

# Spatial and Temporal Analysis of Women's Welfare in the Democratic Republic of Congo

## A Multidimensional First Order Dominance Approach

Malokele Nanivazo and Kristi Mahrt



### OBJECTIVE

This paper assesses the wellbeing of women in the Democratic Republic of Congo (DRC) using six indicators of basic welfare. We examine differences among provinces and changes between 2007 and 2010. We employ the first order dominance (FOD) approach to compare welfare outcomes. We consider married, unmarried, and a combined sample of women.

### METHODOLOGY: FIRST ORDER DOMINANCE

- FOD allows comparison of discrete multidimensional welfare indicators without assumptions about each indicator's relative importance.
- FOD only maintains that it is better to be deprived than not deprived in any dimension.
- Population A FODs population B if we can achieve population B's distribution of outcomes by transferring shares of population A to unambiguously worse outcomes.

#### An example with 3 binary indicators and 3 populations:

- It is better to be not deprived in any dimension (1, 1, 1) than deprived in all dimensions (0, 0, 0).
- The combination of indicators (1, 1, 0) is better than (1, 0, 0).
- The combinations (1, 1, 0) and (0, 0, 1) are indeterminate. One is not better than the other without assigning relative importance.

Indicators			Populations		
I	II	III	A	B	C
1	1	1	25	20	25
1	1	0	15	15	20
1	0	1	20	20	15
1	0	0	25	25	25
0	1	0	35	35	35
0	1	1	25	25	25
0	0	1	35	35	35
0	0	0	20	25	20
Total			200	200	200

A dominates B. C & A and C & B are indeterminate.

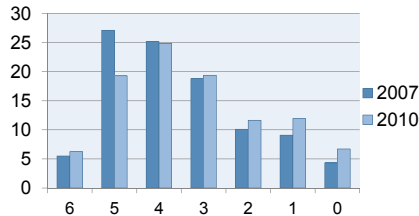
### DATA AND WELFARE INDICATORS

We define six binary welfare indicators using data from the 2007 DRC Standard Demographic and Health Survey (DHS) and the 2010 DRC Multiple Indicator Cluster Survey (MICS). Each woman is either "deprived" or "not deprived" in each indicator. With six indicators, there are 64 possible combinations of welfare outcomes.

**Water deprivation:** Water is surface water or is more than 15 minutes away.  
**Sanitation deprivation:** No access to improved latrines or toilets.  
**Shelter deprivation:** Floors are not improved, e.g. mud floors.

**Education deprivation:** Cannot read at a basic level.  
**Information deprivation:** The household does not have a radio or TV.  
**Health deprivation:** Did not use a mosquito net the previous night.

Women Facing a Combination of 0 – 6 Welfare Deprivations (%)



Note: The seven categories sum to 100 for each year.

Women not Deprived by Welfare Indicator (%)

	Unmarried Women						Married Women					
	National		Rural		Urban		National		Rural		Urban	
	2007	2010	2007	2010	2007	2010	2007	2010	2007	2010	2007	2010
Sample size	834	4395	455	1967	379	2428	7884	8235	4812	5121	3072	3114
Sanitation	83.6	86.6	76.8	78.3	95.7	97.6	88.5	84.3	83.8	79.6	95.9	96.5
Water	27.1	41.2	4.6	12.7	66.5	78.9	25.5	29.0	4.3	12.5	58.8	72.0
Shelter	20.8	31.2	2.0	4.0	53.8	67.3	16.3	17.6	1.2	3.5	40.1	54.6
Information	36.7	51.1	24.4	32.3	58.1	76.1	49.6	47.2	37.4	36.6	68.9	74.9
Health	13.8	25.9	10.8	19.7	18.9	34.1	24.7	43.2	19.8	42.9	32.5	44.1
Education	47.1	60.0	32.1	42.4	73.4	83.5	42.6	41.2	27.4	28.9	66.4	73.2

### RESULTS

2010 Spatial FOD Comparisons, All Women (bootstrap probabilities)

Areas	NAT	RUR	URB	BDD	BCG	ETR	KOC	KOT	KTG	KSS	MNM	NKV	ORT	SKV	AVG
National		0.87		0.04			1.00	0.43	0.12					0.01	0.19
Rural								0.28							0.02
Urban	0.87	0.87		0.62	1.00	0.02	1.00	1.00	1.00			0.79	0.04	0.54	0.60
Bandundu								0.33							0.03
Bas Congo							0.98	0.02							0.08
Equateur								0.06							0.00
Kasai Occident															0.00
Kasai Oriental							0.05								0.00
Katanga		0.01					0.79	0.02							0.06
Kinshasa	0.97	0.99	0.97	0.91	1.00	0.10	1.00	1.00	1.00			0.92	0.33	0.79	0.77
Maniema		0.11		0.01		0.07	0.48								0.05
Nord Kivu		0.49		0.03			0.98	0.19	0.10					0.04	0.14
Orientale		0.72		0.02		0.13	0.77	0.02		0.01					0.13
Sud Kivu	0.08	0.72		0.06		0.05	0.93	0.25	0.21			0.02			0.18
Average	0.15	0.37	0.07	0.13	0.15	0.03	0.67	0.23	0.19	0.00	0.00	0.13	0.03	0.11	0.16

Notes: In the spatial FOD comparisons, row averages show the probability an area dominates all other areas, and column averages show the probability an area is dominated by other areas.

Probability of Net Domination and Rank

Areas	2007		2010		Change
	Domination	Rank	Domination	Rank	
Kinshasa	0.76	1	0.77	1	0
Urban	0.53	2	0.53	2	0
Orientale	-0.17	11	0.10	3	-8
Sud-Kivu	0.15	3	0.07	4	1
Maniema	0.02	5	0.05	5	0
National	-0.03	7	0.04	6	-1
Nord-Kivu	-0.10	8	0.01	7	-1
Equateur	-0.11	9	-0.03	8	-1
Bas-Congo	0.05	4	-0.07	9	5
Bandundu	-0.24	12	-0.10	10	-2
Katanga	0.00	6	-0.13	11	5
Kasai-Oriental	-0.16	10	-0.23	12	2
Rural	-0.39	14	-0.35	13	-1
Kasai-Occident	-0.31	13	-0.67	14	1

Notes: The probability of net domination is the probability an area dominates all other areas minus the probability it is dominated.

### KEY FINDINGS

- This paper set out to investigate the welfare of women in the DRC.
- The FOD comparisons reveal mixed evidence of improvement and deterioration of women's welfare across the DRC and over the three year period as well as across the three sub-samples.
- The province of Kinshasa and urban areas outperform other areas and the province of Kasai-Occidental and rural areas lag behind.
- There is evidence of welfare improvement in the provinces of Sud-Kivu, Nord-Kivu, Maniema, and Oriental.