Resilient and Sustainable Cities:

Challenges and Opportunities for WMO and its Members

Urbanization is rapidly becoming the dominant feature of population dynamics in the 21st Century exerting tremendous influence on sustainable urban development. More that half the global population now lives in cities and this percentage is expected to increase to approximately 70% by 2050. Urbanization is particularly noticeable in the developing world and in low laying areas. The urban environment is complex and sensitive and relatively small environmental perturbations can have large impacts. Furthermore the urban environment comes in different sizes and forms, ranging from megacities with more than 10 million inhabitants to informal settlements and small villages. Many cities develop so rapidly that planning is not optimal. This often results in a habitat in which living conditions are neither safe nor healthy. Poorly planned cities result in high maintenance costs and a situation where the community is caught in an endless cycle of disaster-react-recovery which undermines sustainable development. Considering the ongoing urbanization and related expectations of more weather and climate extremes, as projected in IPCC studies, an urgent need exists to enhance the resilience of cities and their inhabitants.

The risks in the urban environment include but are no limited to: 1) flooding; 2) poor air quality ; 3) sea-level rise; 4) extreme heat and human thermal stress; 5) water, energy and food sustainability; and 6) public health problems caused by the previous. These urban risks are largely related to weather and climate extremes and a key question would be to better understand how they have to be sustainably and cost-efficiently managed in the context of enhanced climate variability and change. The understanding of how and to which extent cities modify regional weather and climate, for instance through additional heat and pollution fluxes, is needed. We have to develop a common understanding on how best the weather prediction capability (or precision forecast) can be advanced on all time and spatial scales for megacities and large urban complexes. Modelling capability should be improved and integrated from regional to canopy scale to identify the urban features and illustrate urban impact processes in order to provide a core technical pillar to integrated urban service delivery on weather, climate, water, and environment related operations. Cities require the development of mitigation and adaptation strategies that increase resilience, including through the real-time use of weather and climate information to optimize the use of energy and other resources in the urban environment while at the same time contributing to the quality of the life of the inhabitants.

Cities also have many positive attributes. They have economies of scales that can be tapped to enhance more efficient service delivery. They provide a vibrant backdrop to innovation, cultural interaction and economic progress which exert their influence on the future mode of service delivery. They are hubs for transport, manufacturing and the latest innovation in communication and information technology. A recent study has pointed out a so-called ‘superlinear scaling’ observed in cities: as a city’s population doubles there is on average a 15% increase in wages and patents produced per capita while at the same time requiring 15% less infrastructure per capita to provide the same services. Cities therefore inherently promote efficiencies and could, if managed well, provide part of the answer to many of the dilemmas being faced by the humankind.

WMO and its Members can make a tangible positive impact on the urban environment by providing impact-based forecasts and integrated services that are seamless in space and time and that are targeted to the wide ranging needs of the urban population. The building blocks to do so now exist and it is an opportune time to take on the urban challenge. The GFCS should within its evolving priorities ensure that the needs of more that half the global population are addressed. Long-term planning which considers weather, climate, water, and environment related risks will build more resilient and energy efficient cities. Similarly, new observations and prediction systems that will provide the different sectors and the general public specific impact based forecasts, that go beyond mere weather and climate forecasts, will have to be developed through research and its application. New service delivery models, including the role of the private sector as a partner, have to be developed to ensure that services, products and warnings do in fact have the intended impact. Guidelines and standards should be developed to assist Members, especially LCDs, to develop their capacities to address urban issues. Examples of good practices and lessons learned are to be shared between

cities and NMHSs through global and regional partnerships. Clearly the contribution to sustainable cities and urban sustainable development requires cross cutting initiatives between WMO Members and between WMO(constituent) bodies / structures, Programmes and activities, between research and operational applications and with other agencies and organizations involved in urban matters.