4. Access to basic services in post-apartheid South Africa: What has changed? Measuring on a relative basis

Remigius Chidozie Nnadozie1

Abstract
The end of apartheid and the first all-race elections of 1994 marked a turning point in the socioeconomic and political landscape of South Africa. The apartheid legacy left high levels of poverty in both rural and urban areas, as well as inequalities in access to resources, infrastructure, and social services. Policies and programs ushered in by the new government sought to redress the observed inequalities in different spheres of the people’s everyday lives. For instance, the Reconstruction and Development Program (RDP) was established for the provision of universal access to basic services linked to time-bound targets. This paper attempts to provide measurable insights into shifts in access to basic services for different demographic segments of the South African society. This is undertaken against a backdrop of government claims to have accelerated service delivery and demographic change in the country. The analysis is mainly on the basis of household income levels and population groups (race), with access to piped water and access to formal housing as the two main variables of interest. The results show that population group appears to be a stronger factor than household income level in explaining the variance in access to water and to formal housing over the period 1996–2007. Our findings point to a slight improvement for previously disadvantaged segments of the society in terms of access to basic services over this timeframe, even though serious inequalities remain to be addressed by policymakers.

Key words: Access and backlog, service delivery, piped water, housing, demographic change, inequalities

Résumé
La fin de l’Apartheid et les premières élections panraciales de 1994 ont marqué un tournant dans le paysage socioéconomique et politique de l’Afrique du Sud. Le régime de l’Apartheid a laissé derrière lui des niveaux élevés de pauvreté dans les campagnes comme dans les villes, et des inégalités dans l’accès aux ressources, aux infrastructures et aux services sociaux. Les politiques et programmes introduits par le nouveau régime tentent de mettre fin aux inégalités observées dans les différentes sphères de la vie quotidienne des habitants. Le Programme de reconstruction et de développement (RDP) a ainsi été mis en place pour assurer l’accès

1. Remigius Chidozie Nnadozie (PhD), Mangosuthu University of Technology, Institutional Planning & Research Directorate, PO Box 12363, Jacobs 4026 Durban, South Africa. E-mail: nnadozie@mut.ac.za
universel aux services de base, avec des objectifs de calendrier. Le présent article tente de donner des indications mesurables sur les changements intervenus dans l’accès relatif aux services de base dans les différents segments de la population sud-africaine, sur la base des résultats affichés par le gouvernement et compte tenu de l’évolution démographique de la société. L’analyse repose principalement sur les revenus des ménages et les groupes de population (race), les deux grandes variables retenues étant l’accès à l’eau courante et l’accès à un logement formel. Les résultats montrent que le groupe de population semble avoir été un facteur plus important que les revenus du ménage pour expliquer la variance observée dans le niveau d’accès à l’eau courante et au logement formel entre 1996 et 2007. Les mêmes résultats indiquent une légère amélioration durant cette période pour les segments de la société jusqu’ici défavorisés en termes d’accès aux services de base. Il reste toutefois de graves inégalités auxquelles les politiques vont devoir faire face.

**Mots clés** : Accès et retard ; prestations de service ; eau courante ; logement ; évolution démographique ; inégalités.

1. **INTRODUCTION**

South Africa is Africa’s largest economy, endowed with vast mineral resources and relatively strong institutions compared with other Sub-Saharan African countries. It is regarded as an upper middle-income country on a par with advanced emerging economies like Brazil, Mexico, and India. The 2001 Census reported a total population of about 45 million for South Africa; of whom around 80% were Black Africans. In terms of the other segments, the Colored population represents about 9%, Indian Asians 2.5%, and Whites about 10%.

South African colonial history is characterized by a struggle for supremacy between the migrant Europeans and native Black Africans, with the minority rule of the former culminating in 1948 in the introduction of the apartheid policy. This system marginalized non-White population groups from most aspects of national life and effectively disenfranchised them. Restrictions were imposed that curtailed their free movement, political representation, ownership of land, equal access to education and health services (hospitals and schools being segregated) and to basic services.

The end of apartheid and the first all-race elections of 1994 marked a turning point in the socioeconomic and political landscape of South Africa. The central perception among the new ruling class (“The ANC Comrades”),
which shaped the majority of government policies, focused on redressing the injustices and inequalities of the past. This perception was founded on the high incidence of poverty that prevailed in both rural and urban areas as well as serious inequalities in access to resources, infrastructure and social services, especially among the majority African population. This perception helped to frame the vision of the post-apartheid 1998 Population Policy of South Africa, which looked forward to the “... establishment of a society that provides a high and equitable quality of life for all South Africans” (DSD 1998). Table 1 from the 1996 Census provides some measurable indicators of baseline social conditions, which the government policies sought to improve in their efforts to create a more equitable society.

Table 1: Relative baseline statistics by population segment (%)

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Black African</th>
<th>White</th>
<th>Indian</th>
<th>Colored</th>
<th>SA Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>% with no education</td>
<td>24.3</td>
<td>1.2</td>
<td>10.2</td>
<td>2.6</td>
<td>19.3</td>
</tr>
<tr>
<td>Unemployment rate</td>
<td>42.5</td>
<td>4.5</td>
<td>20.9</td>
<td>12.2</td>
<td>33.9</td>
</tr>
<tr>
<td>Living in shacks/huts</td>
<td>46.0</td>
<td>0.8</td>
<td>9.6</td>
<td>1.3</td>
<td>34.0</td>
</tr>
<tr>
<td>No piped water</td>
<td>72.3</td>
<td>3.6</td>
<td>2.4</td>
<td>27.6</td>
<td>55.3</td>
</tr>
</tbody>
</table>

Source: Stats SA 1996 Census.

Table 1 reveals wide disparities in socioeconomic conditions across different population groups in 1996. The Black Africans lag behind for all variables by a wide margin in terms of education, employment status, and living conditions. The 1996 Census revealed that only 6% of employed non-White African men earned R3,500 or more per month, compared to 65% of employed White men. If one also takes gender into account across population groups, the inequality at that time becomes even more glaring. For instance, about 48% of employed non-White women earned just R500 or less per month in 1996, while 65% of White men earned about R3,500 or more per month (Statistics South Africa 1998). Cognizant of the wide divide in socioeconomic conditions, all the post-apartheid governments in South Africa have held the universal delivery of basic services to be a top priority for the new era. Policies were introduced to elevate the poor and formerly disadvantaged segments of the population, thereby narrowing the inequality gap.

On the side of the populace, there has been a high expectation of a speedy delivery of services, to create a better life for those who have waited so long for more equitable living conditions. This has helped to fuel protests from communities when the pace of service delivery has been slow, or when there
is a general perception that unacceptable inequities in access to basic services remain, despite promises of accelerated service delivery by the authorities.

Consequently, the rise of social movements and protest actions has characterized sociopolitical life in post-apartheid South Africa. The report by Jain (2010) shows that the number of protests in South Africa over service delivery increased by over 100% between 2007 and 2009, from an average of about 9 per month in 2007 to 19 per month in 2009. Even though there may be other underlying causes for the mass actions – apart from the genuine call for improved delivery of basic services – it is critical to ascertain whether the serious political-will to bring about universal access to basic services has yielded concrete results in reality.

The objective of this paper is then to provide measurable insights into the relative odds of access to basic services over time for different demographic segments of South African society. The segmentation is based on, firstly, the population group/race of households and, secondly, the level of household income. In a nutshell, we seek to test the following hypothesis: The relative odds of access to basic services in South Africa have remained unchanged in the post-apartheid era for different demographic segments of the society.

The above objective is justified, given that most attempts at measuring service delivery in the post-apartheid South Africa have shown considerable numerical improvement in terms of the numbers of individuals or households gaining access to various services. What then appears paradoxical is that in spite of reported progress in this area, there has been increasing outcry and contestation of outcomes amongst various communities in the recent times. This suggests that different dimensions are required in order to measure access to basic services, in order to comprehend this dichotomy. This paper aims to provide clearer insights into the perceptions of the populace regarding access to basic services in various communities on a relative basis. It is hoped that these insights will contribute to the debate regarding access to and perception of basic service delivery in South Africa in the current era.

The paper is organized as follows: this introduction presents the theoretical/conceptual framework that informs the development of the research. In this section, we also briefly review some earlier studies of service delivery in post-apartheid South Africa, in particular. Our analysis seeks to identify some of the challenges in measuring service delivery in South Africa in general. In Section 2 we present the data sources and scientific methodology adopted in our research. The empirical findings of the study and are presented in Section 3, while Section 4 sets out the conclusions and recommendations for the way forward.
4. Access to basic services in post-apartheid South Africa: What has changed? Measuring on a relative basis

**Theoretical focus**

More than a decade after the end of the apartheid system, the people of South Africa have gained political freedom but still have a long road to travel to achieve a more equitable redistribution of the country’s wealth. The apartheid system left a legacy of wide inequalities in access to resources and services that persists to a high degree today.

Conceptually, this paper draws on a combination of two theories namely: the theory of relative deprivation and the theory of public participation. These conceptual foundations enable us to define and assess the poverty and service access situation in the country, to gain a better understanding of attitudes and perceptions toward service delivery, and to posit intervention frameworks that might remedy the situation.

The high incidence of mass protests in South Africa in response to the inadequate service delivery in recent years can be explained by recourse to the social theory of relative deprivation. “Relative deprivation” refers to a situation where a demographic segment of the population is deprived of some goods or services to which they perceive they are entitled, while another segment of the population enjoys such goods or services. Runciman (1972) maintains that the feeling of relative deprivation could have consequences for attitudes and perceptions towards service delivery. Indeed, it could lead to social movements and protests as people join together to demand what they perceive as their fair share of the system. The backdrop for the mass action is social deprivation and lack of basic services, which still negatively impact the majority of individuals and communities in South Africa and prevent their escaping from the poverty trap.

The majority of the people in South Africa are not only deprived of access to basic services but also sidelined from the mainstream activities and processes leading to the provision of such services. Against this backdrop, government intervention is required for a complete overhaul of the system. A participatory community development intervention may be most effective to effect such wholesale change. According to Freire’s theoretical model, as set out in his work *The Pedagogy of the Oppressed* (Freire 1970), communities and individuals must be active agents in their development generally, rather than perpetual passive agents, on the receiving end of governmental or institutional aid. This shift to a more proactive development approach should not only ameliorate the basic living conditions of the poor, but also empower them equally as active stakeholders and responsible individuals within engaged communities. Through this democratization process, a civilized and effective mechanism should emerge that will allow citizens’ voices to be heard.
The day-to-day interactions and forms of group socialization upon which the experiences of public participation are built can secure an equitable level of social inclusion for both individual members and communities. Conceptualizations of public participation can be reinvigorated by exploring new ways to build communities while respecting individual freedoms. In this way, a level of generalized trust can be achieved by communities, while still recognizing the importance of individual free choice, thereby giving everyone the opportunity to contribute and make a real difference. Such an approach could eventuate in a more even redistribution of social potentiality, improving the day-to-day living conditions and empowerment across the community.

Measuring service delivery in South Africa

From the very inception of the Reconstruction and Development Program (RDP), there was an expectation that the goals set out in the national development framework would be achieved as planned. For instance, in the water and sanitation sector, the stated target was to provide all households with a clean and safe supply of 25 liters of water per capita per day (within 200 meters of the household) as well as improved sanitation facilities. Apart from the targets of the RDP, there were other development commitments from various quarters. These included the service delivery targets of former President Mbeki (Mbeki 2004), articulated in one of the most remarkable State of the Nation addresses in 2004 (ten years into democratic South Africa). These related to the key issues around household services provision, education, health care, and security amongst others and were premised on the expectation of speedy delivery. The promises include intensifying the housing program and the delivery of piped water to all households in South Africa within the next five years (2008/9) (Mbeki 2004).

The monitoring and evaluation of progress toward meeting such targets require consistent datasets of different levels of service, from national to provincial as well as district municipality levels. The annual national household surveys (OHS/GHS) from Statistics South Africa remain the main source of such data. Hemson and O’Donovan (2006) identified difficulties in measuring progress toward service delivery targets, both on a year-by-year basis as well as in the inter-census period. One problem they highlighted was erratic data, especially at the household level. This is partly due to the benchmarking of survey estimates to mid-year population projections for individual-level data. Equivalent data are not readily available to benchmark household-level data; moreover there is the historical antecedent of exclusion and latter inclusion of the so-called
former TBVC states from national censuses and surveys. These issues have implications for accurate serial weighting of the national survey datasets. It is, however, encouraging that efforts continue to be made by Statistics South Africa to re-weight the household survey datasets as new information becomes available.

A further measurement difficulty recognized by Hemson and O’Donovan concerns the disparate ways in which development goals and targets are framed in various documents, for instance the Reconstruction and Development Program, the State of the Nation addresses, and the UN’s Millennium Development Goals (MDGs). Such document include differing deadlines and contents that may not be comparable (Hemson and O’Donovan 2006). These impediments notwithstanding, efforts have been made by various researchers to measure achievements in service delivery since 1994, especially in relation to the MDGs and government programs. The work by Hirschowitz and Orkin (1997) was one of the first of these post-1994 studies to measure access to basic services and living conditions among South Africa households on a relative basis. It analyzed the 1994 October household survey and found wide disparities in the likelihood of access to basic services across different demographic segments. It found that Black African households were more likely to lack access to housing, water, sanitation, and electricity amongst other amenities. Similarly, a study by Budlender (1999) found that households in the low-income category were more likely to be excluded from access to basic services (Budlender 1999). With these inequalities firmly in sight, the various governments of the new era have implemented programs geared toward accelerated service delivery and infrastructural development of the previously disadvantaged communities.

Studies in the recent times confirm that remarkable attempts have been made to improve service delivery to the poor. Bhorat, Naidoo, and van der Westhuizen (2006), in their study entitled “Shifts in Non-Income Welfare in South Africa 1993–2004,” utilized factor analysis to show that government welfare services in the post-apartheid era have taken a pro-poor stance. Households at the bottom of the expenditure decile (the poorest of the poor) were found to have benefited the most from government services. Despite this, a significant amount of backlogs were noted (Hemson and Nnadozie, 2005) and clearly a lot more still needs to be done. Table 2 shows a summary of trends in percentage access to selected services based on the 2001 Census, 1996 Census, and the 2007 Community Survey (CS) of Statistics South Africa.
Table 2: Access to basic services according to various censuses 1996–2007 (%)

<table>
<thead>
<tr>
<th></th>
<th>Formal Housing</th>
<th>Piped Water</th>
<th>Basic Toilet</th>
<th>Electricity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1996 Census</td>
<td>64.4</td>
<td>81.2</td>
<td>50.0</td>
<td>57.6</td>
</tr>
<tr>
<td>2001 Census</td>
<td>68.5</td>
<td>84.5</td>
<td>57.6</td>
<td>69.7</td>
</tr>
<tr>
<td>2007 CS</td>
<td>70.5</td>
<td>88.6</td>
<td>64.4</td>
<td>80.0</td>
</tr>
</tbody>
</table>


The general impression from Table 2 is that access to formal housing, piped water, basic sanitation and electricity has improved over the period 1996–2007. One could also infer that this trend is likely to have continued to the present day. Access to electricity has shown the biggest percentage improvement, rising from about 58% in 1996 to 80% in 2007, while access to formal housing evinces the least improvement over the period. Table 2 needs to be interpreted with care, however, in view of the fact that households are increasing at a far more rapid pace than the overall population growth in South Africa. This rapid increase in the number of households and the concomitant demand for services puts enormous pressure on authorities in terms of infrastructure to meet the demand for water, housing, sanitation etc. (Hemson and O’Donovan 2006).

The 1996 Census recorded about 9 million households, but this had risen by almost 38% to 12.4 million by the time of the 2007 Community Survey. However, the population increase over the same period was almost half this rate at 20%, from about from 40.5 million in 1996 to 48.5 million in 2007. The rapid increase in the number of households does not conform to the trends in the basic components of demographic change in South Africa. For example, there has been a consistent decline in total fertility rates (TFR) (Udjo 1998). For the majority Black African population, for instance, the TFR was around 7.0 in 1950, but started to decline after 1960, dropping to 4.5 by mid-1980s, 4.0 by 1990, 3.1 by 1998, and is estimated at about 2.7 from 2000 to the recent period.

More so, the HIV epidemic in recent years has brought about increased mortality rates. HIV-related deaths in South Africa were estimated at around 147,500 per annum in 2000, but the figure is projected to rise almost threefold, to around 430,000 deaths per annum, by 2015. Indeed, the total accumulated deaths in South Africa due to HIV to date are estimated at around 3 million (Actuarial Society of South Africa 2006). The decreasing fertility rate, combined with the increasing mortality trend,
has slowed population growth in recent years. Why then have households grown at such a disproportionate pace? This may be attributed to the fact that young people, especially from Black African households, are becoming more empowered to leave home and start their own households. Other contributory factors could be increasing separation/divorce rates and the surge of in-migrants from the rural areas to the richer provinces and urban centers (Statistics South Africa 2007).

The household dynamics imply a potential imbalance between the reporting of household-based services using percentage scores (as in most reports) as delivery is accelerated, and progress according to actual numbers of population gaining improved access to basic services. For instance, Table 2 suggests that in 1996, about 35.6% of the total 9 million households lacked formal housing, which equates to about 3.2 million households. Further, the percentage score for 2007 implies a substantial decrease in the deficit of housing access to about 29.5%. However, in reality this is not the case, since due to the rapid increase in household numbers (12.5 million in 2007), around 3.7 million (Figure 2) households had no access to formal housing in 2007. This is actually an increase in housing deficit in real terms from 1996 to 2007, despite considerable efforts to scale up the provision of formal housing.

**Figure 1: Trends in access to basic services, 1996–2007**

![Graph showing trends in access to basic services from 1996 to 2007](image)

The trends in access to basic services for the period 1996–2007 are shown in Figure 1, while Figure 2 reveals the backlog over the same period. The problem of persistent backlogs due to the rapid increase of households is clearly evident in Figure 2, even though delivery of the respective services seems to have accelerated over the years, as evidenced in Figure 1. Backlogs have been persistent for most services, except electricity. Figure 2 shows the electricity backlog decreasing significantly from about 3.8 million households in 1996 to about 2.5 million households in 2007, with a projected further small decline to around 2.35 million households in 2010. On the other hand, the housing backlog increased from about 3.2 million households in 1996 to 3.75 million (estimate) in 2010. This was despite access to formal housing increasing significantly from about 5.8 million households in 1996 to almost 9 million households (estimate) in 2010.

Figures 1 and 2 reveal a steady rise in access to water, with the backlog remaining relatively stable at about the 1.5 million mark over the period. Sanitation, however, seems to be lagging both in terms of improved access and in the backlog of provision. This may be partly attributed to the filling effect of Ventilated Improved Latrines (VIP), which have an average life span of 10 years, depending on environmental factors and usage (Hemson and O’Donovan 2006).

**Figure 2: Trend of backlogs in basic services provision**

![Graph showing trends in backlogs for water, housing, electricity, and sanitation from 1996 to 2010.](image)

Other important dimensions regarding basic service provision in South Africa relate to the municipalities’ capacity to deliver, the maintenance of existing infrastructure, and institutional problems of corruption and mismanagement. There have been documented cases where funding allocations for development projects have been returned to the central treasury because local governments have lacked the capacity to utilize such funds. Moreover, a good proportion of service delivery protests relate to municipalities’ failure to carry out basic maintenance of existing infrastructure. Minister Trevor Manuel, during a 2010 graduation address at the Faculty of Engineering at the Cape Peninsula University of Technology, warned that, “...it is necessary to remind ourselves that beyond the temptations of the great and the grand new projects lies the responsibility to ensure that proper and regular maintenance is undertaken... The failure to maintain any part of this rapidly wipes out the initial infrastructure investment...” All these factors have contributed to the growing protests by communities regarding the delivery of services which are apparently lagging. Communities faced with a massive gap between demand for speedy and better access to amenities on the one hand, and the slow provision of such services by local authorities on the other, are increasingly taking to the streets.

A recent study (Zama 2010) used geographic information systems for mapping and tracking service delivery, linking this to the incidence of related protests in South Africa in the post-apartheid era. The study indicates that although the highest level of multiple service deprivation occurred in the deep rural areas, most service delivery protests were taking place in or near urban and peri-urban areas. This calls to mind the debates on absolute and relative measures of service exclusion, as explained by the relative deprivation theory. Even though the grievances of the protesting communities might be justified on absolute scales of measurement, the relative measure of deprivation and comparison of conditions of living with other segments of the population could possibly be an igniting factor, escalating the intensity and frequency of the mass actions.

Most attempts at measuring service delivery in the post-apartheid era have focused on absolute measures of service access. The present study though adopts a slightly different perspective. We seek to measure advances in relative deprivation of basic services from the perspective of measuring relative likelihood of access. Using the 1996 and 2001 Census data and 2007 Community Survey data, we investigate whether the odds ratio in favor or against access to basic services for different demographic segments of the South African society — especially the previously disadvantaged group — are increasing or decreasing over time.
2. DATA SOURCES AND METHODOLOGY

This study represents a secondary research in which both quantitative and qualitative dimensions are incorporated. The bulk of data for this study derive from the national Censuses of 1996 and 2001 and the 2007 Community Survey conducted by Statistics South Africa. These datasets have been accessed through the online 10% sample data download provision by Statistics South Africa. The censuses and survey collected socioeconomic individual and household data on the following themes: demographics; household services and welfare; income and expenditure; land access and use; and general perceptions of household dwellers, amongst others. It should be noted that the 1996 Census marked the first occasion in democratic South Africa where questionnaires were administered in the eleven official languages of the country. Census counts in the apartheid era used different approaches for enumeration in different areas. Some Black African communities were estimated using aerial photographs, as those communities were considered too dangerous for door-to-door enumeration. The 1996 Census also marked the introduction of a standardized enumeration approach for all South African communities (Cronje and Budlender 2004). During the 1996 and 2001 Censuses, the country was partitioned into 86,000 and 80,000 enumerator areas respectively.

Efforts were made to harmonize the two censuses in order to render comparability to the emerging data. Even though there were minor changes in definitions and some aspects of the questionnaires from 1996 to 2001, this did not significantly affect the aspects of household data analyzed in this paper.

The 2007 Community Survey was the largest and most inclusive household survey by Statistics South Africa, guided by the new provincial boundaries. The survey covered 274,348 dwelling units in the country (Statistics South Africa 2007). The 2007 CS was found to be comparable in many aspects with the 1996 and 2001 censuses. However, given that the 2007 Community Survey was designed on the basis of a random sample and not a Census, some negligible fluctuation effects should be expected in the data.

The particular variables of interest are access to piped water and access to formal housing. The choice of these variables is informed by the fact that shelter is considered one of the three basic human needs. Furthermore, studies have shown that most of the service delivery protests are centered on the demand for proper housing (Hemson and Nnadozie 2005). The criticality of water for improved sanitation, human nutrition, disease prevention, and
improved maternal and infant mortality ratios is self-evident. Indeed, access to formal housing and to piped water are critical variables for the computation of the United Nations’ Human Poverty Index (HPI). In this sense, these two variables can be viewed as antecedents to the provision of other basic services. For instance, a household without formal housing or piped water connection is unlikely to have sanitation, electricity, or telephone connection amongst others. It follows that households normally access the fundamental services of formal housing and water before other services.

Exploring the datasets, we employ frequency tabulations, cross-tabulations, and descriptive statistics to illustrate the trends. For the analysis of the relative odds toward gaining access to these services, we use the statistical multivariate method of logistic regression. The particular indicator of interest is the change (from 1996 to 2007) in the relative odds-ratios in access to basic services for different segments of the South African society based on population group (race) and income level of households.

The logistic probability model is given by:

\[
\text{prob(event)} = \frac{e^{B_0+B_1x_1+B_2x_2+...+B_nx_n}}{1+e^{B_0+B_1x_1+B_2x_2+...+B_nx_n}}. \tag{1}
\]

Simplifying (1) and setting \( z = B_0 + B_1x_1 + B_2x_2 + ... + B_nx_n \) as a linear combination of the model independent variable(s) coefficient(s) \( B \) and their respective values, we obtain (SPSS Inc. 1999):

\[
\text{prob(event)} = \frac{1}{1+e^{-z}}. \tag{2}
\]

This model yields values for the probability that lie between 0 and 1, as required for one of the basic assumptions (Kolmogorov’s axioms) of probability theory. The particular statistic of interest is the analysis of the odds ratios, denoted \( OR \), which is defined as the ratio of the odds for \( x = 1 \) to the odds for \( x = 0 \) and is given by

\[
OR = e^{B_i}
\]

Or

\[
\ln[OR] = B_i \tag{3}
\]

The analysis for the relative odds of access to water and the relative odds of access to formal housing are done separately. For the water analysis, the dependent variable is access to piped water recoded 0 for households with
no access and 1 for households with access to piped water. The recode stems from the original water access question in the census questionnaires, in which households are asked to select their main source of water from a list including: piped water to dwelling, piped water to yard, piped water to community stand, bore hole, spring, river, dam, stagnant water/pool, water tanker, and rain water. Households that responded to access to any of the categories of piped water are recoded as 1, while those accessing from rivers, rainwater, pool etc are recoded as 0.

Similarly, for the housing analysis, the dependent variable is access to formal housing recoded as 0 for households with no access and 1 for households with access to formal housing. The recode also stems from the type of dwelling question from the census questionnaires in which households are asked to select their type of dwelling from a list that includes brick structures, traditional mud structures, shacks, tents, hostels, etc. The households that responded yes to mud houses and shacks are recoded as 0, while those with brick dwellings, hostels, etc. are recoded as 1.

In both cases of analysis of relative odds of access to piped water and housing, the independent variables are Population Group of households and Income Level of households. These independent variables are treated as categorical variables for the logistic regression model. The population groups comprise Black, Colored, Indian and White. The White population is the reference category for the analysis of relative odds of access to water and housing. The income variable is a recoded variable from the census household annual income question. The original income categories comprise the range of households that reported R0 annual income to the highest R2.5 million or more. The recode reduced the income groups from 12 income groups in the census questionnaires to 5 Income Levels (1 to 5) in order of magnitude. The lowest income group (Level 1) comprised households earning from R0 to R5,000 per annum, while the highest group (Level 5) comprised households earning R600,000 or more. The income Level 5 is used as the reference category for the analysis of relative odds of access to water and housing.

The extrapolations in Figures 1 and 2 are obtained depending on model of best fit for each delivery variable, using the logarithmic model and the reciprocal quadratic model as given below respectively,

\[ Logarithm \, Fit: \quad y = (a + b) \times \ln(x) \]  \hspace{1cm} (4)  

\[ Reciprocal \, Quadratic: \quad y = \frac{1}{(a + bx + cx^p)} \]  \hspace{1cm} (5)
Each case of the extrapolation yielded negligible standard error values. These are the scientific tools that have been used in analyzing the trend in relative propensity towards access to basic services based upon the parameters and variables that we have defined above.

This study is not without its limitations however. One limitation relates to the fact that as this is secondary research, the author cannot gain an immediate feel of events on the ground at the time the data were collected. This distancing in terms of time lag is due to the secondary datasets being at least three years old. This implies that more recent, real situations may not have been adequately captured in this paper. Another limitation may stem from the combination and comparison of disparate census and community survey datasets. These are not strictly comparable, although the 2007 Community Survey is highly inclusive.

The income variable is an important correlate for many measurements in the social sciences. Nevertheless, the reliability of income reporting in most surveys is a controversial issue. The potential problems of the income variable have led some researchers to adopt indirect approaches to obtain a truer measure of income. In this paper, we have used the income variable as it appears in the censuses and survey data. Our emphasis is not the exact measurement of income but a more generic feel of patterns of events over time.

3. FINDINGS AND DISCUSSION

In Tables 3a and 3b we present the relative odds ratios for the analysis of access to basic piped water and formal housing in South Africa for the years 1996, 2001, and 2007. The relative odds ratios are based on population group (Black, Colored, Indian, and White) and income level (Level 1 to Level 5) of the household. The White population serves as the reference group for population group, while Income Level 5 serves as the reference group for income level. In Table 3a, the dependent variable is access to piped water coded 1 for households with access and 0 for households without access. In Table 3b, the dependent variable is access to formal housing where household with access are coded with value 1 and households without access are coded 0. The coding scheme has been discussed in the preceding methodology section.

Direct logistic regression was performed to assess the impact of population group and income level on the odds of households having access to piped
water and formal housing over time. The models for each of the cases (i.e. water access and formal housing access) are presented in Tables 3a and 3b respectively. The tables show that all the predictors are statistically significant, $p \leq 0.05$ for all categories of the independent variables. The models in both cases across all three years explain 21.7–30.4% (Nagelkerke R Squared) of variance with respect to access to piped water and formal housing. In Tables 3a and 3b, in order to keep the interpretation of the output consistent, the inverse of the original odd ratios that are less than 1 have been taken and the description reversed (Osborne 2006). The negative odds ratios indicate the sign or direction of their respective B coefficients. This also helps to fit in the direction of the relative comparison with respect to the reference group.

Table 3a: The odds of accessing piped water based on population group (race) and income level

<table>
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<tbody>
<tr>
<td></td>
<td>EXP(B)</td>
<td>EXP(B)</td>
<td>EXP(B)</td>
</tr>
<tr>
<td>Population Group (Ref.: White):</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Indian</td>
<td>3.343***</td>
<td>1.011***</td>
<td>6.220***</td>
</tr>
<tr>
<td>Colored</td>
<td>-1.127***</td>
<td>-2.544***</td>
<td>1.472***</td>
</tr>
<tr>
<td>Black</td>
<td>-5.847***</td>
<td>-19.607***</td>
<td>-3.831***</td>
</tr>
<tr>
<td>Income Level (Ref.: Level 5):</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Level 4</td>
<td>1.460***</td>
<td>2.816***</td>
<td>1.000*</td>
</tr>
<tr>
<td>Level 3</td>
<td>1.421***</td>
<td>2.760***</td>
<td>-1.937***</td>
</tr>
<tr>
<td>Level 2</td>
<td>-1.422***</td>
<td>1.045***</td>
<td>-2.762***</td>
</tr>
<tr>
<td>Level 1</td>
<td>-3.003***</td>
<td>-1.239***</td>
<td>-2.369***</td>
</tr>
</tbody>
</table>

Notes: *** $p=0.00$, ** $p=0.01$, * $p=0.05$

Table 3a shows that in 1996, the Indian households were about 3.3 times more likely than White households to have access to piped water; the Colored households were marginally less likely than White households to have access; while the Black households were about 6 times less likely than the White households to have such access. The year 2001 shows a dramatic change in that the Black households were then almost 20 times less likely than White households to have access to piped water. This may be attributed to the spike in household numbers after 1994 (post-apartheid), as population from rural areas surged into informal settlements without basic services in urban and peri-urban areas in search of jobs and better living conditions (Kok et al. 2003). The results for 2007 show Indian households to be about 6 times more likely than White households to have access to piped water;
Colored households slightly more (1.4 times) likely than White households to have access; while the Black households were about 4 times less likely than White households to have access to piped water. Although still lagging in access compared to the reference group, the Black households’ access shows a remarkable improvement from 2001.

Analyzing Table 3a on the basis of income, where the highest income level (Level 5) serves as the reference group, it emerges that household population group is a stronger factor than household income in explaining the variance in access to piped water. Generally, the odds of gaining access to piped water are shown to have improved over time (1996–2007) for the poorest group (Level 1) but to have deteriorated for the next low-income group (Level 2). This may be attributed to two factors; the prioritized focus of delivery to the poorest of the poor and possibly the growing number of shack dwellers (working poor) in urban and peri-urban areas.

Table 3b: The odds of accessing formal housing based on population group (race) and income

<table>
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<tr>
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</thead>
<tbody>
<tr>
<td></td>
<td>EXP(B)</td>
<td>EXP(B)</td>
<td>EXP(B)</td>
</tr>
<tr>
<td>Population Group (Ref.: White):</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Indian</td>
<td>-1.353***</td>
<td>-1.386***</td>
<td>-1.526***</td>
</tr>
<tr>
<td>Colored</td>
<td>-7.936***</td>
<td>-5.154***</td>
<td>-6.756***</td>
</tr>
<tr>
<td>Black</td>
<td>-47.617***</td>
<td>-21.739***</td>
<td>-28.571***</td>
</tr>
<tr>
<td>Income Level (Ref.: Level 5):</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Level 4</td>
<td>1.747***</td>
<td>2.506***</td>
<td>1.000*</td>
</tr>
<tr>
<td>Level 3</td>
<td>1.246***</td>
<td>1.594***</td>
<td>-3.690***</td>
</tr>
<tr>
<td>Level 2</td>
<td>-2.267***</td>
<td>-1.594***</td>
<td>-5.291***</td>
</tr>
<tr>
<td>Level 1</td>
<td>-3.623***</td>
<td>-2.123***</td>
<td>-5.988***</td>
</tr>
</tbody>
</table>

Notes: ***\(p=0.00\), **\(p=0.01\), *\(p=0.05\)

Table 3b suggests that population group is a far stronger factor in explaining the variance in the odds-ratio with respect to access to formal housing than for variance in access to piped water. Indian households’ access to formal housing is shown to be on a par with that of White households throughout the period. In 1996 the Colored households though were about 8 times less likely to have access to formal housing as the White households, but the odds decreased marginally to around 7 times less likely in 2007. The Black households suffered a far greater inequality over the
same time period, being almost 48 times less likely than White households to have access to formal housing in 1996; although this reduced to 22 times less likely in 2001, rising slightly to 28 times in 2007. Overall, this is a remarkable improvement in the odds against the Black households accessing formal housing over the period, testifying to the fact that service delivery is being accelerated. However, a striking difference in the magnitude of odds against the Black households could be noted between access to piped water and access to formal housing. Black households seemingly face far greater odds against accessing formal housing than they do in accessing piped water. This could be partly due to the fact that a substantial proportion (26% in 1996) of Black households were living in informal/mud dwellings and deriving their main supply of water from community stand-pipes. According to the definition of “access to piped water”, such houses would still have been categorized as having access to piped water. This has internal effects in the computation of the odd ratios. In view of this, the variable “access to formal housing” may be a better indicator for measuring relative inequality in access to basic services in South Africa on the basis of population group.

As in the case of access to piped water, the household population group is ostensibly a stronger factor than household income in explaining the variance in relative odds of access to formal housing in South Africa. A remarkable increase in the odds against access to formal housing for the low-income levels (Income Levels 1 & 2) could be noted for 2007. For instance, the lowest income group was about 4 times less likely than the top income group to have access to formal housing in 1996, and the odds against this lowest income group rose to about 6 in 2007. The persistence of glaring inequalities in this area resonates with the increasing trend of mass protests over inadequate housing-related service delivery in recent years.

4. CONCLUSION AND RECOMMENDATIONS

One of the greatest development challenges in South Africa is the severe inequality in access to basic services across different demographic segments of population. This great divide between the “haves” and “have-nots” in terms of social amenities stems from historic legacies of the apartheid era which sought to segregate and disempower the majority Black African population. We have in this paper attempted to evaluate shifts in the relative likelihood of access to piped water and formal housing on the basis of population group and household income. At the outset, we set as the prime objective of this paper to test the following hypothesis: “The relative odds of access to
What then has this research unearthed? One notable finding is the very diverse initial conditions of these services at the dawn of new South Africa, as shown in Table 1, which derives from the 1996 census. Analyzing the relative odds, we find household population group to be a stronger factor than household income level in explaining the variance in the level of access to both piped water and formal housing over the period. Generally, the odds against the previously disadvantaged segments of the society, i.e. the Black Africans with the lowest level of income, gaining access to basic services seem to have reduced over time. This is especially evident in the case of access to piped water, although this may be due to the substantial proportion of this segment of the population accessing water from community stand-pipes. Access to formal housing in 2007 evinces a wider odds-ratio among different segments of society, despite claims of accelerated delivery in the provinces.

The findings of this study therefore seem to refute the hypothesis that the odds of access to basic services have remained unchanged since 1994. Nevertheless, there is still unacceptable inequality with access to basic services, especially for the Black and lowest-income households in South Africa. Although there has been some progress in the delivery of services, the protests by some communities with regard to the lack of/inequitable access to basic services could be well-founded in both absolute and relative terms. There is therefore an urgent need for continued and intensified involvement of communities by employing platforms like imbizo\(^2\), ward committees, youth meetings and women’s assemblies, amongst others. Such platforms should focus not only on the politics behind the allocation of service units, but should also promote information sharing on the logistics and limitations of local governments towards the delivery of expected services. The intensified participation of communities could help to create an effective and civilized mechanism for citizens’ voices to be heard, and to enhance communal resources in social capital.

This paper recommends the establishment of a service delivery model that would redress the substantial unevenness in access to and delivery of basic services, according to the demographic segmentations (population group and income level). To achieve this, robust instruments need to be put in place to concretely measure all the dimensions of progress. Monitoring and evaluation tools should be incorporated into the relevant policy frameworks.

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2. The Imbizo program allows South Africans to engage provincial political leaders including the President by providing feedback on policy delivery in a typical bottom-up approach.
to determine whether in real terms, there is a narrowing of the service delivery gap in favor of the poorest segments of the population. In view of the scale of the overall challenge, a considerable policy push linked to strong political commitment is needed at both national and municipal levels to reduce the backlogs in service delivery to those most in need. It is essential that the disparity levels in access to basic services, as presented in this paper, are acknowledged and tackled head-on, to harmonize with developmental timelines both nationally and internationally (e.g. MDGs targets).

Finally, it should be mentioned that South Africa features diverse socio-economic conditions across its different provinces and other administrative units. This study has taken a holistic approach, looking at the entire country as a whole. It would also be instructive to perform the analysis of measuring relative odds to basic services from a slightly different perspective, by looking at the performances of all the different provincial and municipal governments. In addition to identifying the areas in most need of reform, lessons could be learned and strong performance emulated to establish a baseline of excellence.

REFERENCES


