Environmental Scarcity and Violent Conflict: The Case of South Africa

VAL PERCIVAL & THOMAS HOMER-DIXON

Peace and Conflict Studies Program, University of Toronto

The causal relationship between environmental scarcities – the scarcity of renewable resources – and the outbreak of violent conflict is complex. Environmental scarcity emerges within a political, social, economic, and ecological context and interacts with many of these contextual factors to contribute to violence. To examine this relationship, we outline a theoretical framework defining scarcities, the social effects arising from these scarcities, and the ensuing movement towards violence. We subsequently apply this framework to analyse the link between environmental scarcities and violent conflict in South Africa. Within South Africa, violence arose at precisely the same time that many anticipated a transformation to a more peaceful society – upon the release of Nelson Mandela, the end of the ban on political activity and the official end to apartheid. This article provides a new perspective on these events by analysing the link between South Africa's environmental scarcity and violent conflict.

Introduction

This case-study on South Africa was produced for the Project on Environment, Population, and Security at the University of Toronto. The project analysed the causal link between renewable resource scarcities and violent conflict. Researchers sought to answer two questions. First, does environmental scarcity contribute to violence in developing countries? Second, if it does, how does it contribute? The project therefore analysed cases that exhibited both environmental scarcity and violence – cases with a *prima facie* link between these two factors. This method of case selection may appear to prejudice the research in favour of finding a positive relationship between scarcity and violence. However, at the early stages of investigation into links between environmental scarcity and conflict, biased case selection

enhances understanding of the complex relationships among variables in highly interactive social, political, economic, and environmental systems (Homer-Dixon, 1996).

We begin with an overview of the theory that guided the work of the project and this case-study. Using this theoretical framework, we analyse the relationship between environmental scarcities and violence within South Africa. Although our analysis faced serious limitations in data quality and quantity, the data available suggest that scarcities of renewable resources – in the context of the apartheid system and the transition to majority rule – contributed to pre-election violence within South Africa. First, we examine environmental scarcity within the former homelands, trace its interaction with political, social and economic factors, and examine the effects of these interactions –

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primarily migrations to urban areas. Second, we analyse how migrations to South Africa's cities combined with social, political, and economic factors to produce urban environmental scarcity. Scarcity of renewable resources in urban areas and the vast numbers of people moving to and within cities heightened grievances and changed the opportunities for violent collective action. These factors, combined with the transition from apartheid, produced the most devastating levels of violence in South Africa's history.

Theoretical Overview

The context specific to each case determines the precise relationship between environmental scarcity and outbreaks of violent conflict. Contextual factors include the quantity and vulnerability of environmental resources, the balance of political power, the nature of the state, patterns of social interaction, and the structure of economic relations among social groups. These factors affect how resources will be used, the social impact of environmental scarcities, the grievances arising from these scarcities, and whether grievances will contribute to violence.

There are three types of environmental scarcity: (1) supply-induced scarcity is caused by the degradation and depletion of an environmental resource, for example, the erosion of cropland; (2) demand-induced scarcity results from population growth within a region or increased per capita consumption of a resource, either of which heightens the demand for the resource; (3) structural scarcity arises from an unequal social distribution of a resource that concentrates it in the hands of relatively few people while the remaining population suffers from serious shortages.

Two patterns of interaction among these three types of scarcity are common: resource capture and ecological marginalization.

Resource capture occurs when increased consumption of a resource combines with its degradation: powerful groups within society – anticipating future shortages – shift resource distribution in their favour, subjecting the remaining population to scarcity. Ecological marginalization occurs when increased consumption of a resource combines with structural inequalities in distribution: denied access to the resource, weaker groups migrate to ecologically fragile regions that subsequently become degraded (Homer-Dixon, 1994: 15–16).

Scarcity and its interactions produce several common social effects, including lower agricultural production, migrations from zones of environmental scarcity, and weakened institutions (Homer-Dixon, 1991: 91). In order for these social effects to cause heightened grievances, people must perceive a relative decrease in their standard of living compared with other groups or compared with their aspirations, and they must see little chance of their aspirations being addressed under the status quo (Gurr, 1993: 126).

High levels of grievance do not necessarily lead to widespread civil violence. At least two other factors must be present: groups with strong collective identities that can coherently challenge state authority, and clearly advantageous opportunities for violent collective action against authority. The aggrieved must see themselves as members of groups that can act together, and they must believe that the best opportunities to successfully address their grievances involve violence.

Most theorists of civil conflict assume that grievances, group identities, and opportunities for violent collective action are causally independent. However, in this article, we argue first that grievances powerfully influence the meaning of group membership and the formation of groups and, second, that grievances can shift these

groups' perceptions of opportunities for violence. The potential for group formation increases as people identify with one another because of their shared perception of grievance, and the meaning of group membership is influenced by the degree and character of the grievance. In addition, more salient group identity influences the perception of opportunity for group action: it ensures that the costs of violent challenges to authority are distributed across many individuals, and it increases the probability that these challenges will succeed.

Civil violence is a reflection of troubled relations between state and society. Peaceful state–society relations rest on the ability of the state to respond to the needs of society – to provide, in other words, key components of the survival strategies of the society's members – and on the ability of the state to maintain its dominance over groups and institutions in society (Migdal, 1994: 27). Civil society – groups separate from but engaged in dialogue and interaction with the state – presents the demands of its constituents (Chazan, 1994; Putnam, 1993). The character of the state is particularly important; a representative state will receive these demands and react quite differently to a non-representative state such as apartheid South Africa. Grievances will remain low if groups within society believe the state is responsive to these demands. Opportunities for violence against the state will rise when the state's ability to organize, regulate and enforce behaviour is weakened in relation to potential challenger groups. Changes in state character and declining state resources increase the chances of success of violent collective action by challenger groups, especially when these groups mobilize resources sufficient to shift the social balance of power in their favour (Gurr, 1993: 130).

Environmental scarcity threatens the delicate give-and-take relationship between state and society. Falling agricultural production, migrations to urban areas, and economic contraction in regions severely affected by scarcity often produce hardship, and this hardship increases demands on the state. At the same time, scarcity can interfere with state revenue streams by reducing economic productivity and therefore taxes; it can also increase the power and activity of rent-seekers,[1] who become more able to deny tax revenues on their increased wealth and to influence state policy in their favour. Environmental scarcity therefore increases society's demands on the state while decreasing its ability to meet those demands.

Severe environmental scarcity forces groups to focus on narrow survival strategies, which reduces the interactions of civil society with the state. Society segments into groups, social interactions among groups decrease, and each group turns inwards to focus on its own concerns (Chazan, 1994: 269).[2] Civil society retreats, and, as a result, society is less able to articulate its demands on the state. This segmentation also reduces the density of 'social capital' – the trust, norms, and networks generated by vigorous, crosscutting exchange among groups (Putnam, 1993: 167). Both of these changes provide greater opportunity for powerful groups to grab control of the state and use it for their own gain. The legitimacy of the state declines, since it is no longer representative of or responsive to society.

Opportunities for violent collective action can decrease, even under conditions of environmental scarcity, when the power of potential challenger groups is diffused by vigorous horizontal interaction within society and vertical interaction between civil society

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[1] Rent-seekers are persons or groups who seek to extract payments from the economy for factors of production that are in excess of what would normally be obtained in a competitive market.

[2] Chazan argues that, under conditions of economic strain, both state and society become more insular.

and the state. However, if poor socio-economic conditions persist, grievances will remain. These grievances will probably be expressed through an increase in deviant activity, such as crime. Unless the grievances are addressed, the legitimacy of the government will decrease, society will once again become segmented, and opportunities for violent collective action will increase correspondingly.

Theoretical Application: Environmental Scarcity in South Africa

Below, we provide evidence for each link of the theoretical framework. First, we outline the physical geography of South Africa and overview the degree of environmental scarcity. We present the social effects arising from this scarcity, such as poverty, rural–urban migration, and declining institutional capacities. We then analyse the link between scarcity, its social effects, and violence by examining the mobilization of group identities and the opportunity structure for violent conflict.

This article analyses environment–conflict linkages in South Africa as a whole. Moreover, we make specific reference to KwaZulu-Natal because it is one of the most populous and poverty-stricken provinces in South Africa, and, since the mid-1980s, it has also been one of the most violent.[3] Because much of the black population in the region is Zulu, explanations of violence cannot be reduced simply to ethnicity. Intra-ethnic divisions – caused in part by the effects of environmental scarcity – produced levels of violence in the region akin to civil war. We outline below the environmental situation in South Africa in

[3] Under the new constitution, the formerly white-dominated province of Natal has been integrated with the neighboring Zulu-dominated homeland of KwaZulu to form the province of KwaZulu-Natal.

general, with particular attention to KwaZulu-Natal.

Physical Geography

The South African eco-system is characterized by land unsuitable for agricultural production, low rainfall, and soils susceptible to erosion. Only approximately 13.5% of the land area of South Africa is suitable for crop production. Of this area, only 3% is considered high-potential arable land (Whyte, 1995: 43). Approximately 65% of the country receives less than 500 mm of annual precipitation, a threshold that is widely regarded by experts as the minimum required for rain-fed cropping (Coetzee & Cooper, 1991: 130). Low rainfall and fragile soils limit agricultural potential. Approximately 60% of South African cropland is characterized by low organic matter content. After repeated cultivation, organic matter is rapidly lost and the soil is easily eroded (MacKenzie, 1994: 2).

Of the total area of cropland, 13 million ha fall within commercial farming areas, while only 2.5 million ha are in small-scale farming areas in the former homelands (MacKenzie, 1994: 1). This imbalance, combined with other natural resource limits – including weak soils and poor rains – has resulted in extensive environmental scarcities in the homelands.

Environmental Scarcities within the Former Homelands

Figure 1 traces the causes and effects of environmental scarcities in the former homelands. These causal links are discussed in detail below.

Structural Scarcity under Apartheid: The Political Economy of Apartheid The apartheid system institutionalized the uneven social distribution of environmental resources in South Africa, which caused serious structural scarcity for blacks

Figure 1.   Effects of Environmental Scarcity within the Former Homelands
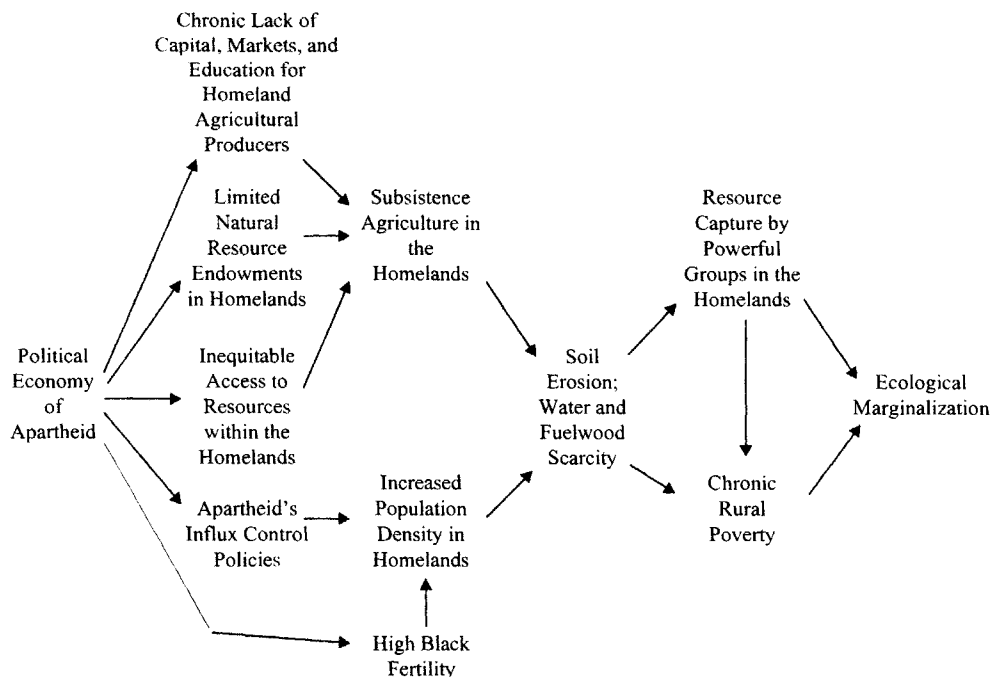
Table I.   Comparison of Population Densities within Rural South Africa, 1991

	South Africa	*White Areas*	*Former Homelands*	*Natal*	*KwaZulu*
Total Cropland and Pastureland (hectares/person)	4.7	16.22	0.92	5.36	0.68
Total Cropland (hectares/person)	0.75	2.54	0.16	1.1	0.08

Adapted from: Development Bank of South Africa (1994: 99).

Table II.   Comparison of Yields in Crop Agriculture, Natal and KwaZulu, 1983–84

	Tons/hectare in Natal	*Tons/hectare in KwaZulu*
Cereals (maize)	2.088	0.826
Legumes (dry beans)	1.011	0.337
Roots (potatoes)	24.015	5.006
Sugar-cane	53.814	28.795

Source: Bromberger & Antonie (1993: 421).

Table III.   Comparison of Statistics of Cattle Performance, Natal and KwaZulu, 1987

	Natal private land tenure (%)	*KwaZulu communal grazing (%)*
Herd Mortality	3.9	7.4
Calving Rate	80.0	32.0
Slaughter and Export Rate	25.0	5.0

Source: Bromberger & Antonie (1993: 422).

(McGrath & Whiteford, 1994: 49).[4] Approximately 86% of the land was owned by the white minority, while the black majority subsisted on 14% of the land base (Whyte, 1995: 41). Table I uses differences in per capita availability of farmland to illustrate the structural land scarcities affecting blacks in South Africa.

Not only did blacks suffer from an imbalanced distribution of the quantity of land, but they also often received the most marginally productive land. Moreover, under the apartheid regime, structural scarcities of land were often reinforced by stark shortfalls in agricultural inputs, such as capital, fertilizer, veterinary services, and new agricultural technologies. Tables II and III compare statistics for crop yields and cattle performance in Natal and KwaZulu, and demonstrate the disparities in agricultural performance for these adjacent regions.

Although the major economic activities in the homelands were livestock and maize production, Table II shows the maize output in KwaZulu was only 40% of the yield in Natal and Table III shows the mortality rate in KwaZulu is almost twice the rate in Natal. Therefore, residents relied on precarious remittances from mines and other industries outside the homelands for much of their income (Whyte, 1995: 95–96).

In sum, the black population, with little political or economic power in South Africa,

was forced to subsist on a severely restricted and eroded land base. Because of the particular vulnerabilities of the South African eco-system, this structural scarcity interacted with and exacerbated demand- and supply-induced scarcities.

Demand-Induced Scarcity: Population Density in the Homelands   The estimated population of South Africa in 1995 was 42.6 million, with an annual increase of 970,000. Approximately 28 million people – over 66% of the population – lived within towns and cities, while 15 million resided strictly within urban areas (Barnard, 1994: 1). The black population is expected to grow at a 3% rate from its current 32 million to 37.2 million by the year 2000, which will be 78.3% (up from 74.8% in 1991) of the anticipated total population of 47.5 million. Conversely, the white population will stay constant at approximately 5 million, and its proportion of the total population will drop from 14.1% to 11.4% (Mkhondo, 1993: ix).[5]

The growth of the black population results in more severe scarcity of land and exacerbates the differentials in land availability per capita shown in Table I. Under apartheid, the average population density of the former homelands was ten times the density of rural 'white' South Africa. When labour requirements in commercial agriculture and mining declined, apartheid ensured that black South Africans could not move to cities when they were expelled from rural white areas. Police forcibly

[4] According to its Gini coefficient, South Africa was the most inequitable nation in the world. In 1976, the Gini coefficient based on household income was estimated at 0.68, and in 1991 it was 0.67. The coefficient for the United States is 0.34, and that for Canada, 0.29.

[5] Mkhondo obtained these figures from the South African Development Bank.

moved blacks to the homelands; partly as a result of this forced migration, the population of the homelands grew from 4.5 million to 11 million between 1960 and 1980 (Wilson, 1991: 32).

In addition to this in-migration, the homelands experienced high natural population growth rates. The total fertility rate for blacks from 1985–90 was estimated at 5.12 children per woman (Simkins, 1991: 22). In 1990, Alan Durning observed, 'Black couples ... have larger families because apartheid denies them access to education, health care, family planning, and secure sources of livelihood – the things that make small families possible and advantageous' (Durning, 1990: 13).

Gender discrimination contributes to these high fertility rates. Research conducted by Cambridge economist Partha Dasgupta shows that women who lack paid employment have less decision-making authority in their families. Weak authority, combined with the usefulness of children for labour in subsistence conditions – for collecting fuelwood and water and for herding animals – leads to high fertility rates (Dasgupta, 1995: 40–42). In the former homelands, women are largely responsible for the provision of food, water, and fuel, in addition to caring for children and generating income through activities such as trading forest products. Moreover, legal and cultural barriers deny women the right to own or control natural resources (Deshingkar, 1994: 1). High rates of infant and child mortality also raise fertility rates, because families have no guarantee that their children will survive to adolescence. The infant-mortality rate among black children was estimated at 74 per 1,000 from 1985–90 (Simkins, 1991: 23).[6]

Supply-Induced Scarcity: Soil Erosion,

Water and Fuelwood Scarcity The apartheid regime situated the homelands in fragile environments with thin topsoil not suitable for supporting the level of agricultural production required by their populations.[7] The result has been severe erosion: 'Dongas (erosion gullies) have become small valleys which split the hillsides; soil has given way to a crumbling grey shale, stone-built huts squat in a scene which is almost lunar in its desolation' (Wilson, 1991: 34). Experts estimate that South Africa has lost 25% of its topsoil since 1900 and that 55% of South Africa is threatened by desertification (Archer, 1994: 5). Approximately 400 million tonnes of soil have been lost each year for the past decade (Whyte, 1995: 43). Soil quality is also threatened by the overuse of agrochemicals and acid rain which causes soil acidification. The heavy reliance on coal in South African industries and homes contributes to this acid rain (Whyte, 1995: 5–6).

Deforestation is an important form of supply-induced environmental scarcity. By destabilizing soils and changing local hydrological cycles, it disrupts key eco-system links (Gandar, 1991: 98). Unfortunately, fuelwood remains the most accessible and inexpensive energy source for many rural and urban blacks, which encourages deforestation. Inadequate energy services force approximately 40% of the South African population – approximately 17 million people – to depend on fuelwood for cooking and heating (Whyte, 1995: 62). Estimates place the annual volume of fuelwood

[6] The white infant mortality rate for the period 1985–90 is 9.0 per thousand (South Africa Statistics, 1992).

[7] Land use management practices, not just natural vulnerabilities, must be analysed when soil erosion is discussed: 'Factors such as climate, soil erodibility and topography determine the potential erosion hazard in an area. Nevertheless, the difference in erosion caused by differing management of the same soil is very much greater than the difference in erosion from different soils under the same form of management. Thus cropping and management practices provide the key to controlling soil loss' (Liggitt, 1988: 27).

consumed at 11 million metric tons (Cooper & Fakir, 1994: 1). In the past 50 years, 200 of KwaZulu's 250 forests have disappeared (Wilson & Ramphele, 1989: 44). A comparison of forest consumption rates with non-commercial forest growth rates shows that all ten former homelands are in a fuelwood deficit, with supplies expected to be almost depleted by the year 2020 (Gandar, 1991: 98–99). Wood for fuel is perceived as free, and collection costs are seen in terms of women's time, which is generally undervalued. Moreover, 'frequent fires, the high opportunity cost of land, the long time periods for tree growth, and the use of both arable and uncultivated land for grazing all discourage tree planting. Trees can be seen as a threat to crops if they compete for space, water, and labour, and if they are seen to harbour pests' (Peden, 1993: 7).

The scarcity and degradation of water resources is also a problem. South Africa is a water-scarce country: 12–16 million people lack potable water supplies, and 21 million people – half the country's population – lack adequate sanitation (Brooks, 1995: 17). Seventy percent of urban blacks do not have access to running water and are forced to rely on severely contaminated river systems for their daily water needs (Dewar, 1991: 92). The water used by residents in informal settlements tends to have the highest concentration of suspended solids and the highest level of faecal bacterial contamination (Simpson, 1993: 28). The wider health of South African society is at risk as the probability rises in these settlements of epidemics of cholera, gastroenteritis, dysentery, parasitic infections, typhoid, and bilharzia. Pollution from industrial sources and seepage from coal, gold, and other mines threaten the quality of both river and ground water. The level of industrial pollution is particularly severe in the former homelands, where environmental controls were non-existent.

Resource Capture   As scarcities intensified, powerful groups within the former homelands took control over scarce resources. Rights to communal land were unevenly distributed among homeland populations: up to 80% of production came from 20% of the farmers who controlled most of the land, and in some areas three or four landholders owned 80% of the livestock grazing on communal land. Widespread landlessness existed even in Transkei, the homeland with the best land, where fewer than 50% of villagers were allocated a field, and 60% had no cattle (Cooper, 1991: 179). These processes particularly affect women: although women comprise 80% of the population in rural areas, they have no access to land and no decision-making authority over the use of natural resources (Whyte, 1995: 45–46).

Resource capture and environmental scarcities combine to produce devastating levels of poverty. In the 1980s, 95% of the black population earned less than USD 100 per month, whereas 89% of the white population earned more. With an average disposable income of only USD 150 a year – one-sixteenth of the white average – homeland farmers in particular cannot make the long-term investments necessary to protect their land (Durning, 1990: 14). To escape this poverty, the poor move to marginal lands within the homelands and, increasingly, to urban areas.

Social Effects of Environmental Scarcity

We have shown that environmental scarcity has reached alarming levels in many of the former homelands and informal urban settlements in South Africa. Rural areas are unable to support their growing populations: soil is degraded, water resources are inadequate and decreasing in quality, and fuelwood is scarce. Figure 2 summarizes the variables and causal relations which we will

Figure 2.   Environmental Scarcity and Urbanization in South Africa
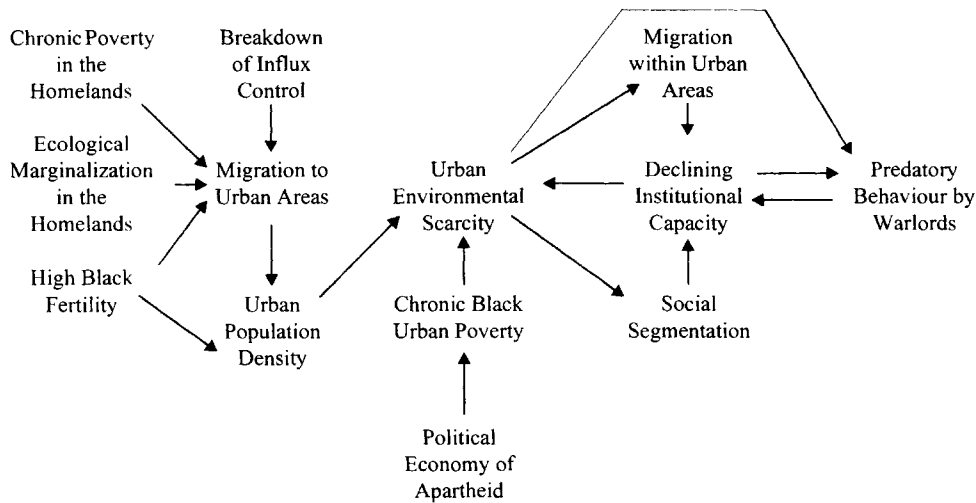
identify in this section. Below, we describe these interactions in detail.

Poverty and Ecological Marginalization in Homelands Agricultural potential decreased in the homelands because of growing population densities, water scarcity, and soil erosion. Per capita food production fell; these areas became net importers of food, partly as a result of land degradation and high population growth rates (Durning, 1990: 12–13). The rural black South African population became increasingly unable to sustain itself. As agricultural and forest resources became depleted, people switched to low-paying jobs in villages and towns. A study of a rural community in Bophuthatswana found that such wage labour was the major source of income for more than 90% of households; less than 5% could make a living from agriculture. Approximately 55% of the households studied had no agricultural land at all, and 37.5% had too little land to make a living (Boesema, 1988: 113–114).

Finding wage labour became more and more difficult because of South Africa's

serious unemployment problem: formal jobs are available for only 50% of the country's population, whites and blacks included (Barnard, 1994: 2). Poverty is therefore endemic within the rural black community (Steyn & Boesema, 1988: 3). In 1993 in KwaZulu, 80% of all rural households and 40% of urban households were living below the poverty line. The average rural monthly household income was 43% below urban income. It was estimated that only 25% of the urban population in KwaZulu – and a dismal 16% of the rural population – had formal jobs (South African Institute of Race Relations, 1994: 493). Rural poverty, and the hope for a marginally better existence in urban areas, contributes to rural–urban migrations.

Rural–Urban Migration Migrations from rural areas to urban and peri-urban areas have increased sharply in recent years (Barnard, 1994: 1).[8] 'Push' factors are difficult to distinguish from 'pull' factors. The former clearly include environmental degra-

[8] In addition, South Africa has an estimated 7–8 million homeless people drifting from countryside to cities, and also among cities (Barnard, 1994: 1).

dation, unequal access to land, and high population densities within the homelands. Three major pull factors are 'the repeal of the pass laws in 1986, the rapid construction of backyard shacks in formal townships, especially in the Pretoria-Witwatersrand-Vereeniging area, and the increasing designation of land outside the "homelands" as suitable for African residential development' (Simkins, 1991: 23–24).[9] As a result, South African cities are growing at the rate of 3–5% a year (Whyte, 1995: 80). According to estimates produced by the World Bank, 20,000 ha of arable land are lost to urbanization each year (Whyte, 1995: 42). Although the number of blacks moving into cities is estimated to be around 750,000 a year (Lawson, 1991: 47),[10] rural–urban migration rates are disputed, and determining the precise rate will require more research.

However, we can make three generalizations regarding migration in South Africa. First, although most migrants to urban regions are still of rural origin, the percentage is falling. Families arriving in informal settlements increasingly move from closely adjacent communities. Second, the same processes of resource capture and ecological marginalization that take place in the homelands are occurring in urban informal settlements. The concentration of many people on a limited resource base, in the context of weak local government authority, leads to resource capture: 'violence (becomes) entrenched with formation of competing local

power structures whose leaders seek to gain and secure power through the control of basic residential resources such as land, home allocations, services, business rights etc.' (Hindson & Morris, 1994: 1). This violence also plays a role in determining migration: people often leave their homes after violence erupts, but their places are quickly taken by migrants desperate for housing (Cross et al., 1992: 43). Third, the combination of this resource capture and environmental problems forces greater urban–urban migration.

KwaZulu-Natal experiences particularly high levels of migration to urban areas: 46% of the informal population in the Durban Functional Region (DFR) comes from the surrounding rural districts (Cross et al., 1994: 88–89). Although the population of both rural and urban areas within KwaZulu-Natal is growing, the population growth rate in urban areas is about three times as high as that in rural areas. Moreover, the growth of informal settlements, which now represent more than one-third of the total urban population and more than half of the total black urban population, exceeds growth within formal urban boundaries (Hindson & McCarthy, 1994: 2). Migration from rural regions is largely responsible for these differentials. Nick Wilkins and Julian Hofmeyer note that 'by the mid-1980s it was clear that rural poverty was undermining the system of oscillating migration, and that people were migrating permanently into urban areas. Migrants appear to follow several routes into urban areas, and once there may move several times from area to area' (Wilkins & Hofmeyer, 1994: 109).

Urban Environmental Scarcity   In urban areas, the system of apartheid ensured that black townships were built on sites not useful to the white community. These townships were often overcrowded, short of housing, and located downwind from heavily polluting industries. Infrastructure

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[9] See also Steyn & Boesema (1988), written before the repeal of the pass laws: 'The rural–urban migration of blacks in South Africa centers around the inability of the rural areas to provide for the material needs of the local people. Structural determinants such as land shortage and the inaccessibility of available land, overpopulation, and the general underdevelopment of rural areas on the one hand, and the attractions of cities and city life such as job opportunities, general infrastructure and facilities on the other hand are relevant in this regard' (Steyn & Boesema, 1988: 134).

[10] This estimate was produced by the Urban Foundation.

Table IV. Basic Services in Informal Settlements, KwaZulu-Natal, 1994

	Population	*Percentage of Total*
Water		
Only Springs and Streams	229,878	76.2
Taps in Homes	300	0.0
Standpipes	45,434	15.0
Reservoirs	4,800	1.6
None	21,205	7.1
Electricity		
Some Domestic Supply	108,816	36.2
No Supply	191,501	63.8

Source: Hindson, Byerley & McCarthy (1994: 20).

was inferior, with few services such as electricity and running water (Lawson, 1991: 61). South Africa's economic decline in the late 1980s combined with its infrastructural shortcomings to produce a dire marginal existence for most blacks within urban areas.

The recent influx of migrants has placed natural vegetation under constant attack, as the poor struggle to satisfy their basic needs. A growing population, concentrated in a limited area, coupled with the structural inequalities that deny them access to basic services, such as electricity, running water, refuse collection, and adequate sewage disposal facilities, results in environmental degradation. Overcrowding and poverty means that new residents build their houses from non-conventional materials scavenged from local dumps and public buildings; they use mud, grass, and straw from nearby streams, fields, and hillsides. Trees are cut down for fuel, grasses are used for feeding livestock and thatching, and residents often burn the veld to promote rapid regrowth, which depletes the soil of its humus content. These processes increase soil erosion, which is particularly high during intense rainstorms (Whyte, 1995: 85). Devegetation leads to floods, mud slides, and sinkholes, because informal settlements are frequently in water catchment areas (Lawson, 1991: 54).

An estimated 25% of the population of informal settlements have no access to piped

water, 46.5% have no access to electricity, and 48% lack adequate sanitation facilities (Barnard, 1994: 1). Table IV provides statistics on water and electricity services in informal settlements in KwaZulu-Natal and shows the degree to which the population relies on the local environment to provide its daily needs.

As Table IV indicates, 76.2% of the population of informal settlements in KwaZulu-Natal rely on springs and streams for their water supply, and 63.8% have no electricity supply. Therefore, many urban blacks are trapped between worsening environmental scarcities and inadequate investment in the physical and human capital that might eventually generate alternative employment opportunities. The result is chronic poverty: approximately 40% of urban blacks earn incomes below the poverty datum line of R700 per month (Dewar, 1991: 91–92).

Declining Institutional Capacity Strong community institutions are crucial for managing the social conflicts that inevitably arise from large numbers of migrants. When he received the 1993 Nobel Peace Prize with Nelson Mandela, F. W. de Klerk stated that it was not international sanctions or armed struggle that forced apartheid to change, but instead the movement of millions of people into the cities that created social upheaval

and strained community and state institu-
tions (Darnton, 1993: 7). Institutional
strength is a function of an institution's
financial resources, the adequacy and rel-
evance to community needs of its expertise,
and its flexibility in novel circumstances;
these factors, in turn, are influenced by the
depth of the community's social capital.
Community institutions within South
Africa were ineffective products of the
system of apartheid: they were fiscally weak,
unrepresentative of communities, and ill-
equipped to manage the flow of new mi-
grants.

Uncontrolled influxes of people and the
degradation of resources that often ensues
can cause social segmentation as subgroups
within the community withdraw into them-
selves to protect their own interests.
Segmentation breaks down social networks,
weakens community norms, and erodes
trust. This loss of social capital, in turn, un-
dermines the ability of institutions to func-
tion. In South Africa, segmentation often
takes the form of divisions among ethnic
groups, among family-based clans, and
among the residents of townships, informal
settlements, and work hostels.

Marginal urban communities of blacks
are often trapped in a downward spiral.
Community institutions, already weak in
the context of apartheid South Africa, were
further debilitated by the processes described
above, and unable to provide infrastructure
– including sewers, electricity, and running
water – to keep residents from wrecking
local environmental resources. As people
became more dependent on these resources
for basic services, and as the resources were
thus further degraded, community segmen-
tation increased. This segmentation further
weakened essential community institutions,
allowed powerful 'warlords' to capture criti-
cal resources, and set the stage for outbreaks
of violence among competing groups.

KwaZulu-Natal has seen huge influxes of

people into its cities. Approximately half the
population in the Durban-Pietermaritzburg
region now live in informal settlements,
lacking infrastructure and basic services
(Louw, 1994a: 17–18). According to the
Urban Foundation, the region has the
largest concentration of informal settlements
in the country (Harrison, 1992: 14). These
settlements are often run by warlords – local
leaders who control their own paramilitary
forces and owe 'only nominal allegiance to
any higher authority' (Minnaar, 1992: 63).
Warlords establish patron–client relations
with settlement residents: the residents sup-
port the warlord in return for essential re-
sources and services. Paramilitary forces
allow warlords to exercise strict control over
the right to conduct business and over en-
vironmental resources, such as land and
water. Resource control multiplies warlord
power and wealth, permitting extraction of
surpluses in the form of taxes, rents, and
levies (Hindson & Morris, 1994: 6–7).

Warlords, in fact, have limited ability to
provide their communities with infrastruc-
ture. They have no real control over services
such as electricity, refuse removal, and roads,
since these services – to the extent that they
are available – are provided by the local mu-
nicipality (Hindson & Morris, 1994: 8).
They control only their paramilitary forces
(often armed by the apartheid state in the
pre-election period), the residents in their
territories, and the local land and water (in-
cluding taps into municipal pipelines) that
residents depend upon.

Therefore, as resources are degraded
within their territories, warlords often try to
maintain power by pointing to resources in
neighbouring townships and informal settle-
ments, and mobilizing their communities to
seize them. 'Squatters are mobilized to fight
for access to resources in neighbouring
townships, and township youth organize
military style units to defend their areas and
counter-attack squatter areas' (Hindson et

Table V.   Unrest-related Deaths and Injuries, Natal and Transvaal, 1990–93

	Natal Deaths	*Transvaal Deaths*	*Total Deaths*	*Injuries*
1989	800*	NA	1,403	1,425
1990	1,685	924	2,609	4,309
1991	1,057	1,197	2,254	3,166
1992	1,430	1,822	3,252	4,815
1993	2,009	2,001	4,010	4,790

* Estimated. *Source:* Minnaar (1994: 1).

al., 1994: 341). This type of mobilization produced the devastating levels of violence outlined below.

Acute Conflict Within South Africa

Between September 1984 and the end of 1989, an estimated 3,500 people died in political violence throughout South Africa. After Mandela's release in February 1990, violence became pervasive. From that date, until December 1993, political violence killed an estimated 12,000 people – an annual rate more than four times that prior to 1990 (Minnaar, 1994: 1). In 1992 alone, criminal and political violence together produced more than 20,000 deaths (South African Institute of Race Relations, 1994: 296).

In July 1990, the so-called Reef Township War began in the regions around Johannesburg. Clashes broke out between migrant workers residing in hostels and residents of townships and informal settlements (Minnaar, 1994: 17). In 1992, the annual incidence of violence escalated by 133% in the Central Rand, the area immediately surrounding Johannesburg. The area south of Johannesburg saw a increase of 200%, whereas the region east of Johannesburg witnessed an increase of 84% (Ki & Minnaar, 1994: 26).[11]

[11] The percentage increases are based on the following figures: Central Rand: 203 incidents to 473; East Rand: 145 incidents to 266; South of Johannesburg: 53 incidents to 160.

Table V contains totals of deaths and injuries for the former provinces of Natal and Transvaal (the violence occurred primarily in the area around Johannesburg). Table V does not include deaths from criminal violence, but the distinction between political and criminal motivations is somewhat arbitrary in a politically charged atmosphere, such as that of the pre-1994 election period (Louw, 1994c: 16).

Environmental scarcity is not the sole cause of this violence, yet analysts should not ignore how scarcity has undermined South Africa's social stability. Below, we examine the effect of scarcity on grievances, group segmentation, and opportunities for violent collective action. Figure 3 diagrams the surge of violence after 1990 in South Africa. Below, we provide a detailed examination of the relationships that are illustrated in Figure 3.

Increased Grievances   Environmental scarcity reduced rural incomes and helped push many black South Africans into urban areas. The apartheid state depended upon its ties to co-opted local institutions, such as municipal and tribal councils, to maintain order within black communities. These institutions were unresponsive to the needs of the community, and could not address the increasing demands of local residents. The segmentation of urban black communities further weakened local institutions, which often could not deliver basic services to

Figure 3. Outbreak of Violence in South Africa
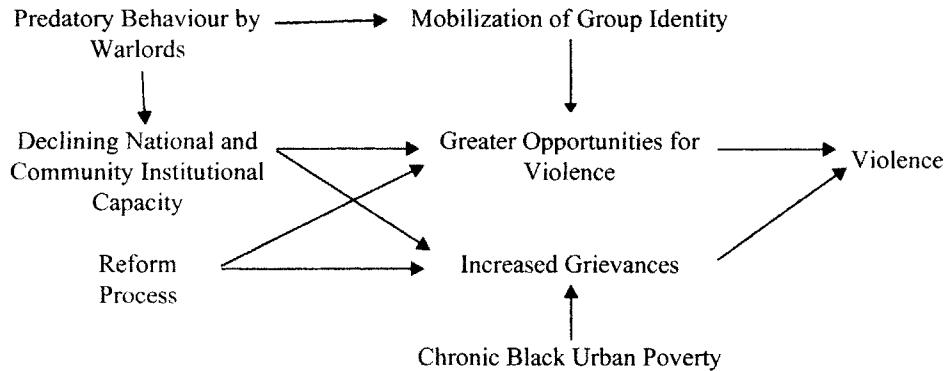
their people and as a consequence lost legitimacy.

Research conducted on black South Africans' happiness and perception of personal well-being shows that, although levels of happiness have historically been low, grievances escalated during the late 1980s. 'Being black in South Africa was a strong predictor of negative life satisfaction and (un)happiness, even when other background factors were controlled' (Moller, 1994: 27). From 1983–88, the percentage of blacks satisfied with life declined from 48% to 32%, and the percentage stating they were happy declined from 53% to 38% (Moller, 1994: 28).

Mobilization of Group Identity Group divisions, reinforced and in some instances created by the institution of apartheid, became the basis of politics in South Africa. Identification with one's ethnic group was necessary for survival and advancement within apartheid's ethnically divided political system. These divisions were reinforced by the territorial boundaries of the homelands. When people moved to the cities, they tended to carry their ethnic identities with them. A survey taken just prior to the 1994 election demonstrates the salience of ethnic identity: when asked to name their nationality, 16% of blacks replied South

African or black South African, while 63% gave the name of their tribe (Battersby, 1994: 11). Much of the recent violence in South Africa has been between supporters of the African National Congress (ANC) and those of the Inkatha movement. The Inkatha-based Freedom Party is primarily a Zulu organization, and the ANC's leadership is dominated by members of the Xhosa ethnic group. Thus, ethnic divisions reinforce the political differences between the two groups.

Ethnic groups are not only divided among themselves; they are also divided internally. Environmental scarcity increases the salience of group boundaries, which causes the segmentation of communities. Competition within and among groups grows under conditions of economic hardship and influxes of migrants (Olzak & Olivier, 1994: 2–7). Powerful individuals manipulate group identities within their communities to capture resources, and they distribute resources according to group affiliation to maintain their support (de Haas & Zulu, 1993: 49).

While international attention has often focused on the inter-ethnic conflict between Zulu and Xhosa, the Zulu population itself is cleaved into factions. These cleavages have political overtones and often manifest

themselves as conflicts between the ANC and Inkatha. Group divisions were constructed and manipulated by the apartheid state, and the political leaders and warlords on each side. ANC members tend to support political and social change, while Inkatha members support more traditional tribal institutions. The ANC is strong in the townships, while Inkatha draws its strength from informal settlements, often through connections to warlords.

Greater Opportunities for Violence After Mandela's release in February 1990, the nature of protest and violence changed, as it became clear that apartheid was about to collapse. The climate of reform made it easier to express grievances publicly. Both the ANC and the Inkatha Freedom Party, led by Mangosuthu Buthelezi and supported by the Apartheid regime, were transformed into political parties. The townships went to war with each other as the ANC and Inkatha struggled for political dominance.

In just one month, between August and September 1990, the death count around Johannesburg stood at more than 700, dwarfing the final death toll after four months of the Soweto uprisings of 1976. In the first three months of 1991, more than 400 people died in political violence, 260 of them after the long-awaited and much-applauded Mandela–Buthelezi peace summit. Watching the death count on television and reading about the carnage in newspapers gave the impression that nearly every major South African city, large town, and even outback farming districts was experiencing turmoil more fierce than the 1984–86 upheavals. More than 7,000 lives were lost in the fourteen months that followed the unbanning of the ANC, and other liberation movements, from February 1990 to April 1991 (Mkhondo, 1993: 48).

The events of 1990 radically changed the opportunities for political violence in South Africa. As the ANC and Inkatha became fully fledged political organizations battling for control of the institutions of power, they mobilized huge numbers of people and substantial financial resources for their political ends. Meanwhile, the apartheid state attempted to control the transition process through its support – both financial and armed – of Inkatha. The ANC and Inkatha mobilized large numbers of alienated and underemployed young men for their political battle. The battle took place within a deeply aggrieved society, brutalized for generations, and well rehearsed in fighting the system of apartheid. It resulted in the worst outbreak of violence in the country's history.

In KwaZulu-Natal, political leaders and warlords on both sides manipulated the conflicts among communities over access to resources, such as land, housing, water, and services (Morris & Hindson, 1992: 158). The large numbers of people moving into and within the KwaZulu-Natal region made the situation worse: migrants contributed to turmoil by increasing demands on resources and straining relations among groups. Disputes over scarce resources within informal settlements were transformed into political battles between the ANC and Inkatha (Morris & Hindson, 1994: 160).

Inkatha came to dominate informal settlements by striking political deals with warlords and manipulating the conservative group identities of many residents who had only recently arrived from rural areas (Hindson et al., 1994: 340). Warlords used the charged political climate to gain protection and favours from Inkatha. The ANC, in turn, promoted a revolt against tradition among Zulu youth, who expressed their opposition to traditional tribal structures through participation in ANC recruitment drives (Louw, 1994b: 21). Divisions between the ANC and Inkatha polarized social relations within townships and informal

Table VI.   Total Deaths Resulting From Political Violence in the Durban Functional Region, 1986–92

Area	1986	1987	1988	1989	1990	1991	1992
Total Formal	100	88	186	227	289	151	246
Proportion of Total	70%	63%	50%	44%	36%	34%	30%
Total Informal	43	51	188	288	515	290	566
Proportion of Total	30%	37%	50%	56%	64%	66%	70%
Grand Total	143	139	374	515	804	441	812

Source: Hindson, Byerley & Morris (1994: 339).

settlements, mobilizing and politicizing their residents (Louw, 1992: 57).

As a consequence, the region seemed locked into a spiral of violence as conflict created migrants that, in turn, strained social relations in receiving communities: the number of refugees and displacees from violence over the years runs into the thousands. Conflict has arisen when these people either move into new communities or try to return to their homes. This, along with migration of people for economic reasons, puts extra pressure on scarce resources, creating the potential for violent conflict (Louw, 1994b: 21).

Table VI shows how political violence soared during this period in the DFR. After 1990, the use of lethal weapons rose and attacks targeted specific persons, not property or police (Louw, 1993). Deaths in KwaZulu-Natal doubled again in 1992–93. Between 1992 and the 1994 election, more than one hundred violent events occurred per month, making the conflict in KwaZulu-Natal, and in the DFR in particular, the most sustained in the country (Louw, 1994b: 17). Although violence increased everywhere, the informal settlements became the main zones of conflict. Table VI also shows that – similar to elsewhere in the country – Mandela's release in 1990 substantially boosted violence.

After the election, violence subsided in both KwaZulu-Natal and the region around Johannesburg. Although conflict levels have remained relatively low around Johan-

nesburg, they have risen in KwaZulu-Natal. The lives of people in the province continue to be disrupted by violence that shows little sign of ending.

Conclusion

In this article, we investigate the influence of environmental factors on social and political behaviour in South Africa, and argue that environmental scarcity played a role in generating pre-election turmoil. This analysis of the causes of conflict within South Africa is relatively novel. Much of the commentary focuses on traditional explanations of violence, examinations of the political and economic conditions surrounding the efforts by the National Party to preserve apartheid. According to such accounts, pre-election violence was caused by the competition between the ANC and Inkatha for control of the political arena, fuelled by the National Party's clandestine support of Inkatha. Yet large-scale civil war was averted by the decision of de Klerk and Mandela to engage in peaceful negotiations for the end to minority white rule (Stedman, 1996: 353).

It is impossible to establish the counterfactual argument that, in the absence of severe environmental scarcity, the upsurge of violence in the early 1990s would not have occurred. The data available are simply not adequate for such proof. Moreover, environmental scarcity is always enmeshed in a web of social, political, and economic factors, and its contribution to violence is difficult to

disentangle from these other factors. In particular, the apartheid state helped foster much of the violence by fuelling conflict between Inkatha and the ANC. Strong group identities and the transition to democracy also contributed to the violence.

However, analysis that focuses solely on the role of the apartheid state and the tumultuous nature of a democratic transition does not explain the role of factors such as migration, scarcities of resources in black urban communities, poverty, and warlord manipulation of resource access in this violence. Moreover, this traditional analysis does not explain why crime remains high, and why conflicts continue to erupt between communities over access to resources (Fig, 1996).

As we have shown, scarcities pushed up grievances and helped alter opportunities for violent collective action. Therefore, although the role of environmental scarcity is complex, we maintain that scarcity contributed to social instability in pre-election South Africa. In addition, we have argued that analysts must understand the relationship between state and society if they are to understand the complex links between environmental scarcity and violent conflict. During the 1980s and early 1990s, South African society's demands on the state increased as thousands of people migrated to urban areas, while the ability of both national and local institutions to meet these demands decreased. With the decline of local governments, the apartheid regime lost its already tenuous links to society. Society segmented, and powerful groups seized control of resources. These groups married their local conflicts over resource access to the struggle for political control between the ANC and Inkatha.

The election of Mandela has changed the relationship between state and society. State legitimacy has jumped upwards. The Reconstruction and Development Programme (RDP) recognizes the needs of society, and interactions between state and society are now more constructive and vigorous. The government has established fora around the country to discuss local implementation of the RDP – fora that boost civic engagement and generate social capital. Although scarcities remain severe, levels of grievance have fallen: the proportion of black South Africans expressing satisfaction with their lives rose from 32% in 1988 to 80% in 1994, while the proportion expressing happiness went from 38% in 1988 to 86% in 1994 (Moller, 1994: 28).

However, a sharp rise in expectations of change has accompanied this decline in grievances. Blacks have high expectations of the Mandela government. A poll conducted just after the 1994 election shows that 58% of the population expect the government to provide ready-built houses and enforce minimum wages, while 71% demand that the government provide work to all unemployed. When asked what their reaction would be if their expectations were not met, 20% cited violent action, while only 5% cited peaceful mass protest (Anon, 1994: 73).

The election of Mandela may have boosted expectations for change, but, for most blacks, objective living conditions remain dismal. Blacks are not happier because their living conditions have changed; rather, they are happier because they think these conditions are going to change. If change is not quickly forthcoming the regime will lose legitimacy, and linkages between state and society will once again weaken. Unfortunately, already severe environmental scarcity makes the process of positive change much harder. Social demands on local institutions continue to expand, and the potential for violence between the ANC and Inkatha remains high.

Nelson Mandela's victory gave hope to many that the ills of apartheid and the violence of recent years would give way to peace

and prosperity. Nothing can detract from the accomplishments achieved so far. But without careful attention to the environmental factors that contribute to violence, South Africa may once again be locked into a deadly spiral of conflict.

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VAL PERCIVAL, b. 1970, MA in International Affairs, Conflict Analysis (Carleton University, 1995); researcher for the *Project on Environment, Population, and Security and The Project on Environmental Scarcities, State Capacity and Civil Violence*; currently working with the UNHCR in Guinea.

THOMAS HOMER-DIXON, b. 1956, PhD in Political Science, Massachusetts Institute of Technology; Assistant Professor in the Department of Political Science and Director of Peace and Conflict Studies Program at the University of Toronto; Co-director of the *Project on Environmental Change and Acute Conflict*; Director of the *Project on Environment, Population, and Security*, and Principal Investigator for the *Project on Environmental Scarcities, State Capacity and Civil Violence*.