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1. MR. JAWAD DARWISH (AFGHANISTAN)				
Water-related affects due to change in climatic conditions from water scarcity to intense floods and storms are increasing in developing countries especially in our region. The irregular floods, precipitation and droughts are destroying the Natural resources specially Soil, Plants, organisms and water itself. By the spring, intense floods the land are become eroded, and agriculture plantation become decrease and damaged. During the summer, most of the cultivated plants are facing to the shortage of water. The cattle's and other livestock's some time vanished through water scarcity.	Major climate change issues are related to water, which is more frequent drought and change in time and pattern of rain particularly in spring. Government of Afghanistan particularly MAIL has initiated a CCAP climate change adaptation program for most vulnerable areas where they can build the capacity of local communities and enhance their infrastructure resilience in terms of construction water reservoirs, improved water channels, watershed and OFWM management and flood protection structures.	Climate change involves many dimensions science, economics, society, and politics and is a global problem, Carbon dioxide, the heat-trapping greenhouse gas that has driven recent global warming; responding to climate change involves a two-main approach. First mitigation: reducing climate change involves reducing the flow of heat-trapping greenhouse gases into the atmosphere, by either reducing sources of these gases for example, the burning of coal, fuels for electricity, heat or transport). In addition, the second issues is Adaptation to life in a changing climate – involves adjusting to actual or expected future climate.	Recently some OFWM practices, technologies, and methodologies has been carried out which may generate long-term strategies. Institutionally the MAIL has restructured and improved the organogram restructuring. They developed the Irrigation mandate, Policy and program. Some improve Irrigation application Management practices such Land laser levelling, improve irrigation methods, introduction of High Irrigation use efficiency has been applied and disseminated through Field demonstration plots. Besides Water user and Irrigation Association has been continuously established and being trained in-regard to the OFWM activities and practices. In addition, terms of the conveyance efficiency Hundreds of secondary canals have been lined and rehabilitated. As still traditional water application and networks are dominate, and as water demands continue to grow, MAIL irrigation department, considering a new water project prototype that entails nonstructural measures such water conservation, water use technologies, Conveyance efficiencies, groundwater storage, and changes in water pricing policies.	Climate-smart agriculture (CSA) helps farmers to manage their resources and production in ways, which protect ecosystems and reduce agriculture's contribution to climate change. By promoting new methods and technologies, can build resilience against the global warming, which can result the climate changes. CSA also aims to help farmers boost their profits, supporting business growth and the development of stronger value chains. By promoting diversification and the growth of cash, industrial, strategic crops and orchards such as Saffron, vegetables, wheat, Rice and main orchards, we can encourage agricultural intensification, which is both profitable and environmentally friendly.
2. DR. DAI WEI (CHINA)				
The main challenges of China's current water resources are drought and water shortage, flood disasters, deterioration of water environment and soil erosion. And	1. The climate change data recording and risk management system;	An integrated assessment system for the adaptive management of the impacts of climate change on water resources	1. Research on the principles of climate change: (a) Climate change and water cycle are the foreland of international global change and water science research. (b) Detection and	At present, the research on extreme climate in China is relatively weak, and some basic research needs to be deepened:

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the climate change has further aggravated the uncertainty of China's future water resources problems in recent years. Firstly, China's water resources are unevenly distributed, with great inter-annual changes and severe water shortage. The extreme climate has intensified the water resources pattern of China. Secondly, climate change may increase the frequency and intensity of extreme climate and hydrological events in some river basins, which can aggravate the risk of frequent occurrence of floods and droughts in China. And it can have a negative impact on the existing water conservancy projects and water disaster emergency management system. Thirdly, the geographical environment in China is greatly different, and water resources are highly sensitive to climate change. The climate change is likely to increase the pressure and vulnerability of water supplies in the future.	2. Extreme climate prediction models: Climate change GCMs model, Air-sea coupling model AOGCMs, Multi-mode super set MMSE and Bayesian model BMA. 3. Climate change monitoring platform		attribution of the change of water cycle elements is an important issue in the study of the impact of climate change on water resources. (c) Uncertainty is one of the difficulties in studying the impact of climate change on water resources. (d) The response mechanism of terrestrial water cycle under climate change is developing from unidirectional connection to interaction and feedback mechanism between terrestrial hydrology and regional climate. (e) Water resource vulnerability and adaptability are important research contents in coping with climate change. 2. Sound and stable long series of effective research mechanisms: National climbing program, National key research and development projects and the science and technology project to cope with global climate change, National science and technology program, Research projects supported by various departments.	1. The evolution law and uncertainty of water cycle elements in China under climatic conditions; 2. Interaction and feedback mechanism between terrestrial hydrology and regional climate. For the current situation, the opportunities and challenges of global climate change and the water resources research in China and adaptation strategy research in the 21st century: 1. To reveal the influence and driving mechanism of climate change and underlying surface change, 2. to develop the uncertainty theory and method of hydrological prediction in multi-model scenario of climate change, and to predict and evaluate the impact of future climate change on China's water resources. 3. It reveals the interaction mechanism between "climate-water-human activities" in different climate and natural geographical zones, the internal relationship between hydrological changes and human activities and their responses to climate changes, and promotes the understanding and development of the hydro-climate two-way coupling mechanism.

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3. MR. MOHAMED MOKHTAR MOHAMED ABDELKADER (EGYPT)				
Climatic extremes are affecting water management in my country into main three issues: 1. Decrease in rains amount in the agriculture areas. 2. Major flash floods damaging certain areas of the country. 3. High temperature effects on the ET values and dates.	New technologies are used in both irrigation methods and protection from flash flood.	Integrated water resources management approach is adopted by my country considering the stakeholders participation for adaptation measures to face climate change.	Application of the Integrated water resources management in the main components of management such as enabling environment, institutional roles and management instruments.	The use of satellite images analysis and Remote sensing to calculate the crops ET and link it to the process of water accounting and water supply.
4. MR. PAAVAN KUMAR REDDY GOLAPALLI (INDIA)				
Climate change has perhaps posed the most extreme challenges that agriculture in India and across the world has to deal with today and in the future. There is now scientific consensus that the world is getting warmer due to climate change and such increasing weather variability and worsening extremes will impact the agriculture sector more and more adversely. The land degradation and environmental challenges have however emerged to thwart sustainability of agri-food systems. The frequent occurrences of natural disasters like food, drought, storms, hails, cyclones have led to severe hardship and farm distress. The monsoon onset is getting delayed (than the normal date of onset) in the recent years that may adversely affect cropping system. Mean	India has been doing a balancing act between growth and sustainability in its climate change policies and leading the third world countries to place agriculture in the ongoing negotiations. The ICAR (Indian Council of Agricultural Research) has initiated the National Innovations on Climate Resilient Agriculture (NICRA) network project since 2011 to enhance resilience of Indian Agriculture to climate vulnerability through strategic research and technology demonstration through pool of climate-smart technologies, such approaches for building climate smart villages include: watershed management approach	Addressing food security and climate challenges in a "business-as-usual" approach will make the tasks more difficult. Therefore, it's high time that rationale of climate-smart agriculture (CSA) be appreciated by decision makers at all levels. There should be structured trainings to build capacity of officials of relevant Departments to sensitize them to understand diverse impacts of global climate change even at local levels. Similarly, defined institutional architecture has to be built into the Government system to sustain focus and integrate activities into ongoing schemes and programs aligned to sustainable agriculture practices.	The hardest political problem in climate change/water management policy framework comes from the least appreciation of a changing climate at the level of local self-governments. Till the day a village Sarpanch at the cutting-edge level is sensitized to tune the development strategies of a Gram Panchayat for adapting agriculture to climate variability, any efforts at higher levels of Governance may not bear fruits. The institution of a Panchayat in Indian context has the capacity to leverage funds from a plethora of schemes. Allocations under MGNREGA can be purposefully utilized in climate-proofing projects such as farm ponds; soil and water management through participatory watershed approaches; plantation and agro-forestry; and many other eco-friendly activities that will adapt and build resilience to climate change.	In my view impact assessment of climate change on availability of water resources like surface and ground water in the country by considering rainfall intensity and duration on continuous basis. Changes precipitation can affect the variety of planning issues like planning and design of hydrological structures, river basin management, flood control and drought management. Satellite based monitoring of land and water by time-to-time establishes the requirement of policies with more flexible food policies that can anticipate selection of crops for the planting season with drought/flood resistant. Policy will need to account for erosion mitigation measures in areas where precipitation is predicted to be high.

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annual precipitation (rainfall) and mean number of rainy days showed a decreasing trend over last one century (since 1901). This would obviously disturb crop choice and crop planning.	(improving rural livelihoods by rehabilitating natural ecosystems); futuristic multi-model approach (Customizing adaptation packages to enhance climate resilience); digital technologies approach (by integrating climate information and eco-conservation technologies); met advisory and farm systems approach (building resilience agro-ecosystems by using climate information); and the climate and crop-modelling approach (cropping advisories based on seasonal forecasts).			
5. MR. HAMED EBRAHIMIAN TALESHI (IRAN)				
Climate change is expected to adversely affect Iran's agricultural practices through reduction in precipitation and rising temperatures. Flood and drought are two main outcomes of climate change affecting on water management for agriculture. Moreover, increased crop evapotranspiration as well as increased changes of precipitation distribution highly affect on agricultural water management.	When faced with increasing water shortages, farmers adopt water-saving technologies such as pressurized irrigation system (particularly drip irrigation), using concrete to construct irrigation canal, applying plastic mulch or retain stubble to store water more efficiently and using irrigation pipe instead open channel.	Rainwater harvesting, deficit irrigation, wastewater reuse, measures addressing the risk of flood, biotechnology (i.e. crop varieties with less water requirement), conjunctive use of surface and groundwater, improved monitoring and early warning, improved water use efficiency	Long term strategies could be: conserving water resources, improving water conveyance and distribution system, promoting on-farm irrigation systems, encouraging reduced agricultural water use, implementing and improving early warning systems, promoting optimal crop patterns and leading education and awareness campaigns using media.	Developing an irrigation management information system for irrigators is imperative for efficient use of water resources for sustainable crop production. For this purpose, automated weather stations are needed. Smart on-farm irrigation systems and Supervisory Control and Data Acquisition (SCADA) systems are other important tools to promote climate smart agriculture.
6. MR. KAUNG MYAT AUNG (MYANMAR)				
In the recent year, water management for agriculture is effected by extreme climate impacts as water shortage and flooding. Due to the abnormal rainfall pattern and	At present, IWUMD encourages modernization of irrigation systems by means of rehabilitation of existing facilities and enhance	Drought is adaptable by using interim catchments for storage improvement, cooperating with agriculture sector for free selection of	Law enforcement should be strongly executed to improve water productivity by using effective utilization of irrigation facilities. Water management information must be disseminated among water	Climate smart agriculture could be promoted by using water saving technologies i.e sprinkler method, alternate wet and dry method etc; and GIS/ Space technology for field reconnaissance.

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intensity causes flooding together with debris flow and sedimentation problem especially in the vicinity of hill regions. Meanwhile, water shortage occurs in central dry zone area.	farmers participation in on-farm level water management. As finance and capacity building remain prerequisite for innovative technologies, it is still difficult in Myanmar. To increase storage capacity, construction of silt-trap weirs and dredging the sediment in the reservoirs are now used.	climate resilient varieties and cropping pattern, and implementing Loan/ Grant land consolidation for effective water utilization. Flood is adaptable by strengthening of embankments and spillways, and promoting farmer's awareness by integrated approach with agriculture sector.	managers and users Irrigation Management Transfer-IMT shall be practiced to change institutional framework from now on so that water management policies could be pivoted by these three pillars forcefully.	Real-time data should be improved by Telemetry process using automatic devices for measuring and monitoring, and these data should be shared by IT technologies among line ministries.
7. MR. AMALI ABRAHIM AMALI (NIGERIA)				
The disappearing of the transboundary Lake Chad and abandonment of irrigation schemes in North Eastern Nigeria is a vivid description of wide impacts of Climate extremes in Nigeria. This is in addition to recent floods along the River Benue in Southern Nigeria where inundation renders a large population homeless during the wet season.	In addition to determined efforts to end gas flaring, increase of renewable energy mix, and reduce of number of cars, the Nigerian Government is also promoting technologies and practices such as sustainable land management, climate resilient agriculture, and water efficiency.	Insurance-based initiatives to deal with loses and damages, as well as adaptation to internally accepted practices are current management approaches to adapt to climate change. Green climate bonds have also been initiated by the Nigerian Stock exchange to fund renewable energy projects and reduce carbon emissions. The inter-basin water project has also been reinitiated to transfer water from the Congo river for recharging the Lake Chad.	A detailed study on crop water productivity (economic and water productivity) will be a foremost approach towards sustainable management of available water resources. A productivity driven approach will increase the marginal value of water to extents that every available quantity is optimally allocated as best as possible. In the absence of this, droughts and floods will prevail in same region.	In my well-considered opinion, early warning systems and ability to forecast with high degree of certainty will be a pre-measure to promote climate smart agriculture. Advocacy and training programs can be used to facilitate learning of farmers to access and interpret climate data which can guide their decision towards crop type, planting date and agricultural practices selection.
8. MR. GOLOVINOV YEVGENY EDUARDVICH (RUSSIA)				
Aridization in the south of the European part and Western Siberia is a very acute problem. Warming during the XXI century will significantly exceed the average global indicators. The amount of precipitation is expected to increase in winter, in the	Since 2014, the Federal Target Program has been implemented. Improving the productivity, sustainability of agricultural production and soil fertility by means of integrated land reclamation in the context of global	Expansion of agricultural areas in the central and northwestern part of the European territory. Improving crop rotations, land reclamation activities. Expanding the use of drainage systems. It is necessary to improve irrigation equipment and	The search for solutions must be conducted in different directions. Namely: water conservation, rational use of existing water, improvement of water supply and drainage systems, land reclamation systems, transition to closed water use cycles, transition to closed pipelines for drinking water,	Smart agriculture will help improve the efficiency of agricultural production by improving accuracy and controlling the quality of work, including reducing the environmental impact. It will be possible to assess the complex state of all

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summer - a decrease of 25% within the southern regions.	and regional climate change and natural anomalies, increasing the productive potential of reclaimed land and efficient use of natural resources.	technologies with an emphasis on water conservation. Measures to combat pests and plant diseases.	separation of drinking water and technical water supply.	elements of the agricultural chain based on big data analysis technologies.
9. MR. LEHLOGONOLO BENEDICT MOTSOKO (REP. OF SOUTH AFRICA)				
Increased the frequency of climatic events, e.g. the prolonged drought, less rainfall, extremely hot temperatures, unexpected floods and dryness of rivers, dams and lakes within South Africa. The groundwater table has decreased dismally, thus leading to the dryness of boreholes that are providing water for irrigation.	The skills of rainwater harvesting during rainy seasons, the usage of water saving irrigation systems, the re-use of water as greywater (Water from the kitchen, bathrooms and industries), the usage of tunnel structures that will assist in controlling temperatures and usage of soil moisture monitoring tools to save irrigation water.	The water quality control, enforcing water usage guidelines, strict disclaimers, physical actions (Issuing legal fines for big and small industries which are involved in water contamination).The protection of natural wetlands, planting of genetically modified seeds that are drought resistant and to enforce and facilitate irrigation water restrictions.	To establishment the accountable and manageable Catchment management agencies that will take full responsibility to enforce the ground rules. To facilitate the quarterly stakeholder meetings with water users associations to monitor and manage the usage of water. To update the governing policies and acts to ensure effectiveness.	To ensure the maximum productivity of crops by practicing water management skills, to plant sustainable crops for ensuring secured food and water security in the country. To manage the available water sources, e.g the wetlands, dams and rivers for sustainability. To create awareness on the concept climate smart agriculture.
10. MS. LAHIRUNI IRESHIKA JAYATILLAKE (SRI LANKA)				
Irrigation and water resources management is vital for the economic development and social well-being of Sri Lanka. Currently, about 80% of paddy production comes from irrigated agriculture. Water Management was considered as an important subject area since the inception of the Irrigation Department. Changes in Sri Lanka's climate and weather patterns had been observed in the recent past. Analysis of long-term data has indicated a gradual and steady rise of temperature in most parts of the country. In parallel, changes in	1. River Basin Planning - Assessment of the structural safety of major dams, hydrological modeling at river basin level and river basin plans (in selected basins), increasing the coverage of hydro-meteorological information systems 2. River Basin modelling - Flood and drought modeling in selected river basins with due consideration to climate risks,	1. Establishment of institutions to address climate change issues in Sri Lanka as Climate Change Secretariat, Institute of Policy Studies of Sri Lanka etc. 2. Upgrading and modernizing irrigation systems with appropriate guidelines 3. Inter-basin and intra-basin diversions to enhance water availability	The National Adaptation Plan (2016-2025) identifies the several priority actions for the identified sectors. The proposals contained herein will contribute to the achievement of the following Sustainable Development Goals also. The post relevant actions for irrigation and water resources are listed below: (a). Develop and implement watershed management plans for critical watershed areas (b). Increase the efficiency of use and reduce losses of irrigation water	CSA is the agriculture that sustainably increases productivity, enhances adaptation and reduces GHGs emission and enhances achievement of national food security and development goals. By following sustainable cultivation practices the productivity can be increased. I would like to search the technologies and new varieties of crops that are used for increasing the food production. I would like to promote re-forestation to have soils and trees to act as carbon sinks for atmospheric CO2. I suggest to introduce GHG emission machineries for agriculture field.

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monsoonal rainfall patterns have been observed with a corresponding decreased predictability of rainfall. Specifically, monsoon and inter-monsoon onset time, duration, nature of rainfall, extreme rainfall events during a season and distribution of rainfall (quantity and duration) across these four seasons have been observed. Major climate-related disasters in Sri Lanka include extreme wind events, floods, and droughts, which account for 96% of the people affected by disasters. Out of these, floods cause most of the damage and destruction to houses and the second most severe cause for agricultural losses. Summarizing the above forecasts and observations, water resources management in Sri Lanka is most likely to confront the following issues and challenges: (a). Unpredictable weather patterns (b). High intensity rainfall events leading to reduced groundwater recharge and soil erosion. The latter will contribute to reduced productivity and siltation of reservoirs (c). Prolonged dry periods (d). High temperatures leading to high evaporation and evapotranspiration losses	improving climate resilience, river basin development plans, improving risk communication management. 3. Intra- Basin and trans-basin diversions of water, cascade-based irrigated agriculture development, water allocation for drinking, improvement of irrigation efficiency and institutional arrangements for IWRM. 4. The on-farm water Management, micro-irrigation and drip irrigation are innovative approaches used to reduce water losses. The wet and dry method used in paddy cultivation is another innovative approach of water management in dry periods.	4. Monitoring irrigation performance and adopting rectifying measures including crop diversification, improved conveyance efficiency, improved agricultural practices, optimum use of rainwater and groundwater, and adjusting cropping pattern and calendar to suit weather forecasts	(c). Assess the current practices of water management for climate resilience and identify ways to improve them (d). Identify and map areas vulnerable to droughts and flood hazards and prepare disaster risk management plans (e). Design rational intra-basin and trans-basin strategies to harness periodic surpluses of water in storage facilities	

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11. MR. ZOALNOON GUSMALSID MOHAMED AHMED (REPUBLIC OF SUDAN)				
Yes, of course, rain in the fall makes irrigation easier and reduces the required water through the irrigation channels of the dam, but the problem occurs when the rain stops in late September and early October each year because of the change of irrigation system there is a very large demand and at the same time	There are drains in the main basins used in extreme cases to reduce water for the protection of channels and cultivated land, also rely on meteorological forecasts to avoid the negative effects of precipitation.	There is currently a strong effort in Sudan to advance water management through the application of the IWRM principles in accordance with international conventions and best practices. The result of this effort is reflected in the draft national policies and regulatory frameworks. However practical implementation of IWRM is still a challenge. There is study to review the current degree of IWRM implementation and related challenges.	It is very important that the areas targeted for agriculture be set according to the possibility of irrigation. The area, type of crop and agro-time are useful for irrigation management in an integrated manner because this will regulate the water demand and the drainage process in the field so that we get good irrigation without wasting water.	It is possible to design smart systems that enable us to predict climatic conditions and expected weather; this will have a clear effect on effective irrigation and drainage control, which will reduce the negative effects of climate on the irrigation system.
12. MR. KAYUMOV KOMRON (TAJIKISTAN)				
Due to the impact of the climate change, the glaciers of our country have changed and according to some estimates, have lost 20% of the volume and 30% of the area over the past 50-60 years. There is a shortage from water. Year after year it becomes harder to supply water agricultural lands. These effects can potentially increase poverty and reduce a country's GDP.	Energy-efficient solutions for household to decrease biomass consumption (wood, dung), sustainable land management techniques at farm level (compost, mulching), efficient agriculture using solar greenhouse, better integration of natural resource management into local development plans.	Modernization of logistical base in agriculture; (a). Development of scientific and technical support of agricultural sector, including (b). long-term forecasting; (c). Conducting a series of agro-technical and land-reclamation measures to improve (d). sowing areas; (e). Rationalization of crop rotation combined with agricultural machinery application,	With a mountain conditions in Tajikistan, it is necessary to build hydroelectric power stations with a large reservoir, so we can control water for long periods. We do not have large plants, Nuclear power stations and Heat Power stations to reduce emissions.	Our country uses 10-15% drip irrigation and 20-30% greenhouses. I would like to recommend our country's farmer to use drip irrigation and greenhouses more to save water and time. In my opinion, year after year, there will be more shortages from water. I appeal to all countries of the world to deal with climate change together we are a big force.

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		(f). appropriate use of chemical and biological methods against insects; (g). Measures on the prevention of salinization and swamping, as well as water and wind erosions; (h). Securing the financial sustainability of households and insurance in agriculture.		
13. MS. IULIIA DANYLENKO (UKRAINE)				
According to statistical analysis the rise of temperature in Ukraine is faster than in the world in general. This leads to the drier conditions in the Southern part of the country. Even in Northern over wetted part of the country it is needed to apply irrigation during summer period for successful crops growing. Water resources in Ukraine distribute unevenly and to meet growing requirements they need to be reallocated between different regions.	The farmers started using crops varieties more resilient to drier conditions. Development and implementation of new water saving crops growing technologies, for example, drip irrigation of corn and rice, is being carried out. Mini- and no-till technologies usage to save soil moisture at the beginning of growing season become more widely spread.	The Strategy of irrigation and drainage development in Ukraine were prepared by experts and introduced to the Cabinet of Ministry for adoption. The Strategy contains the main steps for water management reforming. It proposes to separate functions of water resources management and operation of water infrastructure, and to create of water users' associations and National Water Board for comprehensive water management.	On my opinion, to ensure sustainable water management and agricultural production under modern conditions, firstly it is very important to create well-functional network of water users associations. This will ensure more transparent water management in irrigation and drainage sectors.	On my opinion, the best way to promote climate smart agriculture is to show farmers its efficiency. The outstanding farmers and research centers should promote such technologies at experimental plots. The research centers should not only develop such technologies, test it, but also create the promotion company with the help of NGOs, governmental support etc.
14. MS. POONEH PAHLEVANI (USA)				
The 2018 Atlantic hurricane season was the third in a consecutive series of above-average and damaging Atlantic hurricane seasons, featuring 15 named storms, 8 hurricanes, and 2 major hurricanes, which caused a total of over $49.975 billion (2018	The new technologies that can help the climate change can be electric cars.in the United States, there is a federal tax credit of up to $7,500 to get people to buy electric cars, but it is starting to phase out for some	In a brief the solutions are such as: (a). Be smart about your air conditioner, encourage electric vehicles, Be smart about nuclear power,	My job is about drainage design for roadways, so I want to try to design the drainage system more conservative and get more distance from wetlands areas. Try to keep working with environmental hazards more seriously and consider them in to my design. I also try to have contribution to build more	Agriculture should transform in order make a better use of natural resources, producing more with less land, water, energy and other inputs Restore, conserve and use natural resources sustainably and Use energy-efficient methods, such as solar power and biofuels. My

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USD) in damages. Hurricane Florence hit my region (North Carolina) and caused damage to 3000 acres of sweet potatoes were worth $346.5 million, according to the U.S. Department of Agriculture.	types of cars. Combined with incentives in some states, these tax credits have been helpful, but electric vehicles still make up only a few percent of all vehicle sales.	(b). Make it easier to live without cars, prevent wasted food — the right way, incentivize carbon farming, Curb the effects of meat and dairy, Making the green houses, (c). producing lab-grown meat.	Eco-friendly homes (environment friendly houses) in this region.	contribution is to extend and improve the roadways in this region, it will reduce the traffic gam and less CO2 will produce from cars. Also, I'm working on Eco-houses in this region that they are very efficient in energy usage.
15. MR. MWENYA SAMPULE (ZAMBIA)				
Late commencement of rains coupled with early withdrawal of the rains and prolonged dry spells characterizes typical growing seasons in Zambia. In some years, flooding of agricultural land affects agriculture production. Droughts also affects ground water recharge thereby increasing the depth to which water is available for pumping to irrigate.	Irrigation agriculture is being developed for both supplemental and dry season cropping. This includes the development of large, medium and small dams. In the case of rain fed farming on farm Conservation agricultural practices are being up scaled. This measure ensures that rain water is concentrated around the root zone.	(a). Up-scaling conservation agriculture and rainwater harvesting (b). Consideration of investing in large water transfer schemes to transfer water from regions with excess water to regions with water scarcity (c). Rehabilitation of small dams and weirs (d). Development of strategies for artificial ground water recharge, rehabilitation and sinking of boreholes	(a). Continental and regional based policies and strategies (b). Strengthening country-based policies and strategies (c). Promoting awareness on climate change mitigation and adaptation (d). Strengthening climate early warning system (e). Building country-based capacity to carry out climate change risk assessment	Promotion of adaptive strategies and methodologies to climate change like climate smart agriculture is one mean for ensuring food and nutritional security. National polices and strategies should be enhanced and enforced.
16. MS. PRACHI SHARMA (INDIA)				
The global warming is resulting in extreme climate in India, especially in terms of frequent droughts and floods. The presence of excess or minimal water in the rootzone are detrimental for the production of agricultural goods rendering water	Technologies such as micro-irrigation, ICT and other digital tools, modernization of irrigation and drainage infrastructure are being adopted worldwide to address climate change issues.	To adapt to climate change in agriculture, several management approaches are being considered such as introduction of resilient crops especially drought resistant crops, changing the cropping pattern,	Government plays a major role to bring cutting-edge technology to the farthest corners of the country in promoting climate smart agriculture. With government and institutional interventions, long term strategies need to be implemented for climate change adaptation and mitigation to combat water	In my view, to promote climate smart agriculture, apart from technological and management interventions, the communication channels between the stakeholders must be properly established. The research must reach the ground appropriately and adequately. Climate

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management extremely challenging in such situations at large scale.	Approaches such as community participation through formation of water user associations, smart water management techniques, adoption of practices such as irrigation scheduling, mixed cropping etc. are required.	developing climate change-proof infrastructure, land use management, drought and flood management and promoting integrated water resources management in agriculture.	scarcity and food security. Efforts are required to bring resilience in agriculture, and thus policies should be drafted to encourage management efforts towards irrigation and water resources, flood and disaster risk management. Farmers should be encouraged to adopt new and improved technologies and approaches through government incentives. They should also be protected against crop and income loss risks.	smart agriculture must be promoted within the integrated water resources management (IWRM) framework considering the environmental, social and economic aspects of water and agriculture. I have contributed towards research in the water sector through irrigation scheduling, water accounting, scientific communication between stakeholders and so forth to promote agricultural water management.
17. MS. SALMA OUDRHIRI (MOROCCO)				
In Morocco, irrigated agriculture is increasingly confronted with a scarcity of water resources under the combined effects of successive and prolonged droughts and increased demand for water from economic sectors. Under these conditions of climate change, considerable effort has been devoted over time to introduce policies aiming to increase water efficiency based on the assertion that more can be achieved with less water through better management.	Faced with the difficult situation of water resources, the Department of Agriculture has launched since 2008 a voluntarist and ambitious strategy (Green Morocco Strategy) based on the improvement of the irrigation water service, the strengthening and adaptation of the financing and incentive system for water saving, the improvement of the agricultural downstream in all its forms (organization, partnership, crop contracts, etc.), and the development of a local council for the design of water-saving irrigation systems and support for productivity improvement. This strategy for the field of water is based on 3 big programs:	Morocco is considering adopting a series of green policies to conserve natural resources and make agriculture more resilient: (a). Transfer of raw water resources in the basins of the North to the South; (b). Mobilization of unconventional resources through the reuse of treated wastewater, capture rainwater, desalination of seawater and brackish water desalination. (c). Improving hydro meteorological forecasting; (d). Promoting of resilient technologies to farmers;	To ensure a long-term strategy of water management in agriculture, many actions can be identified: (a). Modernization of the management of irrigated perimeters; (b). Reinforcement of irrigation advice, especially for farms equipped with localized irrigation; (c). Development and implementation of a project support model for agricultural exploitations; (d). Development of knowledge & technology; (e). Promoting best practices (research development and education); (f). Harmonization of law and regulations, so as to facilitate tangible implementation and to prevent the damaging environmental practices; (g). take benefit from its “advanced status” with the EU, to raise funds, search for	Climate Smart Agriculture is an adaptation strategy that helps rural farmers and agricultural systems to be resilient to and cope with the effects of climate change. It can be improved through innovative policies and practices by means of the use of space technology by empowering key actors, providing them with reliable weather forecasts at the right time.

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	The National Program of Water Economy in Irrigation: it is planned to move to drip irrigation over an area of 555,000 ha, which would make a considerable saving of water resources of about 1.4 billion m3 /year, in 2020; National Program of extension of irrigated area: Extend irrigated areas over 160,000 ha and Valuing 1.2 billion m3 of water mobilized by existing dams. Public Private Partnership in irrigation Program: Institutional reform of the irrigation sector, especially of large-scale irrigation, so that its competitiveness and performance are better valued, whether through the public-private partnership for the management of collective irrigation schemes	(e). Adopting renewable energy sources (wind and solar).	collaboration, and promote the environmental quality and traceability of local production, imports and exports	
18. MR FRANCESCO PEPPOLONI (ITALY)				
During 2017, for example, Italy and in particular the central regions suffered a very strong water crisis. This has mainly impacted on the lack of water supply for irrigation. In particular, many withdrawals from surface water bodies such as rivers and lakes have been interrupted. This due to limited water outflows during the irrigation season.	For the optimization of water resources for example, the innovative approaches concern the adoption of technologies that can make irrigation more efficient and avoid losses. These are for example localized irrigation systems and all the technologies	In my opinion it would be necessary to have an integrated management of the available resources that takes into account the consumption and impacts that human activity has for example on a specific territory. This is to favor an approach that goes towards circular economy forms.	For a water management policy, it would be necessary in my opinion: (a). long-term structural interventions such as the construction of new dam or little artificial lakes to increase water uptake during the year; (b). Maintenance and renovation of existing water networks to limit the losses along the network.	To oppose climate change and the consequent limitation of available water, agriculture will have to adopt innovative tools for saving water and in general water must be considered as a scarce resource and valued with appropriate fare. My role is to make farmers aware of the sustainable use of water resources and simultaneously develop expert systems for irrigation advice.

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	for estimating irrigation requirements.		(c). Operations on Farm to promote efficient irrigation methods;	
19. MS. BANG NAKYOUNG (REPUBLIC OF SOUTH KOREA)				
As summer rains turn concentrated and regional, we suffer from a shortage of agricultural water due to insufficient water in the reservoir.	Forecasting drought from a meteorological perspective as well as monitoring of agricultural water usage patterns and water supply networks to predict and prepare for a comprehensive drought.	It is necessary to conduct research related to the comparison and analysis of the indices that can keep a close eye on climate change and the systems that are currently using water.	Resolving structural problems to secure water resources is also necessary, but non-structural solutions are needed improving the operational problems of water management to cope with climate change.	In order to prepare for climate change and stabilize agricultural water supply, a network of field units should be established to conduct a water balance analysis considering the interaction between the water facility and the water canal. It can help water management decisions.
20. MS. BEVERLY JOY QUIBEL POCOT (PHILIPPINES)				
The water delivery schedule to irrigation service area was affected by the recent climatic extremes. Reduce volume of water was delivered to the farmlands thus decreasing the planted area or benefited area. With this situation, there would be low in rice, crops, vegetables production and other related to agriculture aspects.	The Irrigation systems adopted the rotational irrigation water delivery in the upstream, midstream and downstream to address this issue but recently Cloud seeding was being used for the entire region to answer the drought situation and El Nino phenomenon.	Climate resilient design of all irrigation structures must be considered especially on Dams. There should be catchment dams. Slope protection work is also very important to prevent soil erosion on canals and other structures and to minimize the siltation. It is ideal to concrete line all the irrigation canal to minimize seepage and maximize water delivery to irrigation service area.	Introduce the water saving technology (wet and dry techniques) and groundwater pumps.	Water saving technology dissemination to the community especially to the farmers. Participate and contribute ideas in designing climate resilient structure. Help in sharing of information to our farmers to adapt the method of crop rotation or diversified cropping so that farmland can still be productive in any season (wet and dry) and also adapt the heat resistant of seed variety. Monitor the application used by the farmer.
21. MR. CHRISTIAN D. ABANAG (PHILIPPINES)				
It has been a great challenge for my country, Philippines to address the alarming effect of the extreme weather conditions to the water management for agriculture. Most of the irrigation structures	In the amidst effect of droughts and heatwaves in dry seasons, a water saving technology named as “Alternate Wet and Dry” method is applied. The use of shallow tube-	Water saving management must be implemented and improved. NIA must find new water saving technologies in order to cope up with the increasingly severe impact of	Philippines’ water management practices and policies are more concern on how to find potable water good for irrigation and controlling the supply of it. It is not focused on how they will preserve the existing potable water and prevent this from being	As a young professional which is very new in the irrigation development industry, my greatest contribution to promote climate smart agriculture is through research of new water saving technologies that will help irrigators to maximize

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and facilities were destroyed due to typhoons. In dry seasons, heatwaves and droughts are experienced in the northern part of Luzon which causes a low water efficiency use for crops and no source of irrigation water at all.	wells for supplemental irrigation of diversified crops is being done to save water use for irrigation. Due to excessive rainfall in the wet season, the use of fully automated control of gates are being implemented to prevent overflowing at reservoirs and breach of the irrigation systems. For some hydraulic structures, slope stabilization using an advanced technology called concrete canvas and conversion of canals of National Irrigation Systems (NIS) from vulnerable earthen channels to concrete canals are conducted.	climate change. Projects and Programs which involves climate proofing such as Philippine Climate Change Adaptation Program (PhilCCAP) and the like must be formed and duplicated for similar projects which would need climate resiliency.	contaminated due to environment-degrading human activities which must be one of the priorities when people want to prolong the supply of water. It is very important for the stakeholders to commit on the policies and laws regarding water management on every region. Stakeholders need to change their ways and recalibrate their minds towards their actions whether these are helpful or destructive to the available water in their respective regions.	the use of water and increase its efficiency. Smart irrigation systems which are climate adaptive and can respond to uneven climatic patterns are very important to deal with since this will be helpful for farmers to still operate and maintain the agricultural production that will be of big contribution to the economy.
22. MR. JONATHAN L. CABISO (PHILIPPINES)				
The impacts of climate change are already experienced in almost the entirety of the Philippines resulting to different calamities such as extreme typhoons, floods, drought and many others making agricultural products in jeopardy. In terms of water management, it is now far from manageable as weather patterns are now unpredictable.	Infrastructure projects are funded through the Climate Change Adaptation Works (CCAW) Fund which aims to mitigate the effects of Climate Change. Example of these projects involves the construction of Flood Protection Structures, Slope Stabilization through the use of Coco Net and Vetiver Grass, Construction of Water Impounding Dam and Solar Powered Water Pumps.	One of the agency's program is introduction of water saving technologies to the farmers through meetings and trainings. Alternate Wetting and Drying (AWT) Method is one of these technologies which aims to promote controlled irrigation to save water to increase irrigation service area and increase production.	I would like to promote sustainable water management in simple ways. First is to provide water monitoring tools such as staff gauges and control gates to every irrigation canal to be able to convey just enough water needed for irrigation. Second is to introduce wider and more effective participation of farmers in the monitoring and management of water.	I can contribute in the promotion of climate smart agriculture through dissemination of information to farmers such as information regarding the current and projected effects of climate change in the agricultural sector and the practices needed to mitigate and reduce these effects. Plan and construct climate change resilient irrigation structures to provide efficient and effective irrigation services.

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23. MR. MARY JOHN A. SUNGGAHID (PHILIPPINES)				
Our country experiencing dry season at this time and it leads to the scarcity of water supply in our agricultural areas.	We reuse the waste water for irrigation and install pumps especially solar pumps.	We should be innovative and responsible to maintain the balance of our nature.	By continuing to construct infrastructure and planting trees to our watersheds.	Conduct research and experiment how to use sea water for irrigation to ensure water supply for irrigation.
24. MS. LEE, SEUL GI (REPUBLIC OF SOUTH KOREA)				
Since 1970, five to seven-year recurrence frequency of extreme droughts has now shifted to two to three-year due recent climate change in Korea. Rampant droughts coupled with frequent heat waves are changing the agricultural ecology and crop productivity.	Proposed approaches to tackle the climate change include: (a). Re-evaluate the water demands and availabilities under climate change to secure agricultural water supplies, (b). Developing climate-driven floods and droughts resistant water storage facilities (c). Development of intelligent water management system based on ICT, (d). Development of renewable energy to ease climate change	Primarily studies are being conducted: (a). To improve the prediction reliability of the future climate change (b). To develop resilience against drought through various water management and farming methods (c). To introduce institutional reforms such as disaster insurance payments (d). Encouraging the farming community to indulge in water conservation practices	In Korea, due to the perception that water is abundant and free, the farmers are selfishly utilizing excessive water, Therefore, farmer's perceptions about the water availability and cost should be addressed. Farmers should be charged for regular water usage; and should even be fined for the irresponsible/excessive agricultural water usage.	The government, farming and scientific community should work together to understand and move forward to climate smart agriculture. Technologies should be developed for sustainable water resources management; greenhouse gas emissions should be monitored; and information about the climate vulnerabilities should be effectively conveyed among various sectors to improve adoptability.
25. MS. HONG, EUN BI (REPUBLIC OF SOUTH KOREA)				
Due to extreme droughts and floods, it is difficult to supply agricultural water and manage reservoir. In particular, scientific hydrological measurements are being try	For scientific water management, we are constructing a system to accurately measure reservoir inflow and water supply, and we are	In water management centered on paddy farming, water consumption is low and it is necessary to replace with crops that are resistant to climate change.	In order to manage agricultural water, the allocation of water should be made through the construction and operation of reasonable governance in region.	For smart farming, we distribute the technology to the farmers in order to fit supply the amount and timing of the water needed by the cultivated crops after storing the rainwater.

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in preparation for the poor supply of agricultural water due to drought.	attempting to scientific agriculture by combining IoT technology.			
26. MR. KWON, HYEOK JOON (REPUBLIC OF SOUTH KOREA)				
In Chuncheon, where I live, there are few seasonal changes. In spring, cold water cannot use water from reservoirs or lakes as agricultural water. In summer, crops do not grow well because of heat wave and drought.	Recently, the Rural Development Administration has announced that it will implement greenhouse gas measurement, management and reduction technologies and energy efficiency technologies for agricultural facilities in order to minimize the damage caused by abnormal weather, and is preparing to implement low carbon agriculture.	When viewed macroscopically, they regulate greenhouse gas emissions and, when viewed microscopically, grow crops that are appropriate for the climate or cultivate genetically engineered crops.	It is necessary to add water management provisions considering geographical characteristics. It also responds to changes through continuous monitoring and predicts changes through simulation.	Utilizing artificial intelligence technology, you must make predictions about climate change to prevent damage to crops in advance.
27. MR. JEON, MIN GI (REPUBLIC OF SOUTH KOREA)				
Recently, the extreme drought in Korea has led to the shortage of water available in the reservoir. Drought response through efficient management of reservoir water is being studied.	In order to efficiently manage water in the reservoir, several studies are underway such as establishment of operating standards for water reservoir management, reservoir monitoring using IoT, and water conservation scenarios.	Forest preservation, Green way and (Urban) forest, Solar thermal energy, Flood protection construction plan, Park Creation, and Tree planting.	There are various studies on climate change adaptation, and research methods and cases that have been conducted overseas have been studied and applied to Korea. As a result, solutions such as forest preservation, greenery and (urban) forest creation, solar energy activation, flood prevention construction plan, park construction and tree planting were derived.	I think it is necessary to continuously monitor and respond to numerical responses using data such as IoT and satellite images. In Korea, there is no standard for reservoir water management, and water is not used efficiently. In case of drought, a drought countermeasure committee is formed and drought is dissolved at the same time.
28. MS. YANG MI HYE (REPUBLIC OF SOUTH KOREA)				
As climate change increases the frequency of drought, damage to the agricultural sector continues. Existing repair facilities are designed to withstand a 10-year water shortage based on past	The Korea Rural Community Corporation analyzes the problems of information service in city and county management reservoirs, draws improvement measures, and	The Framework Plan for Climate Change, which has been established every five years, includes the preparation of measures to adapt to climate change, and the study of	The assessment of extreme droughts is expected to help determine the level of drought and when drought response and mitigation measures will be	Climate smart agriculture refers to a farming community that aims to maintain and improve productivity at the same time as climate change mitigation and adaptation. I think we need a climate smart agriculture system that can

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weather data. However, rice paddies (as of 2014) which account for 12.8% of the repair answers were found to be vulnerable to a single frequency of the average year, which is expected to disrupt the supply of agricultural water due to the occurrence of abnormal weather in the future.	conducts research to establish intelligent rural water information service system for decision automation to swiftly respond to and prevent floods and droughts through real-time ICT information.	climate change, including changes in the concentration of greenhouse gases, and prospects. However, I believe that policies should be established to enable the participation of residents in the future.	implemented by defining the level of drought and the beginning and end of the drought.	respond to changes in the planting season, regional breeding season, and growing crops that can occur due to lack of precipitation and global warming.