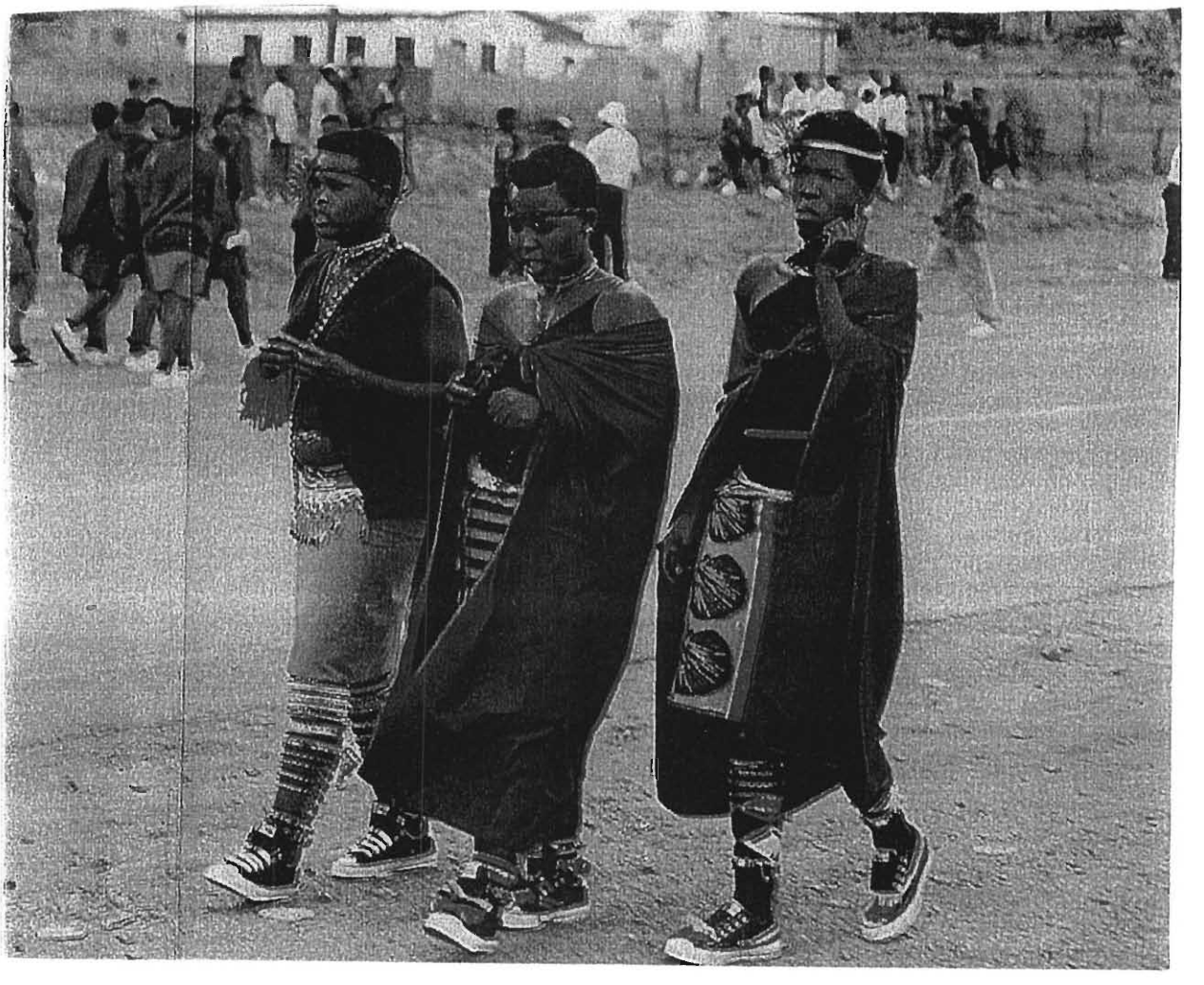
An Environmental History of Keate's Drift:

The inter-relationship between humans and the environment over time.



David Connor Bowden
1999

Submitted in partial fulfilment of the requirements of the Degree of Master of Environment and Development, in the School of Environment and Development, University of Natal, Pietermaritzburg.

Supervised by:
Prof. D.R. Edgeconbe
and
Dr.J.E. Granger

Contents

Abstract

This dissertation provides an exploratory study of the environmental history of the Keate's Drift area, Umvoti Magisterial District, KwaZulu-Natal. The broad objectives are to explore the past and present modes of resource use of people living in the area, human reproduction, human consciousness and ecology from the Stone Age to the present day. Thereby we can deduce how, through the application of the techniques and methodology of environmental history, these findings can help establish baselines for understanding the problems facing environmentalists and policy makers in South Africa today. Such understanding can inform the formulation of more effective policies for the future.

The study provides a history of how significant change at all levels of production, reproduction, consciousness and ecology initiated the first complete ecological revolution in KwaZulu-Natal between the Stone and Iron Age societies. Using the same methodological parameters, the dissertation then proposes that an incomplete ecological revolution has occurred in Keate's Drift since colonial times. It has found that the pre-colonial mode of resource use still exists in some form, but relies heavily upon migrant remittance money obtained from the modern industrial mode of resource use. The two modes of resource use operating together underlie the conflict between modernity and traditionalism in the Keate's Drift area.

Interpretation of the historical evidence proposes that planners in charge of land redistribution in the Keate's Drift area must realise the role of the legacy of the past in development proposals. Planners must realise that the traditional mode of resource use exists alongside elements of the industrial mode. This is a situation resulting from the area's history, and any long term development plan that is going to work, needs to understand the historical legacy of the problems if they are to be resolved.

Preface

In December 1997 the Department of Land Affairs acquired six farms (Duikerhoek, Aangelegen, Uitkyk, Keerom, Montallard and Froglands) in the Keate's Drift area of the Umvoti District, KwaZulu-Natal. The farms, totalling approximately 10 022.40 ha in area, were purchased in terms of the Provision of Certain Land for Settlement Act (No 126 of 1993) with the intention of settling some 500 families, represented by the Zondi Community Trust, on the land.[1] This action formed part of the government's land reform programme whereby 30 per cent of the country's agricultural land was to be redistributed to 25.6 million landless black people.[2]

In April 1998, the Department of Land Affairs called for tenders for the devising of a plan for the comprehensive development of a settlement and associated agricultural holdings and economic enterprises on the six farms in the Keate's Drift area. The planning had to augment sustainable and efficient utilisation of potential and existing resources within the immediate context and sub-region.[3]

An Environmental Impact Assessment (EIA) is today, a necessary part of any planning process. One of the consultants, Dr Ed Granger, suggested that an Environmental Historian should form part of the team conducting the assessment. It was in this context that this dissertation was formulated. Through exploring the reciprocal interactions between human beings and the environment over time and down to the present, an Environmental History of the area could provide a base line for understanding the present and perhaps give some ideas as to what might be feasible in the future.

---

[1] 'Consultant's Brief' in Acting Provincial Director, Department of Land Affairs, to Setplan Metroplan Association, Richards Bay, 20 April 1998.

[2] Reconstruct supplement to The Sunday Independent, January 17th, 1999.

[3] 'Consultant's Brief'

It was not possible to conduct primary research into the very long period of human settlement in the Keate's Drift area before the twentieth century. Instead, the most recent and best secondary sources were consulted, and their findings reinterpreted within a theoretical framework developed from Carolyn Merchant's theory of ecological revolutions, and M. Gadgil and R. Guha's concept of modes of resource use.[4] The analysis of the 20th century pattern of human settlement was based primarily on interpreting a series of aerial photographs (1952-1996) in conjunction with personal observations in the field.

---

[4] C. Merchant, Ecological Revolutions: Nature, Gender, and Science in New England, (The University of North Carolina Press, Chapel Hill, 1989),

and, M. Gadgil and R. Guha, This Fissured Land- An Ecological History of India, (Oxford University Press, Delhi, 1992).

Acknowledgements

I wish to thank the following people for their major contributions in different ways to the work presented in this dissertation:

Professor Ruth Edgecombe and Doctor Ed Granger for supervision of this project, especially to Ruth for introducing me to the subject of Environmental History with such a passion, that I think it has rubbed off on me;

Ms Toni Boddington (Cartographic Unit, Department of Geography), for her crucial role in the analysis of aerial photographs;

Mrs Olive Anderson (Cartographic Unit, Department of Geography), who drew the site map;

Ms Gina Thompson for her invaluable proofreading and assistance with the methodology;

Mr Kelson Camp, for his help with vegetation and aerial photograph analysis;

Mr Dean Naude from the Plant Protection Resource Unit, Cedara Agricultural College, for allowing me to use an office there;

and finally, many thanks to my parents for their support and interest.

List of Figures, Plates and Tables

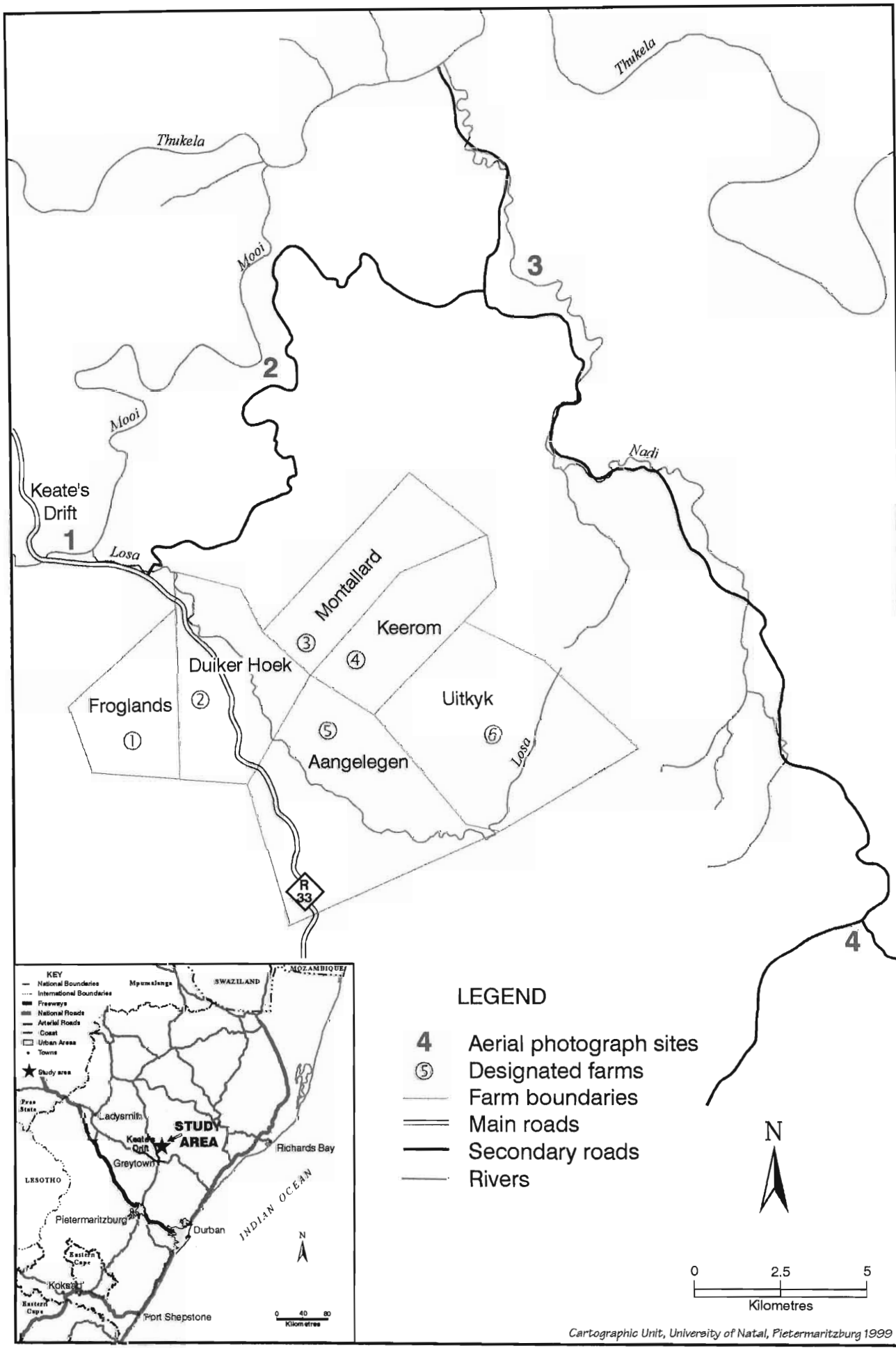


Figure 1.1: The study area

Chapter 1

Environmental History: A Definition and Methodology

Introduction

This dissertation attempts to reconstruct an environmental history of the interactions between people and an area of land undergoing a process of land redistribution. The study area, shown in Figure 1.1 (p1), is located near Keate's Drift in the Umvoti magisterial district, KwaZulu-Natal. The area comprises of six former commercial farms which adjoin the Etembeni Mission and total approximately 10 022 ha in area. This environmental history, through the application and techniques of the subject, intends to help illuminate the complex historical problems facing environmentalists and policy makers in the resettlement of indigenous people on these six farms by looking at human interaction in the area from the Stone Age to the present day.

This is the first environmental history in South Africa to be considered within an Environmental Impact Accessment (EIA). The EIA intends to look at the sustainability of relocating members of the Zondi community onto the land of these six former commercial farms. The practicality of the conclusions drawn from this thesis will hopefully alert planners to the need for the inclusion of an environmental history in all EIAs. The evidence used in this thesis is derived principally from secondary sources and primary field investigation. The major primary sources used are aerial photographs of the study area and the evidence given by Professor Francis Wilson to the Commission of Enquiry into Health and Safety in the Mining Industry, 1994. Analysis of these and other sources, was aided by several field trips to the area.

Further, as environmental history is a relatively new discipline, and its theories, techniques and methodology are crucial to this dissertation, it is considered appropriate to undertake an examination and analysis of the theory, techniques and methodology underlying this discipline and to provide an explanation of how these methods have been applied to this study.

What is Environmental History?

Environmental history is a relatively new discipline in the academic world. It is multi-disciplinary in the broadest sense of the word as it amalgamates subjects from both the natural sciences and the humanities. Environmental history attempts to argue a case in which the environment and the cultures and economies of people powerfully interact to shape and influence one another. It must be assumed that most human activities, if not all, have environmental consequences, and that change in natural systems (whether induced by humans or nature itself) almost inevitably affect human beings.[1] This linkage between humans and the environment can go from one extreme to the other. Nature affects human populations through cyclic perturbations of climate, drought or flooding, for example, but human influence on the environment has also been noted; we now have acid rain, a hole in the ozone layer, the greenhouse effect and many other contemporary environmental issues. Therefore, to prevent environmental problems, we need social principles for appropriate inter-actions with nature that can be determined by explaining how past situations came about. That is where environmental historians can be of great help.[2]

Although science and the humanities have crossed paths a few times in the last century, it has only been in the last half of this century that a subject like environmental history has tried to cover the middle ground. Humans have obviously had a major impact on the environment throughout historical time, but the traditional approach to history did not consider the state of the environment as part of the subject's paradigm, and so the traditional historians focussed mainly on topics within human culture such as wars, politics and economics. It was not as if the environment did not play a role in human concerns, or that humans did not impact upon the environment, but natural disasters, such as the rinderpest epidemic in sub-Saharan Africa from 1896 to 1898 and the introduction of placental sheep to marsupial Australia from 1788, were just

---

[1] William Cronon, 'The uses of Environmental History', Environmental History Review, (Fall, 1993), p13.

[2] Stephen Dovers, 'Pragmatic Environmental History; A note from Australia', Environmental History Review, Vol 18, No 3, (Fall, 1994), p23.

not linked ecologically.[3]

Charles Darwin's book, *Origin of Species* published in 1859, was the first great influence to change the 'old' historians' perspectives. It brought home the idea that there was a process by which humans, all forms of living things, and all forms of matter, lived together. However, the book did not stimulate scientists or historians to write environmental histories as such. The problem was that environmental problems or degradation did not weigh on the consciousness of academics at the time. The ancient belief, going back to biblical times, of human beings as inferior to the angels, but surely above and somehow independent of the rest of life still reigned.[4] Due to this lack of compliance, the subject had no chance of growth and therefore lacked an 'audience' through which its principles could be promoted.

French academics showed the first initial interest in Environmental History in the first half of this century. The French historians , Marc Bloch and Lucien Febvre, were the first to make a sustained attempt to examine the human interaction with the organic and inorganic world. This was because the French studied a concept of 'total' history, which was more diverse in covering all historical concepts than the prevailing political and constitutional histories. The problem with these preliminary environmental histories was that they were written in French initially and were not available to the wider English-speaking audience. Translations and resultant growth of an English-speaking audience only materialised with the later growth of a world wide environmentalism.[5]

The ideal that the humanities had a role to play in explaining environmental problems had its real boost in North America due to the study of frontier history circa 1950 - 1960. This history had an undeniable factor between the human and ecological interface that simply could not be ignored. As Crosby has argued,

---

[3] Alfred Crosby, 'The Past and Present of Environmental History', American Historical Review, (October, 1995), p1181.

[4] Ibid, p1182.

[5] Ibid, p1183.

> the advance by the old world peoples had been profoundly affected by geography and biology, and it involved a dramatic alteration of ecosystems: cattle for buffalo, wheat for buffalo grass, and gold miners for grizzly bears.[6]

This new discipline required a popular audience. The general public, all contributors to environmental problems, were not fully aware of, or sympathetic to their interactions with the planet. This non-compliance changed drastically during the 1960's and 70's with the growth of environmentalism.[7] It was brought home that the advent of the nuclear age could destroy all life on the planet. The first pictures of the Earth from space showed a beautiful, but small and isolated object in space. It suddenly made all human interaction fairly small and irrelevant and even clearer that the rate of change was so fast that the extinction of the human race was not fully incomprehensible. The potential vulnerability of planet Earth and the realisation of the extent of man's involvement in shaping the world's environmental systems led to the formation of major environmental movements, and pushed the concept of environmental history right into the framework of academia. None so much as the book *Silent Spring* by Rachel Carson, first published in1962, in which she provided a vivid analysis of the menace of DDT in ecological systems. Carson transformed environmentalism from an elitist to a popular movement. At last there was a popular audience for environmental history.[8] Now it was time to prove that the study of the humanities was fundamental to the understanding of environmental problems and therefore provided the possibility of finding solutions.

The use of the humanities in environmentalism has been led by Donald Worster, a leading environmental historian, who interprets environmental history as the role and place of nature in human life.[9] In other words, the subject looks at the reciprocal interactions between human beings

---

[6] Ibid, p1183.

[7] Ibid, p1183.

[8] Ibid, p1183.

[9] Donald Worster, ed, The Ends of the Earth: Perspectives in Modern Environmental History, (Cambridge University Press, Cambridge,1988), p290 - 293.

and the natural world. Worster claims that it is about time we rejected the conventional assumption that human experience has been exempt from natural constraints, that people are a separate and 'super-natural' species, and that the ecological consequences of their past deeds can be ignored. We can no longer be so naive so as not to understand the fact that we have been, and still are, one small part of the whole planet.[10]

According to Worster, there are three levels around which environmental history should operate to sufficiently intertwine the humanities and natural science. The first deals with understanding nature itself. It looks at both the organic and inorganic complexities and interactions in ecosystems throughout the world. For example, the oscillations in carbon dioxide concentrations related to the coming and going of the ice ages and how the biota has changed as well. For this purpose, Worster cannot stress enough that a good environmental historian requires a wide and varied scientific understanding, and it is here that historians need to draw on the work of natural scientists. The second level looks at the socio-economic realm as it interacts with the environment. This is strongly related to the third level which deals with the uniquely human concepts of values, laws and myths, or how people view nature, that shape the socio-economic adaptations to the environment.[11]

In any culture, Worster says the production of food is the most 'basic and revealing concern of environmental history'. The concept of humans obtaining food has led them to be connected in the most vital, constant, and concrete way to the natural world. This is the idea of agro-ecology which focuses on the examination of the causes and consequences of the rise of capitalist agriculture and its radical simplification of the natural ecological order.[12]

One criticism of Worster is that he applies the humanities to the environmental problems of the past as cause or solution, but does not offer pragmatic solutions to potential problems of the

---

[10] Ibid, p291.

[11] Ibid, p292.

[12] Richard White, 'Environmental History, Ecology and Meaning', Journal of American History, Vol 78, Part 1, (March, 1992), p1112.

future. As William Cronon writes on Worster, 'although environmental history without agricultural history, especially the capitalist mode, may be defunct, he may be needlessly closing doors to approaches different from his own'.[13]

Stephen Dovers offers a more pragmatic form of environmental history that combines insight from both the humanities and the sciences to be used as practical management tools in the field.[14] Dovers views the future survival of the subject as needing the attention of a larger, more sympathetic audience. He feels that at present the ecologist, environmental chemist, policy expert, economist and others combine to inform the resolution of difficult environmental issues, but neglect the historical implications of an environmental problem. To Dovers this is an absurd situation, because at any spatial scale, an environmental issue without a past is altogether as mysterious as a person without a past. In seeking a sustainable relationship between human and natural systems we must first construct histories, establish baselines, and identify long term trends.[15] It is for these reasons that it would seem logical to include an environmental historian in any environmental problem solving team. This is exactly what this thesis intends to do for the planning of the Zondi community settlement in the Umvoti district of KwaZulu -Natal.

Dovers elaborates on Worster's concept of three levels. He feels they are not an operational definition, through not fully setting out purpose or approach in terms of combining the humanities and sciences in practical cases. Dovers is more optimistic than Worster. He seeks to explain the landscapes and issues of today and their evolving and dynamic nature, and from this to elucidate the problems and opportunities of tomorrow.[16]

Dovers claims the solving of environmental problems requires a framework that includes the concept of 'sustainability', especially that of ecologically sustainable development. This concept

---

[13] William Cronon, 'A Place for Stories: Nature, History and Narrative', Journal of American History, Vol 78, Part 1, (March, 1992), p1123.

[14] Stephen Dovers, 'Pragmatic Environmental History; A note from Australia', Environmental History Review, Vol 18, No 3, (Fall, 1994), p22.

[15] Ibid, p23.

[16] Dovers, 'Pragmatic Environmental History', p22.

draws together the natural and social sciences because 'ecological problems' are human and social problems which the natural sciences cannot resolve alone. His prime example is the role of fire on the Australian landscape.

Fire has shaped vegetation types on the Australian mainland for millions of years. The concept of sustainability is this. It was long known that Aborigines were responsible for fires, but only relatively recently was it realised that fire was used by these people as an intentional and finely applied land management tool. He therefore asks, did the English convicts arriving in Botany Bay in 1788 come into a land, 'not as God made it, but as the Aborigines had made it?'.[17] Dovers interprets this as having two important implications. Firstly, to find out what the true original vegetation make-up in 1788 would have been without aboriginal interference. This would provide a suitable historic base line of vegetation make-up for the second implication, that of sustainability. The baseline provides an opportunity to determine the relevant modern day fire regimes to maintain or reach a particular vegetation type within practical environmental management.

The Aboriginal use of fire is only one example used by Dovers to illustrate the practical implications of environmental history. One cannot stress more the need for the humanities in looking at environmental problems. The principle of human and natural interaction must become as well embedded in the minds of development planners as it is in the minds of all environmental historians. Environmental history has sufficient insight into the humanities to understand that the culture and ideologies of people around the world have a great deal to do with the state of the environment and the changes within it. Therefore, the methodology chosen for this thesis intends to fulfill the requirements of a practical environmental history that would seem logical to include in an EIA process.

---

[17] Donald Worster, 'The Two Cultures Revisited: Environmental History and the Environmental Sciences', Environment and History, Vol 2, (1996),p9.

Methodological Approaches

The methodological approach to this thesis is based on the guidelines and theories set out in Carolyn Merchant's book, *Ecological Revolutions: Nature, Gender, and Science in New England*[18], and M. Gadgil and R. Guha's book, *This Fissured Land: An Ecological History of India*[19]. These books provide suitable guidelines by which an understanding of ecological revolutions can be achieved and then applied to the Keate's Drift area of KwaZulu-Natal.

An ecological revolution, as defined by Merchant, is a major change in a society's mode of production, human reproduction, ecology and consciousness.[20] A society's mode of production is the way in which that particular society extracts, processes and exchanges the resources around them. For example, a hunter-gatherer's extraction and processing of resources is different from that of an agriculturalist. A society's human reproduction is divided between biological and social needs. Biological reproduction requires the inter-generational production of human off-spring to maintain population, which in turn requires intra-generational reproduction or the provision of enough food to maintain an individual's day to day reproduction. Social reproduction aims to reproduce family and community norms, including the reproduction of future labour, and to reproduce and maintain the larger social order through the structures of governance and law.[21] A society's consciousness is determined by the way a society knows and explains the natural world through science, religion and myths.[22] The ecology of a society, or non-human nature, responds to human induced change just as humans interact with plants, animals and soils and so the relationship between human beings and the non-human world is reciprocal.[23]

---

[18] C. Merchant, Ecological Revolutions: Nature, Gender, and Science in New England. (The University of North Carolina Press, Chapel Hill, 1989).

[19] M. Gadgil and Ramachandra Guha, This Fissured Land - An ecological history of India. (Oxford University Press, Delhi, 1992).

[20] Merchant, Ecological Revolutions, p3.

[21] Ibid, p14.

[22] Ibid, p19.

[23] Ibid, p8.

An ecological revolution, requiring change in the above parameters, arises as a result of tensions between a society's mode of production and its ecology and between its mode of production and human reproduction.[24] The tensions between mode of production and ecology arise because the extraction, processing and exchange of resources within production are the most direct human impacts on non-human nature. The tensions between mode of production and human reproduction arise because the biological reproduction of humans for both day to day and inter-generational reproduction is mediated through the supply of sufficient resources from the mode of production. This in turn affects the ecology, as the need to produce subsistence to reproduce human energy on a daily basis connects humans with their local environments.[25] These tensions can be instigated within a society itself, or by the external influences of a society previously foreign to the area, whose mode of production, reproduction and consciousness are based on different levels.[26]

The basic modes of production that characterises different societies' interactions with resources are hunter-gathering, agriculture and capitalism. The hunter gatherer mode of production uses resources directly from the land that is instantly converted to human energy in order to reproduce daily life. Agriculture, however, has a productive period of several months followed by a period when stored food energy is used. This energy is used to maintain the elderly (past producers) and focuses on the reproduction of social relations within a family or community and the biological reproduction of a future labour force. Therefore, within the agricultural mode, production exists for the sake of reproduction. This differs from the capitalist industrial mode where production is the ultimate goal and reproduction is subordinate. These societies' modes of production are obviously very different, but Merchant argues that change between them does occur. The structure of change within an ecological revolution is based on two frameworks of analysis.

The first is provided by Thomas Kuhn's *Structure of Scientific Revolutions* (1962) in which he investigates the major paradigm shifts that have occurred in the scientific world. The strength of his argument is that he recognises that stable world views or paradigms exist in science over time,

---

[24] Ibid, p3.

[25] Ibid, p10.

[26] Ibid, p3.

but acknowledges that they may eventually collapse in the light of new contradictory evidence, and therefore undergo transformation. However, this is a scientific paradigm shift and does not incorporate the social sciences and the influences of humans that is vital to an ecological revolution.[27] Therefore, Merchant incorporates the structure of social revolution provided by Karl Marx and Friedrich Engels into Thomas Kuhn's idea of a scientific paradigm shift.

Social revolution begins in the economic base of a particular social formation and results in a fairly rapid transformation of the legal, political, and ideological superstructures in which the stable state of a society is upset by changes in politics and consciousness.[28] A weakness to this approach is that determinism is applied to the economic base, but its view on society and the capability for change are vital to Merchant's concept of an ecological revolution. Therefore, both Kuhn's theory of scientific revolutions and Marx's theory of social revolution are starting points for a theory of ecological revolutions because a viewpoint that incorporates social, economic, and ecological change is required for a more complete understanding of scientific change.[29]

Merchant illustrates this analytical framework for change by interpreting the environmental history of New England in the USA because changes in its ecology and society in the last 250 years have been rapid and revolutionary. What took place in 2500 years of European development through social evolution came to New England in a tenth of that time through revolution'[30]. As such, Merchant claims that a colonial and capitalist ecological revolution occurred in this area.

The colonial ecological revolution of New England occurred in the seventeenth century. The tensions between mode of production and human reproduction, and the mode of production and the local ecology, arose because of the external influence of the colonising nations of Europe's societies on native American society. The colonising nations introduced new modes of production, human reproduction and consciousness that led to the collapse of local native

---

[27] Ibid, p3.

[28] Ibid, p4.

[29] Ibid, p3.

[30] Ibid, p1.

American ecologies as they were replaced by a European ecological complex of animals, plants, pathogens and people all previously foreign to the area.[31]

The capitalist ecological revolution occurred between the American Revolution and 1860 as a result of tensions arising from internal sources. The internal source was the growth of a dynamic market economy during the colonial period. Local natural products were now being processed by the manufacturing industry, thereby adding value to the product and instigating the need for profit to keep the system going. The drive for profit subordinated the previous agricultural human reproduction needs as the new system demanded different types of labour, improved technology and vast land management. The capitalist mode of production affected the ecology by utilising a distinct set of local resources from the agricultural mode. These changes also instigated a change in the consciousness of the people as a result of their incorporation into the new mode of production and fulfilled the complete change in all the parameters required of an ecological revolution.[32]

The framework put forward and illustrated by Merchant in New England has been adapted to the Keate's Drift study area by incorporating Gadgil and Guha's 'modes of resource use'. Modes of resource use complement Merchant's theory of ecological revolutions because it expands on the Marxist concept of modes of production as a means of classifying societies according to their technologies and relations of production.[33]

Therefore, the Marxist modes of production set out by Merchant will be replaced by Gadgil and Guha's concept of 'modes of resource use' as their methodology and framework offer a more pragmatic and realistic view of the world's societies because it expands on the Marxist mode of production for three reasons.[34] The Marxist theory lacks the view of how important political structure and struggle are in the transition from feudalism to capitalism in different parts of

---

[31] Ibid, p144.

[32] Ibid, p260.

[33] Gadgil and Guha, This Fissured Land, p5.

[34] Ibid, p8.

Europe. Secondly, the fact that Marxist ideals are based on European models of feudalism creates huge problems when trying to apply this system to completely different third world societies; in the case of Gadgil and Guha, it is India. Thirdly, the concept of explaining differences in economic structure by looking at the modes of production is of little use when interpreting differences in the religious, cultural and ideological attributes of different societies.[35]

Therefore, the modes of resource use framework attempts to amend the criticisms of Marxist thought in a number of ways. Whereas Marxist analyses usually begin with the economic 'infrastructure' - the so called relations of production and productive forces- without investigating the ecological context, Gadgil and Guha's modes of resource use intends to fully appreciate the ecological infrastructure of human society. In this way, the modes of resource use extends the realm of production to include flora, fauna, water and minerals and therefore complements the mode of production beneficially, while adding an extra two dimensions. Firstly, it examines whether one can identify a particular type of ideology in a society that inevitably governs a certain type of resource use mode. Secondly, it looks at a particular mode's impact upon the ecology and its consequences in terms of the pattern, distribution and availability of natural resources in a particular environment.

The final major difference between the framework of modes of resource use and the Marxist mode of production, that focuses purely on capitalism, is that Gadgil and Guha have included both capitalist and socialist societies within one industrial mode of resource use.[36] This is because, from an ecological point of view, the similarities in these two developmental paths are more significant than the differences. Gadgil and Guha consider capitalism and socialism as simply two variants of one industrial mode of resource use.

The other modes of resource use from throughout human history include hunting and gathering, nomadic pastoralism and settled cultivation.[37] To help with further study, the aspects of

---

[35] Ibid, p9.

[36] Ibid, p9.

[37] Ibid, p9.

technology, economy, social organisation, ideology and ecological impact for each varying mode of resource use are examined to determine a particular society's ecological context. The authors admit that more than one particular form of resource use may occur within a society, but that there will always be one dominant mode. The instigation for change is recognised when they state, 'as one mode of resource use comes into contact with another mode organised on very different social and ecological principles, we expect the occurrence of substantial social strife'[38]. The change between modes of resource use can therefore be facilitated by the framework of analysis for change put forward by Merchant.

An outline of how the above mentioned methodology has been adapted to the Keate's Drift study area is shown in Table 1.1 (p15). These adaptations will be explained in later chapters.

Conclusion

The use of Gadgil and Guha's modes of resource use in conjunction with Merchant's theory of ecological revolutions offers a more pragmatic and realistic view of the Keate's Drift study area. The framework of these methodologies covers the concept of change, can be applied to an African perspective and incorporates man's impact upon the environment over time. The methodology follows the practical guidelines put forward by Dovers, while abiding by the broad guidelines of environmental history according to Worster. Therefore, the next chapter deals with the first level of Worster's outlines for an environmental history, an understanding of nature itself within the bio-physical environment.

---

[38] Ibid, p16.

Table 1.1. Ecological Revolutions. Adapted from Carolyn Merchant, Ecological Revolutions: Nature, Gender, and Science in New England, (The University of North Carolina Press, Chapel Hill, 1989), p24

	1st Ecological Revolution		**Incomplete Ecological Revolution**	
	Stone Age Society (1.6 m.y.a to 2 000 years ago)	**Iron Age Society** (2 000 to 100 years ago)	**Colonial Period Society** (1840 to 1910)	**Industrial Society** (present day)
Ecological Impact	Evolution of upland grasslands through sustained burning as game management tool.	-Clearance of valley woodland: *Acacia*/grassland mosaic develops. -Maintenance of upland grasslands	Over-grazing and associated land deterioration on crowded native reserves	Mono-cultures and associated ecological problems on private commercial farms. Eg. Pine forests
Modes of Resource Use	Hunter/gatherer	Settled Cultivation through homestead economy.	Settled Cultivation: -Homestead economy maintained on reserves. -Industry introduces beginning of migrant/farm labour.	Industry: -Commercial agriculture and mining. -Deteriorated homestead economy so migrant labour necessary
Biological Reproduction	Steady State: Equilibrium of populations and reproduction of daily subsistence.	Growth of population: Production exists for the sake of reproduction of labour force.	-Continued Growth on tribal lands as result of increased legislation: -Forced immigration from 'white' South Africa	Demographic transition: Sublimation of sexuality into economic production.
Social Reproduction	Roving family unit.	Individual family *imizi* (homestead).	-Individual Family *Imizi* on reserves. -Rise of westernised *Kholwa* on mission stations.	Nuclear households.
Political Structure	Tribal councils	Tied together within a chiefdom by ties of neighbourhood, kinship, clientship and marriage.	-Indirect British Rule: Tribal system of iron age maintained, but gradually eroded.	-Modern day political government. -Modernity vrs Traditionalism.
Consciousness	Part of nature: Purveyed through Shaman dance and rock art.	Departed from nature, but still dependent: Ceremonies and rituals vital in holding up farming society eg. Coming of age and use of cattle in *lobola*.	Still regard themselves as part of tribal system. Rising Christian *Kholwa* and religious beliefs of transcendent God.	Mix between those who still believe in tribal authority and those westernised by migrant labour.

Chapter 2

The Physical Landscape

Study Area

The village of Keate's Drift lies 660 metres above sea level in the valley of the Mooi River, a tributary of the Thukela River. Seven ecological regions have been identified in the Thukela Basin in recognition of the close relationship between physiography, climate and vegetation.[39] Keate's Drift lies in the Valley Savanna Region which starts 13 kilometres in from the east coast and continues for another 160 kilometres inland. However, this area is again sub-divided into the Lower Valley sub-region and the Interior Valley sub-region which starts above the Blood River confluence with the Thukela River. The study area lies in the Interior Valley sub-region where tributaries above the Blood River confluence, such as the Mooi River, have caused considerable widening of the Thukela Valley floor. The area is known for the markedly stepped gradient of the Thukela River in this area because of the numerous dolerite intrusions that are more resistant to the other surrounding rocks. Other prominent features are the koppies and steep valley flanks.

Geology

The present Keate's Drift landscape bears testimony to geological processes that have been active over millions of years. The flat-lying sedimentary rock formations dominated by sandstone that form the hills in the region, provide evidence of extensive river systems that once carried enormous volumes of sand, silt, and mud southwards into the sea. The tops of many of these hills are capped by hard igneous dolerite. The present-day Thukela River and its tributaries have cut deeply into

---

[39] Kelson Camp, Valley Bushveld of KwaZulu-Natal - Natural Resources and Management (KwaZulu-Natal Department of Agriculture, Cedara Report N/A/95/2, National Department of Agriculture, Pretoria, 1995).

these ancient rocks to expose the horizontal layers of sedimentary rock that characterise the hilly landscape and enable us to interpret the history of their deposition. A study of the sedimentary layers and the associated fossils provide the earth scientist with clues to environmental conditions which once prevailed in this region.[40]

The sedimentary beds found in the Keate's Drift area belong to the Karoo Supergroup that covers a very large part of South Africa, and are exposed as far afield as Kimberley, Calvinia, Pietermaritzburg and East London. Karoo rocks range in age from about 300 to about 160 million years which cover the late Carboniferous, Permian, Triassic and early Jurassic geological times. It can therefore be truly considered as a very significant part of the South African Phanerozoic geological history. Karoo sedimentation was initiated by the Permo-Carboniferous glaciation that led to the formation of glacial sedimentary rocks consisting mainly of diamictite. This is known as the Dwyka Group. This Group forms the base of the Karoo Supergroup. Many of the succeeding Permian and Triassic sediments are of fluvial and marine origin, although some are deltaic and lacustrine. The period of sedimentation coincided with arid to semi-arid climatic conditions in which wind blown sands accumulated.[41]

The post-Dwyka sedimentary deposits are divided into several lithostratigraphic units termed as groups and formations. These are the Ecca Group (Permian age), the Beaufort Group and the Molteno, Elliot and Clarens Formations. These subdivisions consist predominantly of sandstones and shales, underlain by the glacial diamictite of the Dwyka Group and overlain by basaltic lavas of the Drakensburg Group. Sills and dykes of dolerite, related to the basalt, occur as intrusive igneous rocks within these sedimentary beds.[42] The sedimentary rocks of the Keate's Drift area belong to the Ecca Group.

---

[40] V. von Brunn, 'Geology of the Muden/ Tugela ferry Area'. (Department of Geology, University of Natal, Pietermaritzburg, 1998). (Unpublished).

[41] J. F. Truswell, The Geological Evolution of South Africa. (Purnell, Cape Town, 1977), p131.

[42] J. F. Truswell, An Introduction to the Historical Geology of South Africa. (Purnell, Cape Town, 1970), p114.

The Ecca Group is divided into three Formations that are recognised by the differing types of sediments and relative thickness. The rock below Keate's Drift belongs to the Vryheid Formation. This rock, together with the underlying Pietermaritzburg Formation, comprises the northern facies of the Ecca Group and consists of sediments mainly deposited under fluvial and deltaic conditions on a stable shelf. The major source of these sedimentary deposits lay to the east and north east of the existing east coast and the rocks from which they were derived were predominantly granitic in composition.[43] The northern facies of the Ecca Group are composed of bluish-black shale from the Pietermaritzburg Formation, and coarse arkose, conglomerate and coal seams from the Vryheid Formation. The coarser detrital sediments and coal seams are associated with shale in the Vryheid Formation.[44] Many of the coal deposits of the northern facies represent the accumulation of decaying vegetable matter in swamps and lakes upstream from the deltas and alluvial flood plain, as opposed to the shales and sandstones that represent the respective lithification of mud and silt in deltaic and fluvial conditions.

The dolerite, originating from about 190 million years ago, is a bluish black fine grained igneous rock that consists mainly of the iron-rich mineral, pyroxene, and a white silicate mineral, plagioclase feldspar. This rock formed when magma, under great pressure, rose up into the upper levels of the earth's crust and intruded into fractures and cracks in the sedimentary rock formations. The magma cooled and solidified to form features which are now preserved as the typically vertical and sub-vertical 'dykes' and horizontal 'sills'. These sills are commonly found as a capping to the hills in the region because of its resistance to weathering, and so it retards or prevents the complete erosion and removal of the thick sedimentary layers over time; the sandstone above the sills having been weathered and eroded away already.

The eventual weathering of dolerite results in a red soil from the decomposition of pyroxene into iron oxide.[45] These soils are fertile and rich in available lime, magnesia, potash and phosphorous

---

[43] S. H. Haughton, Geological History of Southern Africa. (The Geological Society of South Africa, Johannesburg, 1969), p361.

[44] J. F. Truswell, Historical Geology of South Africa, p121.

[45] V. von Brunn, 'Geology of Muden'.

as well as being water retentive which make them very favourable to agriculturalists in such a dry climate as Keate's Drift.

Climate

The climate of the area can be determined by levels of insolation, temperature, wind and precipitation adapted from Edwards(1967) and Camp(1995).

The insolation received in the Valley region is higher than the coastal and highland areas. A maximum of 90% or an average of 8.5 hours per day can be achieved in the winter months. Insolation can be reduced to a 42% average per day in the summer months. Aspect is important as north facing slopes receive greater insolation due to their position in the southern hemisphere which can lead to significant differences in vegetation on varying slopes. For example, in the valley region, the altitudes of equivalent zones of vegetation on opposite slopes may differ by as much as 900 metres or at the same altitude, strongly xerophytic vegetation may be found on hot, dry, north aspects, while forest mesophytes occur on the cooler, moister, south facing slopes.[46]

The temperatures of the study area show a great deal of variation. The daily maxima from December to February is 30^{0}C, and from April to September it is 25^{0}C, while the low minimum temperatures are often less than 6.7^{0}C. As a result, this area has the highest mean daily and annual temperature ranges of the Tukhela Basin. On average, the fluctuation varies from between 14.1 to 20.5^{0}C. This area can receive light frost for 11 months of the year and the threat of severe frost from May to August. Vegetation which grows successfully in the area has to have an element of frost tolerance or avoidance.

The prevailing winds over the area are south-east, east, and north east. The moist south-east and east winds frequently bring cloud and mist in from the coastal areas. In autumn, a hot, dry Berg

---

[46] Denzil Edwards, A Plant Ecological Survey of the Tugela River Basin, (Natal Town and Regional Planning Reports, Botanical Survey of South Africa; No36, Town and Regional Planning Commission, 1967), Vol.10. P21.

wind from the north-west marks the onset of the dry season, and the deciduous character of the various trees and shrubs become evident. May, June and July are relatively calm with minimal Berg winds, but from August to November the Berg wind dramatically picks up again for the season of windy weather. This is significant as it presents a major fire hazard, especially in the dry grasslands of the area, and also instigates the commencement of the vegetation's spring growing season. The low humidity of the Berg winds benefits those plants better adapted to retaining moisture. The slopes principally affected by the hot, dry Berg winds are north to north-west to west facing. These slopes are made into even harsher environments as they are also to the leeward side of the rain-bearing easterly winds, as well as receiving the greatest amount of insolation throughout the year. This is in strong contrast to south aspects on high hills and escarpments that are exposed to moisture laden winds and receive considerably less insolation.[47]

In terms of rainfall, the study area falls into the category of between 601 and 700 mm per annum. This low rainfall can be attributed to the west to east trend of the Thukela Basin, nearly at right angles to the direction of the rain bearing winds, which puts the valley region in a marked rain shadow intensified by the high flanking ridges, which means that Keate's Drift is one of the driest places in the Thukela Basin. The low level of rainfall has led to xerophytic and mesophytic forms of vegetation predominating because the 'effectiveness' of rainfall is seriously reduced by high evaporation as a result of high temperatures which seriously reduces the availability of water to plants. Increased and direct 'run-off' because of the steep slopes, accompanied by a very low percentage of vegetation cover, accentuates this problem.[48]

Soils

The soils of the Thukela Basin are conveniently arranged according to a particular ecological

---

[47] Ibid, p30.

[48] Ibid, p36.

region as they are directly related to geology and climate.[49] The soils of the valley region are highly, and often fully, saturated with bases as a result of the hot dry climate. Accordingly, these valleys may be termed the 'un-leached landscapes'. They are characterised by the occurrence of reddish brown and grey brown soils of a semi-arid region.[50]

The reddish brown soils are clays developed from the colluvial material at the foot of valley sides and in older alluvial deposits. Topsoils are mildly to moderately alkaline in reaction, while the sub-soils are usually strongly alkaline. Free lime, in the form of nodules or powder is sometimes present already in the topsoil, and in any case at greater depth. Locally, the lime content may be very high and some soils even contain a solid lime pan. Illite is a common clay mineral throughout the soil profile which is particularly common in the subsoil.

These soils are highly erodible with widespread sheet erosion and deep gully formation evident, but if properly managed they can be highly productive under irrigation and a wide variety of crops, including citrus and vegetables, can be grown. Irrigation may reduce the erosion hazard, but brings the risk that the soils could become saline if no precautions are taken.[51]

The second soil group consists of hard, grey brown to dark brown soils developed from colluvial material mainly originating from sandstone. The pH of the topsoils varies from neutral to moderately alkaline; in the latter case they may contain free lime, mostly in a finely dispersed form. With depth, they merge to form a very hard calcareous clay, or into sandstone, in and above which large quantities of lime have accumulated.

If sound management is not applied, this fragility, together with unreliable rainfall, results in rapid

---

[49] Ibid, P45.

[50] J. J. Van der Eyk, Soils of the Tugela Basin: A Study in Sub-Tropical Africa. (Natal Town and Regional Planning Reports, Town and Regional planning Commission, Natal, 1969), Vol 15. P110.

[51] Ibid, p110.

degradation of the natural resources.[52]

Vegetation

The vegetation of the study area has been described by a number of authors over the years. The vegetation types are synonymous, but each author has his own unique description of the vegetation make-up, as shown in Table 2.1.

Table 2.1. Synonymous vegetation units of Keate's Drift.

	Acocks (1953)	**Edwards (1967)**	**Phillips (1973)**	**Low+Robelo (1996)**	**Camp (1998)**
Vegetation Unit*	Valley Bushveld (23)	(5) Spirostachys-Acacia burkei woodland (6) Spirostachys woodland (7) Euphorbia tirucalli succulent scrub (8) Combritum apiculatum tree veld (9) Semi-deciduous Bush (Acacia-Boscia-Olea-Schotia scrub) (10) Sclerocarya-Acacia Tree veld (12) Acacia karoo-A.nilotica	Group 10a: Sub-arid riverine and lowland mixed scrub and wooded savanna.	(5) Valley Thicket (25) Natal Central Bushveld	Bioresource groups: (21) Valley Bushveld (18) Mixed Thornveld

(* - The numbers represent a particular author's designated vegetation unit.)

[52] Camp, Valley Bushveld of KwaZulu-Natal, P7.

According to Phillips, Keate's Drift is situated in the low lying valley of the Thukela River which falls within bio-climatic sub-region 10a.[53] This is comprised of sub-arid riverine and lowland mixed scrub and wooded savanna as shown in Table 2.1.[54] The Iron Age (1000 to 2000 y.a) appearance of vegetation probably ranged from medium to short wooded savanna, tall to short scrub, open grass glades, grass "islands" in wooded savanna and denser scrub, as well as drainage line woody vegetation of a taller, more vigorous nature. The occurrence and intensity of thorniness and succulence probably depended on local ecological conditions. Both broad geographical position and more detailed local environmental conditions contributed to the various faciations in height, structure, composition and vigour of relevant vegetation which often resulted in a mosaic of varying faciations that were either extensive and repetitive, or local and petty.

The present day appearance of vegetation, according to Phillips, is generally much as above, but with many detailed local changes. For example, there is a great reduction in grass glades because of the invasion into areas by woody elements in the course of scrub intensification due to overstocking and the inevitable associated cessation of, or reduction in, fierce fires. There has also been an increase, locally, in succulents and other species that are either browsed poorly or not at all by livestock. The increased intensification of woody elements and succulents has been at the expense of grassland. Where woody or succulent communities have not captured land deprived of earlier grass cover, the soil is either hard baked or eroded. Erosion, sheet wash, rilling and dongas are well advanced in many parts.[55] Bio-climatic sub-region 10a is synonymous with the other vegetation types shown in Table 2.1.

Acocks' concept of veld types was developed to facilitate the classification of vegetation. A veld type is defined by Acocks as a unit of vegetation whose range of variation is small enough to permit the whole of it to have the same agricultural potential. Each different veld type is determined by environmental variations. The environment contains many variable factors, such

---

[53] J. Phillips, The agricultural and related development of the Tugela basin and its influent surrounds: a study in sub-tropical Africa, Natal Town and Regional Planning Report; Vol 19 (Town and Regional Planning Commision, natal, 1973). Appendix Map 3.

[54] Ibid, Appendix Map 4.

[55] Ibid, p153.

as grazing animals, birds and insects, light, heat, and most important of all, water. To overcome the problem of infinite variations, Acocks has grouped them into manageable veld type units.

However, Acocks stresses that vegetation changes according to the way it is treated. The baseline vegetation from the beginnings of anthropogenic impacts upon it has changed considerably, but the scantiness of records of variation as it was when Europeans settled the country, makes it difficult to define the changes which have since occurred, enormous though some of them undoubtedly are. The vegetation we know today is primarily the result of vegetation migrations over millions of years, it is also the result of the activities of the indigenous and white inhabitants during the last three hundred years, and, in particular, the last one hundred years.The view must be taken that the ecology of South Africa is something dynamic.[56]

In Acocks' synonymy of vegetation, the Valley Bushveld (23) is of the Karoo and Karoid types of vegetation. This veld type is found in the valleys of the numerous rivers, mostly draining into the Indian Ocean. These valleys are hot and receive less rain than the intervening ridges. The annual rainfall ranges between 500 - 900 mm per annum. The Valley Bushveld proper occurs as narrow belts on the steep, less arid sides of the valleys, particularly on the northern sides which do not receive the same intensity of insolation and wind as the southern aspects. Keate's Drift lies within the northern variation of the Valley Bushveld which extends as far south as the Great Kei Valley. It is more open, includes more grass, has fewer succulents and more species that are definitely tropical in nature (e.g *Euphorbia ingens, Dombeye simosa, Dalbergin obovata, Acacia nilotica*). It is also far less thorny and not dominated by tree Euphorbias, as the southern variation is, and is therefore mainly scrub forest or else dense savanna.[57]

A more recent description of the Valley Bushveld by Camp(1995), based largely on Edwards (1967), identifies the major vegetation types in the Keate's Drift region.

---

[56] J. P. H Acocks, Veld Types of South Africa. (Memoirs of the Botanical Survey of South Africa No 57, Botanical Research Institute, Department of Agriculture and Water Supply, South Africa, 1988), P1 - 5.

[57] Ibid, p59.

The woody species of the area consist of both deciduous and evergreen species. Prominent evergreen trees are *Olea europea* subsp. *africana* (wild olive), *Boscia albitrunca* (shepherds tree), *Euclea crispa* and *Euclea racemosa*.

The tall trees (5 to 8 m in height) are being reduced in numbers and are now mainly found as relic trees in the eroded areas. These include:

Schotia brachypetala
Vitex rehmannii
Cussonia spicata
Ziziphus mucronata
Euphorbia tirucalli
Olea europaea subsp. *africana*
Acacia robusta
Pappea capensis
Euphorbia ingens
Aloe rupestris

The small trees in the area are:

Acacia caffra
Acacia tortilis
Euclea racemosa
Aloe spectabilis
Rhus dentata
Acacia karoo
Rhus pentheri
Euphorbia tirucalli
Dichrostachys cinerea
Boscia albitrunca - is often found growing as a relic tree in eroded areas.
Acacia nilotica
Euclea crispa
Aloe marlothii
Maytenus heterophylla

Overgrazed areas have become dominated by low scrub thickets or a sparse shrub layer including:

Blepharis natalensis
Felicia filifolia
Lippia javanica
Euphorbia pseudocactus
Coddia rudis

The grass species can be split into three broad categories:

- Climax grasses:

Themeda triandra
Eustachys paspaloides
Cymbopogon plurinodus
Bothriochloa insculpta - on black clay soil

- Subclimax grasses:

Chloris gayana
Eragrostis superba
Heteropogon contortus
Panicum maximum - dominant in shade

Eragrostis chloromelas
Eragrostis curvula
Sporobolus pyramidalis
Panicum deustum - dominant in shade
Sporobolus fimbriatus
Hyparrhenia hirta

- Pioneer grasses:

Urochloa mosambicensis
Aristida diffusa
Melinis repens
Chloris virgata
Tragus berteronianus
Aristida congesta subsp. *barbicollis*
Aristida congesta subsp. *congesta*
Fingerhuthia africana - on calcareous soil
Enneapogon scoparius - on calcareous soil

Variations within the semi-deciduous bush include:

***Vitex rehmannii* Woodland:**

This is found mainly on the dolerite ridges of the area. The grass cover tends to be good, and is dominated by *Themeda triandra*. There is a high relative abundance of *Vitex rehmannii, Acacia caffra, Acacia nilotica, Euclea racemosa* and *Euclea crispa*. Grass production in this area is usually good owing to the nature of dolerite soils.

***Boscia albitrunca* Woodland:**

This plant community is found in the dry valley floors on severely eroded sediments. The grazing capacity is extremely low. The dominant trees are *Boscia albitrunca, Schotia brachypetala, Olea europaea* subsp. *africana* and *Acacia tortilis*. The very poor ground cover consists mainly of *Blepharis natalensis, Felicia filifolia, Euphorbia pseudocactus* and *Coddia rudis*. Grass production is restricted to a limited cover following good rains. The grasses include *Urochloa mosambicensis, Tragus beteronianus, Aristida congesta* subsp. *congesta* and *A. congesta* subsp. *barbicollis*.

***Euphorbia* Scrub:**

The Euphorbia scrub is situated mainly in very dry areas of steep, rocky, north facing aspects where severe frosts are absent. It is frequently encountered as a narrow belt across the slope, with semi-deciduous bush below and *Acacia* veld above. Species common to this scrub include

Euphorbia triangularis, Euphorbia tirucalli and *Aloe rupestris* which form a dense canopy permitting only limited growth in the ground layer. Around the fringes, shade tolerant species such as *Panicum maximum, Panicum deustum* and species of the *Acanthaceae* family grow. This scrub provides practically no grazing or browse. It also shows little indication of spreading.

***Acacia* Thornveld:**

The Valley Bushveld of KwaZulu-Natal is generally referred to as 'Thornveld' because of the abundance of *Acacia* species in the bush component. In fact, the reduction, and in many places, the destruction of the grass layer, has led to a thickening of *Acacia* species, mainly *Acacia tortilis* in the valley bottoms, and *Acacia nilotica* and *Acacia karoo* on the hillsides. In Keate's Drift, the *Acacia karoo/ Acacia nilotica* component is encroaching into former grasslands, isolated dry north-facing aspects, and into eroded areas. Edwards(1967) states that the *Acacia* thornveld covers approximately 4 400 km^2 of the Tugela basin, and estimates that at least 60% of this thornveld has invaded during the last century. Reference to 1944 aerial photographs illustrates the alarming thickening and spread of *Acacia* species since that period. In the areas where this has occurred, a deterioration of the grass cover has resulted in low effective rainfall, a dry soil profile and consequently a changed environment more suitable for bush veld species.[58]

Conclusion

The physical landscape provides a baseline on which the impacts of humans upon the environment over time can be accessed. The next three chapters examine the changes that have occurred in the region from pre-colonial times to the present in line with the methodology set out in chapter one. Different people, with different modes of resource use, have occupied Keate's Drift over time. Each time a change occurs in either mode of resource use or human reproduction, it has implications for change within the physical environment. Therefore, an understanding of the physical environment of Keate's Drift is essential before an environmental history using the methodology of ecological revolutions can be applied.

---

[58] Camp, Valley Bushveld of KwaZulu-Natal, P 5 - 7.

Chapter 3

The Pre- Colonial Period

Introduction

The pre-colonial history of Keate's Drift investigates the human societies and ecology of the area before it was incorporated into the British colony of Natal in 1842. Both Stone Age and Iron Age human populations occupied this area before this time and as Cronon states, 'to live as human beings on this planet is to change the world around us'.[59] This chapter proposes that an ecological revolution occurred in which the modes of resource use of the more recent Iron Age population gained complete dominance over the previous Stone Age mode of resource use, thus representing a complete ecological revolution with changes in society's mode of resource use, reproduction, consciousness and ecology.

The Stone Age

The Stone Age in South Africa dates back to the time of the earliest known artefact found at Sterkfontein in the Transvaal and dated to 1.6 million years ago. Very little is known about the early Stone Age peoples (1.6 million to 200 000 years ago) of South Africa. A bit more is known about the middle Stone Age peoples (200 000 to 30 000 years ago) and even more on the late Stone Age (30 000 to 2 000 years ago). The boundaries between the early, middle and late 'ages' are determined by clear technological differences in the archaeological evidence. This evidence shows that the mode of resource use practised by the people throughout the different Stone 'Ages'

---

[59] W. Cronon, 'The Uses of Environmental History', Environmental History Review, (Fall, 1993), p7.

was hunter gathering.[60]

Mode of Resource Use

The hunter gatherer mode of resource use involved a nomadic lifestyle maintained by subsisting on the natural products of the land. It can be assumed on the basis of archaeological evidence, that the early Stone Age hunter gatherers' diet consisted primarily of animals and plant foods and that the use of fire had been discovered which allowed a certain amount of food processing. More advanced processing of foods and materials took place in the middle Stone Age as a result of technological improvements including the use of stone tools detached from the core and grinding stones. The diet was composed of wild fruits, berries, seed collections and a wide variety of the local fauna. The remains included honey badger, dassie, zebra, bush pig, warthog, hippopotamus, steenbok, oribi, mountain reedbuck, waterbuck, roan/sable, impala, cape buffalo and possibly an extinct giant cape horse (*Equus capensis*).[61] The later Stone Age is characterised by further advances in technology in relation to the tools used to carry out this particular mode of resource use. However, these changes and adaptations can largely be attributed to Stone Age society's way of reproduction. The implications of these changes in the early and middle Stone Ages can largely be ignored as the many dated sites in the Thukela Basin show that it was only intensively settled by later Stone Age hunter gatherers after about 7 000 years ago. Before then it was virtually unoccupied due to low population densities and the extremely nomadic nature of these people.[62]

---

[60] A. Mazel, 'The Stone Age Peoples of Natal', in A. Duminy and B.Guest, eds, Natal and Zululand from earliest times to 1910: A new history, (University of Natal Press, Pietermaritzburg, 1989), p7.

[61] A. Mazel, 'The Stone Age Peoples of Natal', p9.

[62] Ibid, p13.

Late Stone Age Reproduction

The growing number of nomadic family groups becoming more permanent in the Thukela Basin after 7 000 years ago had significant implications on the society's need to gather enough food from the resources available to maintain their family groups on a daily basis so that, in turn, enough food is provided to maintain inter-generational biological reproduction. Archaeological evidence shows that the later Stone Age economic practices of the Thukela Basin changed considerably from between 7 000 and 2 000 years ago. The changing economy is indicated by an increased exploitation of certain foods and that a greater variety of foodstuffs was being consumed. The increase in food utilisation is consistent with the idea of a growing population which in turn enhanced the need for the development of improved technology to utilise the available resources more efficiently to maintain society's increased levels of biological reproduction. This was done by tapping into previously untouched resources of the area such as a wider variety of underground plant foods by devising improved digging sticks weighted down with bored stones and a general increase in the exploitation of small mammals such as dassies, hares, mice, rats and shrews.[63]

To maintain the wider resource base, the late Stone Age society's economy and biological reproduction required the enhancement of hunter gatherer movement in order to attain these resources. It is believed that sites were occupied because of the set of resources which were available within easy reach of them to maintain day to day reproduction and that the movement between sites was related to differences in resource availabilities from place to place and time to time.[64] It is believed that the late Holocene populations of KwaZulu-Natal exploited the resources of the area by moving seasonally across the major ecological zones, scheduling their occupation of various zones to coincide with fluctuations in the availability and productivity of staple resources, particularly the distribution of grazing which wild grazing fauna would have followed throughout the year. Therefore, it is assumed that hunter gatherers occupied the highland sourveld of the Drakensberg mountains and their foothills during its summer peak in

---

[63] Ibid, p14.

[64] C. Cable, Economy and Technology in the Late Stone Age of Southern Natal, (British Archaeological Review, International Series 201, Oxford, England, 1984), p2.

productivity and moved down through the intervening midlands to the coastal belt, thus scheduling their occupation of the coast and its hinterland with its all year round grazing potential.[65] The hunter gatherers of the Thukela Basin were therefore highly mobile, well aware of the potential of their environment and ordered their movements according to seasonal and geographic variations in the availability and abundance of staple, predictable resources to fulfill their day to day needs for reproduction.

The social network of the late Stone Age peoples in the Thukela Basin, up until 2 000 years ago, comprised of three separate groups of hunter gatherers numbering more than 175 people in each group who followed the varying seasonal resources available to them[66]. Each group would have comprised loosely associated individual family units. The reproduction and maintenance of the larger social order was maintained by family elders and 'shamans' who acted as tribal decision makers. Shamans would enter into a trance during tribal dancing and perform certain tasks such as the maintenance of social relationships, the promotion of economic activity by, for example, guiding antelope into bushes and controlling rain, and the maintenance of sound links between families by means of 'out of body travel' in which they visited associated families. Thus, it has been stated that the Shaman's art was not "a luxury indulged in leisure time to provide pleasure and relaxation, but a remarkable aesthetic achievement which lay at the very heart of the functioning of hunter gatherer society".[67] The Shaman's role in social reproduction was very much linked to the consciousness of the Stone Age population.

Consciousness

The consciousness of the late Stone Age hunter gatherers incorporated the idea that they were a part of nature. This idea was passed on from generation to generation by the tight kinship associated with these people. The intricacy in which their lives were associated with nature was

---

[65] Ibid, p4.

[66] Mazel, 'The Stone Age Peoples of Natal', p15.

[67] Ibid, p19.

purveyed through Shaman trances and rock art. The ideology among the late Stone Age communities was represented by paintings of animals dominant in the diet, especially in the hunt, which inevitably governed their mode of resource use. As a part of nature their impact on the local ecology was significant.

Ecology

The hunter gatherer mode of resource use and day to day need of food for biological sustenance and reproduction is now believed to have had a dramatic effect on the upland areas by maintaining a sub-climax vegetation structure through the continued use of fire as a management tool to promote prime grazing to attract wild game. This is considered to be one of the few ecological effects of the Stone Age populations on the local ecology.[68] However, this is only a theory and there has been inconsistent botanical opinion on the vegetation make-up of the upland areas. Acocks argues that there is no reason why the upland areas did not achieve full bio-climatic potential of predicted *Podocarpus latifolius* dominated forests in the high bio-climatic region 4, and *Acacia sieberana* valley bushveld in the lower bio-climatic regions 6 and 8.[69] Phillips, on the other hand, estimates the vegetation type in the context of fire. These areas would have comprised relatively open vegetation with fire preventing full development. Bio-climatic region 4 was 'comparatively extensive forest, scrub and wooded savanna with large grass glades'. Bio-climatic regions 6 and 8 were composed of 'wooded savanna and scrub only when protected from fire and was more normally a sub-climax short and very open wooded savanna and open grassland'.[70]

However, it is now assumed from recent archaeological evidence that the upland areas were, before Iron Age settlement, grasslands similar in general appearance to the modern biota. This theory is based on the fact that these upland areas were not occupied during the early Iron Age

---

[68] M. Hall, 'Man's Historical and Traditional use of fire in Southern Africa' in P de V Booysen and N. M. Tainton, eds, Ecological Effects of Fire in South African Ecosystems, (Springer Verlag, Berlin, 1984), p52.

[69] Acocks, Veld Types of South Africa, p59.

[70] Phillips, Agriculture of the Tugela Basin, p213.

(2000 to 1000 years ago) and so these people had no influence on the area. However, when the Iron Age peoples did move into the uplands, the archaeological sites show no evidence of charcoal middens and the use of wood in building that had been found in the lowland sites. These factors indicate a lack of a feasible wood resource to burn or build with, and so the uplands are believed to have been grasslands before the end of the Stone Age.[71]

The upland areas sub-climax grassland vegetation is therefore believed to have been determined by the anthropogenic use of fire by Stone Age peoples in the region. The use of extensive fire regimes was used in the hunter gatherer economy as an invariable adjunct to food procuration within this mode of resource use. Although Hall believes that burning would have been employed only where there was adequate natural accumulation of combustible fuel, he also believes that fire may have actually been used as a conscious management tool as shown by the ethnographic observations of Burchell (an African explorer) while travelling on the edge of the highland grasslands of West Griqualand in 1811 that:

> In some parts of the plain the Bushmen had burnt away the old grass, for the purpose of attracting the game by the young herbage which subsequently sprung up.[72]

Although extensive burning maintained a sub-climax vegetation, the river valleys remained forested throughout the Stone Age. It is believed that the river valley woodlands were unaffected by the influence of fire as, according to Hall, established woodland communities are rarely totally removed by burning since trees are well established and the barriers to the spread of fire too developed.[73] Hall suggests that before the Iron Age, the river valleys of KwaZulu-Natal supported a stable and diverse flora that had achieved the full bio-climatic potential of the region. In studies based in Zululand, Hall estimated the late Stone Age river valley vegetation from the fossil trees found today. In the same way, the Keate's Drift vegetation can be estimated as the following:

---

[71] M. Hall, Settlement Patterns in the Iron Age of Zululand: An ecological interpretation, (British Archaeological Reports, Oxford, England, 1981), p143.

[72] Hall, 'Man's Historical and Traditional use of fire in Southern Africa', p43.

[73] Hall, Settlement Patterns in Iron age Zululand, p142.

Schotia brachypetala	*Olea europea* subs. *africana*
Vitex rehmannii	*Acacia robusta*
Cussonia spicata	*Pappea capensis*
Zizphus mucronata	*Euphorbia ingens*
Euphorbia tirucalli	*Alloe rupestris*

From this evidence it can be assumed that the hunter gatherers who occupied Keate's Drift study area used fire in the highland areas of the inter-locking spurs as a management tool of the very resources that maintained their nomadic lifestyle, economy and means of reproduction. This mode of resource use inevitably changed the original baseline ecology of the upland areas to the sustained grasslands that we know today, while the river valleys established forests were left essentially untouched.[74]

The Iron Age

Around 2 000 to 1 500 years ago, a people of the Negro physical type and very much distinct from the Stone Age Bushmen arrived in the Keate's Drift area. They introduced a different mode of resource use which, although it co-existed with the Stone Age hunter gatherer mode for some time, eventually replaced it, thus instigating dramatic changes in society's reproduction, consciousness and ecology. This complete transition therefore constituted the first ecological revolution.

Mode of Resource Use

The Iron Age people introduced a new mode of resource use, that of settled cultivation and the maintenance of domestic cattle herds. Following their arrival, it is no longer possible to consider the late Stone Age hunter gatherers in isolation, for the archaeological record shows that there was inter-action between these two communities, but that two separate modes of resource use

---

[74] Ibid, p143.

were maintained in the same area for a significant period of time. This is consistent with Gadgil and Guha's methodological idea that it is possible for two modes of resource use to operate in one area for some time before one becomes dominant. The reason the two modes of resource use survived together up until approximately AD 1 000 was the lack of competition for the same resources in the local area. The hunter gatherer mode made use of different resources from the resource use of settled cultivation. Eventually the hunter gatherer mode of resource use was supplanted completely by settled cultivation as the Stone Age populations were either assimilated into Iron Age populations or migrated elsewhere.[75]

Reproduction

Biological reproduction of Iron Age society was completely different from that of the stone age hunter gatherers and evolved itself over time as new farming practices, crops and animals were introduced. Unlike the later Stone Age hunter gatherers, who lived in rock shelters, and probably in temporary encampments out in the open, the Iron Age farmers lived in fairly large semi permanent open air villages.[76] The early Iron Age villages of the river valleys are believed to have been 8 hectares in size with a population of approximately 100 people being relatively common.[77]

These people maintained their intra-generational biological reproduction by relying on a seasonal food supply. Unlike the Stone Age day to day food collection, these people would grow their crops when the climatic conditions of a season suited the crop, and then store the surplus for consumption in the off season. Crops that were grown in the early Iron Age included bullrush millet, finger millet, sorghum and African melon[78]. The resource yields from this mode of

---

[75] Mazel, 'The Stone Age Peoples of Natal', p21.

[76] Ibid, p21.

[77] T. Maggs, 'The Iron Age Farming Communities' in A. Duminy and B. Guest, eds, Natal and Zululand from earliest times to 1910: A new history, (University of Natal Press, Pietermaritzburg, 1989), p31.

[78] Hall, Settlement Patterns in the Iron Age of Zululand, p146.

resource use were capable of sustaining the larger more settled populations of the Iron Age. In particular, the resource yields of the river valleys were greater than corresponding settlements at the coast.[79] This was because the soils had a high inherent fertility which could be maintained for relatively longer terms under the 'slash and burn' agriculture practised by these people. As such, the natural soil resource allowed the maintenance of a high agricultural population.[80]

The Iron Age population sustained their biological reproduction by technology which complemented their mode of resource use. They introduced metallurgy and pottery which provided invaluable agricultural implements and a means of processing crops and plant foods respectively. Metallurgy provided hoes to dig the ground with, while pottery introduced a vessel that water could be boiled in. The archaeological record from Stone Age sites up until 1000 years ago, shows that they used Iron Age pottery and metallic tools as well.[81] This indicates that high levels of mingling and adaptation between the two different modes of resource use occurred for some time. Therefore, implements necessary for Iron Age reproduction were incorporated and absorbed into the Stone Age peoples mode of resource use; a change that can be viewed as part of the gradual take over of the hunter/gatherer mode of resource use by another.

As well as crops, biological reproduction of Iron Age people was also maintained by domestic stock. These people introduced a whole complex of foreign animals to the study area. These included cattle, sheep, goats and dogs.[82] Cattle in particular were a very important aspect of the economy in this mode of resource use. The cattle provided much needed nutrition through dairy products and a valuable source of protein when slaughtered.[83]

The second millennium of the Iron Age witnessed dramatic changes within this society's reproduction. Firstly, the settlement pattern of villages changed from being beside the rivers up

---

[79] Ibid, p149.

[80] Ibid, p149.

[81] Mazel, 'The Stone Age Peoples of Natal' p21.

[82] Maggs, 'The Iron Age Farming Communities', p29.

[83] Ibid, p30.

to elevated positions on spurs or hill slopes.[84] The implications of this change were that the Iron Age peoples now occupied more of the land that had once been occupied by Stone Age populations. Those that had not been incorporated by inter-breeding into the Iron Age populations were forced to move further afield and would explain why there is less information available about the relations between the later Stone Age peoples and the Iron Age peoples after AD 1000.[85] Regardless, the villages of the new settlement pattern were much smaller and comprised of a few huts more typical of the individual family homestead of the traditional *Nguni* speaking people.

The reason for the movement of settlement was to provide suitable grazing for the increasing number of cattle needed to sustain human population growth within the same mode of resource use. To sustain growing inter-generational reproduction, an area had to be found that would increase their means of production. The edge of woodlands on the higher ground was chosen as this area provided seasonal variation in grassland production between the open grasslands of the uplands and the under story grasslands of the wooded river valleys. Therefore, in the management of their domestic stock, the Iron Age farmers maintained a short grazing season in the higher grasslands bordering the immediate river valleys in order to rest the riverine grasses and maintain the high overall productivity.[86]

The move to higher ground to maintain cattle production was at the sacrifice of agricultural production. The soils of the upland areas fell short of the quality of the riverine alluvia and although these were undoubtedly still exploited, the distances involved meant that upland soils had to be used for crop production. The dependence on the same crops on poorer soils resulted in some reduction in agricultural yield. This reduction in yield explains the smaller village size of the new upland settlements.[87] However, this changed dramatically with the introduction of maize to the study area in the 18th century, if not earlier.

---

[84] Hall, Settlement Patterns in Iron Age Zululand, p 152.

[85] Mazel, 'The Stone Age Peoples of Natal', p23.

[86] Hall, Settlement Patterns of Iron Age Zululand, p157.

[87] Ibid, p157.

The introduction of maize as a crop to the Iron Age population affected inter-generational reproduction dramatically as it allowed for substantial population growth.[88] This is because maize provides a vastly increased carbohydrate yield per unit of labour over other traditional grains such as sorghum. Maize is also less susceptible to bird damage, produces higher yields, requires virtually no winnowing and is therefore less labour intensive.[89] This population growth occurred in the uplands as maize was more suited to the climatic conditions of these areas in comparison to the river valleys because of the slightly higher rainfall, a lower drought incidence, and areas of doleritic soils particularly suitable for cultivation.[90] As a result of this almost complete shift of the Iron Age mode of resource use, both in cattle and crop production, to the upland areas, the area in which the hunter gatherer mode of resource use could continue was reduced. The very land on which hunter gatherers could reproduce had now been inhabited by Iron Age farmers. Therefore, the Iron Age mode of resource use and means of biological reproduction had completely replaced the Stone Age society's mode, as did the type of social reproduction.

The social reproduction of Iron Age farmers was organised amongst the clusters of *imizi* (homesteads) that were tied together within a chiefdom by ties of neighbourhood, kinship, clientship and marriage.[91] Each individual *umuzi* had a headman (*umnumzana*) who recieved land directly from the chief and as such, held significant power. The power of the *umnumzana* was passed down by direct descent to ensure the continuation of the lineage. This was vital, as both the survival and the reproduction of the *umuzi* were secured by the control of the *umnumzana* over the labour of young men, and the labour and fertility of women.[92] So important was the aspect of lineage that the practice of *ukungena* was practiced whereby a man would marry the widow of a deceased brother to perpetuate his lineage.[93] Each *umuzi* consisted of the *unumzana*

---

[88] Maggs, 'The Iron Age Farming Communities', p41.

[89] Hall, Settlement Patterns of Iron Age Zululand, p146.

[90] Ibid, p146.

[91] John Lambert, Betrayed Trust: Africans and the State in Colonial Natal, (University of Natal Press, Pietermaritzburg, 1995), p39.

[92] Ibid, p40.

[93] Ibid, p39.

and his sons and wives. The eldest son of the favoured wife would stay to maintain the *umuzi* while the other sons would leave to form their own *umuzi*. As such, the legal authority and social norms of one *umuzi* was passed on to others through the *amnumzana* system.[94]

Social norms included the sexual division of labour within the *umuzi*. Men catered for the husbandry of livestock, building, maintenance of huts and cattle kraals, digging grain pits and land clearance, while the women maintained agricultural production, domestic labour, thatching and portering. In manufacturing, the men made wooden and iron implements while women made pots and mats.[95] This division of labour was considered as community norm and was reproduced inter-generationally to ensure levels of production to maintain biological reproduction for the provision of a future labour supply. The division of labour was maintained by the headman's power over labour.

The headman's power over labour lay within his allocation of land, but also in the control of women's fertility by the system of *lobola*, or bridewealth system.[96] *Lobola* involved the control of marriage because the passing of authority from the brides father and her *umuzi* to her husband was a political and economic means of stabilising relationships between lineages.[97] The main focus behind a *lobola* was the trade of cattle for they comprised a man's wealth, indicated his social status and were his sacrificial link with the spirits of his ancestors.[98] Therfore, *lobola* played a pivotal role in the distribution of wealth amongst Iron Age society through the medium of cattle which both played a vital role in the consciousness of the people.

---

[94] Ibid, p39.

[95] Ibid, p39.

[96] Ibid, p40.

[97] Ibid, p40.

[98] Ibid, p41.

Consciousness

The Iron Age consciousness was very different from that of the Stone Age. They did not view themselves as a part of nature, but as farmers in which the land provided for them. Consciousness was portrayed through ceremonies such as circumcision and the importance of cattle as a source of wealth elicited through such social systems as *lobola*. Ceremonies, dances and decoration signified completely different meanings to the rituals of the hunter gatherer mode of resource use and therefore constituted a change in consciousness as well as mode of resource use and reproduction. The final stage of an ecological revolution therefore relied on a dramatic change in the ecology of the region.

Ecology

Settled cultivation impacted on the ecology of the river valleys as it changed the very structure of the biota rather than merely extracting a living from it as hunter gathering had done. The need for land to grow crops and graze cattle meant that intensive fire regimes were introduced by the Iron Age farmers to clear river valley forest around individual *imizi* for fields.[99] The deforested areas were maintained as grassland by grazing domestic stock and the continued use of fire.

The gradual deforestation of the river valleys was further accentuated by the resource needs of iron smelting. The need for iron tools within the agricultural mode of resource use had enormous ecological implications as forests were cleared to produce charcoal for the iron smelters. More extensive clearance of the forest occurred in the second millennium as a result of the greater demand for tools and weapons from a growing upland population who had no trees from which to produce charcoal for their own iron smelters.[100] Therefore, as a combined result of slash and burn agriculture and iron smelting, the river valley woodlands were finally opened up and an open

---

[99] Hall, 'Man's Historical and Traditional use of fire in Southern Africa', p47.

[100] Hall, Settlement Patterns of Iron age Zululand, p169.

Acacia/grassland mosaic maintained.[101] This was a dramatic ecological change from the Stone Age ecology and occurred as a result of Iron Age society's reproduction needs within a settled cultivation mode of resource use.

The upland grasslands that were initiated by the hunter gatherer mode of resource use were maintained by the Iron Age mode in the second millennium when the Iron Age peoples moved into the uplands. The spread of Iron Age peoples out of the river valleys to grow maize and attain better grazing lands meant that the uplands grass productivity continued to be induced by fire; this time for the benefit of cattle and not wild game. This ecological impact was as a result of the tensions caused by the needs of production, or resource use, to maintain Iron Age society's reproduction.

Conclusion

An ecological revolution occurred in the Keate's Drift area after the arrival of Iron Age people. The region saw a complete change in mode of resource use, human reproduction, human consciousness and ecology. A change at all these levels constitutes all the parameters required of an ecological revolution. The change was gradual, with the region sustaining two modes of resource use for some time when there was no competition for resources, but the eventual 'hunger' for resources that settled cultivation required to maintain the growing farming population saw the eventual assimilation, or dismissal, of hunter gatherers from the whole study area. Settled cultivation created a new balance within the ecology of the area as a different set of resources was required to maintain this particular form of production. The next stage in the ecological history of Keate's Drift was related to the colonial era in which a different mode of resource use, reproduction and consciousness was introduced to KwaZulu-Natal by a foreign society.

---

[101] Ibid, p169.

Chapter 4

The Colonial Period

Introduction

The colonial period saw the first external influence on the Iron Age society of the study area for 1 000 years. The tensions this external influence inflicted between the Iron Age Society's mode of resource use and its reproduction, and the Iron Age mode of resource use and the Keate's Drift ecology are analysed. This chapter takes John Lambert's analysis of the rise and fall of the homestead economy of KwaZulu-Natal, and seeks to place it in the methodological framework that is being pursued in this thesis.

Land and Labour in Early Colonial Natal

The first European settlers arrived at present day Durban in 1824 and found Iron Age people practising the settled cultivation mode of resource use. The settler numbers were small and had little influence on the black population. However, the British annexation of the Boer republic Natalia in 1842, and its evolution into the separate colony of Natal under Representative Government in 1856, with its own executive and legislative councils, provided enough power to begin intervening in African affairs and ways of life. As a separate colony, the need to achieve economic self-sufficiency was promoted through white settlement. Their farming practices and attempts were not too successful at first and so the colonial government looked to the black population as a source of profit and as such a system was evolved which placed the main tax burden on them.[102]

---

[102] Lambert, Betrayed Trust, p7.

The hut tax was the first levy charged on Africans at 7 s per hut in 1849.[103] This tax applied pressure on the subsistence mode of resource use because an excess in production was now required on top of subsistence production to pay the recently introduced tax. Many more taxes were to be introduced in later years, but the other major factor which applied pressure on the African mode of resource use was the geographical division and re-allocation of land by the colonial government.

The decision to restrict Africans to native reserves, including the Impafana reserve bordering the study area, was made in 1847 under the recommendation that villages be established in these areas for the training of agriculture and industry. It was intended that reserves could nurture an African peasantry capable of breaking away from traditional agricultural practices.[104] Therefore, the intention of the colonial government was to see the replacement of the traditional mode of resource use by Western methods that suited their industrial mode of resource use. The reality was, however, that these reserves were located in areas not wanted by white farmers and as such remained underdeveloped in terms of roads and communications and were effectively isolated from the colonial market and the influences of a cash economy right up until the 1890's. Therefore, the African mode of resource use had little incentive to change in these areas.

The main impact of land restriction on Africans was the overcrowding found on reserves by the 1850's. Natural growth and immigration from the Zulu state north of the Thukela had swelled African numbers in the colony to 100 000.[105] Simple population pressure on sub-quality land made many of the farming practices within their mode of resource use untenable. For example, the seasonal movement of cattle between the high lying sourveld and the valley sweetveld as described in the previous chapter was made difficult by the 1850's because of this population pressure. Population and grazing pressure caused a rapid degeneration of the grasslands, the disappearance of the woodland, and the undermining of both agricultural and pastoral lands.[106]

---

[103] Ibid, p19.

[104] Ibid, p10.

[105] Ibid, p10.

[106] Ibid, p11.

This land pressure forced many Africans to move out of the reserves onto neighbouring land where they could continue the farming methods within their mode of resource use. The move pushed them further towards a dependence on the cash economy because most of the neighbouring land was either crown or privately owned land that required payment in the form of rent or labour for tenure. Therefore, the mode of resource use on these lands required the production of a subsistence to maintain daily reproduction as well as an excess in either labour or food to pay the rent. This inevitably applied significant stresses to a mode of resource use that was labour intensive, time consuming and based at the subsistence level only.

The advantages of both labour and rent tenancy was that the tenants escaped restrictive chiefly authority and obligations, allowed them to accumulate cattle herds, and gave them access to some of the best agricultural land in the colony, but at the same time the demands put on them by their landlords often obliged the African tenant to send sons out to work to supplement the income.[107] For example, in labour tenancy the Africans were forced to work when their own personal maize lands needed cultivating so that tenants were often unable to plant more than the bare minimum needed for subsistence. Rent payers had the problem of land owners constantly increasing the rent so that their production could not keep up with the costs.[108] Therefore, the African mode of resource use was being degraded by population pressure in the reserves and by pressures to reproduce rent, the hut tax, and subsistence on private lands. These were the first steps towards the impoverishment of the Natal peasantry because of the growth of the colonial market economy, and instigated their growing reliance on short term labour for the maintenance of their settled cultivation mode of resource use.

On mission lands, such as the Etembeni Mission in the study area, there was a complete change from the traditional mode of resource use by some Africans. They were known as Kholwa and were promoted by the colonial government as the potential civilising aspect of African society from 1855 onwards. The missions contained a potential challenge to the African mode of resource use. On virtually all their reserves and stations they attempted to break down the

---

[107] Ibid, p14.

[108] Ibid, p15.

homestead mode of resource use and encourage individual tenure and the cultivation of cash crops.[109] However, they were only partly successful as most Africans on the reserves maintained their homestead lifestyle showing indifference to change.

Chieftainship and Social Reproduction in Early Colonial Natal.

The social reproduction of African society was maintained during the early colonial period. The reason is that the British chose to maintain the administrative chiefly system because with few resources at their disposal, the government had little alternative but to continue recognising the authority of chiefs. This system of indirect rule helped to maintain the larger social order and its reproduction by maintaining traditional structures of governance and law. These were strengthened initially by an order of council in 1849 that established a separate administration system for the Africans of Natal by recognising the laws, customs and usages that had governed relationships in the region before the settlers arrived. The major changes were that chiefs did not have the power of life or death over their subjects and they were now agents of the colonial government answerable to the colonial Lieutenant-Governor who stood in the place of the paramount chief.[110] Chiefs were also not allowed to call up young men through the *amabutho* system for military reasons, but only for ceremonial purposes with the consent of the Lieutenant-Governor. However, despite the British authority, it was fairly easy for chiefs to maintain African society's social reproduction in the early colonial period because the fledgling colony had few resources with which to impose authority upon them.[111]

However, the colonial administrative dormancy ended after a few native uprisings stirred the government to take more effective control, which essentially meant the gradual loss of power of the chiefs. The Native Administrations Act of 1875 and the Code of Native Law in 1878 were the first legislative attempts to define the official role of chiefs and to subordinate them to a

---

[109] Ibid, p16.

[110] Ibid, p23.

[111] Ibid, p26.

foreign codified legal authority associated with the industrial mode of resource use.[112] As such, the increased powers of the colonial magistrates over traditional law circumscribed the position of chiefs within their society considerably. They were no longer able to administer criminal cases or distribute land on white owned land, and only retained the right to try property, marriage and inheritance related civil cases.[113] The inability to enforce their traditional obligations on white owned land was a major loss of the power base that maintained the traditional methods of social reproduction.

The Changing Homestead.

For the individual *umuzi*, the imposition of white rule was at one level little more than a change of paramountcy. However, there was a gradual adaptation to meet the needs of a new ruling elite that was urban based and part of an imperialist, capitalist community, as the tentacles of a new mode of resource use infiltrated the rural areas.

White annexation resulted in safety from Zulu power and the scrapping of paying for allegiance in cattle, which meant that many *abanumzana* accumulated much wealth. This led to overstocking in many areas, especially the reserves, and caused severe degradation of the relevant grasslands, but more importantly this accumulated wealth had severe social implications that further denuded the power of the chief.[114] The accumulation of cattle was restratifying African society because the ability to accumulate wealth and prestige no longer necessarily depended, as it had done in the pre-colonial era, on the relationship between an individual and his chief, but on the proximity to a market to provide wealth.[115] This excess of cattle within the social system put marriage beyond the means of many young men as they could not afford the inflated *lobola* prices. This in turn forced many young men to seek short term employment to raise money to buy cattle

---

[112] Ibid, p32.

[113] Ibid, p32.

[114] Ibid, p45.

[115] Ibid, p45.

for *lobola*. Therefore, the traditional exchange systems between *imizi* that upheld many social interactions such as *lobola* were affected by the industrial mode of resource use which in turn affected the social reproduction of African society.

The Deepening Land Crisis

The greatest threat to the subsistence mode of resource use by the 1880's was the increasing lack of land due to rapid population growth. The African population of Natal had tripled since the 1840's to approximately 300 000 in the 1870's, of which, only half lived on native reserves.[116] This was a major problem for the settled cultivation mode of resource use which had developed on the basis of free and sufficient access to land to be able to move cattle and plant gardens, but population pressure and the fact that over half the African population had to pay for their land meant that the mode of resource use was essentially forced to adapt to the cash economy.

This was made even clearer by the expansion of white settler farmlands in response to the discovery of gold in the Transvaal in 1886 and the realisation that the stagnant homestead economy could not cater for the food requirements of the industrialising areas. In the commercialisation of white owned land, many African rent or labour tenants were either evicted or had their access to land restricted as they were now viewed as being uneconomic.[117] This increased the number of people forced to live on native reserves, but commercialisation also bought with it the need for African labour on a more permanent basis.

Commercial farmers were becoming ever more aware that if they could deprive Africans of access to land, they could limit their ability to amass cattle and grow crops and therefore wipe out agricultural competition and supply themselves with labour.[118] Many evictions were carried out to force labour from the settled cultivation mode of resource use into the industrial mode of

---

[116] Ibid, p71.

[117] Ibid, p78.

[118] Ibid, p83.

resource use for commercial agriculture. Farmers were constantly threatened that their mode would be undermined by the loss of labour supply and as such, when Representative Government was administered in 1896, the political structure and legislation favoured commercial farmers and the maintenance of their labour supply.[119]

Land and Labour- 1880 onwards.

The advent of commercial farming in the last two decades of the century meant that the bargaining power of Africans declined dramatically due to the loss of available land and extortionate rents being asked for on low quality land.[120] In order to raise money for the increased rents, Africans had little option but to sell a large part of their harvest or to send young men out to earn wages. In fact, wage labour became the only viable option for many *imizi* and as such these Africans were slowly but surely absorbed into the growing cash economy, especially that of the gold mines.[121]

The gold mines were a viable option for many young Africans because they offered short term contracts, increased wages until 1897, the ability to pay off the hut tax and land rents, and the ability to buy cattle for *lobola*. The mines contracted labour through traders who, with conditions deteriorating in many *imizi*, encouraged the men to work on the mines for an advanced payment of one or two head of cattle.[122] However, legislative restrictions were applied by the government in favour of white commercial farmers to control the movement of black labour out of the colony and epitomised the consolidation of settler farming and their growing political subjection of Africans. Therefore, the option for dislocated Africans to move out of the colony to find areas where they could carry out their mode of resource use was restricted and the only choices left

---

[119] Ibid, p83.

[120] Ibid, p92.

[121] Ibid, p89.

[122] Ibid, p95.

were either labour or the reserves.

The Crisis Facing African Production

The difficulty to make ends meet due to drought, land shortage, ever increasing taxation and population growth all contributed to the almost complete demise of the African mode of resource use by the 1890's. The population of Natal had grown to an estimated 455 983 after the first census in 1891.[123] More taxes included the introduction of a 10s tariff for the cutting of wattles on reserve or crown lands and as free access to timber was vital to *imizi*, these charges and increased forest regulation struck at the basis of homestead life.[124] So when the droughts of 1888 and 1893 decreased the already stagnant maize yield, there was actually less maize for an increased number of *imizi* on the reserves. This meant that *imizi* were increasingly unable to provide for both their reproduction within the traditional mode of resource use and the increasing tariffs applied by the government. This problem was further exacerbated by the ecological condition of reserve lands often at the ironic expense of introduced technology that had actually been accepted by the African, such as the plough.

Deep ploughing has had disastrous ecological effect in southern Africa which, in combination with over-cultivation and forest clearance, resulted in creating perfect conditions for soil erosion on the reserves.[125] This further decreased yields and the amount of land available for cultivation. These pressures were further compounded by increased cattle numbers and a lack of grazing land which, with an increased number of goats, indicated a sign of growing impoverishment of many *imizi*.[126] So up until the 1890's, most *imizi* had managed to cope with the colonial presence as long as the demands on their resources could be met by the production of a relatively modest agricultural surplus supplemented by occasional wage labour. This balance turned more in the

---

[123] Ibid, p 107.

[124] Ibid, p113

[125] Ibid, p109.

[126] Ibid, p110.

favour of wage labour with the onset of a spate of natural disasters that knocked the bottom out of a previously sustainable mode of resource use.

These natural disasters were the locust and rinderpest epidemics that occurred between 1894 and 1898. The 1896 locust epidemic wiped out much of the maize in an already lean year so that the gold mine touts encouraged men to migrate for a forwarded six bags of maize.[127] Then the rinderpest epidemic that wiped out most of the cattle in 1897 meant the loss of the very basis of African production, social reproduction and consciousness. These calamities made the ability of many *imizi* to function independently of migrant labour well nigh impossible. They crippled the *umuzi* and accelerated a process of proletarianisation in African society.

The Dislocation of African Society

The impact of migrant labour was felt at all levels of African society, but mainly through the further breakdown of the chiefly system. On top of the lack of ability to allocate diminishing land, young migrant labourers were less reliant on the chief for social reproduction because their own economic independence earned in the industrial mode of resource use bypassed the traditional economic pathway based mainly on cattle. Young migrants received cattle for *lobola* directly from the industrial touts and therefore undermined the power base of the chiefs as much as the land shortage had.[128]

Chiefs were now less able than in the past to cement ties of dependence with their people, and less able to distribute and redistribute land and so had few resources with which to shore up their authority. In fact, the growing legislative and tax demands by both settlers and government made a lot of chief's positions untenable with their people.[129] However, the chiefly system and indirect rule were never fully replaced, but weakened, and so the required parameters of a complete

---

[127] Ibid, p144.

[128] Ibid, p123.

[129] Ibid, p123.

change in social reproduction for a complete ecological revolution never truly occurred. This can be seen in Keate's Drift today, where the traditional values still exist as a result of this maintenance of indirect rule.

The erosion of chiefly powers came through legislation such as Act 13 of 1894, which allowed *izinduna* to try cases without referral to the chief, and Act 37 of 1896 which replaced the authority of chiefs in reserves by a governor in council.[130] This legislation turned chiefs into little more than policemen responsible for ensuring that the rules and regulations of the crown were not contravened. This administrative ignorance undermined the social reproduction of African society as young blacks questioned the leadership of appointed chiefs. This disregard of chiefly authority was illustrated no more so than in the consumption of *utshwala*, or traditional beer.[131]

The consumption of *utshwala* held a prominent place in African society and had a traditional importance both as a form of tribute and as a way of rewarding services and its preparation within the *imizi* was integral to the *abanumzana's* power.[132] Young migrant labourers challenged the declining powers of the elders by drinking beer as a status symbol in a form of reluctance to conform to traditional social conventions.[133] Beer drinking was an outward manifestation of their growing independence, or in other words, a sign that they were being assimilated into an alternative industrial mode of resource use that required different levels of social reproduction and a change in consciousness from that of rural areas.

As a result of this migrant labour and dislocation of African society, conflict was endemic on many of the reserves. The faction fighting was blamed on the mixture of different chiefdoms forced together on the restricted land of the reserves and the growing intolerance of a more independent male youth.[134] The forces behind the faction fighting also caused a rise in crime and

---

[130] Ibid, p124.

[131] Ibid, p125.

[132] Ibid, p127.

[133] Ibid, p127.

[134] Ibid, p127.

resistence to the white settler community which arose because of the disrespect for general law by migrants that was taken back to rural areas.[135]

This sociological displacement of migrant workers is discussed more extensively in the next chapter, but the fact is that men did not return home untransformed by the urban experience. Returning migrants often found they had little in common with the families they had worked so hard to support, and took refuge in groups and the *espirit de corps* of men like themselves.[136] Therefore, the impacts of the industrial mode of resource use were brought back to rural areas through young migrants, who, belonging to neither town nor country, were truly at home only among themselves.[137]

Conclusion

This division within the consciousness of a migrant worker epitomises the incomplete ecological revolution of the colonial period. The mode of resource use, society's reproduction and the ecology of rural areas like Keate's Drift did not undergo a complete change as they had done in the ecological revolution between the Stone and Iron Ages. This was because the colonial government restricted most of the African population from the influence of an industrial mode of resource use, by segregating them on reserves where they continued to practice settled cultivation, maintained their social reproduction through indirect rule and, by forcing them onto restricted land, initiated the impoverishment rather than change of their local ecology.

Towards the end of the colonial period, restrictive legislation and taxation destroyed the independence of the settled cultivation mode of resource use and forced it to provide the additional labour required to sustain the increasing commercialisation of the industrial mode of

---

[135] Ibid, p128.

[136] David Coplan, 'The emergence of an African working class culture' in Shula Marks, ed, Industrialisation and Social Change in South Africa: African class formation, culture and consciousness !870-1930, (Longman, London, 1982), p363.

[137] Ibid, p363.

resource use. However, the maintenance of segregation through legislation provided the beginnings of the migrant labour situation that still affects Keate's Drift today.

Chapter 5

The Twentieth Century

Introduction

The erosion of the Keate's Drift traditional mode of resource use and a growing reliance on migrant labour during the colonial period carried on through to the post-colonial period and remains a feature of the contemporary scene. The segregation initiated during the colonial period was maintained under successive governments before 1994, and the social implications can still be seen today, especially in places like Keate's Drift. This chapter argues the case of Francis Wilson, who believes that a dependence on migrant labour actually impoverishes rural areas and is one of the major barriers to sustainable development. In conclusion, this chapter argues the fact that Keate's Drift is stuck in an incomplete ecological revolution inherited from the colonial period, is dependent upon migrant labour as a result, and so the arguments put forward by Wilson apply to this area. As such, the government must take these factors into account when seeking to redress the adverse effects of past policy through land reform. It is not enough simply to redistribute land.

The Wilson Argument

Wilson argues that the one special feature of mining, especially gold mining, unique to South Africa, has been an oscillating migratory system for the full 100 years of South Africa's industrial revolution. Labour has been brought into industrial areas, particularly the mines, for a fixed period of time, and then returned back to the rural areas. This means that the workers concerned have been experiencing two different modes of resource use. On average 95% of black labour

on the mines is migratory and there is no industry on Earth which has got that peculiarity.[138]

The problem with this situation is that a migrant labour system of this magnitude has a profound effect upon society.[139] The essence of migrant labour is that a man is being divided in half as a human being; one half as a labourer in one place and one half a family man in some other place. A distinction can be made between the length of stay on the mines for example, and the extent to which a particular worker's family roots and social structure have been eroded.

To understand many of the issues of society's problems, in this case the reliance on migrant labour and the faction fighting that occurs in Keate's Drift today, an understanding of the ways in which this particular economy has been shaped is very important. The uniqueness of South Africa's gold mining industry is made apparent when compared to other industrial mining countries. The Zambian copper mining industry had the same situation of an oscillating migrant labour system from the 1930's to the 1960's, but this only lasted for 30 years, as compared to South Africa's 100 years, and so the social impacts are not as severe.[140]

The separation of racial communities began in the colonial period as shown in the previous chapter, but was maintained through the use of 'closed compounds' inherited from the beginning of the diamond (1885) and gold (1886) mining industries. They were initially constructed to stop the illicit smuggling of diamonds out of the mines, but were later developed to provide an organised labour supply, legislative control, and shelter for an increasing numbers of migrant workers at low cost.[141] The mines also introduced labour tax, the colour bar and pass laws to effectively isolate black workers within the compounds and out of the 'white' urban areas.[142]

---

[138] Unpublished evidence given by Professor Francis Wilson to the Commission of Inquiry into Safety and Health in the Mining Industry, Volume 8, (Department of Mineral and Energy Affairs, Pretoria, 1 August 1994), p733.

[139] Ibid, p735.

[140] Ibid, p735.

[141] Ibid, p737.

[142] Wilson, 'Workshop on Environment and Development Issues' led by Professor Francis Wilson, School of Environment and Development, University of Natal, 14-2-99.

This system was then adopted by the apartheid government as the perfect solution to the Verwoerdian policy of achieving economic growth through separate development. The migrant labour system as developed by the gold mines was taken by Dr Verwoerd as the model on which to build the apartheid labour system, and so the 50's, 60's and 70's saw hostels being built outside the mining industry by the railways, by secondary industry, and agriculture in order to develop a permanent system.[143] Therefore, the South African industrial mode of resource use solved its inner problem of sustaining economic growth through urbanisation, while simultaneously maintaining separate development for the black population.

The next twist of the apartheid strategy that increased black rural poverty were the technological innovations of the commercial agricultural sector in the 1950's and 1960's. These innovations resulted in a declining demand for African labour, which forced many Africans off white-owned land. This decline corresponded with the expansion of the Pass Laws by the Nationalist Party in 1948, which prohibited black urbanisation unless there was proof of a contract. This policy left many dislodged blacks with little option but to move onto the already crowded native reserves.[144] This misplaced urbanisation and the National Party's destruction of black education were the fundamental screws on the present day situation of rural poverty.

The migrant labour system simultaneously produced rural poverty because restrictive legislation forced people to live at too high a density in rural areas, and secondly, the shortage of resources due to overpopulation, meant that these people had no other option but migrant labour to sustain their day to day reproduction.

Further impoverishment in rural areas occurs because the people who built the wealth of Johannesburg by digging gold were not allowed to settle in the region because of the apartheid migrant labour system. Therefore, they returned to rural areas at the end of their contracts, married rural women and had children. Thus, the inter-generational reproduction of population was tied to the rural areas, but the financial means of day to day reproduction was inextricably

---

[143] Wilson, 'Commission of Enquiry into the Health and Safety of the Mining Industry', p771.

[144] Wilson, 'Workshop on Environment and Development Issues'

tied to the city of Johannesburg through the link of the migrant father who would send remittance money home to maintain the family. As such, the economy of the rural areas was based less on the production of food through the traditional mode of resource use, but more and more on the production of gold through migrant labour wages. What the traditional mode of resource use produced before could now be bought. As a result, the capacity to generate wealth in rural areas was actually falling because of the geographic distance from the origin of the new industrial mode of production. The reliance on remittance money meant that no jobs were created locally through a lack of industry and insufficient food was grown as a result of rural areas being symbiotically tied to the mining industry.[145] Wilson uses the migrant labour dependent country of Lesotho to illustrate rural impoverishment.

In the Lesothan town of Mohale's Hoek there is a dependence on the importation of long life milk. This milk is delivered from Port Elizabeth and bought with remittance wages earned on the mines in Welkom, South Africa. The production of milk in Port Elizabeth produces jobs in agriculture and packaging down there, but the process over 100 years of Lesotho participating in the migrant labour system, meant that Lesotho was unable either to produce the jobs to buy that milk or even to produce the milk locally, despite the fact that Lesotho was once self sufficient in milk.[146] Therefore, the industrial mode of resource use benefits at the loss of the rural settled cultivation mode of resource use.

Further rural impoverishment was accentuated by the low wages received by miners. From 1911 to 1969, black wage's in real terms (that is allowing for inflation), remained static.[147] During this time cheaper tropical labour was used from countries like Malawi and Mozambique whose citizens made up approximately one third of the mine labour force. Then in 1974, the increased number of independent tropical African countries, and the associated political threats to cut off the labour supply, initiated the internalisation of the labour market. This instigated a rise in

---

[145] Wilson,'Commission of Enquiry into the Health and Safety of the Mining Industry', p743.

[146] Ibid, p777.

[147] Ibid, p749.

wages on the gold mines and attracted enough indigenous South Africans to make up 60% of the labour force.[148] This meant that more black South African families and rural areas came into contact with the impoverishment associated with migrant labour and the industrial mode of resource use.

However, it also introduced them to the fundamental dark side of the mining industry which is the *de facto* vision of a migrant worker who is divided in half. As a worker in the industrial mode of resource use (Johannesburg), he lives in a hostel with food, shelter and a bed, but that is him there. When it comes to him as a person with family ties, with children and so on, then he is somewhere else and it is that division within the heart of a miner, the split of the family and its associated consequences that can be traced.[149] As Wilson states:

> You go and talk to women living in rural areas, or men in the compounds as to the pain of growing up without your children, the pain of being separated from your husband, these are the essential features that we have got to get to grips with to fully understand the problems of migrant labour.[150]

Also, the whole compound system is sociologically abnormal. The single sex hostels offer no room for home life over a very extended period of time and the social pathology of a single sex, single generation groups with no family structure can lead to a highly explosive situation. Wilson claims that these factors explain hostel violence and leads to the conclusion that labour compounds were and still are the epicentres of violence in South Africa.[151] The problem is that this violence often spills out of the urban areas back to the rural areas when migrants return from work, and there does not appear to be any short term answers as long as migrant labour remains.

The reason is that despite the rise of the National Union of Mineworkers and the notion of a truly democratic government, the shape of Keate's Drift society has been built up over a hundred years,

---

[148] Ibid, p749.

[149] Ibid, p761.

[150] Ibid, p761.

[151] Ibid, p745.

and will not change dramatically in the immediate future. This is because a form of social scaffolding that has shaped today's society was put in place by the legislation of the colonial and apartheid government. This scaffolding can be dismantled, but the structure is still there and will take time to demolish. For example, the legislation of the1913 Lands Act left blacks with only 13% of the land in South Africa, and despite the demise of this and similar legislation after the 1994 elections, the distribution of land remains the same. This power structure was in the nature of the scaffolding that shaped South African society. However, the removal of that scaffolding does not necessarily result in the change of a lot of very important things that were shaped by it.[152] Therefore, the migrant labour system is still with us and the brunt of the physical and sociological problems will remain in South Africa and Keate's Drift for some time to come. So what are the solutions?

The major problem is that if migrant labour were halted from any sending area, it would be a disaster, because that sending area depends on the wages coming in from remittances and wages.[153] The traditional mode of resource use has been so eroded in many rural areas that the earnings from agriculture are minimal. Therefore, although the money earned from migrant labour is the life blood of people in the rural areas, it is also the source of this rural impoverishment. Wilson proposes that solutions to rural poverty include education, investment by employers within the sending area, the promotion of family life and the payment of a living wage. The government could also increase pensions above the inflation rate.

The promotion of family life is vital in the alleviation of violence related to sociological problems. Wilson proposes that the natural order of urbanisation be assisted gradually so that miners and their families can live near the mines as happens in the rest of the world.[154] The problem is that many migrants wish to remain as migrants because:

- wages are relatively low and the cost of maintaining an urban family is expensive.
- they wish for their children to be brought up in rural areas.

---

[152] Ibid, p763.

[153] Ibid, p775.

[154] Ibid, p811.

- they may have part of a homestead remaining which they wish to return to one day.[155]

However, the irony is that the nature of today's rural society , that of overpopulation, distorted population pyramids, the permanent absence of large numbers of men, has been, in a sense, produced by the same industrial mode of resource use that has been producing real wealth in areas foreign to these people. Keate's Drift is an area typical of the rural society described above. Therefore, any development proposals made for the six farms intended to be resettled by members of the Zondi community, must realise the fact that the peoples reliance on migrant labour must be reduced in the long term, or else the same sociological and physical impoverishment, leading to the faction fighting over limited resources, will continue to deter the sustainable development of this area. Evidence of this rural impoverishment, the reliance on migrant labour in the Keate's Drift area, and the impact of an incomplete ecological revolution are provided by a comparison study of aerial and standard photographs over time.

Aerial Photography

Four sites were chosen from the 1: 50 000 map of the study area.[156] Each site was compared against the others by relating the respective sites on aerial photographs from the years 1953, 1972 and 1996. These were then compared with present day photographs of each site from ground level. In each photograph, the spread of settlement, the extent and type of cultivation related to mode of resource use, and the vegetation make up were accessed. This analysis, it was hoped, would help illustrate the incomplete ecological revolution that has occurred in the Keate's Drift area by comparing it with an adjacent area where commercial agriculture predominates, and a complete ecological revolution has occurred.

Four sites were chosen from around the study area and the respective aerial photographs chosen. The sites were chosen for their ease of ground access, their representative value as to the nature

---

[155] Ibid, p778.

[156] South Africa, 1: 50 000 Sheet, 2830 DC NADI.

of change for the whole area, and the visual clarity of information. These will then be compared with ground photographs from the farms intended to be re-distributed and a proposal put forward for the development of these areas.

Site 1

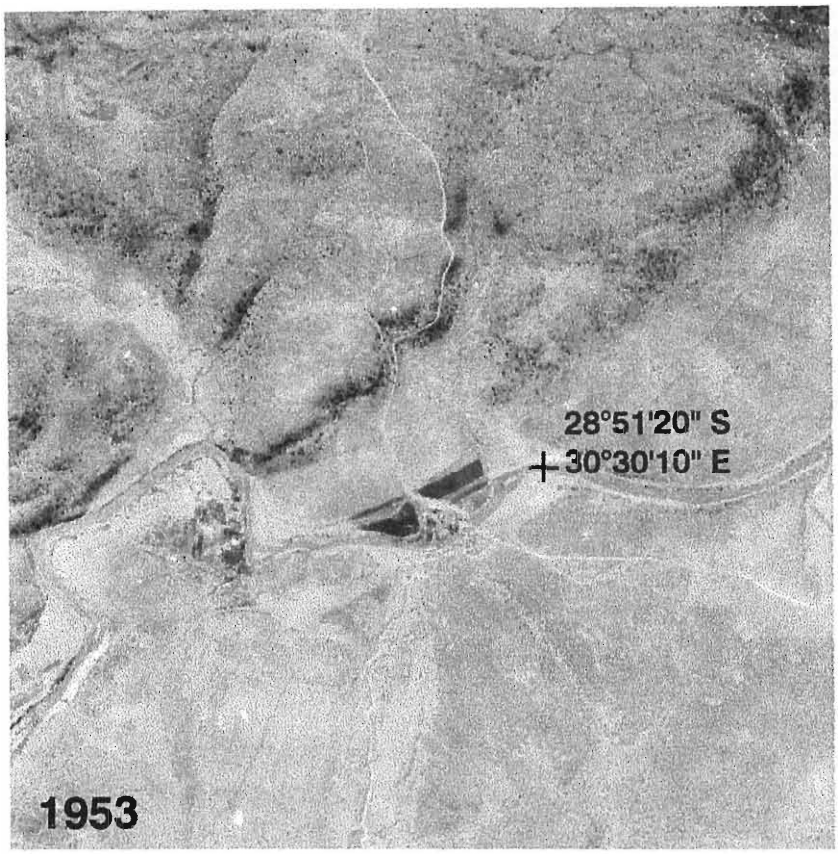


Plate 5.1 - The town of Keate's Drift - 1953

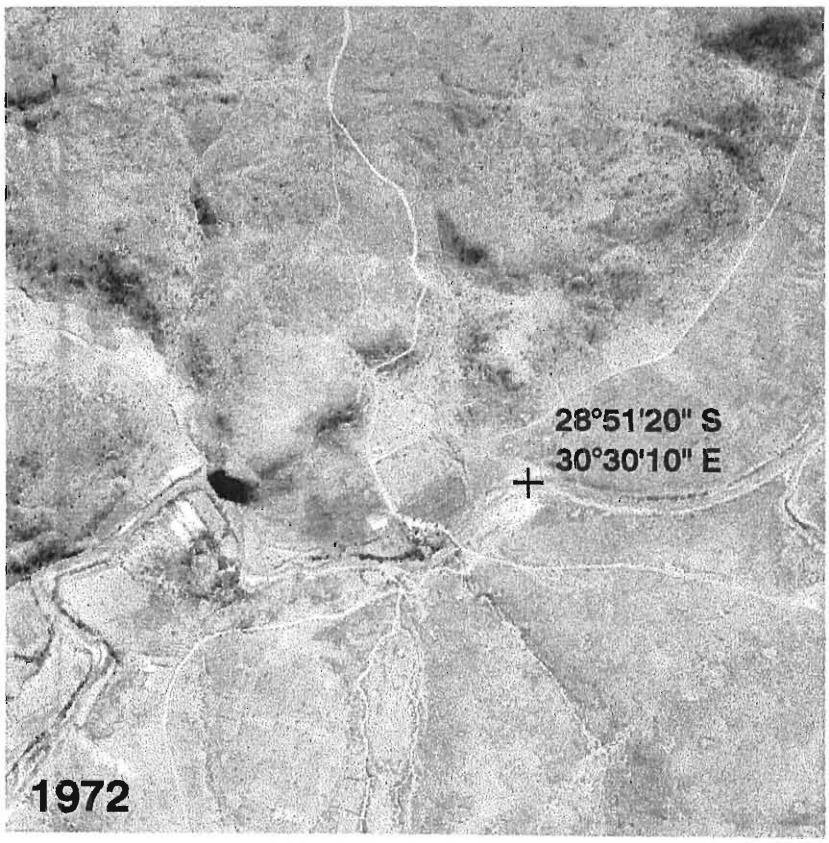


Plate 5.2 - The town of Keate's Drift - 1972

Site 1

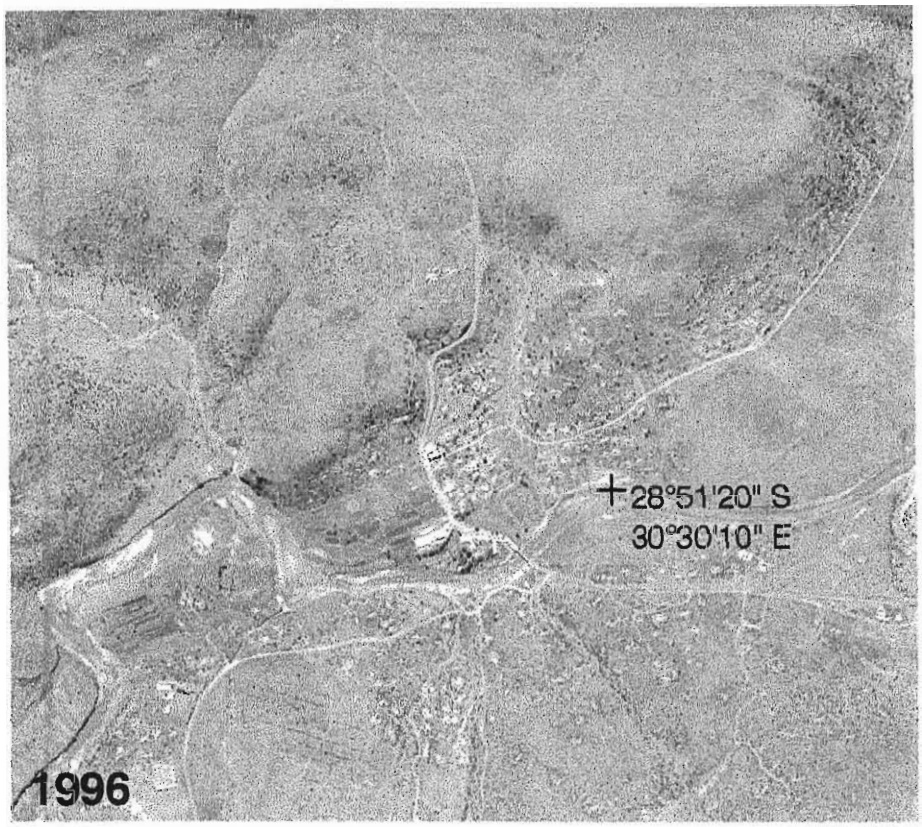


Plate 5.3 - The town of Keate's Drift - 1996

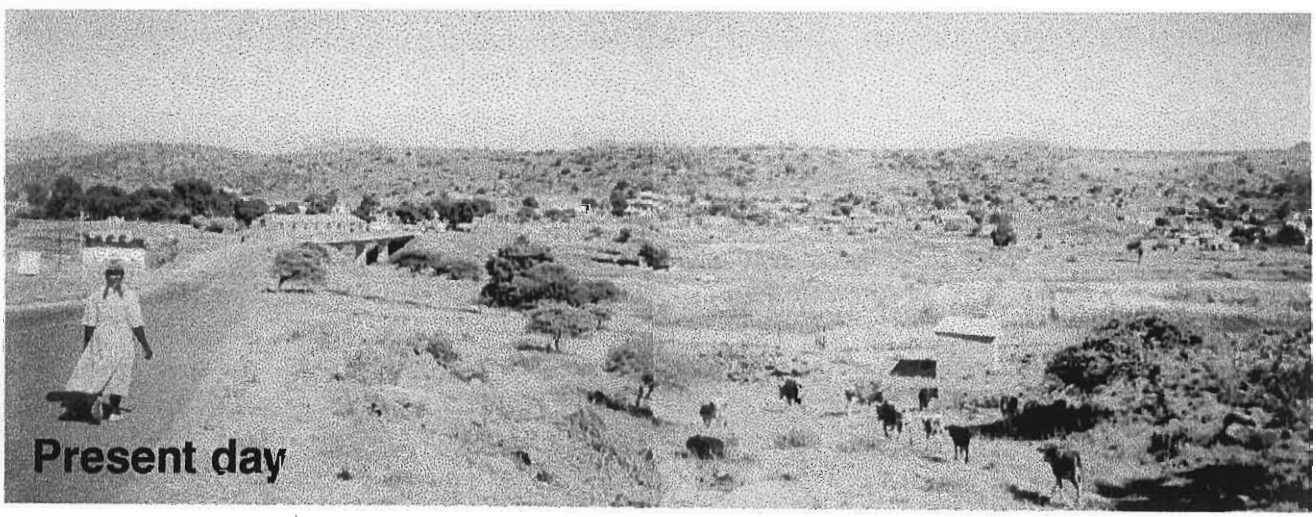


Plate 5.4 - The town of Keate's Drift

Site 1

Location: The town of Keate's Drift.

Grid Reference: 28°51' 20" S
30° 30'10" E

Plate Reference:

Plate 5.1 - 1953 [157]

Plate 5.2 - 1972 [158]

Plate 5.3- 1996 [159]

Plate 5.4 - Present Day

Plate Observations:

1953 (Plate 5.1 on p62)

Settlement - Individual homesteads are few and widely spread out. The present day site of Keate's Drift is occupied by a few households only.

Settled Cultivation- Fields are prominent to the south west and north east of Keate's Drift following the immediate valley of the Mooi River. In fact they are the dominant land use in these areas. The fields are small and concentrated together, indicative of subsistence agriculture. The distribution of fields on the higher ground is very sparsely spread out, and individual clearings are smaller. Agriculture is focussed on the fertile alluvial soils of the river valley.

Vegetation - The lowland of the river valleys has been extensively cleared of forest to make way for settled cultivation, but once onto the higher ground, especially along the steeper ridges, there is significant woodland cover showing a minimal sign of disturbance.

---

[157] Aerial Photograph, Job 330/53, 2123.

[158] Aerial Photograph, Job 685/72, Strip 3, 3109.

[159] Aerial Photograph, Job 985G/96, Strip 13M, 2114.

1972 (Plate 5.2 on p62)

Settlement - There has been a significant increase in the number of homesteads along the new road to the north east where previously there were none. In general the number of individual homesteads has increased by about 40%.

Settled Cultivation - The areas described from 1953 still exist, but the small concentrated field structure indicative of subsistence agriculture is clearer in this plate. The main focus of cultivation remains in the valleys.

Vegetation - There is evidence of forest clearance, particularly along the new road where trees have been physically replaced by settlement, but clearance is not particularly significant.

1996 (Plate 5.3 on p63)

Settlement - The increase in the amount of homesteads is immense. The photograph clearly shows a drastic increase in all areas, but especially a conglomeration along the new road running east to west. Settlement at the bridge across the Mooi river could now be referred to as an urban settlement.

Settled Cultivation - There is still evidence of small fields in the river valleys, but they are not as clearly defined, nor as common, as they were in 1972. In a number of areas, homesteads have taken the place of settled cultivation. The number of fields has therefore decreased.

Vegetation - Whereas the difference in vegetation between 1953 and 1972 was not marked, the significant decrease in vegetation by 1996 over the whole area, including the steep hill slopes, is very evident. A direct relationship can be assumed between the increased settlement and decreased woodland as wood is a major resource to these people, and as such this resource has been heavily denuded because of population pressure.

Present Day (Plate 5.4 on p63)

The present day photograph shows the settled cultivation in the valleys, the deforested hillsides and the conglomeration of an urban centre at the main bridge crossing the Mooi River. The small maize fields and cattle show that the attributes of the pre-colonial mode of resource use have been maintained, but the amount of land available for cultivation is decreasing as the levels of urbanisation increase. A visit to this area showed many severely eroded lands in this area

Site 2

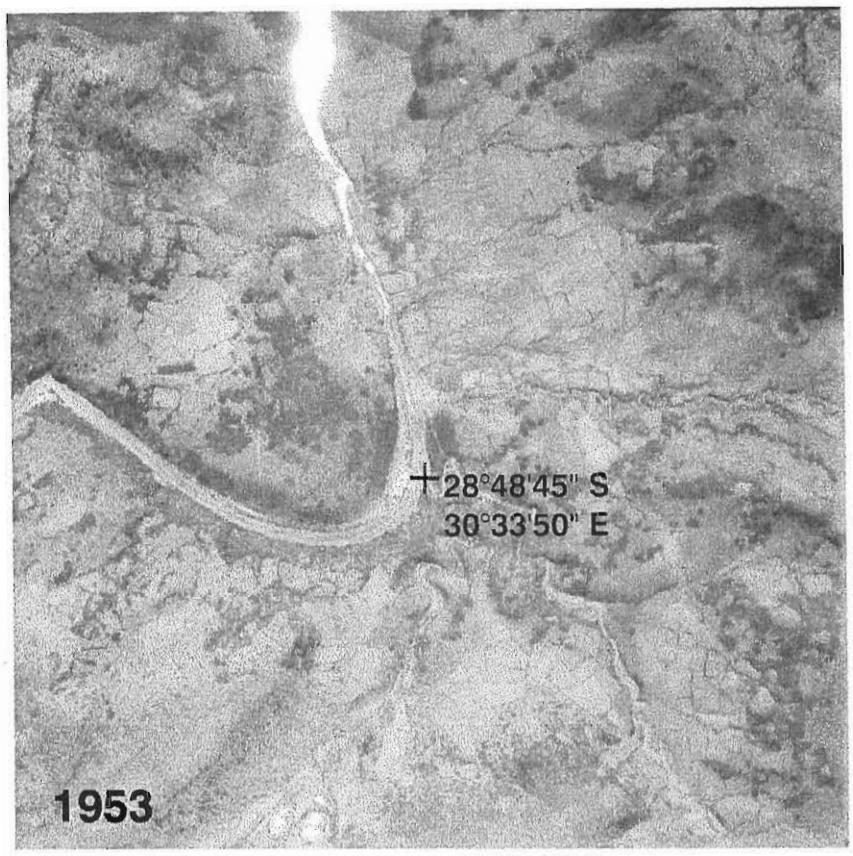


Plate 5.5 - Rural setting in Mooi River Valley
North West of Site 1 - 1953

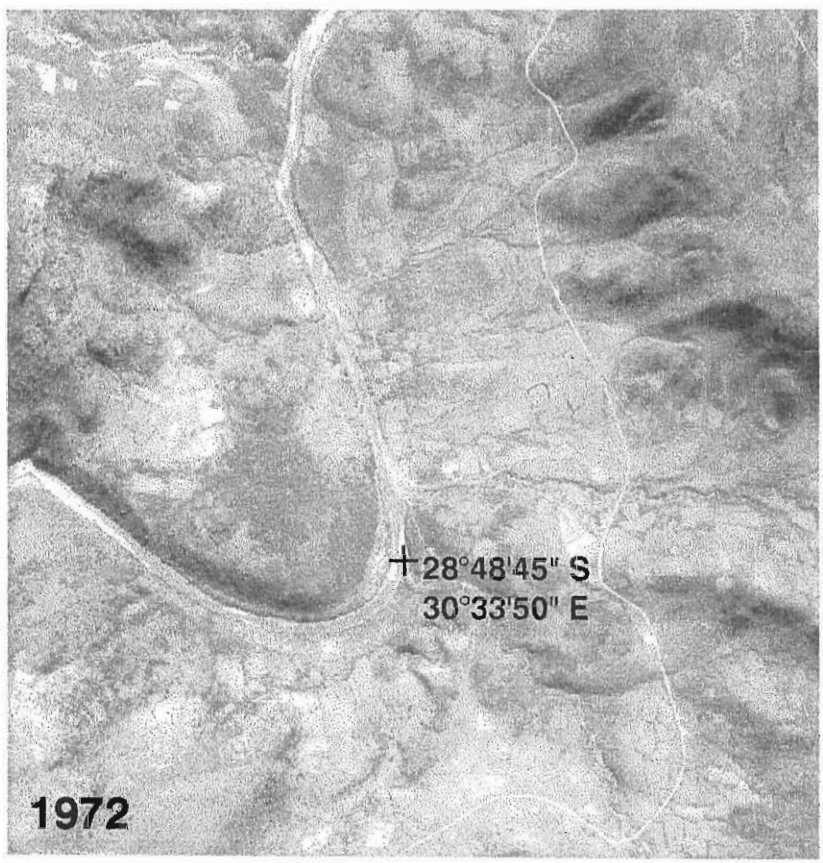


Plate 5.6 - Rural setting in Mooi River valley
North West of Site 1 - 1972

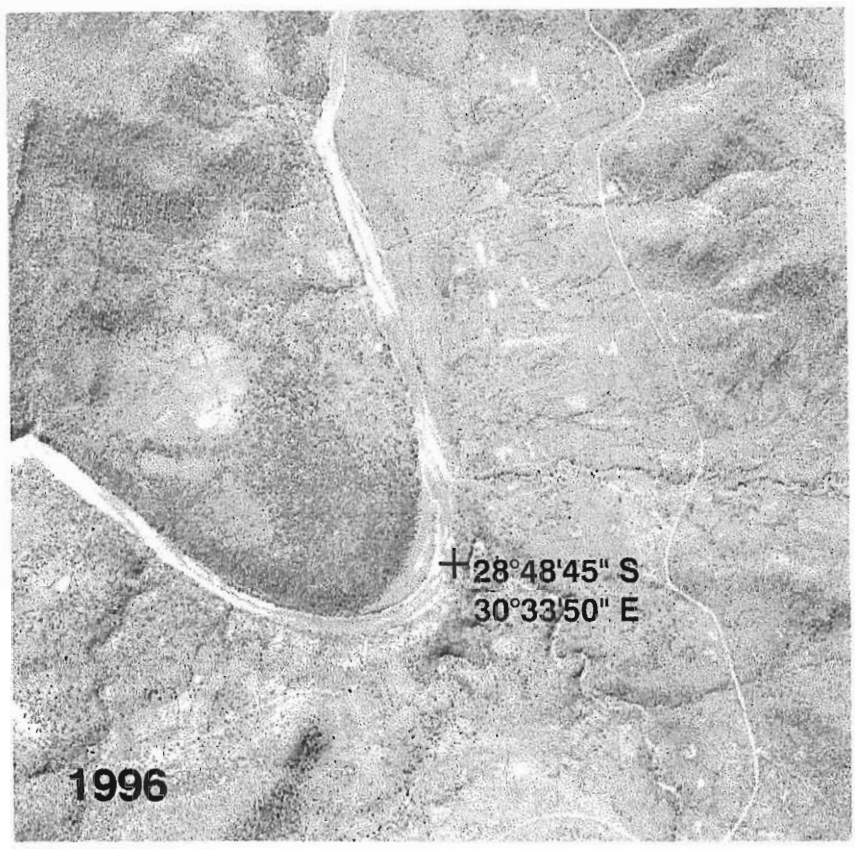


Plate 5.7 - Rural setting in Mooi River Valley
North West of Site 1 - 1996

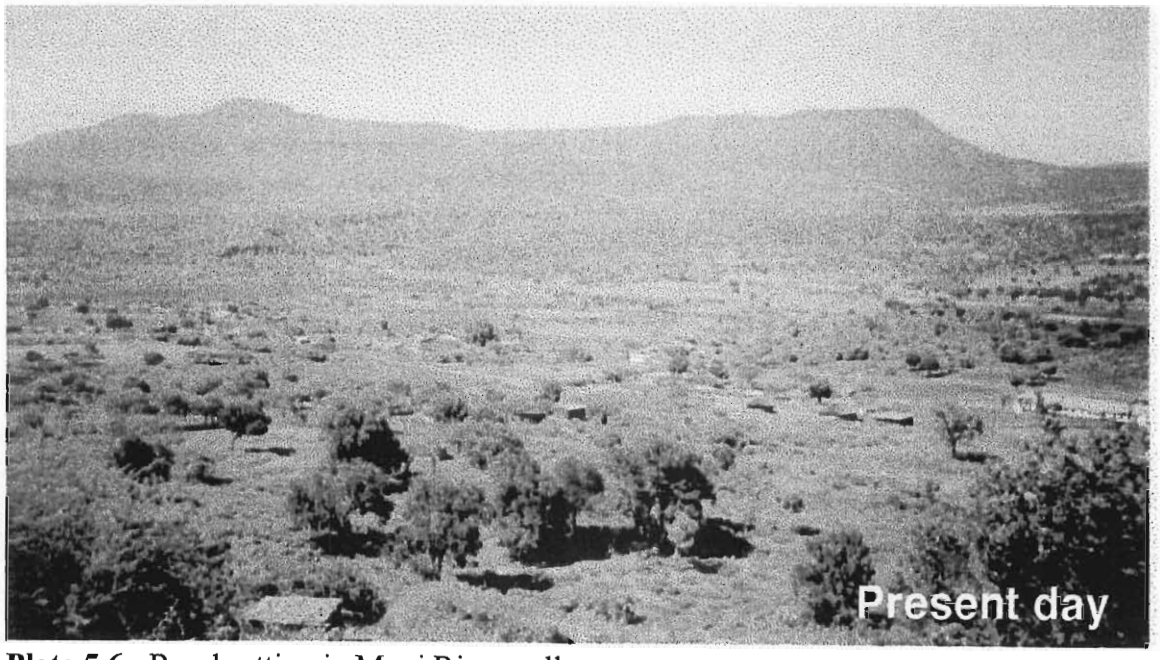


Plate 5.6 - Rural setting in Mooi River valley
North West of Site 1

Site 2

Location: Rural setting in Mooi River valley north west of site 1.

Grid Reference: 28°48'45" S 30°33'50" E

Plate Reference:

Plate 5.5 - 1953 [160]

Plate 5.6 - 1972 [161]

Plate 5.7 - 1996 [162]

Plate 5.8 - Present Day

Plate Observations:

1953 (Plate 5.5 on p67)

Settlement - Individual homesteads are hard to determine, but a few are visible. The amount of visible cultivated land suggests they are there, but spread out.

Settled Cultivation - The fields of settled cultivation dominate this picture within the valley of the Mooi river. The only areas not cultivated are on the steep hilly ground. The fields are small, close to the river and comprise of the alluvial soils. This is indicative of subsistence farming.

Vegetation - Woodland predominates on the steeper ground, but on the valley floor it has been cleared for cultivation. Bands of woodland line the immediate banks of the Mooi river, and there is a significant clump of woodland at the confluence of the small streams coming in from the south east and the Mooi river.

---

[160] Aerial Photograph, Job 330/53, Strip 3, 2603.

[161] Aerial Photograph, Job 685/72, Strip 2, 3170.

[162] Aerial Photograph, Job 985G/96, Strip 12M, 2145.

1972 (Plate 5.6 on p67)

Settlement - Individual *umuzi* are clearly visible in this photograph with a small cleared patch around the individual households. They are again thinly spread out and tend to be located on slightly higher ground just above the valley floor. A new road has been built in the area.

Settled Cultivation - The pattern is much the same as in 1953, although there is some evidence of slight expansion.

Vegetation - There are no significant changes in vegetation. Perhaps this indicates that population levels were in harmony with the environment.

1996 (Plate 5.7 on p68)

Settlement - A greater number of homesteads evident, but mainly located in a linear development along the new road that appeared in the 1972 photograph.

Settled Cultivation - A major change has occurred. The field systems clearly evident in 1953 and 1972 photographs appear not to have been cultivated in 1996. The boundaries of fields are not as clear or as defined as they were before, which could signify that the fields have been left fallow or have been deserted. This change can be clearly seen on the southern bank on the big bend of the Mooi River.

Vegetation - There has been clearance of woodland around the confluence of the two streams on the eastern bank, but overall there has not been a significant change. In fact, there appears to be bush encroachment where previously there had been fields. This encroachment often signifies a decrease in the productivity of the land as the fields are either not sustaining crop production, or that unpalatable scrub bush, consisting primarily of *Acacia* species, is taking over pasture

land.[163]

Present Day (Plate 5.8 on p68)

The photograph shows the linear development of settlement along the road. The hillsides remain wooded, but in the river valley itself the tree cover has been heavily denuded. There was significant soil erosion behind the school buildings in the right-hand side of the picture and very little evidence of subsistence agricultural plots to the same extent as there was in 1953 and 1972.

---

[163] Camp, Interview, January,1999.

Site 3

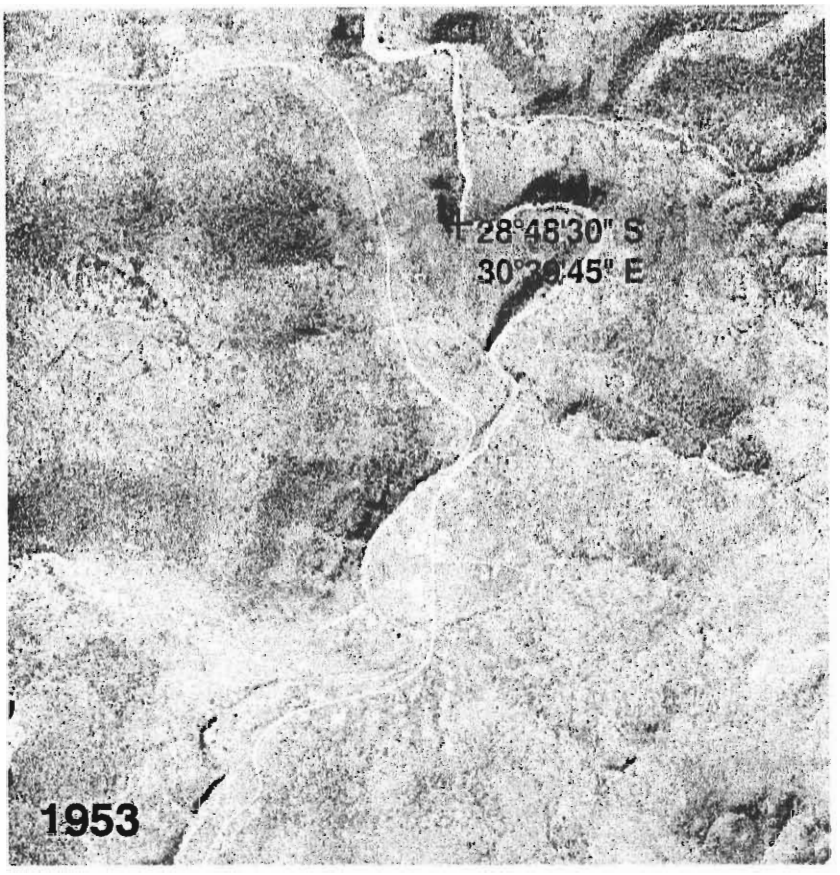


Plate 5.9 - Rural setting in Nadi River Valley directly East of Site 1 - 1953

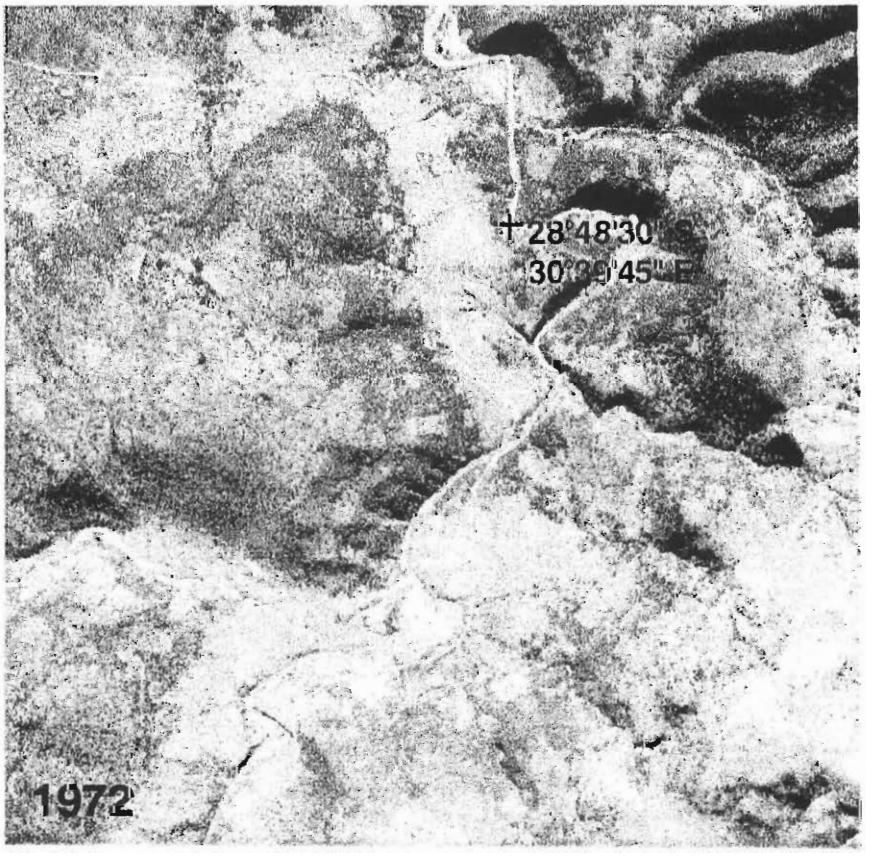


Plate 5.10 - Rural setting in Nadi River valley directly East of Site 1 - 1972

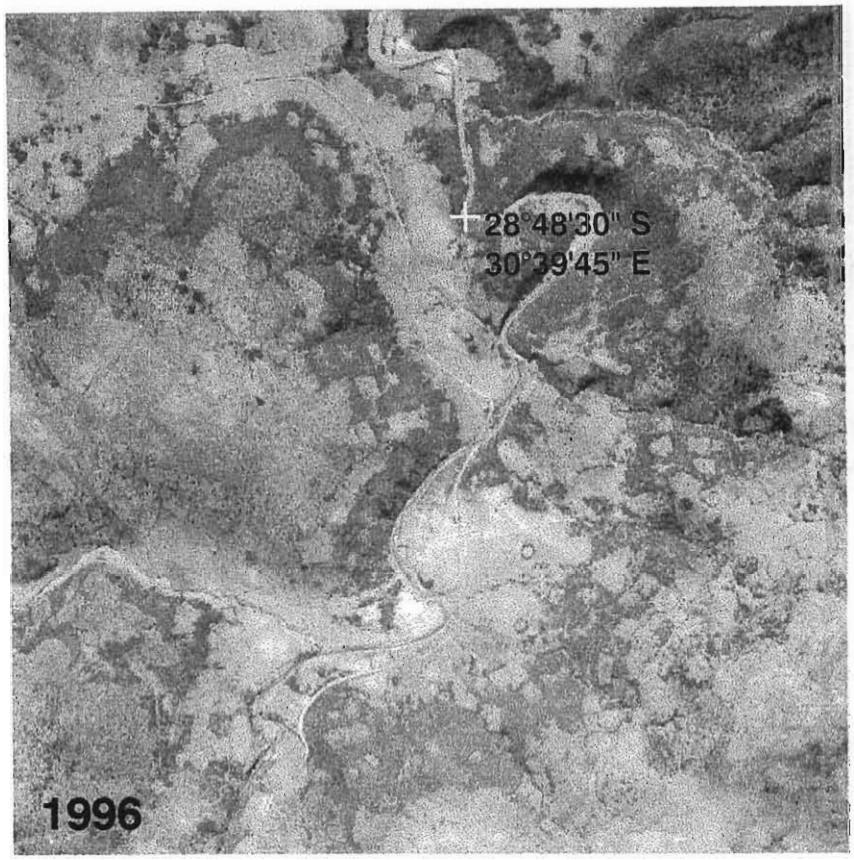


Plate 5.11 - Rural area in Nadi River valley directly east of Site 1 - 1996

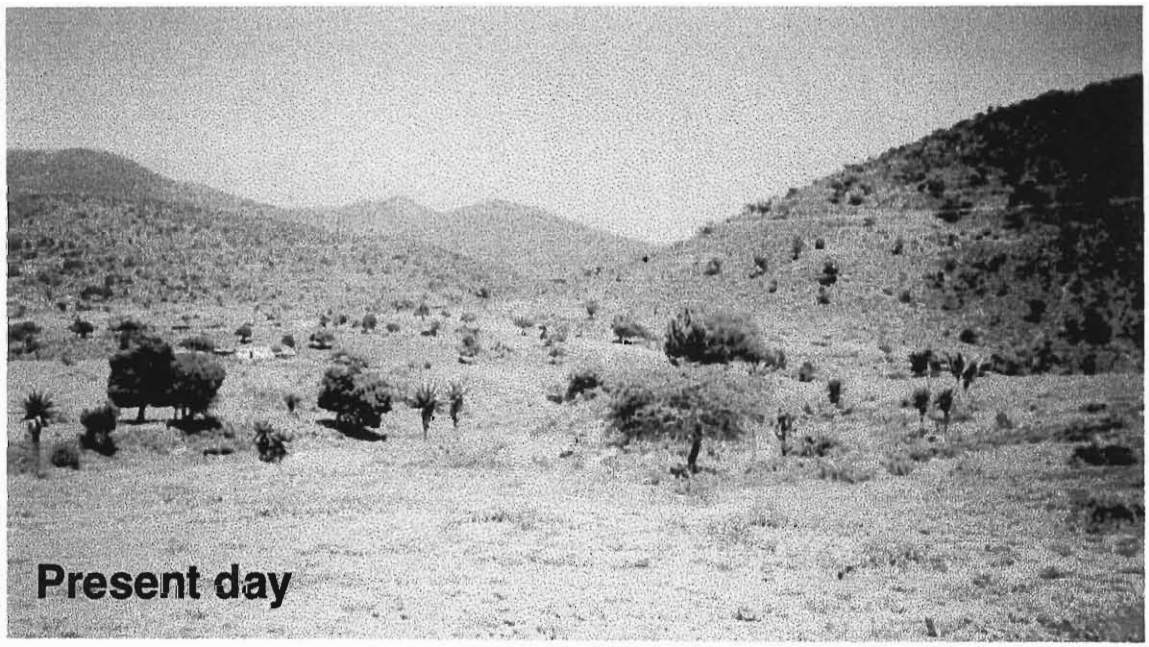


Plate 5.12 - Rural area in Nadi River valley directly east of Site 1

Site 3

Location: Rural area in Nadi River valley directly east of site 1.

Grid Reference: 28°48'30" S. 30°39'45" E

Plate Reference:

Plate 5.9- 1953 [164]

Plate 5.10 - 1972 [165]

Plate 5.11 - 1996 [166]

Plate 5.12 - Present Day

Plate Observations:

1953 (Plate 5.9 on p72)

Settlement - The rural setting is similar to that shown in the 1953 photograph of site 2. Individual homesteads are spread out throughout the valley of the Nadi river.

Settled Cultivation - The small fields of subsistence agriculture can be seen cut into the woodlands of the hill sides of the valley. The fields are not as concentrated as at site 2, but that may be because the valley floor of the Nadi River is very narrow compared to the wider valley bottom of the Mooi River, and therefore does not provide a fertile flat alluvial floodplain.

Vegetation - The woodland cover of this site is greater than any of the previous sites. Dense woodland covers an estimated 20% of the selected area. Cleared patches into this fairly dense woodland have been made by the establishment of fields for settled cultivation. A visit to this location showed the topography of this site to be comprised of very steep valley slopes and this might account for the survival of more trees on this land which was not initially favoured for settled cultivation.

---

[164] Aerial Photograph, Job 330/53, Strip 3, 2607.

[165] Aerial Photograph, Job 685/72, Strip 2, 3166.

[166] Aerial Photograph, Job 985G/96, Strip 12M, 2141.

1972 (Plate 5.10 on p72)

Settlement - Individual homesteads are still sparsely spread out, but they are seen more clearly in this picture along the main road on what is actually a flat piece of ground following the contour between two steep slopes. The flat ground might explain this site preference.

Settled Cultivation - The field pattern remains the same, with little increase in productive areas. In fact, the settled cultivation is clearer in the 1953 photograph. One cannot say for sure whether this means a decline in settled cultivation, but a comparison of the south eastern quarter of the 1953 and 1972 photographs, clearly shows that the field system is not as distinct and many of the fields have been abandoned.

Vegetation Cover - The pattern of woodland remains roughly the same and still covers approximately 20% of the photograph. There does appear to be a slight thinning out of some of the woodland particularly in the south eastern quarter of the photograph. However, the density of woodland on the steep slopes remains the same.

1996 (Plate 5.11 on p73)

Settlement - Like Site 2, the number of settlements has increased significantly and are again located in a linear development on the hillsides along the road.

Settled Cultivation - Settled cultivation of the scale evident in the previous two photographs has virtually disappeared apart from some very small fields next to the settlement along the roads. The prime example of the disappearance of settled cultivation is by comparing the south eastern quarter of this photograph and the 1953 photograph. Where previously there had been fields cut into the woodland, in 1996 there are none. The demise of settled agriculture as a mode of resource use is clear.

Vegetation - The disappearance of woodland at this site over time has been extreme. As already mentioned, a comparison of the south eastern quarter, but especially the north eastern quarter shows that dramatic levels of deforestation have taken place. The negative ecological implications of deforestation in the north eastern quarter of the photograph where the topography of the land is very steep, are immense in terms of erosion and loss of soil cover. Further significant deforestation has also occurred on the hillside that runs parallel to the road in the middle of the photograph.

Present Day (Plate 5.12 on p73)

The ground photograph shows all that has been explained above. The hills in the background are those from the north eastern section of the aerial photographs and show the denudation of what once appeared to have been much denser woodland. The homesteads can be seen dotted along the valley floor and roadside and the vegetation in the valley floor is minimal. Cattle, the basis of the traditional mode of resource use, can be seen grazing on what little grass remains.

Site 4

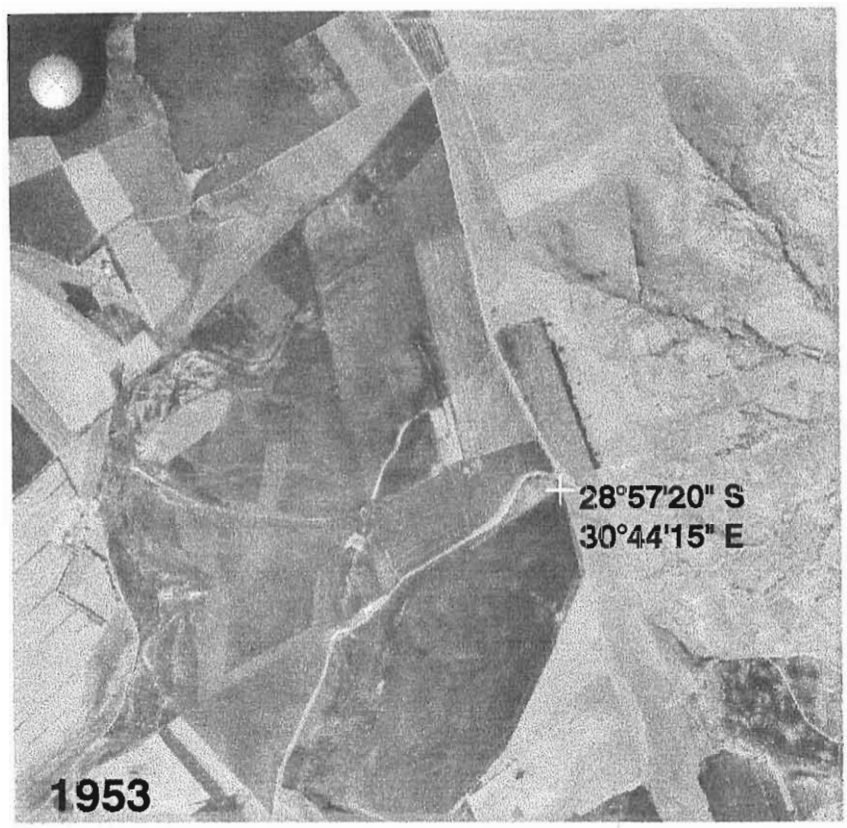


Plate 5.13 - Privately owned land under commercial agriculture - 1953

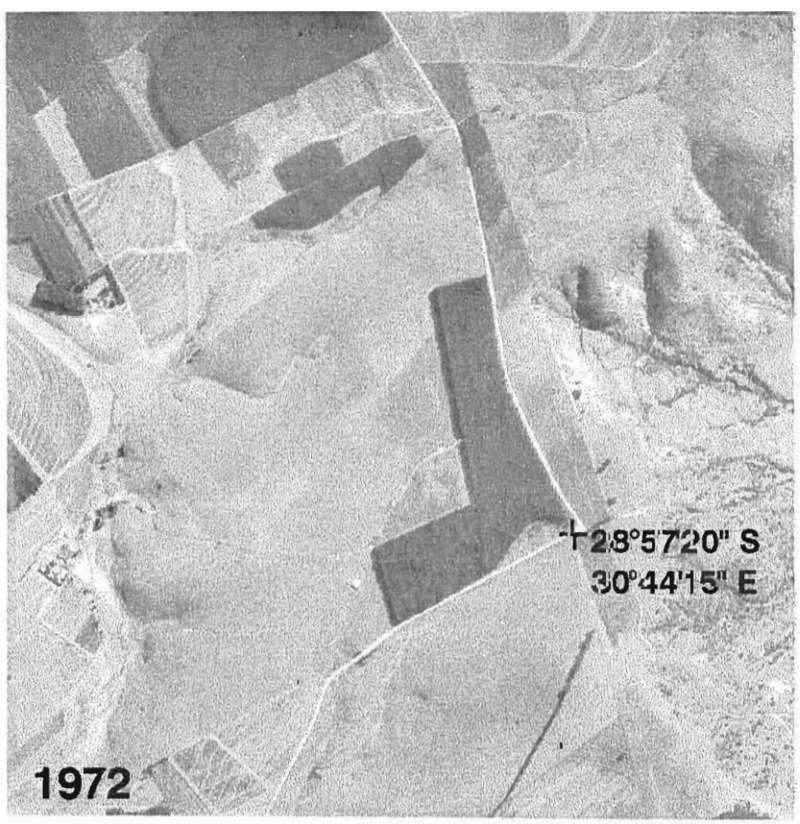


Plate 5.14 - Privately owned land under commercial agriculture - 1972

Plate 5.15 - Privately owned land under commercial agriculture - 1996

Plate 5.16 - Privately owned land under commercial agriculture

Site 4

Location: Privately owned land under commercial agriculture.

Grid Reference: 28°57'20" S
30°44'15" E

Plate Reference:
Plate 5.13 - 1953 [167]
Plate 5.14 - 1972 [168]
Plate 5.15 - 1996 [169]
Plate 5.16 - Present Day

Plate Observations:

1953 (Plate 5.13 on p77)

Settlement - The individual commercial farmers homestead and associated farm buildings can be seen in the middle left of the site. Apart from that, there is little or no evidence of homesteads of a traditional nature.

Settled Cultivation - The fields are obviously much bigger than the settled cultivation of the other sites. It is unclear what is being grown in these fields, but evidence of ploughing undoubtedly done by tractor for such a large size, makes this the hall mark of the commercial industrial mode of resource use.

Vegetation - The natural vegetation in the western half of the picture has been completely removed and replaced by fields to provide for commercial agriculture. The land in the eastern section has not been cultivated and may have been left alone or used for pasture, and as such, may have retained some of its original characteristics.

---

[167] Aerial Photograph, Job 330/53, 2352.

[168] Aerial Photograph, Job 685/72, Strip 5, 3349.

[169] Aerial Photograph, Job 985G/96, Strip 15M, 2004.

1972 (Plate 5.14 on p77)

Settlement - There is the individual commercial farm unit and nothing else.

Agriculture - The introduction of pine trees as a monoculture is very clearly shown in part of the picture. This epitomises industrial or commercial agriculture as forestry is grown for commercial purposes to earn money, and is very different to the subsistence agriculture shown in the other photographs.

Vegetation - The original vegetation has been replaced by an exotic species foreign to this land.

1996 (Plate 5.15 on p78)

Settlement - As in the 1972 photograph, the individual commercial farm unit provides the only evidence of settlement

Agriculture - Pine monoculture has expanded and fields have been enlarged.

Vegetation - Vegetation comprises of pine forest and large field's for cultivated crops. There is very little evidence of indigenous woodland.

Present Day (Plate 5.16 on p78)

The photograph shows the very same patch of pine forest at the Karkloof turn off that first appeared in the 1972 aerial photograph. The sign in the picture shows that the land is privately owned by a major South African commercial timber company. This commercial agriculture promotes the use of a mono-culture of exotic trees that have replaced the indigenous vegetation of the area. A visit to the study area showed no evidence of settlement other than the main farm unit.

Interpretation of Sites 1 - 4.

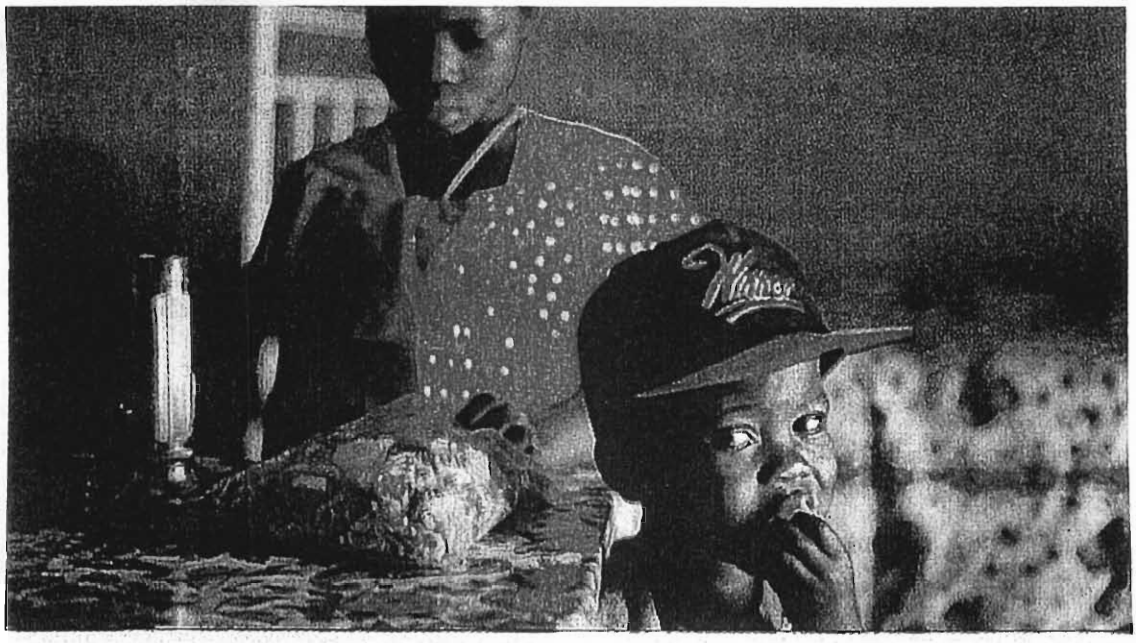
The aerial photographs can be used to illustrate the impact of an ecological revolution. I argue that an incomplete ecological revolution between the settled cultivation mode of resource use, and the industrial mode of resource use, has occurred at sites 1, 2 and 3. In comparison, a complete ecological revolution has occurred at site 4.

Plates 5.13 to 5.16 (p77 and 78) from site 4, illustrate that a complete ecological revolution has occurred here. A major change can be seen at all three levels of mode of resource use, reproduction and ecology. In terms of mode of resource use, the aerial photographs showed no evidence of any settled cultivation, as it has been replaced by commercial agriculture within the industrial mode of resource use. In terms of reproduction, the aerial photographs showed no individual *umuzi*, the basis of African biological and social reproduction, but the single farm unit of a commercialised homestead. And finally, in terms of ecology, the change has been dramatic. This site lies within the bio-resource unit Wxc7 of the moist midlands belt, and as such should have indigenous indicator species such as *Aristida junciformis*, *Acacia mearnsii*, *Rubis cuneifolia* and *Solanum mauritianum*[170], but as the photographs show, the vegetation has been completely replaced by commercial monocultures of maize and pine. Therefore, a complete ecological revolution has occurred at this site.

In comparison, sites 1, 2, and 3 are caught in the midst of an incomplete ecological revolution in which the industrial and settled cultivation modes of resource use compete side by side. This balance is maintained by a reliance on both migrant labour and the remains of settled cultivation. Plates 5.1 to 5.12 show the decline of the settled cultivation mode of resource use and an increase in settlement at sites 1, 2 and 3. The dramatic decrease in the number of fields meant that subsistence agriculture could no longer fully maintain the reproduction of Keate's Drift society alone. This decline of the traditional mode of resource use meant that a reliance on migrant labour was required to sustain reproduction. This is also shown by an increase in settlement, especially the urbanisation at site 1, and the linear development of homesteads along the roads in sites 2 and 3. A conglomeration of settlement indicates that the settled cultivation mode of resource use was

---

[170] Camp, Bioresource Units, Map RHFA.



For children, it's also a special time. Their fathers, rather than Father Christmas, bring the gifts

Plate 5.17: A boy receives a base ball cap, the epitome of the industrial mode of resource use, from his migrant father. (Source: The Sunday Independent, January 4, 1998, p6).

Dancing is central to Christmas day celebrations. Among those who gather in a circle around the dancers are the married women, resplendent in their brightly coloured isicholo, decorated with tinsel

Plate 5.18: Traditional dress associated to the settled cultivation mode of resource use is still maintained in many cases. (Source: The Sunday Independent, January 4, 1998, p6).

abandoned by many households in favour of remittances from migrant labour. This reliance on migrant labour means that Keate's Drift society suffers from the rural impoverishment suggested in the Wilson argument.

As such, Keate's Drift society is reliant on the industrial mode of resource use due to the demise of settled cultivation. However, the traditional mode of resource use does still survive, albeit in a very eroded form, and so the change in reliance on modes of resource use is only a partial fulfilment of the requirements for a complete ecological revolution. Therefore, the maintenance of day to day reproduction still relies on two modes of resource use.

In addition, the social reproduction of African society in Keate's Drift has not changed completely, but has been maintained within the roots of traditionalism. This balance between modes is shown by the contrast between the picture of a boy in Plate 5.17 (p82), receiving items associated with the industrial mode of resource use, such as the torch and baseball cap from his migrant father, and the picture of women still wearing their traditional Zulu garments in Plate 5.18 (p82). This form of traditionalism is maintained despite the reliance on migrant labour, and this is well recorded in an article on Keate's Drift at Christmas by T. J. Lemon.[171]

Lemon comments on the fact that traditional gatherings to celebrate weddings, mourn the dead and attend coming of age ceremonies, all occur around the Christmas period, because this is the only time when the whole community is present. Men return from working in the industrial mode of resource use to the traditions and customs associated with the settled cultivation mode of resource use. So although traditional customs are maintained, it is subject to when the industrial mode of resource use allows the full community to gather, and so contributes to the idea of an incomplete ecological revolution.

The changes in the ecology of the area have also been incomplete. The land on which these

---

[171] T. Lemon, 'Christmas is special for migrant workers-it's a time to get together at home: We accompany Siyasi Zulu from a hostel in Soweto to Keate's Drift - and leave the Christmas trees behind', The Sunday Independent, January 4, 1998, p6.

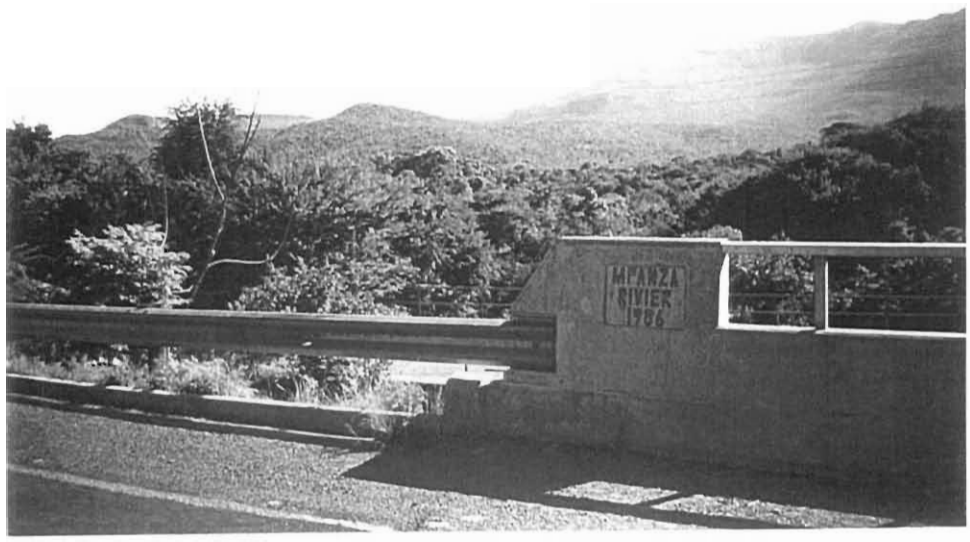


Plate 5.19: A view of the vegetation Duiker Hoek; one of the farms to be resettled. It lies within bioresource unit Sb1.

Plate 5.20: A view of the vegetation at the boundary of Duiker Hoek and the Impafana Reserve on the way to Keate's Drift. This area lies in the same bioresource unit as Plate 5.19.

Plate 5.21: These women travel 10 kms from the Impafana Reserve to Duiker Hoek to collect wood.

people subsist has been degraded rather than changed because of over-cultivation and over-grazing arising out of population pressure. This is shown clearly by comparing the vegetation in Plates 5.19 and 5.20 (p84).

Plate 5.19 provided a view of the vegetation on Duiker Hoek, one of the farms allocated for resettlement. Plate 5.20 provided a view of the vegetation on the boundary between Duiker Hoek and the former Impafana Reserve on the main road to Keate's Drift from Greytown. Both areas lie within the same bioresource unit Sb1. As such they both belong to the Tugela-Mooi valley bushveld and should have the indicator species of *Acacia karoo*, *Acacia nilotica*, *Acacia tortilis*, *Boscia abitrunca* and *Olea europea* subsp. *africana* present.[172] However, as Plates 5.19 and 5.20 show, the vegetation cover on the former reserve has been heavily denuded in comparison to the vegetation that has been preserved by private ownership. Despite the denudation, the indicator species for this bioresource group are still present in this area and so, unlike site 4, this area near site 1 has not undergone a major change in ecology.

This denudation of vegetation has been caused by population pressure on resources and is illustrated in the aerial photographs of sites 1, 2 and 3.[173] The need for fire wood and timber for building by an increasing number of households is directly related to the rapid deforestation at sites 1, 2 and 3. The shortage of the firewood resource is further illustrated in Plate 5.21 (p84) where these women have to walk into Duiker Hoek farm from the reserve to find a sufficient wood supply.

This shortage of resources, population pressure, and a reliance on migrant labour in Keate's Drift has also been associated with faction fighting. This violence is illustrated in Lemon's article where Siyusu Zulu of Keate's Drift states that Fehlakhe's brother Musi was killed here in George

---

[172] Camp, Bioresource Units.

[173] Aerial photographs: Site 1 - p62 and 63; Site 2 - p67 and 68; Site 3 - p72 and 73.

Goch when we were fighting with the people across the river.[174]

This violence, according to Wilson's argument, is directly related to the problems associated with migrant labour, as is the rural impoverishment of this area. Therefore, the development proposals for the resettlement of these farms must consider the historical origins of these problems in order to avert them in the future.

Conclusion

The aerial photographs prove that Keate's Drift is typical of an impoverished rural society, in accordance with Wilson's argument, because of its reliance on migrant labour to sustain reproduction. The photographs, when related to the methodology of this thesis, show that the study area is in the midst of an incomplete ecological revolution between the settled cultivation mode of resource use and the industrial mode. As Wilson argues, this situation has been determined by a history of legislative measures that has restricted and segregated the African population into areas like Keate's Drift over the past 100 years. Therefore, an understanding of the history that sets in place the reliance on migrant labour, must be understood by developers if they are to deconstruct the social scaffolding hanging over since the colonial period, and reconstruct a society based on long term sustainability.

---

[174] Lemon, 'Christmas in Keate's Drift' P6.

Conclusion

This thesis has shown that a complete ecological revolution occurred in the Keate's Drift area between the Stone and Iron Ages as a result of a complete change in the mode of resource use, human reproduction, human consciousness and ecology in the area. The colonial period saw the beginnings of an incomplete ecological revolution between the industrial and settled cultivation modes of resource use. The colonial government restricted full involvement in the industrial mode of resource use of most of the African population by segregating them on reserves, where they continued to practice settled cultivation, to maintain their social reproduction through indirect rule, and by forcing them onto restricted land, to initiate degradation rather than change in their local ecology. This degradation of the ecology, the very basis of the settled cultivation mode of resource use, reinforced a dependence on migrant labour to bolster reproduction. This dependence had begun with the need to earn cash to pay various taxes.

Chapter Five shows that the twentieth century inherited and maintained the incomplete ecological revolution of the colonial period that led to further degradation of the local ecology, the unsustainable use of resources, the continued reliance on migrant labour, and the general maintenance of rural impoverishment in the Keate's Drift area.

The implications of this situation in terms of the resettlement of 500 families from the Zondi community onto the six farms, is that there is a great danger of perpetuating these problems by simply "dumping" members of this community onto the land, as happened under previous governments before 1994. It must be realised that it is not enough to redistribute land, because simple redistribution does not solve the problems of an incomplete ecological revolution. It is the task of planners to avoid this situation. For example, this thesis shows that migrant labour will continue to be an important factor in the day to day reproduction of Keate's Drift society even though it is undesirable and leads to rural impoverishment. However, it must be understood that the reliance on migrant labour cannot be fully eradicated in the short term because the deteriorated settled cultivation mode of resource use, the only other form of production in the area, cannot sustain the reproduction of such a large population on its own . Instead, the planners must try and

reduce the dependence in the long term through imaginative and innovative planning.

Planners must take into account that the society of Keate's Drift is caught between two modes of resource use, one modern and one which is deeply traditional. Effective planning must take this dichotomy into account. What the evidence in this thesis shows, is that the resettlement of 500 families of the Zondi community requires something more than simply supplying land. What is needed, is informed planning that will help the community to complete the journey to modernity.

---

[179] Sharon Hammond, 'Projects battle without support', Reconstruct Section, The Sunday Independent, January 17th, 1999, p1.

[180] Ibid, p1

Bibliography

1) Official Sources

i) Official Unpublished Sources

Unpublished evidence given by Professor Francis Wilson to the Commission of Inquiry into Safety and Health in the Mining Industry, Volume 8, (Department of Mineral and Energy Affairs, Pretoria, 1 August 1994), pp703 to 760.

Unpublished evidence given by Professor Francis Wilson to the Commission of Inquiry into Safety and Health in the Mining Industry, Volume 9, (Department of Mineral and Energy Affairs, Pretoria, 1 August 1994), pp 761 to 855.

Consultant's Brief in Acting Provincial Director, Department of Land Affairs, to Setplan Metroplan Association, Richards Bay, 20 April 1998

ii) Aerial Photographs

The Surveyor General, Mowbray, Cape Town.

Job 985G/96 1:30 000 Contacts:

Strip 11E; 2993, 2795, 2797, 2799, 2801, 2803
Strip 12M; 2139, 2141, 2143, 2145,2147
Strip 13M; 2114, 2116, 2118, 2120, 2122
Strip 14M; 2027, 2029, 2031, 2033, 2035
Strip 15M; 1994, 1996, 1998, 2000, 2002 2004.

Job 685/72 I:36 000 Contacts

Strip 1; 3060, 3062, 3064, 3066, 3068
Strip 2; 3164, 3166, 3168, 3170, 3172
Strip 3; 3109, 3111, 3113, 3115, 3117
Strip 4; 3486, 3488, 3490, 3492, 3494
Strip 5; 3341, 3343, 3345, 3347, 3349.

Job 330/53 I: 36 000 Contacts

Strip 2; 3237,.3239, 3241, 3243, 3245, 3247

Strip 3; 2601, 2603, 2605, 2607, 2609, 2611
Strip 4; 2412, 2414, 2416, 2418, 2420, 2422
Strip 5; 2377, 2379, 2381, 2383, 2385, 2387
Strip 6; 2352, 2354, 2356, 2358, 2360, 2362
Strip 7; 2308, 2310, 2312, 2314, 2316, 2318.

2. Unofficial Sources

i) Printed Books

J. P. H Acocks, Veld Types of South Africa. (Memoirs of the Botanical Survey of South Africa, No 57, Botanical Research Institute, Department of Agriculture and Water Supply, South Africa, 1988).

C. Cable, Economy and Technology in the Late Stone Age of Southern Natal, (British Archaeological Review, International Series 201, Oxford, England, 1984).

K. Camp, Valley Bushveld of KwaZulu-Natal - Natural Resources and Management (KwaZulu-Natal Department of Agriculture, Cedara Report N/A/95/2, National Department of Agriculture, Pretoria, 1995).

K. Camp, The Bioresource Units of KwaZulu-Natal, (Cedara Report NoN/A/95/32, October, 1998).

A. J. Christopher, The Crown Lands of British South Africa, 1853-1914, (Limestone Press, Ontario, Canada, 1984).

S. Dovers, Australian Environmental History Essays and Cases, (Oxford University Press, Oxford, 1994).

D. Edwards, A Plant Ecological Survey of the Tugela River Basin, (Natal Town and Regional Planning Reports, Botanical Survey of South Africa Survey; No 36, Town and Regional Planning Commision, Natal, 1967), Vol. 10.

M. Gadgil and R. Guha, This Fissured Land - An Ecological History of India. (Oxford University Press, Delhi, 1992).

M. Hall, Settlement Patterns in the Iron Age of Zululand: An ecological interpretation, (British Archaeological Reports, Oxford, England, 1981). P139 - 172.

M. Hall, The Changing Past: Farmers, Kings and Traders in Southern Africa, 200 - 1860, (David Phillip, Cape Town, 1987).

S. H. Haughton, Geological History of Southern Africa. (The Geological Society of South Africa, Johannesburg, 1969).

J. Lambert, Betrayed Trust: Africans and the State in Colonial Natal, (University of Natal Press, Pietermaritzburg, 1995).

B. Low and G. Robelo, Vegetation of South Africa, Lesotho and Swaziland: A companion to the Vegetation Map of South Africa, Lesotho and Swaziland, (Department of Environmental Affairs and Tourism, Pretoria, 1996).

C. Merchant, Ecological Revolutions: Nature, Gender, and Science in New England. (The University of North Carolina Press, Chapel Hill, 1989).

J. Phillips, The agricultural and related development of the Tugela basin and its influent surrounds: a study in sub-tropical Africa, Natal Town and Regional Planning Report; Vol 19 (Town and Regional Planning Commision, Natal, 1973).

Leonard Thompson, African Societies in Southern Africa. (Heinemann, London, 1969).

J. F. Truswell, An Introduction to the Historical Geology of South Africa, (Purnell, Cape Town, 1970).

J. F. Truswell, The Geological Evolution of South Africa, (Purnell, Cape Town, 1977).

D. Welsh, The Roots of Segregation: Native Policy in Colonial Natal, 1845-1910, (Oxford University Press, cape Town, 1971).

W. Williams, South Africa's War against Capitalism, (Praeger, New York, 1989).

Donald Worster, ed, The Ends of the Earth: Perspectives in Modern Environmental History, (Cambridge University Press, Cambridge, 1988).

J. J. Van der Eyk, Soils of the Tugela Basin: A Study in Sub-Tropical Africa, (Natal Town and Regional Planning Reports, Town and Regional planning Commission, Natal, 1969), Vol 15.

ii) Journal Articles

William Cronon, 'The uses of Environmental History', Environmental History Review, (Fall, 1993), pp 1 - 20.

William Cronon, 'A Place for Stories: Nature, History and Narrative', Journal of American History, Vol 78, Part 1, (March, 1992), pp 1347 - 1376.

Alfred Crosby, 'The Past and Present of Environmental History', American Historical Review, (October, 1995), pp 1177 - 1189.

Stephen Dovers, 'Pragmatic Environmental History; A note from Australia', Environmental History Review, Vol 18, No 3, (Fall, 1994), pp 21 - 33.

Richard White, 'Environmental History, Ecology and Meaning', Journal of American History, Vol 78, Part 1, (March, 1992), pp 1111 - 1116.

Donald Worster, 'Transformations of the Earth: Toward an Agroecological Perspective in History', Journal of American History, Vol 76, No 4, (March, 1990), pp 1087 - 1106.

Donald Worster, 'The Two Cultures Revisited: Environmental History and the Environmental Sciences', Environment and History, Vol 2, (1996), pp 3 - 13.

iii) Articles or chapters in a compositely produced book

A. Ballard, 'The complex nature of agriculture in Colonial Natal: 1860 to 1909' in Enterprise and Exploitation in a Victorian Colony: Aspects of the Economic and Social History of Colonial Natal, ed. Bill Guest, (University of Natal Press, Pietermaritzburg, 1985), p121 - 143.

H. Bradford, 'Lynch Law and Labourers: The ICU in Umvoti, 1927-1928' in Putting a plough to the ground: Accumulation and Dispossession in Rural South Africa, 1850 to 1930, ed. William Beinhart (Ravan Press, Johannesburg, 1986), p 420 - 443.

David Coplan, 'The emergence of an African working class culture' in Industrialisation and Social Change in South Africa: African class formation, culture and consciousness !870-1930, ed. Shula Marks, (Longman, London, 1982), p358-378.

Jeff. Guy, 'The Destruction and Reconstruction of Zulu Society' in Industrialisation and Social Change in South Africa: African class formation, culture and consciousness !870-1930, ed. Shula Marks, (Longman, London, 1982), p167-190.

M. Hall, 'Man's Historical and Traditional use of fire in Southern Africa' in Ecological Effects of Fire in South African Ecosystems, ed. P de V Booysen and N. M. Tainton, (Springer Verlag, Berlin, 1984), p39-52.

J. Lambert, 'The Impoverishment of the Natal Peasantry, 1893-1910' in Enterprise and Exploitation in a Victorian Colony: Aspects of the Economic and Social History of Colonial Natal, ed. Bill Guest, (University of Natal Press, Pietermaritzburg, 1985).

T. Maggs, 'The Iron Age Farming Communities' in Natal and Zululand from earliest times to 1910: A new history, ed. A. Duminy and B. Guest, (University of Natal Press, Pietermaritzburg, 1989), p28-48.

A. Mazel, 'The Stone Age Peoples of Natal', in Natal and Zululand from earliest times to 1910: A new history, ed. A. Duminy and B. Guest (University of Natal Press, Pietermaritzburg, 1989), p1-27.

iv) Unpublished theses, seminar papers, etc

D. Gautier, 'Prudence and Profligacy : The Dialectic of Ecology and Humanity in the Underberg District in an Historical Context' (unpublished Bachelor of Arts Honours Thesis, University of Natal, 1944).

G. Thompson, 'The Eastern Shores of St. Lucia: towards an environmental history, 1950-1996' (Unpublished Masters Thesis, University of Natal, 1998).

V. von Brunn, 'Geology of the Muden/ Tugela ferry Area'. (Department of Geology, university of Natal, Pietermaritzburg, 1998).

v) Lectures, notes and papers

S. Hammond, 'Some land reform projects resemble dumping grounds', Reconstruct Section, The Sunday Independent, January 17th, 1999, p1-2.

S. Hammond, 'Projects battle without support', Reconstruct Section, The Sunday Independent, January 17th, 1999, p1-2.

T. Lemon, 'Christmas is special for migrant workers-it's a time to get together at home: We accompany Siyasi Zulu from a hostel in Soweto to Keates Drift-and leave the Christmas trees behind', The Sunday Independent, January 4 1998.

F. Wilson, 'An economic history of migrancy and rural impoverishment within Soiuth Africa'. A lecture prepared for the School of Environment and Development, University of Natal, Pietermaritzburg. January, 1999.

vi) Oral Sources

T. Boddington - Series of interviews in relation to interpretation of aerial photographs, January 1999.

K. Camp - Interview in relation to interpretation of aerial photographs, January 1999.

7) Maps

South Africa, 1: 50 000 Sheet, 2830 DC NADI.