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WHO IS GOING TO BE PRIME POWER OF THE WORLD?

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KEYNOTE ADDRESS

08 JUNE

I would emphasise on Pakistan's national leadership to make the most of this diplomatic vacuum and focus our national technology plans on familiarization, development, induction and indigenization of emerging technologies in relevant areas of civil and military applications to serve the purposes of comprehensive national security. An appropriately focused national task force with clearly defined lead agency, mandate, objectives and reasonable resources at its disposal could be a good start point.

EXPANSION OF UNITED NATIONS SECURITY COUNCIL

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MITIGATING CLIMATE CHANGE IMPACT IN PAKISTAN THROUGH NUCLEAR APPLICATIONS IN AGRICULTURE

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It is not a coming-of-age phenomenon that climate change is adversely affecting agriculture productivity. In 2022 International Food Policy Research Institute pointed out that rising temperatures, high humidity levels and extreme weather conditions pose complex challenges for the global food value chain. A 2021 study published in the Science Daily found that climate change has resulted in 21% decline in global agricultural productivity during the last six decades. In 2022, World Bank estimated that food insecurity would continue to grow as 70% more food will be required by 2050 to feed an estimated 9 billion people.

A 2019 special report titled "Climate Change and Land" of Inter-Governmental Panel on Climate Change concluded that, as earth is warming agricultural yields would continue to drop which is worrisome for global food security. Scientists argue that with worsening climatic patterns there is likely to be a significant reduction in global food exports. Climate smart agriculture is therefore the focus of debates on food security.

According to Carbon Brief (2022), almost 0.702 billion world population is living under extreme poverty and facing food security challenges which would become an existential threat by 2050. Competition for land may increase as certain areas might become climatically unsuitable for production. According to the United Nations, if business continues as usual, an area almost the size of South America could be degraded due to Climate Change.

One way to address climate related challenges being faced by global food market is to use nuclear applications in agriculture. According to the UN (2020), "Nuclear technology has been used worldwide to develop new varieties of crops that are more resilient to climate change and meet the needs of growing population." According to Food and Agriculture Organization (FAO), nuclear agriculture relies on the use of isotopes and radiation techniques to tackle pests

and diseases, raise agricultural yield, preserve land and water resources, assure food security and boost livestock productivity.

It is further added that due to their cost-effectiveness and high quality, nuclear techniques in agriculture remain an economically viable option, especially for developing countries. A number of developing as well as advanced economies have started using nuclear applications in agriculture which have resulted in stable yields despite challenges from climate change.

At present, seventy countries are benefitting from nuclear applications in agriculture sector. These include: (i) Bangladesh in Rice cultivation; (ii) Benin in Soybean; (iii) Burkina Faso in Livestock; (iv) China in Wheat; (v) Indonesia in Rice and Soybean; (vi) Kenya in irrigation technology; (vii) Madagascar in soil erosion; (viii) Malaysia in Rice; (ix) Mexico in Radiation-based Sterile Insect Technique; (x) Namibia in Cowpea and Sorghum; (xi) Sudan in Drought resistant groundnut varieties; (xii) Tanzania in Rice; and (xiii) Azerbaijan in Cotton. International Atomic Energy Agency (IAEA) has developed over 3400 mutant crop varieties globally. FAO and IAEA have almost 60 years of joint experience in inducing mutations in agriculture in various countries.

According to IAEA, agriculture is the second largest source of Greenhouse Gases (GHGs) emission after energy generation. Growing crops, raising livestock and other forms of land uses are responsible for 23% of human induced GHGs emission. One of the many benefits of nuclear applications in agriculture is that it leads to 50% reduction in GHGs emission as compared to conventional methods of agriculture. Agriculture is the backbone of Pakistan's economy. According to Pakistan Economic Survey (2022-2023), agriculture contributes around 18.23% to the GDP. It employs around 38.5% of the total labor force. However, Pakistan's agriculture sector is faced with a number of challenges. According to Asian Development Bank report (2017), by 2040, agricultural production will decline by 8%-10% in Pakistan due to temperature rise.

Pakistan's National Climate Change Policy 2021 highlights many benefits of nuclear applications in agriculture. The Policy objectives include: (i) To develop climate resilient agriculture and food systems for all agro ecological zones in the country; (ii) To develop varieties of crops which are high yielding, resistant to heat stress, drought tolerant, less vulnerable to heavy spells of rains and less prone to attack by insects and pests; and (iii) To develop salinity tolerant crop cultivars for coastal agriculture. Pakistan Atomic Energy Commission (PAEC) has a long experience in developing mutant crop varieties. PAEC has established four agro-based institutes: (i) Nuclear Institute for Agriculture Tando Jam (NIA), in 1962; (ii) Nuclear Institute for Agriculture and Biology Faisalabad (NIAB), in 1972; (iii) Nuclear Institute for Food and Agriculture Peshawar (NIFA), in 1982; and (iv) National Institute for Biotechnology and Genetic Engineering Faisalabad (NIBGE), in 1994. These institutes are contributing in areas of food security, food safety, sustainable agriculture, high yields despite climatic challenges, cost-effectiveness, quality products, improving farmers' livelihood, corporate linkages, meeting Sustainable Development Goals (SDGs) and biodiversity. Agriculture institutes under PAEC

have developed over 130 varieties of mutant crops, including: (i) Wheat; (ii) Rice; (iii) Cotton; (iv) Sugarcane; (v) Chickpea; (vi) Mungbean; (vii) Lentil; (viii) Oil seeds; (ix) Tomato; and (x) Kinnow.

Sindh was particularly impacted by flash floods in 2022. According to satellite images acquired, between 2228 August 2022, flood water directly inundated about 2.5 million hectares of land (over 18% of Sindh's total area) which resulted in limiting mobility in nearly three-fourths of the province. The province faced crop losses of almost Rs. 364 billion during the floods. Sindh is also projected to suffer due to increase in temperature. According to Climate Change Policy of Sindh (2022), "increase in temperature will increase the evaporation rate of moisture from the soil surface and transpiration from plant tissue in vegetated areas of Sindh."

According to Pakistan Agriculture Research Council (PARC), agriculture sector of Sindh contributes significantly to the national economy. Sindh province accounts for 42% of the rice production, 23% of the cotton production and 31% of the sugarcane production. NIA is an important agriculture Institute under PAEC. The Institute has, over the years, introduced eighteen mutant crop varieties in Sindh. The first mutant variety of wheat was introduced in 1979. The crop seeds produced by NIA are affordable, high quality and address climatic challenges such as heatwaves, land salinity and droughts. This is evident as sales of these seeds from 2005 to 2022 have increased as follows: Cotton by 1,868.9%, Wheat by 380.5% and Rice by 200%. During the last decade, Pakistan has faced serious threats due to Climate Change. Use of climate-smart nuclear applications in agriculture is one way to effectively address climatic threats and food security challenges in Pakistan.

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