RISK SCIENCES INTERNATIONAL

BRIEFING NOTE

Projection Guidance of South Vietnam Drought

Prepared for:
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Drought is a complex term which can have varied definitions including meteorological, agricultural and hydrological. There is no set time period for a drought declaration and it may be caused by decreased precipitation, decreased surface and/or subsurface water and/or increased evapotranspiration.

Many different indicators may be used to define drought, but from a meteorological viewpoint, the amount of precipitation is the main determining factor.

For the current Cai Be/Cai Lon sluice gate location in southern Vietnam, an ensemble of global climate models can provide some future guidance of precipitation change from present conditions, which can help inform future expectations of meteorological drought. Historically, the region experiences a dry season from December through April. This is the period most likely to experience meteorological drought.

Using the RSI CCHIP tool, ensemble average projections of future precipitation are provided using an ensemble of all AR5 assessment GCMs under the high emission scenario (RCP8.5). This is the current observed emission pathway. Near 40 GCMs are considered in the calculation of the averages shown in this document for a grid cell at the project location.

Although mean annual increases are envisioned for this region, very different changes are found from month to month. The historically dry season is projected to experience similar or decreasing precipitation amounts, whereas the wet season period will experience increases as seen below (dry season underlined) (Figure 1).

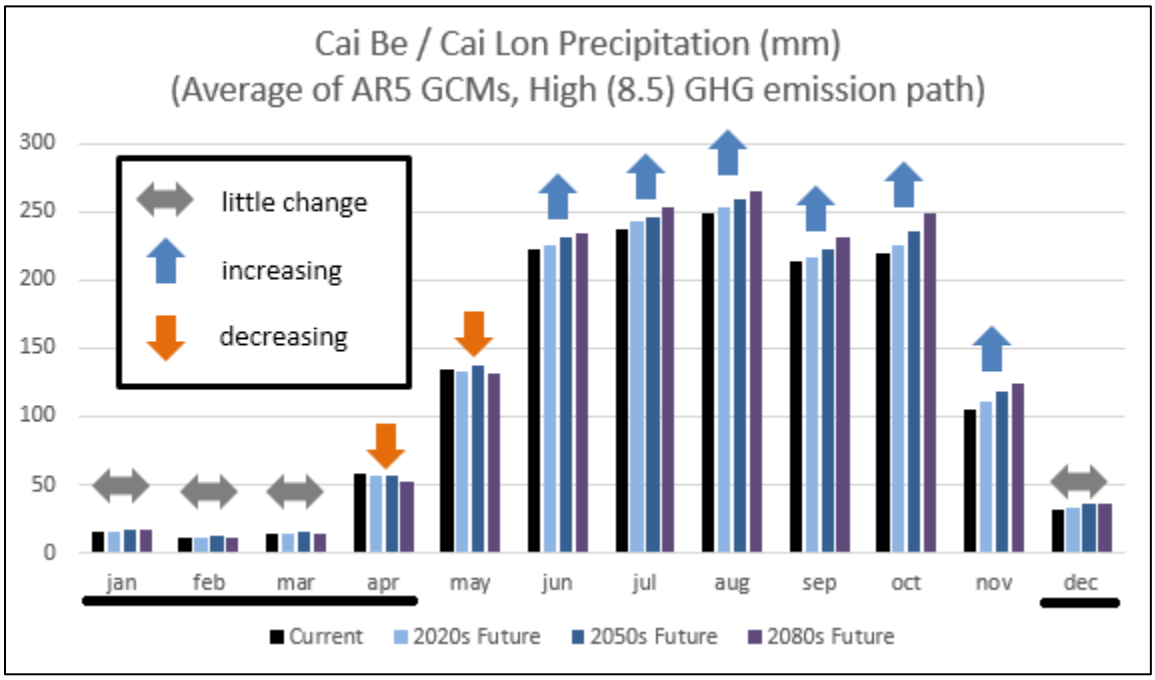

Figure 1- Precipitation Projection (mm) - RCP8.5

In addition to precipitation, temperature projections will affect availability of water through changes in evaporation. An increase in atmospheric temperature will increase potential evaporative loss in all months. The change in projected potential evaporation is shown below (Figure 2).

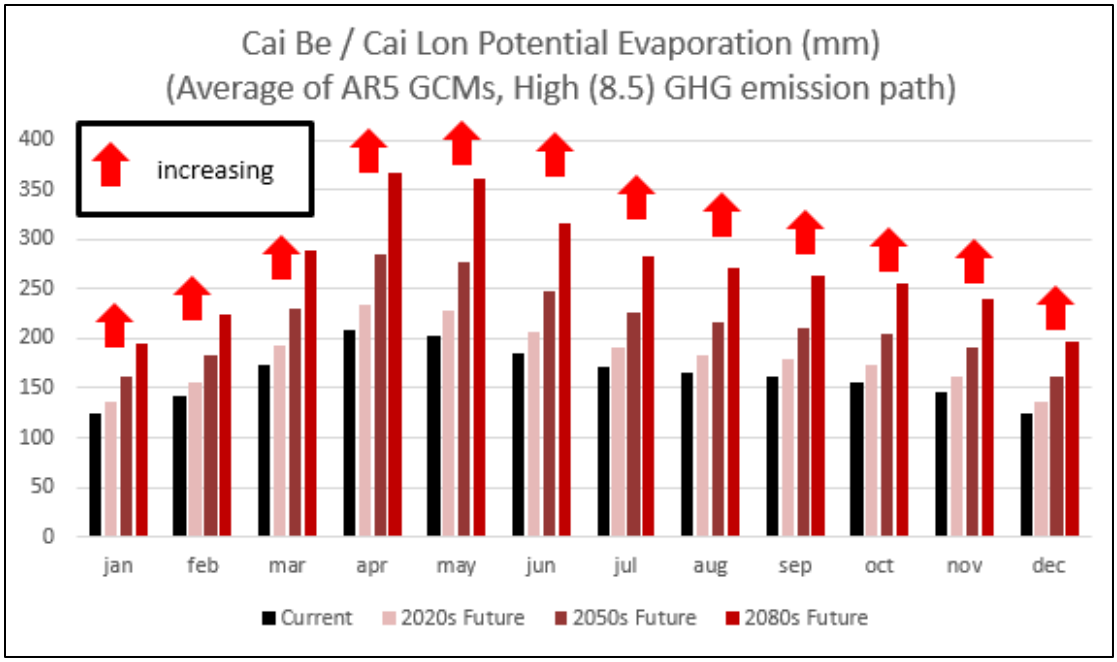

Figure 2- Potential Evaporation Projection (mm) RCP8.5

The difference between change in precipitation and evaporation can yield some useful information for available moisture. Where precipitation exceeds evaporation, a surplus of moisture exists, whereas when evaporative loss exceeds incoming precipitation, a moisture deficit is experienced. This balance between precipitation and evaporation is shown below (Figure 3). What this indicates is that the moisture deficits of the dry season are expected to greatly increase from present day.

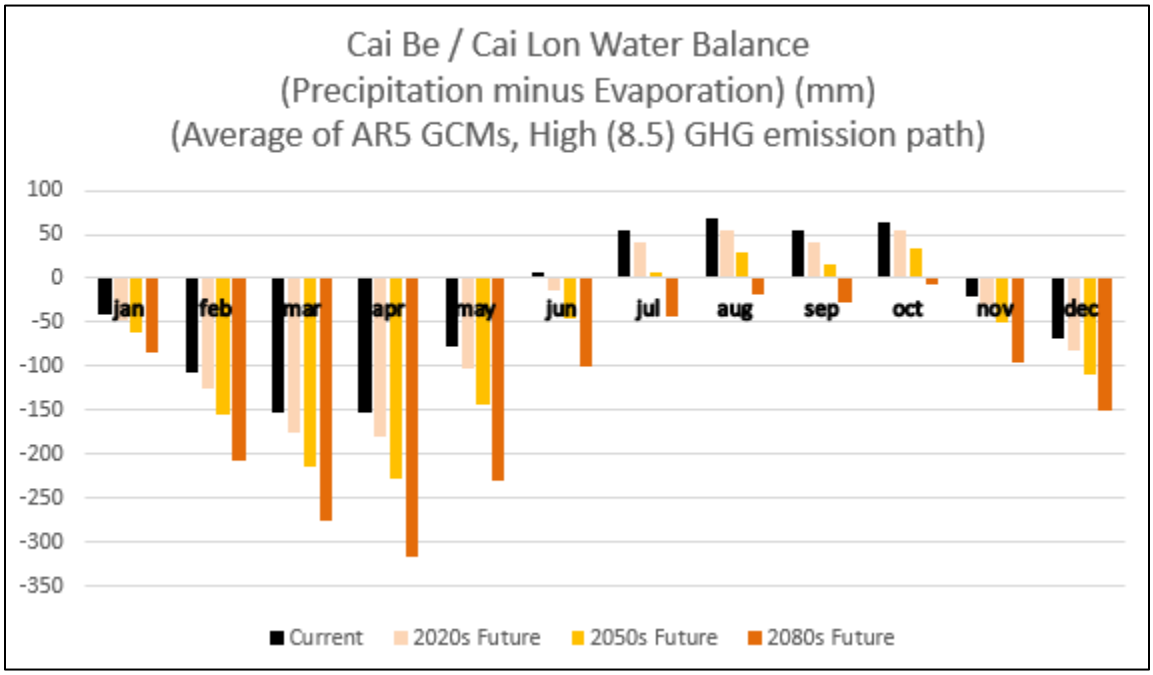

Figure 3- Water Balance Projection (mm) RCP8.5

Conclusions:

- From the ensemble projection of all GCMs, it should be noted there is a large range of estimates and the results here represent an average of all models.
- Projected drought change is consistent with the report 'Climate Change and Sea Level Rise Scenarios for Viet Nam' (Ministry of Natural Resources and Environment, 2016).
- Increased precipitation is projected for the current wet season (June to September), whereas small changes in precipitation amounts are expected for the dry season (December to April) according to an ensemble of GCM projections (high emission scenario).
- Increases in evaporation losses are projected for all months of the year due to increasing temperature.
- In the future projection periods of the 2020s, 2050s and 2080s, increased evaporative losses lead to reduced moisture availability in all months – making the dry season potentially much drier. With near steady or reduced precipitation and greater evaporation, the dry season is likely to become more water stressed.
- *The outcomes presented here would support the conclusion that drought will become increasingly frequent going forward due to near-steady precipitation coupled with greatly increased evaporation in the dry season.*