Food security in crisis: Resilience of farming systems in postconflict Burundi

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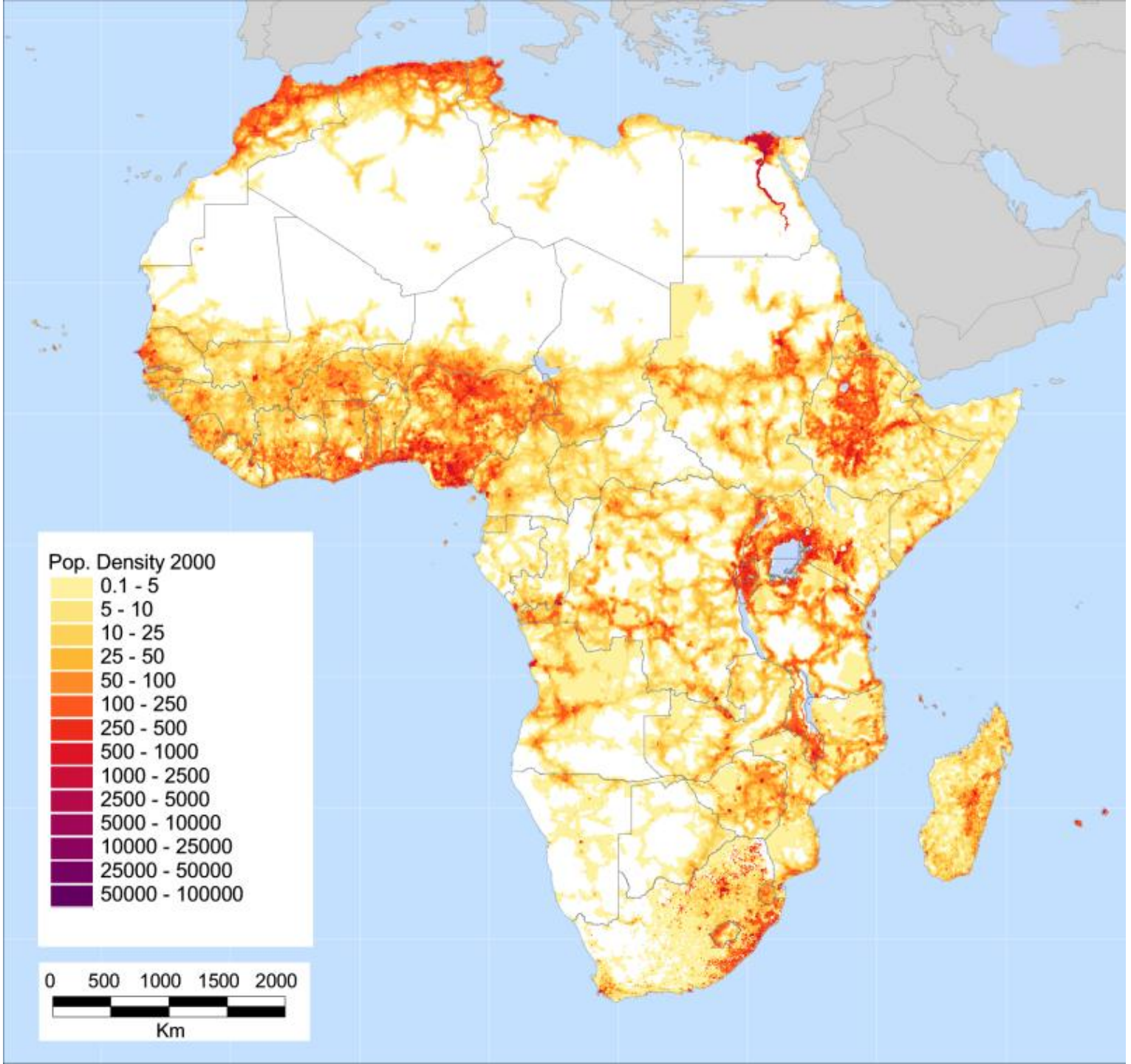
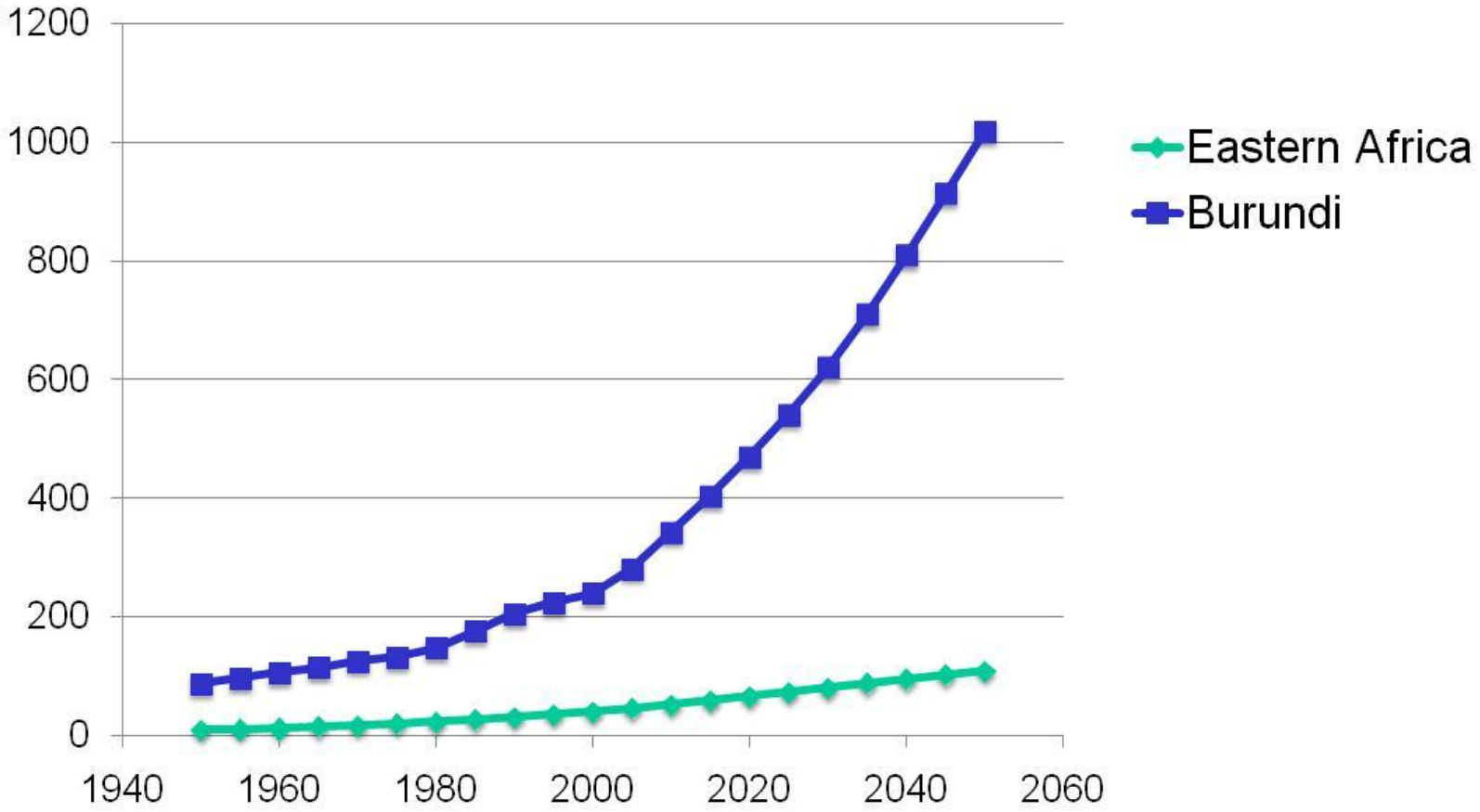
Introduction

- Burundi among the poorest countries in Africa
  - Population of 9 million
  - Poverty headcount: 68%
  - GNI per capita PPP: 300 US$
  - Life expectancy at birth: 50 years
  - Child mortality under 5: 63/1000 births
  - HDI ranking 166 out of 169
- 90% of people work in agriculture
- Civil conflict since 1993
- Highly vulnerable to changes in the farming environment


Pop. Density 2000
0.1 - 5
5 - 10
10 - 25
25 - 50
50 - 100
100 - 250
250 - 500
500 - 1000
1000 - 2500
2500 - 5000
5000 - 10000
10000 - 25000
25000 - 50000
50000 - 100000
0 500 1000 1500 2000
Km

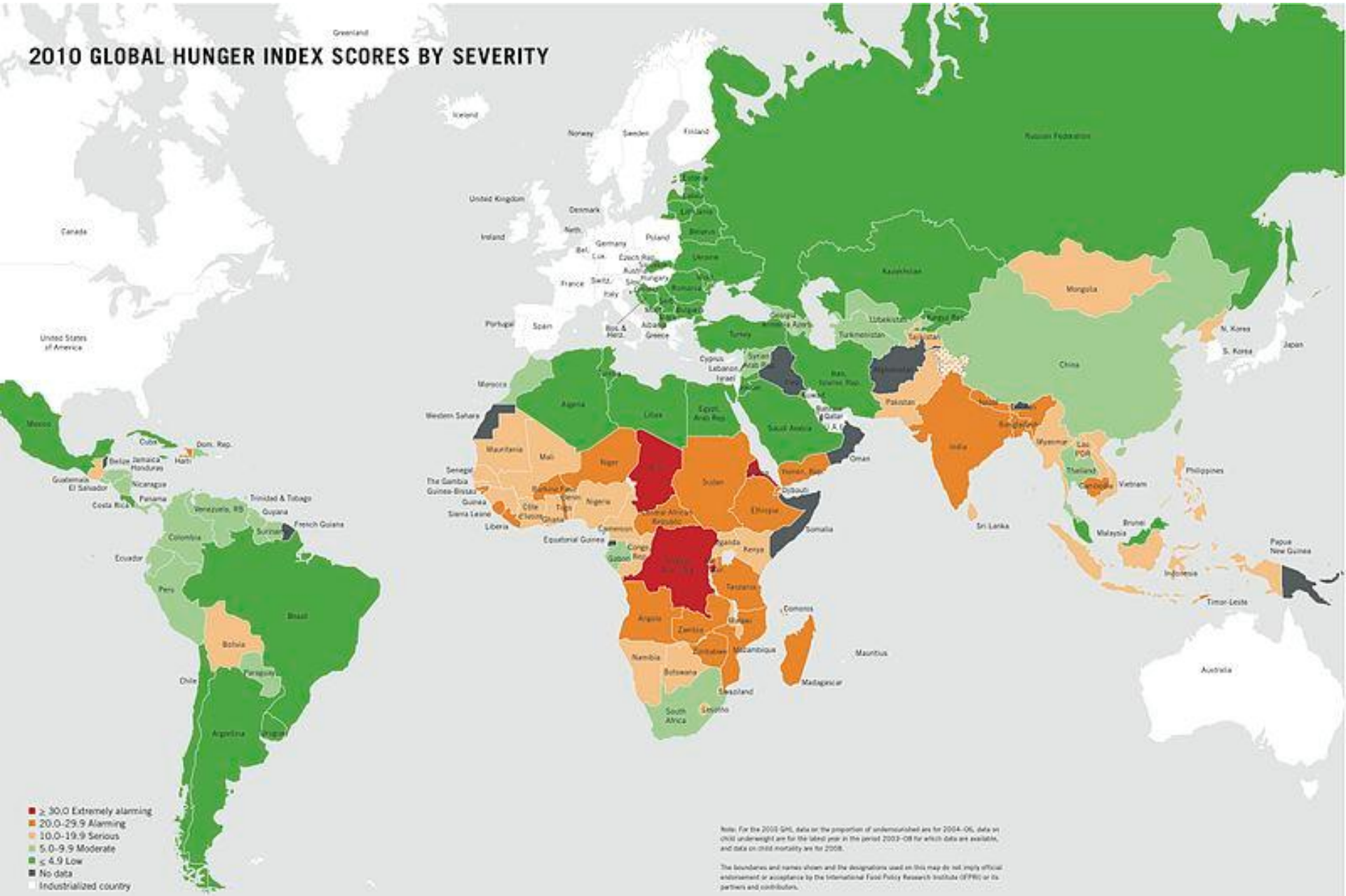
Expected increase in population density



Agriculture, food insecurity, vulnerability

- Small-scale, subsistence oriented family farms
- 85% of the cultivated area under food crops
- Farming strategy
  - On-farm diversification: mixed cropping
  - Self-reliance: no/limited access to food markets
  - Shortage of agricultural land: demographic pressure
  - Lack of income earning opportunities in agriculture and non-farm – limited push diversification
  - Poor and decreasing performance:
    - Per capita food production 2005 was 45% of the 1993 level

2010 GLOBAL HUNGER INDEX SCORES BY SEVERITY



Note: For the 2010 GHI, data on the proportion of undernourished are for 2004–06, data on child underweight are for the latest year in the period 2003–08 for which data are available, and data on child mortality are for 2008.

The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the International Food Policy Research Institute (IFPRI) or its partners and contributors.

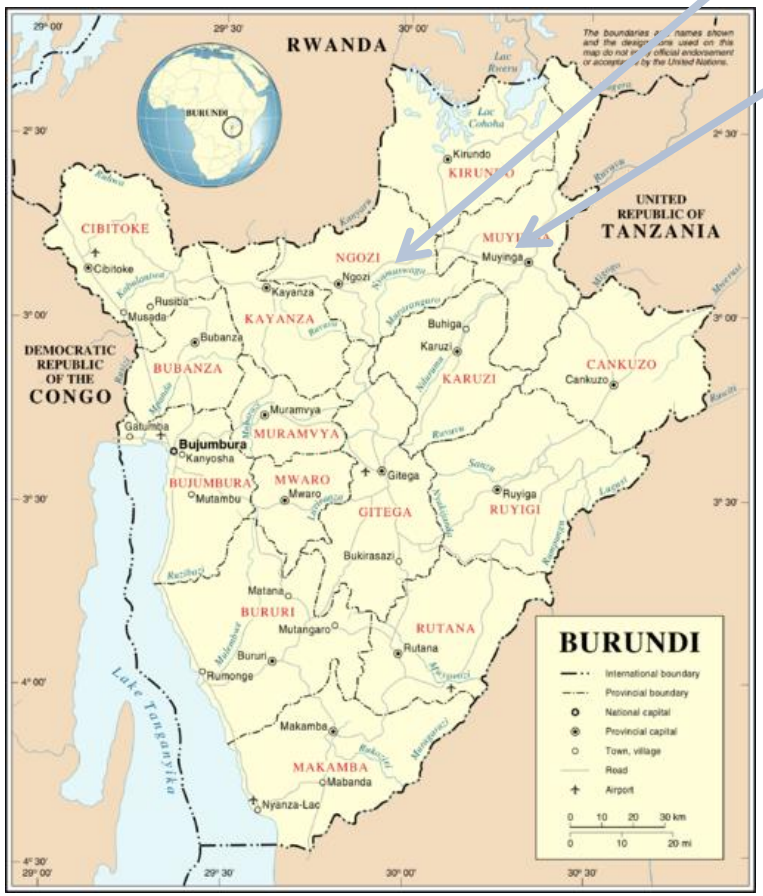
Vulnerability and resilience

- Threats in Burundi:
  - Cyclical ethnic violence
  - Malthusian checks??
  - Households in war-hit zones: including displacement
  - Underperforming agriculture: low incentives to invest
  - Climatic change??
- Conflicts:
  - Cause food insecurity, depress (food) production and income from cash crops and livestock
  - Poverty, hunger, food insecurity, unequal income/land distribution generate anger, hopelessness...fertile ground for grievance and conflict

Aim of the study

- Study the possible impact of civil war and demography on the agricultural production
  - Analyse dynamics in farming practices
  - Assess socio-economic and food security situation
  - Interrelationship between conflict and change in food security

Data



Ngozi

Muyinga

- Sample taken from:
  - all villages (communes)
  - 8 random hills (collines) per village
  - 4 households random chosen per hill
- Total 468 households in 1996 and 640 households in 2007
- 116 same collines in 1996 and 2007

Methodology

- 116 collines vistited in 1996 - 2007
- Output:
  - Difficult to assess agricultural production:
    - Multitude of fields and plots
    - Large diversity in crops
    - Mixed cropping patterns
    - Limited surplus sales – household consumption

  → Sum of food output expressed in Kcal

  → Banana production in kg ('semi-cash' crop)

  → Coffee production in kg (cash crop)

Model

- Poverty trap?
  - Erosion of assets due to conflict
  - Low returns to assets – absence of alternatives and entry barriers

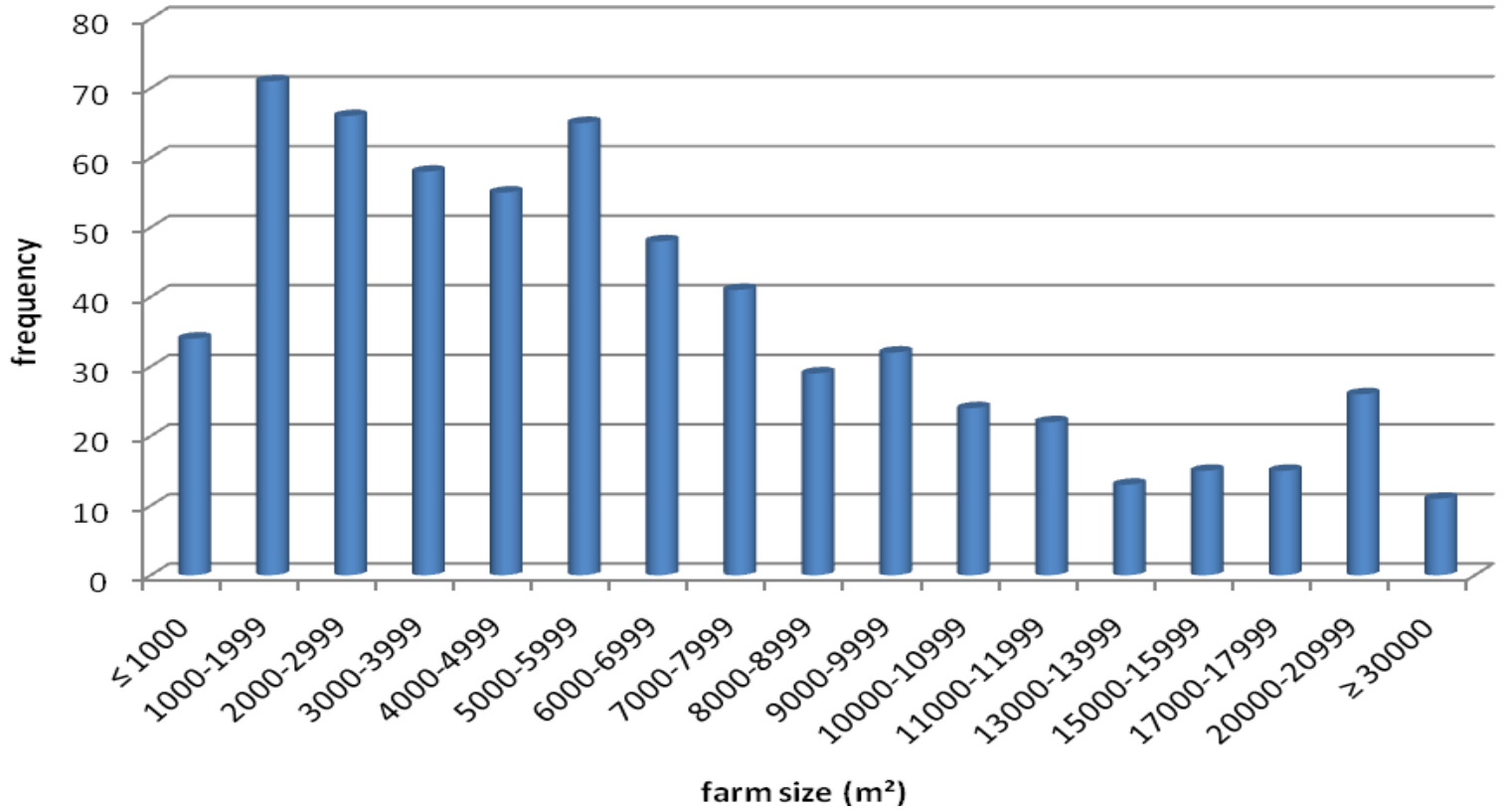
$$dY = dA' R + A' dr + A' d\varepsilon^R + d\varepsilon^T + d\varepsilon^M$$

- Comparative data analysis at colline level
- Frontiers estimated with Data Envelopment Analysis
  - Calculate the Malmquist index for TFP change
    - Changes in efficiency levels between the two time periods

Some descriptives 2007 data

	Mean (std. dev)	Ngozi (n=360)	Muyinga (n=280)	Test
Age head of household (years)	41 (12.7)	42	40	Ns
Household size (nb)	5.2 (2.4)	5.8	5.6	Ns
Farm size (m^2)	11,248 (16,462)	9,919	12,952	**
Farm size excl. > 3.7 ha (m^2)	8,346 (8,013)	7,639	9,269	***
Total number of plots on hill (nb)	8.4 (4.7)	8.2	8.8	*
% food production (%)	76	73	80	***
Households coffee in 2007 (%)	58	61	55	Ns
Households banana in 2007 (%)	95	95	97	Ns
Households with cattle (%)	12	18	4.5	Ns

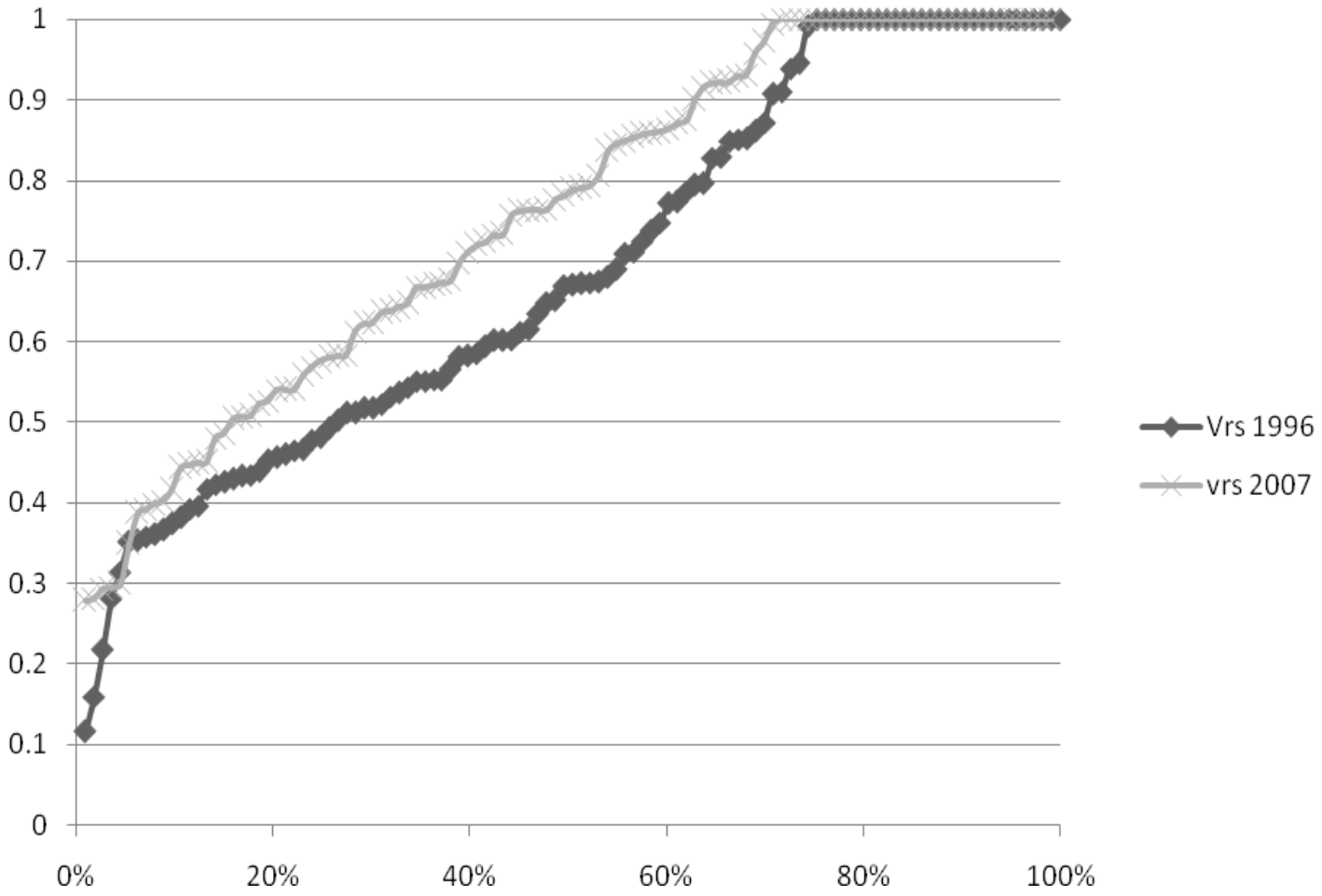
Small farm sizes & unequal distribution



Asset levels 1996-2007

	1996 data (n=116)	2007 data (n=160)
Household size (nb)	6.3	5.7
Involvement in paid jobs (0 to 1:yes)	0.12	0.37
Number of coffee trees (nb)	365	233
Production food crops per person (kcal/day/person)	4,342	1,494
Production bananas (kg/year)	6,042	3,882
Coffee production (kg/year)	598	441
Number of plots (nb)	13	10
Farm size (m^2)	11,235	11,054
Cattle (nb)	0.76	0.73
Total expenditure (US$ value 2007)	122	181

VRS efficiency levels 1996 and 2007



Decrease in TFP mainly due to worsening technical change

	Mean (std.dev.)
Malmquist index	0.65 (0.43)
Efficiency change	1.34 (1.04)
Technical change	0.52 (0.15)
Scale change	1.03 (0.27)
Efficiency score VRS 1996	0.69 (0.25)
Efficiency score VRS 2007	0.76 (0.22)

Determinants of MI quartiles

- Dependent variable: Quartile Malmquist index
- Model: ordered logit
- Results:
  - Probability of scoring in the highest MI Q:
    - Smaller households
    - Female head of household
    - Having a regular paid job
    - Lower on-farm diversity (herfindahl index)
    - Farm size – U shape
    - Lower efficiency scores in 1996 (improving most)
    - Location in Ngozi Province





Conclusion

- Continued impoverishment
- High levels food insecurity
- Lower capacity to produce and purchase
  - asset loss and lower returns
- Low resilience levels of farming systems to shocks
  - Conflict
  - Climate change?