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Creating tools for the generation of weather-based crop calendars to support climate services.

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The UN 2030 Sustainable Development Agenda included achieving Zero Hunger as one of its prominent goals. According to Food and Agriculture Organization for the United Nations (FAO), this objective is far from being achieved, as over 735 million people faced hunger in. The geographical distribution of food insecurity is not even across the globe, with greater impact over less developed countries where subsistence agriculture is a major livelihood. Weather, climate, climate variability and climate change alter in time and space the phenological stages of crops and, therefore, agricultural planning and production. One of the most widely used tools to convey weather and climate information to final agricultural users are weather-based crop calendars. They use time series of daily accumulated rainfall to provide actionable information on the timing of phenological stages, specifically on the times for planting (start of the season) and harvesting (end of the season) for different crops and different agroclimatic zones. The creation of a Crop Calendar requires quality controlled and homogeneous rainfall series to detect the onset and cessation of the rainy season, plus crop-specific information, like drought resilience and crop cycle length. Rainy season onset and cessation are determined using threshold-based methods, which combine rainfall accumulation over several days and additional criteria to avoid false alarms, such as the presence/absence of consecutive dry days. The rainy season onset and cessation for each year are calculated and their timeseries fit to a probability distribution to evaluate the climatological expectations for early/normal/late onsets and cessations. The final crop calendar results from assimilating the first/early/normal/late onsets of the rainy season to the span of possibilities for the sowing dates. The harvest dates are defined as the sowing dates plus the crop cycle length for each variety and agroecological zone. In this contribution, we present a series of tools developed with the support of the World Meteorological Organization (WMO) and the Climate Risk and Early Warning Systems Initiative (CREWS) project in West Africa and the Enhancing Adaptive Capacity of Andean Communities through Climate Services (ENANDES) project in South America, following a “from data to service” approach and including a series of training events. The process is illustrated using rainfall series from Togo.