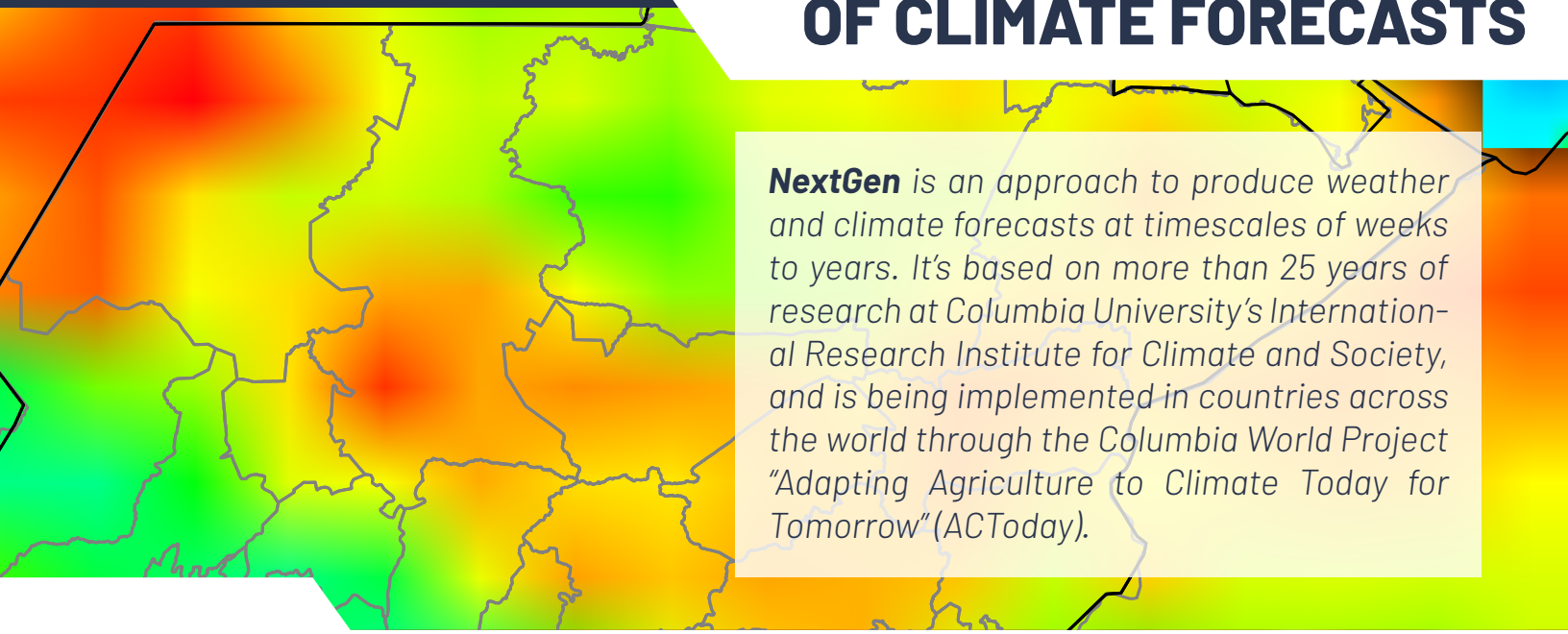
THE NEXT GENERATION OF CLIMATE FORECASTS



NextGen *is an approach to produce weather and climate forecasts at timescales of weeks to years. It's based on more than 25 years of research at Columbia University's International Research Institute for Climate and Society, and is being implemented in countries across the world through the Columbia World Project "Adapting Agriculture to Climate Today for Tomorrow" (ACToday).*

The development and informed use of tailored climate forecasts at a range of timescales are important components of successful climate services. *NextGen* is a flexible tool that enables countries to make such forecasts. It helps them implement international best-practices for objective, reproducible forecast methodologies that take advantage of the latest dynamical models available.

A number of factors come into play in the design of reliable forecasts, including which models are available, particular aspects of the climate system that these models can predict, and the specific needs of decision makers for whom the forecasts are intended.

The *NextGen* approach facilitates this design process. For example, it helps forecasters assess past model performance, which can inform how best to correct and combine different global climate models. It also helps forecasters select the best climate models for any region of interest through a process-based evaluation, and it automates the generation and verification of tailored predictions at multiple timescales at the regional, national or sub-national level.

NextGen can generate seasonal as well as new subseasonal forecasts to provide weather-to-climate prediction products that are more seamless. It is built to be adaptable to the design needs of any forecasting environment – from national meteorological agencies to regional climate institutions to prediction groups at local universities.

Co-Developed with Stakeholders in Mind

Using *NextGen*, teams not only can identify and select specific variables that stakeholders need for their decision making and planning, but they can also analyze the physical mechanisms that lend predictability for those variables. Compared to traditional forecasting methodologies, *NextGen* represents a more automated and objective system to create, and assess, tailored predictions at various timescales. Additionally, it provides information about the full range of possible outcomes, such as forecasts of both mean and extreme values from the same system. Such information allows users to assess the risk of exceeding–or not exceeding–particular thresholds of interest.

For example, users can forecast the total amount of rainfall expected over the next season, or next few weeks, and also receive information on rainfall characteristics such as frequency of rainy/dry days in the target season, rainy season onset, and demise and duration of the rainy season(s).

"The improved seasonal climate forecasts produced by *NextGen* are tailored to be especially useful to decision making and planning in agriculture, energy and other sectors"

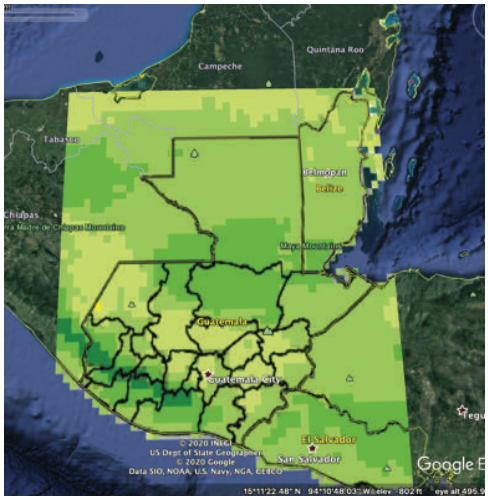
José Franklyn Ruiz
Instituto de Hidrología, Meteorología y Estudios Ambientales, Colombia (IDEAM)

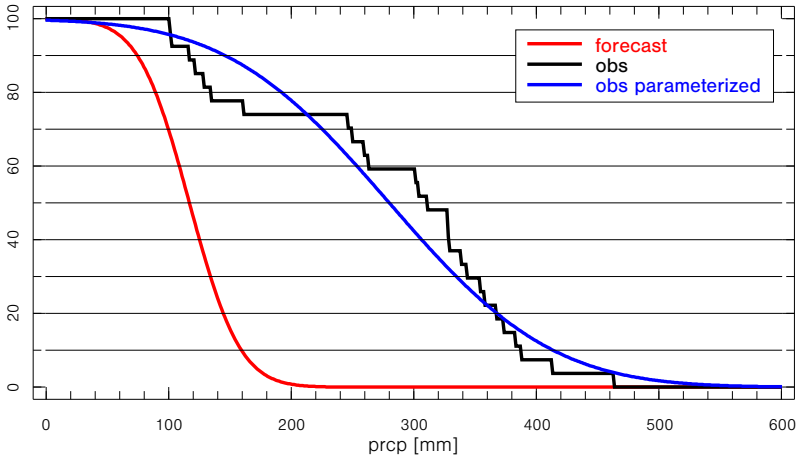
Some *NextGen* Applications

- *Rainfall amounts, frequency, onset, demise and other characteristics*
- *Coffee yield, vegetation health indices, and other agriculture applications*
- *Acute undernutrition and food security early-warning systems*
- *Mosquito-borne diseases*

NextGen Applications

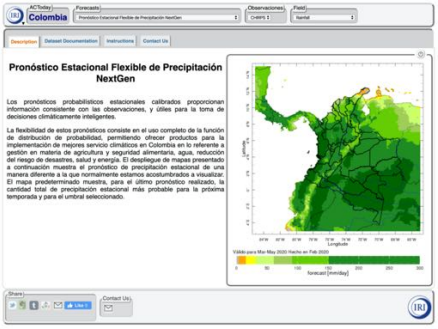
NextGen provides actionable information to assess future climate risks and opportunities. Users can download data into a variety of formats and visualization tools. Here are a few examples of current applications:



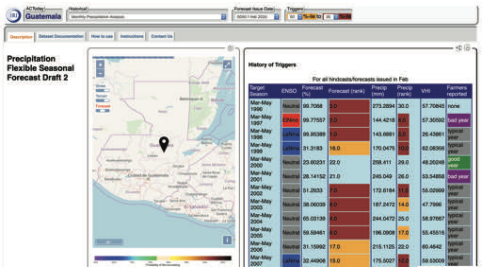


Mar-May 2020 probability of exceedance issued February 2020

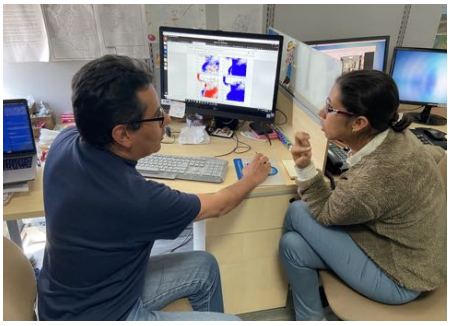
Seasonal forecast layer for Guatemala integrated into Google Earth (left) and plot of observed and forecasted rainfall for a given location (right).



NextGen seasonal forecast maproom developed with Colombia's IDEAM.



Experimental maproom for forecast-based financing and early warning/early action systems, co-developed with WFP-Guatemala.



Staff from IDEAM being trained on NextGen subseasonal-to-seasonal forecasting methods.

International Research Institute for Climate and Society
Earth Institute | Columbia University