# Data issues in climate-related risk and impact assessments for food security

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The old computer science aphorism, "garbage-in, garbage-out" (GIGO) is now often gaining a new youth in climate-related risk assessments for food security. This is due to three main reasons: (1) risk and impact assessments make use of a wide spectrum of data types, (2) the availability of directly observed ground data keeps decreasing and (3) the "distance" between the raw (observed) data and final analyses used for decision making becomes longer in terms of number of processing steps and complexity.

A spectrum of data types: climate impacts, the mark left by climate variability (weather) on a vulnerable system, depend on both climate and the nature of the system. Therefore, we need to describe the climate and the system to understand the impacts. Particularly in food security, the impacted system can be extremely complex and, therefore, requires data from a number of sectors. They include socio-economic data on markets (food prices, trade and stocks), human health, demography, usually in the form of time series. We have to add environmental variables that affect the way in which climate and the food production system interact, for instance soil and vegetation maps, next to some variables to describe communication networks and the dissemination of information. We note that all those data are defined by a natural time and spatial scale: weather data can be recorded continuously at stations (points), while satellite information comes by pixels recorded every day or so and, finally, some socio-economic data are available for large administrative areas (regions, provinces, districts) and updated with less than annual frequency, e.g. whenever a census is conducted.

Decision making in food security requires that the data be made compatible across the mentioned scales. A number of techniques are now available and in common use in the applied agro-climatology community, including geostatistical interpolation methods, Geographic Information Systems (GIS), random weather generators, a wealth of satellite imagery, crop simulation models etc. while the socio-economic data have been lagging behind. Not only: advances in data collection and processing has not really affected some sectors that participate in food security analysis, such as the health and food marketing sectors (e.g. children's weight from dispensaries crop retail prices from rural markets).

It has also become very easy to use readily available computer tools to generate products describing impacts. Unfortunately, (1) the data on which such impact assessments are based are often selected based mostly on ease of access and (2) impact assessments are too often dealt with as a data processing exercise only, with little attention paid to the underlying physical, ecophysiological and economic phenomena.

The paradox is that the Internet offers about any kind of data a potential user can possibly need. The number of providers of climate grids (interpolated climate surfaces) is increasing every day, against a background of decaying networks of observing stations. Not only do we have more and more detailed global and national climate products of largely unknown quality

based on less and less actual observations, but the same sources are often used by separate assessments of food security, resulting de facto in a loss of independence between analyses.

At the same time, as indicated, socio-economic data are not improving, particularly in developing countries, nor are social scientists and economists developing a culture that makes their analyses more compatible with data about the physical environment. We also lack some basic data layers, for instance good maps of crop and population distributions, systematic collections of farming practices, as well as good tools that would allow us to disaggregate some socio-economic data enough to make them compatible with the current level of sophistication of environmental data used in food security analysis.

The users of weather data, and climatologists themselves would eventually benefit if they had a closer look at the actual quality of their processed products; more than ever should they dialogue to ensure that their products are used properly, and more than anything else, should National Meteorological Services offer easy access to observations from their ground stations.