*Speech by Her Excellency*

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*President of the Republic of Mauritius*

*on*

***"Reconciling Agro-Biodiversity Conservation with Food and Nutrition Security in a Changing Climate"***

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*at 16 30 hrs*

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*Ladies and gentlemen, Good afternoon*

**Thank you for the kind invitation, it is a pleasure to be at Princeton, one of the world's distinguished centers of higher learning and scholarship. In preparation for this visit, I did my part and visited the Albert Einstein Memorial at the National Academy of Science in Washington, DC.**

**The Nobel Prize for Physics 2017 edition has gone that extra mile in proving what a great scientist Albert Einstein has been. His thoughts and ideas still resonate to this day.**

**As an academic, I needed little persuasion to accept Smitha Haneef's invitation, especially since the topics of food and nutrition security and biodiversity conservation are close to my heart.**

**On a more parochial note, I've looked forward to visiting Princeton since the 2013 publication of a case study of Mauritius by Gabriel Kuris, Deputy Director at the Center for the Advancement of Public Integrity at the Woodrow Wilson School.**

**That study took a hard look at the economic evolution of my country over the past 40 years, growing from a GDP per capita of $350 and exports consisting of 92% sugarcane, to a modern, knowledge-driven economy today where information and communications, offshore finance and upscale tourism together account for 72% of GDP, and in 2016, gross national income per capita was under 10.000 USD.**

**Mauritius is a tiny island country of 1.3 million inhabitants 680 miles off the east coast of Madagascar.**

**Yet it plays an outsized role in the economic development of the African continent and serves as the global financial hub for much of the Foreign Direct Investment (FDI) flowing from the industrialized world, including increasingly from China.**

**In the case of India, roughly 40% of FDI flows go through Mauritius.**

**This is achieved through a system of bilateral and multilateral trade agreements across Africa and the world, based on a commitment to transparency, integrity, and treaties that eliminate double taxation and cut red tape.**

**These strategies have attracted some of the world's most respected banks to Mauritius.**

**Aspiring to and achieving this world class standard is reflected in our place as Number One in Africa in the Legatum Prosperity Index global ranking – accounting for the economy, business, governance, education, health, safety & security, personal freedoms, social capital and the natural environment.**

**The thriving service sector is playing a critical role in strengthening the Mauritian economy, and the small island developing state is in turn playing a critical, supportive role in growing the economies of Sub-Saharan Africa.**

*Ladies and Gentlemen,*

**Let me now turn to the main topic, agrobiodiversity and why it matters for food and nutrition security in the face of a changing climate.**

**I intend to look at these issues primarily through the lens of food – its production, consumption and distribution - which affects us all.**

**Let's look at the numbers.**

**Most of the world's poor people live in rural areas, and 78% of the world's poor depend on agriculture for their livelihoods.**

**By 2050, the world's population is expected to reach 9 billion people, and food production will need to increase at least by 50 percent and more in the populous parts of Africa and Asia.**

**Today, according to FAO, over 812 million people go to bed hungry every day. Sadly, hunger amid plenty is the tragic leitmotif of our times.**

**Food in the form of a balanced and nutritious diet is fundamental for sustaining human life. The numbers are stark.**

**More than two billion people suffer from micronutrient deficiencies, that is, their diets lack key vitamins and minerals necessary for growth, development and for fighting disease.**

**Children bear a disproportionate share of the burden of malnutrition. Over 165 million children under age five are stunted. In Sub-Saharan Africa and Asia, that means one child in every three is stunted, with adverse, life long consequences such as reduced cognitive development, which in turn undermines earning potential during adulthood.**

**In terms of non-communicable disease, over two billion people are overweight or obese, and with two-thirds of the world's obese coming from developing countries, it is clear that obesity is not just a problem confined to industrialized countries.**

*Ladies and Gentlemen,*

**Agriculture has a large environmental footprint. It is the largest user of land, biodiversity, and fresh water resources to name just a few.**

**Over 70 to 80 percent of fresh water withdrawal is used to irrigate crops. Agriculture is a profligate user of water - It takes roughly about 1,400 litres of water to produce a kilogram of rice. And demand for this water-intensive crop is spiralling.**

**Take the case of West Africa where increasingly rice is food itself. In March 2017, The Economist reported that between 2000 and 2014, rice production jumped from 7.1 to 16.8 million tonnes.**

**The newspaper's punchline: West Africans are eating more like Asians and Asians are eating more like Americans, read more animal-protein intensive diets.**

**Biodiversity is central to human existence. Over millennia, humans have depended on plant diversity, both wild and cultivated, to meet their needs.**

**Biodiversity is a critical resource not only to address sustainable agriculture, but for all of our ecosystemic needs.**

**Increasing the sustainable use of agricultural biodiversity in production and consumption systems will be an important part of the solution to the challenge of meeting future food and nutrition security.**

**Conservation of biodiversity must span the entire spectrum of activities and locations, on-farm, off-farm, in seed banks, all the while drawing on the wealth of local, indigenous knowledge.**

**Let me turn briefly to climate change, because agriculture and food production are closely linked.**

*Ladies and Gentlemen,*

**Climate change is said to be the single-largest threat to achieving the sustainable development goals. Already, the effects of climate change are acute in Africa.**

**Observable effects on water resources include flooding, drought, changes in distribution and intensity of rainfall, drying-up of rivers, melting of glaciers and receding bodies of water.**

**Droughts, heat stress and flooding have all led to a reduction in crop yields and livestock productivity, and to the destruction of homes, shelters and villages across the continent.**

**Conflicts over resources also exacerbate these impacts and, in turn, contribute to ongoing migration within and between countries in Africa.**

**A United Nations report predicts that access to water may be the single biggest cause of conflict and war in Africa in the next generation.**

**Currently, agriculture and land use changes contribute 25% of greenhouse gases. We need climate-smart agriculture to fight the negative effects of climate change while working to achieve the triple win of increased productivity, greater resilience and lower emissions.**

**Paradoxically, even as agriculture is a major contributor to the climate problem, it can also be a significant part of the solution through storing carbon in soils and adopting and scaling-up more climate-friendly farming practices.**

**A recent study by Ezekiel Mugendi Njeru and colleagues found that agrobiodiversity conservation is vital to attaining sustainable agricultural systems in the context of limited external inputs and climate change.**

**This is why the scholarly community assembled at the first International Agrobiodiversity Congress last year and adopted the Delhi Declaration of Agrobiodiversity Management.**

**The evidence is robust and growing that we must invest in and improve Sustainable Food Systems to meet many of our Sustainable Development Goals.**

**The broad elements of healthy, diverse diets, seed and crop diversity, improvements in seed and crop delivery and cultivation, and the maintenance of our agrobiodiversity must be optimized to ensure a healthy and prosperous future for all our people.**

**The magnitude of the task cannot be overstated. There is no scholarly consensus on the number of plant species on Earth – much less on the best strategy to protect and benefit from them.**

**The Kew Royal Botanical Gardens estimates that there are over 5,500 food plant species and almost 18,000 medicinal species, though some credible estimates for the total are over 75,000.**

**Biodiversity scientists such as myself know that solutions require knowledge, and knowledge starts with good data.**

**That is why we need a universal agrobiodiversity index, another consensus imperative. This will be an important step toward developing the common understanding necessary to find global solutions to the human challenge of sustainable health and prosperity across the world.**

**Ann Tutwiler and her colleagues at Bioversity International have summarized the key deliverables we expect of agrobiodiversity monitoring and implementation of sustainable practices. They are:**

- **to reform food systems to nourish people while nourishing the environment;**

- **to use agricultural biodiversity as a source of nutritious foods which are culturally acceptable and often adapted to local and low-input agricultural systems, and which also produce important traits for breeding resilient, nutritious crops and animals;**

- **to improve farming and breeding systems, and**

- **to support policymakers and the private sector by providing reliable data to be used to guide interventions and investments for sustainable food systems.**

**Another factor that sits squarely at the nexus of agricultural health and nutrition is climate.**

**A major finding of the post-Paris Climate Accord UN FAO study is that hunger, poverty and climate change need to be tackled together. Farmers, pastoralists, fisherfolk and community foresters depend on activities that are intimately and inextricably linked to climate – and these groups are also the most vulnerable to climate change.**

**A World Bank study, "Shock Waves," has warned that absent climate action, 100 million people will be pushed deeper into poverty by 2030.**

**These people – all of them survivors and providers -- will require far greater access to data, technologies, markets, information and credit for investment to adjust their production systems and practices to meet the multifaceted challenges posed by a changing climate.**

**Economic modelling of the impact of climate change on Africa predicts a mean average global temperature rise of 1.5°C by 2040, with costs equivalent to 1.7% of Africa's GDP.**

**As the mean temperature rises 2.2°C by 2060, economic costs increase to the equivalent of 3.4%.**

**By the end of the century, with a mean temperature rise of 4.1°C, the economic costs are equivalent to just under 10% of the Continent's GDP. This is a loss Africa cannot ignore.**

**We must look beyond fossil fuels and the extractive industries to develop renewable resources to curb climate change and ensure sustainable economic development.**

*Ladies and Gentlemen,*

**Think about the potential of our oceans as a source of food and energy and incubator for biodiversity.**

**The oceans are home to about 2 million species, from the largest animal that has ever lived to the tiniest bacterium.**

**Marine biodiversity far outweighs that on land.**

**Oceans cover 71% of our planet's surface, are a life-support system for Earth and provide more than half of the oxygen we breathe. They are central in the planetary water cycle that produces rain and snow, and nourish more than 1 billion people with their primary source of animal protein.**

**The oceans also regulate the global climate; mediate temperature, and drive the weather, determining rainfall, droughts and floods.**

**They are the world's largest store of carbon: an estimated 83% of the global carbon cycle is circulated through marine waters.**

**Africa's flora and fauna is a similar source of natural wealth. This is especially critical in Mauritius, with a relative lack of oil and mineral resources compared to many other African countries.**

**I recently contributed an op-ed in *Nature* to underscore how our plants and animals can produce big financial dividends and improve human well-being.**

**Today, 60% of commercially available drugs are based on molecules derived from natural sources.**

**As an organic chemist and biodiversity scientist, I find it significant that while about 25% of all plant genetic resources reside in Africa, just 83 of the 1,100 plant-derived drugs marketed globally are synthesized from African species.**

**On our continent, 45,000 plant species are unexplored for their potential to serve as the molecular basis of pharmaceuticals. And African species are disappearing at almost twice the global rate, driven by climate change, habitat loss and haphazard development.**

**Opportunities for innovation are also emerging from biotechnology and the life sciences.**

**This is the premise of CARI, the Coalition for African Research and Innovation, for which I am privileged to serve as Chair of the Leadership Council.**

**CARI seeks to establish the proof of principle that world-class, pan-African science and innovation can be mobilized for tackling Africa's deep and entrenched development challenges, led by Africans, in Africa, with priorities set by Africa, for Africa in strong partnership with the international community.**

**In this way Africa can claim its rightful place as a global driver of prosperity for the benefit of all.**

**Even though Mauritius and nearby islands are designated as biodiversity hotspots, almost 100 species have become extinct since the arrival of people in the seventeenth century, and only 2% of the native forest remains.**

*Ladies and Gentlemen,*

**Mauritius, by any standard, is tiny. Yet with the right priorities, small countries can punch above their weight.**

**While African nations are a rich and growing source of fossil resources, home to six of the top ten global discoveries in the oil and gas sector in 2013, alternatives to extractive industry sources of energy are essential for a sustained African economy.**

**Effective investment in these priorities requires the right technical, legal, regulatory and cultural conditions.**

**To this end, I helped found what is now the "Centre International de Dévelopement Pharmaceutique", which searches for ingredients from our local species with the potential for development.**

**A recipe from the San people of southern Africa has led to standardized extracts of the plant *Sceletium tortuosum* to be tested for their tranquillizing properties.**

**Other extracts of African plants — including nuts of the shea tree and seed oil of the baobab -- are used commercially in skin and beauty products.**

**All this opportunity is leveraged perhaps most critically at the point of development known as the 'valley of death', the transition from lab bench to marketplace.**

**At this critical juncture, significant resources are necessary to overcome the research, regulatory, economic, clinical, legal and other barriers to drug development, such as they did in containing the Ebola outbreak before it became a global scourge.**

**Paradoxically, one factor that positions us to succeed is that in many industries, we have little or no legacy. This relative lack of robust infrastructure and vested financial interest means little resistance to and greater agency for Africa to use innovation as a mechanism to leapfrog to better solutions.**

**Addressing these challenges involves many moving parts. Our health and prosperity are a function of interdependent, transdisciplinary scientific research, and, in a broader context, of climate, nutrition, agrobiodiversity, health, agricultural management on all scales, environment, governance and the economy.**

**It requires sustained operational resources and capital support, and the capacity to engage successfully with funders, governments, policy makers, communities and other stakeholders.**

*Ladies and Gentlemen:*

**Only significant investment in all these elements – public-private investment in basic and translational research, development of sustainable resources, creation of the legal, regulatory and policy conditions to encourage research and development, and the right education and training for the next generation of scientists on the Continent -- will result in a sustainable research and innovation environment that leads to less disease and displacement, more prosperity and more independence in Africa.**

**My own small country of Mauritius provides a proof-of-principle that intelligent, strategic investment, based on a dispassionate view of the powerful forces at play, can yield important returns.**

**The challenge is not easy: reaching it depends on the contributions of highly-skilled individuals and ambitious initiatives such as CARI and the cultivation of sustainable agrobiodiversity.**

**Recognizing the critical importance of agrobiodiversity, I am giving my voice to the initiative of Food Forever initiative that aims at protecting both in situ and ex situ our germplasm so as to ensure our food security in a changing climate.**

**That's because it can be done, and it must be done. Our ability to create a sustained future for ourselves isn't optional: it's existential.**

**There's an African proverb that says, "The best time to plant a tree was 20 years ago. The second best time is now."**

**Bring your seedlings, and your shovels, and given that this is Princeton, the sheer, unadulterated power of your ideas and we can plant many trees together, nurtured among other things, with the latest, cutting-edge knowledge.**

**In so doing, we will help create a sustainable future where we banish the blight of hunger and malnutrition for the benefit of all. Our time for action is now.**

**Thank you.**