Abstracts of the Technical Conference on Changing Climate and Demands for Climate Services for Sustainable Development

**With a Special Joint Session with the
Joint Scientific Committee (JSC) for the
World Climate Research Programme (WCRP)**

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Chairperson, Publications Board
World Meteorological Organization (WMO)
7 bis, avenue de la Paix
P.O. Box 2300
CH-1211 Geneva 2, Switzerland

Tel.: +41 (0) 22 730 84 03
Fax: +41 (0) 22 730 80 40
E-mail: Publications@wmo.int

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PREFACE

Evidence from observations of the climate system, which includes an increase of 0.74 ± 0.18°C in global average surface temperature over the last century, and an even greater warming trend over the last 50 years, has led to the conclusion that human activities are increasingly contributing to a warming of the Earth's atmosphere. Climate change is widely accepted as the single most pressing issue facing society on a global basis, and the growing awareness of the impacts of climate change on different sectors is forcing decision-makers to refocus on the demands climate change places on sustainable development. Broad concepts in sustainable development encompass ecological, economic, and social parameters, whereas more narrowly defined concepts are mostly concerned with environmental issues such as optimal resource and environmental management. When global climate change is viewed in the wider context of sustainability, it is imperative that a holistic view must be taken of nature, man and climate, and science and technology as a source of innovative ideas and solutions. It is important to manage the social, environmental and economic impacts of climate change in a structured manner to help affected countries to manage climate related risks more efficiently and to strengthen its ability to thrive in the future.

Previous efforts of WMO and partners to engage with the user communities included the organization of the Technical Conference on "Climate as a Resource", (Beijing, China, November 2005), the International Workshop on "Living with Climate Variability and Change: Understanding the Uncertainties and Managing the Risks" (Espoo, Finland, July 2006) and the Madrid Conference on "Secure and Sustainable Living: Social and Economic Benefits of Weather, Climate and Water Services" (Madrid, Spain, March 2007).

WMO, in cooperation with other UN agencies, Governments and the private sector, organized the World Climate Conference-3 (WCC-3) from 31 August to 4 September 2009, in Geneva, Switzerland. Heads of States and Governments, Ministers and senior government officials of 160 countries participated. More than 2,500 scientists, sector experts, and decision makers discussed the urgent need for accurate and timely climate information. WCC-3 decided to establish a Global Framework for Climate Services (GFCS) to strengthen the production, availability, delivery and application of science-based climate prediction and services.

With the forgoing impetus, the World Meteorological Organization (WMO), together with the World Climate Research Programme (WCRP) and the Turkish State Meteorological Service, is organizing the Technical Conference on "Changing Climate and Demands for Climate Services for Sustainable Development" in Antalya, Turkey, from 16 to 18 February 2010. The Conference is co-sponsored by Météo-France. The agenda importantly includes a one-day joint meeting between the Commission for Climatology (CCl) of WMO and the Joint Scientific Committee (JSC) for the WCRP. The Conference will focus on how both climate variability and change affect sustainable development, and how the WCRP climate research community and other partners can work with the CCl to improve responses by WMO to the needs of society in this regard.

Specific objectives of the Technical Conference are to:

- Review the benefits and risks to society from climate variability and change; the requirements of society for climate information, products and services to support adaptation to climate variability and change, as well as sustainable development; and known gaps in meeting user requirements;
- Identify within WMO and its partners, currently available tools, techniques, infrastructure, systems and human capacity for serving user requirements across a range of climate information products and services at all levels;
- Assess the adequacy of these with respect to societal requirements;

- Review recent advances in seasonal prediction research, consider their operational uptake and formulate joint CCI/WCRP efforts to sustain research-operations linkages particularly at regional/national scales; and

- Recommed to the upcoming fifteenth Session of CCI, new approaches to improving the contributions of CCI and WCRP and other relevant partners.

The Technical Conference is organized in 6 sessions (including the opening session and the Special Joint Session with the JSC of WCRP) during which 32 invited papers are presented addressing the different specific objectives of the Conference.

This volume includes the abstracts of the 32 invited papers and of 15 posters that will be displayed during the Conference. The Sponsors of the Conference would like to thank all the authors for their efforts and for their cooperation in bringing out this volume in time.

CLIMATE RISK MANAGEMENT FOR AGRICULTURE: THE AUSTRALIAN EXPERIENCE

Roger C. Stone
University of Southern Queensland, Australia
E-mail: roger.stone@usq.edu.au

Abstract

Australia has remarkably high year-to-year variability in both rainfall and agricultural yield. However, a feature of this variability is that it is strongly El Niño-Southern Oscillation (ENSO) dominated (Nicholls and Wong, 1990), suggesting good opportunity for use of seasonal forecasts to aid risk management, especially if based on aspects of ENSO. However, seasonal forecasts can provide higher value to users in aiding climate risk management if integrated with agricultural simulation models and so provide more decision-relevant outputs such as agricultural yield or pasture growth rates. In this respect, it has been emphasized in Australia that in application of climate risk management for agriculture, simply having knowledge of climate variability and the influence of such climate drivers as ENSO is not necessarily sufficient to reduce vulnerability to climate extremes and assist risk management. To reduce vulnerability in agricultural production, there is a need to modify actions ahead of likely climate impacts. In Australia, appropriate seasonal forecasting systems have provided the means to reduce agricultural production vulnerability to extremes of climate variability, especially when they are integrated with crop and pasture simulation models and delivered in a form of relevance to users in an iterative, participatory environment.

A further key requirement in climate risk management identified in Australia is the need for producers of seasonal forecasts (of either climate or agricultural yield) to, if possible, personally meet with decision-makers through targeted workshops relevant to the agricultural sector. Indeed, Hammer (2000) points out that “climate forecasting has no value unless it changes a management decision” implying a strong requirement for management decisions to be clearly articulated by users and for this information to be provided in an iterative process to the developers of seasonal forecasts and associated information so that effective outputs may be produced.

To aid the required connectivity between climate forecast output and agricultural management additional opportunity has been provided through the key linking role of integrated climate forecast-agricultural simulation modelling which can then be used to evaluate outcomes and risks relevant to various decisions in agriculture. Additional facilitation of the decision-making process to aid risk management can be made through use of ‘discussion-support systems’ where agriculturalists can discuss climate risk management options with climate experts and agronomists to aid their decision making.

Risk management and associated decisions in agricultural production in Australia have been shown to be related to climate systems occurring at a variety of temporal scales – intraseasonal, seasonal/annual (strongly ENSO related), biennial, decadal, multi-decadal, low frequency systems and also those necessarily associated with climate change. These management decisions range from logistical and tactical decisions (scheduling of planting and harvesting; application of fertiliser) through to those strategic decisions related to cropping type and sequence, crop rotation, and related to low frequency systems, industry scale and landuse policy decisions. Appropriate climate modelling and forecast systems relevant to those decision-scales need to be developed.