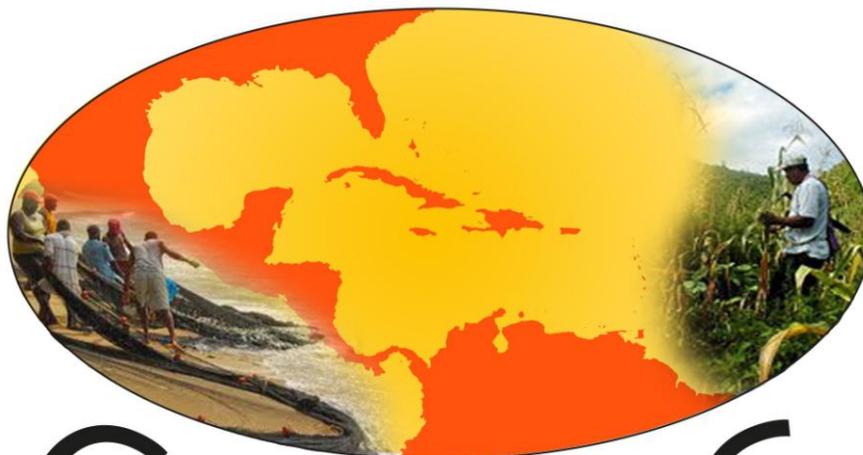


**Caribbean Weather Impacts Group**  
Supporting risk based decision making



# CARIWIG

## **Drought Assessments in Different Regions and Sectors**

### **Summary for Policy Makers**

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# 1 Importance of the Sector to National Sustainable Economic Development

It is known that water scarcity in the Caribbean region places many pressures on water and water resources management, and several productive sectors especially agriculture and tourism. Recent experiences of drought events illustrate the potential impacts of future events and can serve to raise the need for the urgent implementation of adaptation and response measures that could be applied in almost all the socio-economic sectors where water is a critical factor for development. Future increase of drought events in the Caribbean is one of the big challenges for life and development within the Caribbean region as it is indicated by several or almost all the model projections as a consequence of climate change.

Agriculture is one of the most important sectors for the Caribbean region, both in terms of income earner and subsistence farming. Agriculture is not only important to the peoples of the Caribbean region with regards to providing food security and Nutrition, but also to feed the tourists and give them that cultural flavour and cuisine that can only be found in this region. Therefore, the CARiDRO tool will help the Caribbean develop and maintain robust sectors through policies formulation and implementation of adaptation strategies and measures.

The application of the CARiDRO tool will impress on Governments the urgency to formulate and implement policies with regards to using more drought tolerant flora, engage in integrated water resources management, adjustment of cultural and sporting activities, implementing modern livestock management, and modifying and enhancing the tourism products.

## 2 Application of the Tool to determine Outputs

For the implementation of the cases studies, the outputs from seven experiments with the PRECIS Regional Climate Model as well as the Climate Research Unit observed dataset were used. The first step/case study focused on the development of the tool “Caribbean Assessment Regional DROught” (CARiDRO), which is an online web based tool for drought assessment (<http://caridro.caribbeanclimate.bz/>) available at the clearing house portal of the Caribbean Community Climate Change Center. As the tool is very flexible and not so hard to use, it was used to run three practical case studies, which covered different spatial and time scales as well as different sub-regions within the Caribbean region; namely, one for western region (Belize), one for northern region (Cuba) and one for the Eastern Caribbean.

The case study for western Caribbean was related with drought and forest fires in a specific location in Belize (Maya Golden Landscape). The results demonstrate that CARiDRO tool and the drought indexes produced can provide useful contribution for warning about escaped agricultural fires and forest fire management. In the case of Cuba, the case study investigated the future frequency of the extreme drought process that affect Las Tunas locality during 2003-2005. Results indicated that this

kind of extreme climate event will become more frequent and intense over the next decades, reducing the water availability by a combination of a reduction in precipitation and increase in water losses due to evaporation. These findings highlighted the relevance of the existing measures to reduce the negative impacts of drought, particularly those related with water management in Las Tunas province. While for the eastern Caribbean, a similar study was conducted taking as baseline the drought episode of 2009-2010. In this case, the study was oriented to a bigger sub-region that comprised various countries. The results showed that future drought such as observed in 2009-2010 will occur more frequently and will also be more intense and extended in spatial terms. This result has strong implications for different sectors including agriculture and water resources.

### **3 General Issues Emerging from the Application of the Tool**

The cases studies demonstrated that drought events will be a challenge for Caribbean development with serious implications in almost all socio-economic sectors. However, it is not possible to have a complete picture of the impacts across the region with just few assessments; therefore, more work must be done in order to produce more useful information.

Generating such kind of additional information can be done by using the CARiDRO tool, which was developed as part of the suite of tools developed under the CARIWIG project. It needs to be noted that the tool is not generally suitable for general users/stakeholders without technical background on climatology, thus technical guidance and training from climate experts along with the development of a user manual will be needed.

### **4 Other Sectors to which the Tools can be Applied**

The CARiDRO tool is also very useful to conduct regional drought analysis in a comprehensive way even for local assessments. Its versatility has been demonstrated in several studies within the CARIWIG case studies on drought, and the tool appears as a good system to be used in undergraduate and postgraduate trainings on drought assessments at regional, national and local scale.

### **5 Policy Implications for the Use of the Tool in Decision-Making**

Drought is a natural hazard of great importance whose management is gaining increasing interest day; both the predictions and early warnings are considered valuable aid in managing natural hazards. The prediction of drought has great potential because it broadens the scope of the current monitoring of this risk and improves the practice of management in drought events. However, it poses a great

challenge given the complexity of the spatial and temporal variability of meteorological and hydrological processes. Also crucial is the need to improve the understanding of the predictions to support decision-making to respond to drought events.

To improve the prediction of drought and its contribution to monitoring and risk management an increasing effort must be made and an appropriate scientific tool provided. CARIDRO is one such scientific tool and focuses on the use of future projections of climate models to improve predictions of possible drought events in the future so as to strengthen preparedness and adaptation to drought episodes in the Caribbean. Based on the case studies' findings, it is clear that future drought processes should be deeply considered in the planning process in sectors such as water resources management (integrated watershed management), agriculture, tourism and others.

For instance, the agriculture sector can optimize investment and research for and focus on existing drought resistant crop varieties. Water managers can improve planning for distribution, integrated watershed management, emphasis on conservation and increased domestic water storage, while emergency response agencies can improve their work on the basis of better monitoring and early warning systems. Financial resources should be allocated early to promote such kind of responses.

Water management programs, which include water saving devices, regulation of water use as well as controls to reduce fresh water loss by evaporation and leakage of water distribution networks, or by contamination are worthwhile policy measures that can be promoted and implemented. Future reduction in precipitation and the observed and expected increase in temperature will produce more frequent and intense drought episodes and those drier conditions will increased the risk of forest and agricultural fires. In this context, it is imperative to strengthen community awareness, land use planning and fire management in order to reduce the likelihood of escaped fires and the associated negative impacts.

## **6 Gaps and Further Work to be Undertaken in the Refinement of the Tool and its Application**

CARiDRO tool can be easily improved and some refinement work can be done to the tool, some examples of these improvements are.

- Have detailed comprehensive assessments of drought events in the past to make a fair evaluation of similar phenomena in the future.
- Add as many regional climate realizations as possible as well as reanalysis for our region, in order to incorporate other uncertainties sources such as those related with different emission scenarios.
- Increase resolution in the model projections will be beneficial when conducting studies at local scales.
- Make the user interface more user friendly than it currently is.

- The tool should be improved to incorporate more on-line documentation, facilitating a better understanding of the different technical aspects.

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