FIFTY FIFTH CONVOCATION

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CONVOCATION ADDRESS

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His Excellency, the Governor of Karnataka and Chancellor of the University of Agricultural Sciences, Bangalore (UAS-B), Shri Thaawar Chand Gehlot; Honorable Minister of Agriculture and Pro-Chancellor of the University, Shri B.C. Patil; Vice-Chancellor, Dr. S. Rajendra Prasad, Members of the Board of Management, Academic Council; Faculty Members, Representatives of the Press and Media, Special Invitees and Guests, Parents/guardians of the students and my dear graduating students, ladies and gentlemen, I am very happy to be here for this 55th Convocation of the University.

I am delighted to participate in the 55th Convocation of UAS, Bangalore. I congratulate all the graduating students for their academic performance and faculty members for guiding them to achieve well deserved degrees and awards. I wish that the value system and morals acquired by the students at this University will invoke them to face the world with confidence and utilize the knowledge for the benefit of humanity. In the education sphere, India has shown the leadership to other countries of the world for thousand years ago, whether it is Nalanda or Takhshila, where the learners were coming from across the globe to learn from India's experience and knowledge system, health management techniques, the traditional medicine system, particularly vedic philosophy, the India's philosophy, the understanding of Dharma as

a way of life. We have new education policy and hopefully, we will be the global leader, rooted in the past, rooted in the traditions, rooted in traditional strength and again leading the world.

Having said this, I will come back to the area of agriculture and various aspects and facets of agriculture, which is very important for the country. On many fronts, we have succeeded and we have done well. However, there are areas of concern and how do we contribute and take this country forward and make this country a global leader in the arena of agriculture. India was, again, thousand years ago, India was doing exceedingly well in Agriculture and exporting many products and that is how we attracted the attention of the colonizers. They conquered our country and the history is full of all kinds of exploitation and all kinds of examples that we all have knowledge about.

Food and Nutritional Security

Agriculture can remain the most dependable segment of the Indian economy. With food-grain production expected to cross the 300 million tonnes mark, our country has been among the largest producers of milk & milk products, wheat, rice, fish, fruits, vegetables and meat. Further, according to a report by PWC and FICCI, every ninth agri-tech companies have expanded

their presence beyond the Indian territory. Experts opine that the Indian economy recovery would be one of the major reasons for it. This is the time when we must focus on secondary agriculture. Logistics like storage, transportation and credit and market information are crucial for transforming subsistence-agriculture into sustainable, profitable agriculture. Indian farmers incur Rs.92,651 crore per year in post-harvest losses, the primary causes of which are poor storage and transportation facilities. While India's annual food-grain production is expected to cross 300 million tonnes, the present storage capacity is around a mere 100 million tonnes. The digital revolution has opened new windows for Indian farmers. Technology like precision agriculture, e-extension, drone-led agrichemical spraying, smart warehousing and transport optimization, real-time yield estimation and price information, credit and insurance management and e-marketing have proven their applicability in making agriculture easier, predictable and profitable. Indian agri-tech start-ups are today valued at $ 204 million, which is estimated to be just 1 % of current market potential. At the national level, the proportions of the harvested produce loss are significant. There are estimated to indicate that 34-40 per cent of perishable commodities like vegetables and fruits are lost before they are consumed. This would be a great loss to the nation and come in the way of country's Doubling of Farmers' Income program. Therefore, we

need to think of a robust system to minimize post-harvest and storage losses. The graduates from the field of Agri-Marketing and Business Management have wonderful opportunities to help the farmers and also the consumers by supplying high-quality farm produce to their homes. Digital technology and forecasting models would help in predicting the demand and avoiding glut in the market, especially for highly perishable farm produces.

Population Growth, Malnutrition and Hunger

As a candidate who graduated from this prestigious University, I am sure you are ready to face various issues and challenges in the diverse fields of agriculture. As a graduate of an agricultural University, you have an important role to play in managing the crisis, especially in the rural areas; India needs your innovative ideas and approaches to sustain the farm activities and increasing farmers' income. Innovative strategies that integrate education and nutrition programmes hold great importance in combating the malnutrition problem. The Global Nutrition Report (2014) estimates that every dollar invested in a proven nutrition programme offers benefits worth 16 dollars. Innovations in biofortified food can alleviate malnutrition only when they are scaled up with supporting policies. This would require increasing expenditure on agri-R&D and incentivizing

farmers by linking their produce to lucrative markets through sustainable value chains and distribution channels. This will generate remunerative income for farmers and fuel the scaling-up of the unfolding technology. The government can also rope in the private sector to create a market segment for premium-quality biofortified foods to cater to high-end consumers. Moreover, a national awareness drive on the lines of the "Salt Iodisation Programme" launched by the government in 1962 to replace ordinary salt with iodised salt, can play an important role at the individual and community levels to achieve the desired goals of poshan for all. Branding, awareness campaigns, social and behavioural change initiatives such as community-level counselling, dialogue, media engagement and advocacy, especially amongst marginalized communities, can promote consumption of locally-available, nutrient-dense affordable foods among the poor and children.

With the help of the green revolution, we managed to meet the food demand. We need to look for an ever-green revolution henceforth. For sustained production, it is important to evolve innovative technologies, some of them have to be region-specific, as agriculture is a regional issue. There are several modern production and precision technologies, such as seed (priming)-based technologies, nano-agriculture, microbiome-mediated crop production technologies, etc., which

are to be exploited. I feel, interdisciplinary and cross-boundary approaches are needed for the rapid increase in food production and Artificial Intelligence (AI) - based technologies play a crucial role in the evergreen revolution. With fewer people preferring the farming profession, most farmers are facing the challenge of a work-force shortage, therefore, modern mechanization and AI in agriculture would be highly rewarding.

Climate Change and its Impact on Indian Agriculture

India may have already lost 3% of its gross domestic product (GDP) on account of global warming of 1 degree Celsius over pre-industrial levels and risks losing 10% of its GDP in the extreme scenario of a 3 degree Celsius increase, which would lead to a rise in sea levels, a decline in agricultural productivity and increased health expenditure, according to a report by London think thank ODI. Some of the studies cited by the report make direr predictions. Citing a research paper published last year by Oxford Economics and authored by economist James Nixon, the ODI report says India's GDP would currently be around 25% higher were it not for the costs of global warming, and predicts that, with 3 degree C of warming it is likely to be 90% lower by the end of the century than it would have been otherwise.

Climatic factors are the most important determinant of crop productivity, particularly in a country like India, where about 2/3rd of the cultivated area is rainfed. Climate change, therefore, is of serious concern having large-scale impacts, directly and indirectly, on agriculture. India is the largest producer of pulses, okra, banana, mango, lemon and the second-largest producer of crops such as wheat, rice, groundnut, brinjal, potato, tomato, onion, cabbage, cauliflower, etc. We produce more than one-fifth of the global production of rice and pulses. What would happen to our agriculture due to fact changing climate? Global warming or climate change impacts are of many types, the most significant one includes rising sea levels, frequent extreme weather conditions, changes in precipitation (intensity and pattern) and expansion of deserts. As you know, agriculture sector is highly vulnerable to these disasters.

Most of the vegetable crops are severely affected by drought, high temperatures and flooding. We need to make concerted efforts to sustain the production as Agri-sector is already threatened by land degradation, less water availability and biodiversity losses under climate- change situation. We need to think of green technologies and look for mitigation options by removing, reducing or displacing the emissions of greenhouse gases. There are attempts made now to evolve climate-resilient crop types and efficient, eco-

friendly crop production technologies (emerging microbiome-enabled technologies) to sustain or boost crop growth under stressful conditions. Efficient input or resource and water management is the critical factor for overall climate change resilience in India. Under water-limited conditions look for water-use efficient crops (including millets), alternative less water-consuming agricultural activities. For targeted crop improvement and stress-resilient trait improvement focused research using modern technologies such as multi-omics, genome editing, etc., are needed. Data mining and predictive analytics would be useful for efficient forecasting and planning agriculture under the situations of changing climate. As some of you know predictive analytics is a type of data analytics aimed at making predictions based on historical/existing data and analytics techniques. Predictive analytics can generate future insights with a significant degree of precision in various events. With the help of predictive analytic tools and models, one can reliably forecast trends and behaviors. I feel, such approaches are needed for crop improvement and also crop management.

Risks and Policies to mitigate ill effects of climate change: To address the long-term negative impacts of climate change and short and medium-term impacts of climatic variability on agriculture, there is a need for sustained research on increased adaptation and

mitigation, capacity building, development activities and bringing necessary changes in policies. These actions have to be accompanied by long-term sustained actions towards generation and strengthening of strategic knowledge system in key impact sectors like water, agriculture, energy, health, etc., by building human and institutional capacity. The National Mission on Strategic Knowledge for Climate Change (NMSKCC) was initiated with this very objective. The mission had identified various thematic areas and professional expert groups in India in some scientific institutions for commissioning thematic and policy research programs and activities.

A study under the International Plant Protection Convention (IPCC) by Food and Agriculture Organization (FAO) indicated several threats. The scientific review looks at 15 plant pests that have spread or may spread due to climate change. A single, unusually warm winter is capable of providing conditions suitable for insect infestation. As mentioned, climate change would result in increasing problems related to plant/ecosystem health of managed (agriculture horticulture, forestry), semi-managed (national parks), and presumably also the unmanaged ecosystem. Preventive and curative plant protection is one of the key components needed. As you know, 10 to 28 percent of global crop production is currently lost to pests and plant diseases and rob

the global economy of more than $220 billion annually. Invasive pests cost countries at least $70 billion and they are also one of the main drivers of biodiversity loss according to the FAO. Movements like these threaten food security as a whole and small farmers (as well as people) in countries where food security is an issue, are among those especially at risk. The key initiative of the International year of plant health is preserving plant health is fundamental to achieve the Sustainable Development Goals *i.e.,* sustaining plant health is an integral part of our work towards more efficient, inclusive, resilient and sustainable agri-food systems.

I am happy to note that UAS-B has played a vital role in HRD and research, especially in areas of dry land agriculture. The University has contributed to the basic and strategic research in diverse areas and established strong linkages with national and international institutes of high reputation. I am delighted to know that the University is encouraging startups and is housing a well-established Agri-Incubation Centre. These types of initiatives would activate our graduates and ignite entrepreneur-thinking in their minds, which is essential to create new jobs required for nation-building at large. Industry linkages are needed to generate industry-ready graduates and two-way learning can be highly beneficial.

Tomorrow's Agri-entrepreneurs and Smart Farming

We have the mission to make our country a developed nation. Agriculture and food processing will play a significant role to transform India into a developed nation. AI in agriculture will also play significant role to make agriculture more resilient and productive. Horticultural revolution will reduce the gap between village and urban areas. The reforms in agricultural education through STUDENT READY Programme must produce graduates with entrepreneurial skills who can be "Job Creators" rather than "Job Seekers". Priority and emphasis should be on supporting the needs for self-employment scheme in start-ups and setting up of agri-clinics to reach out to farmers through extension service. Hence, there is an urgent need to include the courses on entrepreneurship, to address the demands of diversified agriculture and emerging global markets.

So, the students are trained to be tomorrow's Agri-entrepreneurs. Today the focus of our agricultural education is to make India globally competitive. We are trying to make the students tomorrow's entrepreneurs, instead of becoming job seekers, they are becoming job givers. We are trying to have processing and value addition at the farm gate and production sites. The cluster based production approaches are being implemented at this point in

time. In the coming five years, 10,000 farmer producer organizations are going to be formed with the support of central government and one can go beyond the target. Once this 10,000 farmer producer organizations are built, thousands of farmers should be linked to this farmer producer organizations. The graduates, post-graduates' students, having management degrees are going to manage this farmer producer organizations because it's a big business venture for production, processing, value addition and market link. Everything is going to happen in these farmer producer organizations.

We provide farmers with agronomy intelligence required to manage the crops right from land preparation to harvest. This broadly involves nutrition management, pest and disease management, water management and inter-crop operations. This gives the right diagnosis and builds personalized solutions for the farmers. Then, we provide access to inputs based on the farmer's needs across the cropping cycle and lastly, we enable farmers to sell the produce to buyers at a better price through Gram Vyapaar. The digital map will provide multiple soil parameters - ranging from temperature and moisture to carbon and nitrogen levels. Armed with the data, farmers can get actionable insights through AI and ML-based models. The solution is already live in a few farms across the world, including in India.

Alongside startups, the Indian government is also encouraging the use of technology in agriculture. Policy think-tank NITI Aayog has partnered with technology company IBM Corp. to develop a crop yield prediction model using AI to provide real-time advisory to farmers. The first phase of the project is currently on in Assam, Bihar, Jharkhand, Madhya Pradesh, Maharashtra, Rajasthan, and Uttar Pradesh.

Dear students, as we celebrate your accomplishments today, remember there is no room for complacency. Though it is said that life is not a bed of roses alone, you will do well to remember that life is beautiful only when thorns come along with the beautiful flowers. Challenges provide you opportunities to improve and excel and the secret of success lies in hard work. Finally, it is the day in your life, you must think how people will remember you in future. You have to evolve and shape your life. You must think and translate your thinking to action and create a mark for your future life. Hopefully, you will lead the country in agriculture in different front and bring innovation for agricultural revolution and social change. I once again congratulate the students of UAS-B who have received degrees, medals and awards today and wish them all the best for their journey ahead. My best wishes to UAS-B for success in its mission of contributing to the sustainable development goals of the country. Dear graduates, hard work and

perseverance can take you to the highest level, do not stop learning, continue to learn and grow with knowledge. I wish you all the success and a promising career ahead.

I thank the Vice-Chancellor, Members of the Board of Management and faculty for inviting me to this 55th Convocation and share my views.

Thank you

Jai Hind

Dr. Trilochana Mohapatra

Dr. Trilochan Mohapatra born on 20th April, 1962 at village Kharibil, Dist. Cuttack, Odisha, India and completed his B.Sc. (Agriculture) from OUAT, Bhubaneswar in 1985, M.Sc. in Genetics from Indian Agricultural Research Institute (IARI), New Delhi in 1987 and Ph.D in Genetics from IARI, New Delhi in the year 1992, is presently holding the position of Secretary, Department of Agricultural Research and Education & Director General, Indian Council of Agricultural Research. Prior to this, he worked as the Director of the prestigious IARI, New Delhi and the Director of National Rice Research Institute (Formerly CRRI), Cuttack, Odisha and as a researcher & teacher for over 27 years at the National Research Centre on Plant Biotechnology, IARI, New Delhi, India. His area of specialization is molecular genetics and genomics.

Dr. Mohapatra has over 160 research papers in national and international journals of repute and several book chapters. His research accomplishments include development of the first high-yielding Basmati rice variety resistant to bacterial leaf blight through molecular marker assisted selection and physical mapping and genome sequencing of rice and tomato. His contribution to science is reflected from high h-index and i10 index. He initiated mega research programmes in frontier areas including genomics, phenomics, bioprospecting of genes, allele mining and induced mutagenesis for functional genomics. He created a large pool of trained human resource in the area of molecular breeding that has enabled successful product development following this approach. He has the distinction of receiving several honours and awards in recognition of his excellent academic and research contributions including the INSA Young Scientist Award, Prof. LSS Kumar Memorial Award, NAAS-Tata Award, IARI-BP Pal Award, DBT Bio-science Award, NASI-Reliance Industries Platinum Jubilee Award, Shri Om Prakash Bhasin Award 2016, IMS Diamond Jubilee Memorial Award 2016 and Dr. D. Sundaresan Memorial Oration Award 2017. He also received the Recognition Award of the National Academy of Agricultural Sciences for the biennium 2013-14 for significant contributions in Plant Improvement and the Lifetime Achievement Award of the Indian Genetics Congress in recognition of outstanding contribution in the field of Plant Genetics and also by the Indian Society of Agricultural Biochemists. Dr. Mohapatra is an esteemed Fellow of the Indian National Science Academy, New Delhi, National Academy of Sciences-India, Allahabad and the National Academy of Agricultural Sciences, New Delhi. He has been conferred doctoral degree (honoris causa) by Amity University, Noida, Uttar Pradesh, Orissa University of Agriculture & Technology, Bhubaneswar, Y.S. Parmar University of Horticulture & Forestry, Solan, Himachal Pradesh and Siksha `O' Anusandhan University, Bhubaneswar, Odisha.