What farmers want: Mapping Zambian smallholders' agricultural policy preferences

Nicole M. Mason & Vincenzina Caputo, Michigan State University
Danielle Resnick, International Food Policy Research Institute
Auckland Kuteya, Indaba Agricultural Policy Research Institute (Zambia)

Motivation

Returns to agricultural/rural expenditures in India (1990s)

Expenditure type	Rank w.r.t. returns to:	
	Agricultural growth	Rural poverty reduction
Agricultural R&D	1	2
Roads	2	1
Education	3	3
Irrigation investment	4	5
Credit subsidies	5	4
Irrigation subsidies	6	6
Power subsidies	7	7
Fertilizer subsidies	8	8

Source: Fan et al. (2008). Expenditure types ranked by returns to agricultural growth (↑ in agricultural GDP) and rural poverty reduction (↓ in # of rural poor people) per Rupee spent.

Zambia Ministry of Agriculture budget allocations (2017)*

- Operational funds/ supplies 2.2%
- Other 2.6%
- Personnel 9.6%
- Output price support (FRA) 21.5%
- Input subsidy (FISP) 64.2%
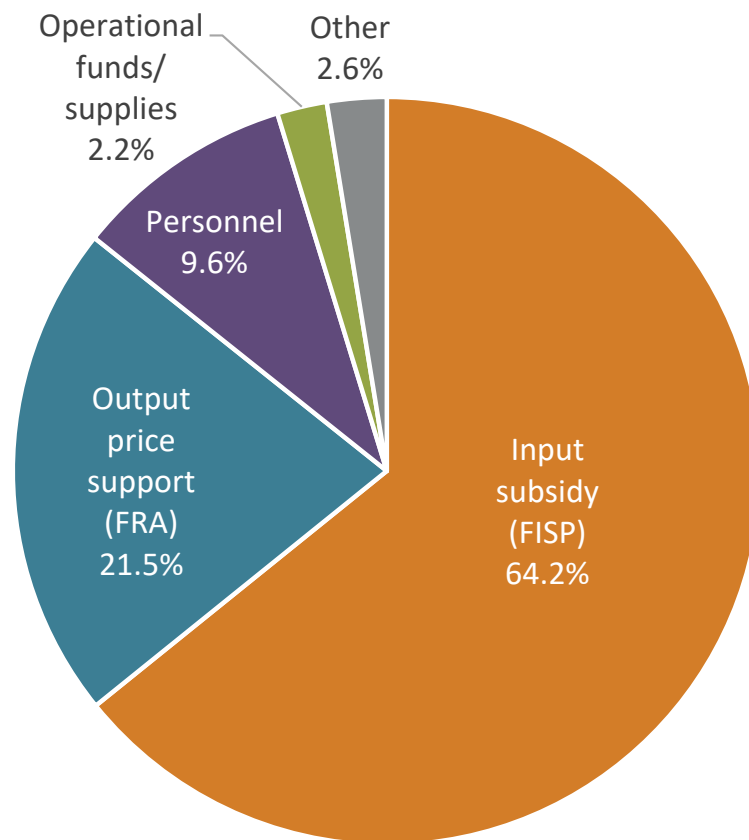
Source: Zambia Ministry of Finance. *excludes donor-funded agricultural development programs

Motivation (cont'd)

- **Mixed evidence on effects of ISPs on voting patterns:**

  - **Malawi**: ISP may have increased support for the ruling party in 2009 (Brazys et al. 2015; Dionne & Horowitz 2016)

  - **Zambia**: no stat. sig. ISP effects on votes won by the ruling party in 2006/2010 (Mason et al. 2017)

What types of government ag. sector programs & investments do farmers really prefer?

- Do they **prefer input/output subsidies** per conventional wisdom?

- **No previous studies** on this topic in **SSA** (to our knowledge)

- Closest US equivalent: **Wolf & Tonsor (2013)** – dairy farmers' policy preferences in run-up to 2012 Farm Bill

- Can we identify **political and economic win-wins**?

- Are farmers' preferences similar in **increase spending vs. cut budget scenarios**?

High political returns | High economic returns
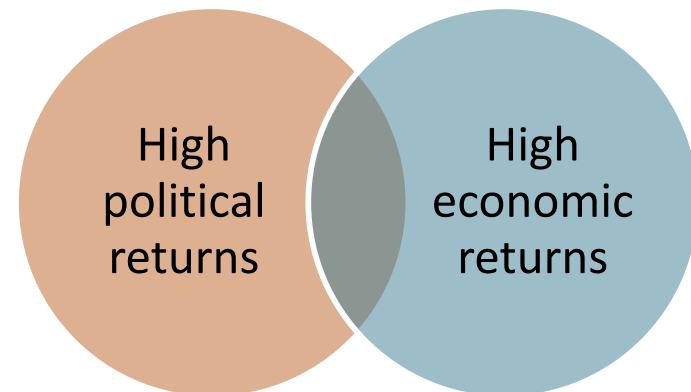
Methodology: Best-worst scaling (BWS)

Louviere (1987), Finn & Louviere (1992), Marley & Louviere (2005), others

- **Choose list** of gov't programs/ investments ("policy options")

- **Break into choice sets** (subsets of 3+ policy options)

- **Respondents select the "best" (most preferred) and "worst" (least preferred)** policy option from each choice set

  - Each **respondent completes multiple** choice sets

- → Can back out **cardinal rankings**
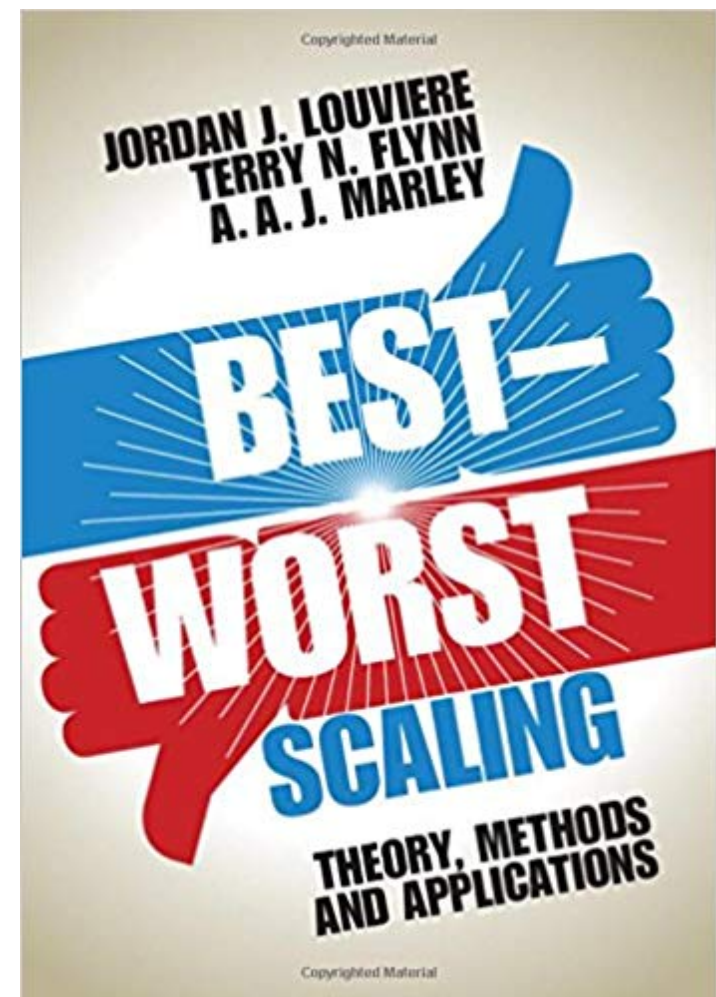
BWS advantages over other ratings methods

1. Ranking a long list of options is difficult; only **choose extremes in BWS** (Marley & Louviere 2005)

2. Compared to **Likert scale or approve/disapprove** questions asked policy-by-policy, with **BWS**:

    a. Respondents have to **make tradeoffs** b/w policy options
    b. Individuals **using ratings scales differently not an issue**

    (Lusk & Briggeman 2009)

Two scenarios: increase spending vs. cut budget

We would like you to consider a situation where the Zambian government has 500 million Kwacha in <u>additional funds</u> to spend on the agricultural sector. Government should use the additional money for the agricultural sector to …

We would like you to consider a situation where the Zambian government <u>must cut</u> 500 million Kwacha from its agricultural sector budget. To cut its agricultural sector budget, government should …

Policy options

1. Increase (reduce) the total **number of FISP beneficiaries**.
2. [Conventional FISP districts] Increase (reduce) the **quantity of subsidized fertilizer and maize seed** per FISP beneficiary. [FISP e-voucher districts] Increase/reduce the **Kwacha value** (government contribution) of the FISP e-voucher per beneficiary.
3. Increase (reduce) the **price at which the FRA buys maize** from farmers (that is, increase the FRA "floor price ").
4. Increase (reduce) the **total amount of maize that the FRA buys** from smallholder farmers.
5. Improve (reduce) spending on **roads and bridges** in the rural areas (for example, repair existing/roads bridges or build new ones).
6. Increase (reduce) the number of **agricultural extension agents** available to smallholder farmers.
7. Develop (reducing spending on developing) better **crop varieties and crop management practices** for smallholder farmers.
8. Develop (reducing spending on developing) **better livestock and fish breeds and management practices** for smallholder farmers.
9. Improve access to (reduce spending on improving access to) quality **irrigation** for smallholder farmers.
10. Improve access to (reduce spending on improving access to) affordable **credit/loans** for smallholder farmers.

Experimental design

- **Nearly balanced incomplete block design** (NBIBD)
  - 10 total policy options (for each scenario)
  - 4 policy options per choice set
  - 5 choice sets per respondent
  - Each policy option appears 2X, compared w/ each other policy option an average of 0.66X
  - D-efficiency score of 97.4%

- **Randomized order** of increase spending/cut budget scenarios, choice sets, and policy options within choice sets

14.1.3. Government should use the additional money for the agricultural sector to …

Most Desirable (BWS3a)	CHOICE SET EXAMPLE	Least Desirable (BWS3b)
O	Increase the total number of FISP beneficiaries.	O
O	Improve roads and bridges in the rural areas (for example, repair existing/roads bridges or build new ones).	O
O	Increase the number of agricultural extension agents available to smallholder farmers.	O
O	Improve access to quality irrigation for smallholder farmers.	O

Multinomial Logit Model & Shares of Preference

- If **assume homogeneous policy preferences** across respondents (will relax later) and make a distributional assumption about the error term, then the **probability of a given BW pair** of policy options takes on the **multinomial logit** (MNL) form:

$$Prob(j \text{ is chosen best \& } k \text{ is chosen worst}) = \frac{e^{\lambda_j - \lambda_k}}{\sum_{l=1}^{J} \sum_{m=1}^{J} e^{\lambda_l - \lambda_m} - J}$$

  where λ_j **is the location of option j on an underlying desirability scale**

- Once have estimated the λ_j's, can use to compute the "**share of preference**" for policy option j = the **forecasted probability that policy option j is chosen as the most desirable**

$$\text{Share of preference for policy } j = \frac{e^{\widehat{\lambda_j}}}{\sum_{k=1}^{J} e^{\widehat{\lambda_k}}}$$

Data

- Piggybacked on July 2017 IAPRI FISP e-voucher follow-up survey

- 13 districts, all in AER IIa

    – 10 e-voucher,
      3 traditional FISP

- 710 HHs

- Main respondent completed BWS module

E-voucher and Traditional FISP districts

■ 2015/16 FISP e-voucher pilot districts
■ Traditional FISP districts
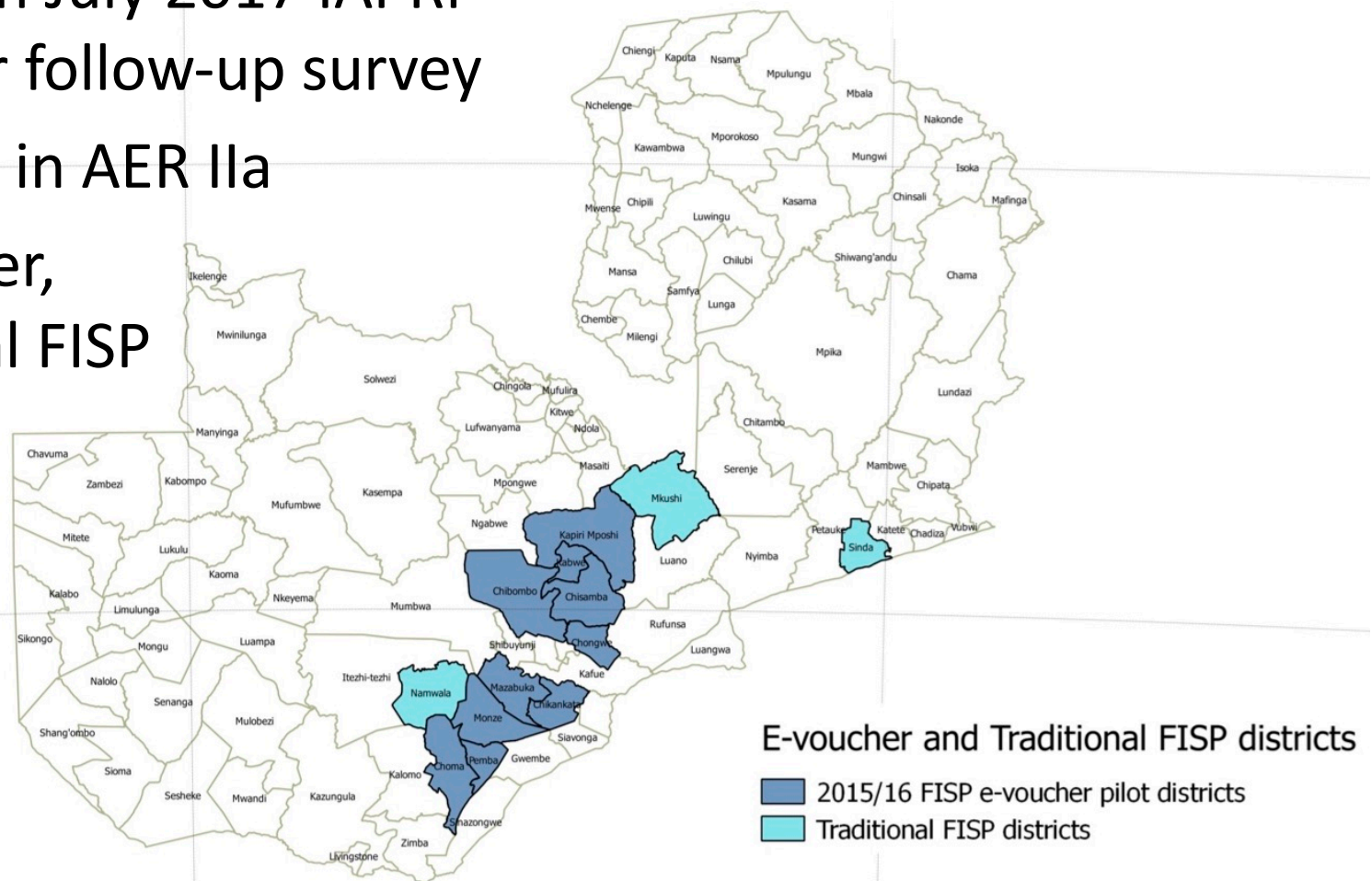
MNL results: increase spending scenario

Policy option	Coef.	p-value	Share of preference	Rank
FISP qty or value	**0.838*****	**0.000**	**0.167**	**1**
	(0.053)			
FISP beneficiaries	**0.745*****	**0.000**	**0.152**	**2**
	(0.053)			
FRA maize price	**0.584*****	**0.000**	**0.130**	**3**
	(0.053)			
Roads & bridges	**0.225*****	**0.000**	**0.091**	**4**
	(0.052)			
Credit	**0.155*****	**0.006**	**0.084**	**5**
	(0.056)			
Crop R&D	**0.151*****	**0.003**	**0.084**	**6**
	(0.051)			
FRA maize qty	**0.113****	**0.047**	**0.081**	**7**
	(0.057)			
Extension agents (base)	0.000		0.072	8
Livestock/fish R&D	-0.043	0.447	0.069	9
	(0.056)			
Irrigation	-0.052	0.319	0.069	10
	(0.052)			

Note: ***, **, * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.
Standard errors in parentheses

MNL results: cut budget scenario

Policy option	Coef.	p-value	Share of preference	Rank
Credit	0.050	0.369	0.124	1
	(0.055)			
Extension agents (base)	0.000		0.118	2
Irrigation	-0.008	0.877	0.117	3
	(0.051)			
Livestock/fish R&D	-0.047	0.392	0.113	4
	(0.055)			
Roads & bridges	-0.067	0.186	0.111	5
	(0.051)			
Crop R&D	**-0.159***	**0.002**	**0.101**	**6**
	(0.051)			
FRA maize qty	**-0.210***	**0.000**	**0.096**	**7**
	(0.055)			
FRA maize price	**-0.465***	**0.000**	**0.074**	**8**
	(0.051)			
FISP qty or value	**-0.479***	**0.000**	**0.073**	**9**
	(0.051)			
FISP beneficiaries	**-0.498***	**0.000**	**0.072**	**10**
	(0.052)			

Note: ***, **, * indicate statistical significance at the 1%, 5%, and 10% levels, respectively. Standard errors in parentheses

Comparing ranks in increase vs. cut budget scenarios

Policy option	Increase spending		Cut budget		
	Share of preference	Rank	Share of preference	Rank	Rank if sym-metric
FISP qty or value	0.167	1	0.073	9	10
FISP beneficiaries	0.152	2	0.072	10	9
FRA maize price	0.130	3	0.074	8	8
Roads & bridges	0.091	4	0.111	5	7
Credit	0.084	5	0.124	1	6
Crop R&D	0.084	6	0.101	6	5
FRA maize qty	0.081	7	0.096	7	4
Extension agents	0.072	8	0.118	2	3
Livestock/fish R&D	0.069	9	0.113	4	2
Irrigation	0.069	10	0.117	3	1

Next steps and extensions

Next steps

- **Random parameters logit** (RPL) model
  - MNL assumes homogeneous preferences
  - RPL **allows for heterogeneous preferences**
    - Estimate individual-specific preference parameters
  - Explore how individuals' policy preferences **correlate with individual/HH characteristics incl. time and risk preferences**

Extensions

- **Telephone interview-based BWS in Zambia and Nigeria**; nationwide random samples of rural mobile-phone owners (with M. Maredia & R. Shupp)
- Are rural/smallholders' **policy preferences correlated with past election outcomes or current partisan affinities**?

Conclusions & policy implications

1. Based on these **PRELIMINARY** results, Zambian smallholders appear to **prefer private goods w/ immediate payoffs** (↑ FISP, FRA) to other types of gov't ag sector spending
   – Fairly symmetric prefs for FISP/FRA in ↑/↓; less so for many others

2. Some (but not strong) support for **roads/bridges and crop R&D**
   – High returns to ag productivity & rural poverty reduction → find ways to further strengthen public support, ↑ gov't budget allocations

3. **Very little support for ↑ # of ag extension agents** → not surprising given poor level of service currently provided
   – Reword in phone-based surveys as "well trained and well resourced"?

4. **FISP/FRA-type programs may be unlikely to go away**
   – Work to make them more efficient and effective, and minimize negative effects on (and try to improve) private sector enabling environment

Thank you for your attention! Questions/comments?

Nicole Mason (masonn@msu.edu)

Vincenzina Caputo (vcaputo@msu.edu)

Danielle Resnick (D.Resnick@cgiar.org)

Auckland Kuteya (auckland.kuteya@iapri.org.zm)

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