The importance of using fertilizers in improving agricultural production and achieving sustainable agricultural development

The world population is increasing at full speed and in 2050 it could reach about 10 billion. Furthermore, food security has become a main challenge in the 21st century due to the limited availability of water resources and arable land, but also a global decline trend in crop yield.).In this respect, the increases in global population and feeding that population will require a 70% increase in food production. At the same time, farmers are facing a series of challenges in their businesses that affect their farm production, such as crop pests and diseases, with increased resistance along with drastic changes due to the effects of climate change. These factors lead to rising food prices, a fact that highlights the need for more effective interventions in agriculture. In this context, agro-food researchers are working on approaches that aim to maximize agricultural production and reduce yield risk. However, there is a demonstrable need for a new revolution that will contribute to "smart" farming and help to address all the aforementioned problems. There is a need for services that are powered by scientific knowledge, driven by facts and offer inexpensive yet valuable advice to farmers. In this context, smart farming is expected to reduce production costs, increase production (quantitatively) and improve its quality, protect the environment and minimize farmers' risks. To tackle the food demand of the growing population, large enhancements in the application of fertilizers and improvement of soil fertility are essential approaches. Indeed, yields of most crop plants are proportional to the number of fertilizers, which is why high agricultural yields depend strongly on fertilization with mineral nutrients. Today, it is no more sufficient to increase yields by applying higher fertilizer doses, we must focus studies on plant nutrition principles and fertilizer effects on plant growth and development, but also, investigate fertilizer interaction with cultivation, production, and economic factors to achieve both greater yields and quality, of the food produced. So, the fertilizer industry, production and application play a vital role to achieve food systems, food security and promote sustainable agriculture around the world. On the other side, sustainable agriculture is not only an ethical choice but also a practical approach to ensuring food security, protecting the environment, and mitigating climate change. Let us join hands in advocating for sustainable agriculture and supporting the farmers and organizations that work tirelessly to feed us while caring for our planet. Together, we can cultivate a

brighter, more sustainable future. So, Sustainable agricultural practices are needed to provide food security for a growing global population. In addition, Food production is usually associated with high nutrient inputs in the form of mineral fertilizers. In this Special Issue, we will need to focus on innovations in organic and inorganic fertilizer production. Also , We welcome studies concerning new approaches for smart fertilizer development, including bio formulations with mineral particles, nanomaterials as well as specialty fertilizer fully water soluble or slow or control release and plant growth promoting microorganisms to improve plant nutrient-use efficiency. Additionally, fertilizer is an important input for farmers providing nutrients to plants that are not readily available in the soil, helping farmers to foster plant growth and increase yields. Implementation, 4R Nutrient Stewardship in their farms (Right Source @ the Right Rate, Right Time, and Right Place) was developed to help crop-producers minimize environmental concerns related to agriculture while maximizing economic benefits. In conclusion, smart fertilizers in their various forms (organic – inorganic – biological) play an important and major role in increasing the productivity of agricultural crops, quantitatively and qualitatively, with the aim of closing the food gap and achieving food security for this growing population while preserving soil fertility for future generations within the framework of sustainable development, provided that fertilizer is added in an integrated and balanced forms that meets the actual nutritional needs of the plant,. In general, every fertilizer, whether organic, inorganic biological, has relative advantages in some aspects and relative disadvantage in other aspects, relying entirely on One source may not be sufficient for the desired quantitative or qualitative production, which necessitates the need for integration between them to produce food crops with high productivity levels and good quality at the lowest costs while maintaining a clean environment.