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Priscilla Hamukwala

University of Zambia, precious1hams@yahoo.com

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**SORGHUM AND PEARL MILLET SEED VALUE
CHAINS IN ZAMBIA: OPPORTUNITIES AND
CHALLENGES FOR SMALLHOLDER FARMERS**

Priscilla Hamukwala
University of Zambia
precious1hams@yahoo.com

Introduction

- Sorghum and pearl millet rank second and third, respectively, as important staple cereals after maize.
- There are new market developments in the beer industry requiring farmers to increase productivity and production
- These markets can significantly affect access to improved seed, and thus increase decisions on utilization
- Even though market developments indicate great potential for the two crops, their supply has remained erratic (Larson et al. 2006)
- There was need therefore to identify the constraining factors to steady supply of sorghum & millet grain through conducting a seed value chain
- Little is known about the existing seed acquisition channels, extent of utilization, how they function and how well they are positioned to enhance small-scale farmers' access to improved seed

Objectives

- Determine farmer adoption of the improved seed, fertilizer use and yields for sorghum, maize, and millet crops since 1990.
- Identify key players, their functions, and value added at each stage of the chain.
- Identify factors that limit adoption of improved seed varieties.
- Determine strategies available to increase adoption and returns, and to reduce risk in the value chain

Methodology

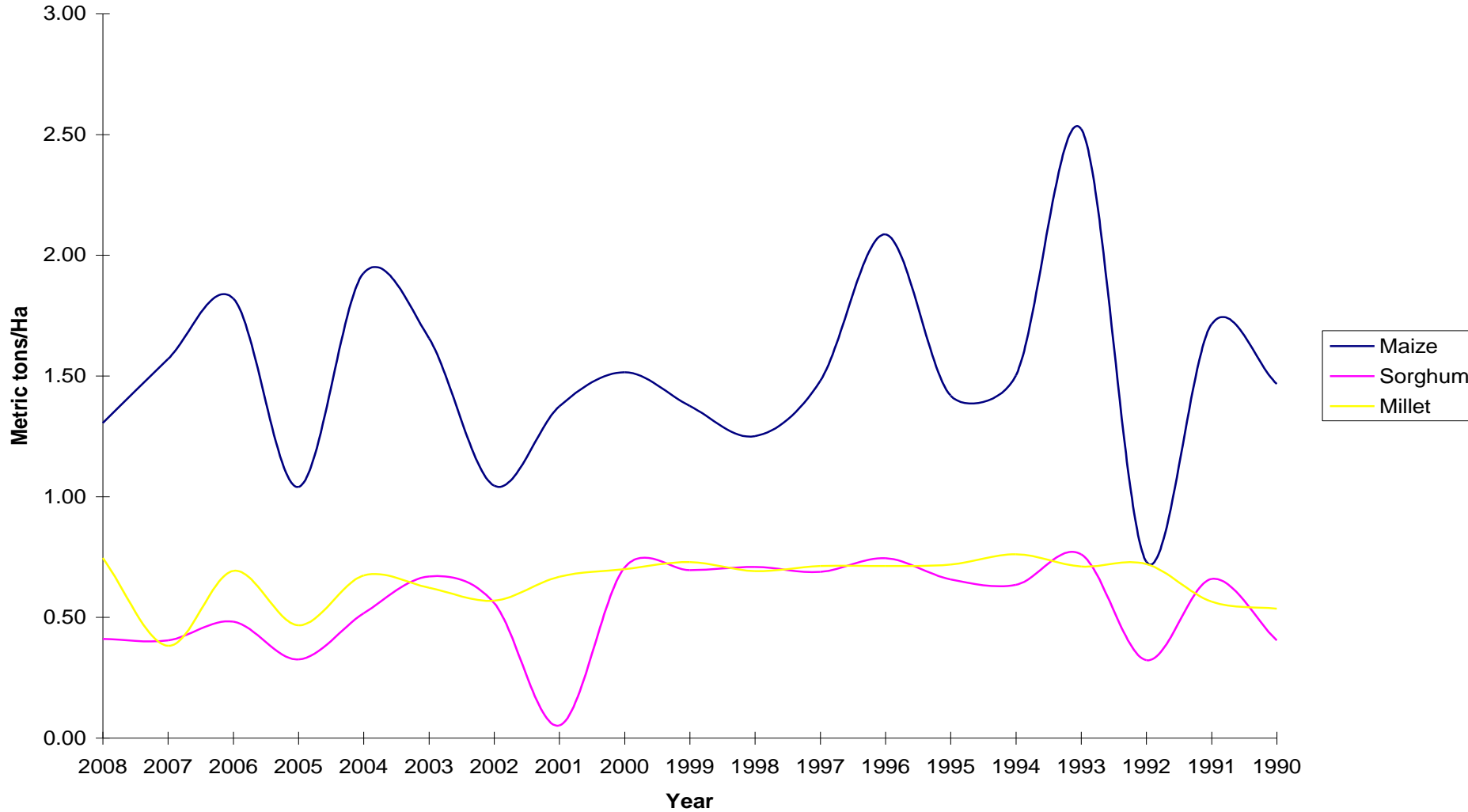
- Value chain analysis was used as a tool to reveal the pressure points that existed in a seed value chain
- A seed value chain in this study refers to the entire sequence of actions necessary to create, sell, and deliver improved seed to farmers.
- Interview guides & structured questionnaires were used as well as secondary data
- 130 farming households, 57 seed dealers, five seed companies, and two Research and Development institutions were surveyed
- Location: Lusaka & Siavonga

Technology use over years (1990-2009) - Yield

- Yield levels for both sorghum and millet have been stagnant at about 0.5 tons per hectare for over 20 years.
- This doesn't compare well with potential yields of more than 5 tons for some varieties
- In the case of maize average yields have never gone beyond 2.5 metric tons in the same period compared to 10 tons of potential yields
- This an indicative of low productive gains of technologies & agronomic underperformance

Results-Technology use over the years

Yield trends (1990-2008)



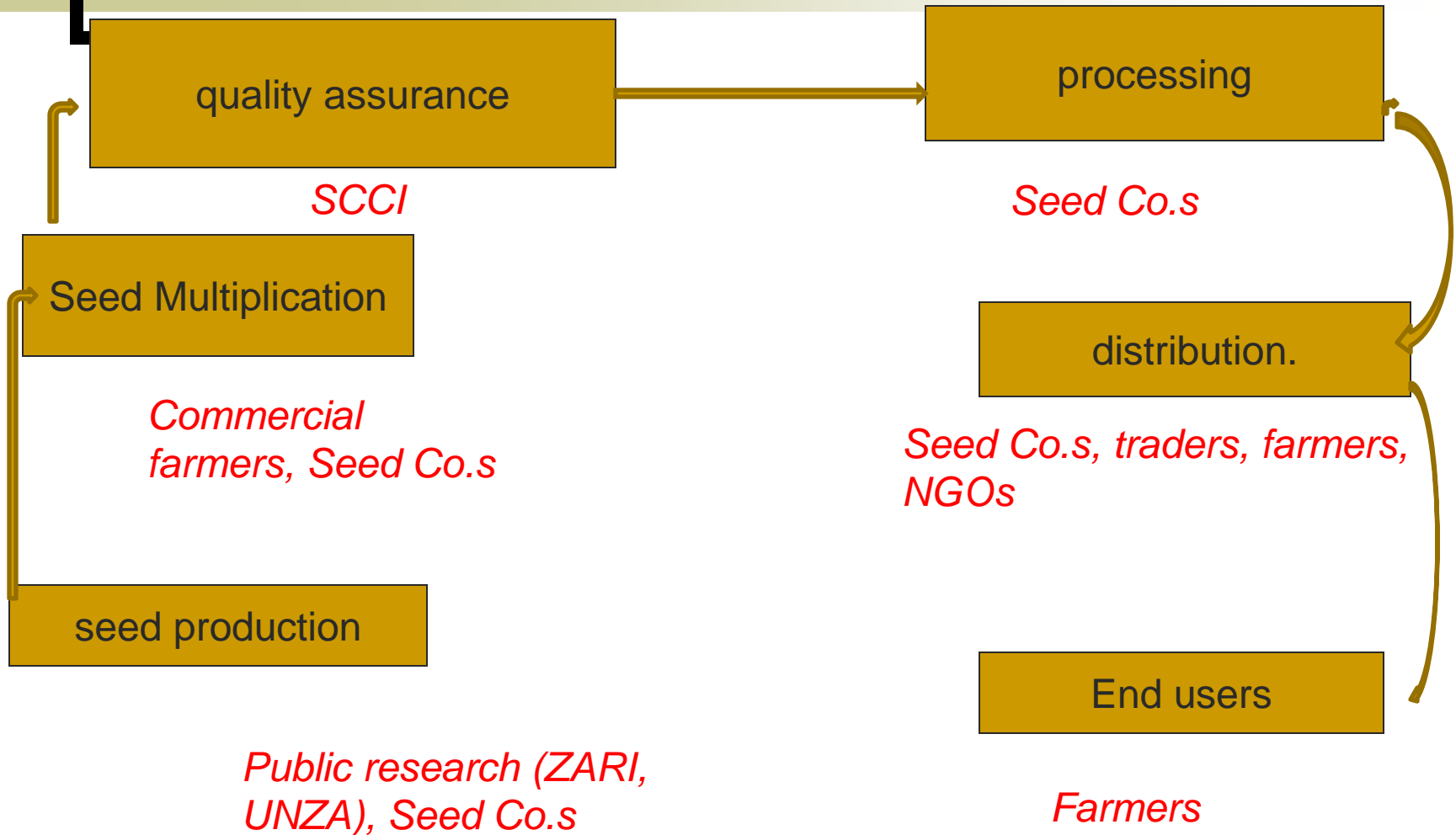
Results-Technology use over the years Fertilizer

- Decline in % area applied with fertilizer since 1990s
- Reduced from 49% in 1993 to 10% in 1998
- Average application rates per hectare are low (70 kg of fertilizer nutrients/ha as opposed to 400kg/ha of the soils requirements)
- The share of households using fertilizer fell from 31.4% in 1990/1991 season to 17.8% in 1998/1999
- Source: CSO -Post harvest survey

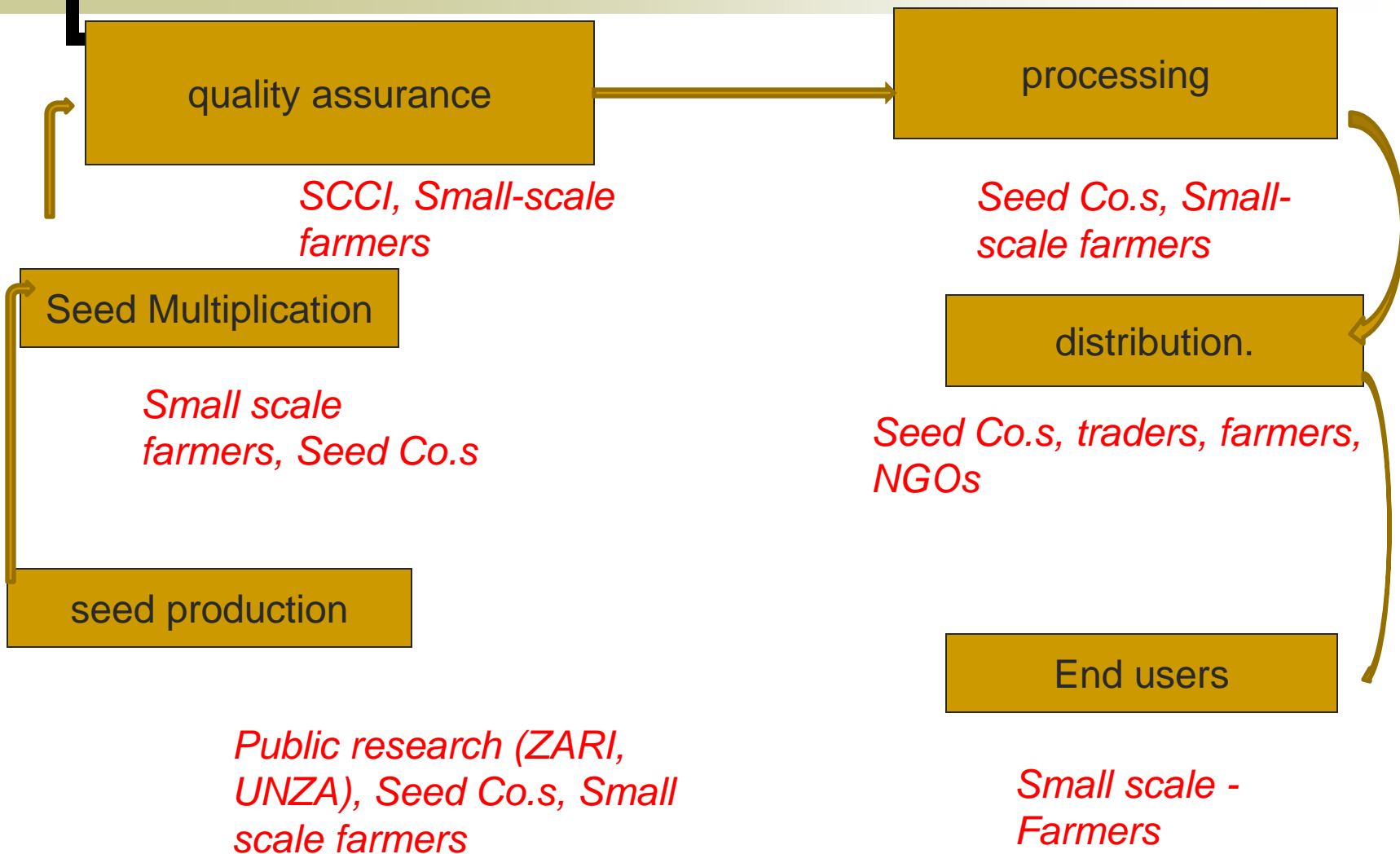
Results-Technology use over the years
Improved seed use

- The trend shows that percentage of household using hybrid seed has declined from 43 percent in 1990/91 season to 17.44% in 1998
- This has been attributed to withdraw of government subsidies

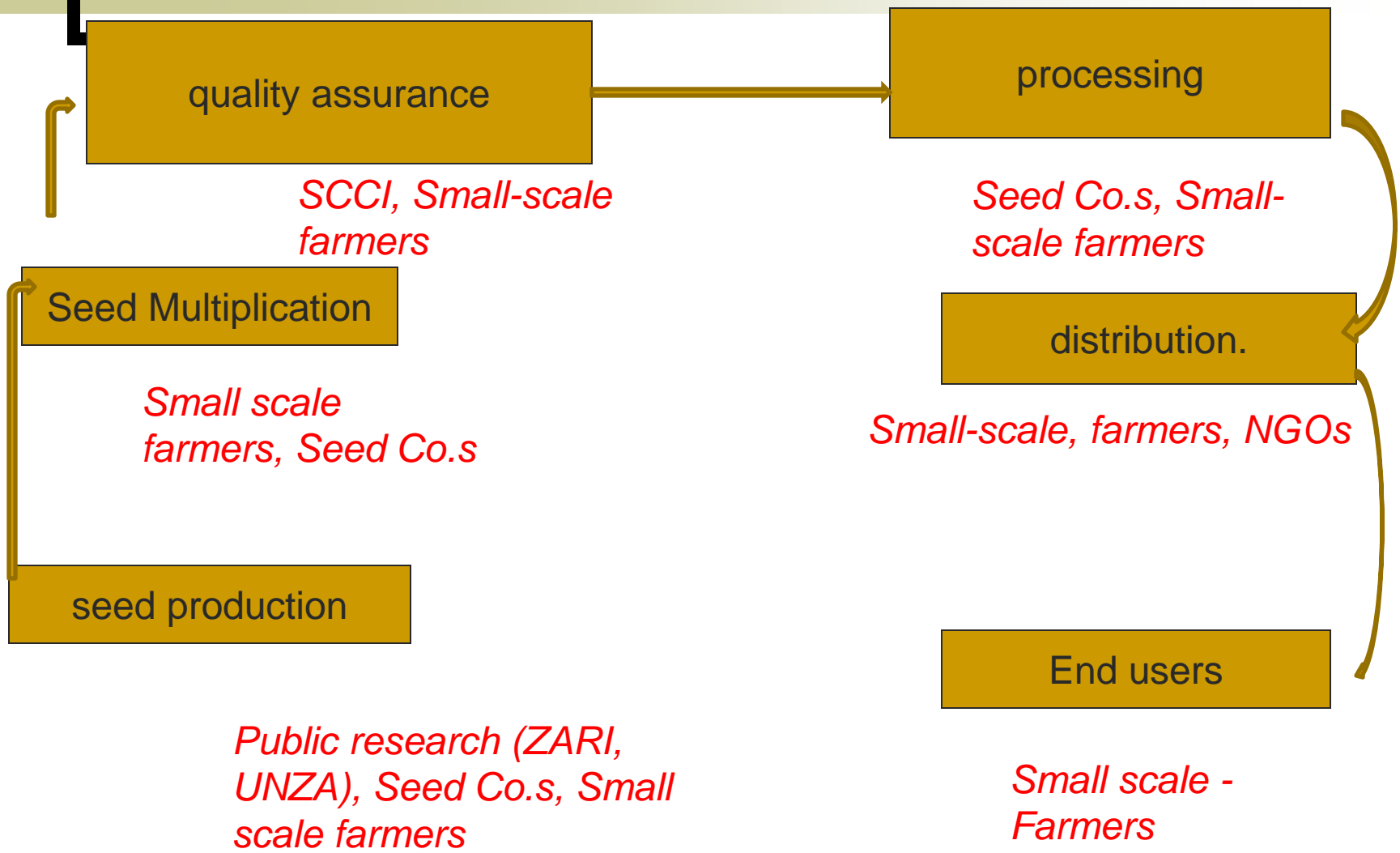
Seed Chain Actors & Functions (Maize)



Seed Chain Actors & Functions (Sorghum)



Seed Chain Actors & Functions (Millet)



Chain Actors (Small-Scale Farmers X-stics Siavonga Region, Zambia, 2008

	N	Min	Max	Mean	Std. Dev
Total Area Under Crop Production in (Ha)	128	0.25	10.5	2.42	1.81
Total Land Area Prepared By Animal draught power	129	0	10.5	1.30	1.91
Total Area Under Conventional Tillage	128	0	6.0	0.41	0.82
Total Area Under Conservation Tillage	129	0	5.25	0.55	1.0
Total Area Prepared By Mechanical Tillage	129	0	1.5	0.01	0.13
Valid N (List wise)	126				

Farmers' Sources of Seed, Siavonga Region, Zambia, 2007/8 season

Source of Seed	Maize (%)	Sorghum (%)	Millet (%)
Own Production	55	60	95
Relief seed	25	23	0
Other farmers	15	12	5
Traders	3	4	0
Other	2	1	0
N	113	127	120

Source Survey data 2008

Variety use by Households Siavonga Region, Zambia, 2008

Variable	N	Mean
Mean No. of years a crop variety has been grown	124	16.02
Mean No. of years seed of a crop has been recycled	115	13.62
Valid N (listwise)	115	

Factors Affecting competitiveness of the chain

- Support environment such as accessibility to support services such as credit, extension, products markets
- Policies such as fertilizer policy, maize price support policy, diversification policy, comparative advantage policies
- Changes in consumer preferences

Seed Dealers Types and Selected Characteristics, Siavonga Region, Zambia, 2008

Data source: Own survey data, 2008

Type of Dealer	Frequency	Percent
Farmer selling surplus seed	22	38.6
Seed Trader	5	8.8
Seed companies & agents	6	10.5
NGOs & Faith based organization	3	5.3
Farmer seed producers	21	36.8
Total=N	57	100
Place of Operation		
Own stalls	8	14.0
Road side stand	2	3.5
Door to door operators	47	82.5
Total=N	57	100.0
Sources of Seed		
Own Production	25	43.9
Other farmers	11	19.3
Seed Companies & agents	9	15.8
Other seed dealers	12	21
Total N=	57	100
Type of seed involved		
Maize Hybrid	N/a	35
Maize OPV	N/a	37
Sorghum	N/a	48
Millet	N/a	2
Other	N/a	15
Years of Operation: 8.32 years		

Sorghum Value Additions

Value Chain Stage	Key Players	Roles	Value Added
Seed Production	ZARI, UNZA, SCCI, Private seed companies, farmers	Variety development Seed production	Seed yield: 3 to 5 tons/hectare
Seed multiplication & Processing	-Seed Companies -Small scale farmers -NGOs	-Seed multiplication -Seed treatment -Packaging	
Trading & Transportation	-Seed Companies & Agents -Seed Dealers -Farmers	-transport -sell	
Seed Consumption	-Government -NGOs -Commercial farmers -Small scale farmers		Small-scale farmers' yield is 0.3 tons per hectare

[Challenged faced: Seed Producers]

- Lack of stable markets
- Low profitability
- Lack of breeder seed
- Lack expert breeders to maintain variety purity

Challenged faced

Seed Dealers

- Lack of stable markets
- Low prices
- Delayed payments

Seed Users

- Non- availability of desired varieties
- Poor extension services
- Poor markets Access
- Poor credit facilities

conclusion

- Seed chains are made of seed producers, seed traders, and seed users
- Most of them play multiple functions
- Their core business is mainly hybrid maize seed production
- Support environment affects the competitiveness of seed chain i.e., access to product markets, credit, extension services
- Policy environment- fertilizer subsidy, maize price support, diversification policy, comparative advantage policies
- Changes in consumer preferences

[conclusion]

- **Farmers use largely farm saved seed**
- **Low seed replacement rate (13 years of average)**
- **Farmers lack desired varieties**
- **Poor yields due to use obsolete technologies**
- **Last public varieties released in 1999**
- **Imperfect information in the value chains**

Recommendations

- R & D institution to take into account of what attributes consumers of seed want
- Link farmers to market opportunities through outreach, institutional improvements and further research
- Need for an agribusiness package that includes a complimentary of inputs including financing