‘The Land Question in South Africa, Zimbabwe and Kenya: a Geographical Perspective on Resource Endowment’

Fox, R.C. and Rowntree, K.M. 2002

Paper presented to Regional Conference of the International Geographical Union, ‘Geographical Renaissance at the Dawn of the Millenium.’

4-7 August 2002, Durban

Accepted for publication in *GeoJournal*

The Land Question in South Africa, Zimbabwe and Kenya: a Geographical Perspective on Resource Endowment

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Abstract

In sharp contrast to the debates concerning land policy, land tenure and sustainable resource management in South Africa is any input concerning the geographical distribution of land productivity. This paper attempts to redress this imbalance by providing an empirical investigation of land potential in South Africa. In this way we intend to provide the crucial context for policy and academic studies of the land issue in South Africa. Furthermore, we will undertake our study in such a way that comparison can be made to Zimbabwe and Kenya where the land issue has been such a critical component of the post-colonial development process. Theoretically our work is contextualised within the debates surrounding the importance of geographical endowments, institutions and policies in the development process.

Introduction

The spatial dimension and environmental potential are two critical areas in understanding 'the land' within the context of land policy. This has been appreciated for some time within the southern African context. West (1986) is one example of an anlayst discussing this issue since he maintains that there are three facets to land policy: the environmental. the spatial and the tenurial dimensions. Many recent South African publications (for example, Cousins 2000; Benjaminsen et al 2002) reveal widespread interest in land policy and policy developments in the context of resource management issues but there is very little in the way of integrating the spatial dimension either at the local or national level.

Much of the following analysis of South Africa, Zimbabwe and Kenya is an attempt to bring into the foreground their spatial, environmental characteristics and then start to unravel how they can be compared. These analyses need, however, be understood in relation to a deeper debate concerning the long-term development process in former colonies which has been revisited recently. Acemoglu et al (2000) and Easterley and Devine (2002) have reopened the debate concerning the importance of geographical/ environmental endowments in the development process. Their work takes a long term perspective of the last 400 years of colonial and post-colonial development.Their two papers have tested the relative importance of geographic variations in phenomena such as tropical location or cash crop potential against the significance of colonial institutions such as the legal system underpinning land ownership, or the role which policies have played in the post-colonial period. Significantly, they differentiate between colonies of settlement, where Europeans had a long term view of colonial development suited to a permanent settler presence (neo-Europes such as Australia), and colonies of extraction where local conditions precluded long-term settlement and so highly extractive economic systems were developed (such as the Belgian Congo).

In brief they have examined the relative significance of the following ideas.

- The geography endowment view. Environment and location directly affect inputs into production, for example, land, resources, labour and accessibility.
- The institution view. The environment has been conducive to certain types of development (neo-Europes versus extractive colonies) which themselves produced long lasting institutional impacts.
- The policy view. Economic policies and institutions reflect current intellectual paradigms, influential information and existing political forces. Adapting current policies and institutions will produce economic development.

Acemoglu et al (2000) found that early institutions have persisted in large part to the present and that the differences in institutions account for most of the variation in current incomes. They cautioned that their work should not be interpreted deterministically since they recognize that institutions are not solely the result of colonialism. Easterley and Devine (2002) took this conclusion somewhat further and concluded their cross-country survey of economic development by finding that measures of location and environment impacted through their role in promoting long lasting and defining institutions. Policies are not a significant factor once the impact of endowments on institutions has been accounted for.

This paper is going to start by relating African countries' recent development, as measured by their human development indices, to the three views described above and the findings of Acemoglu et al and Easterley

and Devine. From this contextualisation we will move on to look comparatively at resource endowments, geography and land ownership regimes in the three countries of South Africa, Zimbabwe and Kenya. In conclusion we will speculate about the relative importance of the three views in understanding the land issue.

Africa: Human Development Indices

This section uses the United Nations Development Programme's Human Development Report for 2001 (UNDP 2001) as its basic source of information. The main summary statistic examined is the human development index since it is derived from a wide range of development characteristics: life expectancy, literacy and school enrollment, gross domestic product per capita. The following two figures (Figure 1 and Figure 2) summarise the HDIs as stem and leaf diagrams and use country acronyms to facilitate identification of different countries. The geography endowment is assessed through categorizing countries as landlocked, tropical, sub-tropical or small islands. The institutions are represented by categorizing the countries which are widely accepted as having the most extractive colonial powers: Belgium (the DRC, Rwanda and Burundi), Italy (Eritrea and Somaolia), Portugal (Angola, Mozambique and Guinea Bissau).

Figure 1 highlights the countries with factors associated with low levels of development. These countries lie at the bottom of the diagram with the exception of Zimbabwe in the middle whose HDI will almost certainly have fallen since 1999 (when the data was collected) as per capita incomes have dropped spectacularly in the last two years. Low HDIs are very clearly experienced in landlocked tropical countries and countries that were under Belgian, Portuguese or Italian colonial rule.

Figure 2 identifies the sub-tropical countries of northern and southern Africa and the small island states. Here the clustering lies to the top of the diagram in a finding that is consistent with the works cited in the introduction. Here the processes would be:

- long-term colonial influence and settlement in temperate areas;
- colonisation of small disease free islands over the last 300 years;
- the lasting significance of the institutions that were developed in those countries;
- the stability of their governments in the post-colonial period.

Clearly there is going to be a difference in the subsequent analysis since South Africa is a temperate country with a relatively high HDI whereas Kenya is tropical and Zimbabwe is tropical and landlocked, both countries have moderate HDIs by African standards. We should expect, therefore that land division will play itself out differently. Moreover there has been a longer drawn out settlement process in South Africa and the institutional imprint will be that much deeper.

The Geographical Distribution of Land Productivity

Zimbawe and Kenya Compared

Scholars studying the land issue in colonial southern Rhodesia and post-colonial Zimbabwe have been able to contextualise their studies both spatially and environmentally since the 1960 publication of the agricultural survey (Vincent and Thomas 1960). This survey contained a delimitation of what were called Natural Regions 1-V.

- Region I. The specialised and diversified farming system (annual rainfall in excess of 710 mm, carrying capacity of 4 hectares per livestock unit).
- Region II. The intensive farming system, suitable for crops.
- Region III. Semi-intensive farming system, suitable for mixed farming (annual rainfall from between 650 and 800mm).
- Region IV. Semi-extensive farming system, suitable for livestock farming.
- Region V. Extensive livestock farming system (annual rainfall below 410 mm, carrying capacity of 12 hectares per livestock unit).

Since this date many authors have utilized this system to analyse the distribution of land by major racial/tenure divisions. It is not the purpose of this section to chronicle the exact uses to which this spatial information has been put, instead examples have been selected below to show the types of analysis that are possible.

At their simplest such analyses are concerned with distinguishing between former white (commercial, freehold) and former black (communal, subsistence) land. For example, Zinyama (1982) delimited the proportions of land by tenure category and natural regions in early post-independence Zimbabwe. At this time land was equally divided (46% each) between the communal and commercial sectors. Table 1 gives the results of

his survey and shows the clear distortion in land occupance between communal lands which were the major portions of the poorest agricultural regions IV and V whilst the commercial areas dominated regions I, II and III.

Table 1: Zimbabwe, Distribution of Land by Category 1982

Natural Region	Communal Farming Areas (%)	Commercial Farming Areas (%)
I	0.5	2.9
II	8.9	26.8
III	16.4	22.1
IV	44.4	24.8
V	29.8	23.4
	100	100

Source: Zinyama (1982)

By the late 1990s considerable sophistication was possible in assessing the impact of government policies at the national level. In 1997 the Government of Zimbabwe started to enforce the provisions of the Land Acquisition Act of 1992 on a large scale (Moyo 1998, 2000). The Government listed 1471 farms in the Large Scale Commercial Farming Sector for compulsory purchase. Moyo (1998) was able to trace these farms to their natural regions by cross refgerencing hard copy cadastral information with the maps of natural regions. In this way he could tell us that the area of farms by region was as follows:

- Natural Region I. 65 farms with 1.1% of the area to be acquired.
- Natural Region II. 639 farms with 18.8% of the area.
- Natural Region III. 380 farms with 17.6% of the area.
- Natural Region IV. 224 farms with 28.6% of the area.
- Natural Region V. 163 farms with 34% of the area to be acquired.

Had this policy been followed through we can see that nearly two-thirds of the land targeted to be acquired lay in the poorest agro-ecological regions (IV and V). Perhaps more significant in terms of agricultural potential were the 639 farms in region II. Here we could speculate that high densities of population could be resettled on good arable farm land though there might well be a trade-off, especially in the short-term, in agricultural output and hence food security and foreign exchange earnings to the country.

Another recent study by Harts-Broekhuis and Huisman (2001) uses the natural regions in a different way. They contextualise the impact of land reform, especially the anarchic ‘fast-track’ land invasions, on the resource-poor region IV. They conclude that resettled households have better food outputs than households not resettled but there is no improvement in productivity per hectare in the resettled areas. Furthermore, cultivation of a 5 hectare plot does not imply self-sufficiency. Off farm incomes, loans and food grants would still be needed to maintain household livelihoods.

These examples show us that we can analyse at both the national level and regional level and so benefit the policy and scholarly debates.

The parentage of the geographical information concerning land productivity is very similar in Kenya. In Kenya the source for much of the work on agro-ecological zonation goes back to Braun’s 1982 map of agro-climatic zones in Kenya This map is contained in Jaetzold and Schmidt’s 1982 set of farm management handbooks for Kenya. These handbooks, which are in fact very weighty books, contain richly detailed and illustrated maps of the agro-ecological zones for each administrative district in Kenya and are thus considerably more precise than the work of Vincent and Thomas. The Kenyan and Zimbabwean analyses are, however, are based on similar information: rainfall amounts, rainfall variability, soils, potential evapotranspiration, temperature and altitude.

Figure 3 shows a simplified version of how the agro-ecological zones are derived for tropical areas such as Kenya. It is based on the original found in Jaetzold and Schmidt (1982). Water availability zones make up the columns of the diagram and range from zones with excess water on the left of the diagram to zones with pronounced water deficits on the right. The temperature belts are related in part to altitude as the row head-

ings indicate. The hottest belts lie at the bottom and the coldest at the top. The intersection of the water availability zones and temperature belts gives the main agriculture zonations.

Comparison between Zimbabwe's natural regions and the agro-ecological zonation system is relatively straightforward. Zimbabwe's two most productive agricultural regions, I and II, would lie in the humid and subhumid water zones and the upper highland to lower midland temperature belts. Regions III, IV and V would be found where the transitional and semi-arid zones intersect with the lower midland and inner lowland temperature belts.

The natural regions of Zimbabwe are often portrayed in the literature but Kenya zonation is not. Figure 2 shows the agro-climatic zones of Kenya and is based on the GIS work used by Rowntree in her 1991 pioneering study of land division and agro-climatic zonation. This digital map cover has been published in Fox's Population Atlas of Kenya (1995). Figure 4 shows the seven amalgamated agro-climatic zones and Table 2 shows how they can be related to Zimbabwe's natural regions.

Table 2: Approximate Comparison of Zimbabwe's Natural Regions, Kenya's Agro-Climatic Zones and South Africa's Biological Productivity Regions

Kenya	Zimbabwe	South Africa (biological productivity tons/ ha/season)
Highland and Midland Cultivation	Region I and Region II	8.75 - 10
Transitional and Marginal Cultivation	Region III	6.25-8.75
Upland Livestock	Region I	3.75-6.25
Lowland Livestock and Millet	Region III and Region IV	3.75-6.25
Lowland Ranching	Region IV and Region V	1.75-3.75
Nomadic Pastoralism	Region V	0.5
Tropical Alpine and Mountain	Small portion of Region I	Portions of 10

Rowntree's 1991 study was based on the national level and examined the agro-climatic distribution of land according to the major racial and tenurial subdivisions at the end of the colonial period (1963). As such her findings are very interesting to compare with post-colonial Zimbabwe in 1980 and post-apartheid South Africa. in the mid 1990s.

Figure 4 shows that most of Kenya's land area was held by the British crown (58.4%). The British Queen was, accordingly, the jural community and she held the land in trust for the nomadic pastoralist inhabitants of these areas, for example the Maasai and Samburu. In the post-colonial period this land became state land. Figure 5 indicates that virtually all of the crown land was in the nomadic pastoralism and lowland ranching categories: extensive livestock husbandry would therefore have been the dominant land-use. The African land was the next largest group with 22% of the country's land area. The vast majority of this was held under communal tenure systems although this was changing from the mid 1950s onwards as the Swynnerton Plan's goals of registering land under freehold tenure was implemented. Just over 50% of the African land lay in the three most productive agricultural zones: around 20% was highland and midland cultivation, a further 25% was transitional and marginal for cultivation and there was a small amount of land in the upland livestock zone. National Parks were the third largest category with 11.1% of the country's surface area: most of the parks lay in the lowland ranching and nomadic pastoral regions of the country. The alienated 'European' lands (colloquially known as the 'white highlands') were very small in terms of their land area, only 6.2%, but they contained significant portions of land in the fertile highland and midland cultivation (20%) and upland livestock (20%) zones. Lastly there were the forest reserves and although Figure 4 shows that they were very small they did consist largely of the country's most fertile land in the highland and midland cultivation category.

African communal areas were much smaller in Kenya (22%) as a proportion in comparison to the Zimbabwean pattern (46%) described by Zinyama (1982). The distribution of agro-climatic zones and natural regions within the alienated/ commercial / European categories was also sharply different. There was consid-

erably more highly productive land as a proportion in Kenya (over 40%) found in the highland and midland cultivation and upland livestock zones. In Zimbabwe only 10% was found in regions I and II. The African/ communal lands were not as different in endowment though in Kenya this category was usually more fertile as a proportion since so much of the country's poorest lands were in the crown land category.

It would be possible now to undertake a comparison of resettlement initiatives in the two countries through locating resettlement by its location in the different agro-ecological zones. That would, however, be a separate study to this and require a good deal of secondary research.

Finally, studies of Kenya have also located case study research within the context of the country's agro-ecological zonation. Fox and Rowntree (2002) have shown that the debate surrounding population increase, land-use intensification and erosion in Kenya needs to be contextualised within both the agro-climatic zonation and land tenure systems (which were originally racially based). In this way structural causal factors such as rapid population growth in relation to land potential can be identified and conflicting case study conclusions better understood.

South Africa

The most comprehensive source of an equivalent period to the work in Zimbabwe and Kenya was Acock's *Veld Types of South Africa* (Acocks 1975) which was originally published in 1952, in the early apartheid era. His concern was both botanical and ecological in mapping the distribution of the vegetation regions of the country. Subsequent work that encompassed agricultural productivity in the apartheid era often dealt either with the black areas or white areas of the country. They were not viewed as part of a continuous land surface. An outstanding example with a great deal of agricultural research would be the Tomlinson Commission Report into the development of South Africa's black areas (Union of South Africa 1955). More recently Schoeman and Scotney's 1987 paper on agricultural potential maps crop production potential but leaves blank areas for Transkei, Ciskei, Bophuthatswana and the other homelands.

The principal sources for this analysis are the recently published digital and hard copy atlases of environmental potential in South Africa (Department of Environmental Affairs and Tourism 1998; Schulze et al 1997). Biological (or primary) productivity is the South African equivalent measure to agro-ecological zonation and is based on an understanding of the relationships between soil moisture, temperature, length of growing seasons etc. It is expressed as tonnes of potential biomass production per hectare per growing season and has an intuitively easily recognizable scale running from 0 to 10 (Figure 7). Table 2 shows the approximate correspondence between biological productivity and the Kenyan and Zimbabwean systems. This table has to be treated with care since South Africa is not a tropical country and so there will not be a direct correspondence as seasonality becomes of more importance than the relationship between altitude and wet/ dry seasons.

It is critically important that this source of spatial information be analysed to facilitate policy debate in South Africa. The preceding analyses of Zimbabwe and Kenya have already shown that land endowments were different in the two countries' major land divisions. Later we will comment on how policy directions have taken different trajectories in the two countries with intriguing consequences. What follows is a comparative delimitation of agricultural potential in South Africa.

The data for biological productivity for South Africa is already available in a digital format facilitating analysis by Geographical Information Systems. Further sets of information on terrain classification, degraded areas (Hoffman et al 1999), urban extent, nature and conservation areas can also be readily obtained from the Enpat database to enable a sophisticated appraisal of the amount of land of varying potential. In this way we are extending the analyses already undertaken by authors such as Pickles and Weiner (1991) which have demonstrated the gross inequity in land division between white and black under apartheid.

The main challenge was for this analysis to derive a digital cover of land division between the former homelands (mostly communal areas) and former 'white' areas of South Africa (mostly commercial areas and State Land). This was undertaken through examining hard copy maps of land division in the apartheid era and classifying land units accordingly in the Enpat covers. A directly comparable method was used to derive the land divisions in late colonial Kenya.

Methodologically the process involved creating two map covers: the communal or black areas and the commercial or white areas. Following that the area of each was reduced by removing the following:

- areas with steep slopes - a good idea of just how rugged South Africa is can be seen in the distribution of mountain place names shown Figure 8;
- the 20 most degraded districts in the country described by Hoffman et al (1999) in their exhaustive and systematic survey of land degradation in South Africa;
- the major urban agglomerations since their surface area was covered by settlement;
- the country's nationally and provincially administered nature conservation areas.

Table 3 summarises the patterns which emerge at the end of this process. The former white areas quite clearly possessed three to four times the amount of good arable land (in the two highest categories of productivity) than the former black areas. Figures 9 and 10 show that these lands of high potential are located along the eastern seaboard of the Eastern Cape and KwaZulu-Natal and the higher areas of Mpumalanga Province. These, therefore, are the areas where commercial, rainfed agriculture could most logically be promoted for resettled emergent black commercial farmers.

Table 3: Subdivision of Commercial (white) and Communal (black) Land Potential after Removing Degraded, Urban, Conservation and Rugged Areas

Biological Productivity	Commercial (square km)	Communal (square km)	Commercial (%)	Communal %	Total
0.5	258,847	0	32.0	0.0	258,847
1.75	154,430	5,483	19.1	6.1	159,913
3.75	210,810	44,001	26.1	49.0	254,811
6.25	126,648	24,709	15.7	27.5	151,357
8.75	37,672	8,928	4.7	9.9	46,600
10	19,930	6,651	2.5	7.4	26,581
Totals	808,337	89,772	100	100	898,109
				SA Total	1,219,090

Most of the land with some arable potential is located in the 6.25 category: marginal or moderate for cultivation. The two largest categories in the former white areas are not suitable for rainfed agriculture having productivity potentials in the 0.5 and 3.75 categories. These two make up over 50% of the total land in the country.

The black or communal areas were much smaller in South Africa (13%) than in Kenya (22%) or Zimbabwe (46%). Another main difference is that in South Africa the land with lowest productivity lay in the commercial or white sector, but it is important to realise that much irrigation investment has been made in this area. In Kenya it was Crown Land at the end of the colonial period and in Zimbabwe it was split relatively evenly between the commercial and communal sectors. There was more highly productive land as a proportion in South Africa's black areas (45%) than in Kenya (just over 40%) whereas in Zimbabwe only 25% was found in regions I, II and III.

Our analysis can be triangulated with the Food and Agricultural Organisation's (FAO) Global Agro-Ecological Assessment (FAO 2000). The FAO have modeled land with cultivation potential across the world using a different methodology to that used by Enpat on which this study is based. As usual there are problems with comparability of terminology and major productivity classes. There is, neveretheless, a high degree of correspondence between the analysis presented above and the FAO study. For example, the FAO has 247,100 square kilometers of land classified as very suitable, suitable, moderately suitable or marginally suitable for rain fed agriculture. The equivalent categories in Table 3 would be biological productivities of 10, 8.75 and 6.25 which have a combined area of 234,820 square kilometers.

Conclusion

Kenya has experienced conversion of communal to freehold land through the late colonial and well into the post-colonial period. Therefore far more high potential land is held under freehold now than was colonially.

In Zimbabwe there has been conversion from freehold land into State land through resttlement in the post-colonial period. Families resettled up to the recent 'fast-track' phase of land invasions were issued with certificates of occupance by the government. So there is a direct contrast to Kenya since there has been a reduction in freehold land of high potential in Zimbabwe. In South Africa there has been a very slow process of resettlement and that has occurred without major changes in tenure system from freehold to State land. If anything there has been conversion from State land to freehold. As yet there has been no examination released into the public domain of the implications in South Africa of the land potential of resettled areas.

In the broader context of the debate concerning the endowment view, the institution view and the policy views on development we could expect Zimbabwe to be the least developed country as it is both land locked, tropical and relatively recently colonised. Kenya should be better developed than Zimbabwe as it is not land locked but is tropical and with a similar colonial intervention. It is perhaps pertinent that at this moment in time it is very likely that Zimbabwe's HDI will be falling below Kenya's. For South Africa, perhaps we should not expect major transformation of the institutional basis to land ownership since it is so much more deeply entrenched within a system that has been produced through 300 years of colonial settlement. Even if there is to be major resettlement within South Africa there is not a great deal of land suitable for rainfed, smallholder, emergent, black, farming development. Lastly, we should reflect on the fact that post-apartheid South Africa is experiencing social and political pressures to transform its land policy at a time when the forces of globalisation are increasing and where they impact to the detriment of the small farmer. In Zimbabwe in 1980 and Kenya in 1963 the global context was significantly different.

References

Acemoglu, D, Johnson, S, and J.A. Robinson 2000. The Colonial Origins of Comparative Development: an Empirical Investigation. National Bureau of Economic Research Working Paper 7771.

Acocks, J.P.H, 1975. Veld Types of South Africa, Second Edition. Memoirs of the Botanical Survey of South Africa 40: Botanical Research Institute, Pretoria.

Barry, M. (ed) 1998. Proceedings of the International Conference on Land Tenure in the Developing World with a focus on Southern Africa: 1-587. University of Cape Town Press: Cape Town.

Benjaminsen, T.A, Cousins, B and L. Thomson (eds) 2002. Contested Resources: Challenges to the Governance of Natural Resources in Southern Africa. Programme for Land and Agrarian Studies (PLAAS), University of the Western Cape, Cape Town.

Cousins, B. 2000. At the Crossroads: Land and Agrarian Reform in South Africa into the 21st Century. . Programme for Land and Agrarian Studies (PLAAS), University of the Western Cape, Cape Town.

Braun, H.M.H. 1982. Agro-Climatic Zones of Kenya, in Jaetzold, R. and Schmidt, H. 1982. Farm Management Handbook of Kenya Vol II/A West Kenya. Ministry of Agriculture: Kenya.

Department of Environmental Affairs and Tourism 1998. Enpat. Environmental Potential Atlas [CD-Rom] Available, Pretoria [November 1998]

Diamond, J. 1997. Guns. Germs and Steel: the Fates of Human Societies. W.W. Norton: New York.

Easterley, W. and R. Levine 2002. Tropics, Germs and Crops: How Endowments Influence Economic Development. National Bureau of Economic Research Working Paper 9106.

Food and Agriculture Organisation 2000. Global Agro-Ecological Zones (Global AEZ) [On-line] http://www.fao.org/ag/AGL/agll/gaez/index.htm [Available June 20 2003]

Fox, R.C. 1995. Population Atlas of Kenya (and user's guide). [On disk] Department of Geography, Rhodes University: Grahamstown, South Africa.

Fox, R.C. and K.M. Rowntree 2002. 'Population densities and agro-ecological potential: a critique of regional-scale analyses from Kenya and South Africa'. In Benjaminsen, T.A, Cousins, B and L. Thomson (eds) Contested Resources: Challenges to the Governance of Natural Resources in Southern Africa. Programme for Land and Agrarian Studies (PLAAS), University of the Western Cape, Cape Town, pp. 304-313.

Harts-Broekhuis, A, and H. Huisman 2001. 'Resettlement revisited: land reform results in resource-poor regions in Zimbabwe.' Geoforum 32, 285-298.

Hoffman, T, Todd, S, Ntshona, Z, and S. Turner 1999. Land Degradation in South Africa. National Botanical Institute: Claremont, South Africa.

Hoffman, N.T. and S. Todd 2000. 'A national review of land degradation in South Africa: the influence of biophysical and socio-economic factors.' Journal of Southern African Studies 26(4), 743-758.

Holt-Jensen, A. 1999. Geography: History and Concepts. A Student's guide. Third Edition. Sage Publications, London.

Kitchin, R. and N.J. Tate 2000. Conducting Research into Human Geography: Theory, Methodology and Practice. Prentice Hall: Harlow, England.

Macdonald, I.A.W. 1989. 'Man's role in changing the face of southern Africa.' In B.J. Huntley (ed) Biotic Diversity in Southern Africa. Oxford University Press: Cape Town, pp. 51-77.

Moyo, S. 2000. 'The Political Economy of Land Acquisition and Redistribution in Zimbabwe 1990-1999. Journal of Southern African Studies 26 (1) pp.5-28.

Moyo, S. 1998. The Land Acquisition Process in Zimbabwe (1997/8). UNDP Resource Centre: Harare.

Pickles, J. and D. Weiner 1991. 'Rural and regional restructuring of apartheid: ideology, development policy and the competition for space. Antipode 23(1), 2-32.

Rowntree, K.M. 1991. Land Division in Colonial Kenya: an ecological perspective. Paper presented at the COMTAG Workshop on Land Use and Soil Erosion in Tropical Countries. Nairobi, August 1991.

Schulze, R.E, Maharaj, M, Lynch, S.D, Howe, B.J, and B. Melvil-Thomson 1997. South African Atlas of Agrohydrology and Climatology. Water Research Commission, Pretoria, Report TT82/96.

Schoeman, J.L. and D.M. Scotney 1987. 'Agricultural potential as determined by soil, terrain and climate.' South African Journal of Science 83, 260-268.

Union of South Africa 1955. Summary of the Report of the Commission for the Socio-Economic Development of the Bantu Areas Within the Union of South Africa. U.G. 61/1955: Government Printer, Pretoria.

United Nations Development Programme 2001. Human Development Report 2001. [On-line] http://hdr.undp.org/reports/global/2001/en/ [Available: 21 June 2003]

Vincent V and Thomas R G. 1960. An Agricultural Survey of Southern Rhodesia, Part 1. Agro-ecological survey. Government Printer, Salisbury.

Zinyama, L. 1982. 'Post-independence land resettlement in Zimbabwe'. Geography 67(2), 149-152.

Figure 1: Human Development Index 1999
***Portuguese, Belgian, Italian* Former Colonies and/or Landlocked, Tropical States**

0.800
0.775 LIB MAU
0.750
0.725 TUN
0.700 CVD RSA ALG
0.675
0.650 EGY
0.625 GAB
0.600 EQG NAM MOR
0.575 BOT SWZ
0.550 **ZIM** GHA LES
0.525 KEN
0.500 COM CAM CON TGO
0.475
0.450 MAD NGA DJI SUD MTA TAN **UGA**
0.425 ***DRC*** **ZAM** CDI SEN ***ANG*** BEN ***ERT***
0.400 GAM GUI **MLW** ***RWA***
0.375 **MAL** **CAR**
0.350 **CHA** ***GUB***
0.325 ***MOZ*** **ETH** **BFS**
0.300 ***BDI***
0.275 **NGR**
0.250 SLE
0.225
0.200

SOM (Somalia)- VERY LOW (UNKNOWN)

Stem: HDI value 1999
Leaf: African Country Acronyms

Figure 2: Human Development Index 1999
***Sub-Tropical* Countries or Small Islands**

0.800
0.775 ***LIB*** **MAU**
0.750
0.725 ***TUN***
0.700 **CVD** ***RSA*** ***ALG***
0.675
0.650 ***EGY***
0.625 GAB
0.600 EQG NAM ***MOR***
0.575 ***BOT*** ***SWZ***
0.550 ZIM GHA ***LES***
0.525 KEN
0.500 **COM** CAM CON TGO
0.475
0.450 MAD NGA DJI SUD MTA TAN UGA
0.425 DRC ZAM CDI SEN ANG BEN ERT
0.400 GAM GUI MLW RWA
0.375 MAL CAR
0.350 CHA GUB
0.325 MOZ ETH BFS
0.300 BDI
0.275 NGR
0.250 SLE
0.225
0.200

SOM – VERY LOW (UNKNOWN)

Stem: HDI value 1999
Leaf: African Country Acronyms

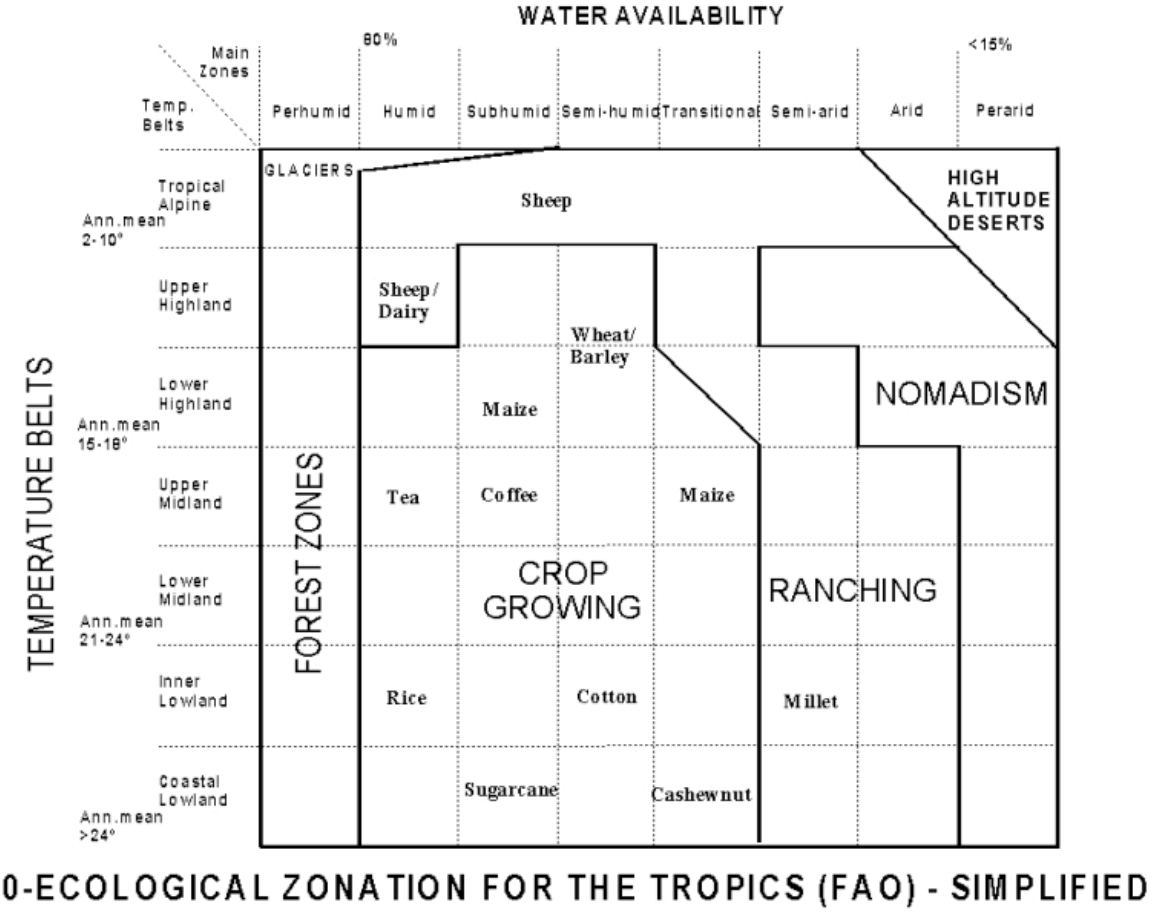

Figure 3 Agro-Ecological Zonation of the Tropics

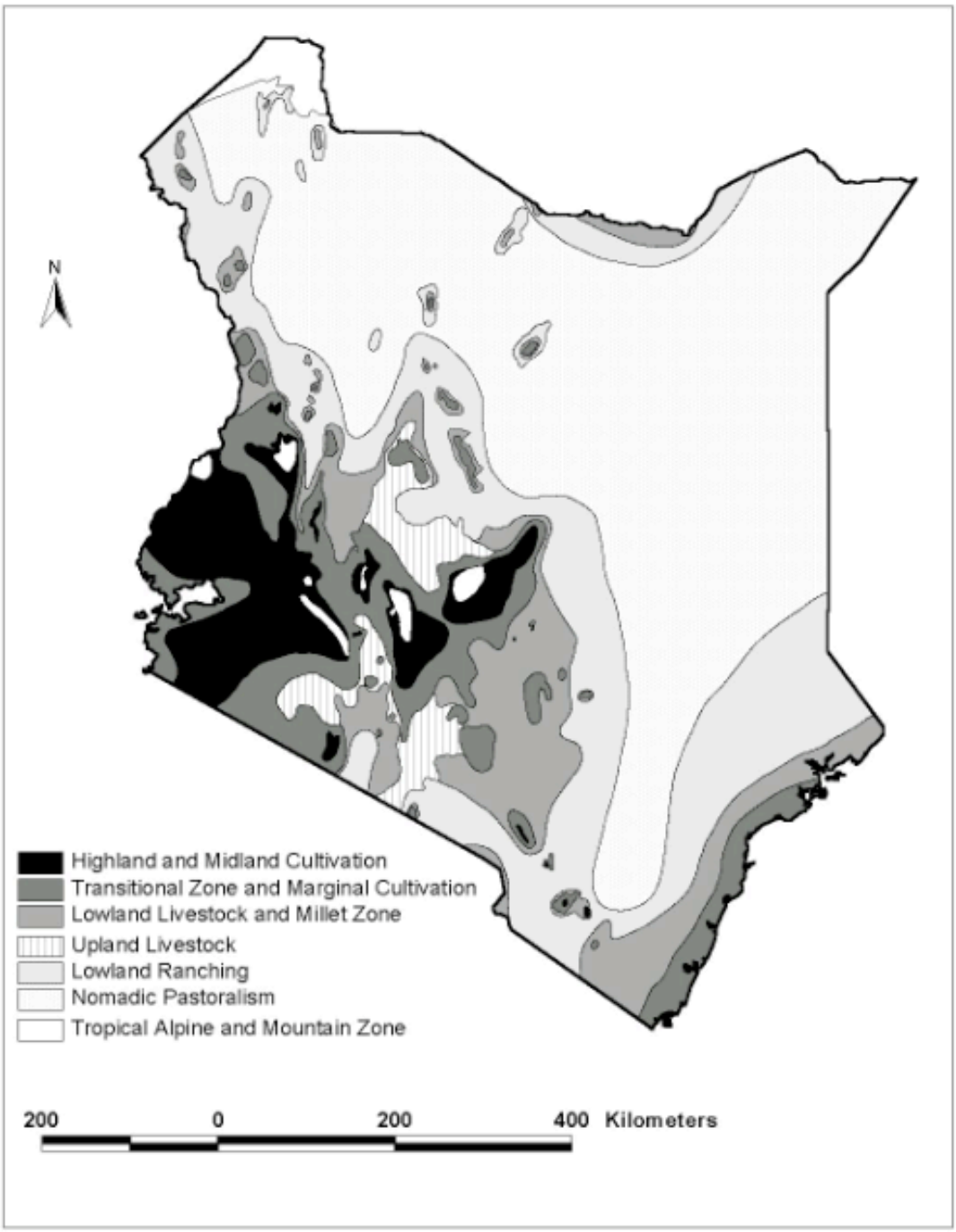

Figure 4 Agro-Climatic Zones of Kenya

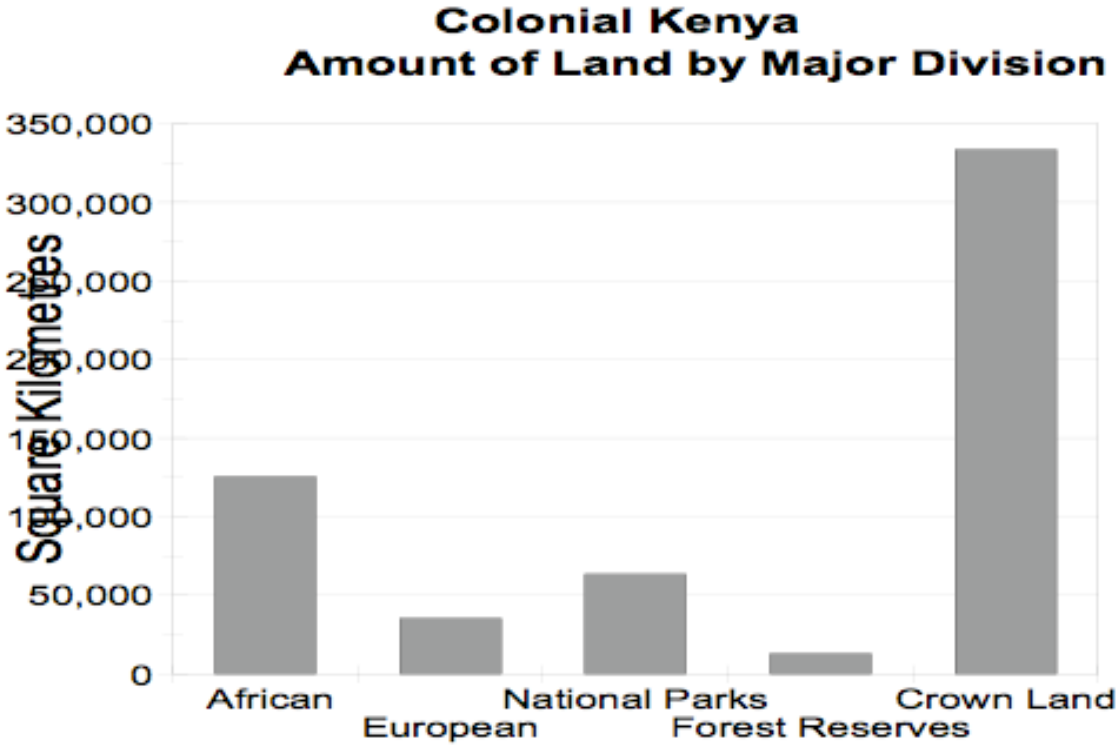

Figure 5 Major Divisions of Land in Late Colonial Kenya

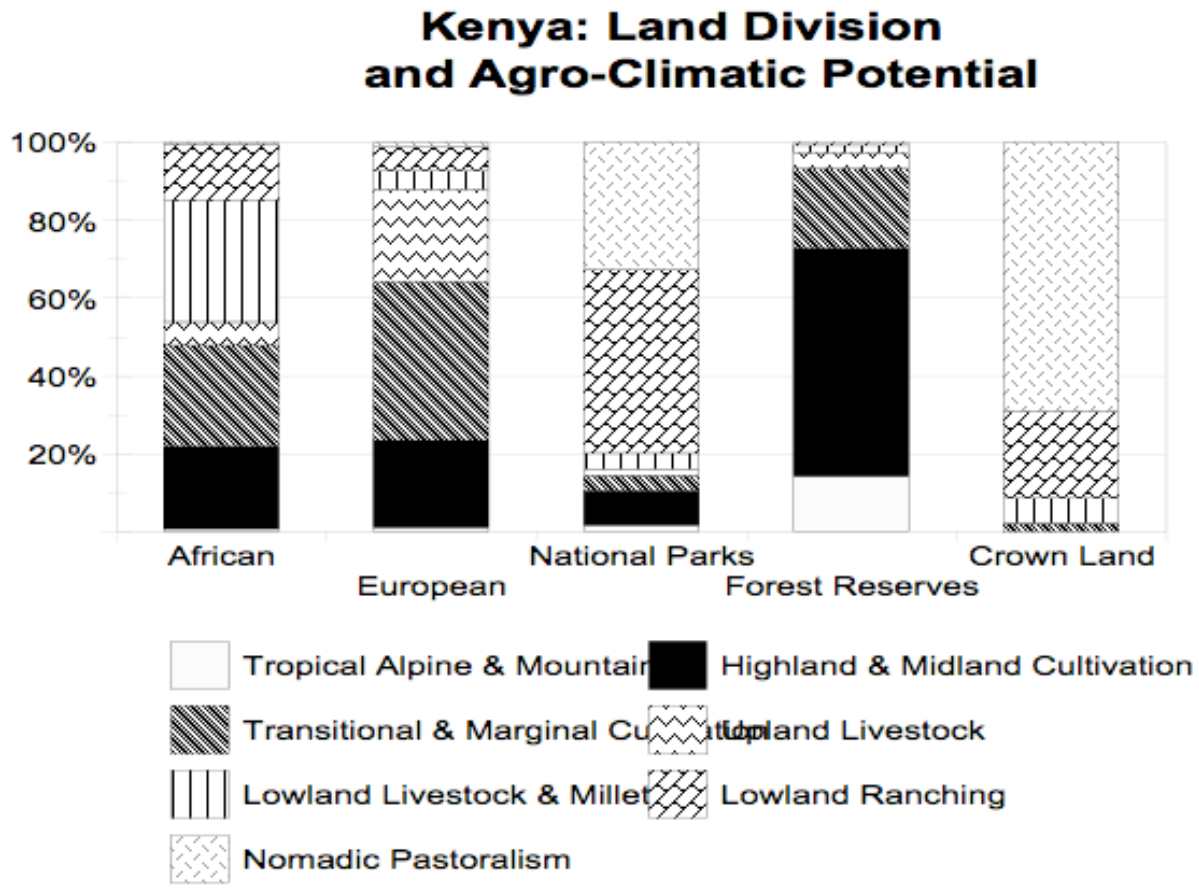

Figure 6 Kenya's Land Divisions Categorised by Agro-Climatic Potential

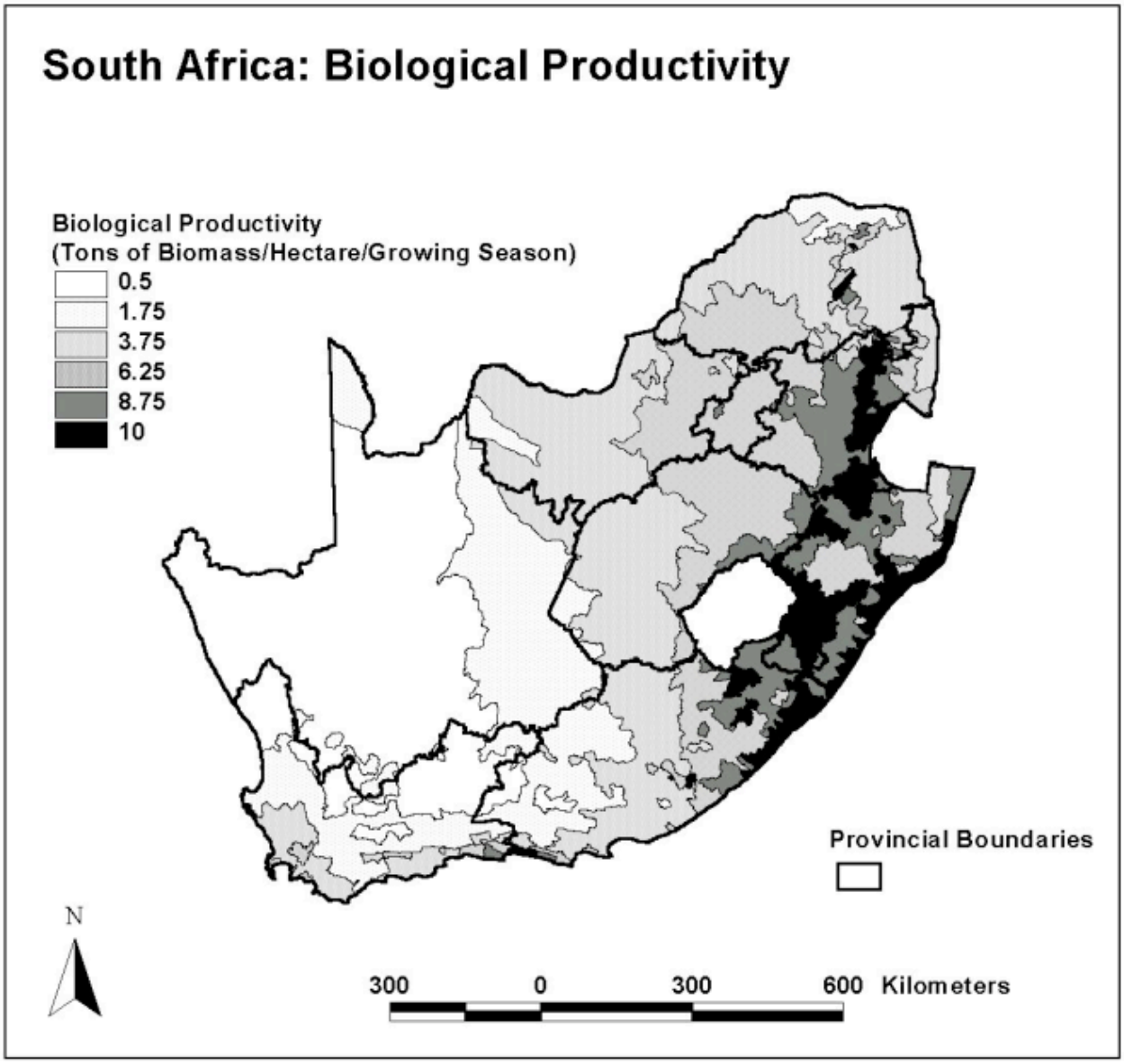

Figure 7: South Africa's Biological Productivity

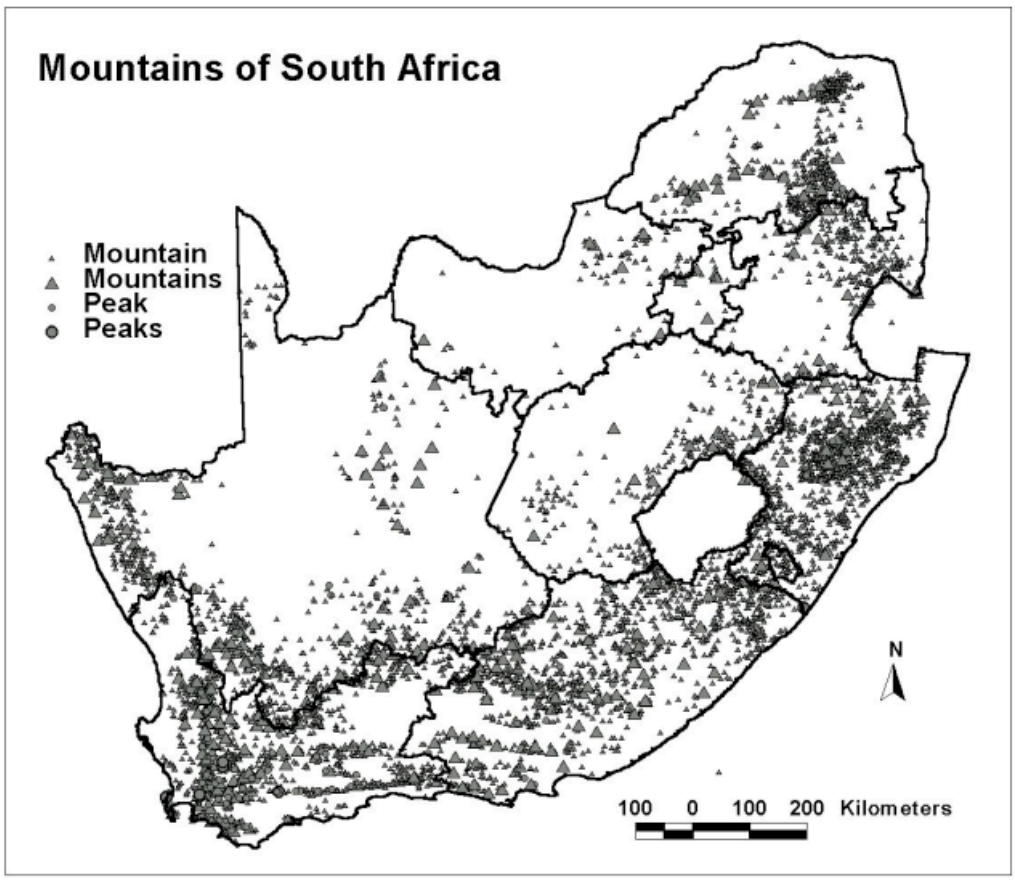

Figure 8 Distribution of South Africa's Mountains and Peaks

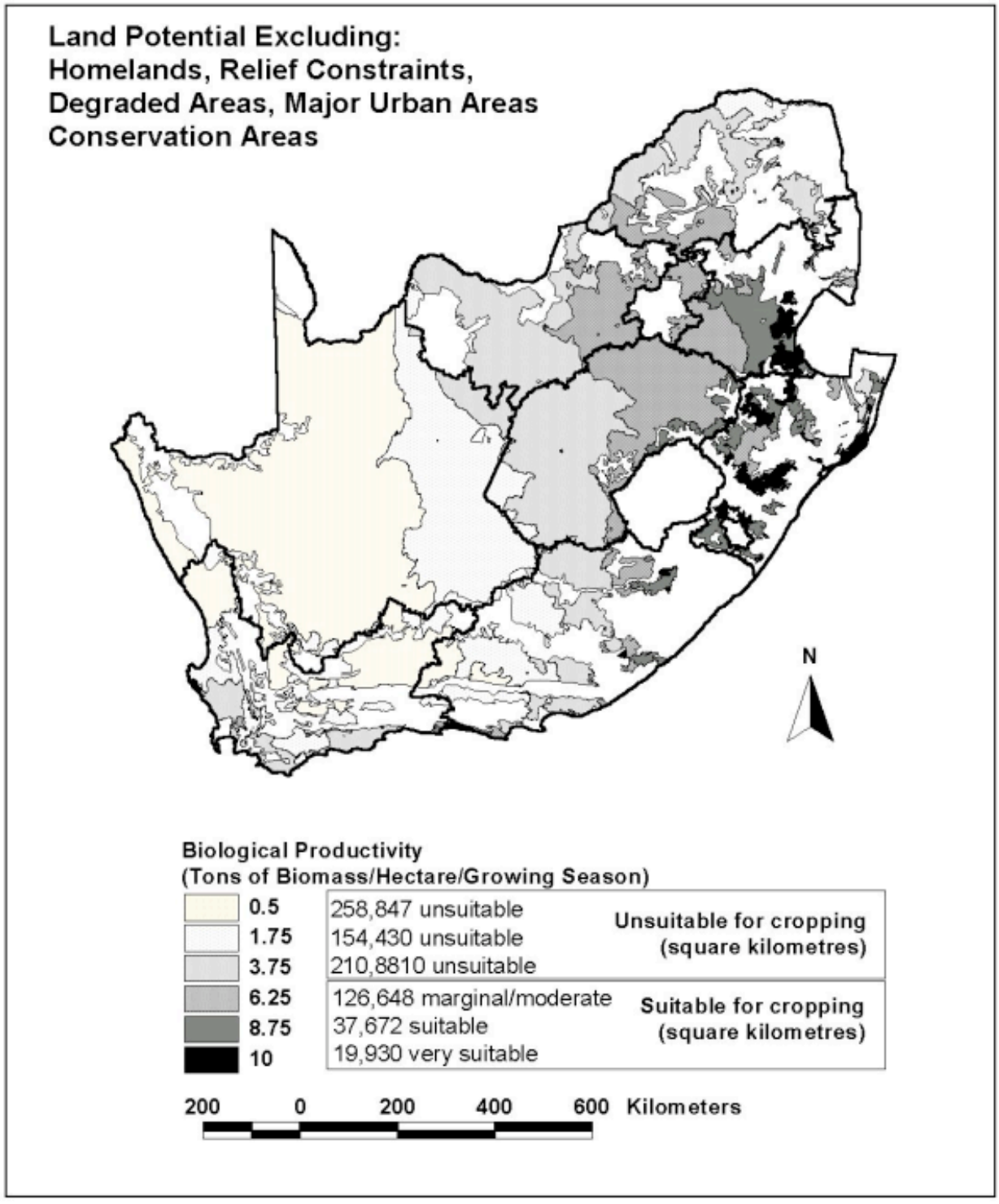

Figure 9: Remaining Distribution of Land Potential in Former White Areas

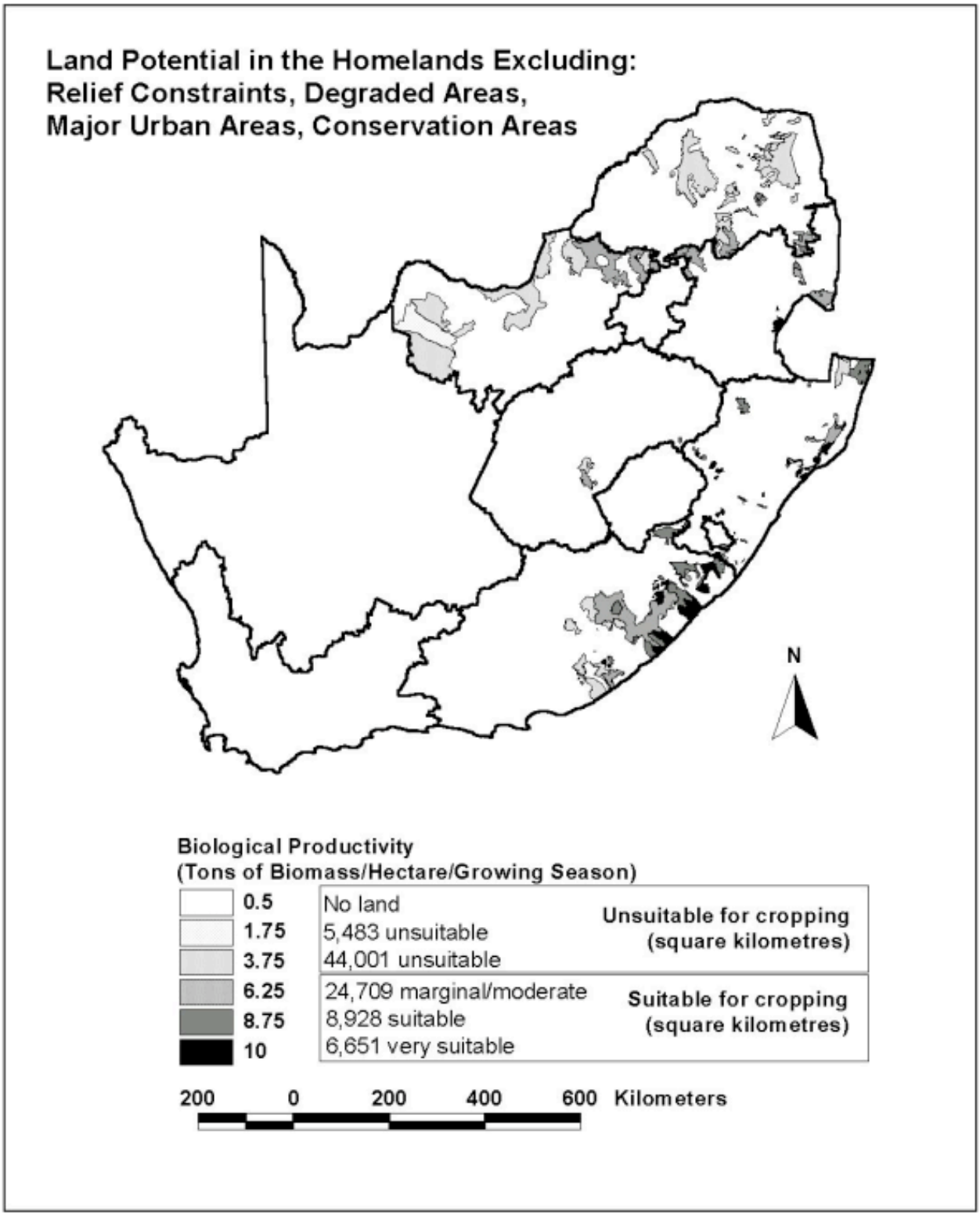

Figure 10: Remaining Distribution of Land Potential in Former Black Areas