



LECLERC1999A

# CIAT

Centro Internacional de Agricultura Tropical  
International Center for Tropical Agriculture

CIAT internal seminars series.

Cali, June 2, 1999.

Human welfare in Honduras and Natural resources

Management...the search for the missing link!

Gregoire Leclerc, Helle Ravnborg, Andy Nelson, Bruno Barbier, Patrice  
Couillaud, Tonny Oyana, Ron Knapp, Jacqui Ashby.

June 1999

# CGIAR

Consultative Group on International Agricultural Research

## Human welfare in Honduras and natural resources management

...the search for the missing link !



Grégoire Leclerc - Helle Ravnborg - A. Nelson - B. Barbier  
- Patrice Couillaud - Tonny Oyana - Ron Knapp - Jacqui Ashby -



June 2, 1999

Seminario CIAT, Cali

## Poverty: the need for indicators

- CIAT is doing research on poverty...
  - ...to find target population
  - ...as a mean to monitor change and impact
  - ...to find the drivers of poverty
  - ...as an element for community empowerment

June 2, 1999

Seminario CIAT, Cali

After all, our mission is to contribute to the alleviation of poverty!

June 2, 1999

Seminario CIAT, Cali

## The talk will consist...

- In describing poverty measures (national and local) and their geographical distribution
- To see how we can link the local and national indicators to produce better ones
- To see how we can combine indicators with natural resources and the importance of a geographical approach.

June 2, 1999

Seminario CIAT, Cali

## Examples of "universal" indicators

- World bank LSMS (poverty line -income based)
- UNDP Human Development Index (human capacity : literacy+life expectancy)

June 2, 1999

Seminario CIAT, Cali

## National indicators

- introduce local 'ingredients'
- are based on surveys and census data according to expert knowledge
- are used to take decisions and assign resources

June 2, 1999

Seminario CIAT, Cali

## Indices from population and housing census

- It is possible to find proxy variables in a census.
- Our method is to produce a weighted combination of normalized variables, using a threshold value for each variable.
- We work from raw census data (~4 Million records and >100 variables)
- there is no single recipe

June 2, 1999

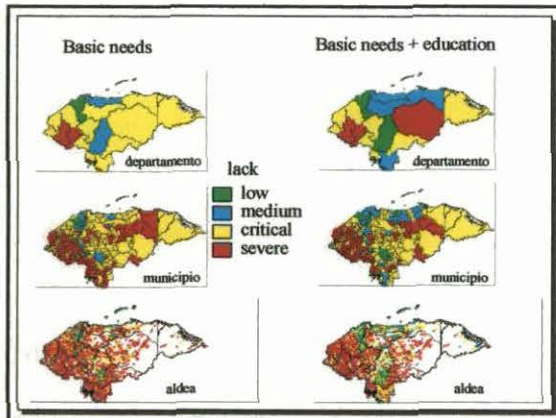
Seminario CIAT, Cali

## Two examples of composite indices

- Basic needs satisfaction index: This is a combination of household type, basic services (water, electricity, latrines), non-land assets (bicycle, sewing machine, refrigerator, etc...)
- We can also add an education index (adult literacy, school attendance, etc..)
- Indices are aggregated from raw census data by defining 5 poverty strata and 1 no/bad data.

June 2, 1999

Seminario CIAT, Cali



## Other approaches

- In contrast to the classic approach (computation of indices), researchers want to know what is the people's perception of poverty (example: Well-being ranking)
  - ...participatory approaches should allow us to discover factors that are unforeseen
  - ...ranking not extrapolable *a priori*

June 2, 1999

Seminario CIAT, Cali

## The problems with both approaches

- the global indices are often considered valid at local level
- the local perceptions are generally considered invalid outside of the community

June 2, 1999

Seminario CIAT, Cali

## The solution

- Extrapolate findings from participatory research to get the attention of decision makers
- Validate indices developed for global estimates based on the results of participatory research
- Put the information accessible to the community and decision makers

June 2, 1999

Seminario CIAT, Cali



## Solution: Extrapolate Well-Being ranking

- Sampling for careful selection of sites
- Participatory grouping into 3+ poverty levels
- Descriptors lead to indicators
- Neural Networks are used to find the sensitivity of the indicators
- Indicators made quantifiable in the form of a household questionnaire (->index?)

June 2, 1999

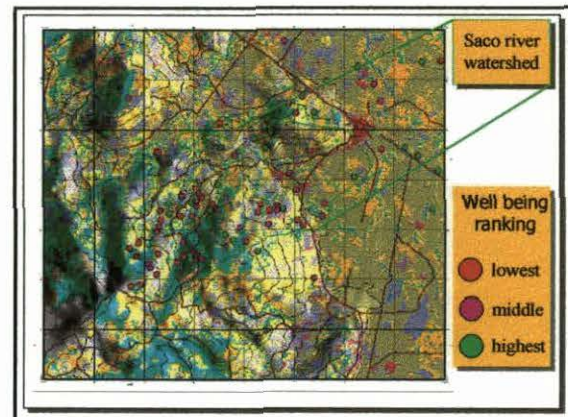
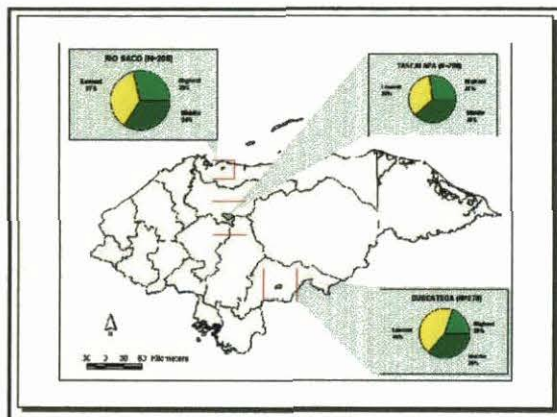
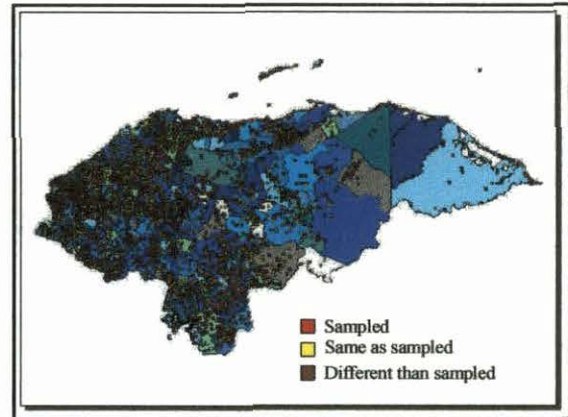
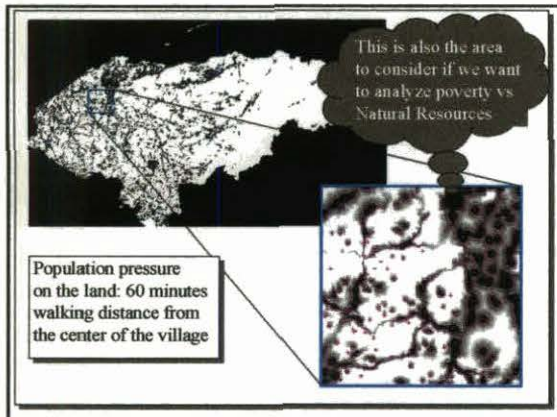
Seminario CIAT, Cali

## 11 WB indicators

- Land
- Day laboring
- Income
- Cattle
- Savings
- Health
- Agriculture
- Food
- Housing
- Animals
- Use of day laboring

June 2, 1999

Seminario CIAT, Cali



## Solution: Validate indices

- Proxy to WB indicators found in census (principal correspondence plots)
- Neural Networks can help build proxy composite indicators
- 5 (out of 11) questions related to WB indicators found in the 1988 Honduras housing and population census.

June 2, 1999

Seminario CIAT, Cali

## Solution: DSS

- The power of household level info... in your hands !
- cook your index: put on the www
- The community: 'how do we compare; have we improved?'
- Communicate to the people with the power
- empowerment and governance are the real solutions

June 2, 1999

Seminario CIAT, Cali

## Mapping...beautiful maps?

- Even if you can map poverty at village level, there are no mechanisms for action at this level
- do we trust our map (are we simplifying too much)?

June 2, 1999

Seminario CIAT, Cali

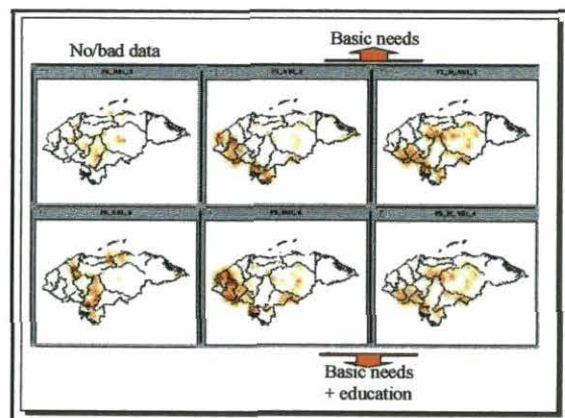
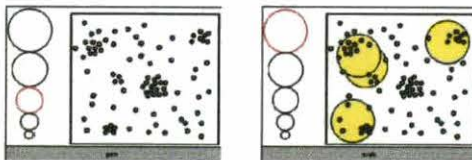
## Beyond mapping

- Methods to find structure hidden in the data
- Methods to process data at different scales
- Decision Support Systems

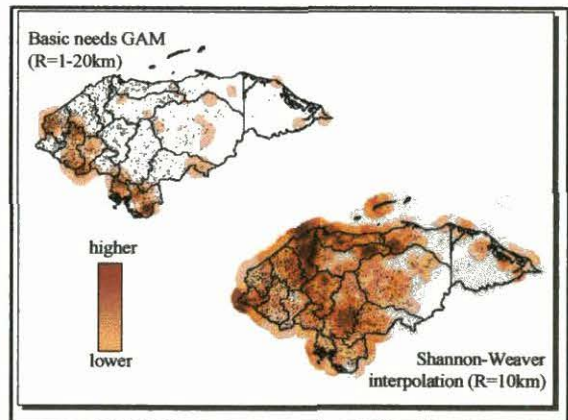
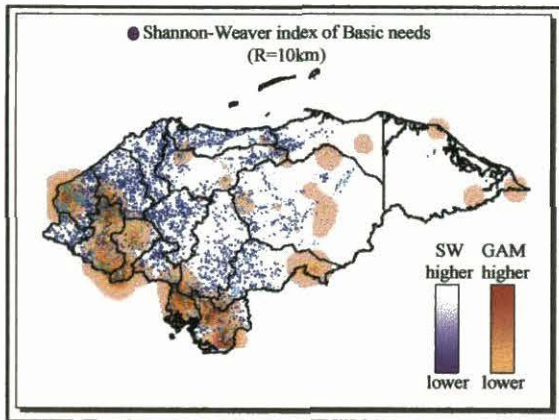
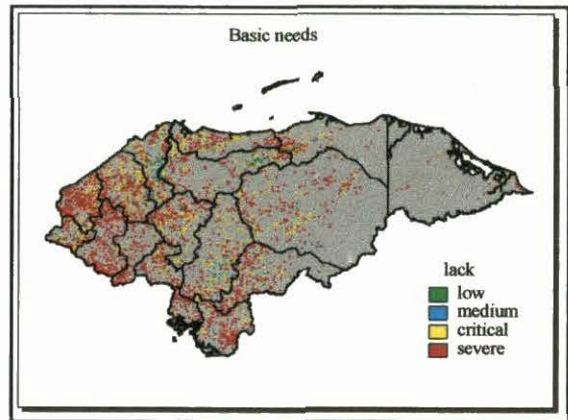
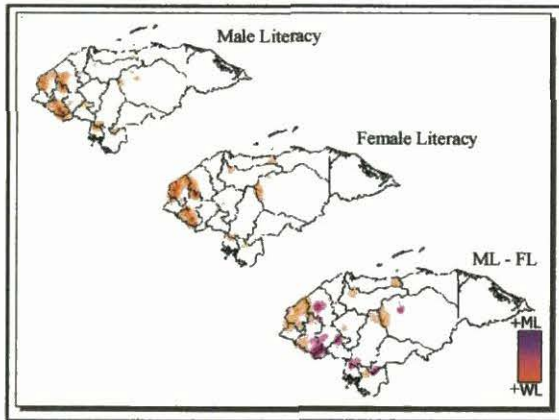
June 2, 1999

Seminario CIAT, Cali

The Geographic Analysis Machine (GAM)







## Poverty vs NR: causality?

- Poverty trap: elegant but...
- Risk of wrong findings if analysis not done well. Example: policy opens state land to refugees: we find that the poor are cutting the forest (or no forest induces poverty)
- data is scarce, not timely, etc..
- Scale is important

June 2, 1999

Seminario CIAT, Cali

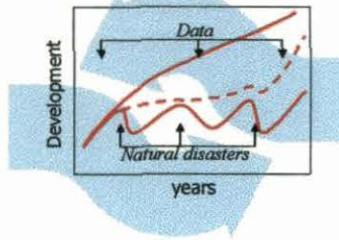
## Some hypotheses

- Agroecological potential and poverty
  - climate, climatic risk, soils, slope
- Influences
  - population density, ethnicity, migration, transportation network, land degradation (erosion)
  - Export crops

June 2, 1999

Seminario CIAT, Cali

## The unplanned



June 2, 1999

Seminario CIAT, Cali

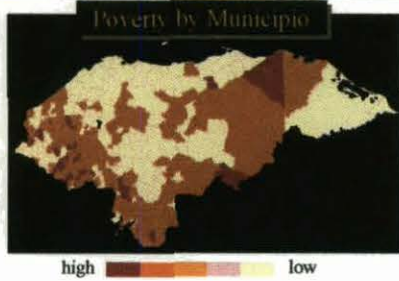
## Some problems

- Conceptual
- Scale
- Analysis at detailed level
- Data
- Methods
- Policies

June 2, 1999

Seminario CIAT, Cali

## An example of scale problem



June 2, 1999

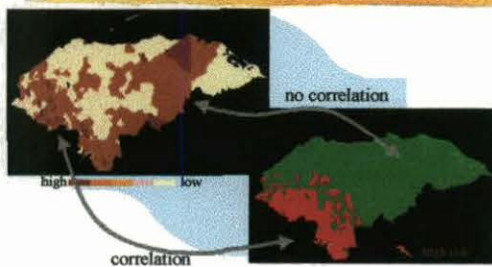
Seminario CIAT, Cali



June 2, 1999

Seminario CIAT, Cali

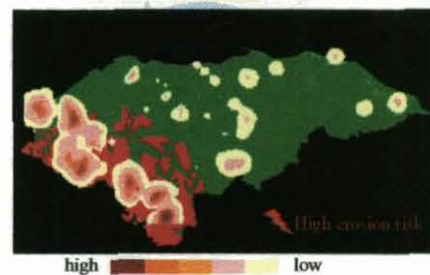
## What is the relationship?



June 2, 1999

Seminario CIAT, Cali

## Modeled across scale, the picture is different



June 2, 1999

Seminario CIAT, Cali

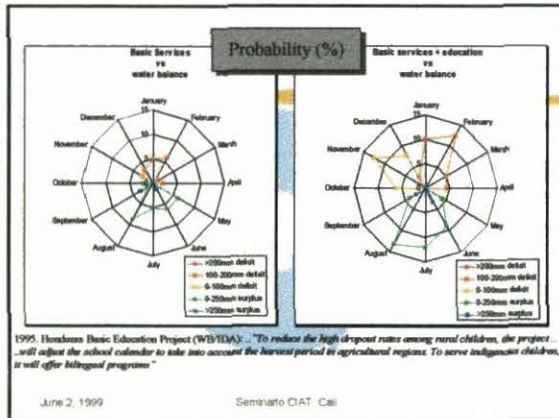
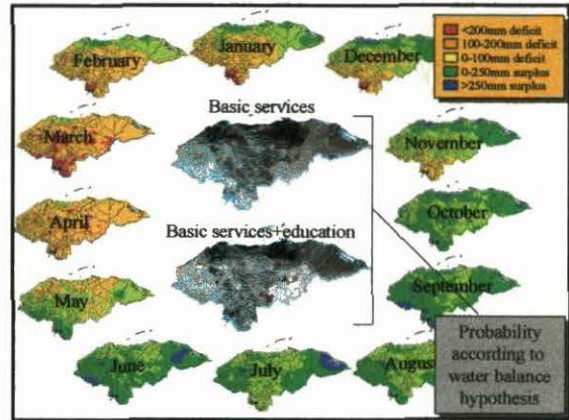


## Other example: poverty vs water availability

- We start with a hypothesis: poverty is related to water balance
- We compute the probability of being poor in each water balance zone
- This is another way to filter the data (remove the noise), according to a hypothesis

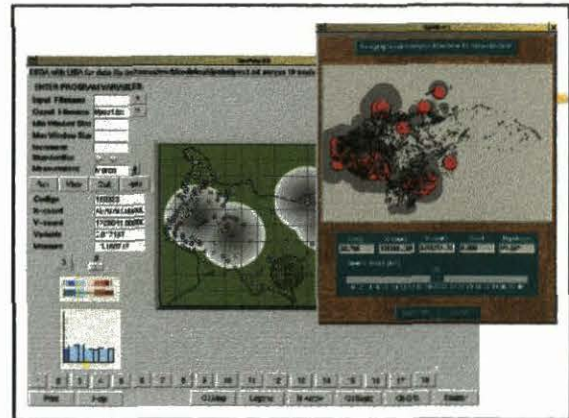
June 2, 1999

Seminario CIAT, Cali



June 2, 1999

Seminario CIAT, Cali



## But there are too many factors to consider!

- Data analysis is not sufficient:
  - We have to understand poverty in the country, do a retrospective analysis
  - We have to start with in-depth analysis at the local level to narrow-down the range of possible causes and effects of poverty
  - We may want to ask ourselves: what is our range of action, and concentrate on what we can do well

June 2, 1999

Seminario CIAT, Cali





## Some "real" relationships with respect to NRM

### Factors that depend on poverty levels

- Food security, health
- Land tenure
- Type of animals, crops
- Own natural forest
- Source of fuelwood
- Soil management, tillage method
- Transportation

### Factors that depend on where people live

- Food security, health
- land tenure
- Type of animals, crops
- Own natural forest
- Source of fuelwood
- Soil management, tillage vs slope, soil problems
- Transportation
- Maize and beans varieties

June 2, 1999

Seminario CIAT, Cali

## What has to be done

- need for analysis of policies, social and environmental conditions
- Add time dimension in most studies
- -> huge databases?
- Water balance -> crop risk (more meaningful variables)
- ...and methods (spatial and data mining, fuzzy sets, probabilistic methods)!

June 2, 1999

Seminario CIAT, Cali

## Where will we end-up?

- We will have user-friendly tools to help Decision makers take poverty into account (data mining, GIS, statistics)
- ..then we will be able to consider more factors to characterize poverty (policies, natural disasters, local knowledge)
- ..and will separate the myth from the reality with respect to cause/effects between poverty and NRM

June 2, 1999

Seminario CIAT, Cali