MALAYSIAN WATER PARTNERSHIP

MALAYSIA WATER RESOURCES MANAGEMENT (MyWRM) FORUM

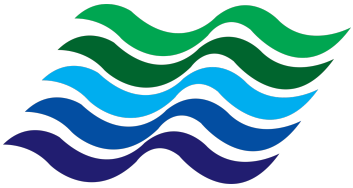
"Sharing Water"

25 – 26 September 2018

Putrajaya

Officiated by
YB DR. XAVIER JAYAKUMAR
Minister of Water, Land and Natural Resources

Organisers:



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PREAMBLE

The Malaysian Water Partnerships biennial Malaysia Water Resources Management Forum this year focuses on the 8th World Water Forum theme – **Sharing Water.** This Forum is organized by The Malaysian Water Partnership (MyWP) in collaboration with the Ministry of Water, Land and Natural Resources (KATS) and the Department of Irrigation and Drainage Malaysia, supported by the Academy of Sciences Malaysia (ASM), Malaysian Water Association (MWA), Centre for Environment, Technology and Development Malaysia (CETDEM), Global Environment Centre (GEC), Universiti Putra Malaysia (UPM), LESTARI-UKM and MANCID.

The Forum, which was officiated by YB Dr. Xavier Jayakumar, Minister for Water, Land and Natural Resources (KATS) gathered stakeholders from various water agencies and provided a platform for discourse on water resources issues in Malaysia while simultaneously sharing strategies to tackle the challenges faced.

OBJECTIVES OF FORUM

- To provide a forum for Malaysian water stakeholders to highlight, discuss and recommend strategies to address IWRM-related issues faced by the different water sectors in Malaysia.
- To provide a platform for Malaysian water stakeholders to review the approaches taken to address IWRM-related work.
- To promote advocacy in IWRM and to strengthen political commitments regarding IWRM

Welcoming Remarks

YBhg. Dato' Ir. Nor Hisham Mohd Ghazali
Chair, Malaysian Water Partnership (MyWP)

The Malaysia Water Resources Management (MyWRM) Forum is a platform to highlight, discuss and recognize strategies to identify the integrated water resources management issues. This year's theme is "Sharing Water" reflecting upon sharing common water goals and water issues we face. In this Forum, together we aim to identify the problems, responsibility, governance and management aspects associated to water. Several highlights of the forum are as follows:

Water sharing – are we ready?
Water availability – are we secure? and;
Water education – are we ignorant?

The future strategies for water management can be conceived from various discussions provided throughout the two-days forum involving keynote speeches from renowned speakers with dedicated Q&A sessions.

A total of five sessions have been arranged to give a holistic overview on the theme "Sharing Water". The forum will serve as a platform for discourse on various water associated issues in Malaysia. While we provide a forum for Malaysian stakeholders to highlights, discuss and recommend strategies to address integrated water resources management (IWRM) related issues, we aim to also promote advocacy in this area and strengthen political commitments regarding IWRM.

Foreword

YB Dr. Xavier Jayakumar
Minister of Water, Land and Natural Resources (KATS)

In light of recent local and global events, the Malaysia Water Resources Management (MyWRM) Forum is a platform for gathering insights of professionals and managers, covering the entire spectrum of water. As we progress towards becoming a dynamic and progressive nation, we must ensure that the enabling factors are in place. This includes ensuring that water in the right quantity and quality is available for our current and future needs across the entire spectrum of use and demand. “Sharing Water” is however, not only in terms of the resource but also in the sharing of knowledge, skills and capabilities, which we must continuously enhance. Ultimately, we also share the responsibility to ensure this valuable resource is conserved and sustained for future generations.

The formation of Ministry of Water, Land and Natural Resources (KATS) has seen the unification of water under one, manageable sectoral water demand. As a nation that has committed to achieve the Sustainable Development Goals, we must first focus on creating an effective management framework transcending the administrative boundaries that exist. The 2030 agenda adoption worldwide on water commands special focus in global agenda. For example, the SDG2 and SDG6 are essentially about sustaining food and hygiene, which are prominent goals in the SDGs that require water. In order to achieve the SDGs, we must be prepared to overcome the challenges. As for Malaysia, we are committed to conserve and ensure safe water for all. Cooperation between the agencies of both Federal and State governments underpinned by accurate information, skilled and knowledgeable workers, and effective laws will pave the way towards achieving water security and national goals.

Water is life, life is water. Water is regarded as a human rights issue and if we failed to get it right the people will hold us responsible and answerable.

It is always a tough question as to how for the Ministry to better handle requests and reports lodged by small communities in some states due to lack of water supply and services. The question is how best can the Ministry supply water for small communities who are happy to pay for water services. We have a question of how small is small as Malaysia has plenty of rains, however no water. Therefore, we need to seriously consider rainwater harvesting as source of clean water.

Another important point that is missing from the water discussion is education. We forget to educate our children about the important message on the importance of water and scarcity of water. How do we do this? How do we get the message across?

We should begin to perceive water as sacred hence we must use water very carefully. There are many examples in developing countries i.e. Africa, India where people are fighting for clean water. In Malaysia, some states like Sarawak, Sabah and Kelantan all having issues with water supply and in this regards the Ministry welcomes all states to work together to overcome this problem.

Through this Forum, I hope that knowledge will flow freely between the various stakeholders and the thoughts and ideas of water professionals and industry players will be collectively harvested towards the enhancement of Malaysia’s water management capability.

Keynote Address

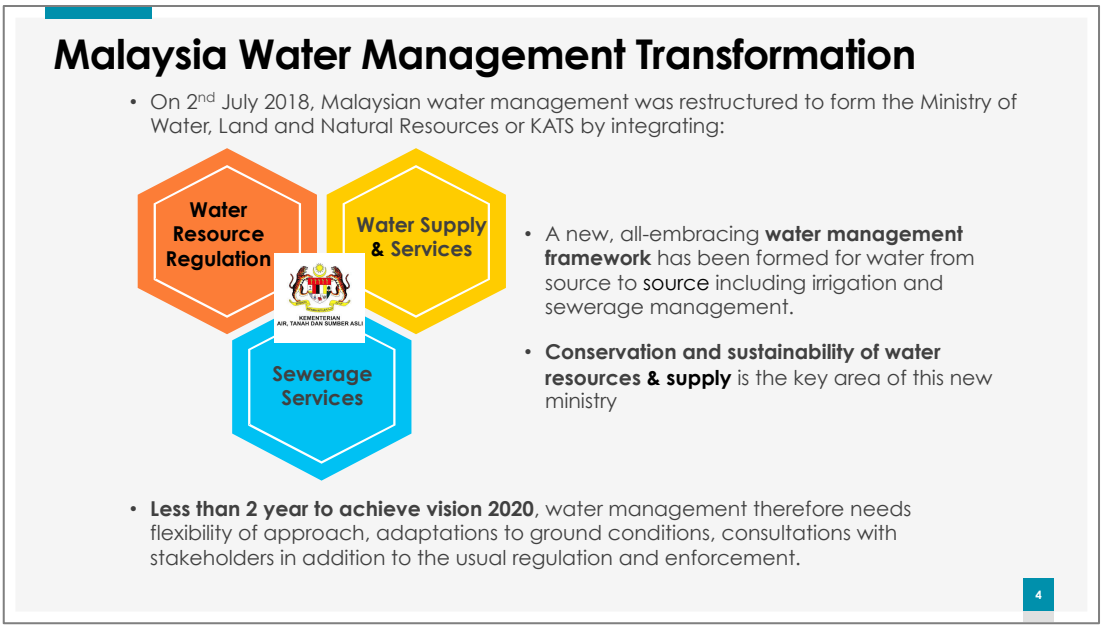
YBhg. Dato' Dr. Tan Yew Chong

Secretary General, Ministry of Water, Land and Natural Resources (KATS)

Malaysia Water Management Transformation

Malaysia is one blessed nation with on average received high rainfall depth of approximately 2,940 mm/year. This amount is translated to about 43% that returns back to the atmosphere through evaporation, 6% percolates into the ground and the remaining 51% flows as surface runoff. As storage infrastructures and withdrawal facilities are mostly sited upstream, mainly due to suit the physical terrain and to avoid salt water intrusion issues, up to 85% surface runoff is estimated to travels to the seas.

Even though Malaysia has seemingly sufficient volume in water resources to meet all our needs in the foreseeable future, there are a number of water-related problems, which have raised concerns among planners and water engineers. Ours is not that of water-scarcity, as in some countries in the world, rather, but it is a problem of not managing the water resources effectively. This is manifested in the form of such that in some river basins, there are water shortage during periods of prolong droughts, and conversely, the problems of excessive water during the wet season. At the same time, pollution of our water courses have impacted adversely the aquatic eco-system, and some rivers are now so badly polluted that for practical purposes, they are deemed to be 'dead'. As we move towards the year 2020, the country will be facing even more serious problems if we continue to adopt a 'business as usual' practice, especially when coupled with a fast growing population as well as rapid urbanization and industrialization. Towards achieving a developed nation status in 2020, Malaysia must conserve and manage its water resources well to ensure adequate and safe water for all in line with the Malaysian Water Vision.



Previously, water resources and water services were managed separately which was seen to be contradicting the idea of high integration required in the planning and management of water. On 2nd July 2018, Malaysian water management was restructured under the Ministry of Water, Land and Natural Resources or KATS with the unification of water resources regulation, water supply services and sewerage services under one roof.

With that, a new, all-embracing water management framework has been formed for water from source to end users including irrigation and sewerage management. Many of our elders in the water industry have waited long for this day to come! The conservation and sustainability of water resources is the key area of this new Ministry. With less than 2 years to achieve vision 2020, water management therefore needs flexibility of approach, adaptations to ground conditions, consultations with stakeholders in addition to the usual regulation and enforcement that at one time was considered the approach to take.

Although Malaysia already has a Water Resources Policy, and state laws on and about water use, the institutions set up at Federal and State levels for stewardship over water have yet to achieve a laudable level of management efficacy.

Among the inhibiting issues are:

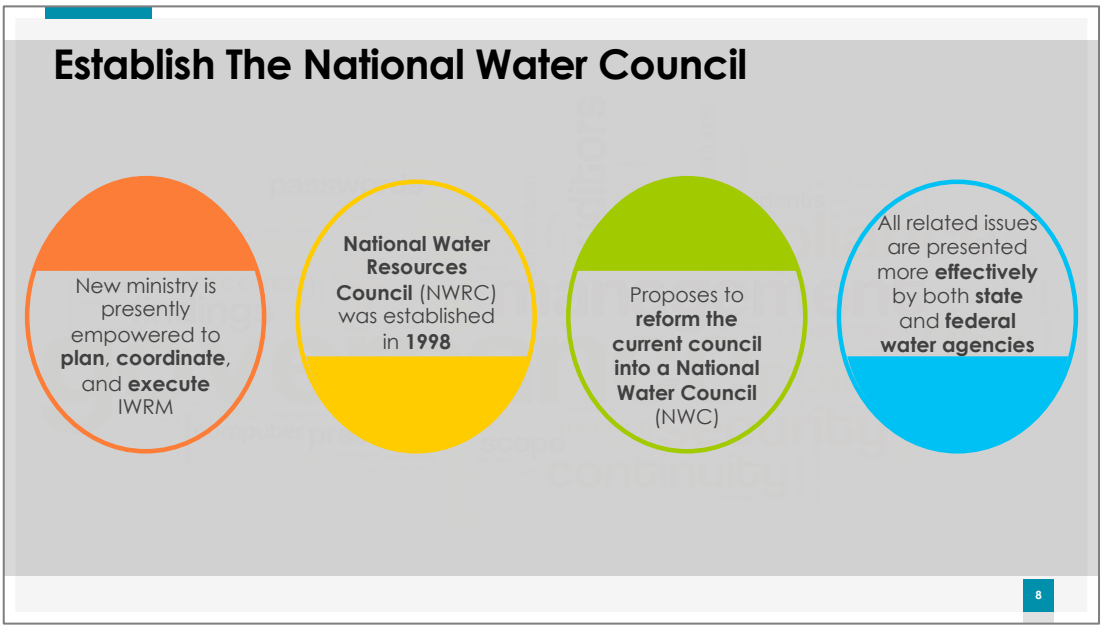
1. Existing governance procedures are spread into the functions of several agencies. A disconnect is perceived to exist when water resources, water services and wastewater management are not elaborated in the current water resources policy and fall under different ministerial control;
2. Current laws are either out-dated or were developed or modified on a sectoral basis for specific applications in selected fields of water governance while the new proposed water resources bill has not come into operation. There is also no specific legislation that deals with dams, other than administrative guidelines;
3. There is a lack of specifics on agricultural water, despite it being estimated at using up to 70% of our water resources;
4. The operating framework of Federal and State institutions are compartmentalised as they pursue the localised objectives, which are often reactive rather than pre-emptive.
5. The operational and financial challenges facing the water services sector

While I acknowledge the importance of the water resources, the whole value chain of water management is not complete without recognizing the water services trajectory. One without the other could not function effectively. For example, inadequate or polluted water resources will have an adverse effect on water supply. Likewise, wasteful water consumption due to incorrect water pricing policy will lead to over abstraction of raw water, thus neglecting other sectors to water.

On this note, let me briefly share what have been done and is planning to do with regards to the transformation in water services. On top our agenda is to conclude the restructuring of water services, which will put the water sector on a sustainable footing. We envisage that we can conclude the restructuring of Selangor, Perlis, Kedah and Pahang as early as Dec. 2018. Once completed, these states will enjoy the financial assistance from the national water asset management company, Pengurusan Aset Air Berhad (PAAB) on a competitive commercial arrangement.

The other major policy shift would be the implementation of the standardized tariff setting for water operators. It allows for a transparent and fair tariff setting that not only addresses the commercial considerations of water operators, but also the interests of consumers and for the environment protection. It will be implemented in Q12019. To manage our water resources in a holistic and sustainable manner we need to heighten inter-agency cooperation in line with the Integrated Water Resources Management (IWRM) principles to achieve Malaysia's National Water Vision. Towards realizing this vision we need to create an enabling environment and develop management tools for effective implementation of IWRM in Malaysia.

The new Ministry is presently empowered to plan, coordinate, and execute IWRM on behalf of the nation. The National Water Resources Council (NWRC) was established in 1998. Whilst it has served as the apex forum for national water affairs, its setback is that it has no legal standing.



This shortcoming would be addressed in the proposed law on water resources. The Ministry also proposes to reform the current council into a National Water Council (NWC) to ensure that resources, demand and quality issues are presented more effectively by both state and federal water agencies. National Water Resources Policy (NWRP) that was formulated in 2012 has founded the strategies and action plans to address the issues and challenges managing water resources. The policy was deliberately focussed on conservation of water resources to ensure human and environment needs.

With the new Ministry and federal management framework in place, the Ministry is reviewing the policy statement with intention to identify any existing gaps in water resources governance. The review should guide us towards formulating or re-designing action plans to ensure that the demand for water for all user sectors is met in terms of quantity and quality for both man and nature. We may be looking at a new National Water Policy (NWP) that we envision to be a comprehensive policy that will ensure water security and sustainability incorporating conservation, water services and wastewater management. The NWP would then be the foundation in the streamlining of practices and approaches for the preparation of water conservation plans involving all the states of Malaysia. At the same time, efforts to build the capacity of all stakeholders in water governance will be given serious attention.

Water resources governance is a process. It needs a national identity, purpose, and direction. These will have to be reflected in a single national policy on water in a broader prospect. It should be the first task ahead. The policy however would be of little use unless a law exists to provide it the necessary mandate. Ideally, the law should be uniformly applicable in all States. The challenge lies in the acceptance of the law by all state governments. We have emphasized that the new law does not deprive the State Governments any of its existing rights. It is thus very important that the states subscribe to the national agenda of uniformity in laws relating to water resources. Uniformity will go a long way in ensuring proper governance

SESSION 1

WATER MANAGEMENT AND GOVERNANCE

Chair: Tan Sri Ir. Shahrizaila Abdullah, Academician ASM

Keynote 1 by Dato' Ir. Dr. Md Nasir bin Md Noh, Director General, JPS Malaysia
Harmonising Water Management – For Now and the Future

The global water scenario contains saltwater of about 97% and 60-70% goes into agriculture while the rest goes into industrial and domestic activities. About 2,300 people die due to shortages of clean water supply. In conjunction with the Sustainable Development Goals (SDG) outlined by United Nation, the national water resources management policy has integrated SDG 6 and 7 into the policy implementation. It is set to be achieved by 2026 through the Integrated Water Resource Management (IWRM).

The national water scenario for the peninsular Malaysia, Sabah and Sarawak produces 971 billion m^3 (bcm) of water, in which over half of it goes to surface runoff (494 bcm), 43% evaporation and the rest goes to groundwater. About 16 bcm water is being consumed (3%) from the water available, while the rest of water goes into the sea. The dams in Malaysia is expected to supply about 42 bcm of water for 4 to 5 years only. The usage of water from the dams are scattered and there are no definite direction as to how we manage the water from these dams. As we can see, water problems still arise when El Nino strikes and Malaysia was facing prolonged water stress situation due to this condition. Nevertheless, at 16.7 bcm in 2018 to 17.2 bcm in 2020, we would still have enough water to meet domestic, industrial, agricultural, energy production and environment needs.

Malaysia is taking the example of the global water management based on countries of the world including European Union, USA, Singapore and Japan.

 European Union	 United States of America	 Singapore	 Japan
3 Different Models: Hydrologic model (UK & France) Administrative model (Germany) Co-Ordinated Model (Netherland)	Federal Government (Formulates general policy and regulations) State (Implementation) River basin based Water Commissions (Cross state water management issues)	Ministry of Environment and Water Resources Under one umbrella - water resources - water supply - Sewage treatment & reuse - Flood control - Sewer System	National Government (Formulate & Implement policies, water work administration & water quality protection) Local Government (Operation, maintenance, water work management, water treatment facilities & water utilities, monitor water quality, ensure wastewater effluent standards) Inter-ministerial cooperation

The National Water Management

The formation of Ministry of Water, Land and Natural Resources (KATS) has brought three different sectors to work together under one roof. By forming KATS, resources and services are brought together to work in synergy. Natural resources and sewerage services require the same agreement to work together under the newly formed Ministry KATS whilst the Ministry of Energy, Technology, Science, Climate Change and Environment (MESTECC), Ministry of Housing and Local Government (KPKT) and Ministry of Agriculture (MOA) need to merge to form a multipurpose agency in managing the country's precious water resources. For the national water management, the Federal government is responsible in promoting uniformity in legislations, providing of technical advice, setting up of hydrological and other monitoring stations, collection of hydrological data and conducting surveys and relevant studies. The State government is responsible for water, rivers, land and forest including gazetting the water catchment areas and control of development in the states.

Public utilities board (PUB Singapore) as models for KATS

Malaysia may adopt PUB models in managing water resources for the country. The Ministry of Environment and Water Resources (MEWR) has two statutory boards namely the Public Utilities Board (PUB) and National Environment Agency (NEA). PUB is tasked with managing Singapore's water resources whilst NEA is responsible to sustain a clean and green environment for the country.

In conclusion, water resource is national heritage. We have to protect them. Water resource belongs not only to us but also the future. We have to manage river basin by natural boundaries and to implement IWRM through smart partnerships with water stakeholders.

PANEL MEMBER / ORGANIZATION	OBSERVATION NOTES

Dato' Ir. Hashim Osman, Director, LUAS	• LUAS is a one stop agency for river basin management
	• LUAS is responsible for water resources management, river basin, water bodies, ground water and coastal water protections under the auspices of the Selangor Water Enactment 1999.
	
	• With average rainfall: 2000 mm/year, the average utilization of water supply is 4600 million litre/day (24%)
	• Water used for irrigation is 1600 million litre/day (8%)
	• The total utilization of water 6200 million litre/day (32%)
	• 10% underground water is available and 400 sites are licensed under LUAS
	• LUAS also monitors 7 dams in Selangor area
	
	LUAS manages river basin protection using the IRBM policies for each river basin:
	• Sungai Selangor protection policy is based on:
	  • Sufficient
	  • Cleanliness
	  • Protection against flood
	  • Concerns for flood

	• Sungai Langat
	  • Sufficient
	  • Clean
	  • Reduce risk flooding
	  • Facilities for river irrigation
	
	• Sungai Klang
	  • Sufficient water
	  • Clean water
	  • Protection against flood
	  • Environmental
	
	Some issues and challenges faced by LUAS:
	  ○ Rapid urbanization
	  ○ Industrial development that have distorted the water
	  ○ Land related resources
	  ○ Climate change
	  ○ River water quality
	  ○ Environment
	  ○ Water governance and transboundary
	
	Issues on water resources management strategies:
	  ○ Legislation and policies for water resource management, water enactment 1999: discharged of pollution
	  ○ Selangor river management strategies
	  ○ Selangor lake management strategies
	
	Resource operation:
	  ○ Gazette and the protection include the river reserved
	  ○ Water catchment
	  ○ Quality control thru enactment
	  • licencing the water extraction
	  • written the book of authorities
	  • licencing the admission of pollutant discharge
	  • licencing the hydroelectricity

Mr. Ramadas Karuppiah, Consultant, Ramesh Yum & Co	Governance in general have 3 main rules: i. Policy ii. Institution iii. Legislation The enforcement of rules requires time to be fully deliberated. There are various examples where water stakeholders may learn and emulate for the betterment of the water sector.

Dr. Sarah Aziz, Chair, Southeast Asia Disaster Prevention Research Initiative (SEADPRI)	There are 12 aspects that required careful consideration in setting up the National Water Resources Policy: ○ The fugitive. Water is fugitive. How are we going to express the fugitive connotation of water ○ The source of fugitive. Where does it comes from ○ Issues of size and location ○ The state and condition (of water) ○ Different types of water uses ○ Water usage in general ○ Services related to the water and from the water ○ Function of water ○ Risk associated to the water and from water ○ Threats to the water and coming out from water ○ Impacts resulting from risk/threats from the water itself and to the water ○ Access and availability of water Questions need to be fulfilled: ○ Who has the right to give the water portions away? ○ How may we use the water jointly? ○ Who is in possession of water? Divide the policy into 2 main aspects: ○ the processes for dealing with water matters ○ the aspect to controlling things, actions and behaviour the water itself Direction of the policy is made based on: i. Responsibility ii. Responsibility and accountability Describe the fugitive and based on consideration, conclude that there are 3 principles to focus on i. Assets. Water is our national security ii. Sustainability. How can it continue to exist and enjoy by people iii. how to discover the partnership to make the policy work

Session 1 – Q & A

NO	NAME / ORGANIZATION	QUESTION / COMMENT	ANSWER / FEEDBACK
1	Tan Sri Ir. Muhamad Syed Muhammad Shahabudin FASc	Why water usage charges is not being imposed to everyone? This contributes to decrease in water revenue, hence maintenance of water infrastructures became a challenge.	**Tan Sri Ir. Shahrizaila Abdullah**: agriculture cultivation always be resented from water charge, to being free without charge. However, all paddy farmers are subjected to zakat payment in which 10% of the paddy farms contribute to zakat that is substantial. In return, the State government resourced this income to provide irrigation for the paddy fields.

2	En Mansor Ghani The Malaysian Water Association (MWA)	1. Is there any policy on clearing of urban river banks? 2. Pollution comes from a lot of sources. We should not put our backyard by the river. Is this due to lack of awareness at government level? How do we sourced our future drinking water?	**Dato' Ir. Hashim Osman:** We have enactment LUAS, referred to as Rang Undang-Undang Negeri. Through this enactment, it is suggested that Jabatan Alam Sekitar need to extend their laws to protect the environment and curb the source of pollutions. This is not to be mixed with the roles of water agencies – which is to protect water sources.
3	Dato' Ir Jaseni Maidinsa CEO, Perbadanan Bekalan Air Pulau Pinang	What is the current policy to gazette water for catchment areas when building a dam. The Federal government spends billions of dollars constructing dam all over the country with no policy to gazette a dam. A dam is supposed to last for 100 years. We are not sure whether the catchments are gazetted. The catchments must be gazetted for nothing else other than water catchment area, only then a dam can last for many years.	**Dato' Ir. Hashim Osman:** Up to date, we have gazetted all 7 dams into zone protection under Section 48. We have also gazetted 21 alternative ponds for additional water resources under the auspices of enactment LUAS. **Mr Ramadas**: Under the laws model, Sabah and Kedah have acquired related laws but no implementation just yet. Justified case may be referred to recent tragedy in Cameron Highlands, where recent overspill resulting damaged water infrastructures. Additional example, Perak and Pahang states are still using the 1920 Acts. These enactments don't have such provision for gazetting of catchment areas.
4	Prof Dato' Sri Dr Mushrifah Idris, Head, Tasik Chini Research Centre, UKM	In the water policy, there is no agreement on biodivers ity of catchment area.	**Dr. Sarah**: The term biodiversity was not used in the policy because at that time we already have National Biodiversity Policy. Completed elements related to biodiversity are within the jurisdiction of the National Water Resource Policy, for example Pelan Tindakan Strategi 36, elements related to ecosystem, ecological

			division. The ecosystem is emphasized to protect the ecosystem integrity, using habitats and biological factors as one of the markers for water health.
5	Dato' Ir Mohamad Hanapi Vice Chair, My Water Partnership	In JPS transformation, prior reform of NRE and KETTHA, how much of the 2012's National Policy would be entitled into the new reformed policy?	**Dr. Sarah**: Agree. We should have national nature resource policy, and should not separate land and water policy from biodiversity. We have one comprehensive national natural resources policy, many components but being put together so that the policy becomes self-explanatory. Policy that addresses sewerage supply distribution should be put together under one policy but belongs to different department i.e. dam management should be in national water resources policy, however sugges to develop specific conservation plan especially in water areas concerning dam operations. **Dato' Nasir**: The process of change is complicated for example change of post and roles in delivering new policies.
6	Prof Chan Ngai Weng, USM	For raw water is there any policy on water tariffs and charges? We need a policy on water tariffs.	**Dr. Sarah**: In 2015/2016 KETTHA already initiated the work in tariff for different sectors. Study was conducted to value water. Dam is covered under Akta Kawasan Larangan for supply distribution, but all noted under one big policy.

SESSION 2

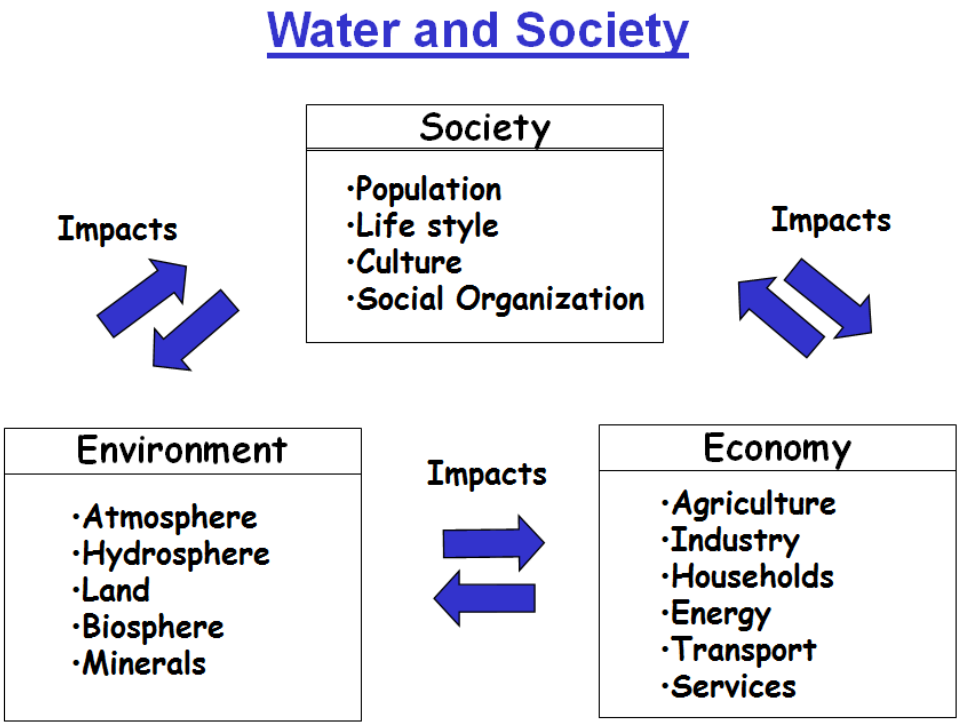
Challenges of Sharing Water

Chair: Tan Sri Ir. Syed Muhammad Shahabudin, FASc

Keynote 2 by Dato' Paduka (Dr.) Ir. Keizrul Abdullah, Chairperson, Council of Wetlands International Water Sharing: Are We Ready?

The meaning of the term water and sharing is important while discussing 'Water Sharing'. According to the dictionary, sharing is a transitive verb of share where as a noun "share" may be defined as a part or the portion that belongs to a person. "Share" may also indicate something that several people are involved in. The use of word "share" as a noun has an implication to ownership. Ownership comes first before sharing can be done. Moreover, share can also be a verb, where as a verb it means to give a part of things to someone else. Therefore "share" may be defined as, giving a part of something to someone else or allowing someone else to use something. In sharing, there are related advantages and disadvantages to be considered. It is crucial to determine the implication of sharing whether it is a win-lose, win-win or neutral situation. There are three implications of sharing in which the *sharer (giver)* loses something but the recipient gain something. Secondly, the *sharer* doesn't lose or gain (neutral) but the recipient gains something. Thirdly, the win-win situation where the *sharer* and recipient will both gain something. The term sharing is closely associated with money. Gaining benefit in terms of money during sharing is not preferable, but it is a matter of semantic practices. In many cases, the receiver is always in a position of a win or gain, but the provider sometimes loses or gains.

Water is needed for mankind survival and water is indispensable for life. Not just for mankind but it is essential for all known forms of life on earth. Water sustains the ecosystem and is a major determining factor for socio-economic development.



The concept of river basin is essential in water management. In Malaysia, water originates from rain whether it is surface water or underground water. From hydrological cycle it was

found that rain water runoff to river and seeps into in the ground. Population growth and development affect the river basin in which when the population is small the impact is localized to a sub-basin however, as the population grows; the impact will extend beyond sub-basin. Aral Sea and The Great Flood of Bangkok were featured as case studies on the impact of activities conducted at upstream and downstream areas of river.

There are five major points that needed to be understood when discussing water sharing which are ownership of water, water right, water as an economic good, water resources study and river basin master plan. Generally, the state claims the ownership of water. Secondly, who owns water rights? Water right refers to the legal right of a user to use water from a water source for reasonable or beneficial use as example domestic, agricultural, industrial and mining activities. There are two major models which have been used in many countries on who own the water right. The first model is riparian water rights and the second model is prior appropriation water rights. Then there is human right to water (HRW). The HRW concept was recognized as a human right by the UN GA through Resolution 64/292 passed on 28th July 2010. UN GA recognized the right of every human being to have access to sufficient water for personal and domestic uses. The Resolution obliges governments to ensure that people can enjoy clean, available, acceptable, accessible and affordable water. While in Islam, water is a common entitlement for all where it belongs to the whole community. Access to public water is a right of the community.

The third point is that water is perceived as an economic good. When water is shared, can *sharer* charge? Yes, they can charge. If we want *sharer* to share water we must also look at water as goods with value. Fourthly, it is essential to study the quantity of water available. In order to find out the quantity of water available data and information should be collected. Among data collected to calculate water availability is meteorological data in terms of rain frequency, surrounding temperature and evaporation rate and hydrological data in term of water runoff, river flows and groundwater recharge. It is also crucial to understand temporal and spatial fluctuations of rain and its season. Moreover, extreme events such as floods and drought need to be considered when studying water resources. Most important is climate change as it will exacerbate the situation. The world specifically Malaysia is expected to experience more flood and drought in future. Water availability study should be done and budget should be prepared. Last but not least, develop a master plan, a holistic and integrated plan for river basin. Water demand should be fully understood in order to identify and determine who needs the water, how much and when? Supply and demand should balance.

In order to share water it is essential to understand the water governance. Water governance set rules, practices and processes for managing water. One of the challenges in managing water is managing the conflict. Conflict comes from community live at upstream and downstream, the ecosystem, agriculture sector, hydro power sector and domestic sector where all competing to get water. As the numbers of stakeholder involved increases, the chances of finding mutually acceptable solution becomes less. Water conflict transformation model can be used to manage a conflict, which consists of four stages; adversarial stage, reflexive stage, integration stage and action stage.

All rivers in Malaysia rested in rulers' jurisdictions. License needed to divert water for domestic use, agriculture or industry and amount use must be paid. JPS has National Water Balance Management System (NAWABs) which studies the way to balance water in river basins. The National Water Resources Council has agreed that Malaysia should prepare a master plan for all river basins. Malaysia needs River Basin Organisation (RBO), an Apex body with a legal mandate and financially sustainable to carry out the necessary

management tasks. One of them is LUAS, an enactment set up for river basin in Selangor to nurture, maintain and facilitate sustainable development. In conclusion, Selangor is one of the states, which is ready for water sharing initiatives.

PANEL MEMBER / ORGANIZATION	OBSERVATION NOTES
Dato' Mohd Ridhuan Ismail CEO, Suruhanjaya Perkhidmatan Air Negara (SPAN)	SPAN vision and mission support sustainability agenda. In the upcoming Dasar Air Negara, sustainability agenda is also highlighted. In 2018, the integration has already begun at Federal level where three Ministry offices were combined to one Ministry. Federal level has made their intention clear. State level should follow Federal, for seamless as well as smooth implementation of Dasar Air Negara. It was highlighted again and again that although Malaysia has outlined good policies, regulation and law, the enforcement of these policies in Malaysia is still lacking.
Dato' Ir. Jaseni Maidinsa CEO, Perbadanan Bekalan Air Pulau Pinang (PBA PP)	Water is a strategic commodity. Water is also a national issue not a state issue. The Federal government should be more aggressive in making sure that our water catchments are legislated and protected. Water catchment should be gazetted only for water catchment not for timber production or other purposes. Water catchment is the beginning of water supply chain. Malaysia should focus on surface water as Malaysia has a lot of surface water making it the most economical form of raw water source. Malaysia needs to design an infrastructure in order to delay water from wet season to directly go into the seas. Moreover, sludge coming out of water is another national issue, not an isolated for a state or water operator. Since independence, 70% of water use for agriculture. Malaysia has to find a solution to improve and lower the percentage as a lot of water can be saved and release it for water supply.
Ir. Tuan Haji Muhammad Ashari Daud	Jordan and South Korea was featured as successful stories in water management. Authority creates an activity where young people and children different nationality near Jordan river participate to take care of the river. It was highlighted managing river and water is not about numbers only but managing the people.

Session 2 – Q & A

NO	NAME / ORGANIZATION	QUESTION / COMMENT	ANSWER / FEEDBACK
1	Dr Salmah Zakaria Akademi Sains Malaysia	Usage of water for agriculture is 63%. Is there an effort between services and agriculture sector to sit together and discuss?	**Dato' Ir. Jaseni Maidinsa** Yes, there is a discussion. Both sides are fully aware of Malaysia's situation. In Malaysia, dry seasons are from January to April. Due

			to the climate change, rainfall rate in Malaysia does not tally with the last 5 years. Both sides do have meeting on when to decide when to release water. During the meeting PBA PP, SEDA and agriculture players were invited. The meeting was held every year to ensure that water supply is sufficient for agricultural activities. **Dato' Paduka (Dr.) Ir. Keizrul Abdullah** The goal of agriculture sector is to produce food. Malaysia needs to cater their goal to produce enough food. Malaysia can improve by using technology however it is expensive. There's a dialog between water services and agriculture sector. Malaysia needs to develop a rigid framework to provide win-win situation for both sides.
2	En. Khaidir Mustamar JPS	The current practice in Malaysia doesn't benefit water resources management in terms of quality or quantity. Malaysia still has lots of room in term of water management and current practice legislation. Is government willing to move forward in terms of law and regulation or institutional reform?	**Dato' Mohd Ridhuan Ismail** 'Dasar Air Negara' will guide us to communicate with other Ministries involved in using of water, i.e. Ministry of Agriculture. 'Dasar' will act, as a platform and the Ministry will coordinate water resources available for distribution across the country. According to the Malaysia Productivity Corporation (MPC), new rules or rules amendment is the last options to overcome this issue. However, all instrument and tools available will be

			used to determine the responsibility and objective that can be achieved without rules/act amendment.
3	Mr. Mansor Abd Ghani, The Malaysian Water Association (MWA)	Is JPS ready to be water resource entity? At the moment, water industries find raw water resources independently, what are the roles of JPS on this issue? Malaysia dam should be able to retain water for three to four months and available to use for multipurpose.	**Tan Sri Ir. Syed Muhammad Shahabudin** Dam construction can be postponed if Malaysia manages the water demand well. There's no guarantee dam can supply water throughout the year. **Ir. Tuan Haji Muhammad Ashari Daud** Water is the responsibility of all people. Young people should get involved in efforts to conserve, care and protect water. **Dato' Ir Nor Hisham Mohd Ghazali** replied; Yes, JPS is ready. JPS understands the system and have all the data related to water resources as well as professionals in water sector. **Dato' Paduka (Dr.) Ir. Keizrul Abdullah** JPS has already been a water resources manager for the past few years. JPS maintains the national hydrological network. Water resource study involved the determination of quantity of water available. In order to quantify water, metrological data and hydrological data is needed. All agencies has to look at water as a resource and water as a service in a

			different way. In Malaysia, dam will not be built for single purpose (to supply water only). **Dato' Ir. Jaseni Maidinsa** Recently, the Chief Minister of Kedah stated to revoke logging permit and stop logging near dam. PBA PP recommends Kedah to be compensated by federal government. However the Minister declined due to current financial state of government. Expert and professionals in water sector are strongly encouraged to give professionals opinion to politicians. A situation at Kedah, no matter how much the compensation, it is nothing compared to the northern state capability to generate GDP for Malaysia. In 2016, Perlis, Kedah and Penang contribute 115 billion worth of economic activity in one year. Authority needs to look and solve issue at national level as well, not only at state level.

SESSION 3

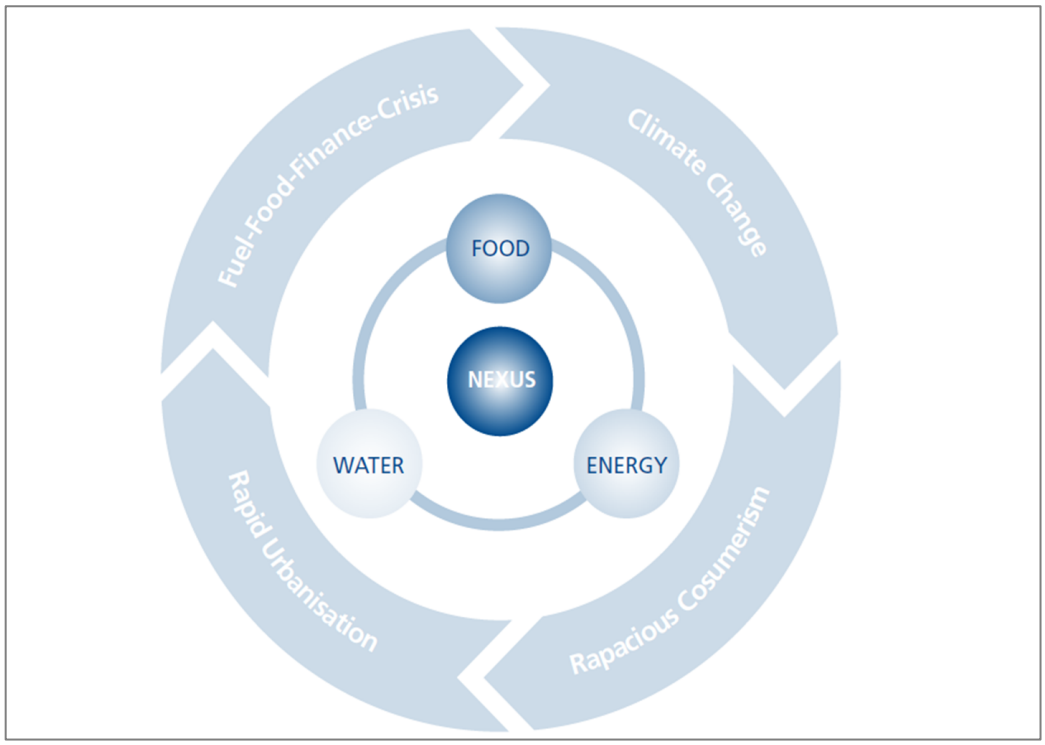
Water Energy Food Nexus

Chair : Ir. Dr. Salmah Zakaria, FASc

Keynote 3 by Mr. Gurmit Singh
Chair, Centre for Environment, Technology & Development, Malaysia (CETDEM)
Water-Energy-Food Nexus: Where Are We?

Issues involved on water-food-energy (WFE) Nexus:

- Fuel-food-finance crisis
- Climate change
- Rapacious consumerism
- Rapid urbanization



Water-Food- Energy Nexus (WFE):

- It started as the concern about national security but little has been discussed about the Nexus
- Water professionals and policy makers don't view the Nexus cohesively but rather separately?
- Is Nexus implementation fit for Malaysian condition?

Elements of WFE

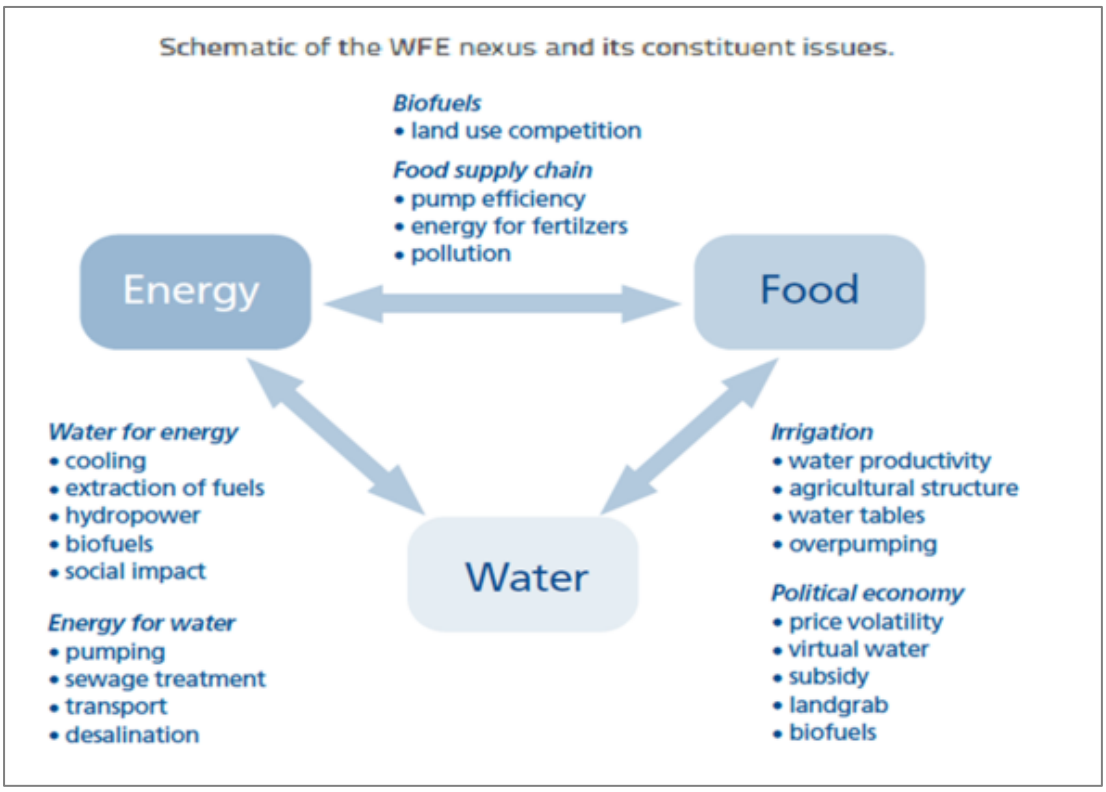
- The natural resources usage are within social needs & economic development however, the social needs aspects are often neglected
- The Nexus is developed to provide security to reduce poverty, promote sustainable agriculture and environmental ecosystems
- The Nexus involves active engagement with a range of stakeholders
- IWRM as originally defined by global water partnership (GWP)
- Sustainability in face of resource scarcity and worsening climate stresses in which climate change is the main effect and factor for the Nexus
- Macro level drivers of natural capital depletion

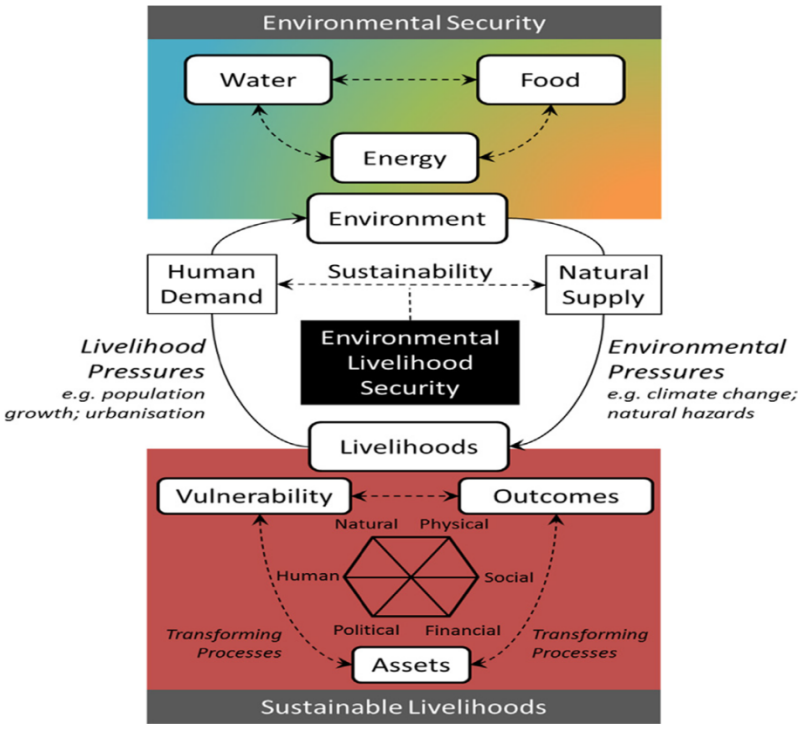
Why do we need the WFE Nexus?

- Good understanding of environmental stresses and their causes. The discussion on Nexus cannot be conducted without including the environmental effects.
- Minimizing personal, corporate and national ecological footprints through understanding the WFE concept.
- To develop a responsible conserver rather than avaricious consumer.
- To promote healthy ambient for air, water and noise levels as well as security.
- Extensive implementation of cradle-to-cradle technologies essential for implementation of circular economy.
- Minimization of hazardous products and wastes as there are increasing concerns on waste but less on the hazardous products of resulting from waste production.

Element on concept of environmental livelihood security in the context of Nexus

The following figure demonstrates the schematic of the WFE Nexus and its constituent issues.





The Connection between Environmental Livelihood Security (ELS) and WFE Nexus

The questions raised in WFE Nexus:

- Why is sustainable livelihoods approach ignored in most WFE related discussion?
- What do the people understand by WFE Nexus? What are the dimensions? Do they consider the rights of future generations to a sustainable ecosystem?
- What would be the roles of government, the public, and private sector in ensuring WFE sustainability?
- What sort of resources are required to sustain an effective WFE Nexus in Malaysia?

- What is our measurement of community vulnerability to WFE imbalances and livelihood stresses?
- Why does the 11MP ignore WFE Nexus?
- When will a holistic approach to WFE Nexus be implemented?
- Who gains & who loses from the WFE Nexus?

The challenges in WFE Nexus:

- Maximizing efficiencies of water usage, conversion of waste to energy and producing optimal amounts of safe food
- Ensuring land use is optimized for multipurpose dams, minimizing biodiversity loss and people displacement
- Ensuring essential food crops are not converted into biofuels
- Using more renewable energy for all water pumping in distribution networks
- Implement sustainable WFE Nexus management (part of which is being undertaken by CETDEM's current study)
- Addressing stresses caused by climate change
- Incorporating SDGs and livelihood concepts into the WFE Nexus

Steps need to be taken:

- MOA, KATS & MESTECC have to collaborate in getting the Nexus embedded in their operations;
- The National Water Council (as well as other national bodies) needs to make the Nexus as its priority;
- Water, energy & food policies must be realigned;
- A holistic sustainable approach to national WFE management must be implemented with appropriate measures at state and local levels;
- There needs to be a buy-in (of Nexus) by politicians, professionals, the public and other stakeholders.

But will it be done?

- That remains uncertain in the context of Malaysia
- Is there enough momentum in Malaysia Baharu to move coherently in this progressive direction?
- Are vested interests and inertia among professionals and bureaucrats so strong that it will be business as usual?
- Even food self-sufficiency remains elusive, what more energy!
- Our overall per capita water consumption remains above global recommendation

Keynote 4 by Datuk Ir. Mohd Adnan Mohd Nor, FASc
Water-Energy-Food Nexus: Foundation for Future Development Strategies

Malaysia water resources management is using the National Water Resource Study as main reference. Based on the report, the main focus is on freshwater available on unregulated flow, where there is not much on returned water, water quality and storage which is part of the main equation in water management. However, what is not emphasized and always forgotten are the role and contribution of sewerage sector. Some laws on roles and contributions of renewable energy are also needed since there is no solid definition of consumptive and non-consumptive in that area. Water resources management needs to be more cooperative with the energy sector focusing on hydro dam as this is perceived as the key to the richness of water sector for the country. Based on Projection 2050, the future water demand remains less than 3% while the rest 97% of water is actually water for the environment. This is in fact to sustain the wealth of biodiversity and environment. We need to start respecting and managing water for the environment. We are sharing water with the environment but there are no single dedicated team/organization that routing the water for the environment. KATS is advised to establish a proper designated team for water for the

environment. There should be a limit for human use in water. This brings to the question of did we really care about the environment?

Water-food-energy (WFE) Nexus is a useful model for future water management planning and operation. WFE Nexus is ultimately looking at the security of the environment. There are two important points in managing the Nexus, which are governance and services. Governance in Malaysia's water sector is well structured and exemplary such as SPAN and LUAS. However, there is no responsible entity specifically focusing on agricultural activities. Nobody knows who should be responsible for water usage in the agriculture sector. In service we focus for consumers. The water supply, sewerage sector, energy sector are very clear on their service level to be provided to the consumers. However, in the agriculture sector this remains unclear. The problem in agriculture sector is that the Ministry of Agriculture (MOA) only focuses on food production. Governance and service are very important in water resource management structure. Some states already have their authorities like LUAS in Selangor and own water authority in Kedah. Malaysia is still struggling to introduce law to harmonize water resource management because there is no commitment at service (level). Water resources are the basis for managing the water. JPS started NAWABS, which is a good start in terms of managing the sector. All aspects needed to be integrated in Nexus, in terms of return, sharing and putting back water to the environment based on the WFE Nexus concept.

Land is another resource that is directly affected in the WFE Nexus. The limits of land use, types and interactions of lands require immediate attention from related stakeholders. Logging industry is important for certain states but the impacts on the water resources management need to be emphasized to prevent disruptions to the environment. In Malaysia, we do not have a clear guideline to look at land and land impacts in the WFE Nexus. The model developed will be more complex to combine WFE Nexus, water resource and land resource. However, it will give full dimension on how to manage land and water resources. It is also important, as it will affect our water, energy and food security. This model needs to be developed as basis in order to negotiate with the State Government as they have full authority on their land and water resources, to be able to express identified interests in protecting excessive land use to the Federal Government. The Nexus provides a qualitative approach in decision making for a better environment. The biggest barrier to integrate WFE Nexus into water and land is political issues between the states. Without this model we may not have any basis for negotiation.

The northern region provides a good example on how to use the WFE Nexus integration in land and water resources management. MADA water management system is the longest single operating water resources management in the country and has proven to be successful. This model was designed principally for agriculture sector but over the years the water supply sector, energy sector is approaching the educational segment of water nexus. MADA is using systems that supply water to other states. Storage in Kedah is used to supply water to Perlis and Penang states. As those state demands are increasing, political dimension in water resources comes to play in the Nexus. The climate change and flood occurrences have become an issue in the model. A system is needed to design and manage flood and disaster related issues. For example **Langkawi**, the island is facing shortage of water. Tourism industry is under various threats. Two proposals are being considered: to consult an ORS system in the paddy field so they have more water resources to support the tourism industry, but there are questions on the impacts on food security? Hence, there is need to balance the usage otherwise we forget the importance of agriculture sector. The second option is to transfer more water to the island. However it will affect the system availability to both agriculture and water supply.

In conclusion, we must look into new model for future of sharing water. This WFE Nexus in relation of two important resources (water and land) needs to be looked into seriously and developed together. To look at implementing the model in water sharing for the future requires higher level of technologies, especially in water reuse and recycling. We also need some form of technological support as opportunities for us to develop our own innovations.

PANEL MEMBER / ORGANIZATION	OBSERVATION NOTES
Mr. Syed Zainuddin Syed Zain, Deputy General Manager (Technical), MADA	Water is life and an important entity for everybody. MADA's main interest is in food production by ensuring that we have sufficient food supplies for the nation. As such, MADA would continue its focus as mixing interest between food production and water management may incapacitate MADA's actual focus.
Mr. Peter Sawal, Controller, Natural Resources and Environment Board Sarawak (NREB)	Sarawak is a unique state with the highest number of river basins i.e. 52 basins. Currently, surface water is neglected to being one of the most important water resources. The availability of raw and potable water is declining due to the poor water quality i.e. 64 rivers were identified as polluted. The main causes are identified as climate change and increase in population. Low line areas are facing flood threats which do not exist before, the question is why now? 70% of energy comes from water however, energy productivity is low due to poor water quality in Sarawak. The increase in population resulting in increase in demand for clean water supply. Sarawak does not have a single entity to manage Sarawak's water resources. The water authorities in charge of water supply are: - Kuching water board: supply to south-east region - Sibu water board - Laku: supplying for Bintulu, Miri and Limbang, respectively.
Assoc. Professor Dr. Zainura Zainon Noor Deputy Director, Centre for Environmental Sustainability and Water Security (IPASA), UTM	Malaysia has high interest in WFE Nexus and this is reflected in the policy, with clear relation between the nexus and SDGs. Due to water resources stress, expected increase of water consumption, energy demand and food production may disrupt the Nexus.

	The 3 elements fall under several goals in the SDG. Hence, all 3 domains focus on water resource management, ecosystem protection, water supply and sanitation. Integrating and documenting SDG goals into the national policy: • How to implement SDG in related to the Nexus through whole national and local level? Requirements to achieve: • Water should act as main catalyst to achieve SDG goals because water is the most important element in the Nexus • SDG criteria should serve as the baseline presenting the new development goals to be pursued in any WFE development plan • Any WFE initiative should be unified within national and local plan and subsequently implemented following the SDG achievements The national policy addressing the WFE Nexus challenges should consider few elements: • The access to public service including potable water, drinking water, adequate sanitation • Healthy food available for the nation • Clean sustainable energy • Productivity of resources used including reducing waste and consumptions and increase overall productivity • Ecosystem services and biodiversity

Session 3 – Q & A

NO	NAME / ORGANIZATION	QUESTION / COMMENT	ANSWER / FEEDBACK
1	Tan Sri Ir. Syed Muhammad Shahabudin, FASc	Agriculture for food production. • Why is Malaysia focusing on the production of palm oil instead of rice? Since rice is the main source of food in Malaysia. We are still importing rice from outside the country. Why can't we produce competitive rice industry? Give opinion on what can government can think and goods we get from it?	**Mr. Syed Zainuddin**: The government spends a lot of money on paddy production. Paddy production in Malaysia is not ready as economic security but contribute more on food security. In terms of increasing the production of rice, most farms are fragmented, and not done in large scale. **Mr. Gurmit Singh**: Neglected on food sufficiency. Policy effect the agriculture. Thailand don't face crisis because

			of the efficient food supply. National physical plan on agriculture and water already in implementation. Planning and implantation are disconnected. **Datuk Adnan**: To achieve self-sufficient in rice production is almost impossible. We can live for 60-70% self-sufficiency on rice. 30% imported is important in terms of food security point of view. Making good diplomatic sense, at least allow for international relationship in food security. For the country to achieve 100% production is very expensive. Farmers interest in income, we need to raise the income for them. If the commodity cannot promise for the income, the farmers will leave. National interest is food security **Dr. Zainura**: Depends on preference of Malaysian. Paddy is highly subsidized sector. Decisions are involving finance and economic impacts in this case.
2	Mr. Mansor Abd Ghani, MWA Council Member	Nexus subject is being talked about, for water players looking at food and energy. In our situation, when we compare the cost to produce water, our way to see whether is economical viable and also the treatment process in production unit of water. That's how we control the usage of energy consumption to treat water. Reduction of paddy	**Datuk Adnan**: The conversion of paddy land into urban areas is considered as a big issue. Based on studies in Langkawi, a lot of paddy lands are being converted into something else. It is of national interest to maintaining the areas for paddy production. There are laws on land conversion and limitations in terms of the percentage of land to be developed.

		plantation. Many paddy fields in sub urban area in Kedah are being developed into housing accommodations. What is the real role of town and country planning in handling this issue? Are we free to build houses on paddy field land? Is it producing more money in building house than planting paddy? Is there no incentive for the farmers to keep their land? What is the effort by the country planning unit to bring the stakeholders in retaining the land for paddy farming.	Strong Nexus model and quantified provision is important to provide a common basis in decision making. **Dr. Zainura**: the preferences of Malaysian, some farmers sold their paddy but buy rice from Thailand because it tastes better. The land is sustaining at the moment, no increase or decrease of paddy land. Paddy plantation is highly subsidized sector. Not agree in increasing palm oil plantation. Requirement of energy production is not simple as what we think. Involve the state of environment heavily influence how much energy we consume to treat water. Pollution also affects 3 elements in Nexus **Mr. Peter Sawal**: State governments do encourage investors to invest in food production, particularly rice. But not much interest. More towards oil palm. No incentive for farmers who involve in rice production.
3	Prof Dato' Sri Dr. Mushrifah Idris, Head, Tasik Chini Researh Centre, UKM	At the moment, what has government given priority in term of budget for water and energy in term of water food energy Nexus?	**Datuk Adnan**: Water supply, ROS, energy has the highest investment in term renewable energy. Security point of view investments in energy continue to be high. Risk of balance the gap. Future: have to work together to support. Public participation. Technology has to come in. climate change big impact. We cannot support each other. Timing not in quality and quantity effect the environment

SESSION 4

Water Resources Security and Hazard

Chair : Datuk Ir Abdul Kadir Mohd Din, President The Malaysian Water Association (MWA)

Keynote 5 by Dato' Ir. Nor Hisham Mohd Ghazali,
Director, Water Resources Management and Hydrology Division, JPS Malaysia
Water Availability in Malaysia: Are We Secure?

Malaysia is changing from traditional resources to sustainable resources. It is estimated that by 2080 the world will face water security problem. Water security is related to food security and economic security. Malaysia assumes that it can provide sufficient water supply until 2050. Water security fails when the threat is not managed properly. Comprehensive understanding on the ongoing issues is crucial to deal with the threat. The United Nations (UN) referred to water security as the next war. All countries will face the same problem due to resources depletion. Global warming is one of challenges in managing water security. Climate change is happening and affected all sectors. Another issue in managing water security is the habit of consumers. Consumers tend to neglect warning during dry season and continue utilizing water.

Water, energy and food Nexus is not the only Nexus as there might be more in future. The global water demand increase due to more country becomes an industrial country. Urgent action must be taken to ensure crops produced are done efficiently. In order to achieve water security, Malaysia needs to ensure no water scarcity event happened and should be enough for diversity of sector. Moreover, the quantity of water in river basin and numbers of basin available need to be identified. Therefore, data collection must be done. Water footprint and demand study need data whereby all these data involved money. It is important to build trust between agency and data should be shared. If water is considered as national assets, it must be conserve. Additionally, gap in governance and enforcement need to address. Infrastructures need to be improved and inefficiency in management is removed. Water security is not exclusive for adequate water supply but also needed for ecosystem preservation. Many activities in Malaysia are overlooked as an example, plantation activities in estate area. Malaysia has taken several measures in an effort to secure water by providing a system to the state to monitor water. Engagement with stakeholder and player in water industry is not yet successful therefore we need to improve.

In conclusion, there are five items highlighted in this discussion. First, the approach based on river basin planning need to be address. Second, the current system available as the tool. Third, the understanding by the government sector as well as private sector need to be synchronized. Fourth, flood water should be retained and considered as one of water sources. Lastly, good and comprehensive policy and law should not be taken lightly as it determines the future of water security in Malaysia.

Keynote 6 by Dato' Haji Muhammad Yusoff bin Wazir
Deputy Director, National Disaster Management Agency (NADMA)
Water Hazard in Malaysia: Is It Serious?

In general, water plays an important role in our environment and can change the ecosystem balance. Water becomes threat in two ways; when water is abandon and when water is scarce. Abandon water can lead to natural disaster such as floods and landslide. Cameron Highland floods and Karak highway landslides was featured as a case study. During dry season when water is scarce it can caused drought and haze. Malaysia should consider to design and build more retention ponds to collect excess water and utilized it during drought season. The effect of hazard can be immediate and prolonged. Level of severity on impact due to water related disaster depends on the magnitudes and frequency of hazards, preventive and mitigation action taken, capacity and capability of disaster management committee at district, state and federal level as well as resiliency of the community. In Malaysia, the impact of water disaster is considered low but should not be taken lightly. Earthquake in Sabah was featured as a case study. Community should be informed early to substantially reduce impact of disaster.

Malaysia practices four priorities for action adapted from Sendai Framework as intervention mechanism during disaster. The first priority understands the risk. Second, strengthening disaster risk governance. Establishment of National Disaster Management Agency (NADMA) by the Malaysian government is one the effort to enhance management of disaster in Malaysia. Third, investing in disaster risk reduction and forth enhance disaster preparedness for effective response and to build back better in recovery, rehabilitation and reconstruction. Malaysia key element in intervention is the governance and policies. Malaysia should develop an Act for disaster management. Malaysia plan to increase disaster awareness through education by conducting awareness campaign and disaster simulation at schools.

PANEL MEMBER / ORGANIZATION	OBSERVATION NOTES
Dr Kalithasan Kailasam Global Environment Centre (GEC)	Do public understand where does the water resource comes from and their duties to ensure water security? Demand management – despite having enough water what are the roles of consumer. We need to empower end users to understand demand management. Malaysia has lots of Standard Operating Procedures (SOP), however not well known by the public. Public awareness on disaster is uncertain. It is important to nurture and instill understanding among public about water and disaster starting from education level (young age). Organization such as RELA and Rukun Tetangga should be educate and empowered.
Dato' Ir. Hanapi Mohamad Noor, Vice Chair, My Water Partnership	Malaysia has no water security. El Nino drought has effect water supply at the Klang Valley, Penang, Kedah and Kelantan. Malaysia has abundance of water however still has problem with shortage water supply. Malaysia fails to manage water in proper manner or lack in investment? Conflicting issues regarding water supply. Household water security scored 5/5. Urban water security 4/5. Economic water

	security 3/5 and need to improve the figure. From 2002 to 2012 flooded area increase by 12%. It is at a worrying state and the impact is a big as lots of damage occurs. It is not possible to stop natural flood however, prevention and preparedness measures may be taken to reduce the risks for community and environment.
Mr. Engku Azman Tuan Mat, President, Malaysia Association of Public Health Engineering (MyPHE)	We have high concerns of water if it meets the quality standards in order to avoid water-related diseases. Malaysia needs to produce optimum quantity of water with the right quality. Consumers are exposed to low quality water during disaster periods. Malaysia is a wet country but facing various problem related to water. Malaysia have to improve water management. The connection between water and sanitation is important. Malaysia rivers are dirty hence indicating that the sources for clean water supply are not properly protected from pollutants. It is important to tie water and sanitation as the SDG targets include both however, sanitation targets are more difficult to achieve. Quality and quantity need to be develop equally as both element is important.

Session 4 – Q & A

NO	NAME / ORGANIZATION	QUESTION / COMMENT	ANSWER / FEEDBACK
1	Ir Dr. Salmah Zakaria Akademi Sains Malaysia	Does the Malaysian structural design adopt/use the most recent technology? We know flood will occur, in some areas this in fact happens repeatedly. Did we identified areas which are prone to flood?	**Dato' Ir. Nor Hisham Mohd Ghazali:** Yes, Malaysia do consider recent design and technology.
2	Prof Dato' Sri Dr Mushrifah Idris Head, Tasik Chini Research Center, UKM	Has the government done something to reserve water? Based on case study, more floods will occur in the future. Flood keeps occurring in 5 years trend and now in 3 years. Is there any innovation or model other country may use to mitigate this situation?	**Dato' Ir. Nor Hisham Mohd Ghazali:** Selangor have retention ponds. Among issues related with ponds is land issue. Suitable land needs to be find and in the city it is impossible to build one. JPS has created the National Flood Forecasting and Warning System (NaFFWS) to study the flood coming. One of the innovation

			used for mitigation purpose is by installing a technology (sensor) at the flood-prone area, however JPS have to deal with vandalism problems.
3	Prof Chan Ngai Weng President Water Watch Malaysia	Why we build house at area prone to flood? Arahan 20 is old, we need to amend. We need new SOP.	**Dato' Haji Muhammad Yusoff bin Wazir:** There are many type of houses, and to build a house we make sure it is safe. However, sometimes there are federal government lands in state area. That explain the reason houses were built at hilly area. Yes we have to come out with new Arahan.

SESSION 5

Water Education and Public Outreach
Chair: Dato' Dr. Mazlin Mokhtar, FASc, Principal Fellow, LESTARI-UKM

Keynote 7 by Dato' Seri Ir. Dr. Zaini Ujang, FASc,
Founder, Friends of Langat River (FoLR)
Being Friends With the River: Engaging the Public

For over 30 years, the water partnership is being talked about. But still this is not happening. Latest photos of Malaysia' river are taken (refer slide). It is important for us to be serious about taking care of our rivers. It involved many people in various responsibilities in order to change for better, which is:

1. Typical rhetoric: blaming each other
2. Legal enforcer: find someone to be prosecuted
3. Awareness
4. Public participation

There are 2 components involved in engaging the public

1. Public expectation: it is unavoidable, the framework is on expectation, and people expectation is high. We should turn into public participation. But how to change?
2. Public participation: focus on what can I do?

How can we turn from public expectation to public participation? Examples:

Friends of river: this organization starts because of few factors.

1. The need to safe our ecosystem. It's our responsible.
2. How to make our rivers recreational in nature?
3. To make the rivers swimmable in nature. Can do many activities, for example fishing, river cruise
4. make the water drinkable
5. How can we develop economy along the river?

Things that can be done:

1. River trails
   - River only use for sewage to be discharge. Migrate the use of rivers to recreational drinkable, food resources and river economy.
   - Role of public participation is vital
   - A lot of things can be done while trailing, for example can make report to the authorities if there any damaged at the river,
   - Make the river clean by develop the infrastructure and trail along the river. For example, Han River in Korea. Used to be polluted before. The 1st thing they did to clean the river, put trail along the river. Have local communities to sit together, found that people are discharging their sewerage water into the river and a lot of places along the river are not connected to public sewer so they discharge into the river.
   - In Malaysia, the authority provide the facilities but no connection by people

Langat River: sketch of Langat River (review slide on Langat map)

- Making the body of main river to be swimmable.
- Most weekend and every months have activities on Langat River

If focus on regulation, will have difficulties to comply and actions. Lecture and talk on awareness program is not effective as public tend to forget all the content. However, practical work will make them connect and easy to educate on environment. Sustainability is something that needs to be focus more on environmental control. To achieved this, environment need to be shifted out from the government control. The framework and governance were based on regulatory that involved in improving the regulation. Not much will be gain through rules. The framework needs to be change to sustainability 4.0 which is not regulatory framework but on lifestyle change. In past or now, we are focus on output given activities, as a result required a lot of time and resources. The outcome of sustainability 4.0 is the people awareness which require change of two things. The change in behavior and habits. The different between behavior and habits is that behavior is conscious thinking or aware while habits more to subconscious or doing it without thinking. In order to have to have public participation, a few factors need to be added which is informing, consulting, involving, collaborating and empowering. When talk about Culture there is three things need to be understood which is attitude (the willingness to changes), values, habits and behaviors.

How to start values, is to act upon them
What can I do? Change the rivers near you

Keynote 8 by Prof. Chan Ngai Weng, President, Water Watch Penang
Water Education: Are We Ignorant?

A water quiz before we start
Do you know how much water you use per day?
Do you know what is your household water bill?
Have you had any water education in school?
How much of your degree is related to water education?
Do you teach others (your family/staff) about the importance of water & the need to use water wisely?
Honestly, do you think Malaysians are “water-literate”?

Water education, are we ignorant? We are in generally ignorant. Most Malaysian is ignorant about water education. Malaysia has a lot of water supply, which we only used about 3% of it. There are lots of problems in term of water in our country, for example, pollutions, draughts, too much water at times and water poisoning. Generally, water is not a problem. It’s the management and people part exaggerating the problem. And why is this so? Because we are ignorant. Because we don’t care. Until today there is no environmental subject in Malaysia education at school level despite being pushed to do so.

A survey on water education with school teachers has been done. The result shows that less than 10% of curriculum in school has some element of water. Even though water has been mention in few subjects like mathematics, Bahasa, English or literature, they do not convey the importance of water to the student. For example the question given on water, the students only need to find the solution instead of knowing why they have to. The real message to the public is loss.

Previous minister has suggested environmental subject in school but then being rejected by teacher because so many subject already being teach in school. After GE14, it is not mention by the new minister. Result on environmental study shows environmental subject in Malaysian school is not adequate and not enough. Based in the study most of subject in

school are not adequate. In IGCSE and WEC also don't have but they do have something as seen in their textbook. Subject in International General Certificate of Secondary Education (IGCSE) i.e. Geography.

UNESCO comes out with real water education program that include teaching on multidisciplinary aspects of water including the scientific aspects. Education for the media is include for community education. Efforts need to be made by all countries to make water a significant component of the K-12 (Kindergarten to Grade 12) curriculum. Lack of water education is the main cause of low awareness, bad habits and low commitments. The root cause is that we not taking the people part, just the waiting result. The main reason people don't pay attention to water because our water tariff is so cheap. Saving water is not about saving money but about saving the environment. Low water tariffs have a negative effect on water conservation. People don't care if they waste any water.

Roles of NGOs very important in water education, this is the area whereby government should engage to the NGOs who have lots of experience. Since teachers don't spend have time teaching on environmental and water education, the NGOs is filling to do so. NGOs are doing the non-formal aspect of water education which include Planning educational program on environmental in school. However, the main constrain is that have to ensure the safety of the children during the program and not enough funding.

Programs under NGOs related to water:

- River ranger
- WWF program
- Water hunt
- Malaysia water forum under span
- Pertubuhan Pelindung Khazanah Alam Malaysia (PEKA)

- Water watch penang
- To educate public to conserve water, general teaching children, communities. Engage with politician about tariff and water pollution. Anything related with water. Do education for partners and companies
- World water day celebration: platform used to engage with public. To educate them on our water.
- Sg Pinang River Education Centre: to provide education center for public. However the project halfway done to give way for fisherman development
- The Sg Ara River Education Centre Proposal 2017

Main proposal: set up river education center in Malaysia to be used by the public including school students and youths.

PANEL MEMBER / ORGANIZATION	OBSERVATION NOTES
Prof. Dato' Sri Dr. Mushrifah Idris Head, Tasik Chini Research Centre, UKM	Freshwater area, Tasik Chini used for learning, research and community outreach purpose. The lake is an area affected by the water that draws from Sungai Pahang river and monsoon. Malaysia is blessed with natural resources. Tasik Chini is for education, research and outreach program. Due to that a lot of funding was provided. Many programs conducted such as IWRM program. Programs were held at Tasik Chini, 5000 hectars land. An experience working with state of Pahang at the same time implementing federal government wishes. Pahang has new RKK (Rancangan Kemajuan Khas) for research to be carried out. Moving towards sustainable development can involve several approaches.
Mr Faizal Othman CEO IWK	There are issue to be address such as low tariff and public awareness. How do we address issues? Try to understand the strategy and criticalness of sewage. Pollutants that polluting the river includes sewage treatment plant. However, looking deeper it also includes others such as non-sewage activities. Indah Water Konsortium (IWK) is actively participating in outreach programs such as friends of river.
Mr. Mansor Abd Ghani MWA	Friends of river, volunteerism activities started one year ago to encourage and increase public awareness on river sanitation. Conducted simple program for public to participate. Identified tributaries in Langat river and assign group of people to adopt the tributary and take care of them. Why taking care of tributaries? Because tributaries is the starting point of river pollution. Currently planning to continue the program at Klang river. Synchronized the effort and create a template so it is easier for any groups to takeout the programs. Transformed our river to recreational activities center where the public can use for picnic, cycling and jogging as well as other recreational activities.
Mr. Amlir Ayat Vice President, EcoKnights	Education is about sharing information and not telling people what to do. It is important to collect information from all sides, whether negative or positive and analyze the gathered information. Sustainability is about making the right decision based on the information gain from the public. Environmental education in school as a subject is not relevant. It is a process whereby you exchange ideas and come out with a decision. Environmental education is a concept where should be integrated in every subject. Environmental education should be practice in daily lifestyle.

Session 5 – Q & A

NO	NAME / ORGANIZATION	QUESTION / COMMENT	ANSWER / FEEDBACK
1	Mr. Amlir Ayat Vice President, EcoKnights	Which is more important, water footprint or carbon footprint?	**Dato' Seri Ir. Dr. Zaini Ujang:** Sustainability is a carbon waste and water foot print are a carbon component. In order to have more nutrient removal facility more carbon is generated therefore sometime nutrient removal isn't necessary.
2	En. Khaidir Mustamar JPS	Malaysia has conducted lots of program and activities. However, there's no significant benefit. How do we deliver?	**Dato' Seri Ir. Dr. Zaini Ujang:** We want outcome and output. Output can be done by Ministry office. Ministry will not be able to get outcome. Focus on the outcomes rather than output. How to change the outcomes? Pantai 2 was featured as case study. Pantai 2 sewage treatment plants are still waiting for people to connect to the facilities. What is the purpose of having mega plan but people are not participating? Encourage people to get closer to river. Don't give expectation but give participation. **Prof. Dato' Sri Dr. Mushrifah Idris:** Among ways to attract community is by conducting activities that provide opportunity for the community to participate. Do hands on activities and get the children involved too.
3	Dr Kalithasan Kailasam GEC	Are we ready to release actual fact to the public without any manipulation or a tone down the real problem that we are facing? So the public knows	
4	Ir Elias Saidin	Comment; NGOs round table should be conducted every month. Give feedback to Ministry on integrated water approach.	
5	Dato Ir Hanapi	The comprehensive master plan for the whole Langat river? What are your advices to replicate the concept to other river basins, especially on the constraint and challenges?	

			Prof. Chan Ngai Weng: Build a river center to attract and get the community to participate. Student can do field trip at river center to learn about river. **Mr Faizal Othman:** Engagement with the people is crucial and it can be achieved through the right platforms.
6	Koh/ Lecturer Universiti Teknologi Petronas	Public research grant for university on social studies?	**Prof. Chan Ngai Weng:** Grants that were given out by Malaysian government, research need to have a component of social benefit. **Prof. Dato' Sri Dr. Mushrifah Idris:** In order to secure a grant, multi-disciplinary and multi university or faculty should get involved.

Conclusion by Chief Rapporteur
Assoc. Professor Dr Norhayati Abdullah

"Sharing Water" – this theme is chosen based on the 8th World Water Forum, which was held in Brazil in March 2018. According to YB Dr Xavier Jayakumar in his officiation remarks yesterday - water is life, life is water. Water is regarded as a human rights issue and if we failed to get it right the people will hold us responsible and answerable. We had 5 sessions which have carefully been crafted to cater for these themes with 7 keynotes and more than 12 panel discussants, focusing on cross cutting issues with more than 10 coordinating water agencies and stakeholders.

1. Water Management & Governance
   Inclusive collaborations between stakeholders is essential to reach the SDGs. Water management must be built at different levels, from government to public, in order to harmonize water for present and future. Legislation and regulation is essential however enforcement is very important aspect to enable practitioners to manage water in an effective and responsive manner.

2. Challenges of Sharing Water
   Very nice capture on the word "sharing". Are we ready for water sharing? It is important to overcome blanket policies and investments not recognizing political, economic and social contexts for best water solution. Water was referred to as a strategic commodity for all states. The importance of water catchments to be gazette as water catchment only, as this is the beginning of water supply value chain.

3. Water Energy Food Nexus
   Today we discussed water for agriculture. 70% of energy comes from water. High connection between water food Nexus and SDGs. We are encouraged to reduce waste by reducing consumption of these Nexus thus promoting productivity. In order to get food, we need to have water for agriculture and this important aspect is not currently receiving the attention it deserves.

4. Water Resources Security and Hazard
   In this session, we touched upon the importance of water security awareness among public and community. Several examples were given featuring simulation training for public and community so that they are ever ready in times of disaster events. It is not possible to stop natural flood however, prevention and preparedness measures may be taken to reduce the risks for community and environment. We have high concerns of water if it meets the quality standards in order to avoid water-related diseases. It is important to tie water and sanitation as the SDG targets include both however, sanitation targets are more difficult to achieve.

5. Water Education and Public Outreach
   It is a great way to conclude the session by having water education and public outreach as the final session for the forum. It is time I think that we put more action-oriented investments in the sector, as education is key for change. Part of the water cycle includes of course sewage and sludge. Enforcement, outreach, education are all promoting action-based solutions involving public engagement and participation. Local communities wish to know how can they be more involved in preserving the environment. Case studies presented on friends groups for Sungai Langat, Tasik Chini all presented inclusive collaboration between many, to address water challenges. *Semangat* volunteerism is the key for these activities to be successful.