is one of the major activities of a major group of people here in Bangladesh. And why we look at the gender dimension? Because most of the cases we found that more than 70% fishers are actually women, but they are recognition, but they. They are not recognized. Their contribution remains unnoticed, excited. They say shows the women involved in fishing. Angel fly fishing need, value chain we have developed. As I mentioned like why we focused on gender because we started

to analyze the plastic accumulation rate in river and as well as in the ocean. Then we focused on the fishing Nets and to tackle these fishing Nets, and pollution in the aquatic systems of Bangladesh. I personally feel like women are the main play a key role to handle these crises because we are the women, we are the mother, we are like synonymous to Mother Nature.

My work is focused on one of my current studies also highlights the interaction between plastics and the climate change. It's like this. And like very fast story. So, I think my work is focused on the SDG five which focuses highlight women empowerment and gender equality as well as we all are working together for the climate action as we are trying to close up the aquatic species. Our work is also focused on SG parking like climate action. Thank you.

Key Words*:* Climate Change, Fishing, water pollution.

Secure and sustainable water sources for vulnerable populations in a region of Central America

Dr. Heyddy CALDERON,

the Instituto de Geología y Geofísica, Nicaragua

Good morning, everyone. Good afternoon, good evening. Thank you very much to the organizers for allowing us to share our research today. I'm very excited to participate in this conference and I've been to Istanbul once and it's a beautiful city. I hope to come back someday.

My research has to do with the groundwater resources and how we can use them to mitigate or adapt to climate change. I'm a researcher at the National Autonomous University of Nicaragua, and I'm the director of the Institute of Geology and John Physics. I would like to start by sharing a few images on how climate change affects our water resources. We are all familiar with the hydrologic cycle, and climate change of course has to do with all the aspects of this cycle, and it affects specifically the precipitation regime. We might have some regions of the world are less frequent precipitation or even more precipitation. We will cause flooding and landslides. For instance, the increasing temperature is also a concern regarding the water cycle because it will increase evaporation. And then reduce the amount of water that is available for the use of human activities. And this is a slide I'd like to share because it explained how aquifers work sometimes, we are not very familiar of.

What is groundwater actually? And you? UNESCO has been promoting this year groundwater as an invisible resource that we must be aware of. So, in this slide you can see the composition of aquifer it, we begin to see precipitation falling on the

land surface. Then we have infiltration this first region in the solid, scaled down, saturated. Because it's not completely filled with water, we have air and humidity. But then we reach something called the water table, which is the water level in our wells. And that's where our aquifers begin. So, this region here is where we are interested more in this research. And our project is in the Central American trade corridor. This is a big region, Central America, for those who are not familiar with it. We're located in the middle of America with the North and South America. Sometimes we're confused with Mexico, but we're not part of it. But with six countries starting from Guatemala, Salvador, Dulas, Caragea, Costa Rica and Panama in this red area here, it's what we call the dry corridor, what it's dry because it rains less than the average and we have very long periods of drop, more than six months.

For a year, this affects, of course, the livelihoods of these people and they are very vulnerable because most of them rely on rainfed agriculture. So, we have around 10.5 million people living in this region from Central America and 3.5 million of them in humanitarian assistance, and 1.6 million suffer from food insecurity, which is related of course to climate change and climate variability. And the first of these challenges, a group of researchers from Central America. We decided to create a network called hidro-REDCA, and we're focusing on how to propose new strategies to adapt to these challenges related to climate change, the lack of precipitation, how to improve. People's conditions and make them more secure in the face of these threats.

So, we are focusing on foreign research lines today. I will only focus on the French one, which is activation to improve people's preparedness and resilience to climate change and hydroclimatic extreme events. I'm leading this research group and my other colleagues are also working on the implications and their sentences on climate threats, on whatever related disaster risk management, and on livelihoods and water availability. So, we'll try to deal with this issue from a very multidisciplinary perspective. And we are very proud of these efforts. So, focusing on the hydrogeological aspects of the corridor of this region, first we realized we needed to do an assessment of what we know. If we wanted to use as a buffer to mitigate the

impacts of climate change, we need to know how many are. We have what kind of characters do they have? And in Central America this information is very fragmentary. The quality varies from one country to another. For instance, Nicaragua has hydrogeological map, but Demala and Salvador don't, and that's a big challenge. So, we are trying to create a. Logical map of this whole region and to provide that as a tool for decision makers and stakeholders to plan the use of water resources in the region. So, we did a. Bibliographic research of all the information available so far. And we decide this criterion to select the kind of information we could use to create the map of the region. So, this information should be traceable, we should be able to check its quality, should be either pre-reviewed or official from government institutions. The hydrogeological classes, which is the classification we wanted to use, should be broad enough to include all the types of aquifers in the region because we have very different geologies sometimes. And it should also give a clear indication of the nature of the aquifer media that indicates if the aquifer is poor or it's very productive. And the nomenclature should be based on some international standard, because our goal is to publish this internationally. There are no published maps of these times for Central America, not for the dry corridor, only very general maps. And based on these criteria and the. Research we did, we came up with this classification. Basically, we have volcanic aquifers and we can sub classify them into purse and fracture. The fracture is when the rock is very hard and then you have these cracks in the rocks and they can store and transmit water. But we can also have a combination of materials that are volcanic. Incidentally, that's also a very important type of aquifer central America. Other aquifers are only sedimentary, which may be for instance the ones from around the river valleys. Deposits of the sediments from the rivers are go also sedimentary aquifers, and we can also have a sedimentary fracture aquifer. And the last type we came up with was the metamorphic aquifer.

So, this is an example of the analysis we made. We took all the geologic information from each country's development information when it's sometimes it's very scarce the hydrological information and we did a cross comparison. Most of the descriptions are based on Electrology, so we must. He took bread this information and

translated into other logic hydrogeological terms that could be used as an indication of aquifer and groundwater productivity. So, this is for instance the case of Guatemala. There was no hydrogeological map, but we found a geologic map, so we use the Lithologic description. to characterize the aquifers and we did the same things for the other five countries do you have one minute left I'm afraid thank you.

And this is the result, this is the map of Central America. It starts from Guatemala, Salvador. Basically, what we want to highlight here is the most important aquifers so far in this region are volcanic aquifers, you know, fracture or chorus. This is very important. This is where most population live and we usually hear the snow, groundwater in the dry corridor, but we. Things, that is. And we need to do more research to keep characterizing these aquifers and provide alternatives to these populations. And these are detailed images for each country. We're still refining these maps with the help of our colleagues and. Well, basically we are very happy that we came up with this first map of the hydrogeological conditions of the right corridor. And we think this is a very useful and important tool for decision makers and the people who live here, because now they have like a guidance to understand how groundwater can help them to deal with climate change. thank you very much.

Key Words*:* Ground water resources, climate change.

Industrial and agricultural waste into anthropogenic (man-made) soil and the “waste to wealth” concept, producing green and value-added products from waste

Dr. Ashani Savinda RANATHUNGA

University of Moratuwa, Sri Lanka

Thank you very much for this opportunity. I am currently affiliated in the School of Civil Engineering, University of Leeds, United Kingdom, but all the research work today has been done at University of Moratuwa, Lanka. So, among the several researches work I do for climate change, I have selected the topic ways to well is to discuss today and I will tell the reason at the end of the presentation.

Waste, is it really a problem? Yes, we become a problem if we do not manage the waste properly. For my research I generally use industrial and agricultural wastes. Let's have a glimpse on what are these wastes. Of industrial waste means waste generated through some industrial processes as a by-product which has no use again for these processes. For example, from the coal fire power plants where we generate power from coal so they burn coal and from the kill we are getting coal fly ash and cold bottom. Such as by products which becomes a waste at the end. Similarly, we have different base generator from industries. Another interesting waste in industries is construction and demolition waste coming from the construction work. They are highly heterogeneous, and they we have different types of phases generated from this construction work. We don't think much from agricultural work, also we develop a lot of waste, for example from rice production. After the ride is taken out, the house becomes a waste. Likewise, every day we are producing so much waste if, I try to quantify them as production per annum. These values from Siri Lanka are some of the selected wastes of industrial and agriculture. If I try to give an idea about this amount the assigned metric tons. A full truck load weight around 20 metric tons, you can imagine how much waste is generated even from a small country like Sri Lanka where

we have only around 22 million people. For example, fly ash is around 10,000 full truck loads. It's very important to manage them properly. Otherwise, it goes for environmental pollution and also create health. Because that leading to changes in climate.

A recent article pointed out that the atmospheric modifications created by the coal fly ash will drive us for the first anthropogenic. It means man made masks tension of life on Earth which emphasize as the importance of. Tackling this waste effective. The solution is proper waste management. This is the waste management hierarchy, so we need to pay more attention to avoid the waste generation. If we cannot, we should utilize it effectively for different other uses.

My research is basically focused on utilizing this waste in different ways for different type of applications in geotechnical engineering. I will highlight only one aspect which is shortage of soil in construction industry. Soil is a natural resource and currently we are facing a problem for not having suitable soil for different type of construction. This can affect economically for the development of a country by delaying our development project. Not only that, but it also creates some different issues. For example, banning the plate fits after mining because we don't have suitable soil to fill these areas create environmental pollution and public health hazards. At the same time, so unfortunate incidents which cause life threats like shown in this news article, two children did after falling into play bit. Mother dies trying to save it. It is Unfortunate to see these kinds of news come. What I try to do is to use the waste as an anthropogenic. That means a manmade soil so that we can utilize the waste and also find a solution for this problem.

I try to use the coal bottom ash for this clay mine rehabilitation. What I try to do is, photograph of an abandoned clay mine. I wanted to turn this place into something like. So here I consider different aspects. The primary aspect is as a few materials. There I found that whole bottom ashes interval for this application because it has very promising engineering properties like the compaction characteristics, friend the drainage characteristics and slopes. Everything is better and are in the

ranges that we need as a film material. The other thing was that these areas are having very steep slopes so and also near water bodies therefore it can create some soil friction. I checked the performance of bottom ash and found that it has very low value for annual soil loss, so which is very promising for this task. The other thing is when we do mining, the ecosystem of these areas is highly damaged. Therefore, we need to try to restore it during the rehabilitation. And I checked it for the whole water mesh as well and found that it has a porous structure facilitate the root.

Broad and high-water holding capacity and some nutrients which are suitable for some selected native flora and fauna born in this area. This can be utilized as a film material in a clear mind rehabilitation. But when we are using waste, there's an important thing that we need to consider which is heavy metals. It can create some threat to environment. We need to check the heavy metal reachability. I found that the values are well below the allowable. It's so we can utilize it as it is without doing any kind of treatment, which is very cost effective for a developing country like Sri Lanka. The other thing is that the coal power generation plant and also these abandoned clear mines star situated nearby in Sri Lanka. The transportation cost is also very low. It's very beneficial in that sense, but this research covers or try to address the different goals in sustainable development.

Targets by reducing the environmental impact by waste management and ensure sustainable consumption and efficient use of natural resources. Finally, I would like to highlight my take on the gender equality for climate change related work. I believe that working on climate change should not be gender biased because we cannot actually say frigate. This should be done by men; this should be done by women. But what we try to do is provide fair and equal opportunities for all. Now I will tell the reason why I selected this waste to present today, because all the things I presented today in my presentation have been done by my female research students, you can see that they have done a brilliant job. Therefore, it's a matter of fact that we provide the fair and equal opportunities for all, not only for research, but starting from policy and decision making to where we put them into action. That we can effectively,

efficiently and successfully try to work to come back with the climate change. Thank you.

Key Words: Intustrial and agricultural wastes, climate changing.

Specific grass for preventing landslides

Dr. Flor de Mayo Gonzalez MİRANDA

San Carlos University, Guatemala

Good morning, everybody. My name is Flor Mayo Gonzalez Miranda from the University of San Carlos, Guatemala. You can see bored people in these pictures. This is a picture of my country. My work is about bioengineering, applied slope stabilization, in Guatemala. You have a gender data in Guatemala. Only 2% of the city halls are run by women; more 4000 girls, aged 10 to 14 give birth each year; and 759 women suffered a violent death in 2013.

Mayan women have an average of three years of schooling. They work in commerce where they do not have social coverage and their work in agriculture is considered as a contribution to the work of men in rural areas, therefore it is not paid (UN women). 43% of men Work in agriculture and Only 10.2% of women. Landslides in Guatemala and their origins are natural catastrophes are frequently in Latin America and The Caribbean (32.4. Disasters/year, (About 7500/year) Due to landslides and earthquakes (Branvilla, 2010). The causes are rugged topography of Guatemala is 40%. The country is ranked as one of the five highest risk countries in the world. Deforestation, Lack of watershed maintenance and climate change increase rainfall and its impact (Gonzalez, Miranda and Garzon, 2014). Poverty, plus more and more populations at risk due to human settlements (Miner,2002).

Poverty in Guatemala is an important fact. From the United Nations Development Program from 2011, Poverty in Guatemala is 90.6%, This group of people suffers some type of deprivation, and has the highest percentage of chaotic child malnutrition in America. It is of 49.8% and effects children under five years of age. The Vetiveria Zizaniodes (chrisopoghon) is a grass native from India and used around the world have the Vetiver Network International.

Key Words: Climate change, bio-engineering.

Closing Remarks

International “Gender Action and Climate Change Conference www.igcc2022.aydin.edu.tr”, was organized at Istanbul Aydın University (IAU), with collaboration of Women's Organization in Science for the Developing World (OWSD), Istanbul Technical University (ITU), Eurasian Universities Union (EURAS) on March 24, 2022. The conference was hosted by the Computer Engineering Department of the Faculty of Engineering with the help of UNESCO, OWSD Turkey Executive Board, IAU Research Center for Environment and Human Health, IAU Energy Policies and Marketing Applied Research Center (EPPAM), IAU UNESCO Education and Sustainability Peace Chair and Green Homeland Platform. On behalf of Organizing Committee Prof. Dr. Zafer ASLAN, OWSD Coordinator Dr. Tonya BLOWERS, on behalf of General Director of Meteorology at the Ministry of Environment, Climate and Urbanization Volkan Mutlu COŞKUN, Head of Climate and Agricultural Meteorology Department, Mr. Hikmet EROGLU, IAU Rector Prof. Dr. Yadigar İZMİRLİ and OWSD President Prof. Dr. Jennifer THOMSON delivered opening speeches The Conference started with his best wishes of IAU Board of Trustees Chairman Assoc. Prof. Dr. Mustafa Aydın.

Contributing to the goals of gender equality, clean water- salinity and climate change, which are among the strategic sustainable development goals of the United Nations (UNDP SDG 5, 9 and 13), 19 original research results from 13 different countries that contribute to science were discussed at the conference. The first two scientific sessions were co-chaired by Heads of Istanbul Technical and Samsun Universities Meteorological Engineering Department, Prof. Dr. Mikdat KADIOĞLU and Assoc. Dr. Meral DEMİRTAŞ. 13 international and 6 national invited speakers attended at the conference. With the researches on this subject, it was tried to raise awareness about protecting our world.

At the third session chaired by OWSD President Prof. Dr. Jennifer THOMSON and General Coordinator Dr. Tonya BLOWERS and six early career researchers awarded by ELSEVIER Foundation Director, Ms. Yılan SCHEMM shared their research experiences. The meeting was broadcasted on IAU You Tube.

International Conference on Gender Action and Climate Change (IGCC2022) Final Declaration
REMARKS at the CLOSING SESSION

Country	Papers	No of Author(s) / Co-Authors
Austria	1	1
Azerbaijan	2	3
Benin	1	1
France	1	1
Italy	4	4
India	1	21
Uzbekistan	1	2
Pakistan	1	1
Spain	4	4
Syria	1	1
Turkey	14	23
USA	1	1
Tunisia	1	1
Total	42	64

Total No of Countries: 13

Total Number of Papers: 42

Total Number of Invited Lectures: 10

Total Number of National Papers: 14

Total Number of Participants: 59

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International Conference on Gender Action and Climate Change

24 March 2022 – Online Programme

10:00 – 16:00 Istanbul time*

*To check the time in your own city you can go directly here
https://www.timeanddate.com/worldclock/converter.html

The link below to join the conference:

https://us06web.zoom.us/j/81677781876?pwd=YWtLTk1vbnplY25HOWxxMGJxSXBVZz09

Zoom ID: 816 7778 1876

Passcode: 4441428

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