CONTENT

Step 11: Develop a mechanism that defines the intervention area

Once you receive information about the trigger being reached you should also know in which geographic regions the trigger is reached. If you work in a preselected community or area designated by the government, you activate your anticipatory action plan. For anticipatory action plans that cover larger areas like s/EAPs, you need to know how to prioritize the municipalities and where to intervene. Note that you and the National Society will probably not have the capacity to act in all municipalities and support everyone, hence you will need to prioritise in a transparent manner. The full EAP criteria state:

There is a map or a clear methodology that will tell the National Society where action should be taken based on a combination of vulnerability, exposure, and the forecast, when the EAP is activated based on the trigger model. (Section 4.4 in full EAP template)

Currently there are two main ways to define the intervention area:

Impact-based forecasting

In case you have an impact-based forecasting system, it should tell you which locations might be most affected. For example, if your National Society has the capacity to act in three municipalities you can select those three municipalities that are forecasted to be most affected.

Indicator-based risk assessment

If no impact-based forecast is available, you can use a regular weather forecast and overlay this with exposure and vulnerability information. This can serve as a proxy to predict where impacts will be highest. The simplest way to do this is to use an indicator-based risk assessment by using the vulnerability and exposure indicators that you have identified in your risk assessment (see chapter 5: collect risk, early action and impact information). This method is used in most EAPs so far.

There is a variety of methodologies to do indicator-based risk assessments. However, the most prominent one is probably the INFORM Risk Index methodology.

Automatization in QGIS

When an EAP activation is near, speed matters. An intervention map is essential for planning and communicating your response, but creating such maps usually takes hours and advanced GIS skills. With QGIS automation, the process can be reduced to minutes. QGIS is a free and open-source GIS used worldwide, supported by a strong community. Its automation features allow you to run predefined processes with a single click – no coding required. As long as your team has basic QGIS skills, you can create, adapt, and troubleshoot automated workflows. Unlike many tools tied to administrative boundaries, QGIS enables precise geospatial analysis, helping you target the areas most at risk.

Specialized QGIS Training for Automated Trigger Models

The IFRC Network QGIS Training Platform is the main resource for building QGIS skills in a humanitarian context. It includes a dedicated exercise track on developing automated trigger workflows, based on the Madagascar Cyclone EAP model. Documentation of the operational model is also available on the platform.

Through this exercise track, practitioners learn how to:

- Build a model from scratch.
- Adapt existing models.
- Tailor outputs (e.g. generate spreadsheets).
- Apply predefined styles and map templates for rapid map production.

The track is embedded within the wider training platform, giving easy access to video tutorials, additional exercises, and in-depth guidance on GIS analysis. You can find a link to the training platform below in the toolbox.

There is no defined methodology to derive the intervention map. Hence, if you have another established methodology, please make sure that you explain it well in the EAP document. You can find examples from Madagascar and Somalia below.

Example 1: Cyclone trigger development in Madagascar

For the AA project in Madagascar, the activation trigger is set as follows: if the Météo Madagascar (DGM) forecast indicates landfall of a tropical cyclone with wind speeds above 118 km/h within the next 48–72 hours.

Once this condition is met, an automated QGIS model defines the intervention area and estimates expected impacts. The model buffers the forecast cyclone track by 200 km and intersects it with multiple datasets: the exact locations of health and education facilities (OpenStreetMap), and a 1 × 1 km raster grid containing population (WorldPop), number of buildings (Google Buildings), and agricultural area (Copernicus Land Cover).

The model outputs both geospatial layers and spreadsheets. Predefined style files and map templates allow users to quickly generate:

- An overview map highlighting the affected districts.
- Thematic maps for each sector, showing the exposed population, buildings, agricultural land, and health and education facilities.

The model relies on one dynamic input – the forecast cyclone track – while all other datasets remain static. These static datasets are not always the most up-to-date or perfectly accurate, but they have a crucial advantage: they are freely available, cover the entire country, and even exist globally. This makes the workflow simple, fast, and reliable.

Ground-truth data, such as detailed government surveys or field assessments, can provide higher accuracy and local relevance. However, these datasets are often costly, slow to collect, and only available for limited areas. Global datasets, by contrast, may be less precise at the local scale, but their consistency and coverage allow organizations to build models that are immediately operational and can be easily updated when new versions become available.

Other trigger models can achieve higher precision by relying on advanced technologies or highly detailed datasets. Yet these approaches often come with trade-offs: higher costs, greater technical complexity, and reduced local ownership, as many organisations lack the resources or expertise to maintain and adapt such systems. The Madagascar cyclone model shows that a straightforward QGIS-based approach can remain both effective and sustainable within existing capacities.

The QGIS trigger workflow for Madagascar can be found in thetoolbox.

Example 2: Drought trigger development in Somalia

For the anticipatory action project in Somalia, a whole workflow was developed in the open source geoinformation software QGIS for the trigger which is owned and run by the Somali Red Crescent Society.

For the development of the Somaliland-Somalia Drought Trigger mechanism various data sources were thoroughly analysed. Finally, the main parameters chosen for the trigger, based on the historical impact assessment, are the twelve-month Standard Precipitation Index (SPI12) and the IPC acute food insecurity classification. The exact data used are the documented and forecasted SPI12 (source: ICPAC) and the forecasted IPC classification (8-month forecast, source: FEWSNET), that is used to calculate a population weighted index of food insecurity. The trigger thresholds for both components were optimized towards the most favourable proportion of hit rate and false alarm rate. The emerging thresholds were <-1 for the SPI12 and >=0,7 for the IPC-based index. The triggering is done on district level and per district just one trigger activation per year is possible.

This information of the threshold is then overlaid with an indicator-based risk assessment which identifies the most at risk districts. The QGIS trigger workflow for Somalia can be found in the toolbox.