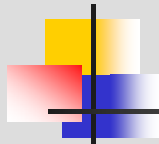
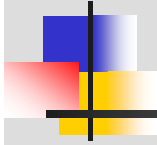


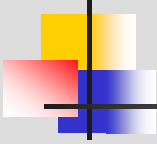
# Factors Associated with Farm Households' Movement Into and Out of Poverty in Kenya: Spatial Analysis, Land Constraints and Diversification

William J. Burke, T.S. Jayne, H. Ade Freeman, P. Kristjanson



## Quantitative Analysis of Poverty

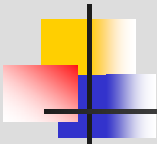
- **Cross Sectional**
  - Shows Contemporaneous Correlation
  - Changes Over Time?
  - Random Shocks?
  - Unobservable Effects?
  
- **Panel**
  - Control for (time invariant) Unobserved Effects
  - Examine Changes Over Time
  - Identify Random Shocks



## Research Objectives

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- **Understand the degree of poverty mobility – do households tend to be static over time or is there considerable mobility over time?**
- **Identify factors associated with consistent wealth and consistent poverty.**
- **Identify factors associated with rising out of (descending into) poverty**

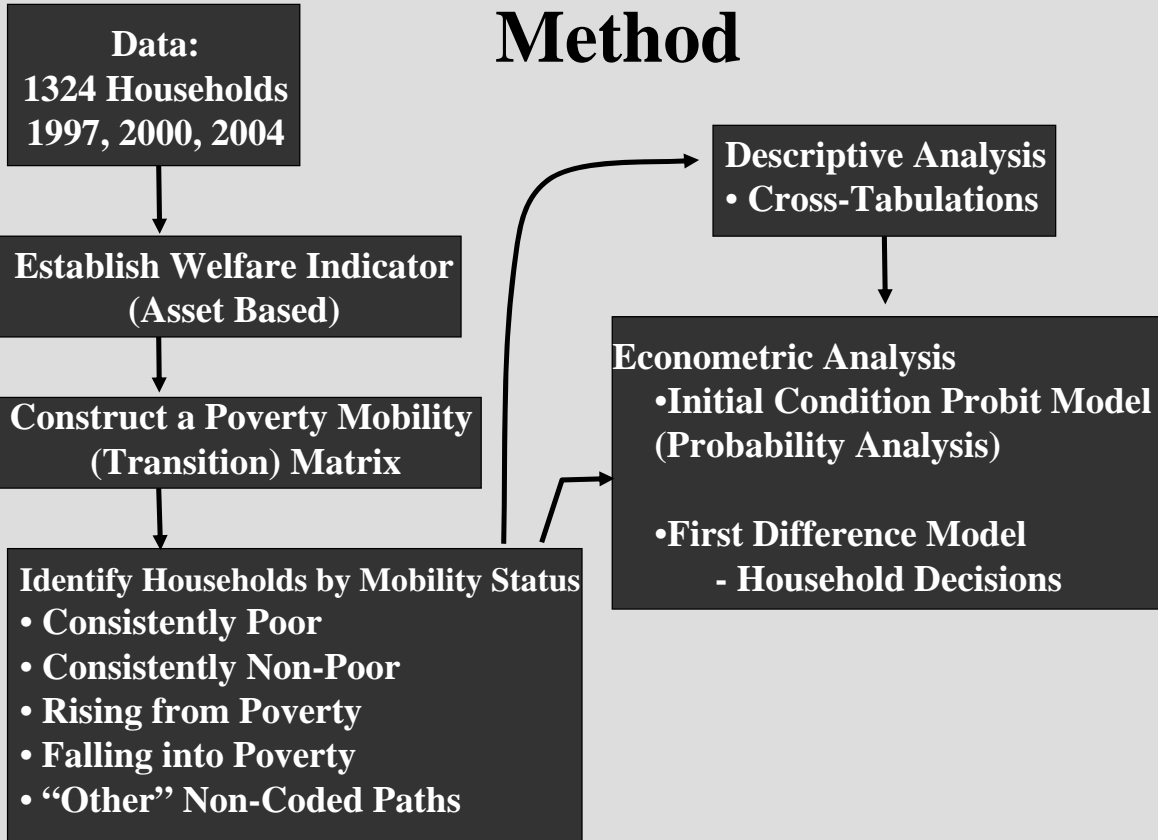


## Presentation

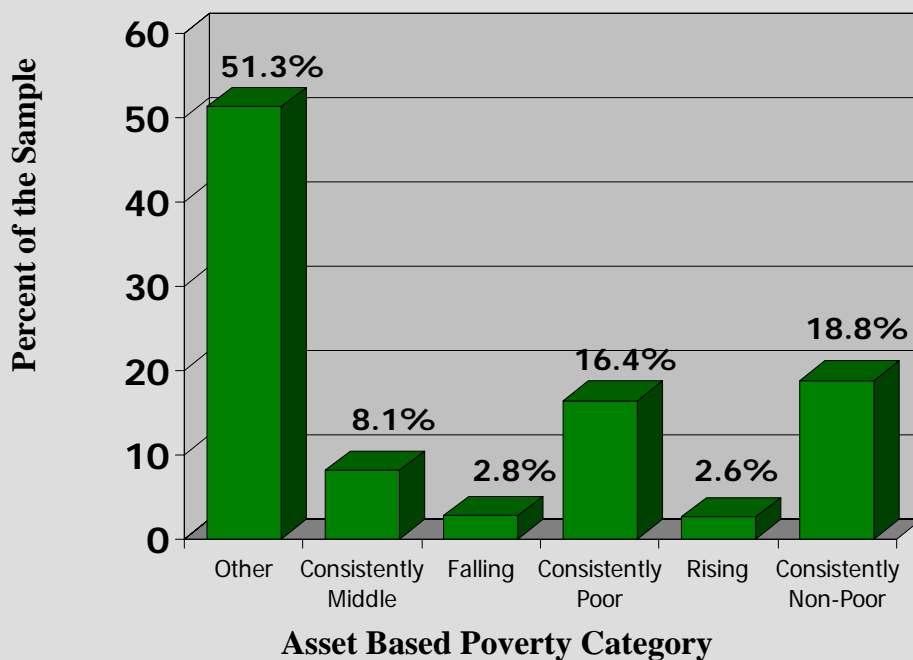
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- **Data and Method**
- **Results**
- **Spatial Analysis**
- **Land Constraints**
- **Income Diversification**
- **Conclusions**

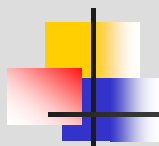
# Method



## Rural Kenyan Poverty Over Time



Source: Tegemeo Household Surveys 1997, 2000, 2004



# Poverty Dynamics Findings

- **57% Remain in Same Tercile 1997 – 2004**
- **High Level of Inequality**
  - **2004 Value of Assets for Consistently Poor Households Averages 13% of the 1997 Sample Median Value**
  - **808% for the Consistently Wealthy**

## Spatial Analysis

### Share of Poverty Groups by Distance to Road Quartiles

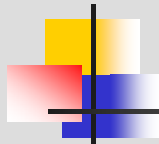
Motorable Road Distance Quartile	Asset Poverty Category				
	Consistently Low Tercile	Consistently High Tercile	Rising from Poverty	Declining into Poverty	Other
Nearest (<.1 km)	13.4	32.9	11.8	8.1	19.6
Mid-Near (.1 to .25 km)	20.3	28.9	32.4	32.4	30.2
Mid-Far (.25 to 1.5 km)	35.9	26.5	32.4	40.5	27.7
Farthest (>1.5 km)	30.4	11.6	23.5	18.9	22.5

# Spatial Analysis

## Share of Poverty Groups by Ecological Potential

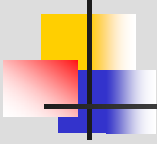
Agricultural Zones by Potential	Asset Poverty Category				
	Consistently Low Tercile	Consistently High Tercile	Rising from Poverty	Declining into Poverty	Other
	-----percent of poverty group-----				
Highest <sup>a</sup>	14.7	53.4	17.6	21.6	23.3
Mid-High <sup>b</sup>	6.0	26.1	8.8	8.1	20.6
Mid-Low <sup>c</sup>	32.7	10.8	32.4	18.9	26.6
Lowest <sup>d</sup>	46.5	9.6	41.2	51.4	29.6

(a) High Potential Maize. (b) Central Highlands. (c) Western Highlands, Western Transitional, and Marginal Rain Shadow.  
 (d) Western Lowlands, Eastern Lowlands, Coastal Lowlands



# Spatial Analysis

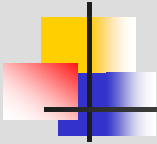
- **Compounded Spatial Wealth Barriers**
  - **Lowest Agro-Ecological Potential Zones**
  - **Farthest from Motorable Roads**
  - **Highest Fares to Market**
  
- **Identifies 77 Households (6% of Sample)**
  - **26% (20 hh) Consistently Poor**
  - **1% (1 hh) Consistently Non-poor**
  - **7% (5 hh) Rising from Poverty**
  - **66% (51 hh) Non-Coded Poverty Paths**



## Analysis of Variance

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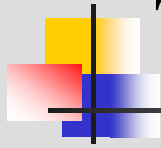
- **Zones – 4.6%**
- **Districts – 8.2%**
- **Village – 17.8%**



## Analysis of Variance

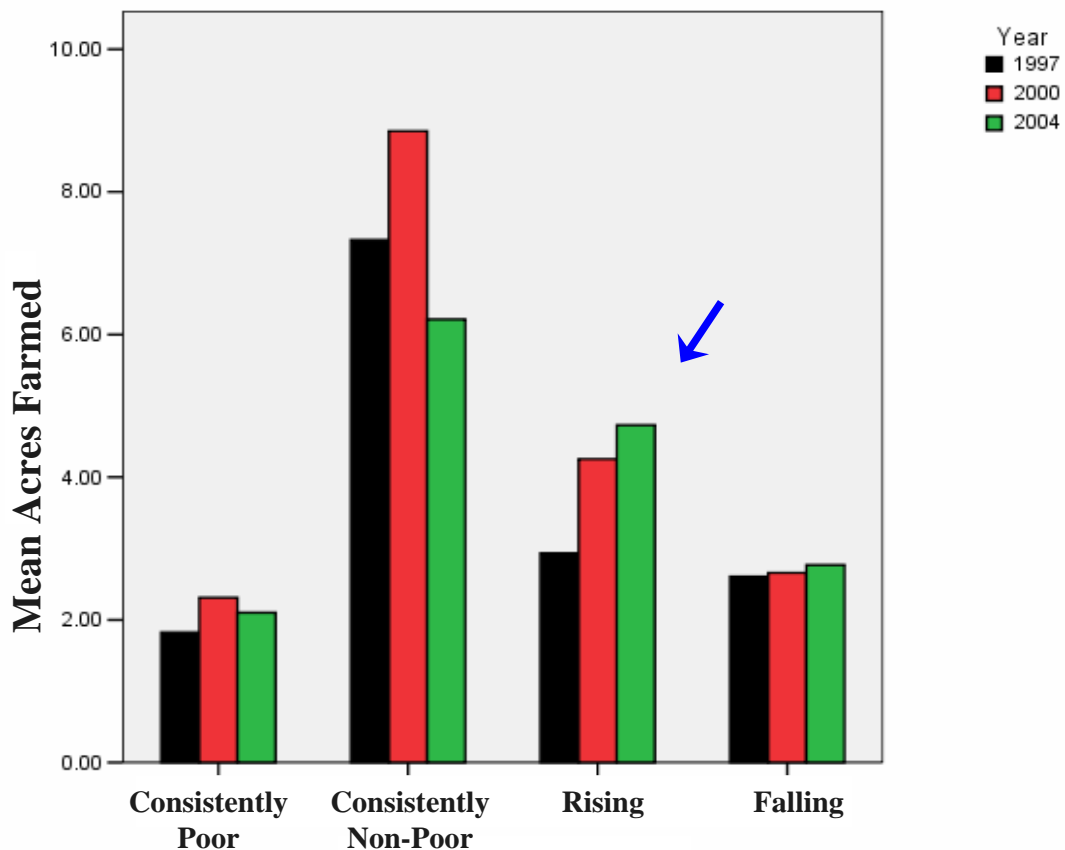
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- **Household Characteristics – 18.2%**
  - **Controlling for:**
    - **Formal Employment**
    - **Age**
    - **Education**
    - **Land Tenure.**
    - **Household Size**
    - **Distance to Road**
    - **Access to Land**



# The Role of Land Constraints

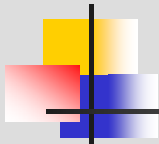
- **The Consistently *Poor***
  - 55% on Small (Less than 1.6 Acres) Farms
  - 84% Controlling Less than 3.25 Acres
  
- **The Consistently *Non-Poor***
  - 57% Controlling More than 3.25 Acres



## Cultivated Land Per Agricultural Person (ha)

	1960-69	1970-79	1980-89	1990-99
Ethiopia	0.508	0.450	0.363	0.252
Kenya	0.459	0.350	0.280	0.229
Mozambique	0.389	0.367	0.298	0.249
Rwanda	0.215	0.211	0.197	0.161
Zambia	1.367	1.073	0.896	0.779
Zimbabwe	0.726	0.664	0.583	0.525

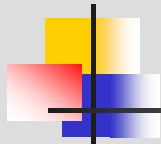
Source: FAOStat website: Source: FAO Stat database: [www.faostat.fao.org/](http://www.faostat.fao.org/)



## Determinants of Land Access

- Jayne *et. al.* (2003) Demonstrate that Much (Most) of the Variation in Land Access Determined *Within Villages*
  - Study of 5 Countries (Including Kenya)
  - Some Key Determinants
    - Household Size (Large = More Total, Less Per Capita Land)
    - Gender of Household Head
    - Education of Head



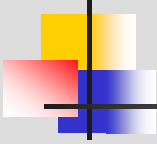


# Income Diversification

- **Increased Crop Diversification across All Groups**
- **Low-Barrier, Low Return Off-Farm Diversification among the Poor and Declining Households**
- **Livestock Diversification (Animals and Products) by the Non-Poor and Rising Households**

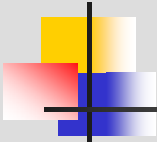
## The Dairy Market





# The Dairy Market

- **The Consistently Non-Poor**
  - **More Likely to Be Producing**
  - **More Commercialized**
  - **Bigger Share of Total Income**
- **Rising Wealth Over Time**
  - **Highly Correlated with Entering the Market**

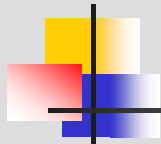


## Initial Condition based Probability Simulation Of Being Consistently Poor or Non-Poor

State of Nature	Area Farmed (Acres)	Primarily Owns Land	Produce Milk	Sell Bulls or Cows	Probability of Being Non-Poor	Probability of Being Poor
Benchmark	3.6	No	No	No	.02	.30
Sell Bulls and Produce Milk	3.6	No	Yes	Yes	.23	.05
Land Rich, Sell Bulls, Produce Milk	8.98	Yes	Yes	Yes	.51	.00

Source: Tegemeo survey data 1997, 2000, 2004

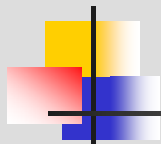
Based on Probit estimates controlling for agro-ecological zones, area cultivated in 1997, household head age and years of education in 2000, the number of full time adult equivalents, distance to a tarmac road, that distance squared, as well as dummy variables for whether major land tenure is ownership with deed, male head of household, whether household suffered a prime-age death, and dummies for participation in the following markets in 1997: bulls and cows, chickens, goats, other livestock, milk, and eggs. All controls not shown in this table are held at their data means, unless otherwise specified



## Success Stories

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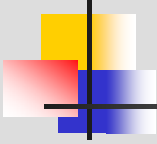
- **Small Farms with Primarily Off-Farm Income**
  - Crop and Livestock on Farm
  - High Entry Barrier Off-Farm Activities
  
- **Medium Sized Farms**
  - Cash Crops
  - Livestock Provide Largest Share of Income
    - Selling Bulls and Cows
    - Dairy
  
- **Large Farms**
  - Focus on Staple Crops



## Conclusions

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- I. **Geographic Conditions and Spatial Poverty Traps Are Evident, but Are Not Fully Explaining Variations in Wealth.**
  
- II. **Interventions Need to Acknowledge Asset Inequality and Understand Asset Position of Target Households**

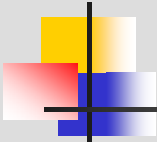


## Conclusions (continued)

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### **III. Household livelihoods are multi-dimensional: designed to enable diversification**

- *But some livelihood strategies are more successful than others*
- **Spatial Concerns**
  - Transactions Costs (infrastructure)
  - Market Access (inputs and outputs)
- **Household Specific Issues**
  - Education
  - Family Sizes
  - Credit Access (not explicitly studied here)
  - Technical Support
  - *Landholding size (we have a problem in Kenya and many areas – farm sizes are shrinking over time, making many rural hhs increasingly unviable for the long run)*



## Thank You

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### Rural Kenyan Household Poverty Movements Over Time

Poverty Mobility Group	Household Rank in terms of welfare terciles (Bottom 3 <sup>rd</sup> )			Number of Households	Percent of Total Sample (%)
	Middle 3 <sup>rd</sup>	Top 3 <sup>rd</sup>			
	1997	2000	2004		
Rising from Poverty	Bottom	Bottom	Top	9	0.7
	Bottom	Middle	Top	17	1.3
	Bottom	Top	Top	8	0.6
				34	2.6
Declining into Poverty	Top	Top	Bottom	10	0.8
	Top	Middle	Bottom	16	1.2
	Top	Bottom	Bottom	11	0.8
				37	2.8
Consistently Non-Poor	Top	Top	Top	249	18.8
Consistently Poor	Bottom	Bottom	Bottom	217	16.4
Consistently in the Middle	Middle	Middle	Middle	107	8.1
				573	43.3
Otherwise in the same wealth tercile in 1997 and 2004	Bottom	Middle	Bottom	49	3.7
	Bottom	Top	Bottom	5	0.4
	Middle	Bottom	Middle	50	3.8
	Middle	Top	Middle	38	2.9
	Top	Bottom	Top	10	0.8
	Top	Middle	Top	34	2.6
				186	14.0
Smaller increases in relative welfare over time	Bottom	Bottom	Middle	59	4.5
	Bottom	Middle	Middle	67	5.1
	Bottom	Top	Middle	10	0.8
	Middle	Bottom	Top	10	0.8
	Middle	Middle	Top	50	3.8
	Middle	Top	Top	54	4.1
				250	18.9
Smaller decreases in relative welfare over time	Top	Top	Middle	55	4.2
	Top	Middle	Middle	43	3.2
	Top	Bottom	Middle	13	1.0
	Middle	Top	Bottom	12	0.9
	Middle	Middle	Bottom	59	4.5
	Middle	Bottom	Bottom	62	4.7
				244	18.4
<b>Total Sample</b>				<b>1324</b>	<b>100</b>

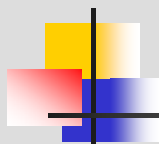
## List of Assets in Wealth Measure

- Ploughs
- Animal Traction
- Cart
- Trailer
- Tractor
- Cars
- Trucks
- Spray Pump
- Irrigation Equipment
- Water Tanks
- Stores
- Wheelbarrow
- Combine Harvester
- Donkey
- Bulls
- Chickens
- Goats
- Sheep
- Calves
- Cows
- Pigs
- Turkeys
- Ducks

# Spatial Analysis

## Share of Poverty Groups by Village to Market Fare Quartiles

Village to Market Fare Quartiles	Asset Poverty Category				
	Consistently Low Tercile	Consistently High Tercile	Rising from Poverty	Declining into Poverty	Other
Cheapest (<20 Ksh)	30.0	26.5	11.8	10.8	22.0
Mid-Cheap (20-30 Ksh)	22.6	28.9	14.7	37.8	28.8
Mid-Expensive (30-47 Ksh)	18.4	18.1	35.3	27	26.7
Most Expensive (>47 Ksh)	29.0	26.5	38.2	24.3	22.5



## First Differences Estimation

- **Note: Explicitly Controls for Spatial Effects on Wealth that Do Not Change Over Time**
- **Change in Total Value of Productive Assets for Entry Into Market for:**
  - Dairy -> +33,600 Ksh
  - Bulls/Cows -> +26,500 Ksh
  - Goats/Sheep -> +32,500 Ksh