Hi Wim,

Apologies, I prepared a neater CDI slide deck a cpuple of months back and failed to distribute it.

Briefly, three variables are considered (rainfall, potential ET, soil moisture). Monthly aggregations (sum, sum, mean) are prepared and converted to percentiles. These are combined using importance weights on their logits to form a monthly CDI. The “direction” of the variable is taken into account (high is good for rainfall and soil moisture and bad for ET0).

Monthly CDIs.

A seasonal CDI is then prepared as Sara indicated, using seasonal weights. You can derive a CDI for the whole season or for a period within the season. Alternatively, for N months you could aggregate the variables over N months and then form a N month CDI, but we haven’t yet looked into that.

I haven’t looked into the data you were provided, so not sure how to answer your second question – let me check internally.

Best, Rogerio

One small point (stickler-for-detail corner): what we use in the CDI is the “potential evapotranspiration” (ET0) which is a purely atmospheric variable (as you know, representing water demand imposed on vegetation). If you refer to “evapotranspiration”, people may think you are referring to “actual evapotranspiration”, which is the water actually lost to the atmosphere from the soil and from the leaves – this is a lot harder to calculate. They are close if vegetation has unlimited water supply, or diverge a lot (in deserts, ET0 is very high, ETact close to zero).

Hi Sara,

Thanks a lot for your email.

I think I got a general sense of the approach that is being followed, however, it would be clearer if there are any underlying equations that you could share. More particularly, I am not sure if I understand the sequence of the various time aggregations.

* I think the basic data for the three components come in pixels and days. Are they first aggregated per month, before the logit operations on percentiles and their subsequent weighted combination into the CDI; or are first the day-specific percentiles derived ?
* Similarly, how should I interpret the individual components in the data shared: I guess these are aggregated for the same “season” as done for the CDI, but should I consider these as percentiles of the season-aggregated rainfall, soil moisture, and evapotranspiration, or as the aggregated value of the percentiles derived for rainfall, soil moisture, and evapotranspiration?
* In any case, given the time and spatial aggregation of pixels into adm2 levels, I don’t think there is an elegant way to express the CDI as a function of its components, but perhaps I got this wrong.

In addition, has there been any account for the reverse interpretation between rainfall/soil moisture on the one hand and evapotranspiration on the other? For the first two indicators, higher values point to wetter conditions, whereas the reverse is true for the latter indicator. But perhaps my climate knowledge is too limited here.

Best

Wim

Hi Wim,

Unfortunately I'm not able to access our sharepoint that has the powerpoint on it at the moment, [@Rogerio BONIFACIO](mailto:rogerio.bonifacio@wfp.org) I think we'd prepared one for Southern Africa this past season if you have that available to share.

I can give a quick overview of the methodology though:

For a given season, first the anomaly is calculated for each variable and time step. The anomaly used is the logit of the percentile value for the specific time given the entire historical series at the same point of the year.

The variables are weighted as follows to combine them into a monthly CDI- rainfall: 0.4, ET0: 0.3, soil moisture: 0.3. The weighting is done on the logit of percentiles to make sure the proper distance between percentiles towards the extremes of the scale is maintained.

The seasonal CDI is calculated by taking the weighted sum of the monthly time steps. The weights are derived by the percent contribution of the long term average of the rainfall each month to the total rainfall of the season. The "season" here is just whatever total time range a user wants to consider, the weights are calculated over the specified time range so they will always add to 1.

The final step is to apply the inverse logit to transform the results back into percentiles.

Please let me know if I can clarify any of these points or if you have further questions, I'll be working from this email for the time being until my access is restored.

Thank you!

Sara