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**SUMMARY AND RECOMMENDATIONS OF THE WORKSHOP ON INTEGRATION OF URBAN-RELATED ACTIVITIES IN THE WORLD METEOROLOGICAL ORGANIZATION**

**Geneva, 13–15 June 2022**

**Background**

Accelerating growth of urban populations has become a driving force of human development, especially in developing countries. Crowded cities are centres of creativity and economic progress; however, extreme weather conditions, flooding, water quality, air pollution and other hazards create substantial vulnerability and challenges in the urban environment.

The third United Nations Conference on Housing and Sustainable Urban Development (HABITAT III) in October 2016 adopted the New Urban Agenda (United Nations, 2017), which brings into focus urban resilience, climate and environment sustainability, and disaster risk management. Following the event at the United Nations Economic and Social Council ([Revitalizing the New Urban Agenda to fight rising inequalities- #NUA2030 | Economic and Social Council](https://www.un.org/ecosoc/en/events/2022/revitalizing-new-urban-agenda-fight-rising-inequalities-nua2030)), efforts are required from the World Meteorological Organization (WMO) to consolidate its input to the revision of the New Urban Agenda and support urban-related activities in a comprehensive manner. Urban development is now a cornerstone of the United Nations 2030 Sustainable Development Goals. It has its own sustainable development goal (SDG 11): Make cities inclusive, safe, resilient and sustainable.

To support implementation of urban activities the WMO inter-programme Urban Expert Team under the Commission for Atmospheric Sciences and Commission for Basic Systems (2018) supported by a dedicated team of urban focal points in the Secretariat developed the Guidance on Integrated Urban Hydro-Meteorological, Climate and Environmental Services (IUS) (Volume 1: Concept and Methodology, 2019 and Volume 2: Demonstration Cities, 2020). Following WMO constituent bodies reform, the newly established WMO Services Commission (SERCOM) formed a Study Group on Integrated Urban Services (SG-URB). SG-URB has been charged by SERCOM to explore how urban hydro-meteorological, climate and environmental services could be delivered in a more integrated manner. Other WMO bodies were developing and delivering guidance materials on the different aspects of urban environment (on urban heat island, urban flooding etc). Summary of these activities is presented in Annex 1.

**General recommendations of the workshop**

The recommended actions that can lead to delivery of benefits for the Members can be combined in several groups:

* Improved information exchanges between the WMO groups
* Common strategy towards user engagement including promotion of already available products within the user community
* Improvement of the working processes
* More strategic involvement in targeted pilot projects
* Joint efforts between different groups on development of normative materials

**1.**  **Information exchange.**

* There is a need for different groups working on urban environment to have a common database where input information for urban modelling, forecasting and risk assessment can be consolidated. The initial elements can use research databases created by the greenhouse gas community, WUDAPT, pollution inventory and others. Such catalogue (where and what datasets are available) would be useful for comprehensive socio-economic and vulnerability mapping.
* It would be beneficial if operational Numerical Weather Prediction (NWP) (GDPFS) centres could provide high resolution (1 km) NWP products to be used for the impact-based forecasts by the Disaster Risk Reduction (DRR) groups.
* WMO urban workshops would be a useful mechanism for information exchange and can be organized once every two years. It would focus on the latest progresses on urban observations, modelling service and research.

**2.** **User engagement**

* Users and stockholders should be made aware of WMO urban work and data products and be further engaged in the work of WMO groups. Their needs and feedback should be evaluated in a proactive manner.
* Comprehensive mapping is required to identify which requirements for urban services can be met by existing capabilities (e.g. provided through GDPFS) for a variety of urban areas that do not currently have such services. Enhancement of such capabilities can be done in close consultation with user including their feedback.
* It was recommended that socio-economic value evaluation to be considered where possible and used as a driver for systems development. SG-URB works on development of the methodology that can potentially be used.
* Regular trainings for users and stakeholders on the available capacities would improve uptake of WMO products and ensure that developments are taking place according to articulated needs.

**3.** **Working processes**

* Potentially there may be a value in a creation of the group of focal points in the Secretariat and corresponding group among WMO urban-related groups.
* Services oriented groups are encouraged to convert user needs into technical requirements for system. Such requirements should be defined with respect to specific services with clear description of what the service wants to achieve, with clearly defined target audience, objective and level of service. Services groups should work closely together to generalize these requirements before passing them to infrastructure.
* The Rolling Review of Requirements process is recommended to evolve to be able to provide in the future guidance towards optimized and integrated urban observing systems. It would be beneficial for research groups to work much closer together to address the most critical aspects of the urban research that lead to fast operational benefits.
* It would also help if the research community established regular evaluation/assessment process regarding operational readiness of research modelling capacities and advise on those to GDPFS.

**4.** **Pilot projects**

* There is a need to have a common catalogue of pilot and demonstration projects between different groups and promote cross-engagement.
* WMO should investigate ongoing pilot projects that are supported by the other organizations (e.g. UN Office for Disaster Risk Reduction (UNDRR), World Bank, United Nations Environment Programme (UNEP), ICLEI) and proactively consider engagement.
* TCs and the Research Board should work with Regional Associations (RAs) to select suitable cities to implement joint pilot projects for testing new technologies (instruments, methods, sub-kilometre NWP models, products especially in support of forecast/warning of multi-hazard in urban environments).

**5.** **Normative materials**

* Develop common standards, protocols and measurement recommendations for new/non-conventional observation instruments building on already initiated work (including low-cost sensors and citizen science) and involving all urban groups. This should include methodology to obtain, analyse, and share both structured and unstructured data types.
* Develop/establish testbeds and benchmarking for high resolution models (e.g. through the consortium of digital twins).
* Evaluate guidance materials developed by different group to establish their internal consistency, establish a catalogue of such guidance materials and build user training on those.

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