GIS and Demography

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Introduction to Spatial Pattern Analysis in a GIS Environment

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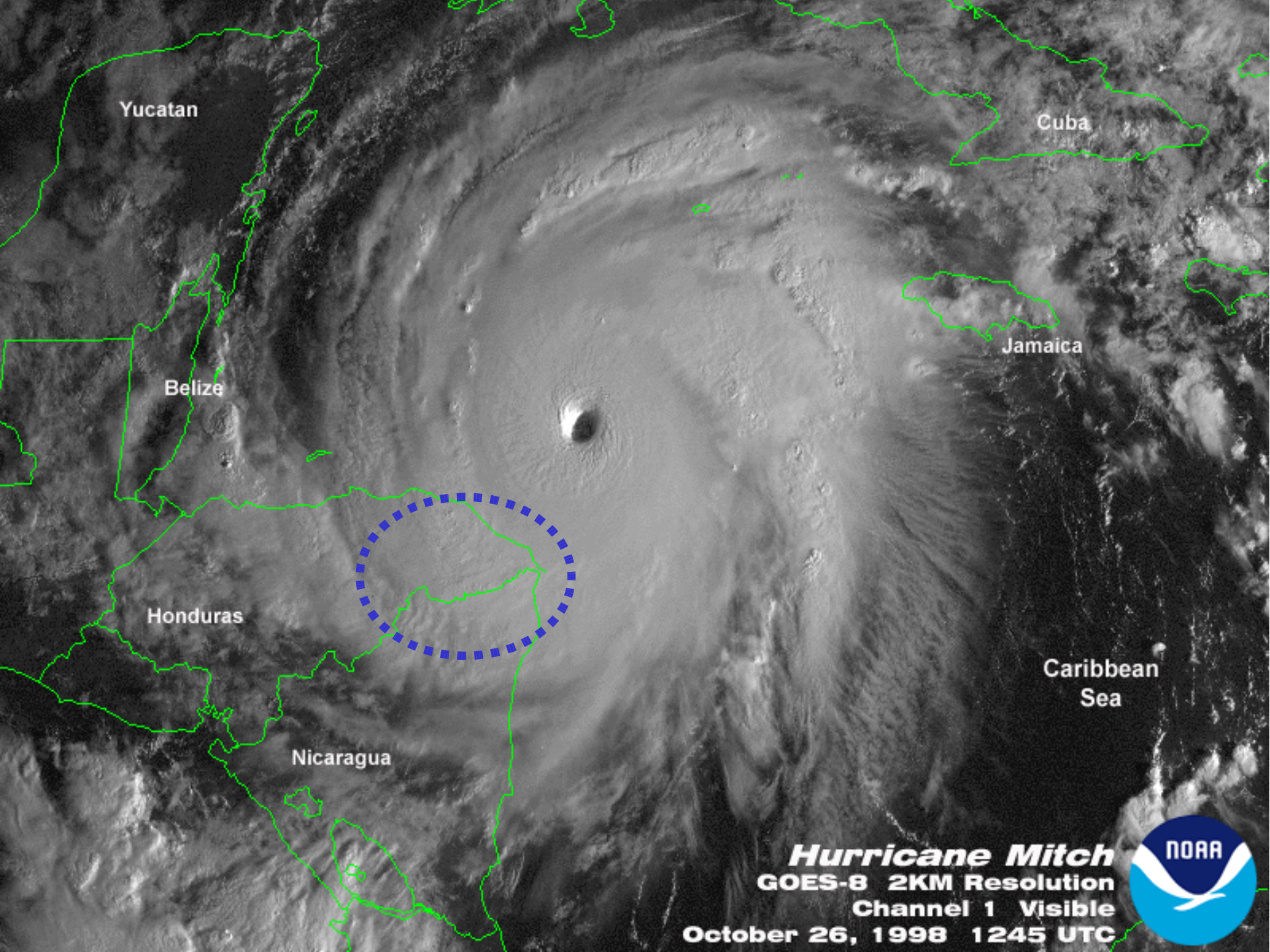
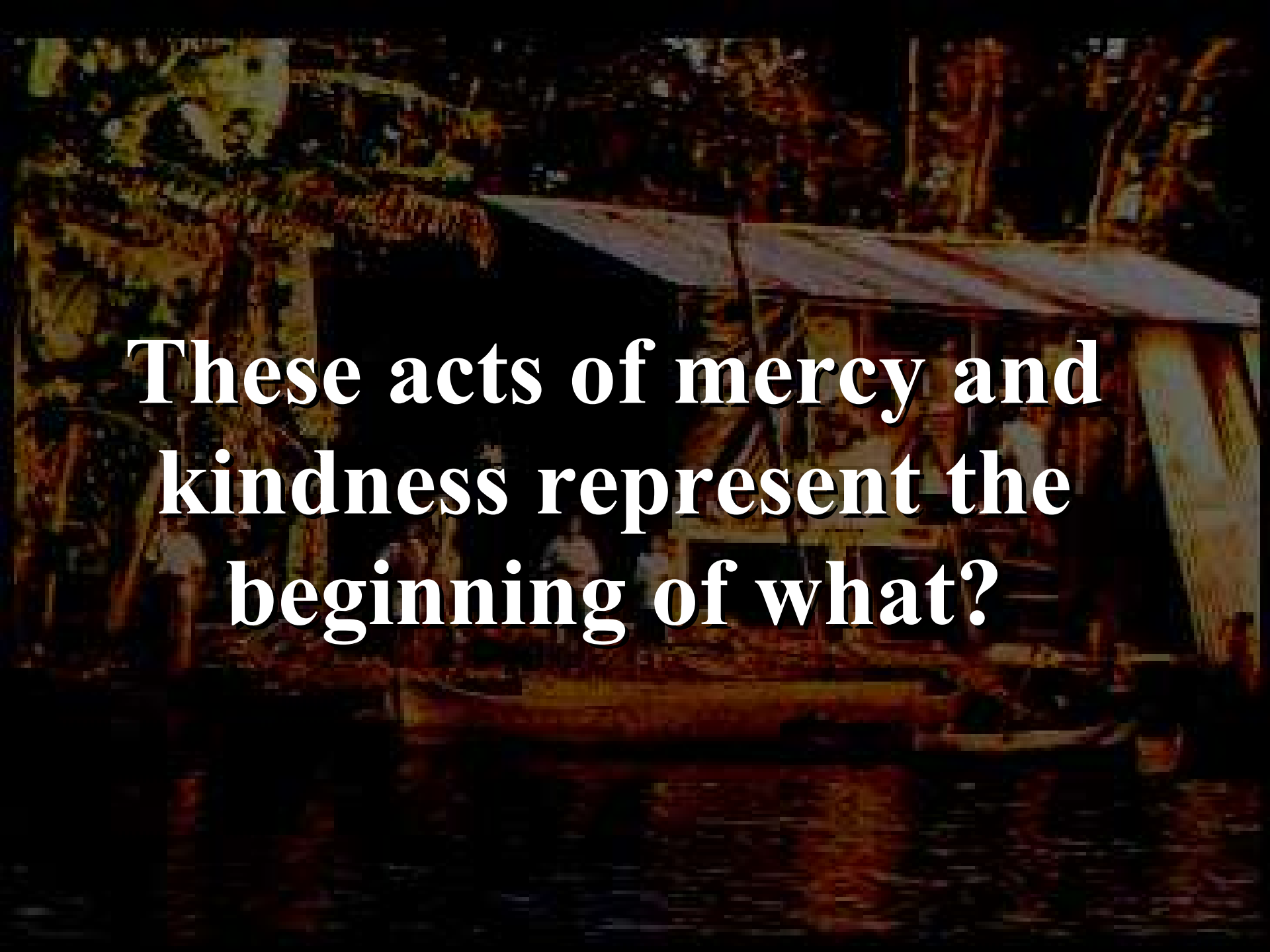

Yucatan
Cuba
Jamaica
Belize
Honduras
Caribbean
Sea
Nicaragua
Hurricane Mitch
GOES-8 2KM Resolution
Channel 1 Visible
October 26, 1998 1245 UTC
NOAA


Caribbean Sea
The Miskito Coast
Cabo Gracias a Dios
Paya
Miskito
Mam
Honduras
Rio Coco
Sumo
Rio Cucola
Tunla
Miskito
Sumo
Rio Tuma
Ulva
Nicaragua
Rio Escondido
Blue Fields
Ulva
Sumo
Rama
L. Managua
Managua
L. Nicaragua
Rio San Juan
Corobici
Costa Rica
San José
Pacific Ocean
Nicoya Peninsula
Athena Review Image Archive

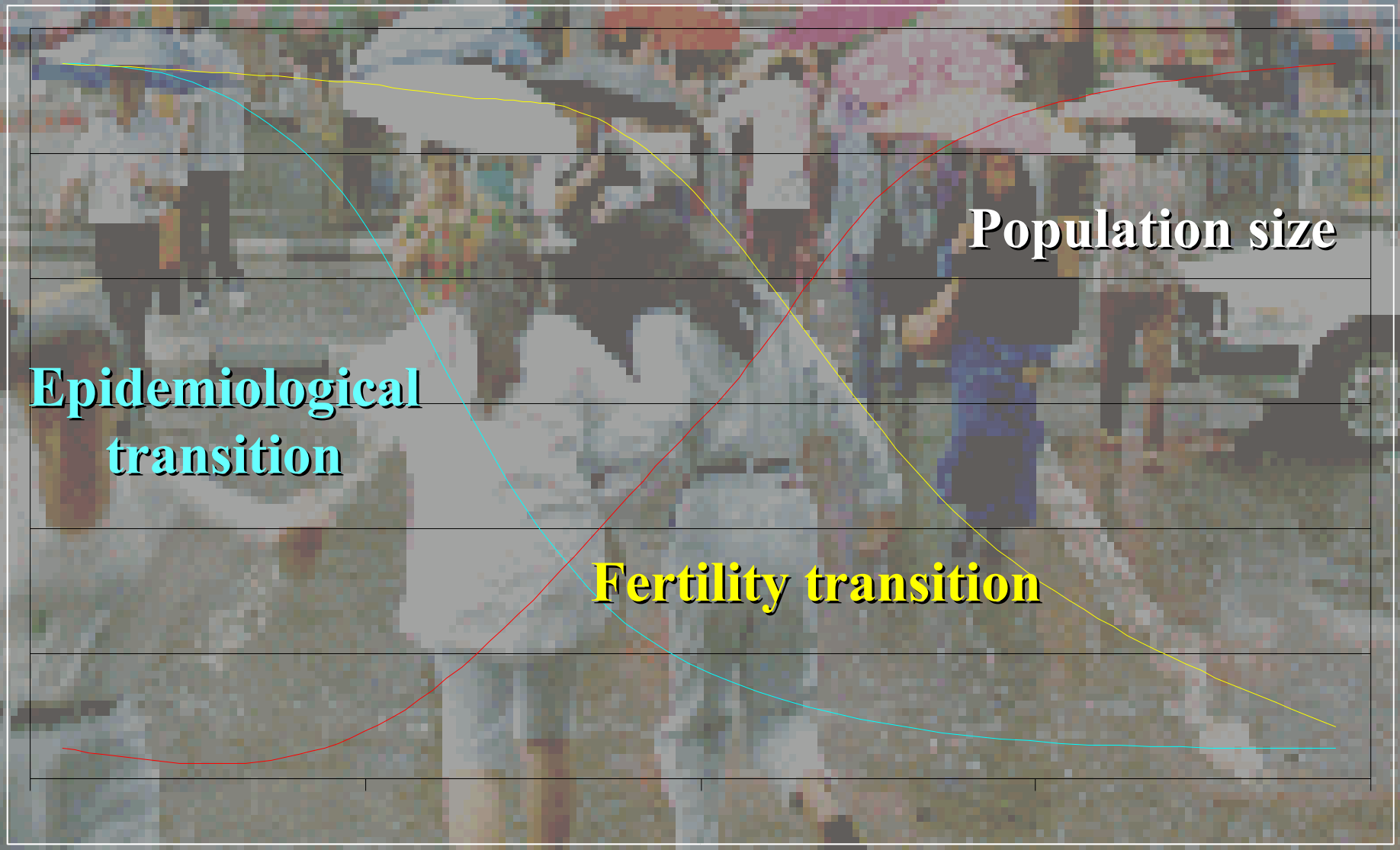
Uhsan, Honduras

A long and difficult labor in which the baby and mother might well have died without the intervention of the volunteer physician from Mexico

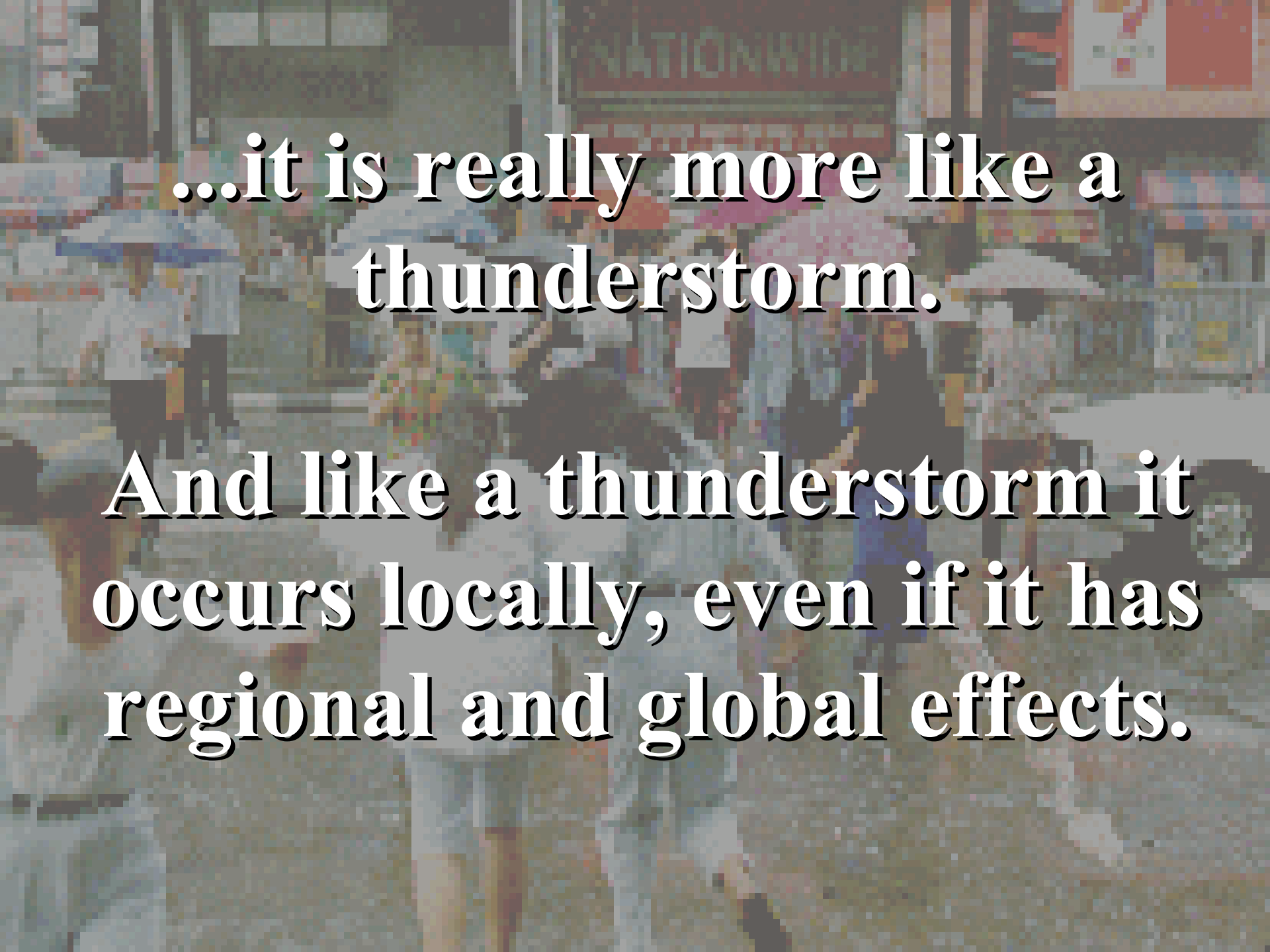
5-month old girl who survived a strangulated umbilical hernia because volunteer workers took her by canoe to a health clinic in a town on the coast


These acts of mercy and kindness represent the beginning of what?

The Demographic Transition

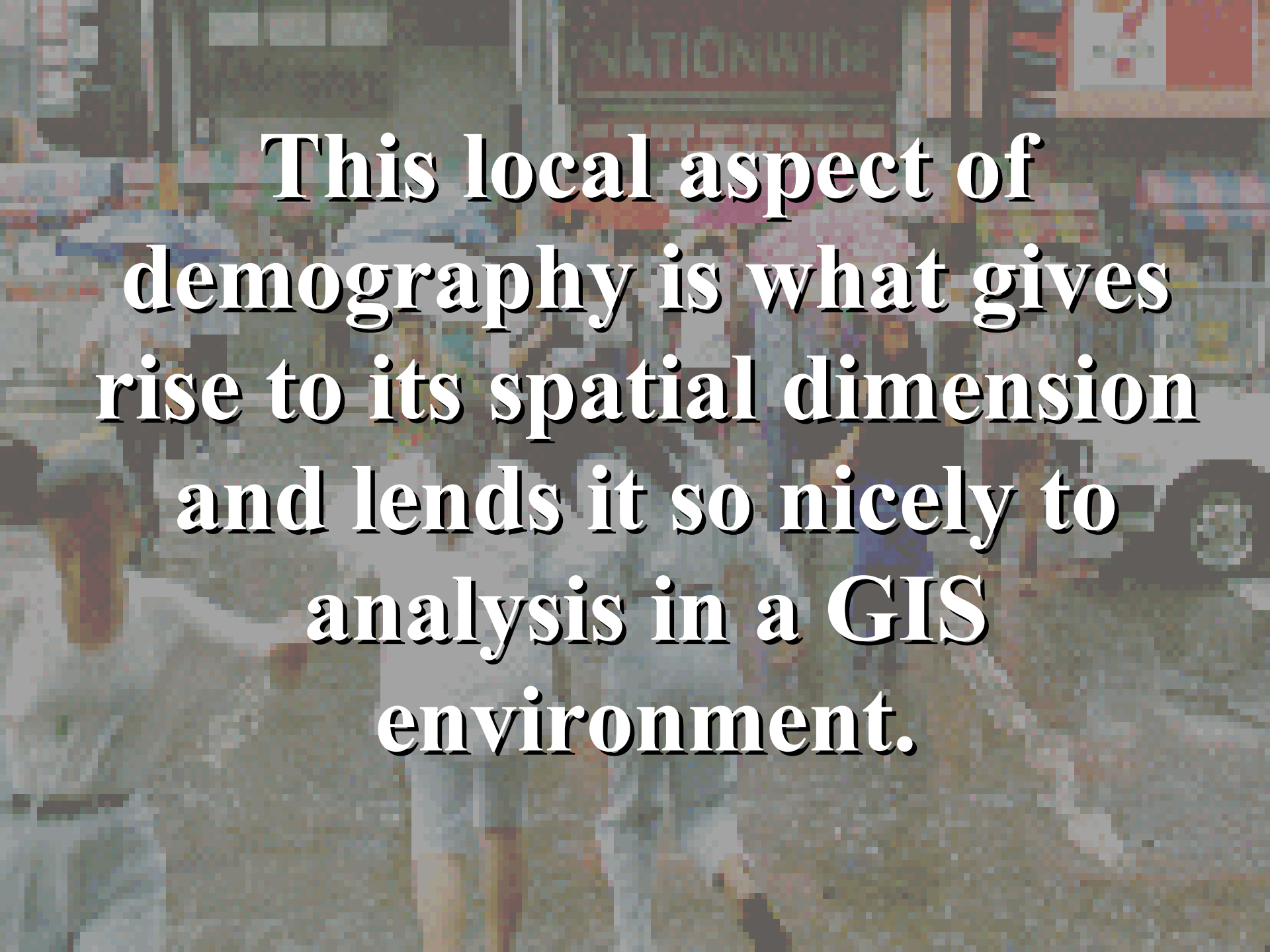



First, we need to keep in mind that population growth is *not* really like an explosion...



...it is really more like a thunderstorm.

And like a thunderstorm it occurs locally, even if it has regional and global effects.



This local aspect of demography is what gives rise to its spatial dimension and lends it so nicely to analysis in a GIS environment.

- Demography is inherently spatial, despite the emphasis on individual-level survey data over the past several decades (but note that DHS has georeferenced its survey data since 1999).

- Demography is also inherently interdisciplinary.

- The power of GIS has produced a renaissance in models of human behavior that place people in the environmental context of space and time —a new version of human ecology.

Spatial dimensions of the components of the demographic transition

- Epidemiological transition
- Fertility transition
- Age transition
- Migration transition
- Urban transition
- Household/family transition

Spatial awareness—location matters in some general way.

Spatial analysis—measures the contribution of location to our understanding of human behavior; spatial dependence (especially clustering) as a predictive variable rather than a "problem."

General Model of the Interaction of Spatial Context and Demography

"Family" of Analysis	Demographic Applications
Neighborhood/local: "environmental context"	Differences and inequalities in fertility, mortality, age structure, family and household structure
Network/connection: diffusion and dispersal	Diffusion of ideas about family size and methods of fertility control; of methods for preventing and curing illness; of information about costs and benefits of migration
	Migration patterns between specific places

Data considerations for spatial analysis in demography

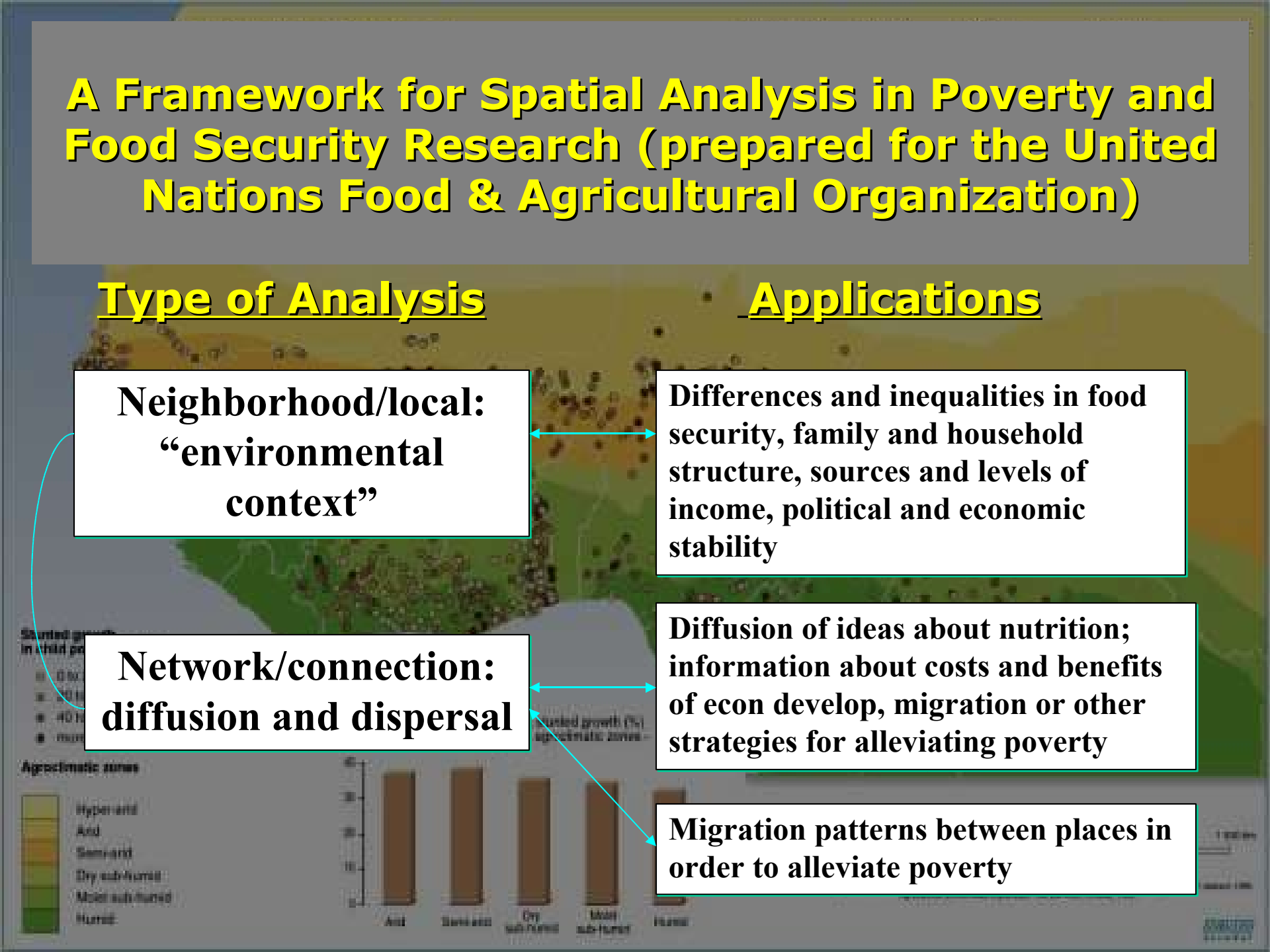
- Data must be geo-referenced
  - ✓Point data (x,y) permit PPA
  - ✓Polygon data permit APA
  - ✓Or assign centroids and do PPA
- MAUP--includes scale and zone effects

Scale effect: different results can be obtained from the same statistical analysis at different levels of spatial resolution.

Zoning effect: different boundaries can produce different results because of the capture of different people within different zones.

A Framework for Spatial Analysis in Poverty and Food Security Research (prepared for the United Nations Food & Agricultural Organization)

Type of Analysis	Applications
Neighborhood/local: "environmental context"	Differences and inequalities in food security, family and household structure, sources and levels of income, political and economic stability
Network/connection: diffusion and dispersal	Diffusion of ideas about nutrition; information about costs and benefits of econ develop, migration or other strategies for alleviating poverty
	Migration patterns between places in order to alleviate poverty



Resource:

John R. Weeks, "The Role of Spatial Analysis in Demographic Research," Ch. 19 in Michael F. Goodchild and Donald G. Janelle (eds.), *Spatially Integrated Social Science: Examples in Best Practice* (New York: Oxford University Press), *2004*.

Can be accessed at:
http://typhoon.sdsu.edu/Research/Projects/Aftweb/AFT-main.htm

Final question: What does this map represent?