GIS and Remote Sensing for vulnerability analysis in the UN World Food Programme

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Summary

- Introduction to the World Food Programme

- Disaster cycle

- GIS applications for:
  - Preparedness
  - Response
  - Logistics
  - Planning possible interventions

- WFP custom GIS tools

The world's largest humanitarian organization
fighting hunger worldwide,
operating in more than 80 countries

90 million people assisted each year, 58
million of whom are children

Established in 1963 by FAO and the United
Nations General Assembly

Goals of the WFP:

Eradicate hunger and malnutrition

Save lives in emergency situations

Promote autonomy of poor communities

Disaster cycle:

The disaster cycle is the framework used by the organizations of the emergency management community

- Prevention: measures which actions can be taken in disaster-prone areas in order to limit the consequences of a possible shock

- Preparedness: identifies human and material resources needed during a specific possible disaster

- Response: issues warnings and evacuations. Shelters are prepared, actions are taken, and the situation is assessed.

- Recovery: focuses on cleanup and rebuilding, concentrating on the longer-term response to the disaster.
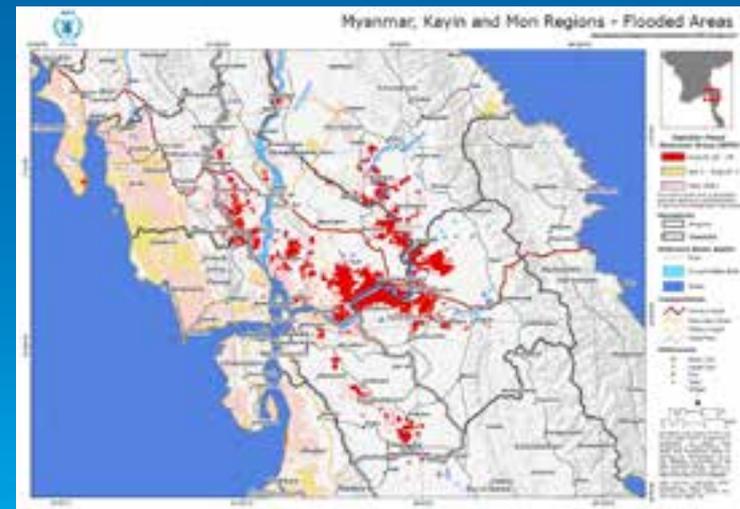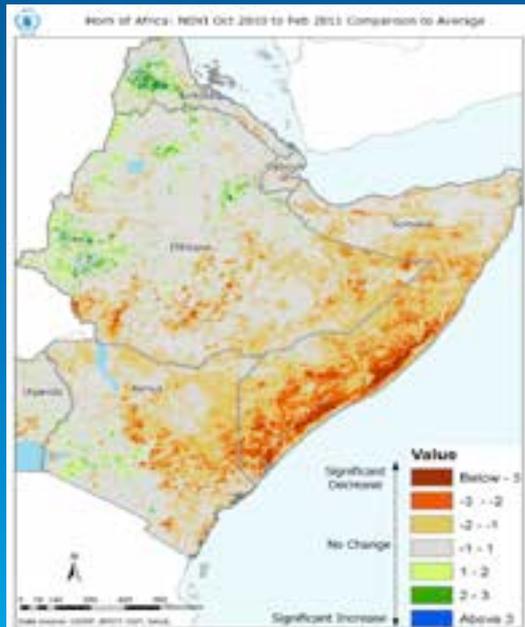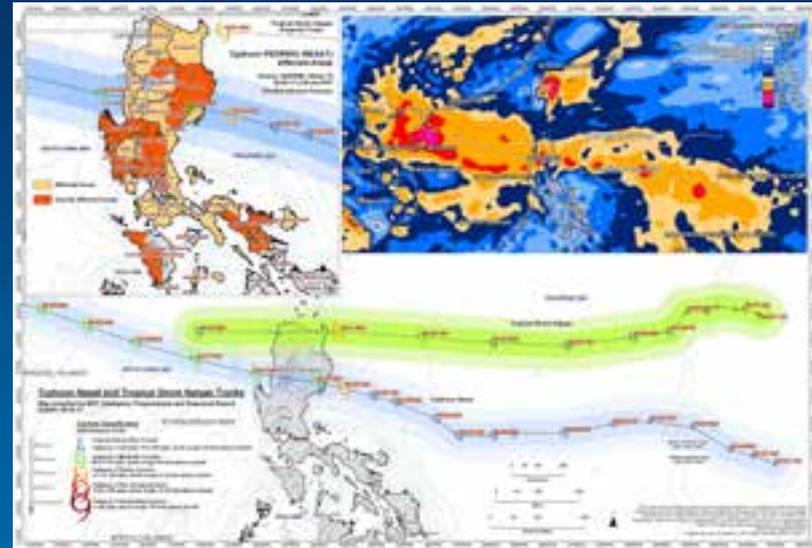
GIS for Preparedness

- Food insecurity patterns

- Number of shocks in the past

- Areas with environ. degradation
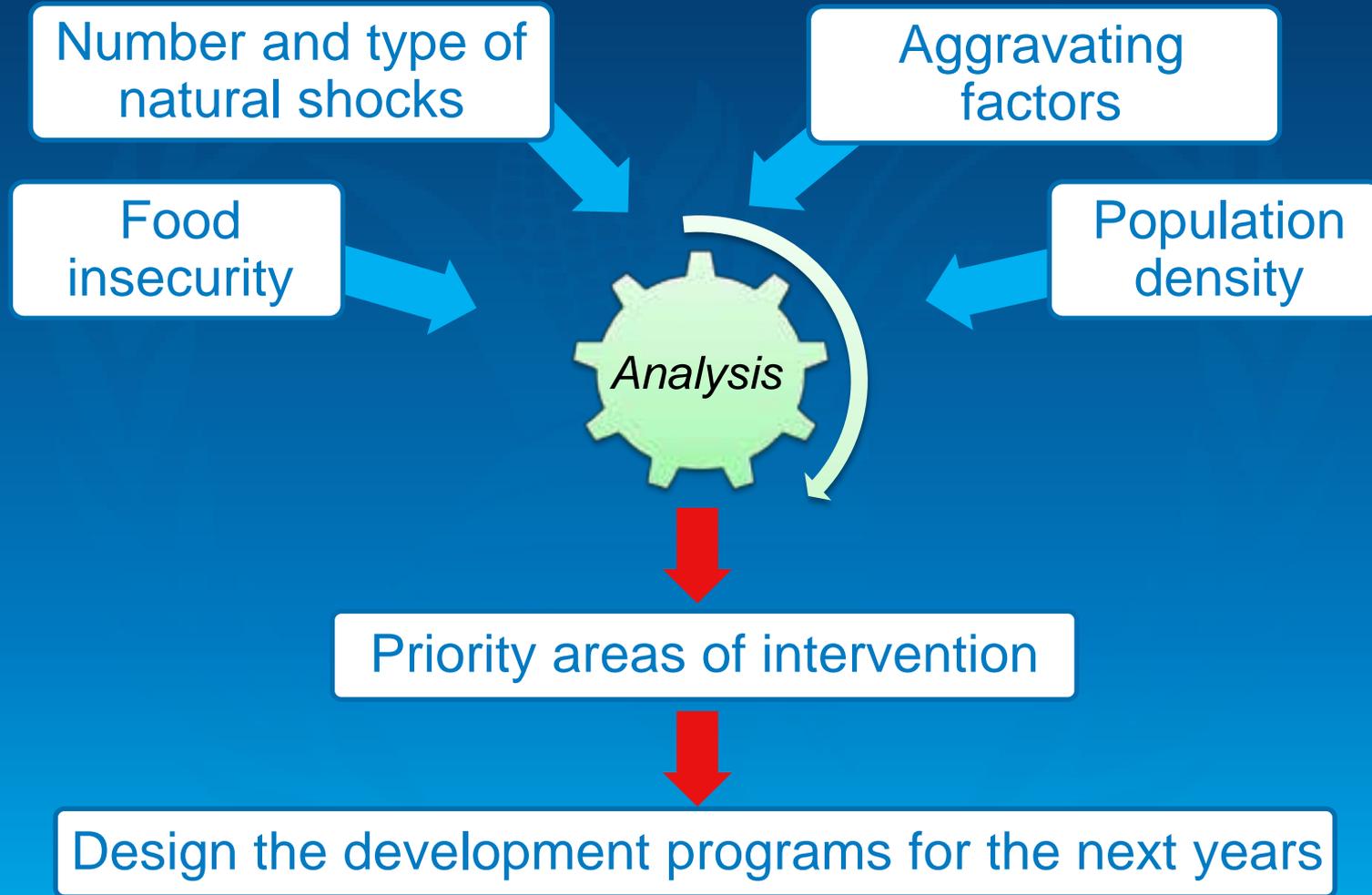
- Population at risk
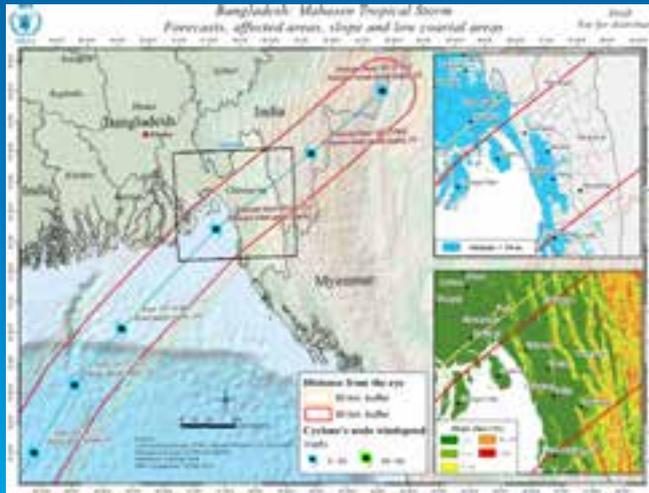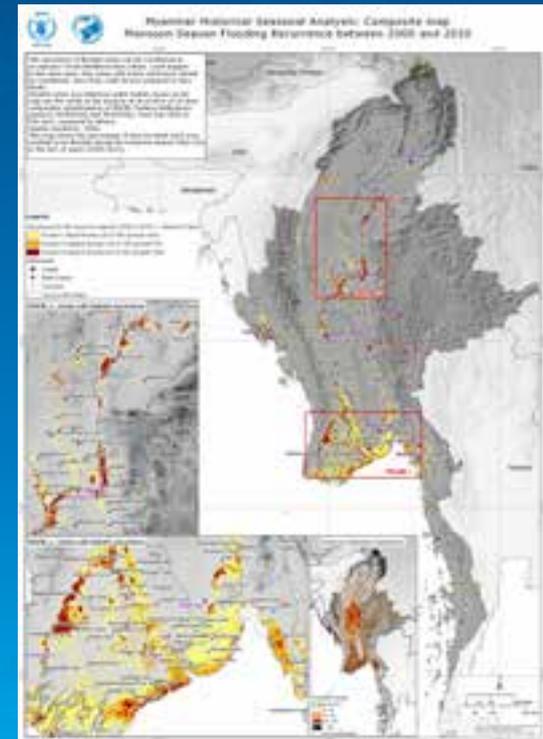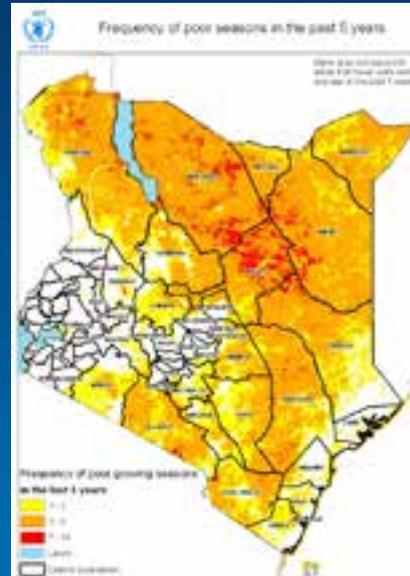
GIS for Response

1. Magnitude and location of the shock

2. Forecast of the shock evolution

3. Infrastructures of the impacted area

4. Population in need of assistance
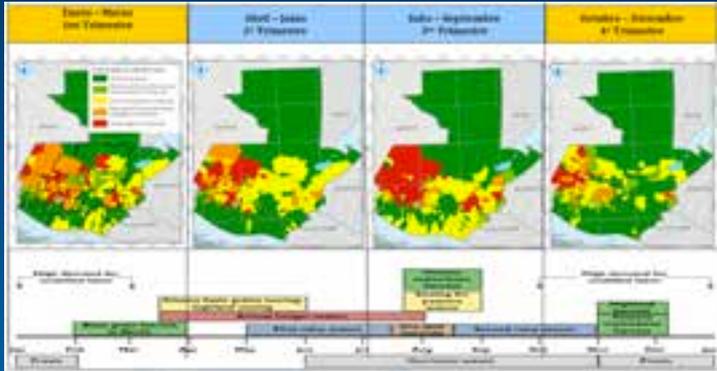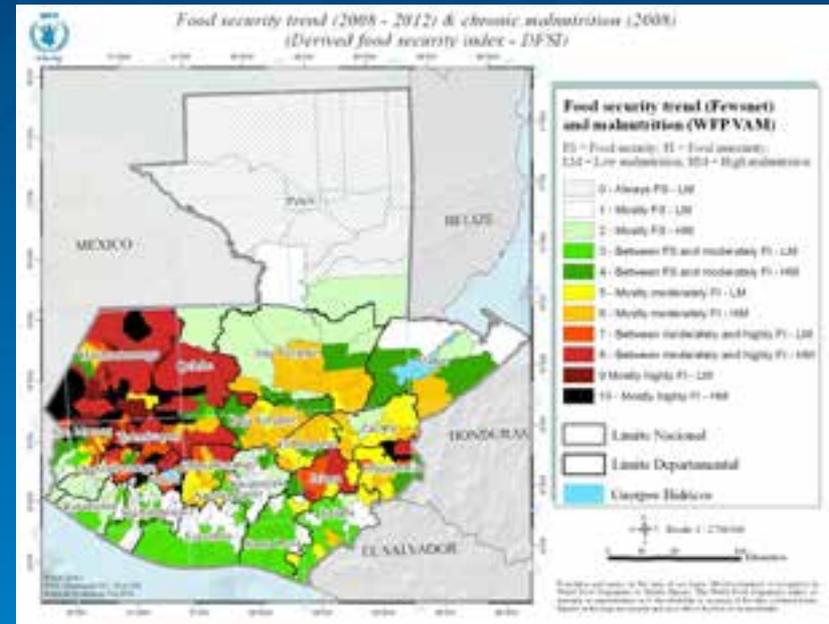
5. Possible areas of intervention

GIS for Logistics

Settlements
Hydrology
Admin. Boundaries
Highways, roads and trails
Airports
Ports
Refugee camps
Food distribution points
Security conditions
Entry points
Check points
Humanitarian corridors
…

Data stored in an SDI and continuously updated

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Seasonal food insecurity trends

Annual average food insecurity

Food insecurity and malnutrition map
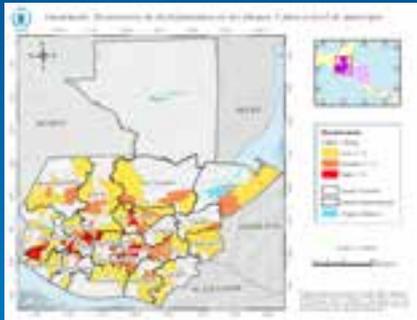
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Floods
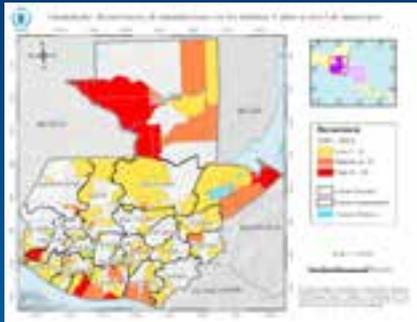
Landslides

Droughts
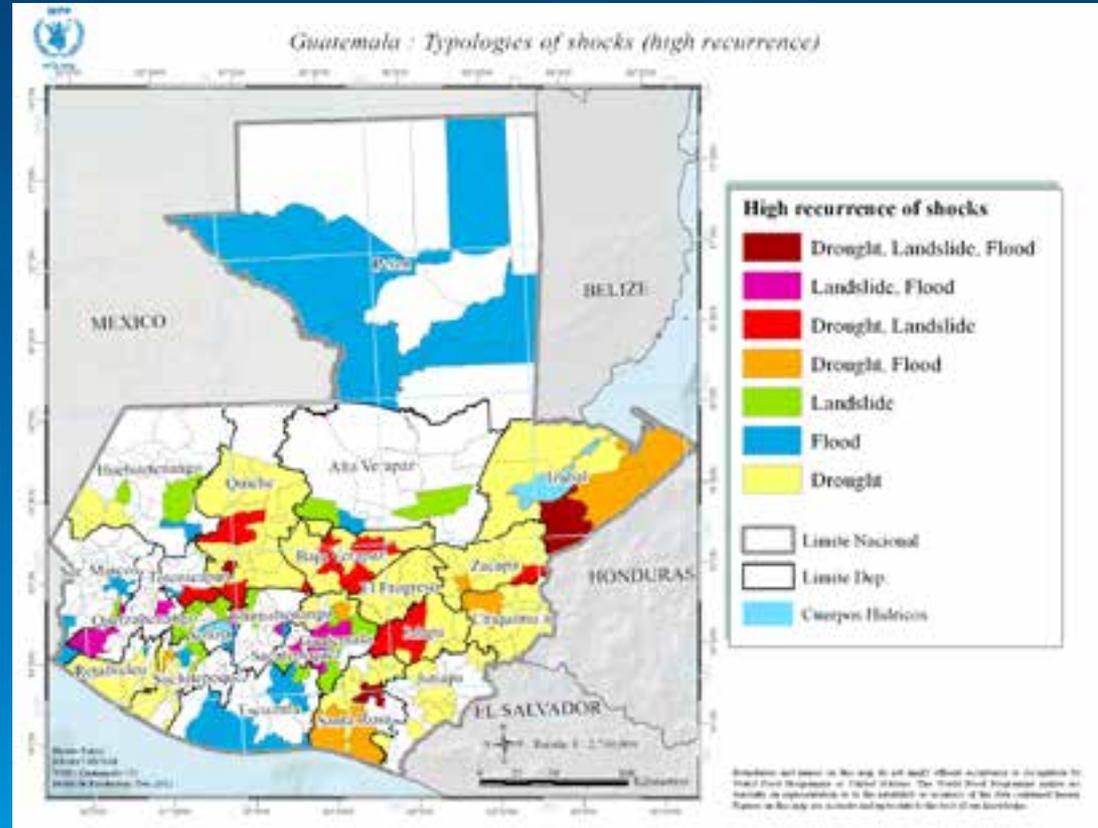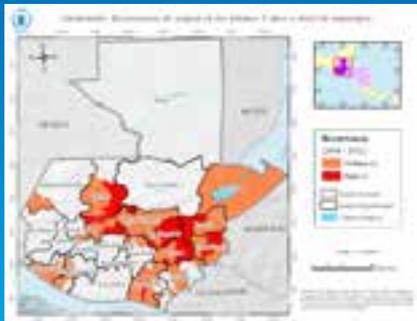
Categories of shocks with high recurrence

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- A degraded environment increases a community's vulnerability to the effects of natural hazards

- Intense deforestation has direct consequences on soil degradation, relief stability and livelihoods

- Recent deforestation patterns are therefore considered the main aggravating factor
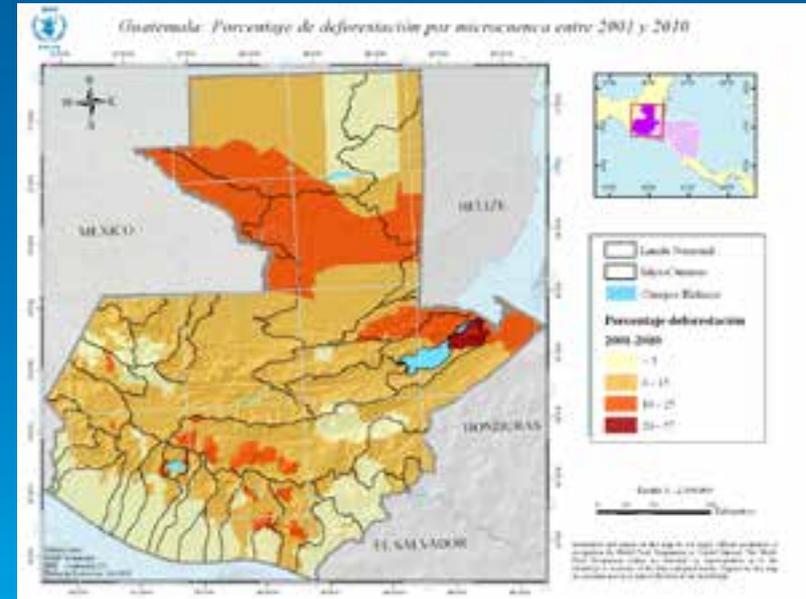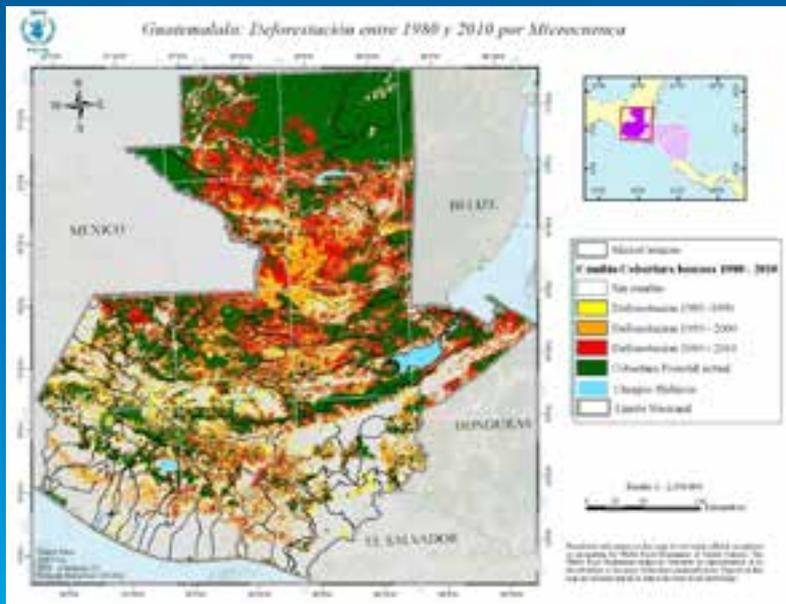
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Analysis output:
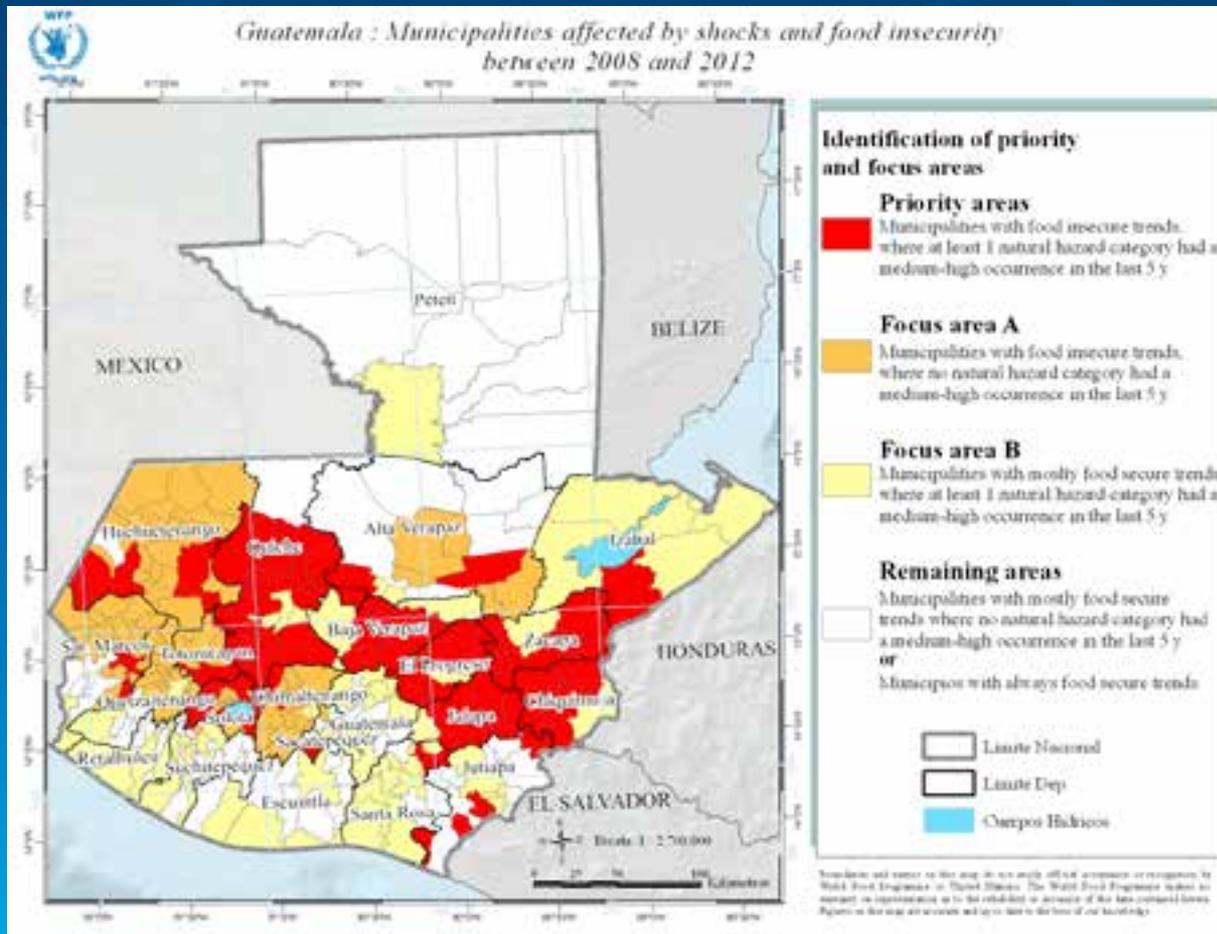
And when there's no tool fitting our needs?

(complex processes, iterative operations…)

We create our own!

WFP custom GIS tools:

Main Name	Alternative Names
Zombe Eucuma	Zombe, Zombe Eucuma, Zumba Ecuma
Zuezueko	Zuezueko, Zuzueco, Zuzueko, Zuzuaco, Zuzuako, Zuazuako
Zouan-Hounien	Zouan-Hounien, Zoum Hounien, Zoun-Hounien
Teninderi	Teninderi, Tenindiere, Teninderi, Teninndiere, Tanindieri, Tanindiere, Taninderi, Taninndiere
Zoudj el Beghal	Zoudj el Beghal, Zoudj el Berhal
Terguaya	Tergueya, Terguaya, Tergueya, Terguaya

Problem:

It's impossible to automatically find in our database a list of settlements of interest, due to spelling errors or multiple alternative local names.

Solution:

We have created the "*Clever matching*" tool

- **Integrates the python *difflib* library into ArcMap**

- **Performs statistical names comparisons**

- **Finds the 4 best matches for each of the desired settlement names**

- **Creates a new settlement layer with these best matches**

Conclusions:

- The UN World Food Programme fully acknowledges the key role of GIS and relies on it during each phase of the disaster cycle.

- A correct management, analysis and display of the geographically-related data can sharpen the capability of preventing and facing crisis.

- The response to particular shocks, such as drought and floods, can be properly organized only with the support of remote sensing data.

- ArcGIS has a large and always increasing number of analysis tools, but by using the Python programming language each institution/user can create new tools that can better satisfy their needs.

Thank you.

Hunger
The world's greatest
solvable problem