

Special Issue on Environmental Stress and Global Crop Security

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Plants, being sessile in nature, are constantly exposed to myriads of environmental stresses which include both abiotic and biotic factors. UV light, infrared, cosmic and other extra-terrestrial radiations of variable wavelengths, high salinity, drought, flooding, chilling injury, nutrient imbalances, air and soil borne pollutants, and exposure to bacterial and fungal pathogens and metabolic byproducts of endogenous processes represent some of the frequent stress factors for plants. In addition, high intensity solar radiation, continuous exposure to artificial light, high decibel sound, and emissions from the vehicles in busy roads and highways also negatively affect plant growth. Various abiotic stresses have both general and specific effects on plant growth and development. For example, photosynthetic declination, osmotic stress, and so forth compromise plant processes, interfere with nutrient availability, and thus limit plant growth as frequently found in case of drought stress. Apart from the direct effect on plant growth, low and freezing temperatures have also been shown to induce osmotic stress. Plant exposure to drought, salinity and low temperature frequently generates osmotic, oxidative, and finally genotoxic stress.

Established facts and data have clearly shown that enhancement in the agricultural practices for last couple of decades in various parts of the world, along with the support from extensive research, institutions, and appropriate policies resulted in significant increment in global food grain production from about 850 million tons to 2350 million tons during the period from 1960 to 2007. In the developing countries, approximately 3.1 billion people mainly live the rural areas and among them about 2.5 billion are dependent on agriculture for their livelihood. Based on the domestic products regularly obtained from agriculture, this has shown to account for approximately 30% to the overall economic growth. Over the past 40 years or so, although the global food production rate has been consistent with the population growth, more than billion people living in rural regions of the developing countries still remain mostly undernourished. Some recent evaluations have recommended a 70% increase in global food crop production by 2050 in order to provide adequate food to the growing global population with increasing incomes and consumption. Along with this, the growing competition for land, food, water, energy, labour, and capital has also created insecurity for food in various regions in developing countries and an increasing magnitude of pressure for improved crop production per unit area. Environmental stresses are undoubtedly complex in nature. However, understanding the full potential of using biotechnological approaches may provide important avenues for improved crop production. The recent development of sophisticated technologies, such as chromosome engineering, transcriptome profiling, targeted gene replacement using zinc-finger nucleases, and nanotechnology, provides a promising future prospect for the development of designer crops with higher efficiency of utilization of natural resources and improved productivity under stress conditions.

The present special issue aims to publish high-quality research articles as well as review contributions on a variety of topics related to environmental stress and global crop security.

Potential topics include but are not limited to the following:

- ▶ Environmental stress response in plants
- ▶ Climate change and its impact on crop health
- ▶ Breeding for abiotic/biotic stress tolerance
- ▶ Plant genome stability maintenance under environmental stress
- ▶ Drought and temperature stress tolerance in leguminous crops
- ▶ Strategies for crop adaptation and improvement under biotic and abiotic stress
- ▶ Environmental stress and global crop security
- ▶ Chemical toxicity in agriculture

Authors can submit their manuscripts through the Manuscript Tracking System at <https://mts.hindawi.com/submit/journals/scientifica/agronomy/esgs/>.

Papers are published upon acceptance, regardless of the Special Issue publication date.

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