CHARCOAL AND FUELWOOD PRODUCTION: IMPLICATIONS FOR POVERTY REDUCTION

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OUTLINE

- Introduction
- Charcoal and fuelwood
- Zambia
- Charcoal consumption and production
- Household survey data
- Results and discussion

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INTRODUCTION

- Vast reliance on fuelwood in developing world
- Per capita consumption highest in Africa
  - Women usually collect firewood for cooking, heating
  - Widespread in rural areas
  - Occasionally purchased (28% rural, 48% urban)
- Increasing demand for charcoal in urban areas
  - Access to forests
  - Alternative fuels are relatively expensive
  - Value may be greater for rural households

INTRODUCTION (*continued*)

- Income generation opportunities for rural households
  - Expansive market
  - Stable prices
  - Low startup costs
- Implications for poverty reduction
- Most research concerned with forest depletion, sustainable use of natural resources
- Role in household income?

OBJECTIVES

- Motivated by the contribution of charcoal and firewood to rural livelihoods in Zambia
- Determinants of market participation
- Household survey (2001) of 6,922 rural households
  - Nationally-representative sample
- Households revisited in 2004
  - Opportunities for panel data analysis
    - Market participation, entry, and exit
    - Attrition and new entrant bias
  - Third phase in May, 2008

CHARCOAL

- Per capita fuelwood consumption is declining
- Charcoal increasingly a prevalent source of energy
  - Cooking
  - Heating
- Sustainable production is important regionally
  - Energy dependence
    - Low price
    - Stable market
  - Contributes to household income
    - Urban entrepreneurs
    - Rural livelihoods

CHARCOAL (*continued*)

ZAMBIA

- Landlocked country in southern Africa
- Tropical climate
- Flat plateau (1000-1500 m)
- Nine provinces

ZAMBIA (*continued*)

- High poverty rate (74%)
- Poor households and non-timber forest products
- Reliance on fuelwood decreases with higher incomes
- Important consideration for poverty reduction

CHAPOSA, 1999

CHARCOAL (continued)

- Charcoal considered an essential commodity in urban households
- Basic Needs Basket
  - Monthly cost of essential food, non-food items
  - Family of six (two 90-kg bags per month)
  - Charcoal expenditures: ZMK45,000-124,920 (US$12-33)

Urban Area	Cost of Charcoal (Kwacha)	% of non-food items	% of total Basic Needs Basket
Kabwe	45,000	7.95%	4.32%
Kitwe	124,920	19.68%	10.64%
Livingstone	88,400	11.55%	6.93%
Luanshya	99,360	23.03%	10.31%
Lusaka	121,000	11.52%	7.76%
Ndola	90,000	13.63%	7.38%

Basic Needs Basket, March 2007

CHARCOAL CONSUMPTION

- Most households collect firewood
- Purchased charcoal is second most common

Sources of energy	% of respondents
Purchased firewood	3.3%
Collected firewood	58.2%
Purchased charcoal	19.8%
Produced charcoal	3.5%
Electricity	14.9%
Kerosene/parafin/gas	0.3%

Living Conditions Monitoring Survey, 1998

CHARCOAL PRODUCTION

- Bigger trees cut into smaller logs
- Burned in a kiln
- Primarily the work of men and older boys
- Meant for sale

CHAPOSA, 1999

CHARCOAL PRODUCTION (*continued*)

- Ease of entry and exit
- Stable market
- Important source of income in agricultural off-season

CHAPOSA, 1999

CHARCOAL PRODUCTION (*continued*)

- Net annual benefit from charcoal production: ZMK646,000 – 810,000 (US$171-214)
- Compares favorably with net benefit for maize farmers (mean - ZMK 675,000)
- Employment, social stability, income distribution

CHAPOSA, 1999

SURVEY DATA

- Household survey (2001) of 6,922 rural households

Province	Households surveyed (#)	With charcoal income (%) (n=162)	With >75% charcoal income (%) (n=96)
Central	714	16.1	19.8
Copperbelt	393	11.1	9.4
Eastern	1,331	4.9	7.3
Luapula	777	11.1	8.3
Lusaka	214	3.7	4.2
Northern	1,363	15.4	12.5
Northwestern	472	3.1	5.2
Southern	872	19.1	19.8
Western	786	15.4	13.5
TOTAL	6,922	100.0	100.0

SURVEY RESULTS

Attributes	All households	With charcoal income	With > 75% charcoal income
Number	6,922	162	96
Male head of household (%)	77.0	86.2	83.9
Household size (mean number)	5.75	5.92	6.03
Education of household head (mean, in years)	5.66	5.60	5.53
Landholding size (hectares)	3.1	3.3	3.2
Land cultivated (hectares)	1.5	1.4	1.3
Distance to nearest town (km)	34.9	26.4	26.5

SURVEY RESULTS (*continued*)

Attributes	All households	With charcoal income	With > 75% charcoal income
Household income (mean, 000 ZMK)	2,076	3,468	3,890
Income per adult (mean, 000 ZMK)	692	1042	1044
Crop income per hectare (mean, 000 ZMK)	938	896	821
Crop income share of income (%)	73.1	47.0	47.6
Off-farm income share of income (%)	25.8	52.9	51.6
Charcoal income (000 ZMK)	40	1,742	2,532
Charcoal income share of off-farm (%)	2.6	72.8	96.3

DISCUSSION

- Charcoal-producing households are more likely:
  - To be male-headed, less educated, larger
  - To be located near urban areas
  - To earn higher total household income (67% higher)
    - absolute and per-capita
  - To rely more on off-farm income sources (and less on crop income)
- Market opportunities are attractive for rural household income generation
- Implications for poverty reduction

CONCLUSIONS

- Income from charcoal activities decreases with higher incomes
  - Pathway out of poverty?
- Dual concern for depletion of forest resources and poverty reduction
  - Highlights the importance of a comprehensive natural resource policy
  - Breadth of perspectives

CONCLUSIONS (*continued*)

- Implications for future research
  - Integration of 2004 panel data
    - Entry and exit
    - Attrition
    - Changes in market effects
  - Third household survey in May 2008
    - Temporal analysis
    - Spatial analysis
- Collaborative outreach efforts
- Policy implications

Thank You!