

Lessons from Zambia's 2010 Maize Marketing Experience

C. Nkonde, N. Mason, N. Sitko, B. Burke, M. Hiichambwa, and T.S. Jayne

Food Security Research Project, Lusaka
Presentation at Cooperating Partners Meeting,
9 February 2011, Lusaka

Collaborating institutions in Zambia's agricultural sector:

- Food Security Research Project
- Agricultural Consultative Forum

Objectives of this presentation

1. Lessons learned from 2010

- What were the specific policy actions taken in 2010
- What were their impacts
- Distributional effects: winners and losers
 - large-scale farmers
 - three categories of smallholder households:
 - net sellers of maize
 - net buyers of maize
 - those that neither buy nor sell maize
 - urban consumers
 - millers
 - traders
 - government

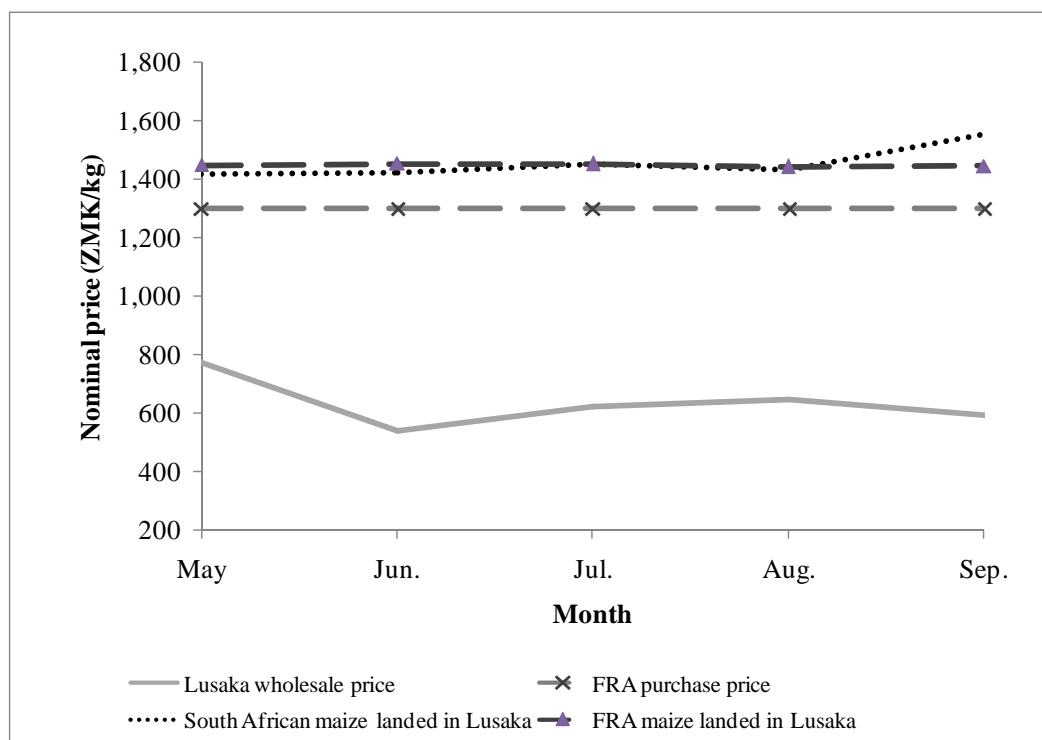
2. Implications for 2011 and beyond

- Concrete proposals for what could be done if 2011 should turn out to be another maize bumper crop
- What else is different in 2011 vs. 2010 that would need to be considered

Main features of GRZ's response to 2010 maize bumper harvest:

1. FRA producer price of 65,000 kw/50kg (~ US\$275 per mt)
2. FRA maize purchase targets continuously revised upward as it became clear that original purchase targets would not be sufficient to absorb the marketed surplus
– 878,570 MT purchased by FRA by 31 October 2010
3. Implicit restrictions on exports

2010 Maize prices: Lusaka wholesale, FRA Purchase Price, and c.i.f. from South Africa



5 Main Outcomes:

1. Accumulation of massive maize stocks
 - Kw 1.5 trillion (a 15-fold cost overrun)
2. Despite the record maize harvest, most smallholders did not produce a maize surplus in 2010.
 - Only 36% of smallholder farmers (45% of maize-growing smallholders) were expected to sell maize in 2010/11
 - extremely concentrated marketed surplus: About 49,000 farmers, or 3.3% of the total smallholder population, accounted for 50% of sales

Disparities within smallholder agriculture, Zambia - 2008

	N=	Farm size (ha)	Asset values (US\$)	Gross rev., maize sales (US\$)	Gross rev., crop sales (US\$)	Total hh income (US\$)
Top 50% of maize sales	30,150 (2%)	7.2	3,703	3,199	3,354	7,624
Rest of maize sellers	467,320 (30%)	1.9	257	172	252	1,272
Households not selling maize	1,010,014 (67%)	1.1	129	0	57	756

Source: CSO Supplemental surveys, 2008

3. After adding FRA marketing costs, millers could obtain maize more cheaply local markets (and from South Africa!) than from the FRA, unless it relied on the Zambian Treasury to subsidize the FRA's sale price

4. The upward pressure that FRA's activities exerted on maize market prices made maize meal more expensive for urban and rural consumers than otherwise would have been the case.

- the FRA's activities effectively transferred income from rural and urban maize purchasing households to a small minority of surplus-producing farmers

-
5. FRA maize was also not competitive in regional export markets. FRA exports in 2010/11 have entailed a loss of US\$91-177 per ton exported.
- because the FRA has been willing to export maize at a financial loss in order to unload its own stocks, export marketing opportunities for private sector have been very limited.
 - In this way, government policies have discouraged exportation that otherwise could have relieved the national surplus without imposing major financial losses on the Treasury.

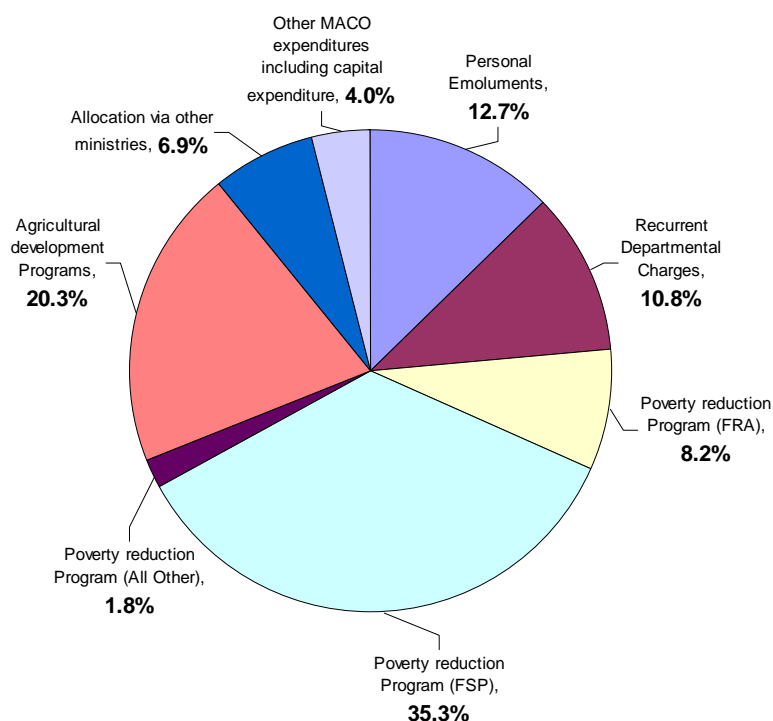
Winners:

1. Large-scale commercial maize producers
2. 36% of smallholder farmers who sell maize
 - Recall 3.3% account for 50% of maize sales from smallholder sector
3. Government (at least in some ways)

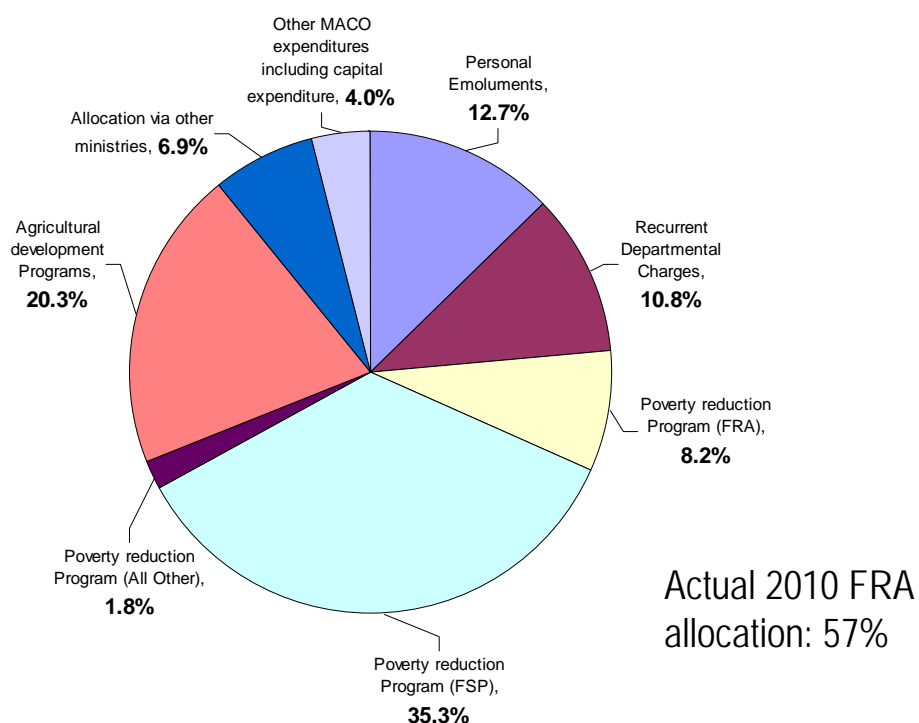
Losers

- Urban consumers (38% of total population)
- Rural grain-deficit consumers (~ 41% of rural farm population)
- Those benefiting from the development of the maize value chain
- the Treasury: estimated financial loss on 2010/11 FRA maize trading account: \$1.2 trillion

2010 Allocation of Public Budget to Agriculture



2010 Allocation of Public Budget to Agriculture



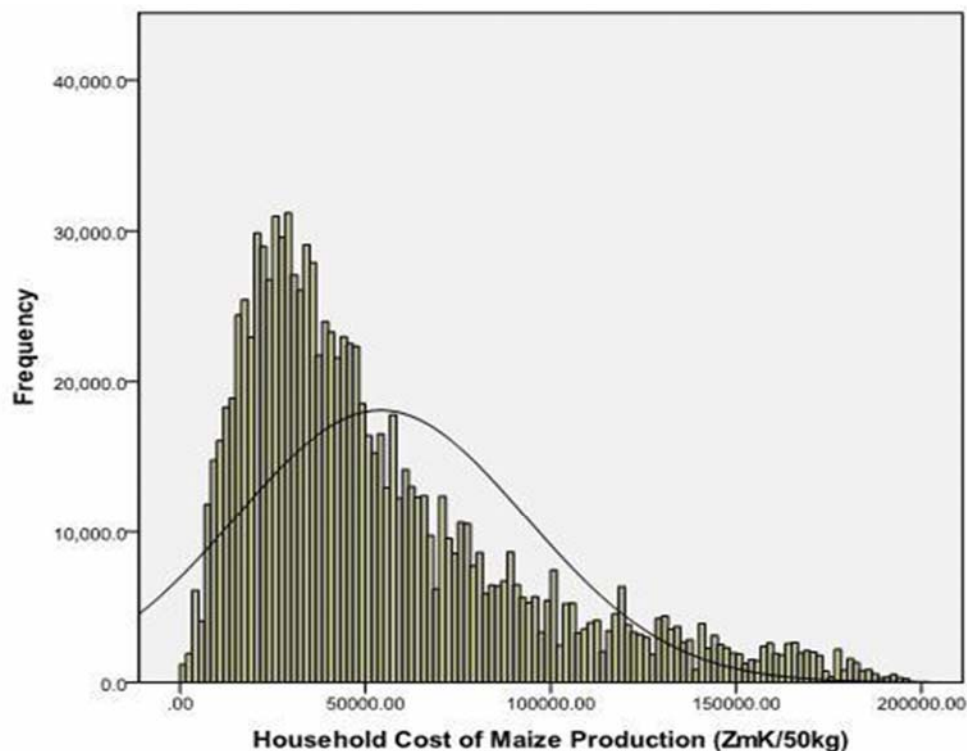
Distributional Effects of the 2010 GRZ Maize Marketing Policies

	Policy scenario	
	Actual 2010	
Stakeholder groups	Immediate	Dynamic
Large-scale farmers	+	-
Smallholders:		
Net maize sellers	+	+/-
Neither buy nor sell maize	0	0
Net maize buyers	-	-
Urban consumers	-	-
Millers	?	?
Traders	-/?	?
Government	+	~

Alternative proposals for dealing with future bumper crop seasons:

1. FRA maize purchases and sales to be triggered when market prices fall below and rise above pre-established floor and ceiling prices
2. FRA prices to be set with reference to production and cost of production estimates
 - Requires capacity building at MACO and CSO

Results from MACO/CSO 2010 Cost of Production Exercise



Results (3)

Table 2: Cost and Share of Total Production by Province and AEZ

Province	Share of Total Production	Total Cash Expenditures	Expenditures plus household labor and assets (exl. land)	Total Cost of Production
		-----ZMK per 50 kg bag-----		
Central	0.21	23,237	43,958	47,785
Copperbelt	0.07	26,099	53,143	58,500
Eastern	0.22	13,925	34,096	38,569
Luapula	0.03	16,203	38,531	41,374
Lusaka	0.04	22,174	44,279	50,470
Northern	0.13	20,370	34,197	37,615
North Western	0.05	17,833	42,801	48,166
Southern	0.22	16,243	41,320	46,630
Western	0.03	12,654	53,018	63,688
All Zambia	1.00	18,630	40,739	45,459
<i>Agro-ecological Zone</i>				
I -Marginally Suitable	0.06	17,145	51,128	59,454
IIa -Suitable	0.64	17,893	39,305	43,682
IIb -Marginally Suitable	0.02	14,835	47,279	57,702
III -Moderately Suitable	0.28	20,956	41,129	45,357
All Zambia	1.00	18,630	40,739	45,459

Source: CSO/MACO Crop Forecast Survey, 2010

Table: Costs of production by 2009 Market Position and Expected 2010 Market Position

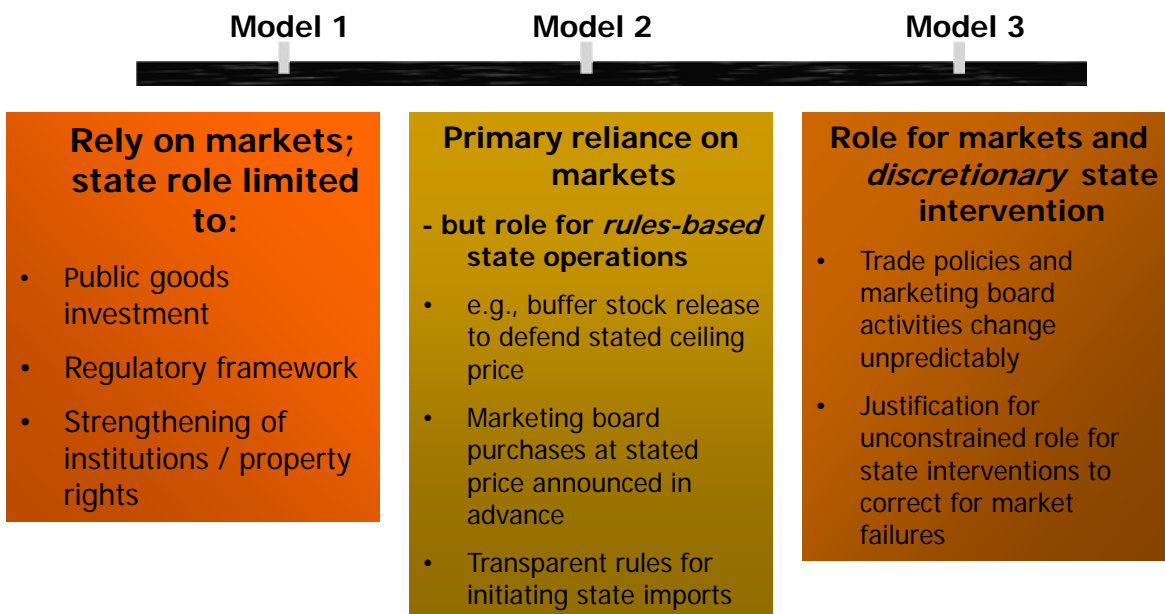
Market Position	Production Costs		
	Cash expenditures	All non-land costs	Total Cost
<i>Market Position 2009</i>			
	Household mean (ZMK/50kg)		
Did not sell	13,991	57,155	66,076
Sold to FRA only	22,935	43,245	47,403
Sold to private buyer only	18,745	50,568	57,006
Sold to FRA and Private buyer	24,919	44,942	48,734
<i>Expected Market Position 2010</i>			
Do not expect to sell	13,714	62,875	73,075
Expect to Sell	18,624	45,551	50,943
All Zambia	16,139	54,318	62,143

Source: MACO/CSO Crop Forecast Survey, 2010

Alternative proposals for dealing with future bumper crop seasons:

1. FRA maize purchases and sales to be triggered when market prices fall below and rise above pre-established floor and ceiling prices
2. FRA prices to be set with reference to production and cost of production estimates
 - Requires capacity building at MACO and CSO
3. Facilitating private sector exports
4. Refocusing public funds to agriculture on measures to promote on-farm productivity
5. Creating a more predictable, rules-based policy environment

Competing models of the role of state and private sector in food markets:



-
- Ultimately, Zambian farmers should be congratulated for their accomplishments this year.
 - There are alternative strategies that government could use to ensure that Zambians reap the full benefits of bumper crops in the future.

Thank You



Results (1)

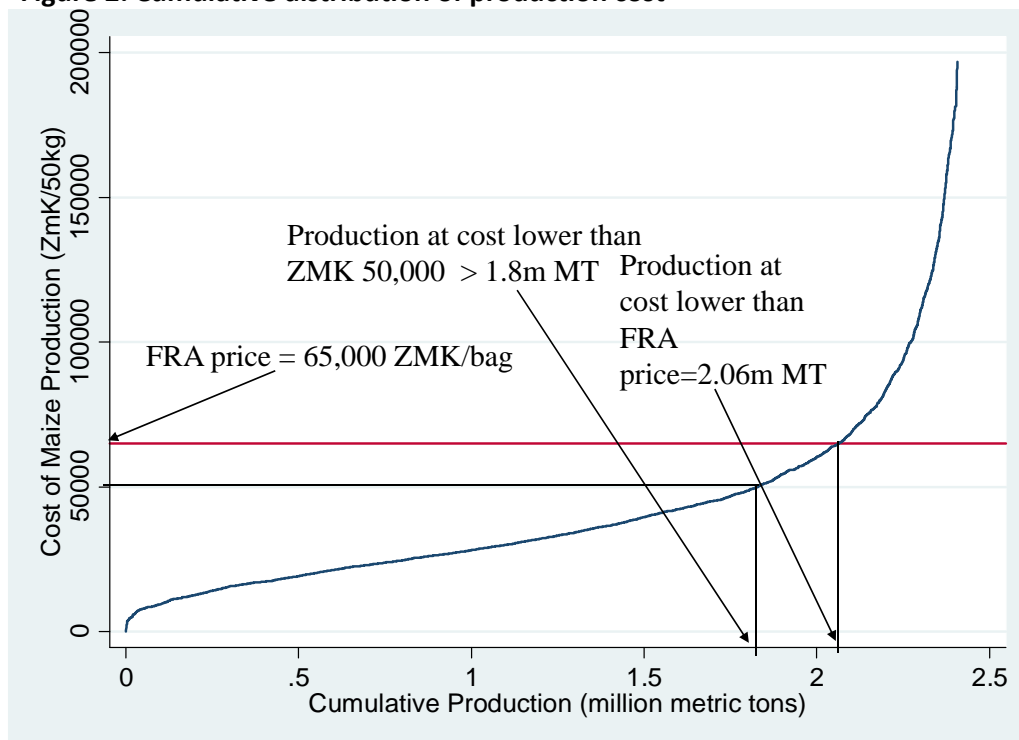
Table 1: Maize Production Costs (ZMK/50kg bag) by Quintile

Share of total maize production (%)	Total Cost Quintile (ZMK/50 maize kg)					farmer mean	per 50 kg bag mean
	1	2	3	4	5		
	31.4%	27.1%	20.1%	12.8%	8.7%		
<i>Costs of production (ZMK/50kg)</i>							
Hired animal use	283	516	829	1,163	1,763	911	536
Hired machine/tractor use	22	57	49	153	103	77	97
Hired labor	1,493	2,662	3,340	4,825	6,619	3,788	3,438
Basal dressing ^a	1,314	2,479	2,897	3,549	4,419	2,932	3,487
Top dressing ^a	1,290	2,585	2,964	3,863	4,627	3,066	3,576
Fertilizer transport to homestead	39	108	143	184	223	139	193
Transport cost to FRA depot	349	606	407	296	208	373	763
Transport cost to private buyer	189	365	543	544	997	528	2,044
Herbicides	15	24	63	17	46	33	62
Seeds ^a	1,417	2,838	3,734	4,853	8,478	4,265	4,434
Total cash expenditures	6,411	12,239	14,969	19,449	27,482	16,111	18,630
Family labor	8,274	15,379	25,585	41,810	87,103	35,638	19,745
Own animal use	873	1,431	2,179	3,071	4,287	2,368	2,304
Own machine use	9	29	43	12	82	35	61
Expenditures plus household labor and assets (excl. land)	15,567	29,078	42,776	64,341	118,953	54,152	40,739
Land annual rental	3,364	4,835	6,633	9,152	15,102	7,818	4,720
Total Cost (incl. land cost)	18,931	33,914	49,409	73,493	134,055	61,970	45,459

Source: MACO/CSO Crop Forecast Survey, 2010.
Note: a) Fertilizer and seed costs include both subsidized and commercially acquired inputs.

Results (4)

Figure 2: Cumulative distribution of production cost



Results (5)

Table 3: Distribution of gross margins for maize production (ZMK/ha)

	Gross Margin Percentiles					Mean
	1	2	3	4	5	
Yield (kg/ha planted)	1,607	1,179	1,675	2,493	4,421	2,275
Price (ZMK/kg)	1,300	1,300	1,300	1,300	1,300	1,300
Gross Revenue (ZMK/ha)	2,088,454	1,532,097	2,177,930	3,241,058	5,746,974	2,957,341
<i>Costs (ZMK/ha)</i>						
Hired animal use	107,787	97,186	88,822	79,808	73,801	89,482
Hired machine use	6,705	3,107	3,100	3,402	7,246	4,712
Hired labor	200,150	117,093	100,705	156,141	198,715	154,568
Basal	172,599	86,033	92,777	150,319	233,677	147,088
Top dressing	180,470	92,968	97,821	156,085	225,662	150,608
Fertilizer transport	9,579	4,277	4,080	7,479	9,545	6,993
Transport to FRA	13,349	6,934	13,949	28,454	67,175	25,973
Transport to other buyer	56,652	13,882	17,570	28,969	36,507	30,719
Herbicides	1,523	579	1,606	1,559	2,996	1,653
Seed	275,545	117,949	117,387	166,048	230,332	181,466
Family labor	2,559,361	949,405	930,752	815,579	776,116	1,206,384
Own animal use	74,089	70,904	59,362	56,068	50,354	62,156
Own machine use	1,774	450	1,755	777	2,346	1,421
Total costs excl' land	3,436,075	1,351,404	1,312,816	1,444,282	1,698,510	1,848,799
Gross margins (ZMK/ha)	-1,347,620	180,692	865,113	1,796,776	4,048,464	1,108,542

Source: MACO/CSO Crop Forecast Survey, 2010.

Table 4: Distribution of adult equivalent family labor hours per activity per hectare

Production Activity	Percentile					Mean
	10	25	50	75	90	
	-----Family Labor Hours-----					
Land preparation	0	11	90	301	650	247
Planting	10	24	52	103	219	94
Basal dressing application	0	0	0	32	79	28
Top dressing application	0	0	0	32	80	30
First weeding	0	47	143	298	531	231
Second weeding	0	0	0	103	277	93
Third weeding	0	0	0	0	0	17
Harvesting	10	42	102	203	375	167
Transport (field to homestead)	0	13	46	124	260	106
Shelling and Packing	0	31	91	216	417	175

Source: CSO/MACO Crop Forecast Survey, 2010

Table 5: Distribution of returns to labor days per hectare planted

Revenue	Returns to Labor Quintiles					Mean
	1	2	3	4	5	
Yield (kg/ha planted)	1,282	1,720	2,112	2,618	3,573	2,261
Price (ZMK/kg)	1,300	1,300	1,300	1,300	1,300	1,300
Gross Revenue (ZMK/ha)	1,666,998	2,235,686	2,746,225	3,403,496	4,645,496	2,939,637
<i>Costs (ZMK/ha)</i>						
Hired animal use	111,541	70,919	81,838	89,496	96,437	90,045
Hired machine use	7,434	1,986	3,014	3,129	7,656	4,644
Hired labor	211,777	81,440	92,753	124,204	201,691	142,370
Basal	172,725	94,266	121,997	141,511	191,926	144,483
Top dressing	174,741	106,863	124,130	145,070	190,268	148,213
Fertilizer transport	9,706	4,218	5,148	6,285	8,935	6,858
Transport to FRA	13,584	12,301	18,940	32,758	47,669	25,051
Transport to other buyer	52,898	11,288	17,975	24,216	44,194	30,113
Herbicides	1,570	346	1,720	1,226	3,059	1,584
Seed	262,520	123,309	147,688	161,964	199,423	178,977
Own animal use	76,710	50,061	56,232	61,976	68,726	62,740
Own machine use	1,742	204	1,659	715	2,764	1,417
Costs excl' land/hh labor	1,096,947	557,199	673,093	792,549	1,062,748	836,494
Net revenue (ZMK/ha)	570,051	1,678,487	2,073,132	2,610,947	3,582,748	2,103,143
HH labor days (days/ha)	394	348	229	156	79	241
Return: labor & land (ZMK/day)	-875	4,966	9,216	17,206	75,560	21,217
Land cost (ZMK/ha/year)	221,908	218,356	215,410	211,929	203,514	214,223
Costs excl' hh labor	1,318,854	775,555	888,503	1,004,479	1,266,262	1,050,717
Net Revenue (ZMK/ha)	348,143	1,460,131	1,857,722	2,399,018	3,379,234	1,888,920
Return : labor (ZMK/ day)	-2,666	3,850	7,683	15,198	70,146	18,844

Source: MACO/CSO Crop Forecast Survey, 2010.

Table 7: Profit per hectare of maize production by province

Province	Total maize profit (ZMK)	Hectares planted	Profit per hectare (ZMK/ha)
Central	215,897,973,871	187,019	1,154,417
Copperbelt	40,864,409,155	77,462	527,540
Eastern	326,853,442,781	284,183	1,150,151
Luapula	34,909,023,448	27,943	1,249,274
Lusaka	36,248,607,230	32,028	1,131,769
Northern	187,590,528,628	111,132	1,687,995
North Western	56,120,979,487	61,420	913,723
Southern	250,840,182,271	243,944	1,028,270
Western	19,194,798,374	62,549	306,877
All Zambia	1,168,519,945,244	1,087,681	1,074,322

Source: CSO/MACO Crop Forecast Survey 2010

Note: Profit is calculated as ZMK 65,000 less total expenditures including family labor and asset use.