Service delivery implications of census undercount in Sub Sahara Africa

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Abstract

Studies carried out in United States of America have confirmed that census undercounting compromises fair distribution of resources. None of such studies have been done in Sub Sahara Africa where most countries use census data to achieve the same goal. This study estimated effect of undercounting on service delivery in the region, using South Africa's 10% census samples. The data provided adjusted counts and these were also used for recreating unadjusted counts. We then applied the PRINCEWATERHOUSECOOPERS method to estimate undercounting effect on the allocation of the Basic Service Grant among the country's nine provinces using both adjusted and unadjusted counts. We further estimated the effects of undercounting on parliamentary seat allocations using the same procedure. We found undercounting to unfairly benefit certain provinces at the expense of others.

Introduction

Authorities largely rely on national data collected from each individual to implement efficient service delivery (Onsembe and Ntozi, 2006). In most cases censuses are the only integral source of such data (Cronje and Budlenger, 2004). Availability and quality of such data is often better among developed countries than developing countries especially those from Sub Sahara Africa (SSA) (Onsembe and Ntozi, 2006). In this region census taking processes among majority of countries are relatively substandard (Onsembe and Ntozi, 2006). Therefore in most cases data from these censuses are of poor quality (Anderson, 2004). Census taking is also a massive, highly costly, as well as largely complex process (Cronje and Budlenger). For this reason the capacity to consistently handle censuses among majority of countries in this region has remained a challenge (Sembajwe, 2001).

A persistent challenge in census taking is undercounting (Keane *et., al,* 1995). The challenge is greater among majority of countries from SSA, largely due to budget constraints (Onsembe and Ntozi, 2006). Therefore few countries like South Africa, Nigeria, Tanzania, Mozambique, Zambia and recently Ghana and Zimbabwe tested for census undercount. Even among these countries only South Africa has consistently tested and adjusted the enumerated counts for undercounting. Methods often used to investigate undercount effect on service delivery require information from such data. Hence only South Africa's census data apply to these methods.

Unavailability of such data partly explains why this subject remains unexplored in this region, further contributing to a compromise on quality of service delivery. Empirical evidence on such a subject matter is necessary for planning authorities as well as members of the public. The latter need to comprehend the importance of participating in such data collection processes. For instance, in Nigeria censuses counts are used in deciding on both the distribution of federal funds and political power (Population Reference Beureau, 2006). In Zimbabwe the distribution of the Parliamentary constituencies among the 10 Provinces is based on census counts (Ministry of Justice, Legal and Parliamentary Affairs). Each Parliamentary constituency receives a yearly allocation of 50 000 United States of American dollars, under the Constituency Development Fund (Ministry of Justice, Legal and Parliamentary Affairs). In South Africa census counts are used for allocating funds as well as the 200 Parliamentary seats that are shared among the country's nine provinces.

Compromise on quality of service delivery should further be worsened by irregular census conduction which is characteristic among most countries in this region (Osembe and Ntozi, 2006). This implies that available census data may be repeatedly used beyond recommendable duration. A maximum of 10 year intercensal period is recommended. Research conducted among developed countries particularly in the United States of America (USA) have confirmed the negative effects of census undercounting on service delivery (PRINCEWATERHOUSECOOPERS, 2000). The same source further confirmed that the effect becomes greater in cases where the same data is repeatedly relied upon for many years; a practice that is common in SSA.

For such reasons there have often been calls for census adjustment in the USA (Schirm, 1991, Breiman (1994). For example the decision not to adjust for census undercounting in 1990 was met with a lot of disappointment by many States governors (Murray, 1992). Such decisions often provoke controversies as undercounting is rarely homogeneous across sub populations. As Steffey (1997) observed, undercounting poses a serious problem, particularly in that not all areas and sub population groups are undercounted at the same rate. This implies that population groups with higher undercount rates tend to lose more in case of e.g. state funding being distributed according to population counts. For instance in United States of America's census 2000 the implications were likely to be enormous for such populous states recording high undercount estimates like California (Steffey, 1997).

The objective of our paper was therefore; to estimate the effect of undercounting on service delivery in SSA. To achieve this objective in a region where most countries had inappropriate data for our method, we used data from South Africa's last three censuses. We argue that results from the country's nine provinces investigated were largely generalizable across SSA. Of course we acknowledge that using findings from a single country's censuses and generalizing them on an entire region has its own limitations. However, we were contented that given the challenges of inadequate census data from other countries' in the region; findings arrived at using South African censuses provided an eye opener of what to expect from the region. From this perspective, our study is important as it provided a starting point that should stirrer further researches that may be more exhaustive in investigating this subject matter in this region.

Data

South Africa's 10% sample data for censuses 1996, 2001, and 2011 were used in this study. For all censuses the adjustments for undercounting were based on calculations from the Post Enumeration Surveys (PES). For each analysis we applied the respective weighting variable for the purpose of weighting the samples' counts so that they estimate actual census counts. For the purpose of this study we also needed unadjusted data. Since Statistics South Africa (Statssa), the custodians of this data do not avail unadjusted census data for public consumption, we recreated the data. We achieved this by multiplying the reciprocal of the adjustment factor for each province on the respective adjusted counts. Statssa arrived at adjustment factors using the following procedure: for instance a 10% undercounting rate; the adjustment factor would be; $1/(1-0.1) = \underline{1.1}$. For a 17% undercount rate; adjustment factor would be; $1/(1-0.17) = \underline{1.2}$, and for an undercount rate of 14.5% adjustment factor would be; $1/(1-0.145) = \underline{1.17}$. The reciprocals for above adjustment factors would therefore be: $(1-0.1)/1 = \underline{0.9}$ for the first example; then $(1-0.17)/1 = \underline{0.83}$ for the second example, and $(1-0.145)/1 = \underline{0.855}$ for the last example (Statssa Census, 2011). We termed the recreated counts "unadjusted", to differentiate them from enumerated counts termed above as unadjusted.

Measurement of service delivery and Procedures

We adopted funds and parliamentary seats allocations as our proxies for service delivery. This selection was guided by literature which suggest that amount of funds allocated to local authorities as well as number of parliamentary seats are vital in achieving quality service delivery (Steffey, 1997; PRINCEWATERHOUSECOOPERS, 2000). According to the South Africa National Treasury IGFR (2008) there are seven main grants under the Provincial Equitable Share funds in South Africa, we chose the Basic Services Grant, whose allocation of funds is entirely based on census counts. The formula for allocating these funds is built on the premise that funding received by a province is proportional to its total population. Hence the formula is given as: **(Provincial Pop/National Pop)*Total Funds Budgeted for particular year from the Grant.** Where **Pop** = population counts.

To estimate the effect of undercounting, the PRINCEWATERHOUSECOOPERS method was applied. The method was first used by a USA's consultancy company called PRINCEWATERHOUSECOOPERS. The company was tasked by the USA government to investigate the effect of census undercounting among the country's States and Counties before the next census in 2000. Their procedure was to first identify key governments grants

that were distributed from the USA's central government to the respective States and Counties using a formula that was entirely based on population counts. They identified eight grants. Each of the grants was allocated to the respective State and County based on population counts from both their unadjusted and adjusted census data. The difference in funds allocations based on the two data for each respective State and County was the estimated effect of undercounting on service delivery. Since the census counts were used in allocating these grants for the entire 10 year intercensal period in USA, the difference in funds allocations based on the two data sets for each State and County were projected for 10 years.

In the case of South Africa we used the country's nine Provinces as a replacement of the States and Counties in the case of the USA. Just like South Africa all other SSA countries are dissected into Provinces which also receive various allocations from respective central governments, except for Nigeria which is divided into Federal States like the USA. Using the same logic behind the method's application in the USA scenario, we computed funds allocation for each of the nine provinces in South Africa; firstly based on counts from "unadjusted" and then unadjusted data. The difference in funds allocations based on the counts from the two comparative data sets for each respective Province became the estimated undercounting effect on service delivery, based on this proxy. We did this for each of the three censuses.

We further projected the effect that would accrue over the entire intercensal period, assuming the same formula remained in effect over that period. We did this with clear knowledge that South Africa does not rely on census data in allocating funds to the country's Provinces for the entire intercensal period. The country only uses census data for only one year immediately after the full census results are declared. For other subsequent years before the declaration of next census's results they rely on population estimates from yearly conducted General Household Survey. Rather we did this analysis in the interest of the majority of SSA countries that largely rely on a single census' counts for many years, when allocating resources. For instance as recommended by the United Nations some countries in this region conduct censuses after the lapse of each 10 year period. Yet some have no capacity to conduct the census within this regulated period. The projection of undercounting effect on service delivery over the years was meant to give the estimates for such countries, assuming that they relied on census data for implementing service delivery.

For the other proxy; the Independent Electoral Commission of South Africa (IEC, 1993) states that; out of the 200 parliamentary seats designated to the country's nine provinces, 100 000 eligible voters constitute a seat (IEC, 1993). The same source defined eligible voters as individuals eighteen years and above who registered to vote. We assumed that all individuals who are eighteen years and above from each province as obtained from census counts would have registered to vote. We therefore computed estimated parliamentary seat allocations based on adjusted and "unadjusted" data for each province. The difference was also interpreted as undercounting effect on service delivery based on this proxy. The same logic in allocating parliamentary seats applies elsewhere in SSA, except that the thresholds for allocating such seats vary with countries. For example Zimbabwe's threshold is 30 000 registered voters (Ministry of Justice, Legal and Parliamentary Affairs).

Results

Adjusted and "unadjusted" counts

Generally there were substantial differences between adjusted and "unadjusted" counts, running into hundreds of thousands or more for each province for all the three censuses. As for census 1996, the biggest difference between the counts from the two data sets was from KwaZulu Natal, i.e. 1 078271, followed by Gauteng with 734 072, and Eastern Cape with 666 118. The lowest was from Northern Cape which had 131 059. Census 2001 recorded bigger differences compared to those for census 1996, for the respective provinces. Again, KwaZulu Natal had the biggest followed by Gauteng, and Northern Cape having the smallest. There were some changes in census 2011, where the biggest difference of counts between the two data sets were from Gauteng with 1 804 023, followed by KwaZulu Natal with 1 714 639, with Western Cape ranking third. Northern Cape still had the smallest difference.

[Table 1 here]

Provincial Equitable Share Funds

There are seven main grants that fall under the Provincial Equitable Share (PESF), whose funds are distributed to provinces using various formulas, shown in Table 2. The grants whose funds are allocated using a formula that at least relies on census counts are education, Health, and the Basic Services Grant. The former two are however not 100% dependent on census counts, but also depend on counts sourced from other data sources. The Basic Services Grant is the only one whose funds are allocated entirely based on census counts. However,

these census counts are only used during the first year in which the respective census' counts are officially availed. Thereafter, yearly population estimates are used. The first PESF allocations coinciding with investigated censuses were in 1999 and these remained in force for the next 5 years. In 2004 allocations were reviewed upwards as should be expected, and these remained in force for ten years, i.e. until 2013 when the third reviews which are currently in effect were carried out. In terms of amounts allocated, Education, followed by Health, and Basic Services had been receiving the highest shares during each allocation.

[Table 2 here]

Basic Services Grant Funds allocations

The provincial allocations from Basic Services Grant (BSG) based on counts from census 1996 were effected in the year 1999. Three provinces were going to lose if the adjustment for undercount was not carried out. KwaZulu Natal was going to lose about R37 491.27, Northern Cape, R 3 7491, and Limpopo R6 184.36. The other six provinces would have benefited from the undercount. In terms of absolute figures the biggest beneficiary would have been Western Cape. Allocations based on census 2001 were effected in year 2004. Again three provinces would have been prejudiced by the undercount. The provinces would have been Free State, Gauteng, and again KwaZulu Natal. Among the three provinces, the biggest loser in terms of absolute figures would have been KwaZulu Natal, which could have lost about R 135 913.23. Eastern Cape Province would have been the biggest beneficiary from the undercount. Allocations based on census 2011's counts were effected in year 2013. Five out of the nine provinces were bound to lose if the last census counts were not adjusted. The provinces are Gauteng, KwaZulu Natal, Mpumalanga, North West, and Western Cape. In terms of absolute loses Western Cape would have incurred the biggest lose, compared to other provinces, i.e. R 276 845.71. On the other hand Eastern Cape would have been the biggest beneficiary from the undercount.

Projecting the effect of undercounting until the next review, naturally a province would have maintained the status earlier obtained. Meaning that, provinces which recorded loses would have escalated loses after projection, and those with gains also having escalated gains.

The only difference would be that the respective projected losses or gains will be larger relative to those for a single year, as they indicate the cumulative effect of undercounting over the projected years. For instance were as KwaZulu Natal would have lost about R

37491.27 from allocations for 1999 using census 1996's unadjusted counts, loses would have escalated to R 187 456.34 after a 5 year projection period.

[Tables 3-5 here]

Estimated Parliamentary seat allocations

Parliamentary seat allocations in Tables 6, 7 and 8 denoted as official seats are the actual seat allocations from the EIC of South Africa, for respective elections. These were allocated to provinces based on people aged eighteen years and above who had registered to vote per province. The other two sets of parliamentary seat allocations from each of the three tables are estimates based on adjusted and "unadjusted" census counts respectively; assuming everyone who is eighteen years and above registered was to vote. In election 1999, from the actual seat allocations, Gauteng received the highest allocation, with 43 seats. KwaZulu Natal followed, then Eastern Cape, and Western Cape respectively. Northern Cape which got 4 seats received the least number of parliamentary seats. If all people aged eighteen years and above had registered to vote, Gauteng would have obtained about 52 seats, followed by KwaZulu Natal getting about 49, Eastern Cape about 33, Western Cape about 26. However the parliamentary seat allocation would reduce if based on "unadjusted" counts. Guaterng would get about 47, KwaZulu Natal 43, Eastern Cape 30, and Western Cape 24. Northern Cape would have obtained 5 seats based on adjusted counts but about 4 seats if based on "unadjusted" counts.

As for elections 2004 and 2009 the allocations maintained the status quo observed in election 1999 in terms of which provinces would get more seats under the three categories of allocation. The only difference was that expected number of seats to be allocated to each province based on adjusted and "unadjusted" counts during elections 2004 and 2009 would be more compared to those for election 1999. For instance Gauteng would then get 63 seats from adjusted counts, or 51 seats if based on "unadjusted" counts. Allocations of seats based on both adjusted and "unadjusted" counts for election 2014 would have further seen all provinces again gaining more seats. However, like in previous cases estimated seat allocations based on adjusted counts would be more compared to those allocated based on "unadjusted" counts, for each province.

[Tables 6-8 here]

Discussion

The purpose of this study was to estimate the effect of undercounting on service delivery in SSA. We used Grants as well as Parliamentary seats allocations to measure service delivery because access to both is expected to contribute towards improving welfare of a population. Access to funds equips authorities with necessary revenue that can be used to plan for the improvement of the welfare of the population concerned. Equally the same adequate parliamentary representation should contribute towards the same goal. For parliamentarians are vehicles that are constitutionally mandated to spearhead development among communities they represent. These proxies that we used to measure service delivery have often been used in the same capacity in other related studies in the USA.

We were aware of the fact that use of censuses from only one country i.e. South Africa, and generalizing the findings to the entire region of SSA has its own limitations. A much preferred approach would have been to use censuses that were sampled across the region. However, we took cognoscente of the fact that the methods we used to achieve our objective only applied to cases where respective countries' censuses were tested and adjusted for undercounting. Then both adjusted and unadjusted data should be accessible, which was not the case among all SSA countries except for South Africa. These countries only publish enumerated data, without adjusting for undercounting. Our attempt to construct adjusted data for these countries proved difficult since we were not privy to the procedures they would employ in adjusting for undercounting. We could only proceed with the research using South African censuses. As for South Africa we took advantage of the fact that, we were aware of the procedures used in arriving at the country's adjusted census data for the last three censuses. This meant we had information that was necessary for recreating the estimates of the respective censuses' unadjusted data, since only adjusted data was accessible. Furthermore not only one census was investigated, but rather three successive censuses. This gave some fair representation with regards to time.

We were also aware of the fact that the recreation of unadjusted data had its own limitations as this had the potential of introducing further bias in the data. However, we realized that the error was very much unlikely to have any significant effect on our findings. Statssa made available the official unadjusted counts for the nine provinces for census 1996 (Statistics South Africa, 1998). Based on this we noted that our "unadjusted" counts relative to official unadjusted counts for census 1996, for the respective Provinces only differed slightly. Such a

realization led to our assumption that equally the same the "unadjusted" counts we constructed for the other two censuses should not have any significant differences with respective counts from the official unadjusted data.

Our findings from investigations on the Basic Service Grant allocations were that undercounting was associated with unfair and unjustified resources allocations. For instance results based on allocations using counts from census 1996 indicated that the three provinces prejudiced by undercounting would have lost a total revenue of R 52 306.26. This amount would have been unfairly distributed among the other six provinces. Allocations based on census 2001 would have also resulted in the three prejudiced provinces losing a total revenue of R 169 044.88. As for the allocations based on census 2011 counts the five prejudiced provinces would have lost a total revenue of R 605 444.82. This would have meant compromised service delivery among provinces which were prejudiced by undercounting. Provinces unfairly benefitting from undercounting would have received more funds and parliamentary seats relative to what they eventually got after adjustment for undercounting. Naturally the losses incurred by prejudiced provinces would worsen if projected over respective intercensal periods. As for parliamentary seats allocations, if all individuals aged 18 years and above, as obtained from respective censuses, were to register as voters, seat allocations from unadjusted counts would be lesser compared to seat allocations based on adjusted counts, for each province. These findings indicated that undercounting compromised service delivery.

As noted most countries in SSA rely on census counts for funds distribution among sub populations groups for entire intercensal period, largely because of data scarcity. The intercensal periods may at times exceed beyond the standard period of 10 years for certain countries, mainly due to lack of capacity to conduct another census. Such countries may have no alternative besides to rely on this data until another census is eventually conducted. For this reason we found it necessary to also project the effect of undercounting on Basic Services Grand and Parliamentary seat allocations in South Africa, for each intercensal period. Yet these projections may not apply to South Africa's context, since the country only relies on census counts for only one year; the projections gave an insight on the long term effect of undercounting on service delivery among countries which rely on same census counts for longer durations. Findings from the projections were that undercounting would lead to arithmetic escalated revenue lose for each province over time. The longer the

intercensal period would be, the bigger the revenue loss for a particular province. Again the effects would be worse for populous provinces with high undercount rates.

Conclusions

Conclusions are that undercounting often compromises service delivery as partly evidenced by some of the findings from Basic Service Grant allocations. There were certain provinces that would have been prejudiced of deserved funds because of undercounting. Further evidence to back up this conclusion also came from the findings from Parliamentary seat allocations. Undercounting would have always decreased the number of parliamentary seats allocated to each province, compared to seats that would have been obtained using adjusted counts. However, further findings from the Basic Service grant allocations indicated that besides compromising service delivery among certain sub population groups, undercounting would also benefit other sub population groups. This was evidenced by the fact that certain provinces were bound to benefit extra funds at the expense of prejudiced provinces. Overall, we are convinced that these findings highlight possible effects of undercounting on service delivery across SSA at large.

From our findings; firstly, we recommend that all census authorities from SSA countries should consistently implement the measurement and adjustment of census undercount. The benefits of this are wide. Secondly, we recommend more researches on this matter.

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Tables and graphs

Table 1: Adjusted and "unadjusted" counts from the last three censuses

Province	1996			2001			2011		
	Adjusted	Unadjusted	Difference	Adjusted	Unadjusted	Difference	Adjusted	Unadjusted	Difference
1	3957322	3613431	343891	4513206	3777553	735653	5822734	4745528	1077206
2	6301972	5635854	666118	6415451	5472380	943071	6562053	5715548	846505
3	840662	709603	131059	823429	678507	144922	1145861	992316	153546
4	2633409	2402986	230423	2715587	2207772	507815	2745590	2468285	277305
5	8417423	7339152	1078271	9420961	7301245	2119716	10267300	8552661	1714639
6	3355012	3040648	314364	3662194	3076243	585951	3509953	2986970	522983
7	7348071	6613999	734072	8830155	7178917	1651238	12272262	10468240	1804023
8	2797692	2515405	282287	3125664	2622433	503231	4039939	3413749	626191

9								
4927336	4371532	555804	5262037	4504304	757733	5404868	4864381	540487
40578899	36245190	4333709	44768685	36819351	7949334	51770561	44207678	7562883

1=Western Cape; 2=Eastern Cape; 3= Northern Cape; 4= Free State; 5= KwaZulu Natal; 6= North West; 7= Gauteng; 8= Mpumalanga; 9= Limpopo. NB Figures in the table were rounded

Table 2: Provincial Equitable Share in South Africa

Equitable share component	Data used	Formula	Year	Amount in Rands (rounded off)
Education	Total enrolment numbers (Ai) School age cohort (6-17 years) (Pi_{6-16})]	$Ai+2 \quad [(Pi_{6-16})]/+\sum i2 [(Pi_{6-16})]$	1999 2004 2013	**33 680 800** **65 588 275** **162 034 758**
Health	Population with and without Medical AID	$(Phi+4Pwi)/\sum i(Phi+4Pwi)$	1999 2004 2013	**15 156 360** **30 394 566** **91 144 551**
Social Development	Target population for each grand type	Sum of grants (weighted 75) and Provincial population income quintiles (weighted 25). Grant values are sum of population eligible for old age grant (65), childcare grant (10) and population	1999 2004 2013	**14 314 340** **28 794 852** **10 127 172**
Economic activity	Gross geographic product (replaced by Remuneration data in 2000)		1999 2004 2013	**6 736 160** **11 197 998** **3 375 724**
Backlog	School Survey of Needs Health Sectorial Report		1999 2004 2013	**2 526 060** **4 799 142**
Basic Services Grant	Census	Provincial share of Population	1999 2004 2013	**7 578 180** **11 197 998** **54 011 586**
Institutional	Independent data		1999 2004 2013	**4 210 100** **7 998 570** **16 878 621**

Source: (South Africa) National Treasury. IGFR

Table 3: Basic Services Grant allocation based on 1996 census

Provinces	Basic Services Grant funds allocations for 1999. Based on census 1996 counts (Rands)			Projected funds allocation for period 1999-2003 (Rands)		
	Adjusted	Reconstructed	Gain/loss	Adjusted	Reconstructed	Difference
1	739 036.83	755 499.71	-1 6462.94	3695183.848	3777498.55	-82314.702
2	117 6904.34	1 178 349.90	-1445.66	5884521.186	5891749.51	-7228.324
3	156 995.12	148 364.49	8630.60	784975.4567	741822.47	43152.9867
4	491 793.64	502 418.68	-10624.97	2458968.566	2512093.39	-53124.824
5	1 571 968.4	1 534 477.12	37491.27	7859841.962	7672385.62	187456.342
6	626 554.33	635 741.68	-9187.35	3132771.645	3178708.38	-45936.735
7	1 372 265	1 382 861.42	-10596.38	6861325.229	6914307.10	-52981.871
8	522 473.85	525 923.35	-3449.50	2612369.246	2629616.77	-17247.524
9	920 188.57	914 004.21	6184.36	4600942.861	4570021.07	30921.791
Total	7578180	7577640.571		37890900	37888202.9	

Table 4: Estimates of funds allocation based on 2001 census counts by Province

Provinces	Basic Services Grant funds allocations based on census 2001 counts (Rands)			Projected funds allocation for period 2004-2012 (Rands)		
	Adjusted	Reconstructed	Difference	Adjusted	Reconstructed	Difference
1	1 128 888.9	1148880.41	-19991.50	10 160 000.1	10339923.66	-179923.51
2	1 604 698	1664334.07	-59636.33	14 442 282	14979006.63	-536727.01
3	205 964.47	206356.71	-392.29	1 853 680.23	1857210.364	-3530.57
4	679 250.21	671457.42	7792.77	6 113 251.89	6043116.783	70134.93
5	2 356 466.5	2220553.18	135913.23	21 208 198.5	19984978.61	1223219.08
6	916 025.17	935588.54	-19563.40	8 244 226.53	8420296.888	-176070.60
7	2 208 688.1	2183349.14	25338.88	19 878 192.9	19650142.23	228049.91
8	781 822.84	797569.72	-15746.91	7 036 405.56	7178127.485	-141722.17
9	1 316 194.2	1369909.73	-53715.61	11 845 747.8	12329187.57	-483440.52
Total	11197998.0	11197998.92		100781985.5	100781990.2	

Table 5: Estimates of funds allocation based on 2011 census counts by Province

Provinces	Basic Services Grant funds allocations based on census 2011 counts (Rands)			Projected funds allocation for period 2013-2022 (Rands)		
	Adjusted	Reconstructed	Difference	Adjusted	Reconstructed	Difference
1	6 074 786.2	5797940.658	276845.71	54673075.8	52181465.93	2491611.38
2	6 846 108.5	6983081.492	-136972.63	61614976.5	62847733.43	-1232753.66
3	1 195 462.6	1212381.319	-16918.67	10759163.4	10911431.87	-152267.99
4	2 864 440	3015675.127	-151234.88	25779960	27141076.14	-1361113.90
5	10 711 747	10449379.84	262368.06	96405723	94044418.58	2361312.51
6	3 661 890.4	3649388.732	12502.16	32957013.6	32844498.59	112519.45
7	12 803 500	12789776.2	13724.39	115231500	115107985.8	123519.49
8	4 214 818.3	4170814.436	44004.50	37933364.7	37537329.93	396040.53
9	5 638 831.8	5943152.491	-304319.72	50749486.2	53488372.42	-2738877.46
Total	54011586.0	54011590.30		486104263.2	486104312.7	

1=Western Cape; 2=Eastern Cape; 3= Northern Cape; 4= Free State; 5= KwaZulu Natal; 6= North West; 7= Gauteng; 8= Mpumalanga; 9= Limpopo.

Table 6: Official and Expected Provincial l seat allocation for Election 1999

Province	Official Seats (Based on Voter registration)	10% sample Adjusted 1996 census count (18 years & above)	Expected seats (Based on 10% 1996 adjusted count)	Reconstructed 1996 count (18 year & above)	Expected seats (based on 1996 reconstructed)
1	21	2604325.7	26.0	2378009.797	23.8
2	26	3364049.7	33.6	3008469.647	30.1
3	4	508123.6	5.08	428907.1308	4.3
4	15	1646063.5	16.5	1502032.944	15.0
5	40	4870770.4	48.7	4246824.712	42.5
6	17	2003052.5	20.0	1815366.481	18.2
7	43	5174424	51.7	4657499.042	46.6
8	14	1589657.3	15.9	1429260.878	14.3
9	20	2471035.3	24.7	2192302.518	21.9
Total	200	24,231,502	242.3	21641154.44	216.4

1=Western Cape; 2=Eastern Cape; 3= Northern Cape; 4= Free State; 5= KwaZulu Natal; 6= North West; 7= Gauteng; 8= Mpumalanga; 9= Limpopo.

Table 7: Official and Expected Provincial seat allocation for Election 2004/9

Province	Official Seats (Based on Voter registration)	10% sample Adjusted 2001 census count (18 years & above)	Expected seats (Based on 10% sample 2001 adjusted count)	Reconstructed 2001 count (18 year & above)	Expected seats (based on 2001 reconstructed)
1	23	3013024	30.1	2521901.088	25.2
2	26	3550922.9	35.5	3028937.234	30.3
3	5	519206	5.2	427825.744	4.3
4	12	1697750.4	17	1380271.075	13.8
5	39	5470630.9	54.7	4239738.948	42.4
6	14	2285648.1	22.9	1919944.404	19.2
7	47	6314155.9	63.1	5133408.747	51.3
8	15	1803704.7	18.0	1513308.243	15.1
9	19	2763913.9	27.6	2365910.298	23.7
Total	197	27,418,957	274.2	22757734.31	227.6

1=Western Cape; 2=Eastern Cape; 3= Northern Cape; 4= Free State; 5= KwaZulu Natal; 6= North West; 7= Gauteng; 8= Mpumalanga; 9= Limpopo.

Table 8: Official and Expected Provincial l seat allocation for Election 2014

Province	Official Seats (Based on Voter registration)	10% sample Adjusted 2011 census count (18 years & above)	Expected seats (Based on 10% sample 2011 adjusted count)	Reconstructed 2011 count (18 year & above)	Expected seats (based on 2011 reconstructed)
1	26	4082578.7	40.8	3327301.641	33.3
2	18	3940532.6	39.4	3432203.895	34.3
3	16	735225.4	7.4	636705.1964	6.4
4	17	1793776.9	17.9	1612605.433	16.1
5	18	6309020.5	63.1	5255414.077	52.6
6	16	2280852.6	22.8	1941005.563	19.4
7	22	8848775.7	88.5	7548005.672	75.5
8	16	2524094.1	25.2	2132859.515	21.3
9	20	3190339.1	31.9	2871305.19	28.7
Total	186	33,705,196	337.1	28784237.38	287.8

1=Western Cape; 2=Eastern Cape; 3= Northern Cape; 4= Free State; 5= KwaZulu Natal; 6= North West; 7= Gauteng; 8= Mpumalanga; 9= Limpopo.