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AUSTRALIAN CENTRE FOR SUSTAINABLE CATCHMENTS
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Dear Committee Members,

We are pleased to provide the following information in respect to the inquiry into extreme weather events:

"The Australian Centre for Sustainable Catchments (ACSC), through the University of Southern Queensland (USQ) has clear and recognised capabilities in the following areas:

- Historical analysis on the number of extreme weather and climate events over the past 100+ years.
  e.g. - Have the number of extreme events risen or fallen?
  e.g. - Have the extreme events become more extreme?

- In-house (and peer-reviewed published) seasonal climate forecasting ability: The ability to provide probability distributions (including mapped forecast outputs) of the likelihood of the potential for an increased chance of such extreme event such as excessively high or low rainfall, excessively high or low maximum and minimum temperatures, radiation, evapotranspiration, and streamflow occurring. This type of output can be produced globally as well as for Australian locations or regions.

- Future climate predictions under climate change modelling based on CMIP5 (best knowledge to date).
  Working on issues such as "Are models predicting an increase in extreme events over the next 100 years"?

- Basic research capability (meteorology/oceanography) into causes and prediction of weather patterns based on climate predictions:
  e.g. - Warmer air at higher altitudes, cooler deep sea temperatures, melting ice, etc…

- In conjunction with BoM/CAWCR, utilising and integrating the 'new generation' of POAMA2 mid-range dynamic ('fully coupled model outputs'), especially in regards to forecasts for agricultural industry and food production needs – an example is a recently funded SRDC project on this type of issue for the sugar industry.

- Strong international and national collaborations in climate research and climate applications research with the following leading world agencies:
  - UK Met Office (Hadley Centre for Climate Research),
  - US National Oceanic and Atmospheric Administration (NOAA),
  - University of Nebraska, Lincoln (international drought research),
  - George Mason University, Fairfax, VA (extreme climate impacts on food and water security),
  - National Center for Atmospheric Research, Colorado, (NCAR) – Research Applications Laboratory – extreme precipitation research,
  - Lloyds of London Insurance,
  - Suncorp Insurance,

- European Centre for Medium Range Weather Forecasting (ECMWF),
- UN World Meteorological Organisation – Commission for Climatology, Geneva (Expert Team leadership in climate applications research and development),
- UN World Meteorological Organisation – Commission for Agricultural Meteorology, Geneva (Global Program Leadership on climate change, climate variability and natural disasters in agriculture).
- Australian Center for Weather and Climate Research (CAWCR) – Bureau of Meteorology and CSIRO, Melbourne.

Probably USQ/ACSC's key capability is in linking climate forecast models – including that of extreme events – with industry decision systems. For example, USQ/ACSC receive considerable industry funding and that from Research Development Corporations (e.g. SRDC) and from industries such as sugar, coffee, insurance, in regards to developing the capability to link climate forecast models with industry 'decision points'. Many of these industries have lost many hundreds of millions of dollars in recent years due to extreme weather and climate events.

Our research has clearly demonstrated that even current capabilities in climate forecasting – whether from Australian agencies (including USQ) or from international agencies (e.g. ECMWF) – can already provide much needed advanced warning within a risk management framework (probabilistic) that would provide enormous benefit to Queensland and Australian industries and communities. It should also be noted that this type of research and operational output can be extended to major issues such as drought as well as extreme climate and weather events.

In this latter respect, Professor Stone at ACSC/USQ currently occupies the position of Open Program Chair within the United Nations-WMO Commission for Agricultural Meteorology on research and operational aspects related to climate change, climate variability and natural disasters in agriculture'.

I again thank you very much for your kind invitation to present this short submission.

Yours faithfully
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Open Program Chair: UN-WMO Commission for Agricultural Meteorology: Climate Change, Climate Variability and Natural Disasters in Agriculture, World Meteorological Organisation (WMO, Geneva).
UN-WMO Commission for Climatology Expert Team Member: "Climate Services Information Systems";
UN-WMO Commission for Climatology Expert Team Leader: "User Interface", (WMO. Geneva).