

# **Targeting Challenges :**

## **Using Zambian Rural Household Data Sets to Inform The Process of Categorisation of Resource Poor Smallholder Farmers**

**By the Food Security Research Project  
Kafue Gorge ACF Sponsored Workshop, Aug 20-22, 2008**

*Research and Outreach Supported By:*



**MACO**

**MICHIGAN STATE  
UNIVERSITY**



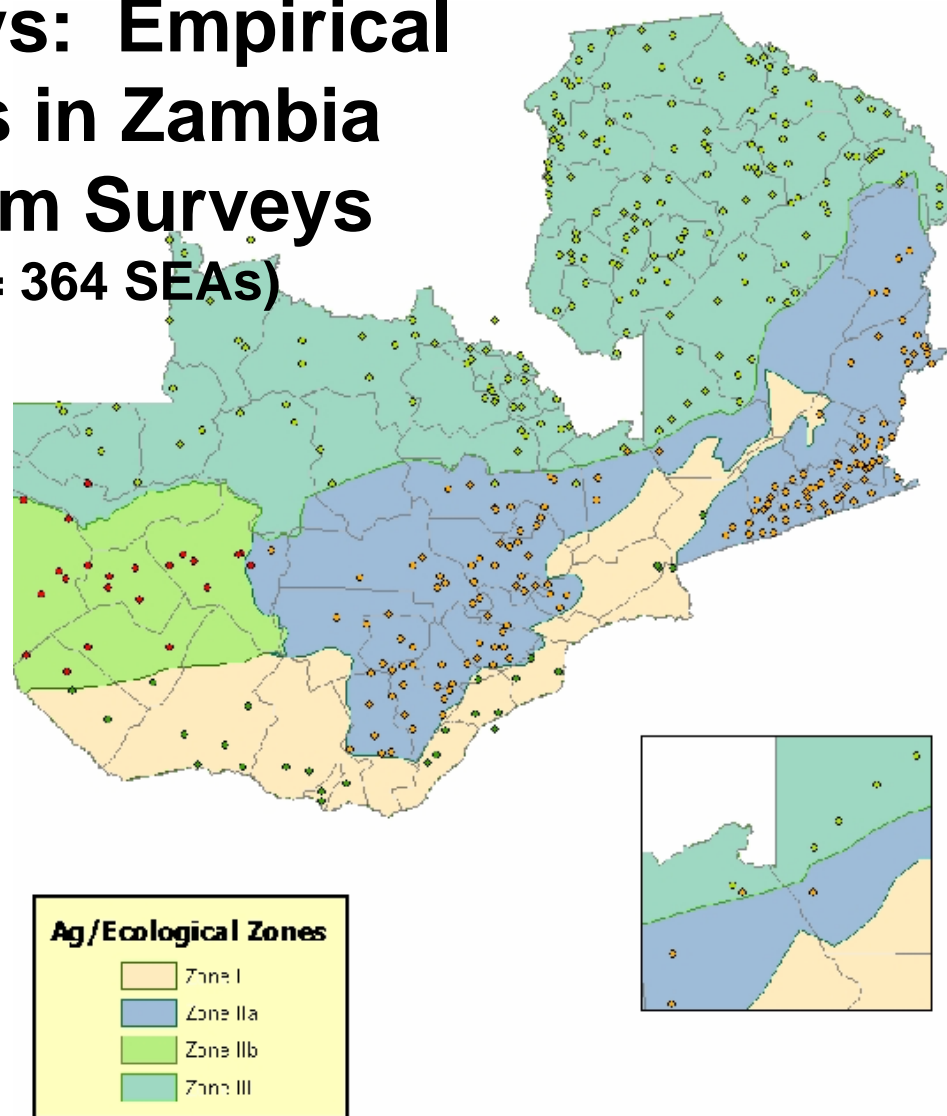
With Funding Support From USAID and Swedish SIDA

# FSRP Special Research/Outreach Targets for 2008

- With CSO/MACO. Improve CFS/PHS data utilization
- 3<sup>rd</sup> round PHS/Supplemental Rural Livelihood Survey (May-June 2008 field work)
- Utilize CFS and PHS/SS Data & Analysis to Inform Discussions of Options To Respond to the Food & Input Price Challenges in 2008, 2009 and Beyond.
  - Statistical Report: Patterns of Maize Farming Behavior and Performance Among Small- and Medium-Scale Holding in Zambia. 2000/2001 - 2007/2008 “Working Draft for Comments, June 20, 2008” Circulate and obtain feedback

# Supplemental Surveys: Empirical Data on Smallholders in Zambia

## – Nation Wide Random Surveys (PHS/SS 99/00, 02/03 & 07/08= 364 SEAs)



Map of Central Statistical Office Statistical Enumeration Areas (SEAs) Sampled in the CSO/MACO/FSRP Post Harvest and Supplemental Surveys in 2001 and 2004 (and to be completed in 2008) by Zambia's Agro-Ecological Zones

# 2008 Supplemental Survey With Smallholders





# Zambia's "Farming Ladder"

(from Gates Team Interview –GART  
Research Station meeting with Director



## Farming Ladder

- Commercial farmers
- Cell phone farmers
- Animal traction farmers
- Hand hoe farmers

## Number of Farmers

- 1500
- 50,000 - 75,000 ?
- 335,058
- 932,087

# Large Scale Commercial Farmers

- Lobby for interests of agriculture – helps small farmers
- Outgrower schemes – opportunities for smallholders



# Smallholder Heterogeneity - Significantly Different Information & Targeting Challenges

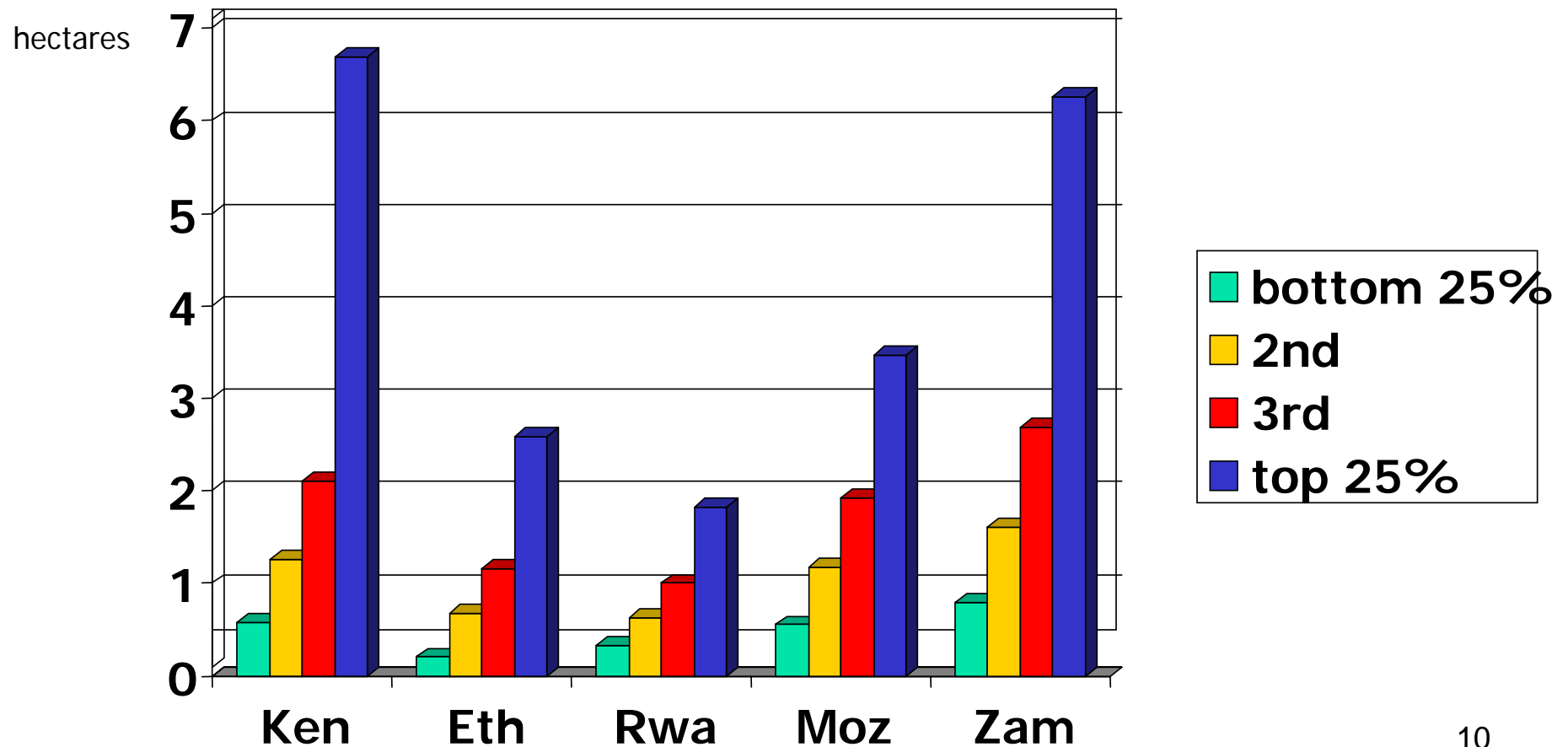
## Using PHS/SS Data – 4 Sets Tables to Review

1. CFS Report: Annex One, Table 3, (pp41). From SS Data: Production and Marketing Interactions: Zambian Smallholder Production and Marketing Behavior Patterns
  - Production and marketing patterns by crop
2. CFS Report: Annex One, Table 2, (pp40 plus two loose pages 40a & 40b)
  - Land access with and without virgin land access included
3. CFS Report: Annex One, Table 1, (pp39). Zambian Smallholder Household Income, Wealth and Demographic Attributes
  - Bivariate analysis suggest importance of education as well as land access
4. CFS Report: Annex One, Table 4, 4a & 4b, (pp42 plus two loose pages Table 4a and 4b – pages 43 and 44)
  - Importance of income, crop production, productive assets, land and other variables in the different maize seller types

# 1. Highlights : Key Patterns of Smallholder Maize Production and Marketing )<sup>00</sup> & <sup>04</sup> mkt years

- Some 80 % of smallholders produce maize
- Only 25-28 % of smallholders sell any maize
- Sales % of national production range 23/27 %
- Vast majority of maize produced is stored and eaten on the farm – traditional on-farm storage needs help
- Production and sales are highly correlated with area cropped to maize
- 35 % of smallholders are net buyers (grain & meal)
- 37 % not in the market as seller nor buyers

## 2. Land Size- Not All Smallholders in Zambia Are the Same: Farm Size (cultivated) Distribution



# 3. Illustrations: Relationships Between Landholding Size, Education & Welfare

(Annex One, Table 1 bivariate)

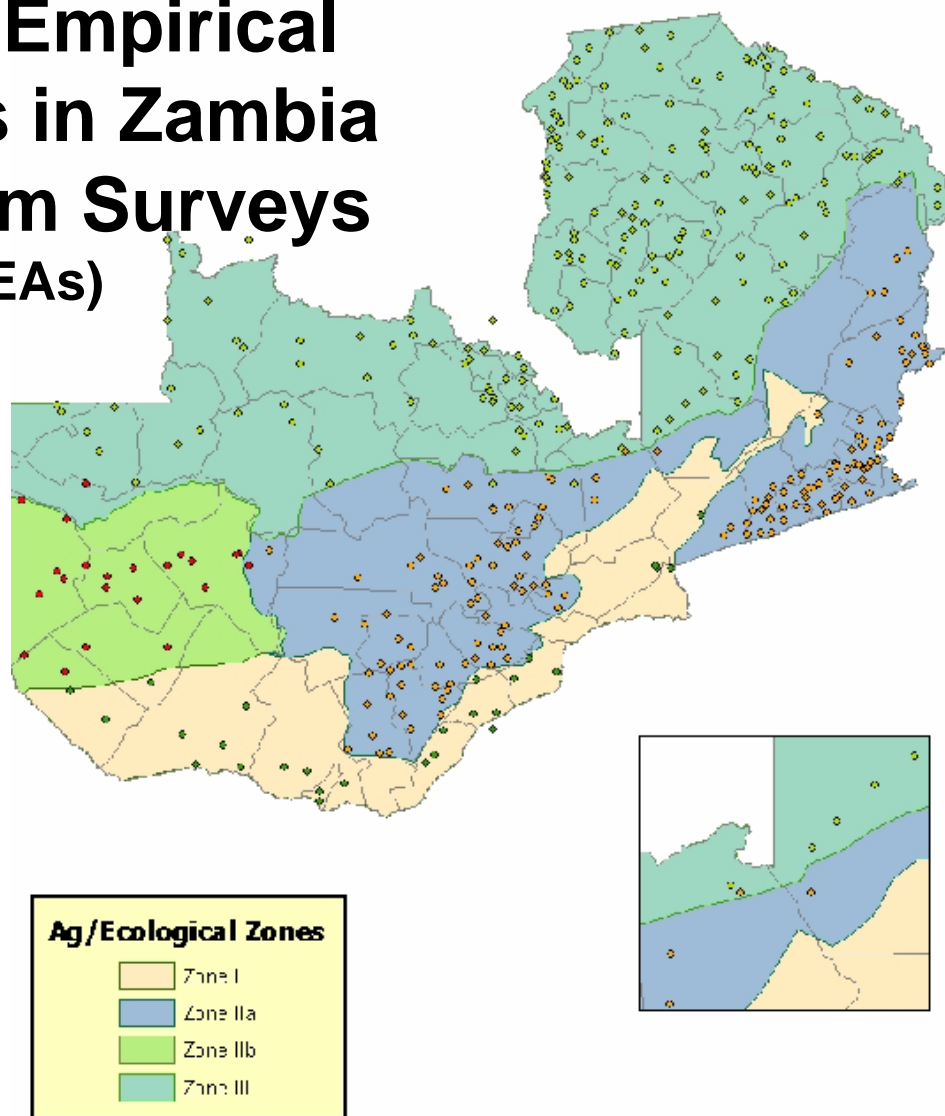
- Income-poverty clearly associated with small farm size and low education (*can't study causality with this cross-section data*)
- Within each landholding tercile, hh income /value crop sales increases 30-50 % between low and high education terciles
- Income is not so constrained by land in top education terciles due to off farm income. Conversely, off-farm income is relatively small for low education terciles
- 24 % female headed hhs overall, but female hhs are found disproportionately in bottom education & land terciles

## 4. Illustrations

### Annex One, Tables 4a and 4b

- Different characteristics of categories of maize sellers/buyers or those not in the market

# Crop Forecast Data: Empirical Data on Smallholders in Zambia – Nation Wide Random Surveys (CFS 2006/07 onward = 660 SEAs)



Map of Central Statistical Office Statistical Enumeration Areas (SEAs) Sampled in the CSO/MACO/FSRP Post Harvest and Supplemental Surveys in 2001 and 2004 (and to be completed in 2008) by Zambia's Agro-Ecological Zones<sup>13</sup>

# Verification of CFS 2007/2008 Data



# Zambia - CFS TIME-SERIES FINDINGS FOR MAIZE

Smallholder Farmers in Zambia (.1 - 20 ha cultivated and customary tenure)						
Crop Year	Area Planted	Area Harvested (% har. of planted)	Production	Yield (Area Planted / Production)	Planned Sales	Fertilizer Used
02/03	627,529	476,493 (76%)	823,209	1.22	218,204	47,950
03/04	589,036	490,939 (83%)	993,930	n/a	246,910	47,850
04/05	750,351	379,959 (51%)	598,411	.79	114,957	55,637
05/06	731,900	576,097 (76%)	1,106,751	1.52	358,221	63,081
06/07	824,247	541,362 (67%)	1,103,679	n/a	398,024	79,443
07/08	887,300	504,568 (57%)	988,169	1.13	357,112	79,150
Commercial Farmers in Zambia (greater than 20 ha cultivated and lease hold)						
02/03	90,004	88,017	412,381	4.58	381,957	42,884
03/04	42,043	46,683	219,670	n/a	234,273	n/a
04/05	93,630	85,873	267,776	4.29	234,777	n/a
05/06	52,624	42,858	317,688	6.07	n/a	n/a
06/07	48,565	45,141	262,479	n/a	224,446	25,755
07/08	48,534	44,948	218,728	4.51	174,164	18,530 <sup>15</sup>

# 1a. Smallholder Household-Level Findings - 2007/2008 CFS

	Small-Scale Holdings <i>2 unequal subgroups</i>		Medium-Scale Holdings	All Smallholders (wc)
Area cult. ha/hh -13crops	.03 - 1.7 ha	1.71 – 4.99 ha	5.0 – 19.7 ha	.01 – 20 ha
Number of smallholders	812,349	270,783	44,610	1,145,829
% smallholders	72 %	24 %	4 %	100 %
% Female headed HHs	27 %	14 %	10.5 %	21 %
% HHs not growing maize	21 %	7 %	3 %	17 %
Maize A. Planted ha/hh	.53	1.46	4.6	-
Maize A. Harvested ha/hh	.31	.83	2.5	-
% of Planted Area Harv.	53 %	57 %	54 %	57.5 %
Yield with fertilizer- mt/ha	2.8 * (1.9)**	2.6* (1.9)**	2.7* (1.6)**	-
Yield without fertilizer- mt/ha	1.7* (.96)**	1.5* (.80)**	2.0* (.50)**	-
National Production – mt	408,113	408,113	171,941	988,169
% National Production –mt	41.3 %	41 .3 %	17.4 %	100 %
% HHs Grow/Sell Maize	22 % (16% all hh)	39 % (36 % all hh)	51 % (49 % all hh)	27 % (22 % all hh)
National Sales - mt	103,562	153,559	99,991	357,112
% National Sales	29 %	43 %	28 %	100 %

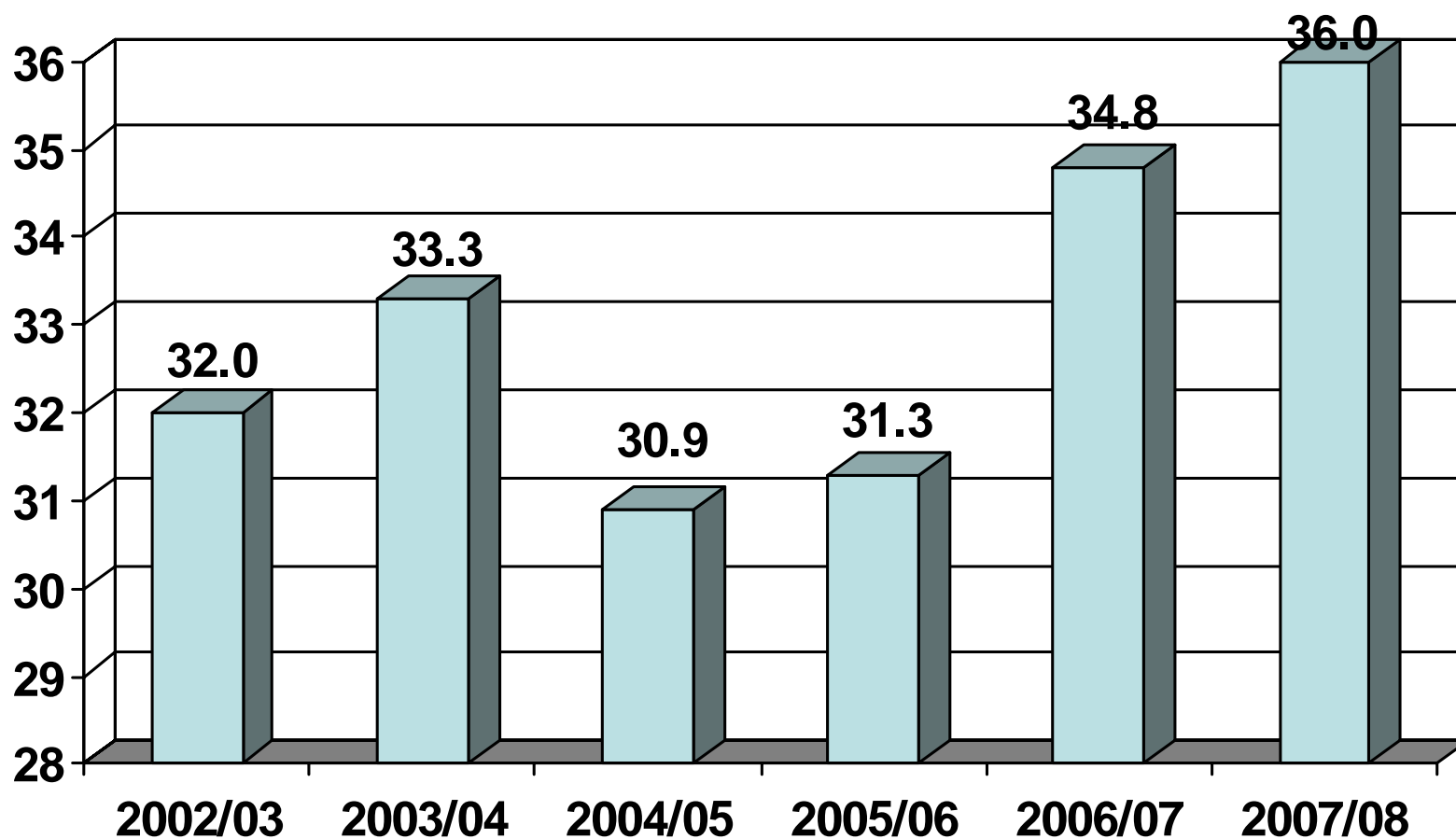
\* Yield = production/area harvested

\*\* (Yield) = production/area planted<sup>16</sup>

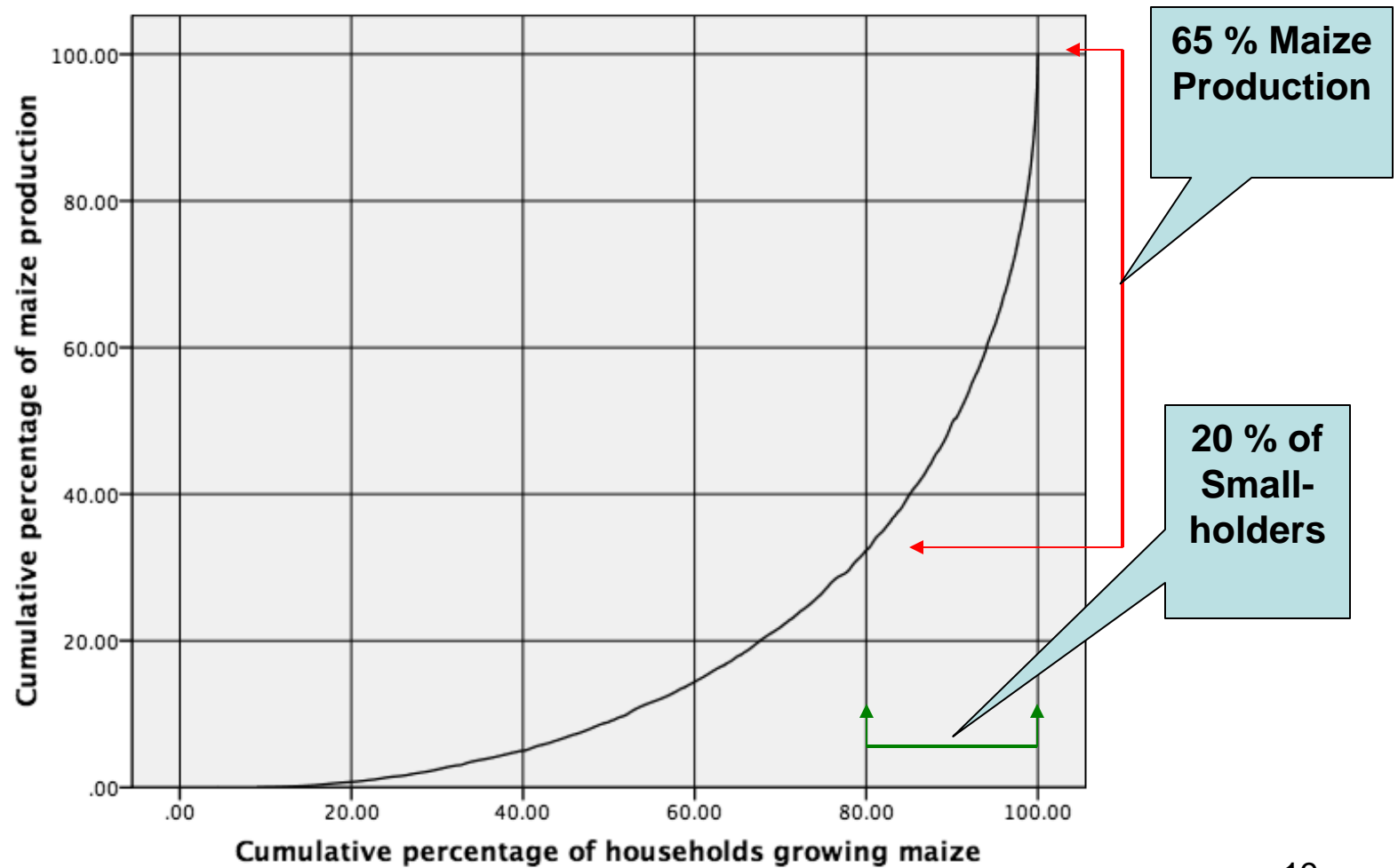
## 1b. Smallholder Household-Level Findings - 2007/2008 CFS

	Small-Scale Holdings <i>2 unequal subgroups</i>		Medium-Scale Holdings	All Smallholders
Area cult. ha/hh -13crops	.03 - 1.7 ha	1.71 – 4.99 ha	5.0 – 19.7 ha	.01 – 20 ha
Number of smallholders	812,349	270,783	44,610	1,127,456
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National Sales - mt	103,562	153,559	99,991	357,112
% National Sales	29 %	43 %	28 %	100 %
% HHs Maize Growing HHs Using Fertilizer on Maize	24 % (18% all hh)	44 % (41% all hh)	59 % (57% all hh)	36 % (29% all hh)
Maize growing hhs using fertilizer				
% of hhs selling maize	40 %	56 %	65 %	
Mean hh sales among sellers	1 mt	2 mt	8.3 mt	
Maize growing hhs not using fertilizer				
% of hhs selling maize	16 %	23 %	29 %	
Mean hh sales among sellers	450 kgs	820 kgs	1.9 mt	

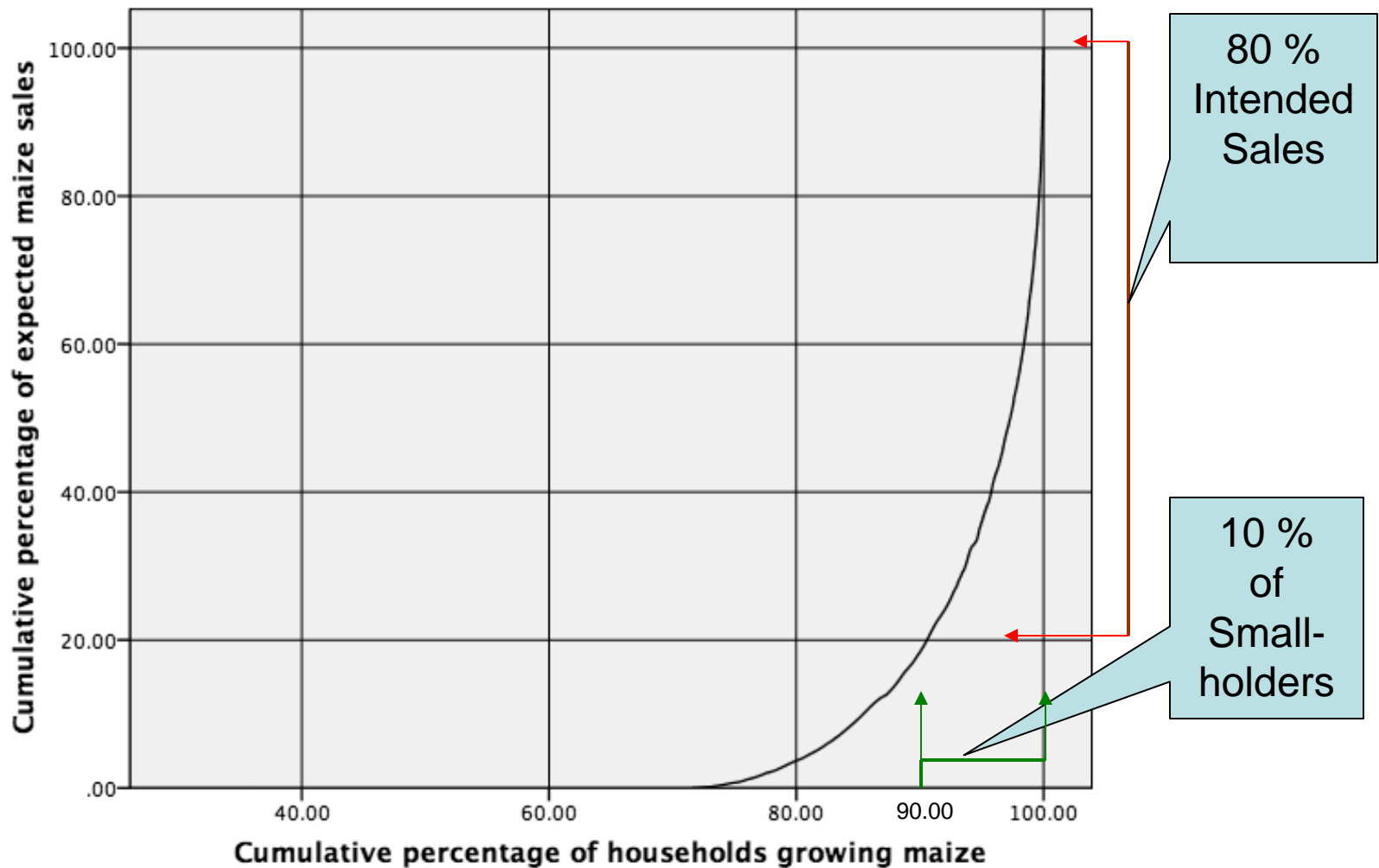
# Zambia: trend in % of smallholders (small- & medium-scale holdings) using fertilizer nationwide



# Importance of Understanding the Concentration of Maize Production by Small- & Medium-Scale Households in Zambia 2007/08



# Concentration of Intended Maize Sales by Small- & Medium-Scale Households in Zambia 2007/08 - CFS Data

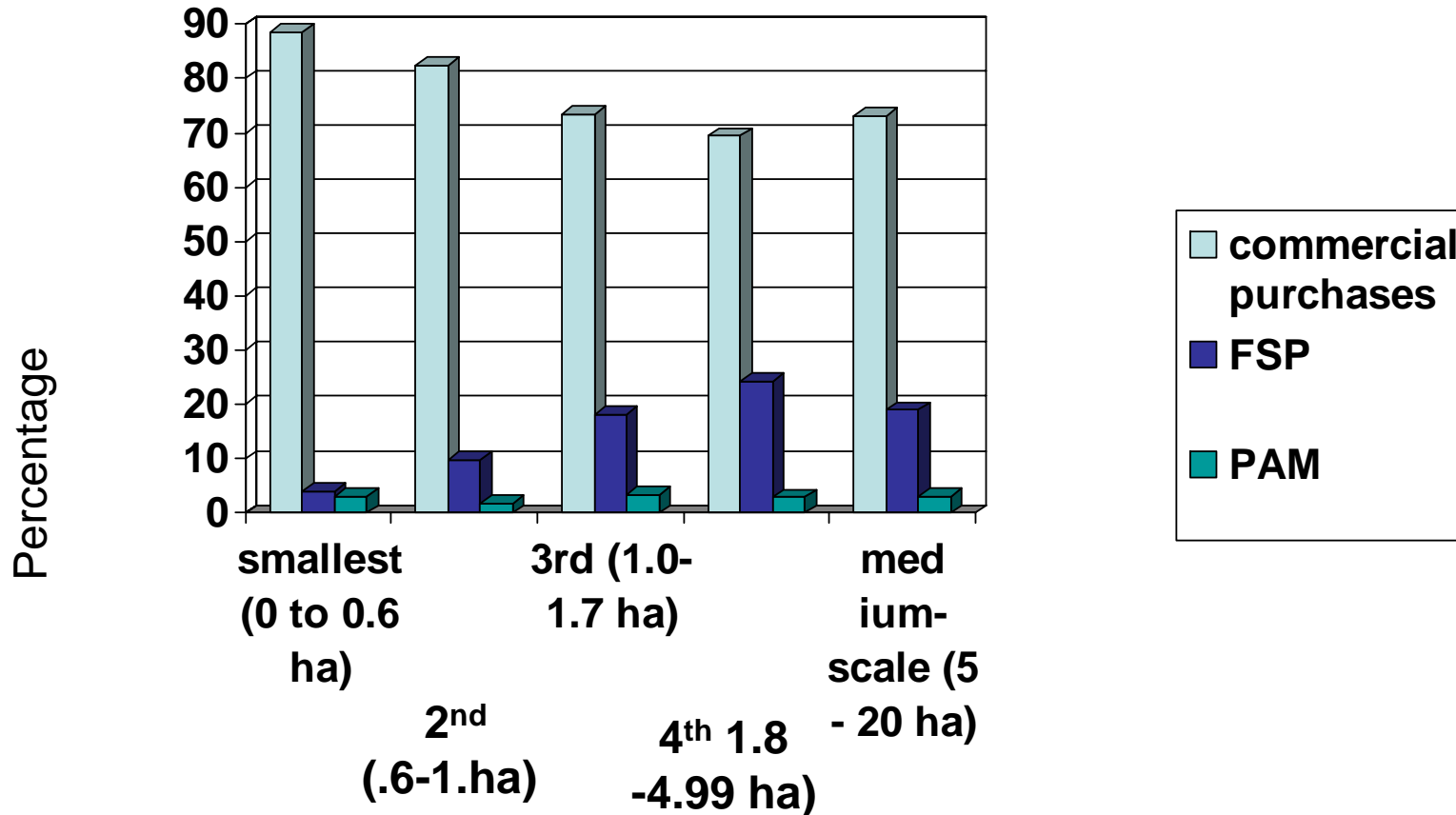


## 2. Smallholder Household-Level Findings - 2007/2008 CFS

	Small-Scale Holdings <i>2 unequal subgroups</i>		Medium-Scale Holdings	All Smallholders
Area cult. ha/hh -13crops	.03 - 1.7 ha	1.71 – 4.99 ha	5.0 – 19.7 ha	.01 – 20 ha
Number of smallholders	812,349	270,783	44,610	1,127,456
% smallholders	72 %	24 %	4 %	100 %
% HHs Maize Growing HHs Using Fertilizer on Maize	24 % (18% all hh)	44 % (41% all hh)	59 % (57% all hh)	36 % (29% all hh)
Tot. Quant. Fertilizer Used	29,365 mt	33,639 mt	16,305 mt	79,151 mt
Acquisition of Fert by mt From Principal Source Used (-others)				
Quant. Commercial Fert mt	22,632 mt	23,525 mt	13,341 mt	59,559 mt
Quant. FSP Fertilizer	4,559 mt	8,000 mt	3000 mt	14,706 mt
Quantity of PAM Fert.	730 mt	968 mt	413 mt	2,110 mt *
Acquisition of Fert % HH	100 %	100 %	100 %	
Commercial/Private	81 %	69 %	73 %	
FSP	11 %	24 %	19 %	
PAM	3 %	3 %	3 %	
Other Source	5 %	4 %	5 %	

\*The CFS identified tonnage of fertilizer distributed by PAM has been confirmed with PAM records

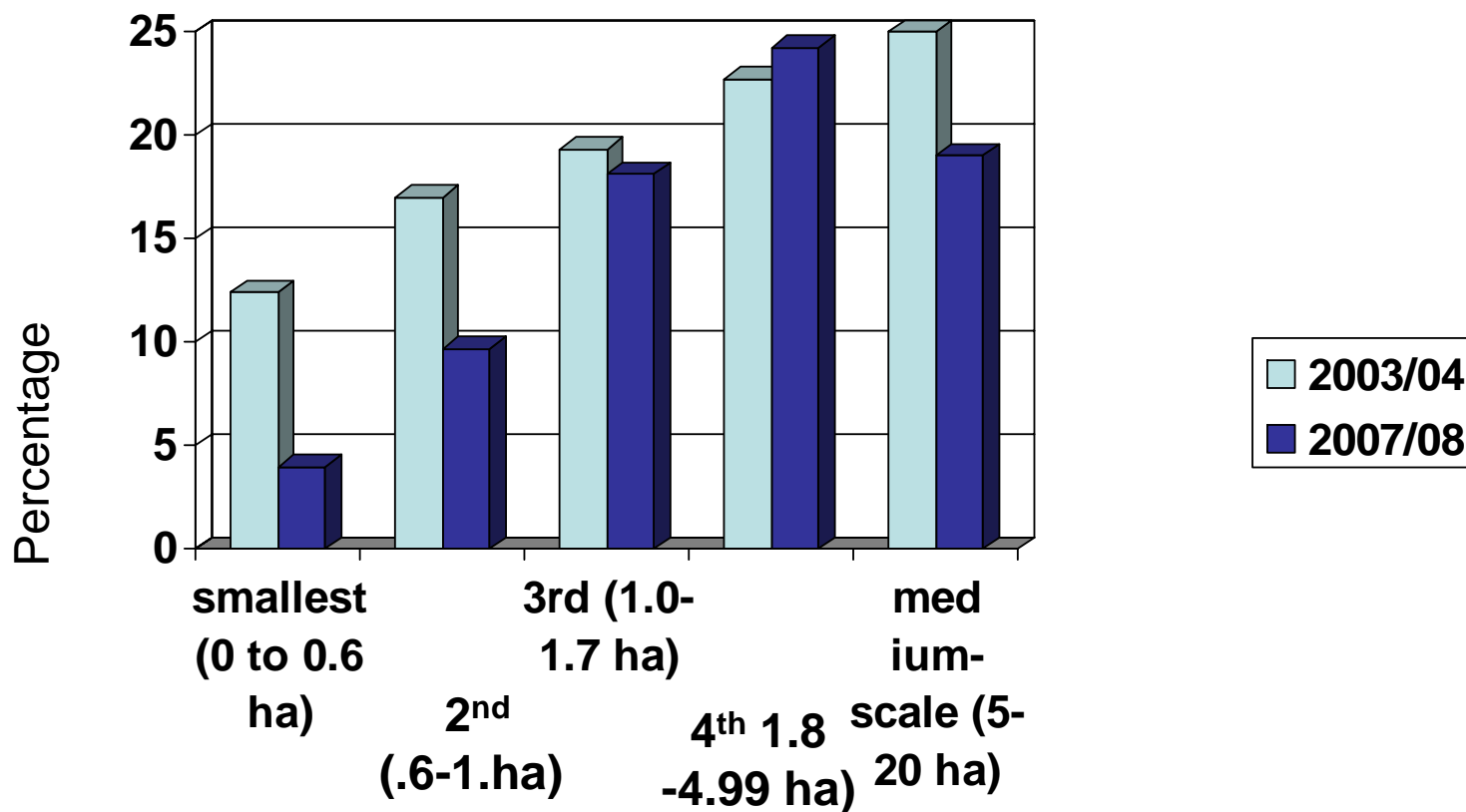
# Fertilizer acquisition sources among small-scale & Medium-scale smallholders using fertilizer on maize, 2003/04 & 07/08\*\*



[--- Small-Scale Holdings---] [--Medium-Scale Holdings--]

\*\* note: NGOs and other farmers account for less than 6% of primary fertilizer acquisition source by small-scale famers

# Percentage of small- & medium-scale smallholders using fertilizer that received from FSP, according to farm size (area cultivated)



**[---Small-Scale Holdings----] [-Medium-Scale Holdings-]**

\*\* note: NGOs and other farmers account for less than 6% of primary fertilizer acquisition source by small-scale famers

# Findings: Comparative Data On Source of Acquisition of Fertilizer for Maize

Crop Forecast Survey – Main Source of Fertilizer Identified as FSP		FSP Data on Program Accomplishments		CFS Main Source –of Fertilizer Identified as Private /Commercial	
# Small-holders	mt fertilizer	# small-holders	mt fertilizer	# small-holders	mt fertilizer
<b>2003/2004 Production Season</b>					
49,824	13,461	150,000	60,000	131,598	24,937
<b>2007/2008 Production Season</b>					
56,271 smallholders	14,706 mt	125,000 smallholders	50,000 mt	259,717 smallholders	59,366 mt

Farmers' declarations FSP fertilizer received

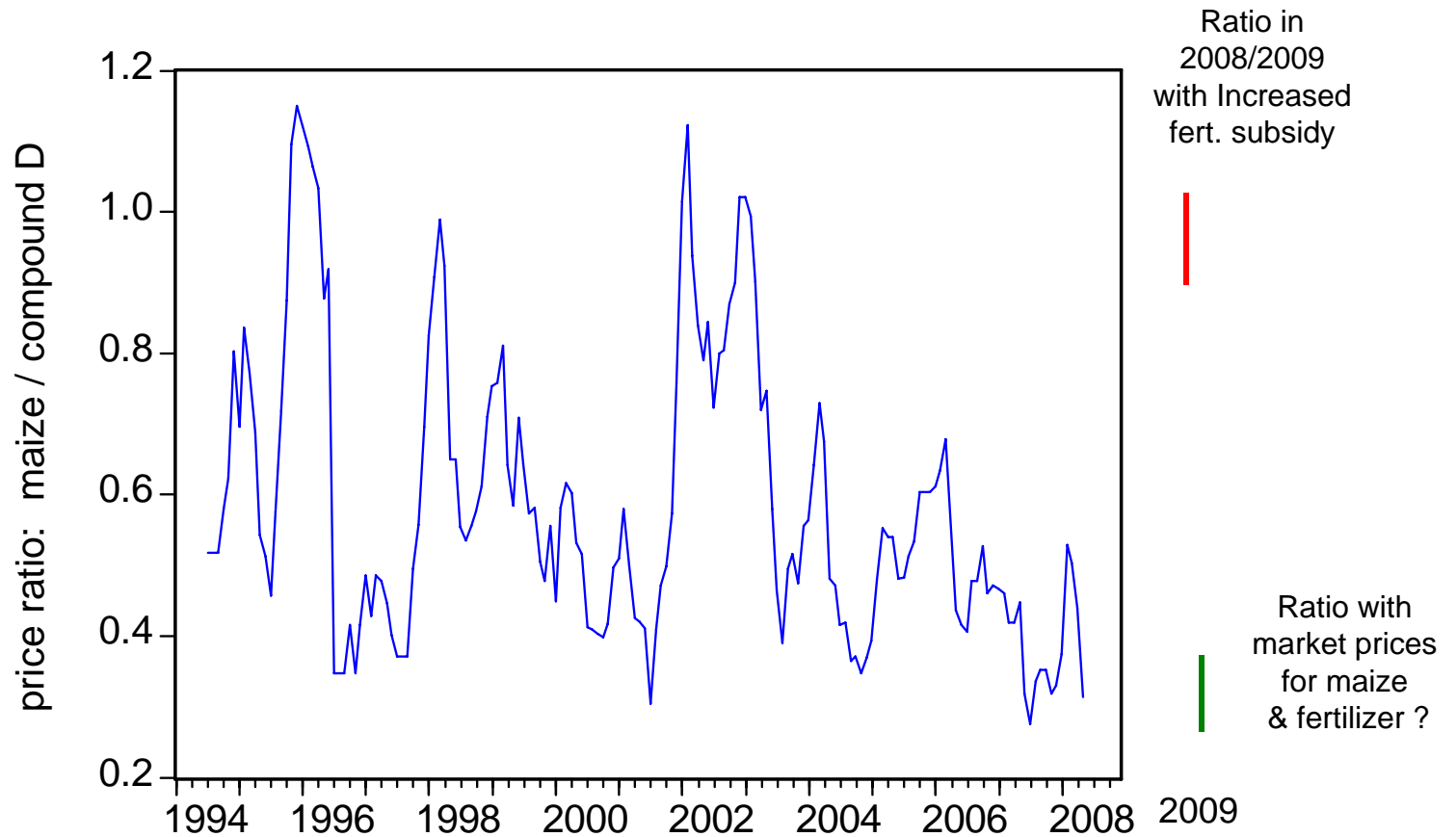
FSP Records of fertilizer distributed to farmers

Farmers' declarations of open mkt purchases

# How Much Did Smallholder Pay for Fertilizer Acquired in the Open Market in 07/08?

- Good news – some 260,000 smallholders paid cash in the open market for 60,000 mt of fertilizer in 2007/08
- But how much did they pay on the open market?
- Open market supplies include commercial stocks & recycled FSP stocks: are they sold at similar prices?
- CFS 07/08 did not ask the question of prices paid
- PSH/SS surveys in past, and the 07/08 survey did enquire about purchase prices for fertilizer from sources
- PHS/SS 07/08 also enquired about all sources of fertilizer, not just the principal source
- Past results & preliminary review of 07/08 data show that smallholders primarily rely on one source of supply
- Prices paid in commercial mkts tended to converge on an open market price – 07/08 100,000 -120,000 kw
- At what price in 2008/09 will smallholder purchase FSP fertilizer that is sold on the open market?
- What will smallholders most likely do about adjusting quantities used?

# Maize / Fertilizer Price Ratios, Zambia, 1995-2009



Using PHS/SS Data to Examine Characteristics of HH Using/Not Using Fertilizer By  
Category of Acquisition – PHS/SS Survey Data 02/03

Zambia	<b>Total Income</b>	<b>Assets</b>	<b>Landholding size</b>
<b>Fertilizer source:</b>	‘000 kwacha per capita		ha per capita
<i>Households not acquiring fertilizer:</i>	266	173	.15
<i>Cash purchases from private retailers:</i>	774	342	.20
<i>Government Fertilizer Support Program (50% subsidy)</i>	804	425	.23