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**“MANAGING WATER FOR SUSTAINABLE
DEVELOPMENT IN MALAYSIA”**

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Introduction

1. First let me thank the organiser for inviting me to deliver this key note speech. Indeed it is an honour to be here with all of you today. Integrated water resources management, natural resources and sustainable development are matters that are very close to my heart.

2. Let me ask you to join me in reflecting on what has happened to our country over the last couple of years, when most parts of the country went through a hot and dry spell which necessitated water rationing and again in the following year, we saw a similar trend.

3. This was coupled with a flood not seen for a long time in certain areas in Malaysia, increasing numbers of flash floods in growing cities caused by urban heat island effects.

This was further compounded by the constant shutting down of several Water Treatment Plants due to pollution and that caused disruption in the supply of water supply to a large number of people.

Water is Life

4. Before I proceed any further, let us reflect on the connection between water and our life. Water, as we all very well know, is the basis of life; we can live for 3 weeks without food but we cannot survive 3 days without water.

5. The human body is also all about water, on average 60% of an adult body is water, our brains and lungs are 90% water and even our bones have 25% water. We need to drink at least 3 litres a day to stay healthy and need at least 30 litres for our other daily basic needs.

6. The early civilisations represent or picture a similar scenario as to why water is the cradle of life and form the foundation of human wellbeing and without water, the civilisations crumbled. Let us look at the Indus Valley Civilisation, along with Ancient

Egypt and Mesopotamia, it was one of three early civilisations of the Old World, and of the three, the most widespread. It was a thriving community between 3300 BC and 1300 BC and extended from what today is northeast Afghanistan to Pakistan and Northwest India. At its peak, it may have had a population of over five million inhabitants. It flourished in the basins of the Indus River, one of the major rivers in Asia. The eventual reduction in water supply from the river finally caused the demise of the civilisation and its people to be scattered eastward.

Another famous example is the abandonment of Fatehpur Sikri, the famed Moghul emperor Akhbar's new capital in 1585, shortly after its completion, due to the exhaustion of the small, spring-fed lake that supplied the city with water. History is thus littered with such examples.

7. Globally and in Malaysia, all major cities are sited beside rivers, our main source of freshwater. You name it and you will locate them, London, New York, Paris, Amsterdam and a hundred more all thrived and grew alongside rivers.

Likewise for Malaysia, the capital city, Kuala Lumpur where we are gathered right now, was raised at the confluence of two rivers, the Klang and Gombak Rivers. Other than that, Putrajaya, our new administrative capital has a man-made lake located right in the heart of the city, which not only enhances and beautifies the landscape and view of the city, but also functions as a key environmental and ecosystem modulating element. In short, water will always be the main factor for life to thrive anywhere in the world.

Global Water Resources Outlook

8. I have taken note that much stride has been made since our pledge at the Millennium Summit in 2000 to make fresh clean water available to a larger section of the human race particularly in the African Continent and the South Asia Sub Continent. There is, nevertheless still so much more to work for, when 663 million people are without access to safe drinking water; 1.8 billion more are exposed to polluted water resources;

200 million productive hours are lost by women and girls in collecting water from distant water sources and a child dies every 15 seconds from water borne diseases. This is indeed a very sad state of affairs.

9. Global demand still outstrips the supply of water with 1.7 billion people living in river basins where demand exceeds supply and 40% of the global population face regular water shortages.

10. The situation in Malaysia is far better than most developing countries with almost 94% of residences receiving treated water supply directly from the reticulation system and over 99% of the premises in the nation have flush toilet facilities. Although statistics and numbers show commendable progress, there are still persistent issues and challenges related to water resources which have now become increasingly apparent.

11. Although significant achievements have been made globally on many of the MDG targets, progress has been uneven across regions and countries. Even though the MDGs encompass both human development and environmental goals and targets, in practice they tend to progress in silos. And there are gaps that need to be addressed as millions of people are still left behind, especially the poorest and the vulnerable. Efforts to ensure global environmental sustainability have also seen mixed results.

12. Malaysia continued its international commitments in the field of sustainable development at the United Nations Sustainable Development Summit in September 2015 which contains 17 goals, Sustainable Development Goal (SDG) No.6 is specifically related to water.

13. SDG 6, for your information, contains six targets on outcomes across the entire water cycle. Two targets specifically address drinking water and basic sanitation needs which our country has already successfully fulfilled.

The remaining targets look into the broader water context that were not explicitly included in the MDG framework, but whose importance was acknowledged at the Rio+20 Conference, such as water quality and wastewater management, water scarcity, water use efficiency, integrated water resources management and the protection and restoration of water-related ecosystems.

Ladies and Gentlemen

14. Perhaps what's happening now in California should jolt us from our comfort zone as they are facing one of their worst droughts in many decades. For some of you who are not aware, California has been suffering from a severe drought situation over the last five years where as of mid-March 2016, approximately 34 million people and 84% of their area are affected.

15. California is the richest state in the US with an annual per capita income of more than USD60,000, it has a size of 439,000 sq.km i.e. slightly less than double of that of Malaysia and has more than 220 storage reservoirs with over 11.2 billion cubic metres in storage capacity and a good network of water services and ground water infrastructures.

16. Even with that kind of water storage capacity, excellent groundwater infrastructures and dense network distribution facilities, it has difficulty braving the kind of drought that is going on now. The losses incurred in 2015 was about USD 2.7 billion (RM11 billion) with over 220,000 hectares of farmland left uncultivated and a reduction of about 10,000 seasonal farm employment. The ill effects of the severe drought have been mitigated somewhat by the availability of good and ready groundwater infrastructures. Otherwise, the impact could be a lot worse.

17. A similar drought situation known as the Millennium Drought gripped Australia from 1995 -2012. The 2000s drought is said to be the worst recorded since settlement. The year 2006 was the driest on record for many parts of Australia. The drought began in 1995 and continued Australia wide until late 2009 with the final areas in drought ceasing in early May 2012. With the official end of the drought declared in 2012, the Federal Government had provided \$4.5 billion in drought assistance.

18. Let us also learn from another human made disaster which is the Aral Sea, which used to be the 4th largest freshwater lake in the world with an area of about 68,000 sq.km (approximately 50% the size of Peninsular Malaysia). Since 1960, the Aral Sea has been steadily shrinking after the rivers that fed it were diverted for irrigation projects. By 2007, it had declined to 10% of its original size, splitting into four lakes. The water was too salty for anything to survive.

19. These three significant events should serve as a lesson for everybody, even for a country like Malaysia who gets much more water than most other countries.

Water Resources Profiling in Malaysia

Ladies and Gentleman,

20. Please allow me to describe a little bit of what Malaysia possesses by way of our water resources.

21. Malaysia is one blessed nation. We have high rainfall, decent average flow of water in our rivers, an abundance of minerals and rich in natural resources. We have occasional floods of different scales, short hot and dry periods and we don't suffer from other severe natural disasters either. It helps that we are just outside the Pacific ring of fire and thus we do not suffer from volcanoes, earthquakes, typhoons and other severe natural disasters.

22. On average, Malaysia gets about 2,940 mm of rainfall a year, which is about three times the global average of 830mm/year. This amount is translated to about 970 billion m³, of which 412 billion m³ (43%) returns back to the atmosphere through evapotranspiration, 61 billion m³ (6%) percolates into the ground as groundwater and the remaining 494 billion m³ (51%) flow as surface runoff.

As storage infrastructures and withdrawal facilities are mostly sited upstream, mainly to suit the physical terrain and to avoid salt water intrusion issues, up to 85% of the surface runoff is estimated to travel to the sea.

23. One important aspect I wish to stress, although on average Malaysia gets a high amount of rainfall. However, due to typical precipitation characteristics coupled with other climatic and physical factors that govern rainfall patterns and trends, there are strong spatial and temporal disparities

between the states. Sarawak, my home state for instance, and the state of Terengganu, get more than their fair share of rain with more than 3,300mm/year while the states of N. Sembilan, Melaka and Perlis get only about 1,800mm/year.

24. As far as timing of the rain is concerned, the states of Kelantan, Terengganu, Pahang and Johor on the east coast of Peninsular Malaysia get about 55% of their rainfall during the Northeast Monsoon between the months of November and March and 41% during the southwest

Monsoon while the west coast states of Peninsular Malaysia get about a third each during the two monsoon periods and also during the inter monsoon months.

25. Due to the high rainfall depth and with several mountain ranges, Malaysia has a dense network of rivers of about 189 major river basins which are typically steep on the upper reaches, slightly gentler in the middle section before meandering gently in the downstream plains before discharging into the South China Sea or into the Straits of Malacca.

Most of the storage infrastructures are at the upper reaches where the physical terrains are ideal for the construction of dams and the forested catchment provide constant sources of water.

Water Resources Management in Malaysia

26. Managing water resources in Malaysia is a delicate affair. Just like India and Australia, Malaysia also inherits almost the same piece of constitution from the British where there is a separation of power and

responsibility between the federal government and the states and water resources and other natural resources fall under the purview of the state governments.

27. Nevertheless, the Federal government as depicted in the Federal Constitution has certain roles in the management of water resources especially with respect to promoting uniformity in legislations, providing technical advice, setting up of hydrological and other monitoring stations, collection of hydrological data and conducting surveys and relevant studies.

Water Services and Irrigation are in the Concurrent list where both the Federal and State Government have jurisdiction.

28. The Ministerial Function Act, which is also a federal act, spells the roles of responsibility of every ministry in the government and provides for the Ministry of Natural Resources and Environment to draft legislation and policy, provide guidelines and draw management plans with respect to natural resource and environment.

The Ministerial Function Act through the latest Federal Ministerial Order also stipulates that the Department of Irrigation and Drainage Malaysia (DID) handles water resources management and hydrology, flood management, river basin management, coastal zone management and sustainable urban drainage matters at the federal level. Every state also has a DID state office and state officers to deal with state and federal financed projects and programmes.

On the other hand, the National Hydraulic Research Institute of Malaysia (NAHRIM) functions as the Government Advisor on matters relating to hydraulics and acts as the National centre in hydraulic engineering research building a pool of experts to provide research services in planning, designing, building and implementing research on water resources development.

29. Malaysia also embraces Integrated Water Resources Management (IWRM) and Integrated River Basin Management (IRBM) and those policy directions were spelled in several Malaysia Development Plans as early as the 8th Malaysia Development Plan.

30. As with many IWRM approaches which stress the introduction of the enabling environments, Malaysia launched its National Water Resources Policy (NWRP) in 2012 and is now in the final stages of

legislating the National Water Resources Act (NWRA) for the purpose of introducing IWRM principles and elements and in promoting uniformity in water resources management.

31. With these two key enablers in place, Malaysia hopes to strengthen its water resources governance and management approaches.

Water Resources Security and Sustainability Issues and Challenges in Malaysia

32. In addressing the nation's water resources security issues, I wish to draw your attention to two extreme conditions, flood and drought. Let me emphasise that there is no doubt that water security is a major concern for many countries and it could be due to various reasons including unsustainable development and the impact of global warming.

33. We have seen changes in rainfall patterns and trends, particularly in cities, perhaps from the urban heat island effect. The changes can also be seen in rural areas as land use changes may affect the hydrological cycle dynamics that translates to frequency and intensity of rains possibly moving away from the forested water catchment areas. If this is proven to be true, then it may pose some concern towards the availability of water in the long term.

Lately, we have been experiencing low rainfalls in some of the catchments of our dams in the states of Johor and Negeri Sembilan and this is certainly cause for concern.

Security Issues and Challenges – Flood

34. Since Malaysia gets quite of bit of rain, it is no surprise that on average Malaysia records approximately 150 flood events of various severities every year. There are some big ones but most of them were local flash floods that lasted less than a day.

35. In particular, I would like to mention two recent flood events at the end of 2013 and 2014. In December 2013, we experienced one that was very bad but the spread of the flood was small and confined to the Kuantan and Kemaman areas. Several significant rainfall depths were recorded at Jabor, Pahang (700mm/day) and in Kuantan (900mm/3days). The rainfall depths recorded for these two locations exceeded more than 50 times the daily average.

Rivers are natural components of the environment which shape themselves according to the flow cycles; however, they were unable to cope with the high rainfall, thus causing a major flood event.

36. The flood that occurred in December 2014 was beyond everyone's imagination. It caught many by surprise especially when we thought that we have made good, early preparation following the 2013 flood experience.

The rain fell for more than 10 days over wide areas of Kelantan, Terengganu and Pahang especially at the cornerstone of the three states above Gunung Gagau which recorded over 1000 mm of rainfall over 10 days.

37. This flood displaced more than 200,000 victims and cost the nation over RM2 billion in infrastructure damages and billions more in untold property damages, compensation and productivity losses.

Security Issues and Challenges – Drought

38. Drought also occurs annually in certain areas of the country, particularly in Perlis and the north of Kedah, where these areas possess similar climatic characteristics to south Thailand which has a distinct dry season.

39. Drought has a longer onset period but its effects are longer and could be much more devastating than floods. Many developed countries in the temperate zone are much more concerned by the impact of drought rather than floods.

40. The 1998 drought and the recent one in early 2014 were perhaps the most reported particularly because they affected a large portion of densely populated areas of Selangor including the Klang Valley where more than 300,000 households and 1.5 million people were affected by the water rationing exercise for over three months.

41. The rationing exercise shows how vulnerable we are when dealing with dry conditions. This is because the storage facilities are too small to cater to the high population and there is over dependence on only one source of water. Perhaps with the completion of the Pahang- Selangor water transfers scheme, such as situations might not arise.

42. I would also like to draw your attention to the fact that Malaysia has more than 100 dams. These dams were constructed for various purposes such as flood mitigation,

irrigation and hydroelectric generation. They are all however, used as water resources for peoples 'daily needs and for industrial use. They are mostly situated in the upper reaches of the river basins in order to suit the lie of the land. These dams have various catchment area sizes; some are of reasonable size but others are very small and even worse, planted with commercial crops.

This situation poses some risk where the siting of these reservoirs and their small catchment areas may not be able to capture precipitation from the incoming storms and the water body may be subjected to chemical pollution.

43. Thus far, the volume of water derived from alternative sources of water such as the groundwater or from existing lakes, is negligible. The Malaysia Water Industry Guide 2015 reported that direct extraction

from rivers constitute 83.1% of treated water produced in 2014 and only 1.4% was taken from groundwater and the remaining 15.5% were directly sourced from storage dams.

As mentioned earlier, the droughts in Australia and California lasted for several years. It is perhaps time for us to draw from these experiences and prepare ourselves with viable alternative sources such as groundwater and lakes from which we can draw upon when the situations arise.

44. Before I proceed to the next subject, let me also stress that there is an urgent need for us to protect our river buffers as they also serve as an important element of the water resources.

Sustainability Issues and Challenges

Ladies and Gentlemen

45. When I look at the sustainability aspect of water resources management, I wish to refer to three main aspects i.e. water quality, pollution and the characteristics of usage.

Water Quality and Pollution

46. Of the 477 rivers monitored by the Department of Environment under my Ministry, there are 276 rivers (58%) which are clean, 168 rivers (35%) slightly polluted and 33 rivers (7%) which are polluted. Most of the polluted rivers are in urban areas where high pollution discharges originate from multiple sources including wastewater plants, industries and commercial premises coupled with small base flow volume due to large percentage of paved areas.

47. Over the last year, there have been a few incidences of water pollution which caused the water treatment plants to be shut down and caused water service disruption. The main causes of water pollution are ammonia, rubber, palm oil mills and those from animal husbandry practices.

48. I am also concerned by suspended sediment pollution from land development activities where huge tracts of land are being cleared either for replanting or new commercial crops. In most cases,

there are little erosion control measures and most of the sediments are washed into waterways during storms. I have received reports that the turbidity level for one major river in Malaysia has reached 6000 ntu (the colour of teh tarik) where in a typical case a reading of 1000 ntu would render a water treatment plant to be shut down.

The shutting down of plant due to high suspended sediment readings has happened in many states..

Non-Revenue Water (NRW), Irrigation overuse, Domestic Daily Use and Landuse Changes

49. The Non-Revenue Water (NRW) losses in Malaysia are still high - 35.5% on average and the water services industry is planning to bring it down to 25% by 2020. It requires a big investment to replace the old pipes but it is hoped that the water operators will play their roles by being proactive and reactive in dealing with pressure control, water theft and burst pipes.

50. Excessive use of water for paddy irrigation is another reason for concern as farmers lack awareness of water conservation. It is sad that our major paddy schemes have an irrigation efficiency of less than 50 % efficient.

This need to be addressed urgently as irrigation is the biggest user of our water resources and any small saving from here will translate to huge savings of our water resources.

51. Generally in Malaysia there is very little awareness about the value of our water resources and the need to conserve them for the future. The problem is that the government is subsidizing the cost of treatment and delivering potable water to every premises. Therefore, Malaysians tend to take the availability of water for granted and this is further reflected in the irresponsible use of this precious commodity.

In Malaysia the urban community uses about 230 litres per person per day (l/p/d) while the rural dwellers only use about 170 l/p/d while the national average is at about 215 l/p/d. Although we are about on par with Germany and France, we can move towards what Singapore, UK and Hong Kong are using at 150l/p/d, perhaps from 215 l/p/d to maybe about 170 l/p/d in the near future.

52. Malaysia has about 52 % of forest cover with about 750,000 hectares (15%) gazetted as water catchment forests. As forest catchments form very important elements in moderating surface flow, contributing to base flow and preventing and controlling erosion and sedimentation of rivers, clearing of forest for other uses will definitely affect the characteristics of flow in the rivers. Forests also contribute to hydrological cycle equilibrium.

This aspects need to be emphasised in all state development plans and failure to realise this may lead to an increase in the number of extreme events of high and low flows and suspended sediment induced pollution.

Managing Security and Sustainability of Water Resources for the future

Governance

53. Water is a finite commodity. Its availability is not evenly and proportionately distributed. There should therefore be a mechanism to provide incentives to the states to protect their water catchment forests. There is also a need to provide a protocol or uniform evaluation instrument to assess the value of water for the transfer of water.

This would address the disagreements that may arise and also help in recognizing the fact that is an opportunity cost to those states that provide water resources. Hence, a win-win approach would be the only solution to any differences.

54. In addressing the issue of water security and water sustainability, Malaysia needs to move at a faster pace towards embracing the whole aspects of IWRM particularly the strategic action plan as outlined in National Water Resources Policy.

The NWRP provides for several discussion and collaborative platforms between the federal and state governments and it is my fervent hope that these platforms could be used to further refine our alignment in managing our water resources.

55. The proposed Water Resources Act is also expected to strengthen water resource management in Malaysia and once implemented together with the support and commitment of the state governments, would ensure uniformity in our approach to managing our water resources.

My ministry realises that this is impossible without the strong commitment and cooperation from all the stakeholders, especially the state governments, and for that reason we have gone to all the states to explain the importance of working together and to accept the proposed bill.

Management Instruments

56. For this coming Malaysia Plan, my Ministry will look into developing several management tools to assist water resources managers in dealing with the security and sustainability issues.

57. The first of these is the National Flood Forecasting and Warning System (NaFFWS). This is a flood forecasting model which will be able to provide information on impending flood situations with a lead time of more than 2 days' warning. The model will cover a total of 40 river basins all over Malaysia and the first phase involving three major river basin in the flood prone states of Kelantan, Terengganu and Pahang will be fully operational by early next year.

Through this, we hope to be able to reduce flood damages and give our disaster personnel enough time to mobilise themselves.

58. Another management tool is the National Water Balance System (NAWABS), a comprehensive river basin management instrument which aims to provide river basin managers with the tools and knowledge needed to make better informed planning and operational decisions.

The NAWABS operational system will combine real time data and climate forecasts with the models to provide information on current and projected water availability and demands on a basin scale, including uncertainty and risk. The system will take into account the national water resources and provide a water balance model for seven major river basins. The basins identified are Kedah, Muda, Bernam, Melaka, Klang, Similajau and Kelantan.

Physical Measures

59. The amount of raw water supply required to meet the increasing needs of the nation has also been decreasing. This could perhaps be due to climate change which prolongs hot and dry spells which subsequently affect the upstream storage by dams and safe yield of rivers. As an adaptation and physical mitigation measure,

we are now looking into downstream water storage such as the Hybrid-Off River Augmentation System and Off River Storage where the river intake is located farther downstream to increase the yield and supplement the reduction. As an alternative for urban river raw water sources, these methods will ensure that there is a continuous and uninterrupted supply of water available to meet the existing and future water demands.

My ministry through the Department of Irrigation and Drainage, has reviewed the Malaysia National Water Resources Study and identified off-river storage areas in several cities to ensure that there will be adequate water supply all the way through to 2050.

Landuse Planning

60. It is a requirement that State Governments ensure all forested catchment areas are gazetted and if possible more areas are protected for the conservation of water resources including wetlands, river corridors and middle reaches perennial forest cover. This is to ensure that forests are able to provide regular and constant base flow to replenish supply to the reservoirs and rivers.

This will in turn provide enough raw water yields for domestic and industrial use as well as for power generation. This will also help to ensure that our reservoirs can function as effective storage especially during periods of dry spell.

Demand Management

61. Demand management is the way forward in managing water resources for domestic, industrial and irrigation needs. This is what was done during periods of water stress in California and Australia where every household, commercial and industrial premises were allocated a fixed amount of water. Among the most effective method in the management of water demand is to set a high tariff for the upper block of water use.

Households then need to make the necessary adjustment to their water usage and consider retrofitting a rain water harvesting system to capture water from rain. Capturing rainwater has been proven to alleviate many households' requirements for extra water.

In Malaysia, for example, many parts of Sabah depended greatly on the use of rainwater for their daily water needs.

62. The irrigation sector likewise needs to look into managing demand rather than fulfilling requests for more water. Farmers also need to make changes to their farming practices.

For example, they can make do with only 2 inches of standing water in their paddy fields rather than the customary 6 inches. A small adjustment like that would not only save a lot of water but also the cost of getting the water to the fields.

Conclusion

63. Sustainable water management is a complex issue. In this regard, I am grateful that the organiser has allowed us to dwell on the subject of managing water for sustainable development which I have tried to cover in my presentation as well as some matters touching on water services and irrigation.

64. Again I wish to stress that we fully understood the demands that water resources management entails especially in view of the rapidly changing climate scenarios.

We pledge to look into matters including planning and development of management instruments to assist the states in managing their water resources more effectively.

65. We also recognize that the governance of water resources is a complicated issue especially when it crosses boundaries for countries who share common river basins. I sincerely hope that those states who are sharing common basins will be able to share the water resources amicably and for the good of all.

There is already a platform set up by the Federal Government to address and mediate such issues which is the National Water Resources Council chaired by the Right Hon. Deputy Prime Minister.

All Menteri Besars and Chief Ministers are the members representing their respective states together with ministers from key ministries. The council is served by both the Ministries i.e. Ministry of NRE and KeTTHA acting as its joint secretariat.

66. Finally, I wish to put on record my appreciation to the organiser for inviting me to give this key note address on a topic which has been receiving growing attention not only in our country but globally.

**Thank you and I wish your congress and
exhibition a great success.**