MINISTRY OF FOREIGN AFFAIRS AND TRADE OF HUNGARY
BUDAPEST WATER SUMMIT 2016 SECRETARIAT
1027 Budapest, Bem rakpart 47. ▪ Hungary
budapestwatersummit@mfa.gov.hu
www.budapestwatersummit.hu

Budapest Water Summit 2016
Policy Recommendations
for the implementation of the SDG-6 areas[1]

30 November 2016

A. Safe and affordable drinking water (1) and sanitation (2)

A.1 Context

- Drinking water and sanitation are too important to remain within the confines of water policies. They need to be a high priority in allocation of effort and resources in ways that recognise the human rights to water and sanitation and benefits and value creation that these create in societies, including protecting public health, enabling education, opening employment opportunities and creating well-being.
- The right to safe and clean drinking water and sanitation are human rights, which entitles everyone, without discrimination, to have uninterrupted access to sufficient and safe drinking water and physical and affordable access to sanitation. This access should be safe, hygienic, secure, socially and culturally and environmentally acceptable, and should provide privacy and ensures dignity. These provisions must ensure that safe drinking water and sanitation are included in safety nets to protect people who are underserved or not at all, including migrants and people living in slums and camps for displaced people.
- There is a direct correlation between poverty and lack of access to organised sanitation. Significant health improvements can be achieved by transitioning to services that confer safe and continuous (piped) water supply and connection to sewerage or decentralised systems. Safe, affordable and sustainable access to water, sanitation and hygiene (WASH) is a formidable preventive health tool to address global health risks.
- Policies on effective planning, investment and operation of access to water require accurate data based on precise indicators and monitoring processes that generate and analyse gender and geographically disaggregated data on service performance. This includes accurate data on levels of access, quality, reliability, the levels of investment and operating costs and cost recovery, conditions of water and sanitation infrastructure, and economic status of water service users analysed to evaluate measures taken and adjust planning. When counted within the framework of compliance with the Human Rights to water and sanitation and the new indicators for the SDGs, every 1 in 3 use water that is unsafe. The number of people without compliant sanitation is even greater. The MDG/current data do not show that enormous gap.
- Narrowing the water and sanitation deficiency gap will protect and improve human health, advance gender equality and human dignity, create education and development opportunities, especially for vulnerable groups, and facilitate economic development and poverty reduction.

[1] The Budapest Water Summit 2016 Policy Recommendations are actions that can be taken to support and reinforce the Budapest Water Summit Messages 2016. The Policy Recommendations provide a list of activities that can be carried out along the lines of the Sustainable Development Goals (SDGs) and cross-cutting themes that highlight the need to integrate across sectors for successful SDG implementation. The following framework follows the Budapest Water Summit 2016 programme. The number in each title denotes the session number within the programme.

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A.2 Policy recommendations

- Apply human rights based approaches to access safe drinking water. Universal, safe and reliable access to drinking water is a key objective of SDG 6 and of the human right to drinking water. National governments must ensure that all necessary efforts are made to fulfil this target. This requires increased efforts both in terms of investments and implementation. National governments should develop human rights based national roadmaps to achieve these, incorporating the normative and legislative framework at national levels.
- Provide efficient and appropriate technologies, financial resources and human capacity in the planning, design, budgeting and implementation of these services. These should include maintenance, finance, policy and institutional frameworks and the means at all levels to ensure sufficient, safe and affordable water and sanitation for all. Designs must respond to the needs based on assessments done together with all relevant groups, but especially vulnerable groups such as women and girls, the disabled, the aged and minority groups.
- Invest in, create, operate and maintain the hard infrastructure (dams, reservoir, treatment and distribution systems) and look for alternatives like nature-based/green infrastructure to meet the increasing demand for safe drinking water. Adequate operations and maintenance are equally essential. These tasks need to be supported with the appropriate skills and professionalism in management, operations and maintenance. Transfer of technology and know-how and regular training and capacity development need to be prioritised. Use of non-conventional water resources for both drinking and non-drinking purposes need to be examined further. These include desalinated brackish or sea water, reuse of used water, rainwater harvesting, to mention but a few options. Dry sanitation should also be considered, especially in the rural context.
- Provide demand- or needs-based capacity development that enable and empower users, community organizations and stakeholders, in order to enable informed choices. Clear and transparent information to all stakeholders is needed.
- Empower local agencies and ensure that they have access to the resources and expertise necessary to meet these obligations. The provision of access to safe drinking water and sanitation is normally a local responsibility.
- Apply realistic approaches to financial planning and cost recovery. This will be achieved by establishing the sustainable and viable business case for drinking water supply systems and services by managing the costs and ensuring predictable income including sustainable and reliable finance mechanisms that are earmarked for these services for the poor.
- Assess the affordability of drinking water supply for all relevant stakeholders. One example to achieve this is that national governments need to identify fit for purpose business models and cost recovery systems that enable sustainability and affordability over the long-term.
- Cover the whole life-cycle of providing water and sanitation services through user charges and/or taxes/tariffs, including investment, operation, maintenance and renewal.
- Improve willingness to pay for services by providing good services and educating and informing water customers. Disincentives and penalties for non-payers who can afford to pay need to be designed and applied.

- Use pro-poor approaches to support those people who are unable to pay for a connection to the service. Specific water tariffs should be designed to accommodate disadvantaged or indigent groups. These can include banded or stepped tariffs, cross-subsidies and other approaches.
- Take into account when assessing peoples' capacity to pay and the bankability of projects, non-money income and in-kind contributions of households and communities for construction, connection and maintenance.
- Incorporate vocational training in developing countries, especially for women as part of the work plan for sustained installation, upkeep and maintenance of projects by the population themselves and eventually leading to paid jobs.
- Source selection and protection, pollution prevention and control, water reuse and recycling contribute to water loss reduction, and to increasing the resources available. The recovery or reuse of materials removed from used water, (such as energy and nutrients) should be encouraged along with appropriate legislation adapted to encourage this form of circular economy.
- Ensure that institutions such as schools and health centres have adequate and operating water and sanitation facilities. Sanitation is not a luxury or "consumption" but a necessary provision for health, economic activity and education for the society as a whole. These must be designed to be gender-sensitive and allow for proper hygiene and menstruation management. States should encourage all public institutions and private companies to provide water and sanitation facilities in the workplace. Water and sanitation services should be provided in camps for displaced people.
- Design and encourage credit facilities to invest in sanitation.

B. Water use efficiency (3)

B.1 Context

- Water scarcity is one of the greatest challenges of the 21st century, and has been identified as one of the biggest societal and economic risks for the next decades. Addressing the issue of water scarcity and enhancing water efficiency go hand-in-hand.
- Water is wasted and lost along the entire value chain and in most sectors, including in agriculture, households and industries, for reasons ranging from negligence, water-inefficient processes, lack or quality of infrastructure, mismanagement and poor governance. Due to lack of inter-sectoral coordination, for example between water, agriculture and energy, decisions taken in a given sector can have an adverse impact on water availability and quantity and vice-versa, if not dealt with the interlinkages explicitly.
- Efficiency gains leading to water savings are possible in all agriculture sectors including crop production, livestock, fisheries, aquaculture and forestry; across the value chain; in domestic and industrial uses; and in capture, production, storage, and distribution systems, including a reduction in food waste.

Action is needed on both the supply and demand side of water management:

- From the supply side, it is essential to utilize all available sources: soil moisture, runoff, groundwater and treated used water conjunctively with rainwater and surface water. More

reuse and recycling of wastewater, including agricultural runoff has huge potential. Used water is an important, however underestimated resource.

- On the demand side, economic instruments are to be used both as a source of revenue to cover/recover part/some of the investment but also as a policy instrument to trigger behaviour change from farmers, producers, users, consumers, and decision makers in order to be able to address water scarcity effectively.

B.2 Policy recommendations

Actions from decision-makers can be articulated around interconnected technical, economic and governance dimensions:

Scale up the implementation of technical solutions to foster water use efficiency across value chains, including transportation, storage, processing and consumption phases:

- Farmers are to be encouraged and motivated to increase farm-level efficiency using the right mix of technology, infrastructure and management.
- Act towards detection, monitoring, and stopping leakages and losses in water distribution and conveyance systems by municipal authorities and water service providers.
- Encourage farmers to use extension services to get information about the availability and benefits of improved crop selection; water-saving, drought resistant seeds; optimal crop-water requirements; and realize water savings in livestock, fisheries and aquaculture, including reuse, a result being limiting virtual water transfers.
- Provide technological innovation and packages by scientific and professional communities through, for instance, facilitating start-ups.
- Provide, by the governments, the conditions for these technical solutions to be readily available and affordable.
- Emphasise the importance to invest in knowledge of the current and future generations, ensuring that there is no knowledge gap but incremental knowledge reinforcing water use efficiency.

Use economic instruments to foster rational use of water resources, to collect needed revenues and to help trigger behaviour change from all water users:

- Implement the polluter- and user-pays principles through setting and collecting sufficient abstraction and pollution charges for surface, groundwater and for untreated used water discharge to encourage water efficiency and quality.
- Use economic instruments to catalyse needed finance for water and water-related infrastructure from drinking water supply to wastewater management and irrigation systems, including rehabilitation and modernisation.
- Implement other measures such as subsidies, incentives and disincentives for ecosystem services with careful consideration of cross-sectoral impacts.
- Take measures for the poor, smallholders and public interest, when using economic instruments and designing investment policies and programs; and strive for fairness, equity, and gender equality.

Encourage water governance systems that are adaptive and flexible to foster water use efficiency at all levels:

- Foster coordinated planning and management across water, land and soil at the relevant scale taking into account administrative, landscape and hydrological boundaries; including appropriate land tenure systems.
- Empower water user associations as mechanisms to manage water at the relevant scale.
- Raise the awareness of stakeholders on water risks and costs to save water across the value chain and to reduce food loss and waste.
- Encourage focused capacity development to deal with trade-offs, co-benefits and synergies and to support vocational training of smallholder farmers.

C. Integrated water resources management (IWRM) and infrastructure (4)

C.1 Context

- IWRM is a conceptual water management process of integrating stakeholders and resources horizontally and vertically, an efficient driver of social and economic development, and an internationally accepted way for efficient, equitable, and sustainable water management.
- IWRM is necessary to integrate multiple water uses and to connect multiple water users and other social sectors. It also helps address large challenges such as climate variability and water scarcity as a means to socio-economic development and advancement of other SDGs.
- The overwhelming majority of the world's disaster damages are water-related, therefore, water infrastructure is a critical component of disaster risk reduction and societies ability to adapt to changes.
- Water infrastructure is an efficient enabler of socio-economic growth. It is transformative. However, if inappropriately managed, infrastructure could also be responsible for a large portion of economic productivity loss in countries.
- With growing financing gaps, the world faces the need for new infrastructure and to address aging infrastructure.
- Investment in physical and institutional infrastructure is a primary means both to achieving social ends of reducing poverty and to managing climate uncertainties for social stability, resiliency and security.
- Future water infrastructure will be increasingly linked to issues of transboundary waters and must be integrative with other sectors.
- Risk reduction goes hand in hand with good governance - the drain of corruption is a major barrier that has stalled infrastructure investment in the water sector.
- There is an urgent need to address issue of sound governance of the subsurface space, which contains not only 97% of the planet's accessible freshwater, but also is a key host for climate adaptation – as a store for water – as well as storage and withdrawal of thermal resources, impacts of shale gas disposal of carbon gases and sequestration.
- It is necessary for the integrated water resources management approach to be coordinated with the development of infrastructure for more efficient achievement of the sustainable development goals.

C.2 Policy recommendations

- Combine IWRM and infrastructure design and operation for major opportunities to increase flexibility and water management options.

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- Put storage, multi-purpose reservoirs in a sustainable manner as well as non-structural methods, at the center of societies' ability to secure water supply for its multiple uses and to adapt to water related risk-projected impacts of climate change.
- View investment in hard infrastructure in a complementarity manner with green infrastructures (including wetlands, healthy soils and forest ecosystems), which also provide clean drinking water.
- Carry out cost-benefit assessment on proposed infrastructures and include new methods of combining non-monetary and monetary values; and should assess the distribution of benefits and costs geographically and over time; as well as it should use new methods of collaborative modelling and shared vision planning.
- Use water that crosses sovereign or jurisdictional boundaries to build cooperation versus generating conflicts.
- Frame negotiations through transboundary water infrastructure investment and management to jointly create benefits versus fighting over allocations of water, achieving joint basin operating rules, planning and management of transboundary waters.
- Link IWRM to water diplomacy for prosperity and peace.
- Investigate the relationship between policy objectives and appropriate systems for cost recovery, as unrealistic approaches are still taken.
- Increase investments for water and sanitation in the short- and medium-term.
- Strengthen cooperation, including with youth, and accept the principles of fair and equitable use and no harm in the transboundary context.
- Make an effort to increase the levels of financing and to diversify the sources of financing.
- Supplement capital intensive centralized infrastructure investments in water supply, wastewater collection and treatment, and water reuse with new alternatives such as modular semi-central approaches, integrating with energy and waste management.
- Raise awareness and information exchange on possibilities to get benefits from IWRM so that people may be willing to participation in the process of water resources management.
- Establish a guiding process of pragmatic and enabling laws, policies, strategies, and plans for practicing the integrated water resources management incorporating infrastructure development.
- Emphasize the implementation of IWRM plans, particularly based on adaptive strategies for the change of complex context with respect to economy, society, and environment.
- Set out community- and project-based local IWRM to understand and experience the nature of IWRM and extend the knowledge to national and river basin IWRM.
- Promote the investment in demonstrative projects for solving problems associated with stakeholders' priorities by integrating across scales and sectors, and proving each stakeholder's benefits through data analysis.
- Promote high-level political involvement to make stakeholders be mobilized and convened for the agreement on strategies and plans, and a robust institutional framework to decentralize decision makings.
- Establish green infrastructure watershed "banks" comprising natural ecosystem-based assets that would be identified and employed in water delivery systems designed for long-term, cost-effective human use.
- Foster an accelerated global research and solutions program on coupled human-environment engineered systems to attain universal, human water security through well-functioning, integral environments.
- Establish partnerships between young people and experienced professionals to strengthen not only youth, but the whole water sector to face current and future challenges.

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D. Water quality (5) and ecosystems (6)

D.1 Context

- Water is the vital natural resource that forms the essential platform of all dimensions of sustainable development, including ecosystem services. Healthy freshwater ecosystems are global reserves for life on earth.
- Without integrated management of land, water and air, which in themselves encompass energy and food, none of the objectives of the 2030 Agenda can be accomplished.
- In the 20th century, the Earth became the "Chemical World" with millions of synthetic compounds, chemical fertilizers and pesticides, cosmetic and pharmaceutical residues, endocrine disruptors, hormones released uncontrolled onto the planet. Water carries these into natural cycles with and through various fluxes, including the food chain. High energy and costly state of art water treatment technologies is required to partly or fully eliminate these pollutants.
- Water pollution is even more dangerous and urgent to overcome than air pollution, but today few people recognise this. As water scarcity grows, pollution makes it even scarcer. Water pollution and atmospheric pollution contribute to and amplify each other. This includes agricultural, urban, industrial and atmospheric pollution of water.
- Bad water quality is limiting safe water use and threatens the integrity of freshwater ecosystems. Unless safeguarded and remedied water quality will gradually become the determining factor of water scarcity.
- There are still many missing links between agriculture, food safety and water quality, mining and human economic activities, sanitation and health, particularly if the effects on irrigation agriculture on food safety and human health are considered. Climate change also adds several layers of complexity.
- Ecosystem services and safeguarding water quality need management of water and land approaches that are sustainable.
- There are many inherent challenges. Many countries do not consider investment in green infrastructure as part of capital expenditure. An issue to resolve is how the cost of maintaining the green infrastructure can be recovered.
- Some argue that the "soft path," or behavioural management is the best approach and even the most democratic. Primary reliance on demand management can be dangerous; especially where there is little water availability. In fact, one can argue that the investment in water infrastructure provides more social resiliency as it buys time and space for people to continue living and coping with and recouping from, water related disasters.
- It is increasing social resiliency and giving alternatives that is critical to prepare for social impacts of uncertain future events.

D.2 Policy recommendations

- Prioritize environmental/ecological flows allocation as an essential piece in any water allocation system.
- Position ecosystems as the objective function (with benefits-services) rather than as a constraint (regulations, fines) in planning-implementation processes.
- Reduce water pollution from untreated wastewater discharges.

- Reduce diffuse source pollution in agricultural, forest and rangelands by appropriate sediment, nutrients and pesticides control. Develop and test innovative and low cost technologies such as water-free sanitation, to be applied in emerging and hitherto unserved urban agglomerations.
- Minimize the use of water as transport medium of nutrients and pollution from human settlements and production systems into the natural cycles of materials and resources. Focus on the whole water and wastewater cycle needs to be imminent in all efforts to improve ambient water quality. The private sector, especially industries, plays an important role. Already proven initiatives such as the Water Stewardship approach need to be further developed and mainstreamed.
- Improve wastewater treatment at all levels of catchment scale, which is critical for improved water quality.
- Increase point and diffuse water pollution management to protect both marine and freshwater ecosystems.
- Make commonplace high technology engineered solutions at high concentration pollution sources (mining sites, industries, big cities).
- Assign biodiversity refuge areas to protect endangered aquatic species. Biosphere reserves may also serve in that function.
- Provide payment for watershed services as financial mechanism to restore ecosystem services. Individual private investments fail to address the downward stream externalities. Public water funding can be used to tackle such problems and connect downstream beneficiaries to upstream land stewards, particularly in covering capital expenditure and insurance, operating expenses. This may catalyse further investment on green infrastructure.
- Factor in all costs of 'grey only' solutions – i.e. longer environmental and societal costs are often not sufficiently enough considered in current practice.
- Discontinue the one-sided development philosophy of "impair and then repair" which characterized most of the water resources development of the 20th century.
- Encourage behavioural change so that humanity can maintain its life support systems through sustained functioning of aquatic ecosystems.
- Provide maximum protection for areas and water bodies needed to preserve the gene pool of aquatic life.

E. Climate and disasters (7)

E.1 Context

- Water plays a key role in the climate system. The impacts of climate change are now felt through changes in the increase of water related extreme events, such as torrential heavy rainfall and mega floods; decadal droughts; high sea level; gigantic tropical cyclones and other hydrometeorological phenomena with increasing frequency and intensity.
- Climate change together with social, economic and environmental vulnerability aggravates the negative consequences of the intensified water hazards. Losses due to disasters are increasing in both developed and developing countries (the occurrence of climatological, hydrological and meteorological disasters increased by three times since 1980).
- There is still a gap between the knowledge generated by the science community and the actions to be taken by society, especially the decisions and designs by policy makers and practitioners. There is a need to bridge this gap, to re-examine the basic planning

methodology, and to reduce the gestation period from scientific finding to practical implementation.

- Climate change and its uncertainty can undermine the performance of physical infrastructure, and high capital investment requirements create the risk of misallocation of capital if or when actual conditions fail to coincide with projections.

E.2 Policy recommendations

- Identify, visualize and evaluate under-recognized water-related disaster risks, by taking a holistic view of the changes in hazards, vulnerabilities and exposures arising from societal and environmental pressures, and by constantly raising political and public awareness and preparing for effective emergency response and rapid recovery.
- Support society via science by deepening the understanding of changing hazards, improving ability to anticipate future emergencies and assess their impacts, and converting scientific knowledge to actionable information. Innovative technology is expected to provide critical information to society.
- Incorporate mitigation and adaptation efforts on water in climate change agreements.
- Strengthen national platforms for water-related disaster risk reduction, and encourage or enable scientists and practitioners to work closely with relevant stakeholders in locally relevant contexts and language.
- Build relevant data archive that accelerates scientific efforts to improve the use of climate projections for countries, river basins and cities, quantify and reduce the related uncertainty, and anticipate future events with greater accuracy.
- Share climate change knowledge as a "public good" throughout the world. Under this consensus, a two-way flow of data, information and knowledge between scientific and socio-economic communities should be established across local, national, regional and global levels.
- Enhance cooperative efforts by scientists and practitioners for effective use of climate projections towards sound decision-making, balanced planning and steady implementation.
- Develop common, compatible and standardized water-related disaster metrics and indicators. They should be used to accelerate international cooperation and help countries identify the most impactful ways for bringing resources to a disaster, its risk reduction and the response. Integrated analysis should be strengthened at a level of detail that supports effective planning and implementation.
- Commit to no-regret investments by planning for incremental adaptation actions in tandem with improving climate projections, and by using an appropriate mix of structural and non-structural measures.
- Revise infrastructure planning methods that is based on historical statistics.
- Engage the investor community (private and public) sectors. It is necessary to ascertain ways to evaluate level of risks among different countries and regions; make informed investment decisions; understand value returns on investments; mobilize to secure the necessary funding; and ensure that it is utilized efficiently, transparently and democratically.
- Establish a national platform in each country for scaling up community of practices into nation-wide solutions and publishing a water-related disaster report periodically, which should contain disaster records, statistics, analysis of the current status, the records of disaster-related activities, and the progress in disaster policy making. Researchers of each country should actively engage in these efforts and provide advice that matches the needs of practitioners.

- Facilitate dialogue among all stakeholders exposed to water-related risks at local, national regional and global levels, and share lessons learnt and good practices in disaster risk reduction.
- Strengthen existing United Nations mechanisms for reliable international assessment, in which the status of scientific and technological knowledge on water-related disaster risk, resilience and the progress towards a safe and secure society are assessed regularly and objectively.

F. Water, food and energy nexus (8)

F.1 Context

- Water, energy and food are integral elements of sustainable development, and have many interconnections and interdependencies within each other. A 50% increase in energy consumption by 2035 and a 60% more demand for food by 2050, respectively, are estimated. The combined effect of these changes can lead to a 55% increase in global water demand by 2050. Water infrastructure has synergetic impacts, such as producing hydropower and storing water for irrigation and urban uses, contributes to climate change adaptation and coping with water scarcity yet potentially adverse impacts on downstream areas, ecosystems and food systems, and on communities that have to resettle.
- Irrigated bioenergy crops can help augment energy resources, but may compete for land and water resources and at the expense of food production. Lack of healthy soils and increased soil degradation reduce crop yields and cause nutrient and micronutrient deficiencies in our food. Soil health is threatened by the unsustainable use of land, by deforestation, desertification and water runoff — all of which can be worsened by improper farming practices.
- Ineffective land governance and tenure alienate farmers and lead to inefficient agricultural practices, waste of water and energy, and degradation of the resource base. Uncertainties and risks related to global environmental changes further complicate the challenge and make the interrelationship between the sectors highly dynamic.
- Nexus approaches offer huge opportunities towards overall resource efficiencies, reducing risks associated with mismanagement, increase investment feasibilities, technological innovations, and for joined-up thinking, management of trade-offs, and incorporation of synergies, local governance and co-benefits from planning to operation.
- The water, energy and food nexus offers the very useful possibility for a coherent and systemic approach to natural resources management for the attainment of the SDGs. The broad implications of food loss and waste on the water, energy, and climate change dimensions provide a very good example on how the nexus approach can help society recognize the broad picture and address multiple facets of the same problems effectively.
- At the landscape level, a major energy policy decision, an investment project or an agricultural innovation can use the nexus approach with benefits beyond their respective domains by recognizing the broader implications, and possible responses they may trigger. The current governance structures are seldom conducive for decision-makers to engage cross-sectorally with each other for more informed decision-making. Data, information and analyses are either sparse or not readily understandable across sectors to develop and implement nexus solutions.

F.2 Policy recommendations

Improved nexus governance:

- Make sectoral policies – especially at the landscape level - more inclusive and better coordinated among each other in order to safeguard the environment and secure rights and access to natural resources, in particular for the poor and the underprivileged.
- Give top priority to political support for and constant monitoring of SDG targets to bring about sound, responsible and transparent governance principles that mitigate cross-sectoral competition around resource distribution while addressing both human and environmental concerns.
- Put in place protocols to assess the environmental, water-related and social impacts of policy implementation and developing as well as implementing, monitoring and updating environmental management plans that consider the inter-linkages between natural resources use and management.
- Frame economic policies, price schemes, including tax/subsidies, fees and other production and operational costs set up by national and local governments, regulators and private producers that allow for a nexus approach and reflect resource scarcities without negative side effects for other sectors and the environment.

Improved nexus solutions:

- Stimulate research that is solution-oriented to facilitate technologies and approaches supporting increased integrated resource use efficiency with an eye on the scarcity of interlinked resources.
- Co-design and co-produce solutions, by policy makers in public and private sectors, with the participation of end users, to incorporate resource scarcity and its implications for wellbeing, taking into account the multiplicity of biophysical and socioeconomic contexts, and incorporating appropriate measures to protect smallholders and the disadvantaged groups.
- Enable informed choices by giving open access to data. Decision-makers should make better use of the wide range of data including, for example, from Earth Observations.
- Carry out scenarios-based assessments to explore strategic questions, compare nexus and business-as-usual approaches for their costs and benefits, to review policies and investment decisions, and to create 'common ground' and improved understanding of the interrelations between water, energy and food as well as the underlying drivers.
- Train the next generation of scientists and practitioners to increase capacities to understand the interconnectedness among water, energy and food, develop and implement nexus solutions.

Broad involvement of stakeholders for nexus implementation:

- Bring together the different stakeholders around water, energy and food security strategies by decision makers in governments and private sector.
- Inform stakeholder dialogue by evidence-based analysis of nexus interactions and the development of scenarios, strategic visions and response.
- Pay special attention to context-specific issues at various levels, with particular reference to policies on water, energy and food systems using the full spectrum of interactions from exchange of information to shared decision-making and action.

G. Urban systems (9)

G.1 Context

- By 2050 the world urban population is expected to nearly double, making urbanization one of the 21st century's most transformative trends.
- This poses massive sustainability challenges in terms of infrastructure, basic services, food security and nutrition, health, education, decent jobs, water and sanitation systems. Cities today occupy approximately only 2% of the total land, contribute about 70% of the global economy (GDP), consume over 60% the global energy, emit 70% of greenhouse gases and produce 70% of global waste.
- The very nature of urbanization contributes to water stress, scarcity and exposure to climate change-related risks, especially in deltas (pollution of local waters, salinization of aquifers, and destruction of ecosystems, that serve as barriers to erosion, sea level rises, ground subsidence, landslides, storm surges, and tsunamis).
- Although cities tend to have better access to safe water and sanitation facilities than their rural counterparts, they struggle to keep up with population growth and sprawl.
- Around one-third of the world's urban population live in slum conditions which tend to emerge near rivers, streams, and coastlines that offer informal access to water and peripheral land that provides the city with critical, but often unrecognized, services, including flood control. Slums are characterized by inadequate access to safe water and sanitation and allied infrastructure.
- Urban sustainability can only be assured through careful design, planning and management and review of the complex interactions among environmental, economic, political, and social-cultural factors.
- The current urban water management systems have not yielded desired results in terms of cost effectiveness, management and sustainability. There is need for more integrated planning and management of water within the water cycle.

G.2 Policy recommendations

- Adopt integrated urban water management (IUWM) principles and include other SDG targets that bring alignment of urban development and basin management to achieve sustainable economic, social, and environmental goals, as IUWM aims to avoid fragmentation and duplication in policy- and decision-making.
- Ensure that predictable and sustainable revenues are available from tariffs and/or taxes, to support adequate investments in infrastructure, its operation and maintenance, to ensure service provision for water, hygiene and sanitation, sewage, solid waste management, urban drainage, and storm water management.
- Design subsidies and other support systems to transfer benefits to vulnerable groups, while ensuring that pricing policy of service provision reflects true costs.
- Establish robust legal and regulatory frameworks for sustainable municipal financing on the basis of sustainable debt management, supported by adequate revenues and capacities, by means of local creditworthiness as well as expanded sustainable municipal debt markets when appropriate

- Orientate urban water infrastructure planning and implementation towards efficient outcomes by combining solutions that embrace an "urban ecology" perspective as well as both old and new water and wastewater systems. Urban water infrastructure (grey and green) forms part of integrated urban and territorial development plans, and should be implemented in an efficient, participatory manner, considering innovative, accessible, context specific and culturally-sensitive solutions.
- Promote conservation and sustainable use of water by rehabilitating water resources within the urban area, reducing and treating waste water, minimizing water losses (non-revenue water), promoting water reuse, increasing water storage, retention, and recharge.
- Promote the safe use of treated or partially treated wastewater in agricultural land through integration of food and nutrition needs of urban residents, particularly the urban poor, in urban and territorial planning, to end hunger and malnutrition. Clarify overlapping lines of authority in wastewater use regulation between health, agriculture, and water supply.
- Create inventories and monitor emerging contaminants like pharmaceuticals, endocrine disrupting chemicals and personal care products.
- Support social, technological, digital and nature-based innovative research and robust science-policy interfaces in urban and territorial planning and policies leading to institutionalized mechanisms for sharing and exchanging information, knowledge and expertise. This includes the collection, analysis, and dissemination of open, geographically-based, user-friendly, community collected, high-quality timely and reliable data for participatory data platforms. This would enhance effective urban planning and management, efficiency, and transparency through e-governance, information and communications.
- Support developing countries in order to enable them to establish proper urban water supply infrastructure.
- To ensure integrated urban water management, planning and implementation and establish global and national collaborative "Urban Hubs," which can be used to mobilize knowledge and expertise.
- Involve youth in water governance mechanisms, project planning, implementation and monitoring, as they represent a significant portion of the urbanizing population, there should be provisions for them to be involved.

H. Transboundary water systems (10)

H.1 Context

- In many watersheds of the world, the amount of shared water between riparian states that have been agreed today will not be there in the future due to increased water scarcity. Climate change may exacerbate the situation.
- The majority of transboundary basins are not governed by any form of treaty or cooperative agreement at all yet 40% of the world population lives on transboundary water bodies.
- During the 21st century, water protection and its optimal use are critically shaping foreign policy and international affairs in countries suffering from water scarcity, and this will affect the relations between nations
- The multitude of transboundary water challenges and the diverse nature of their effects suggest that transboundary water must be a priority:

- Some countries want to keep the *status quo* while others want to renegotiate volumetric allocations.
- Some countries have access to alternative external financial support or have increased their own resources. Historical and non-traditional financiers are competing to create new types of dependencies, willing to increase their geopolitical gains in specific regions. Also, there are new balances of power in river basins due to different economic, social and political dynamics and trends.
- As a result, in many transboundary river basins, previous formulas of water allocation are being challenged. This is affecting agriculture, urbanisation, hydro-electricity and therefore livelihoods, trade and economic development, human security and international relations. These challenges require novel cooperative solutions, based on mutually beneficial outcomes.

- All these factors, and others, impact water resources, water services and ecosystems services. They are likely to deteriorate in the near future with a high potential for major conflict generation. This may be the biggest challenge of our generation. The costs of failing to manage them are counted in terms of poverty, conflict, impaired growth and loss of biodiversity.

H.2 Policy recommendations

- Integrate the watershed and transboundary perspectives in water as well as climate planning processes. Adaptation to increasing water scarcity must not cause a threat for water security in a neighbouring country.
- Create stronger transboundary water management/governance institutions and strengthen existing institutions, and implement instruments for improved joint management of transboundary waters on the basis of mutual benefit and consensus.
- Enhance cooperation among riparian states [through relevant arrangements], taking into account the interests of all riparian states.
- Transboundary water cooperation is based on win-win solutions that can contribute to sustainable development and sound management of the transboundary waters between riparian countries and peace and stability of the nations.
- Employ, by all states, their best efforts to promote UN international watercourses conventions (accession, acceptance and ratification) and effective implementation.
- Encourage cooperative efforts in the field of transboundary waters. Current contracting states on transboundary watercourse cooperation call upon or encourage their neighbours and riparian countries to join the existing relevant UN conventions by demonstrating incentives to cooperate.
- Emphasize the linkages of adaptation investments to resiliency and stability in a transboundary context, as most states that are highly fragile or at high risk for instability are also vulnerable to climate-related threats.
- Build water cooperation across boundaries and consider the use of the soft power of water investment to promote cooperation.
- Use joint water resources planning and environmental management to prevent negative cross-sectorial and transboundary impacts and create additional opportunities for equitable and sustainable sharing of benefits from water use.
- Coordinate between the governance and management of freshwater, land and marine systems and prevention of the pollution of surface, ground and coastal waters and oceans.

- Improve integrated and cross-sectoral approaches to water resources management: Manage freshwater resources in an integrated way in transboundary river basins and aquifers, so to maximise benefits across sectors in an equitable, efficient and sustainable way, foster food and energy security, protect ecosystems and enhance the services they provide, and increase water productivity.

I. Indicators and monitoring to enable informed choices (11)

I.1 Context

- Measuring, monitoring and reporting on all dimensions of the SDG in a disaggregated way is absolutely essential. The maxim holds: If you do not measure it, you cannot manage it. Without it informed choices and evidence-based policies are not possible. However current lack of data should not stop us from acting!
- Some issues in the SDG agenda are new in this global context, methodologies are currently being tested and data collection does not exist yet. Further, interconnection and trade-offs between different SDG goals and targets need to be well understood and managed in coordinated and complementary ways, as they might otherwise lead to adverse outcomes if the set of actions were not properly pre-designed considering such interlinkages. Moreover, initiatives demand adaptations, different tactics to neutralize or minimize adverse conditions, bring forward planned interventions ad so many other activities. Thus, scientific research and evidence have a key role to play in facilitating the implementation of SDGs through indicator development for assessments and policy engagement from global to local scales and through the provision with means of implementation including finance, building capacities, and technology transfer in addition to the exchange of best practices.
- Providing insight in the outcomes of monitoring activities, including disaggregated data if possible, for civil society organisations can effectively support the implementation of the SDGs. There is a need to share disaggregated data, in order for civil society (including important stakeholders such as women and youth) to support efficient implementation of the water-related SDGs.
- Further, adequate global indicators reflecting the political will of the new agenda and enable informed choices of stakeholders in general are needed. Monitoring, follow-up and review will be key to implementing and addressing the challenges of the 2030 Agenda. A key task for the water community is to increase and improve monitoring capabilities and make the meaning of indicators understood.

I.2 Policy recommendations

- Build a more exhaustive evidence base, through normative work and monitoring, carried out by national governments. National governments and international organisations need to reinforce their financing to initiatives that are designed to allow better monitoring in countries where access to water and sanitation remains a critical barrier to progress and economic growth to help them to build political commitment and capacity.
- Carry out an intensive assessment of undertaken actions and the progress towards goals and targets for the management of water resources under an SDG scenario. Since SDG 6 and other water-related targets cover aspects not previously monitored, for which data sources and monitoring capacities still need to be developed, an effort must be made to establish

them and their indicators with clear procedures, so data cannot only be known but compared and interpreted. To support this requires strong global monitoring coordination between UN agencies.

- Coordinate inputs to be sent to High Level Political Forum (HLPF) and establish a legitimized process to discuss the monitoring results and challenges before the HLPF.
- Develop appropriate indicators (including governance indicators) to identify solutions that address the root cause of the water system problem, governance issues, guide investment in infrastructure building and enable the achievement of multiple objectives that are inherent in SDG 6.
- Develop new sources of data, monitoring of high quality and increased capacities to report accurately on the water–related SDG targets in a coherent manner, considering the interlinkages with other SDGs.
- Place monitoring as a central, coordinated focus in efforts of development partners and UN organisations.
- Encourage the production, collection, use and sharing of data and information, and scientific evidence needed to support water use monitoring and efficiency, using techniques such as water accounting, water auditing or crowdsourcing at the field level.
- Develop for new methods facilitating data gathering, and knowledge sharing between countries.
- Expand existing and create new global water-environmental services observatory to assess progress or backsliding in sustainable management of water assets, combining state-of-the-art Earth observations, survey data, and simulation models depicting conditions from worldwide to local scales and with near real-time, operational coverage.
- Devise and establish new indicators to assess the economic impacts of actions (jobs, economic growth, environmental sustainability) and of inactions and to link SDG 6 to other goals and targets.
- Avoid any regression with regard to the level of ambition – both in terms of quality (for example, on drinking water), as well as on the encompassing nature of SDG 6.
- Cover issues connected with conditions and changes within the indicators, providing a sense and measurement of actions and covering availability, uses, vulnerability, risk assessment and level of governance of water resources. As water connects, indicators must cover not only the immediate needs of management of water resources and SDG targets but help describe accurately many of the dynamic trends that are occurring among them.
- Carry out primary data collection, monitoring, indicators and modelling to form a cyclic process to map the situation, determine trends and the need to introduce corrective measures.
- Employ in situ and remote sensing technologies to support the assessment of water targets and identify emerging risks.
- Encourage use of citizen/schools/youth water in quality monitoring and environmental management.

J. Water governance (12)

J.1 Context

- The governance landscape for freshwater management has changed in the last 25 years. It has come to the pinnacle of political and business attention. However, it lacks adequate

mechanisms both at global and national level, since responsibilities are spread over multiple ministries and (UN) agencies. SDG 6 was identified in a report to the UN Secretary-General as one of the two SDGs that completely lack a coordination mechanism in the UN. This needs to change.

- Information flows more easily and potentially sheds greater light on deficiencies, failures and unsustainable use and practices. In addition, the water sector holds intrinsic characteristics that make it highly sensitive to and dependent on multi-level governance.
- Water connects across sectors, places and people, as well as geographic and temporal scales. In most cases, hydrological boundaries and administrative perimeters do not coincide. Freshwater management (surface and groundwater) is both a global and local concern, and involves a plethora of public, private and other stakeholders in the decision-making, policy and project cycles.
- Water in the current approaches of managing it, is a highly technical and thus capital-intensive sector, with great risks that prevent investment where coordination is essential. Water policy is inherently complex and strongly linked to domains that are critical for development, including health, environment, agriculture, energy, spatial planning, regional development including job generation and poverty alleviation.
- To varying degrees, countries have decentralized and allocated increasingly complex and resource-intensive responsibilities to sub-national governments, resulting in interdependencies across levels of government that require co-ordination to mitigate fragmentation and lack capacity, responsibility allocation and finances.
- Coping with future water challenges raises not only the question of “what to do?” but also “who does what?”, “why?”, “at which level of government?” and “how?” Policy responses to meet water-related SDGs will only be viable if they are coherent, if stakeholders are properly engaged, if well-designed regulatory frameworks are in place, if there is adequate and accessible information, and if there is sufficient capacity, integrity and transparency. Water governance systems (more or less formal, complex, and costly) should therefore be designed according to the challenges they are required to address.

J.2 Policy recommendations

- Clearly allocate and distinguish roles and responsibilities for water policymaking, policy implementation, operational management and regulation, and foster co-ordination across these responsible authorities.
- Manage water at the appropriate scale(s) within integrated basin governance systems to reflect local conditions, and foster co-ordination between the different scales.
    - Strengthen, support and empower river basin/catchment organisations so that they become autonomous, fully resourced and financially sustainable.
    - Stress basin level management based on, inter alia, water planning, public participation and the sound management of physical infrastructure and natural systems as a means to effectively tackle the water security related challenges. Stress basin level management based on, inter alia, consensus, mutual benefit, and public participation, for the purpose of realizing sound water planning and the sound management of physical infrastructure and natural systems as a means to effectively tackle the water security related challenges.
- Encourage policy coherence through effective cross-sectoral co-ordination and harmonization, especially between policies for water and the environment, health, energy, agriculture, forest, fisheries, industry and land use.

- Adapt the level of capacity of responsible authorities to the complexity of water challenges to be met, and to the set of competencies required to carry out their duties.
- Produce, update, and share timely, consistent, comparable and policy-relevant water and water-related data and information, and use it to guide, assess and improve water policy.
    - Improve existing programs and tools to ensure support for member states in their national implementation process.
    - Encourage open access data sharing portals. There is a need for an "open data policy" for a free exchange of data, otherwise data collections will always remain an uncompleted task.
    - Support the adoption and use of new technologies in data collection, processing and sharing through earth observation tools (satellite, remote sensing and GIS), smart phones, unmanned aerial vehicles (UAV's) or drones that complement national and local data.
    - Facilitate methodological and other technical innovation to fill data gaps from in situ-monitoring stations through other data sources, like remote sensing data and through modelling, in order to provide an adequate international basis for an assessment of water quality and of the pressures leading to adverse effects. This is a prerequisite for targeted planning and implementation of measures.
    - Facilitate the use of modern modelling tools for improved decision-making in combination with simplified graphic user interfaces. The usage of sector data by regulatory authorities and ministries, for example, should be increased to inform the reporting on SDG 6 on national and global level.
    - Increase investments in building independent and impartial national water and sanitation related statistical capacities and strengthening statistical quality and standards.
- Ensure that governance arrangements help mobilise water finance and allocate financial resources in an efficient, transparent and timely manner.
- Ensure that sound water management regulatory frameworks are effectively implemented and enforced in pursuit of the public interest, where appropriate.
    - Establish water regulators for bulk, raw or treated use, where appropriate. Water business tends to be a monopoly and its part of the reason for failures in many instances. Regulators should inject competition, performance based service provision and protect the customer.
- Promote the adoption and implementation of innovative water governance practices across responsible authorities, levels of government and relevant stakeholders.
    - Add behavioural scientists to planning, policy, mergers and acquisitions teams at all levels.
    - Apply innovative and applicable technologies to develop water policies and to build sound and effective action plans linking science, technology, policy and practice.
- Mainstream integrity and transparency practices across water policies, water institutions and water governance frameworks for greater accountability and trust in decision-making
- Promote stakeholder engagement for informed and outcome-oriented contributions to water policy design and implementation.
- Encourage water governance frameworks that help manage trade-offs across water users, rural and urban areas, and generations.
- Promote regular monitoring and evaluation of water policy and governance where appropriate, share the results with the public and make adjustments when needed

MINISTRY OF FOREIGN AFFAIRS AND TRADE OF HUNGARY
BUDAPEST WATER SUMMIT 2016 SECRETARIAT
1027 Budapest, Bem rakpart 47. ▪ Hungary
budapestwatersummit@mfa.gov.hu
www.budapestwatersummit.hu

- Support the reinforcement of mechanisms to gather global evidence on major challenges, building on existing structures and using synergies with existing efforts. Strengthen on-going efforts with a view to provide regular and comprehensive water assessments in cooperation with regional banks and water agencies.
- Establish appropriate local and national institutions that address the allocation of water in a fair, transparent and equitable manner.
- Create a mechanism for meaningful participation of all subject-relevant stakeholder groups at the appropriate levels.