



## OSMANIA UNIVERSITY FOUNDATION DAY LECTURE ON WATER SECURITY FOR SOCIO-ECONOMIC DEVELOPMENT AND ECONOMIC GROWTH

On this occasion, I would also like to pay my homage to the founder of this 105-year-old institution, who did a great service to humanity and future generations. So, my sincere gratitude goes to the founder of this institution His Highness 7<sup>th</sup> Nizam Mir Osman Ali Khan. It was his foresight, his vision that today, Osmania University, the seventh oldest University in India continues to produce several great human minds ever since its inception. If someone has to learn about leadership or has to build a leadership development programme, they must come here to get insights from this institution. I am indeed intrigued by the fact that so many leaders have come out of this place in so many walks of life. I think it would be a great experience and learning to dive into its rich past and present. I am sure Telangana as well as the people sitting here must be very proud of this fact. And I am sure that many of our future leaders are already sitting here, and in the coming years, we will witness brilliance flourishing from this university.

Friends! Let me congratulate you on this foundation day, that you as a faculty member, as a student, and as an alumnus, are associated with this prestigious institution.

Coming to today's lecture, I compliment Professor Ravinder, Vice-chancellor, and my very dear friend Mr. K V Prasad for coming up with this idea and choosing the theme 'Water Security to Sustain Economic Growth and Prosperity'. I was requested to be part of this gala event, first of its kind, and share my ideas and vision of the water sector. More importantly, I am here to address a crucial question – How to manage water as a resource, which is playing the most critical part in our socio-economic development?

At times, when something is very near to us and is readily available, we don't realize its value. I think many of us in some way or other understood the value of 'Oxygen' during this Covid-19 pandemic. We had always taken the availability of 'clean air' for granted. But during this pandemic, we realized how valuable this resource is. Our needs and quest to survive do not imply in any way that we have the right to destroy our natural resources by cutting down trees or producing uncontrolled Carbon dioxide (CO<sub>2</sub>), Carbon monoxide (CO), or many other polluting agents. We must be sensitive and start thinking about the use and abuse of nature and natural resources.

Imagine the ways in which we struggled for oxygen during the COVID-19 pandemic. I don't think we should be waiting for any kind of pandemic to realize the importance and value of water. I don't think we can afford it. So friends, today's topic is 'water security to sustain economic growth and prosperity.' In a country like ours, with 1.37 billion, that is 137 crores people, every person is having his or her own aspirations and challenges to meet. With expanding economic activities and improving quality of life, demand for water is rising manifold.

Telangana has faced the issue of water shortages in the past. Many states in India have faced challenges in socio-economic development and economic growth, because of the unavailability of adequate water. In a country like ours, where almost more than 40 percent of the area falls under the arid or semi-arid region, 256 out of 734 districts are water-stressed. With such statistics, one can realize the value of water. However, whether water is a finite or an infinite resource is something to ponder upon. Whatever water we have under the ground or over the ground, is limited in quantity. Also, the water cycle is known to all of us. From the Himalayas through the snowfall to the underground reservoirs that we have, the finiteness of the resource is evident. Talking about the number of rainy days, these are about 20 to 30 days. The water we receive through this rainfall must be stored and used judiciously. Take, for example, food grains; keeping in mind our future needs, we grow, store, and use them. If it is a drought year, the food grains stocked up help in mitigating the food crisis. This kind of traditional wisdom has existed before and is age-old in the country. Similarly, such kind of wisdom needs to be underscored for water. Whatever water we get from rainfall, we have no choice but to store it without allowing it to get polluted. The Telangana State Planning Board vice-chairperson is sitting here, and I am sure that he will be taking this forward.

I think we will realize how it is nearly becoming impossible to construct big dams. It has become next to impossible because of environmental and anthropogenic factors. Hence, storing water becomes paramount. There can be only two ways of doing so. Firstly, existing infrastructure in the form of dams, reservoirs, or tanks needs to be improved to increase and utilize their full capacities. In the morning, I was told about it in detail and I'm very proud of the fact that it has been done in Telangana. All water tanks in Telangana have been de-silted, repaired, and restored. This is the first step towards achieving water security. Secondly, the storage of rainwater can be done through aquifer recharge. That too has been done here and, in many states.

I have spent a considerable time of my life in Gujarat. The years 1985, 1986, and 1987 were drought years. In those

years, Rajasthan and Gujarat faced many challenges in ensuring water for everyone. The need for a framework for water-stressed areas was realized. As a result, National Drinking Water Mission was launched at the national level. From 1999 to 2001, eight states were reeling under drought and water crisis. These circumstances led to a commitment to resolve and avert the crisis and the development and use of various water-related technologies over time.

In Gujarat, in those years, 8,000 to 10,000 water tankers and trains were used to ensure drinking water for people. In 1999-2000, the GDP growth of Gujarat was 1.2 percent. In the following year, it was negative; that is - 4.89 percent. Concomitantly, in the five-year period from 1997 to 2002, Gujarat's GDP grew by only 2.6 percent. We witnessed and lived through those kinds of scenarios. With more than 28 percent population comprising youth and rising expectations of people to provide jobs, better facilities, and improved standards of living, the administration and governance were focused on providing drinking water rather than creating opportunities.

Against this backdrop, at the beginning of 2002, I was fortunate enough to be given an opportunity to address the challenges emerging in Gujarat. Through several initiatives, we started building a water-secure state. One of the most important of all activities was a decentralized, demand-driven, and community-managed water supply programme. It was done by making sure that water becomes everyone's business. From 2002 onwards, water governance meant involving people, restoring water bodies, de-silting tanks and reservoirs; interconnecting basins, and inter-basin transfers of water. Today, in Gujarat, just like in Telangana, people are not facing any kind of water scarcity.

I was told that farmers in Telangana are now growing two crops. That indeed is possible when water is managed properly at all levels. Imagine the kind of socio-economic development that happens when a state becomes water-secure. These are the kind of models that have been developed in the country. Let me give you a few facts and figures and I urge people like you to take this forward.

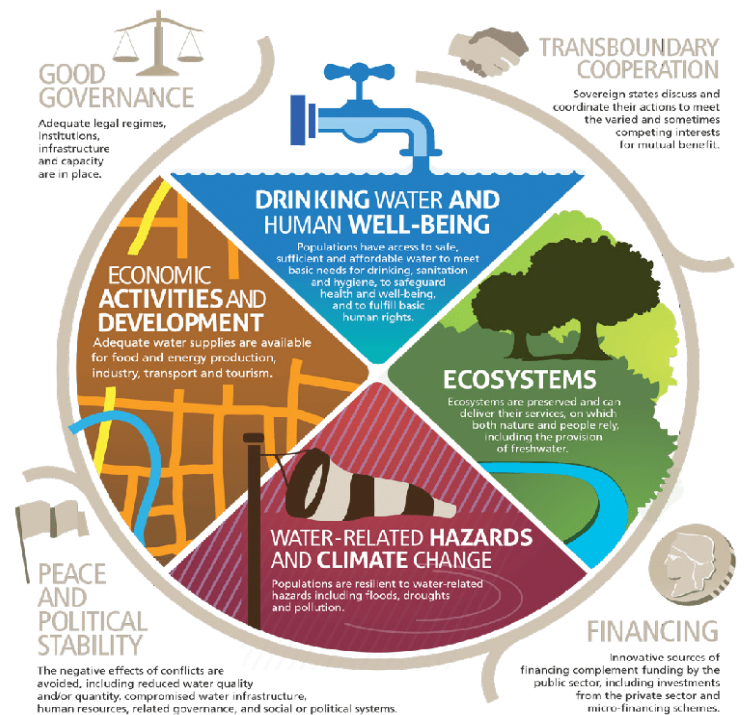
In 1951, the country's per capita availability of freshwater was 5,177 cubic meters. It declined to 1,508 cubic meters in 2014. It is estimated to decline further to 1,465 cubic meters by 2025 and 1,235 cubic meters by 2050. If it declines any further to around 1,000 - 1,100 cubic meters, then India could become a water-stressed country.

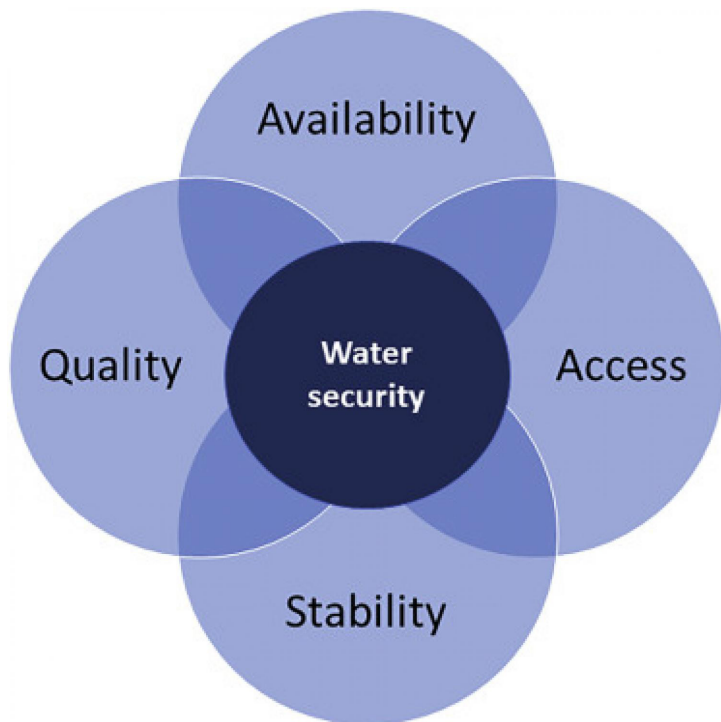
We must understand the gravity of this situation. Our population is increasing and so is our demand for water in all sectors. We have no choice but to make more and more water available to our citizens for conducting different activities. Although water cannot be produced, it can surely be recycled. Whatever we get from the rainfall, we must catch it, store it and use it. You might say that there is a whole sea or ocean surrounding the peninsula and we can desalinate it and provide for meeting all our needs. This can be very well taken as an argument. But as we all know, at this juncture, it is next to impossible for a country like India to use desalination technology to fulfil the massive water demands of its people.

In India, absolute poverty has come down rapidly in the last ten to twelve years. The study shows that today less than 10 percent of people are below absolute poverty, and the goal for next 6 - 7 years, is that not a single person should be living below the poverty line by 2030. If absolute poverty can be brought down from 22 percent to below ten percent in a span of ten years, then the goal to alleviate this ten percent population above the absolute poverty line can also be truly achieved.

If we can provide water security to our populations; if our farmers are able to grow more than one crop, if we are able to save the precious time and energy of our women which gets wasted in fetching water, then we would be able to convert their economic activities towards achieving high economic growth. Hence, for India to achieve the goal of a 5 trillion economy by 2025, we must ensure equitable water distribution.

If some states are having floods and other states are reeling under droughts, that also highlights the issues in water management. To address these gaps, the Government of India is working on the inter-basin transfer of water. Wherever plenty of water is available and allowed to get wasted, we may channelize it to the areas where it is needed most. I personally feel that the time has come for us to focus on sound water management. Efficiency in water management is the key to improved quality of life. You must have noticed that in the last 7 - 8 years, the Gov-





ernment of India has taken many initiatives to achieve water security.

Before we think of collecting rainwater, the first and foremost step is to put an end to open defecation. If left unchecked, one can very well imagine the quality of the rainwater collected. This was the very reason that in 2014, Swachh Bharat Abhiyan was launched to make the country 'open-defecation free'. Similarly, the revival of rivers was taken up because the realization had dawned that water is at the centre of all developmental initiatives. Namami Gange project was started and now thirteen more rivers have been taken up for revival and rejuvenation.

Also, in 2019, at the national level, a new ministry was formed by the name 'Ministry of Jal Shakti', which now deals with all aspects of water management. Whether it is demand, supply, technology, or utility development, the ministry caters to it all. It was also in 2019 that for the first time 'Jal Shakti Abhiyan' was launched. The idea was to 'make water everyone's business' and involve every individual in water management. Thereafter, a mission with an outlay of Rs 3 lakh 60 thousand crores was started by the name 'Jal Jeevan Mission'. Its goal has been to provide clean tap water to every rural

household so that our mothers, sisters, and our family members would not have to run errands in the search for water. I am happy to acknowledge that in Telangana, under the Mission Bhagirathi, this has been achieved. There are many other states or UTs, wherein now more than 90% of rural households have tap water connections.

Simultaneously, to decentralise water governance and involve our panchayats and women groups in rural areas, under the 15th Finance Commission, for a period of six years, around Rs. 1 lakh seventy-two thousand crores have been allocated to Panchayati Raj Institutions. Also, every state is getting tied grants for panchayats to manage water and sanitation annually. Under Jal Jeevan Mission, source development and source sustainability are equally important, so that the developed water supply system remains functional throughout its lifespan. I have been apprised of the fact that today in Telangana, there is no need to supply water by road tankers to people as every household has access to clean tap water. This one-time investment in the infrastructure is a first great step, but its long-term operation and maintenance are equally important. To sustain it and ensure that people continue to have access to clean tap water is the need of the hour. If we think through this, we might come to agree on the fact that while in rural households of Telangana, we might have succeeded in delivering clean tap water but in urban areas, the situation might be different. We still lack the confidence to drink and use water *directly* from the tap. In seminars and gatherings, we use bottled water instead. Surely, we do so because of convenience, but at times, the need for bottled water arises because of our lack of trust in tap water supply.

In every village, sensor-based IoT devices need to be installed so that the quality of tap water is checked, and people can have confidence that the water is safe to be consumed. To ensure that our children drink safe water, we all should know that the water that we drink is indeed potable. Hence, the next stage of utility development to ensure clean tap water is that in every supply system, there must be sensor-based devices propelled by Internet of Things (IoT), available on everyone's phone for him or her to check the status and quality of water.

Imagine that in our homes, we can test one's blood glucose levels but we are yet unable to test our water! Despite all the technological advancements, we have yet not developed a handy instrument that can check for water impurities. Hence, we must empower our citizens with real-time technologies, such as a domestic water quality testing device for drinking water, with the help of which they can inform their supplier that the water that it is distributed is clean or not. The ease of pouring water into that device, testing it, uploading the data, and ask for the water distributor to respond with a solution in real-time will make the water governance transparent and accountable, thereby putting the system in place.

In our country, we have more than 2,000 water quality testing laboratories in the country. However, most of us do not know where they are located. To bridge the gap between the citizens and water governance, the Government of India has opened all these laboratories to the public so that any citizen can go and get their water sample tested at a nominal cost. Afterwards, they can avail their reports online. That is the way forward to a transparent water governance. The time has come that our water supply or public health departments aim to cross the first level and reach the next stage. In this exercise, the youth of India, academicians, and scientists have immense responsibility on their shoulders. We need to develop the kinds of technologies and innovations that are futuristic, sustainable, and citizen-friendly.

Let's take another aspect. When we export one kilogram of rice, do we think of it in terms of the amount of water exported virtually through it? Whenever we export any highly water-intensive crop, we are not just exporting that particular quantity of crop or vegetable or fruit. We are essentially exporting water that is hidden in its produce. If there is an indiscriminate use of water in the production of such commodities, we would not be able to achieve water security. Some research papers have argued that it takes around 1,800 liters of water to produce one kilogram of rice. Exporting such amounts of virtual water from any arid and semi-arid regions of India would lead to a water crisis in the future. What we need is education and awareness generation, and a kind of economic model that needs to be developed by young and vibrant minds like you, which makes sure that we do not trap ourselves in a grim situation through such exports.

Let us take another example. Most of us on average, get around 150 - 200 litres of water per person per day in our homes. If we think carefully and check our consumption patterns, we will realise that we do not really need this much amount of water. In cities like Hyderabad or Secunderabad, an average each family must be getting around 1,000 litres of water per day. As per my understanding, an individual needs around 4 - 5 litres of water for drinking; 5 - 10 litres for cooking, and around 10 - 20 litres for bathing and washing. This drops down to around 50 - 60 litres of water use per day, an amount that can easily satisfy the daily need for water for each person. But our water consumption is far higher than what is needed. If we try to figure out our water consumption, we will conclude that it is not in washing or bathing rather, it lies in the flushing of our faecal matter! The water that we need to dispose of 300 - 400 grams of human excreta, amounts to more than 100 litres. Through gravity, the faecal matter is taken 20 - 30 km away from your locality to water treatment plants, it is then treated and sometimes even unfortunately so, released to natural ecosystems and habitats. The so-called modern sewer system was developed more than a hundred years back. Today, this accounts to be the most inefficient and redundant technology, given the water shortages we have in and around the world.

New innovations and technologies need to be developed and make the human excreta disposal systems sustainable and efficient. We have travelled in airplanes, and we know how efficiently human excreta is collected with the use of just 100 - 150 ml of water with what is known as vacuum toilets. We must think hard about the reasons for not inculcating such practices and technologies into our neighbourhoods, communities, and building structures. In modern buildings and apartments, the need of the hour is to collect the faecal matter through suction technologies. The proper management of faecal matter only requires a few simple steps namely, removal of odour, disinfection, combustion, utilization of gas for electricity, and what remains can be used as manure. In this way, consumption can be reduced from a hundred litres to a few litres in the disposal of human excreta.

The water that is used in the kitchen or bathing can also be collected separately, disinfected, and put into secondary uses. The demand for water can thus be readily reduced from 200 litres per person to around 60 litres per person. Out of these 60 litres, we can recover around 40 litres through reuse and recycling. This is the way forward for sustainable living that is not just water-friendly but also environment-friendly and futuristic. I am standing on the podium at one of the greatest universities. It is over here that I urge young minds to think and address such emergent issues and work on solving them. We need such leaders to emerge and provide a kind of leadership that converges sustainable development with environmental protection and judicious resource management. More importantly, we





need thinking beings who can move beyond just consumption and evolve best practices in all walks of life.

When it comes to agriculture, since India is largely dependent on its success, if we do not use technologies like micro-irrigation, and keep using flood irrigation, we will face huge water shortages in the near future. In Gujarat, we began micro-irrigation in a big way and our irrigated area doubled in ten years. The solution again, lies in water-use efficiency measures. Adopting such economic policies where we keep a tab on water consumption, through its measurement, is the key. There is a need for a revolution in our understanding of various aspects of water. Our knowledge systems need to be better equipped with modern-day challenges.

Finally, I come to the policy interventions, which we need to be understood and adopted:

Water must come into our day-to-day thinking and discussions, and it must become everyone's business, not just of the government alone.

Rainwater harvesting and artificial recharge for storage in our watersheds and aquifers is the way forward. There is no alternative to this. For this to succeed, the whole nation must remain Open Defecation Free (ODF) to save water from major impurities.

The usage of pesticides must be limited, and policy intervention is required for the same. We thoroughly need to reduce our spending on treating surface water or drawn from aquifers that are polluted by chemicals. This can be done simply by appreciating that prevention is better than cure.

We need to revive our old water storage systems by using traditional knowledge and wisdom. We have the example of Late shri Vishweswarya, who created the system of two reservoirs in southern India, which shows how people were involved in the process of conservation of water. We must capture that energy, where people get involved in rainwater harvesting, conservation, and recharge of groundwater.

Water use efficiency needs to become the norm. 85% of the water is used in agriculture and if we reduce that consumption by 5%, 10%, or 20%, huge water resources can become available for industrial or domestic use. Water use efficiency holds the key to water security.

Recycling water is the key. My experience with the government, be it in Gujarat, or at the national level since 1997 in the water sector, has taught me a lot. We are talking about consumption per family, per village, or overall, but none of us are really talking about the recovery of water. For water recoveries, there is no authentic data available. I appeal to this university, students, and faculty to investigate this aspect of water management. Under Mission Bhagirath, we need to know how much water is being recovered. With the data, we can re-evaluate and focus on the recycling of water. Administrators and engineers need to be examining this kind of data on a daily basis.

Usage of technological interventions is a must. One would realize that in the recent past hardly any path-breaking technological intervention has taken place in the water supply sector or management. Sprinklers and certain domestic devices for water conservation have come up, but issues like disposal of human excreta, recovery of water, or measuring and monitoring have not been in focus. Without measuring the usage of water, there can be no management of water. We must use technological interventions, especially in Hyderabad and Bengaluru, which are the

mecca of technology. My request to the university, and the Deputy Chairman is that sensor-based IoT devices are installed where the quantity of water supplied and recovery of water is measured. Sensor-based IoT devices and other automated technology should be part of this institute so that everyone knows how much water is consumed and recharged.

Leadership roles for women are the need of the hour. In water management, especially in rural areas, WASH committees need to be set up with mandatory 50% women as a sub-committee of the panchayat to operate, maintain and manage water supply, greywater, and local water resource management. Imagine a situation in a village where there is a groundwater-based drinking water supply and a farmer puts a tube well next to this for irrigation purposes. This will impact all households as the water supply gets interrupted. Such situations need to be tackled and water conservation activities need to be carried out at large scale. In the last 30 - 40 years, fetching water has been the biggest issue for women and young children. In Gujarat, the government has done its best to make sure that women are empowered within their communities to take up water issues in their own hands. Hence, women should be empowered to take leadership roles, control, and command to achieve water security. This positive intervention, wherein every village has a, Water, Sanitation and Hygiene (WASH) committee comprising 50% to 100% women members responsible for operating, maintaining, and managing water supply and carrying out quality tests, will bring a sea change. Imagine if women were trained and sensitized about testing, treating, and managing water, it will improve the health of not just one family but the whole community. Such investment in women and girls can bring tremendous change and enhance productivity.

When we say, water should be everyone's business, it means sharing knowledge, information, and experiences and working together with academic and technological institutions, state governments and their departments, parastatal organizations, foundations, and NGOs to change people's lives. The motto with which Jal Jeevan Mission started was 'building partnership, working together, and changing lives'. I think that this should be the motto for all of us, to make sure that we achieve better living standards, quality of life, and prosperity. ■

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