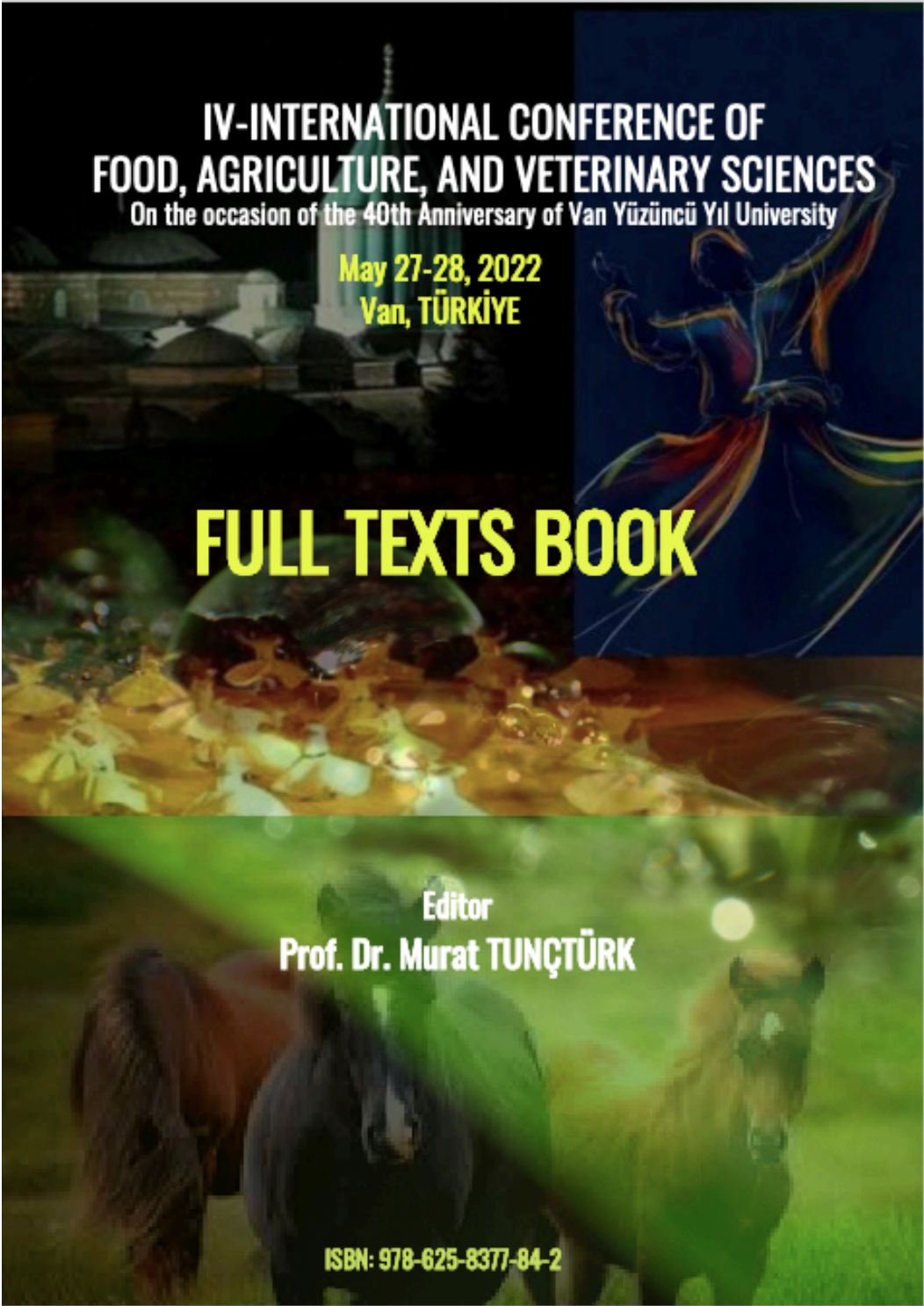




IV-INTERNATIONAL CONFERENCE OF FOOD, AGRICULTURE, AND VETERINARY SCIENCES

On the occasion of the 40th Anniversary of Van Yüzüncü Yıl University

May 27-28, 2022
Van, TÜRKİYE

FULL TEXTS BOOK

Editor
Prof. Dr. Murat TUNÇTÜRK

ISBN: 978-625-8377-84-2



**IV- INTERNATIONAL CONFERENCE OF FOOD,
AGRICULTURE, AND VETERINARY SCIENCES**
On the occasion of the 40th Anniversary of Van Yüzüncü Yıl University
May 27-28, 2022
Van Yüzüncü Yıl University / Van, Türkiye

FULL TEXTS BOOK

Edited by
Prof. Dr. Murat TUNÇTÜRK

All rights of this book belong to IKSAD GLOBAL.
Without permission can't be duplicate or copied. Authors of
chapters are responsible both ethically and juridically.

IKSAD Publications - 2022 ©

Issued: 26.06.2022

ISBN: 978-625-8377-84-2

CONGRESS ID

IV- INTERNATIONAL CONFERENCE OF FOOD, AGRICULTURE, AND VETERINARY SCIENCES

ORGANIZATORS

Van Yüzüncü Yıl University
IKSAD

DATE-PLACE

27-27 MAY 2022
Van Yüzüncü Yıl University
Van / TÜRKİYE

EDITOR

Prof. Dr. Murat TUNÇTÜRK

EVALUATION PROCESS

All applications have undergone a double-blind peer review process

TOTAL NUMBER OF PAPERS: 345

THE NUMBER OF PAPERS FROM TURKEY: 168

OTHER COUNTRIES: 177

PARTICIPANT COUNTRIES (37):

Turkey, Azerbaijan, India, Czech Republic, Romania, Nigeria, Argentina, Pakistan,
Iran, Algeria, China, Kazakhstan, Canada, Malaysia, Russia, Azerbaijan, Morocco,
Bulgaria, Iraq, The Netherlands, Portugal, Ukraine, South Korea, United Arab Emirates,
Hungary, Vietnam, Lebanon, Oman, Philippines, Iceland, USA, Serbia, Albania,
Indonesia, Egypt, South Africa

HONORARY PRESIDENT OF THE CONFERENCE

Prof. Dr. Hamdullah ŞEVLİ – Rector of Van Yüzüncü Yıl University

CONFERENCE PRESIDENT

Prof. Dr. Murat TUNÇTÜRK – Van Yüzüncü Yıl University, Dean of Faculty of Agriculture

ORGANIZING COMMITTEE MEMBERS

Prof. Dr. Anake KİJJOA - Porto University

Prof. Dr. Musa GENÇCELEP – Van Yüzüncü Yıl University

Prof. Dr. Nazım ŞEKEROĞLU - Gaziantep University

Prof. Dr. Rüveyde TUNÇTÜRK – Van Yüzüncü Yıl University

Assoc. Prof. Dr. Erol ORAL – Van Yüzüncü Yıl University

Assoc. Prof. Dr. Mustafa USTA – Van Yüzüncü Yıl University

Assoc. Prof. Dr. Tamer ERYİĞİT – Van Yüzüncü Yıl University

COORDINATOR

Nurlan AKHMETOV

CONFERENCE SCIENTIFIC COMMITTEE

Prof. Abdalbasit MARIOD: College Of Science & Technology, Ghibaish/ Sudan

Prof. Dr. Ahmet Esen ÇELEN: Ege Üniversitesi

Prof. Dr. Ahmet KAZANKAYA: Kırşehir Ahi Evran University

Prof. Dr. Anake KİJJOA: Porto University/ Portekiz

Prof. Dr. Bilal KESKİN: Iğdır University

Prof. Dr. Çetin KARADEMİR: SİİRT University

Prof. Dr. Cumali ÖZKAN: Van Yüzüncü Yıl University

Prof. Dr. Elvan OCAK: Van Yüzüncü Yıl University

Prof. Dr. Fazıl ŞEN: Van Yüzüncü Yıl University

Prof. Dr. H. Murat SİPAHİOĞLU: Malatya Turgut Özal University

Prof. Dr. Murat KARTAL: Bezmialem Vakıf University

Prof. Dr. Halil İbrahim OĞUZ: Nevşehir Hacı Bektaş Veli University

Prof. Dr. İbrahim CEMAL: Adnan menderes University

Prof. Dr. İbrahim YILDIRIM: Van Yüzüncü Yıl University

Prof. Dr. İsmail KAYA 19 Mayıs University

Prof. Dr. M Enes ALTUĞ: Hatay Mustafa Kemal University

Prof. Dr. M. Fatih ÇELEN: Uşak University

Prof. Dr. M. Salih ÖZGÖKÇE: Van Yüzüncü Yıl University

Prof. Dr. Serra HEPAKSOY - Ege University

Prof. Dr. Mehmet Ali BOZKURT: Van Yüzüncü Yıl University

Prof. Dr. Mehmet BİNGÖL: Van Yüzüncü Yıl University
Prof. Dr. Mehmet Emin ÇALIŞKAN: Niğde Ömer Halisdemir University
Prof. Dr. Melek EKİNCİ: Atatürk University
Prof. Dr. Mohammad Sohikul ISLAM: Science And Technology University/ Bangladesh
Prof. Dr. Nalan TÜRKOĞLU: Van Yüzüncü Yıl University
Prof. Dr. Önder TÜRKMEN: Necmettin Erbakan University
Prof. Dr. Rüstem CANGİ: Tokat Gaziosmanpaşa University
Prof. Dr. Üstün ŞAHİN: Atatürk University
Prof. Dr. Şefik TUFENKÇİ: Van Yüzüncü Yıl University
Prof. Dr. Semiha DEDE: Van Yüzüncü Yıl University
Prof. Dr. Şevket ALP: Van Yüzüncü Yıl University
Prof. Dr. Sibel DERVİŞ: Mardin ARTUKLU University
Prof. Dr. Turgut AYGÜN: Bingöl University
Prof. Dr. Türker SAVAŞ: Çanakkale 19 Mart University
Prof. Dr. Yaşar KARADAĞ: Muş Alparslan University
Prof. Dr. Younes Rezaee DANESH: Urmia Üniversitesi İran
Prof. Dr. Yusuf TUNÇTÜRK: Van Yüzüncü Yıl University
Prof. Navid Ghavi HOSSEİN-ZADEH: Guilan University/ İran
Prof. Ndomelele Ndiko LUDIDI: Western Cape University/ South Africa
Assoc. Prof. Dr. Eslam FAİD-ALLAH: Menofia University/ Egypt
Assoc. Prof. Dr. Doç. Dr. Marwa FAYED: Sadat City University/ Egypt.
Assoc. Prof. Dr. Faheem Shehzad BALOCH: Sivas Bilim ve Teknoloji University
Assoc. Prof. Dr. Muhammad Qasim SHAHID: South China Agricultural University
Assoc. Prof. Dr. Ünal KARİK: Aegean Agricultural Research Institute
Assoc. Prof. Dr. Çeknas ERDİNÇ: Van Yüzüncü Yıl University
Dr. TUBA ÖZGE YAŞAR - Tekirdağ Namık Kemal University
Dr. Jiban SHRESTHA: Nepal Agricultural Research Council/ Nepal

28.05.2022
SATURDAY / 16:00-18:30

Zoom Meeting ID: 892 9798 71186

Zoom Passcode: 546894

(All speakers required to be connected to the session 15 min before the session starts)

Moderator is responsible for ensuring the smooth running of the presentation, managing the group discussion and dynamics.

Before you login to Zoom please indicate your name_surname and hall number,

exp. Hall 1, Ali ÖZDEMİR

SESSION-3, HALL-5/OTURUM-3, SALON-5

MODERATOR: Prof. Dr. Fikret YAŞAR

AUTHOR(S)	AFFILIATION	TITLE
Assist. Prof. Dr. Abdullah GÜLLER Assoc. Prof. Dr. Mustafa USTA	Bingöl University, Bingöl, Türkiye Van Yüzüncü Yıl University, Van, Türkiye	MOLECULAR CHARACTERIZATION of 16S RDNA NUCLEOTIDE SEQUENCE of 'Ca. P. trifolii' IN PHYTOPLASMA-SUSPICIOUS CUCUMBER PLANTS IN VAN PROVINCE
Assoc. Prof. Dr. Tamer ERYİĞİT Mehmet Akif ÇELEBİ	Van Yüzüncü Yıl University, Van, Türkiye	THE EFFECT DIFFERENT HUMIC ACID DOSES ON THE YIELD AND QUALITY FEATURES OF COTTON (Gossypium hirsutum L.) VARIETIES UNDER DIYARBAKIR ECOLOGICAL CONDITIONS
Oktay TOMAR Bahar SANCAR	Kocaeli University, Kocaeli, Turkey	Artemisia annua L. OF ESSENTIAL OIL ANTIOXIDANT, ANTIBACTERIAL AND ANTIFUNGAL PROPERTIES
Bahar SANCAR Oktay TOMAR Abdullah ÇAĞLAR	Kocaeli University, Kocaeli, Turkey	PLANT BASED PROTEINS
Oktay TOMAR Bahar SANCAR	Kocaeli University, Kocaeli, Turkey	MEDICINAL AROMATIC PLANTS AND ESSENTIAL OILS
Prof. Dr. Ahmet KORKMAZ Güney AKINOĞLU İlkay ÇOKA	Ondokuz Mayıs University, Samsun, Türkiye	COMMON PHYSIOLOGICAL DISORDERS IN FRESH TOMATO FRUIT
Prof. Dr. Ahmet KORKMAZ Güney AKINOĞLU İlkay ÇOKA	Ondokuz Mayıs University, Samsun, Türkiye	BIOTIC AND ABIOTIC STRESS FACTORS IN RICE PLANTS
Prof. Dr. Fikret YAŞAR Assoc. Prof. Dr. Özlem ÜZAL	Van Yüzüncü Yıl University, Van, Türkiye	MACRO ELEMENT ACCUMULATIONS IN PEPPER SEEDLINGS APPLIED WITH DIFFERENT NUTRITIONAL SOLUTIONS
Assoc. Prof. Dr. Özlem ÜZAL Prof. Dr. Fikret YAŞAR	Van Yüzüncü Yıl University, Van, Türkiye	INVESTIGATION OF THE EFFECT OF MAGNESIUM APPLICATIONS ON MICRO ELEMENT INTAKE IN PEPPER PLANT UNDER SALT STRESS
Havva Eylem Polat Yalçın Gücer Elif Ayşe Anlı Alper Serdar Anlı	Ankara University, Ankara, Türkiye	RELATIONS ON AGRICULTURE, ENVIRONMENT AND FOOD SAFETY THROUGH CLIMATE CHANGE PERSPECTIVE

İKLİM DEĞİŞİKLİĞİ PERSPEKTİFİNDE TARIM, ÇEVRE VE GIDA GÜVENLİĞİ İLİŞKİLERİ

RELATIONS ON AGRICULTURE, ENVIRONMENT AND FOOD SAFETY THROUGH CLIMATE CHANGE PERSPECTIVE

Havva Eylem POLAT

Doç.Dr., Ankara Üniversitesi Ziraat Fakültesi, Tarımsal Yapılar ve Sulama Bölümü

Yalçın GÜÇER

Dr., Ankara Üniversitesi Kalecik Meslek Yüksekokulu, Bağcılık ve Bağ Ürünleri Teknolojisi Programı,

Elif Ayşe ANLI

Dr., Ankara Üniversitesi Ziraat Fakültesi, Süt Teknolojisi Bölümü

Alper Serdar ANLI

Doç.Dr., Ankara Üniversitesi Ziraat Fakültesi, Tarımsal Yapılar ve Sulama Bölümü

ÖZET

Tüm dünyada, iklim değişikliği konusu, akademik-bilimsel çalışmalara yön verdiği gibi, ekonomik ve politik karar verici mekanizmalar üzerinde de baskısını arttırmaktadır. Ortak hedef, insan faaliyetlerinin özellikle doğal çevre üzerindeki olumsuz etkilerini azaltarak, iklim değişikliğinin önüne geçmektir. Özellikle, canlı yaşamının sürdürülebilirliğini sağlayan tarımsal üretimde, sera gazı salınımlarının kontrol edilmesi ve toprak- su kirliliğini önleyici tedbirlerin alınmasına ilişkin uygulamalar yapılmaktadır. Bunun yanında, iklim değişikliği ile ortaya çıkan kuraklık, sel, şiddetli yağışlar, sıcaklık dalgalanmaları ve benzeri olağandışı hava koşulları gibi olumsuz etkilere karşı da tarımsal üretimde önlemlerin alınması ve bu konuda üreticilerin desteklenmesi de ön plana çıkmaktadır. Yukarıda sayılan tüm bu önlemlerin, gıdaya dönüşen tarımsal ürünlerin üretim sürecinde, insan sağlığını tehdit etmeyecek biçimde uygulanması önemlidir. Bitkisel üretimde zirai mücadele yöntemi ve kullanılan kimyasallar, toprak iyileştiricileri, pestisitler, hormonlar ve bunların miktar ve özellikleri güvenli gıda üretimine etki eden ilk adımlardır. Son yıllarda, dünyada birçok ülkede iyi tarım uygulamaları ile çevre kirliliğinin azaltılması ve önlenmesinin yanında gıda güvenliğinin sağlanması da hedeflenmektedir. Bu uygulamalar; organik tarım, tarımsal atık yönetimi sistemlerinin kurulması, temiz ve yenilenebilir enerji (güneş, rüzgâr, biyogaz, biyokütle) kullanımı, kimyasal gübreleme yerine kontrollü organik gübre ya da kompost kullanımı, zirai mücadelede doğal yöntemler vs. sayılabilir. Bu çalışmada, iklim değişikliği ve iklim değişikliğinin azaltılmasına yönelik uygulamaların tarım, çevre ve gıda üretimi üzerindeki etkilerinin tahmin edilmesinin yanında, konu tarımsal üretim, çevre kirliliği ve gıda güvenliği ilişkileri çerçevesinde değerlendirilmiştir.

Anahtar Kelimeler: Çevre kirliliği, gıda, iklimsel parametreler, iyi tarım uygulamaları, karbondioksit salınımı, sera gazları.

ABSTRACT

All over the world, the issue of climate change not only directs academic-scientific studies, but also increases its pressure on economic and political decision-making mechanisms. The common goal is to prevent climate change by reducing the negative effects of human activities on the natural environment. Especially in agricultural production, which ensures the sustainability of living life, practices are carried out to control greenhouse gas emissions and to take measures to prevent soil-water pollution. In addition, it is also important to take measures in agricultural production and support the producers in this regard against adverse effects such as drought, flood, heavy rains, air temperature fluctuations and similar unusual weather conditions caused by climate change. It is important that all of the above-mentioned

measures are implemented in the production process of agricultural products that turn into food, in a way that does not threaten human health. Plant disease control method and chemicals used in crop production, soil conditioners, pesticides, hormones and their quantities and properties are the first steps that affect safe food production. In recent years, it is aimed to reduce and prevent environmental pollution with good agricultural practices, as well as to ensure food safety in many countries around the world. These practices are; organic agriculture, the implementation of agricultural waste management systems, use of clean and renewable energy (solar, wind, biogas, biomass), use of controlled organic fertilizer or compost instead of chemical fertilization, natural methods for plant disease control, etc... In this study, besides estimating the effects of climate change and its mitigation strategies on agriculture, environment and food production, the subject is discussed within the framework of agricultural production, environmental pollution and food safety relations

Keywords: Carbon dioxide emission, climatic parameters, environmental pollution, food, good agricultural practices, greenhouse gases.

1. INTRODUCTION

Climate change is characterized by extensive long-term changes in temperature and precipitation trends. Irregular weather conditions occur as a result of changing ambient pressure and humidity levels. Melting of the global ice sheets and sea level rise results in many international and local effects (Abbass et al. 2022). Hazards related to climate change are mostly unstable climate events and extreme conditions which are closely related with human life and natural systems (Godde et al. 2021). All over the world, the issue of climate change not only directs academic-scientific studies, but also increases its pressure on economic and political decision-making mechanisms. The common goal is to prevent climate change by reducing the negative effects of human activities on the natural environment.

Global warming is accompanied by environmental degradation, decrease in biodiversity and consequent depletion of resources, increase in environmental pollution. The biggest reason for such a drastic change on the world we live in is the rapidly increasing population and the supplying stages of the food demanded by this population. Although it is necessary to evaluate the effects of climate change on food supply on a sectoral basis, it is not possible to separate the water source, plant production and animal production, which are the basic requirements for human life (Malliaroudaki et al. 2022).

In this study, besides the effects of climate change and its mitigation strategies on agriculture, environment and food production, in the perspective of climate change; agriculture, food security and food safety relations are also discussed.

2. IMPACT OF AGRICULTURAL PRACTICES ON CLIMATE CHANGE

Climate change has both direct and indirect impacts on agricultural production systems. Direct impacts are considered as temperature levels, rainfall distribution, wind speed and wind direction etc. on agricultural production systems. Indirect impacts are pollinators, pests, disease causing factors and invasive and destructive pests or species. They affect agricultural production through changing on other species. Indirect effects are much more difficult to assess and so, many of which are still unknown (FAO, 2015).

Globally, negative effects are more common than positive ones. Observations on the effects of climate trends on crop production show that climate change has already negatively affected wheat and maize yields in many regions, as in the rest of the world.

A recent multi-model study using Intergovernmental Panel on Climate change's (IPCC's) highest scenario of warming found a mean effect on yields of four crop groups (coarse grains, oil seeds, wheat and rice, accounting for about 70 percent of global crop harvested area) of minus 17 percent globally by 2050 relative to a scenario with unchanging climate (FAO, 2015).

In agricultural production, which ensures the sustainability of living life, practices are carried out to control greenhouse gas emissions and to take measures to prevent soil-water pollution. In addition, it is

also important to take measures in agricultural production and support the producers in this regard against adverse effects such as drought, flood, heavy rains, air temperature fluctuations and similar unusual weather conditions caused by climate change. It is important that all of the above-mentioned measures are implemented in the production process of agricultural products that turn into food, in a way that does not threaten human health. Plant disease control method and chemicals used in crop production, soil conditioners, pesticides, hormones and their quantities and properties are the first steps that affect safe food production. In recent years, it is aimed to reduce and prevent environmental pollution with good agricultural practices, as well as to ensure food safety in many countries around the world (FAO, 2015).

These practices are;

- Organic agriculture,
- The implementation of agricultural waste management systems,
- Use of clean and renewable energy (solar, wind, biogas, biomass),
- Use of controlled organic fertilizer or compost instead of chemical fertilization,
- Natural methods for plant disease control

Organic farming is a way of maintaining effective but not intensive use of land that supports protection of species' and their habitat. Environmental degradation such as loss of biodiversity by nutrient leakage of soil can be minimized by using organic farming system (Stein-Bachinger et al., 2021). In organic agriculture use of mineral fertilizers and synthetic herbicides and pesticides are not allowed due to negative impacts on environment human life (Lorenz and Lal, 2016). Although uncertified some small farms are still doing farming operations without using fertilizers and pesticides (Stein-Bachinger et al., 2021). Together with supplying more environmentally friendly, more nutritious production of foods with less or free of pesticide residues for human consumption, lower yields are obtained in organic agriculture system when compared with conventional farming systems (Reganold and Wachter, 2016). For food security point of view, sustainability and continuous supply of food is vital for food supply chain. However, there are some regional requirements of using agrochemicals like pesticides in the world, as it is in tropical regions. So organic farming is still found deficient in meeting the needs for large amounts of food for increasing world population (Carvalho, 2006).

Climate change affects livestock production both directly and indirectly. The most important effects are experienced in animal productivity and health as well as, yields of forages and feed crops.

The food industry is a major source of greenhouse gases. Greenhouse gas emissions are an indicator of the environmental impact of the food supply chain, which can result in adverse environmental impacts such as climate change and global warming.

Reducing energy consumption in food production and supply, and the selection of renewable energy sources with less environmental destruction are some of the measures that can be taken in terms of energy. Global warming would also require application of novel practices and/or more strict food safety procedures for guaranteeing food safety concern (Malliaroudaki et al. 2022).

The use of natural methods in agriculture instead of chemical control is important in terms of maintaining the balance of nature.

3. RISKS OF CLIMATE CHANGE IN TERMS OF FOOD SAFETY AND SECURITY

Food security and food safety are interconnected to each other in terms of climate change. Food safety is used as a scientific method/discipline describing handling, preparation, and storage of food in ways that prevent food-borne illnesses. Food security is the measure of the availability of food and individuals' ability to access it. According to the United Nations' Committee on World Food Security, food security is defined as meaning that all people, at all times, have physical, social, and economic access to sufficient, safe, and nutritious food that meets their food preferences and dietary needs for an active and healthy life (FAO, 2015).

Livestock sector is an inevitable part of human life and it will be also affected by climate change starting from farm to consumption (Godde et al. 2021). A decrease or loss of crop yield required for animal nutrition, heat stress of dairy cattle caused by increased ambient temperature and humidity levels resulting in depletion of milk yield and animal deaths are the risks to be faced by the livestock and dairy sector related to climate change (Malliaroudaki et al. 2022).

Rising temperatures increases food- and water-borne pathogens' related infections (Fattori and Mukherjee, 2020). Changes in heat resistance and survival abilities of food-borne pathogens with changing climatic conditions may require development of more intensive heat application methods alternative to classical pasteurization and similarly lower refrigeration requirements in cold chain and during consumption of the products (Malliaroudaki et al. 2022). Besides achieving the raw material under changing climatic conditions is struggling, its processing and distribution practices also require some modifications due to climatic conditions. Some adverse effects of climate change can be prevented by application of harsh cold chain conditions that means increased energy use and costs and increased CO₂ emissions (Godde et al. 2021).

CONCLUSION

The effects of climate change and strategies for mitigating its effects on agriculture, environment and food production requires an interdisciplinary evaluation and search for solutions. There are still uncertainties about the scope and level of climate change that will affect the fields of activity that have an impact on the food supply chain such as processing, storage, transportation and sales. The demand for safe food with enhanced food quality for the constantly increasing population can be maintained by coordinated efforts of academy, industry and governance.

Climate change affects food production and therefore food availability. Climate change will affect the livelihoods and incomes of small-scale food producers, as well as access to food through food price increases and volatility.

Climate change can have several effects on the quality of drinking water, which is key to good nutrient absorption. Climate change has been found to have an impact on food security, especially on the incidence and prevalence of foodborne diseases. Increasing climate variability will make rare natural disasters occur more frequently and severely, thereby affecting the stability of food supply, access and use (FAO, 2015)

Evidence linking rising temperatures to higher incidences of infection by foodborne pathogens such as *Salmonella* spp. and *Campylobacter* spp. (Fattori and Mukherjee, 2020).

Water scarcity can have an impact on hygienic conditions in food processing plants. Flooding increases the likelihood of epidemics of waterborne diseases such as cholera. Climate change is enabling the spread of various species that generate harmful algal blooms (HABs) into new areas, many of which are not prepared to meet the challenges of detection and surveillance. Excessive fertilizer application, combined with more frequent and heavy rainfall, results in increased eutrophication in water bodies, resulting in algal blooms. Increased precipitation increases the accumulation of inorganic mercury in lakes and oceans. Fish life will be adversely affected. Heavy metal accumulation is in question in fish. Again, in field agriculture, arsenic accumulations occur, especially in paddy, with irrigation water (Fattori and Mukherjee, 2020).

In agriculture, the use of adapted varieties, with wide environmental tolerances is way to prevent against risk of individual crop failure. Adaptive changes in crop management, planting dates, increased or decreased irrigation, to have the potential to increase yields according to the region and crop being considered. After harvest, the extent to grain may require drying and how products are stored in post-harvest applications.

REFERENCES

- Abbass, K., Qasim, M.Z., Song, H. *et al.* A review of the global climate change impacts, adaptation, and sustainable mitigation measures. *Environ Sci Pollut Res* **29**, 42539–42559 (2022). <https://doi.org/10.1007/s11356-022-19718-6>
- Carvalho, F. P. (2006). Agriculture, pesticides, food security and food safety. *Environmental science & policy*, *9*(7-8), 685-692.
- FAO, 2015. Climate change and food security: risks and responses. Food and Agriculture Organization of the United Nations (FAO). 2015. ISBN 978-92-5-108998-9. <https://www.fao.org/3/i5188e/I5188E.pdf>.
- Fattori, V. And Mukherjee, K. 2020. Climate Change Implications for Global Food Safety. Food Systems and Food Safety Division, FAO, Rome. 17 November 2020
- Godde, C. M., Mason-D'Croz, D., Mayberry, D. E., Thornton, P. K., & Herrero, M. (2021). Impacts of climate change on the livestock food supply chain; a review of the evidence. *Global food security*, *28*, 100488.
- Lorenz, K., & Lal, R. (2016). Environmental impact of organic agriculture. *Advances in agronomy*, *139*, 99-152.
- Malliaroudaki, M. I., Watson, N. J., Ferrari, R., Nchiri, L. N., & Gomes, R. L. (2022). Energy management for a net zero dairy supply chain under climate change. *Trends in Food Science & Technology*.
- Reganold, J. P., & Wachter, J. M. (2016). Organic agriculture in the twenty-first century. *Nature plants*, *2*(2), 1-8.
- Stein-Bachinger, K., Gottwald, F., Haub, A., & Schmidt, E. (2021). To what extent does organic farming promote species richness and abundance in temperate climates? A review. *Organic Agriculture*, *11*(1), 1-12.