

imifino yasendle, imifino isiZulu

The ethnobotany, historical ecology and nutrition
of traditional vegetables in KwaZulu-Natal

University of Cape Town

Dissertation submitted in partial fulfillment of the requirements of Master of Arts in Social Anthropology, Department of Social Anthropology, University of Cape Town

Landon Myer

21 June 1999

The copyright of this thesis vests in the author. No quotation from it or information derived from it is to be published without full acknowledgement of the source. The thesis is to be used for private study or non-commercial research purposes only.

Published by the University of Cape Town (UCT) in terms of the non-exclusive license granted to UCT by the author.

Table of Contents

1.0	Executive summary	1
2.0	Introduction	2
2.1	Aim and research questions	3
2.2	Terminologies	4
2.3	Structure of this work	5
3.0	Literature review	6
3.1	Human-plant interactions	6
3.2	Traditional vegetables in agricultural research	7
3.3	Social differentiation the knowledge and use of traditional vegetables	8
3.4	The values of traditional vegetables	10
3.5	Conclusion	12
4.0	Methods	13
4.1	Rapid assessment techniques	13
4.2	Ecological techniques	14
4.3	Historical techniques	15
4.4	Nutritional assessment techniques	15
4.5	Analysis	16
4.6	Reflections on methodology	16
5.0	Contexts	17
5.1	Forced relocations in KwaZulu and Natal	18
5.1.1	Impacts of the homeland system	19
5.2	Study site	20
5.2.1	Household demographics and origins	21
5.2.2	Local economy	22
5.2.3	Local subsistence	23
5.3	Conclusion	24
6.0	Ethnobotanical and social perspectives on <i>imifino</i>	25
6.1	Definitions of <i>imifino</i>	26
6.2	Knowledge of <i>imifino</i>	26
6.3	Classification of species	29
6.4	Collection	30
6.5	Storage	31
6.6	Marketing	31
6.7	Medicinal values	32
6.8	Communication of <i>imifino</i> knowledge	32
6.9	Social values associated with <i>imifino</i>	33
6.10	Conclusion	34
7.0	Ecology of <i>imifino</i> in the local past	35
7.1	Habitats	36
7.2	Availability	37
7.3	Seasonality	38
7.4	Access	38
7.5	Changing landscapes	40
7.6	Discussion	42
7.6.1	Resettlement	43
7.6.2	Changing land use	44
7.7	Conclusion	45
8.0	<i>Imifino</i> in food and nutrition	46
8.1	Meals	47
8.2	Foods eaten	47
8.3	<i>Imifino</i> consumption	49
8.4	Preparation	50
8.5	Perceptions of nutrition	51
8.6	Preferences in taste	51
8.7	Micronutrient malnutrition in South Africa	53
8.7.1	Factors influencing malnutrition	54
8.8	<i>Imifino</i> and nutrition	55

Table of Contents

1.0	Executive summary	1
2.0	Introduction	2
2.1	Aim and research questions	3
2.2	Terminologies	4
2.3	Structure of this work	5
3.0	Literature review	6
3.1	Human-plant interactions	6
3.2	Traditional vegetables in agricultural research	7
3.3	Social differentiation the knowledge and use of traditional vegetables	8
3.4	The values of traditional vegetables	10
3.5	Conclusion	12
4.0	Methods	13
4.1	Rapid assessment techniques	13
4.2	Ecological techniques	14
4.3	Historical techniques	15
4.4	Nutritional assessment techniques	15
4.5	Analysis	16
4.6	Reflections on methodology	16
5.0	Contexts	17
5.1	Forced relocations in KwaZulu and Natal	18
5.1.1	Impacts of the homeland system	19
5.2	Study site	20
5.2.1	Household demographics and origins	21
5.2.2	Local economy	22
5.2.3	Local subsistence	23
5.3	Conclusion	24
6.0	Ethnobotanical and social perspectives on <i>imifino</i>	25
6.1	Definitions of <i>imifino</i>	26
6.2	Knowledge of <i>imifino</i>	26
6.3	Classification of species	29
6.4	Collection	30
6.5	Storage	31
6.6	Marketing	31
6.7	Medicinal values	32
6.8	Communication of <i>imifino</i> knowledge	32
6.9	Social values associated with <i>imifino</i>	33
6.10	Conclusion	34
7.0	Ecology of <i>imifino</i> in the local past	35
7.1	Habitats	36
7.2	Availability	37
7.3	Seasonality	38
7.4	Access	38
7.5	Changing landscapes	40
7.6	Discussion	42
7.6.1	Resettlement	43
7.6.2	Changing land use	44
7.7	Conclusion	45
8.0	<i>Imifino</i> in food and nutrition	46
8.1	Meals	47
8.2	Foods eaten	47
8.3	<i>Imifino</i> consumption	49
8.4	Preparation	50
8.5	Perceptions of nutrition	51
8.6	Preferences in taste	51
8.7	Micronutrient malnutrition in South Africa	53
8.7.1	Factors influencing malnutrition	54
8.8	<i>Imifino</i> and nutrition	55

1.0 Executive summary

Traditional wild or weedy leafy green vegetables are an important food source in many parts of Africa, and there have been several recent calls across the continent for interventions promoting the use of these resources for their nutritional values. In South Africa relatively little research attention has been paid to traditional vegetables, known in Zulu as *imifino*. However it is widely thought that these plants are falling into disuse as food preferences change and exotic vegetables such as spinach or cabbage become more commonly available.

This report aims to provide basic understandings to inform the promotion of traditional vegetables in South Africa by exploring their ethnobotanical, ecological and nutritional dynamics. Interdisciplinary methods incorporating anthropology, ecology, nutrition and history are required to present holistic insights into the processes of *imifino* use and disuse. These techniques are focused on the community of Nkonisa, a forced relocation settlement in rural KwaZulu-Natal.

A total of 36 *imifino* species are known across Nkonisa. Most participants know only a core group of 4-6 species which are locally available and are used frequently within the households. When seasonally available, these plants are harvested by women or children and occasionally sold in local markets. There also is a scattered body of knowledge of lesser known species which are rarely used. Many of these can not be recognised in the field by most participants and are generally thought to be locally unavailable.

The knowledge and use of *imifino* are closely correlated. Knowledge of the core body *imifino* is taught to children at a young age. Only later in life are more obscure species learned about through conversations with individuals particularly knowledgeable in *imifino*. Increasingly the process of communication from old to young is being interrupted, most notably by changing social values which often favour 'modern' foods including cultivated exotic vegetables. These interruptions in the transfer of knowledge between generations is likely to contribute to the increasing disuse of traditional vegetables, as many participants come to view *imifino* as the foods of poverty.

Changing land use patterns over the past 60 years, including commercial plantation agriculture and dense modern settlements, have led to severe disturbances of the local environment. The area of contemporary Nkonisa has changed from a sparsely inhabited and relatively undisturbed landscapes to a densely populated village characterised by heavily disturbed ecological conditions. These changes have reduced the 'wild' habitats in which many types of *imifino* live, and are likely to have contributed to an overall reduction in the availability of species. However certain kinds of *imifino* thrive in disturbed microenvironments, and these species have benefited from changing ecological conditions. For the most part, these are also the species which comprise the core group of *imifino* knowledge.

Imifino have the potential to make important nutritional contributions to local diets. Most participants reported eating traditional vegetables twice a week during the summer. At other times of the year *imifino* consumption is greatly reduced as exotic vegetables such as spinach or cabbage play a greater part in household subsistence. Most types of traditional vegetables contain high levels of micronutrients, including iron and vitamin A. The nutrient levels of many *imifino* species can make direct contributions to the diets of individuals at risk of micronutrient malnutrition, most notably children and women of childbearing age.

Interventions to promote the use of *imifino* should seek to address the factors which lead to the disuse of traditional vegetables. These factors include the loss of knowledge of traditional vegetables and the ability to recognise species, an increased reliance on exotic vegetables from markets, the disturbed local ecological conditions, and the historical relocations of households between biomes. Market-based initiatives and educational programmes each present relatively short-term and low-cost interventions which have potential for local application to enhance the use of traditional vegetables.

2.0 Introduction

...kasi va hi tisela ku ta love ka ndzawu leyi
Na xixevo a ha ha toti ka ndzwao leyi
Milomo yi herile hi magidipo ya makhavichi
Va hi susile kaya ka kahletiko leri hi hlopekile
Mayana kaya ka Makuleke ahi hlayiseka hi tsakile¹

...and here they have brought us to perish in this place
We get no relish here
Our lips are parched from the malnutrition of cabbages
They have taken us away from a lovely country
In this country we have suffered
We wish for our home at Makuleke where we were safe and happy

Across Africa and around the world, wild or weedy plants make important contributions to human subsistence. One particularly important but poorly understood category of wild plant foods are the leaves of herbaceous plants commonly consumed as vegetables. These foods play a variety of roles in human diets as garnishes, relishes, side dishes or staple foods.

Over the past decade, researchers and scientists working with rural agrarian communities have begun to recognise the diverse values of leafy green vegetables. These resources often make important contributions to human diets through their high content of certain micronutrients, particularly in areas of poverty and food insecurity. Many of these plants are an important element of local biodiversity and ecosystem health. Within villages and households, leafy green vegetables often have unique social and nutritional roles for commonly marginalised groups, such as women, children or the elderly. In addition these plants are sometimes collected and sold by informal traders, and can be found in markets of all size, from small towns to urban centres. Based on this some researchers have suggested that wild or weedy leafy green vegetables may have potential as part of income-generation schemes in expanded local and regional marketing (Guarino 1997).

These resources are well known in many parts of South Africa. Among Sesotho speakers wild or weedy leafy green vegetables are called *meroho*, and among Zulu speakers they are commonly referred to as *imifino*. However there are indications that these plants are rapidly falling into disuse across the country. The reasons underlying this decline are diverse and complex. Changing climatic conditions and the increasing disturbance of indigenous plant environments reduces the availability of many plants (Shackleton, et. al. 1998). At the same time, social changes in preferred foods have contributed to a decline in the popularity of leafy green vegetables. The wide extent of market systems have helped to make exotic cultivated vegetables like spinach and cabbage available at relatively low cost in even the most isolated rural areas.

Researchers working with leafy green vegetables in sub-Saharan Africa are gradually turning their attention to the ways in which the use of these resources can be promoted for their potential nutritional and economic benefits. In South Africa these efforts have been limited largely to germplasm conservation and plant breeding aimed at the agronomic improvement of leafy green vegetables (Van den Heever 1997). Although such activities may make important contributions over the long-term, given the apparently rapid decline in the use of leafy green vegetables, there is a clear need for more direct short-term activities.

One such short-term activity is the promotion of leafy green vegetables among local

¹ This song is from the Makuleke, a group of Xitsonga speakers who were forcibly removed from their homes during the late 1960s to the homeland area of Gazankulu as part of the spatial planning around Kruger National Park (from Harries 1987).

communities. Despite a well-developed agricultural extension system, activities promoting wild or weedy leafy green vegetables are generally unheard of in South Africa. There are successful examples of this approach in other countries, most notably Botswana (Madisa and Tshamekang 1997) and Kenya (Opole and Kiambi 1993). These activities use regional agricultural extension, farmers' networks or local media to reintroduce leafy green vegetables where they have fallen out of use, as well as to enhance their use in areas where they are still maintained. The success of these efforts is based on their applicability to the local socio-cultural and economic contexts of leafy green vegetable use and disuse.

In its most general form, this research provides a first step towards leafy green vegetable promotion in South Africa by contributing contextual insights into the use of these resources as well as the reasons for their growing disuse. It stems from the idea that any intervention to encourage the use of wild or weedy leafy green vegetables must be rooted in close understandings of the complex processes which underlie changing plant use.

2.1 Aim and research questions

This report aims to provide basic understandings to inform the promotion of leafy green vegetables in South Africa by exploring the socio-economic, ecological and nutritional dynamics around wild or weedy leafy green vegetables. To be successful, any initiative which aims to promote a particular practice—whether agricultural, environmental, or nutritional in basis—must be based on close understandings of existing local practices as well as the potential for their change. Thus, the first step towards the promotion of leafy green vegetables is the development of a detailed understanding of the current practices around the use of these resources as well as an understanding of the contexts which contribute to their disuse.

This research applies an anthropological perspective to the question of *imifino* use and disuse. It seeks to provide holistic understandings which incorporate cultural and sociological insights alongside ethnobotanical, nutritional, ecological and historical data. This multidisciplinary perspective is called for by the multifaceted and diverse nature of the problem at hand—the use and disuse of *imifino*.

Though the goal of this work is an integration of the understandings provided by individual disciplines, each area of investigation is accompanied by its own unique research questions:

- **Ethnobotanical:** What are the relationships in nomenclature between *imifino* and botanical species? What is the state of local knowledge of *imifino* in the study area, and how is this knowledge patterned?
- **Socio-cultural:** What are the social and/or cultural values associated with *imifino*? How is knowledge of *imifino* acquired and communicated?
- **Nutritional:** What is the role of *imifino* within local subsistence? What nutritional contributions can these plants make towards local food security?
- **Ecological:** What are the habitats in which *imifino* grow? How have these habitats been affected by environmental degradation and ecological changes?
- **Historical:** How have historical processes, including the resettlement of populations within KwaZulu-Natal and changing land use patterns, impacted *imifino* use over the past 60 years?

In exploring the diverse nature of *imifino* use and disuse, these different disciplines carry their own avenues of inquiry. However the analysis of these inquiries is intended to address a

single purpose: providing recommendations for possible approaches to the promotion of leafy green vegetables. It is hoped that these recommendations can become the basis for more widespread research and extension to promote wild or weedy leafy green vegetables in South Africa.

2.2 Terminologies

The study focuses within a small part of the province of KwaZulu-Natal in the eastern part of South Africa. Wild or weedy leafy green vegetables are known here as *imifino* (singular, *imifino*), and this term is used extensively throughout this report. A range of other terms is used in scientific literature to define what are referred to here as wild or weedy leafy green vegetables or *imifino*. Far from semantics, choices of terminology provide insights into the nature of these resources as well as the different ways in which they are considered by researchers. Three terms are of particular note: *indigenous vegetables*, *traditional vegetables*, or *wild spinaches*.

Wild or weedy leafy green vegetables are often described as indigenous vegetables, a term that emphasises the importance of these plants for indigenous peoples (Chweya and Eyzaguirre 1999). The relationship between indigenous groups and edible wild plants is commonly indicated by the presence of wild vegetables in the local body of Indigenous Knowledge (or IK) of the environment. However the use of *imifino* is by no means limited to peoples indigenous to South Africa, and in KwaZulu-Natal and elsewhere *imifino* are commonly eaten by people of Indian or European origin. In addition, many of the plants described here are not indigenous in the strict botanical sense, but rather exotic or cosmopolitan species which have been incorporated into local meals and taxonomy over time.

Similarly, the phrase 'traditional vegetables' is commonly applied to indicate the place of *imifino* in African culinary traditions (Guarino 1997). This usage has negative connotations, implying the continued use of these foods in 'traditional' societies which have not been impacted by 'modern', dynamic colonial and post-colonial forces. But *imifino* is consumed in various settings which may be considered non-traditional, from a side dish accompanying the *pap-n-vleis*² eaten as fast food in Johannesburg to an ingredient in the spicy curries of Durban housewives.

Finally, *imifino* are often referred to as 'wild spinaches' or 'veld spinaches'. This reflects the influence of many early recorders of the Zulu language (Gerstner 1938, 1939, 1941; Bryant 1907) who associated *imifino* with their cultivated and domesticated European counterparts³. However most species of *imifino* are neither cultivated nor domesticated, but instead thrive marginal or semi-cultivated settings (such as growing as tolerated weeds in gardens).

Despite their various shortcomings, each of these terms refers to a particular aspect of wild or weedy leafy green vegetables and is important to understanding some of the social, ecological or nutritional complexities of these plants. In developing a definition for *imifino*, the phrases *wild or weedy leafy green vegetables* or simply *traditional vegetables* are frequently used here interchangeably despite their limitations, largely because these terms most closely approximate the Zulu word *imifino* and include all the species referred to herein⁴.

² Meat and stiff maize porridge, commonly cooked over an open fire.

³ *Cultivated* is used here to refer to plants which are actively propagated by humans, such as by preparing fields or sowing seeds; *domesticated* is used to refer to plants which rely primarily on humans for their production and/or reproduction.

⁴ While these terms suffice as synonyms, defining *imifino* is somewhat more complex. This is discussed in detail in section 6.

2.3 Structure of this work

Including the executive summary (section one) and this introduction (section two), this report is comprised of eleven sections:

- Section three of the report begins with a comprehensive literature review discussing key trends in research on leafy green vegetables in sub-Saharan Africa. Special emphasis is placed on the nature of interactions between humans and non-domesticates, the forms of social differentiation in the knowledge and use of leafy green vegetables, and the different approaches to the valuation of leafy green vegetables.
- After this review, the methods employed in this research are presented in section four, including rapid assessment methods for social research, ecological research techniques, nutritional assessment methods, and historical research methods. These are accompanied by a short exploration of how diverse methods are integrated within a multidisciplinary research project.
- Section five presents the background information required to situate the data from this research. These include a brief discussion of the history of forced relocations in South Africa, focusing in particular on KwaZulu-Natal. This section also presents contextual information regarding the study site, including household demographics, economics and subsistence. Although most of the historical data is reserved for later in the report, the origins of the village of Nkonisa are discussed here.
- With these contexts in place, section six presents the results of ethnobotanical and social investigations. The knowledge of *imifino* is discussed in detail, including its classification in local taxonomies, collection, storage, marketing and medicinal properties. Additional attention is given to social values and the transfer of knowledge of *imifino*.
- This discussion segues into section seven, which focuses on the ecological aspects of *imifino*. After describing the habitats and seasonality of different species, the variable access to and availability of *imifino* is explored. In addition, the changes in local landscapes and their impact on *imifino* availability is explored with the help of ethnohistorical and archival evidence.
- Section eight explores *imifino* consumption, including the preparation of *imifino* and its place in local meals. Preferences around taste and nutrition, and their impact on *imifino* use, are discussed. This section also encompasses the nutritional aspects of *imifino*, beginning with a brief discussion of micronutrient malnutrition in South Africa and the factors which influence malnutrition. After this, the micronutrient and macronutrient content of various *imifino* species is presented and used in conjunction with consumption data to calculate the potential contributions of *imifino* to local diets.
- Finally section nine integrates the research findings in a discussion of the individual factors contributing to the disuse of *imifino* and how they combine to define the current situation. Various possibilities for enhancing the use of *imifino*, and the advantages and disadvantages of each are discussed. A single approach is recommended, along with an outline of the steps needed to further this recommendation.

In addition to these, sections ten and eleven are devoted to a listing of works cited and appendixes, respectively.

3.0 Literature review

Research involving wild or weedy leafy green vegetables spans the breadth of social, ecological and nutritional publications. Rather than cover the entire scope of this body of literature, this review explores four trends which are significant towards the study of *imifino*:

- (a) the types of interactions between humans and traditional vegetables;
- (b) the places of wild or weedy edible plants within research on agricultural systems;
- (c) the forms of social differentiation which are commonly correlated with the knowledge and use of traditional vegetables; and
- (d) the different forms of value that are associated with traditional vegetables and other kinds of wild plants.

While this review focuses on examples from southern Africa, relevant works are included from further afield when necessary. Most of the works discussed focus on wild or weedy leafy green vegetables in particular; other types of useful wild plants are also included where the conceptual focus of research is relevant to traditional vegetables.

3.1 Human-plant interactions

As discussed in the introduction, defining the precise meaning of various terms used to refer to traditional vegetables can be made difficult by the diverse ecological and social spaces which these plants occupy. The place of traditional vegetables in agro-ecosystems often falls between the formal cultivated spaces of crops and the 'wild' spaces of undomesticated plants. It may at first seem simple to generally distinguish between a *crop* and a *weedy* plant, but upon closer examination the nature of human-plant interactions is much more complex. The effects of humans on plant populations actually spans a continuum from the completely domesticated, cultivated crop through to entirely wild species which have little interaction with humans. In between the two extremes are human-plant interactions characterised by varying degrees of encouragement, pressure and manipulation.

Most of the plants discussed here as *imifino* fall somewhere between these two extremes. Three classifications along this continuum are commonly used during discussions of traditional vegetables which have varying degrees of interaction with humans (cf. Harlan 1992):

- A *wild species* may be defined as a plant which germinates, grows and reproduces with little or no contact with humans. A wild species is neither domesticated nor cultivated.
- A *weedy species* is a plant which does not rely on human interaction at any stage of its life cycle (and thus could exist as a wild species) but that thrives in a cultivated environment which is created by humans. Useful weed species are usually termed *tolerated weeds*, as they are accepted and even protected by humans.
- A *weed crop* can be described as a plant which falls between weed and crop in classification. Although not domesticated, a weed crop is often cultivated and benefits from human manipulation of the environment. As a result, weed crops are subject to artificial selection pressures from humans (often direct selection by cultivators) and thus are often classified into an incipient stage of domestication.

In sections 6 and 7, we will see that *imifino* includes a range of *wild species*, *weedy species* and *weed crops*. The breadth of this Zulu term is particularly useful because it can include species which grow both as wild plants and as weeds, and thus are difficult to categorise as either. The terms defined here will emerge again in exploring the habitats and human

interactions of *imifino*.

3.2 Traditional vegetables in agricultural research

Wild foods in general, and wild vegetables in particular, are often characterised as marginal resources in the discourses of agricultural and social development. In theory this marginality operates at two levels. Just as they are frequently overlooked by researchers and policy-makers, wild plants may often be considered relatively unimportant by the local communities who use them. The combination of these factors has led to wild foods, and wild vegetables in particular, being represented as a "hidden harvest" of food resources in many developing countries (Scoones, Melnyk and Pretty 1992).

The marginalisation of wild vegetables from agricultural research and policy-making can be linked largely to assumptions around the spectrum of human interactions with their surrounding wild environment. In gross terms, such assumptions suggest that the intimacy of a group's interactions with the environment is inversely proportional to that group's direct reliance on the environment for its livelihood. Placing human subsistence patterns on a continuum between hunter-gatherer and commercial monoculture, this idea postulates that hunter-gatherers may rely closely on their ambient environment for survival, while residents of commercial systems in the modern North may be inherently less attached to their ecological surroundings.

The manifestations of this notion are numerous, and have in some regards guided the conceptualisation of wild food plants in much of science. Numerous works document the roles of wild plants in the subsistence patterns of hunter-gatherer groups and to a lesser degree shifting and swidden agriculturists (e.g. Bicchierri 1972). Prominent examples of these approaches may be drawn from south east Asia (Eder 1988), the Amazon (Posey 1984; Hurtado and Hill 1987) and Africa (Hart and Hart 1986; Dei, Sedgley and Gardner 1989). In southern Africa, the greatest attention has been given to the !Kung bushmen (Lee 1969; Lee and de Vore 1976) and the wild plants on which they rely (Lee 1973; Bieseke, Bousquet and Stanford 1979).

Despite this foundation, the widespread attention paid to wild or weedy vegetables in sedentary agricultural and agro-pastoral systems during the 1980s was not fueled by a progression in understandings of wild plants beyond hunter-gatherer foodways. Instead this change was induced in large part by the increasing attention paid by agricultural development workers to the social, cultural and economic contexts of local farmers in developing countries (e.g. Brokensha, Warren and Werner 1980). In encouraging a greater sensitivity to the situations and needs of rural farmers, the emphasis placed on participatory research with farmers helped to create a context in which the local knowledge and use of wild plant foods was made relevant to agricultural development (Rocheleau, et. al. 1989). Concurrent with this, emerging gender-based critiques of agricultural development helped to cast increasing attention on women's marginalised roles within rural agriculture (Feldstein and Jiggins 1994). As a result the forms of subsistence which are commonly the responsibility of women—including wild vegetables—received increased attention (e.g. Wachira 1987).

Although it is true that mainstream attention to wild foods in agricultural systems did not emerge until recently, several early works of anthropology present minor but notable exceptions to this trend. A number of anthropologists working in agricultural societies recognized the contribution of wild food plants to subsistence. In particular the work of

Richards (1939; Richards and Widdowson 1936) and Thompson (1954) on dietary practices in Zambia stands out as one of the earliest anthropological works which focuses on community nutrition and the role of wild vegetables therein.

One of the most prominent trends emerging from the body of literature on wild food plants, whether focussing on hunter-gatherers or agriculturists, is the association of wild foods with particular locally-held traditions and knowledge (summarized in the term indigenous knowledge, or IK). Several examples of indigenous knowledge of wild vegetables help to illustrate the relationship between the knowledge of particular species and its consumption. Goode (1989) describes the integration of indigenous plant knowledge and consumption in Uganda, with special emphasis on wild vegetables. Among the Nharo of western Botswana, the perception of plants as either traditional or introduced (exotic) is a crucial factor in deciding which plants will be allowed to grow in prepared fields (Barnard 1984). Other examples from Kenya illustrate how the selection and promotion of specific varieties of wild vegetables may be influenced by the practices around their collection and preparation as well as their palatability (Rocheleau, et. al. 1989). In all of these cases the continuing use of wild vegetables is closely tied to a locally-held body of knowledge which has developed over many generations.

The dependence of wild vegetable use on the maintenance of the associated aspects of indigenous knowledge, and vice-versa, is fundamental to understanding the dynamics of wild plant use or disuse. If the traditions or knowledge which support the use of a specific species are lost, the use of that species may be unlikely to continue. Examples from Kenya (Brokensha and Riley 1986; Kituyi 1990) and Zimbabwe (Wilson 1990) clearly illustrate the mutual dependency between local knowledge of wild food resources and their consumption. When locally-based knowledge of a species or its consumption is lost, the use of that species ceases; conversely if a species falls into disuse, local knowledge of that species' value is likely to disappear. The close parallels between the knowledge and use of local resources are also apparent in the case of *imifino*.

3.3 Social differentiation

One important result of research on traditional vegetables within agricultural systems is the development of understandings of patterns of social differentiation. Supporting evidence from sub-Saharan Africa is both detailed and consistent, allowing considerable insight into the social dynamics associated with wild vegetables as they operate at different levels of society. Within communities households may value wild vegetables in varying ways according to differential access to economic and/or subsistence resources. Within households, the recognition, procurement and consumption of wild vegetables are likely to be patterned along boundaries of gender and age.

Economic access

Massive discrepancies often exist in the ability of households to provide food for themselves within communities. This ability is determined by a complex range of factors, including land tenure, access to labour, employment, and social support systems. Inevitably, some households, often described as the poorer ones, find the provision of food for its members more difficult. One strategy for coping in these instances is the diversification of food resources. Wild foods and leafy green vegetables in particular are a frequent element in this broadened subsistence base (Chambers 1989).

In Lesotho, rural households without access to employment (and thus cash income) may have difficulty making purchases at local markets. In these instances locally available wild vegetables have become a key element in local diets (Myer 1998). This phenomenon, in which households with less access to subsistence resources rely more heavily on wild foods, has become more common across Africa with the expansion of markets which make food more widely available, if not more accessible. One of the side-effects of this is the association of wild or weedy vegetables with poverty, a negative association which may deter some from consuming these foods (Mnzava 1997).

In theory the availability of and access to resources in the wild or marginal areas surrounding agricultural systems, areas which are typically held as common property, allow poorer households to supplement their lack of access to other economic resources (Berry 1989). This equation often fails in reality however as competition for resources due to economic constraints and population growth can result in the domination of wild resources by the few (Swaney 1990).

Gender

Research from across sub-Saharan Africa clearly delineates gendered differences in the knowledge and use of traditional vegetables within households. Almost without exception women are far more involved in the collection and preparation of these foods. Research from Kenya shows that women are wholly responsible for recognising and selecting wild varieties of leafy green vegetables. Although these plants become particularly important for general subsistence during certain times, different species are consumed by women throughout the year (Wachira 1987). As they carry most of the knowledge of wild vegetables women are of particular importance in passing this knowledge onto their children (Ogle et. al. 1990). Similar findings are reported in other examples from Swaziland (Ogle and Grivetti 1985c), Zambia (Johannson 1989) and Tanzania (Kingamkono 1990).

The reasons for this gender separation may be rooted largely in the division of labour within different types of agricultural systems. Leach (1994) demonstrates that men's control of the primary agricultural lands in rural Sierra Leone shifts many women's subsistence activities to marginal areas, where wild plant foods are commonly found. Other researchers have posited that there is a more fundamental reason for women's integral involvement in wild plant foods. Rocheleau (1991) has suggested that the differences in the knowledge of edible wild plants between men and women are merely one aspect of the gendered nature of ecological knowledge. This idea has also been promoted also by Shiva, who suggests that women's use of wild resources is distinct from men's due to women's primary contribution to the "production of sustenance" (1989).

Age

As in the case of women, the role of youth in many subsistence systems may help to make them of particular importance in the knowledge and use of wild vegetables. Often responsible for cattle herding, water collection or weeding fields, children of both sexes are well situated for the harvesting of these marginal resources and are commonly given the task of wild plant collection. In addition, patterns of food allocation within households mean that children are particularly likely to require the high levels of micronutrients which wild vegetables can provide (Wheeler 1988).

Despite the potential implications of age-based variation in wild vegetable knowledge and use, the roles of children in the procurement and consumption of wild vegetables is poorly

understood. In one of the few examples of such research, Ogle and Grivetti (1985b) report that most Swazi school children recognise over 20 species of wild plant foods, and that at least one type of plant (*Oxalis* spp.) is consumed by children exclusively. More often, children's involvement in wild vegetable procurement is grouped with that of women (usually mothers), as evidenced in Ghana (Dei, Sedgley and Gardner 1989) and Zimbabwe (Wilson 1990).

3.4 The values of traditional vegetables

Scientific understandings of wild or weedy leafy green vegetables to date have focused primarily on the description of these resources and their roles in different aspects of human ecology. Establishing the values of these resources is a separate concern and one with which many researchers struggle. Two of the strongest arguments for the value of traditional vegetables come in the forms of biodiversity and nutrition. While both topics seek to establish the importance of wild vegetables, the former tends to gauge importance very much at a global level while the latter operates far more locally. A third potential argument around the economic potential of traditional vegetables has received surprisingly little attention.

Biodiversity

Environmental and ecological concerns have been one of the strongest forces in promoting research on and the conservation of useful wild plant resources including leafy green vegetables. The underlying arguments centre around the importance of biodiversity both at a global level—often gauged in terms of entire ecosystems—and in the maintenance of diversity in useful resources, measured in numbers of species as well as intra-specific diversity (Prescott-Allen and Prescott-Allen 1988).

Two types of diversity in wild food plants, each with a distinct set of threats, are significant in biodiversity conservation. The first is actual genetic diversity which is threatened by either the extinction of a species or of diversity within a species. The second is the diversity in indigenous knowledge of useful flora and fauna, which is held within socio-cultural systems. This knowledge is lost as changing social and economic conditions help to eliminate the use of particular plants (Quek 1997). Losing either of these types of diversity is detrimental: if a species becomes extinct, the condition is permanent; similarly, if knowledge of an edible species is lost, the potential for that species as a food resource is lost forever (Altieri, Merrick and Anderson 1987).

The continued conservation of traditional vegetables relies upon their sustained consumption, which relies in turn on the maintenance of knowledge of wild vegetables and their use (Eyzaguirre 1997). Thus, documenting IK of wild vegetables, and understanding the social and economic dynamics which lead to the continued use or eventual disuse of these resources, is of importance in designing and understanding conservation measures.

Nutrition

There is considerable evidence that wild or weedy leafy green vegetables may have particular value as a source of human nutrition (FAO 1988). Such value is presented either in terms of general food security or quantified nutrient content. While both perspectives make important contributions to our understanding of wild vegetables and nutrition, neither encompasses the nutritional value of these resources entirely.

Food security is becoming an increasingly common term in policy and programming around

nutrition in developing countries (Maxwell 1991). Often summarised as the access to the food necessary for adequate nutrition and a healthy life, it also includes the lack of an immediate risk of losing that security (Gillespie and Mason 1991). In most of the works discussed here the nutritional value of traditional vegetables is rarely as a staple or regular food source. Instead, the contributions of wild or weedy leafy green vegetables is to various aspects of dietary diversity. These plants are often important for the diversity they provide to stabilise food intake during specific periods and/or for specific groups. Similarly the diversity which these foods provide in regular diets is crucial for the provision of small amounts of a wide variety of minerals and vitamins necessary for survival.

A sizeable body of research has established the role of wild vegetables in food security during both regular subsistence and periods of unusual difficulty. Hussain (1985) has shown that wild vegetables can play a central part in maintaining food security during specific seasons within the agricultural cycle. This idea of wild vegetables as resources with particular value at certain times of the year is supported by research findings from West Africa (Longhurst 1985; De Garine and Koppert 1988). In other examples, these resources make an integral contribution to food security during periods of extreme conditions, usually drought. Campbell (1986) has illustrated the importance of wild foods during periods of drought in Botswana, and Rahmato (1988) has done the same for Ethiopia. Campbell (1984) has shown that wild vegetables are not always sufficient in offsetting the effects of climatic change, as Kenyan farmers are shown to rely on other forms of employment—and not other subsistence resources—to combat food insecurity. In other cases the role of wild vegetables in food security is constant. Food security may be threatened by social and economic conditions as much as environmental patterns in such instances (Moore and Vaughan 1987). In particular the consumption of wild vegetables, and wild foods generally, can be linked to poverty and situations of subsistence vulnerability (Cernea 1990; Chambers 1989).

One of the key strengths of food security as a nutritional concept is its flexibility as a qualitative indicator. The notion possess breadth and fluidity as well as the ability to account for tremendous intra-societal variation. These features are crucial elements in the idea of food security—as threats to subsistence may be seasonal, social, economic or climatic in origin. Because it incorporates a wide range of factors into an understanding of general nutritional status, the notion of food security is used here extensively. However it is important to note that the broadness of food security as a concept is accompanied by several limitations. Specifically, food security faces a major hurdle in its fundamental generality. Just as the criteria which may threaten food security are numerous and dynamic, the precise contribution which a resource makes to food security are impossible to define.

More specific evidence for the nutritional value of traditional vegetables comes from chemical analyses of various species from different parts of the world. In southern Africa, this type of research often focuses on amounts of a single macronutrient in several species, usually protein (ex., Lewis, Shanley and Hennessey 1971; Shanley and Lewis 1969), or the levels of several key micronutrients in a group of plants (Ferguson, et. al. 1988; Oliviera and De Calvalho 1975). A number of general studies from southern Africa have investigated the nutritional values of all the leafy green vegetables consumed within a particular locality. Of particular significance here are the works of Ogle and Grivetti (1985a-d) in Swaziland, Zmarlicki, Wehmeyer and Rose (1984) in South Africa and Sreermulu (1982) in Tanzania. These researchers use study samples drawn from a range of micro-environments across a wide region, thus helping their data to be applicable more generally. The content of this research and the plants on which it focuses is discussed in detail in section 8.

Although promising, this line of investigation still leaves some question as to the precise nutritional contributions of wild food plants due the lack of quantitative data on plant consumption and the bioavailability of nutrients. Without definitive data on how often wild vegetables are consumed in a given setting and in what amounts, understanding the potential for micronutrient intake from wild vegetables is difficult. Moreover without detailed data on general dietary intake and potential barriers to nutrient absorption (whether in food preparation or biophysical conditions) quantifying the specific nutritional contribution of wild vegetables is made more difficult.

Economics

Since the mid-1980s, the notion of sustainable resources utilisation has fueled a growth in research around the economic potential of various types of wild plants. Forest resources, in the form of timber and non-timber products, have received extensive attention primarily through the quantification of their extraction and use. The economics of the sustainable use of indigenous trees has received considerable attention in southern Africa, with the marula (*Sclerocarya birrea*) most commonly featured. African palms, commonly harvested as a source of oil and wine, have gained recognition as well (Moll 1987; Cunningham 1990).

In addition, medicinal plants have received attention across the continent in conjunction with the growing recognition of indigenous medicine's potential role in primary health care. In South Africa, Cunningham (1991, 1993) has suggested that the trade in medicinal plants—whether local, regional or international—can be co-opted into conservation programmes, and has made similar assertions for other types of useful plants as well (1987). Using data ethnobotanical insights he expands this idea to show that commercial exploitation necessitates, and can even benefit from, a conservation ethic based in sustainable use.

Although medicinal and other wild plant resources have helped to give rise to sophisticated understandings of the economic aspects of local resource use, edible species, and particularly traditional vegetables, have not had the same effect. In Thailand, women's sales of wild plant foods in local markets can make significant contributions to household incomes (Leimar Price 1997; Moreno-Black and Price 1993). Similar examples from Africa show that marketing systems for traditional leafy green vegetables are as well-developed and efficient as any other aspect of the informal economy (Ogle, et. al. 1990). For instance in Kenya, every individual producer helps to keep at least one wholesale seller and another retail seller in regular employment (Nekesa and Meso 1997). These studies provide preliminary indications that the increased marketing of traditional vegetables has potential as a form of income generation, and this idea has been promoted widely by conservation-minded policy-makers (Schippers 1998). However, the lack of detailed research into market potentials and resources supplies has hindered the application of these ideas. This presents a clear opportunity for future work to investigate whether the development of market systems to enhance the availability of wild foods plants may increase their overall use.

3.5 Conclusion

This review provides basic insights into the major trends and concepts in research on traditional vegetables. Several of the issues discussed here will prove to be of particular relevance to the case of *imifino* in KwaZulu-Natal. The dynamics of use, the factors contributing to disuse, and the potential for various forms of interventions to promote these resources will receive more attention after the discussion of research methods.

4.0 Methods

As the literature review illustrates, a wide range of issues contribute to the use and disuse of wild or weedy leafy green vegetables. The complexity of these dynamics means that no single approach to researching traditional vegetables can produce data which adequately address the diverse aims of this study. Instead a range of different methods from various disciplines applied within a holistic framework is required to document and understand the decline in *imifino* use. The research techniques employed here are drawn from range of fields, including the social sciences, ecology, nutrition, and history.

Although still relatively uncommon, this type of multidisciplinary research is becoming increasingly widespread in developing understandings of humans' interactions with their immediate environments. While single disciplines can make important contributions to individual aspects of human ecology, broader perspectives are necessary to understand the effects of changing human behaviours on the ecology, and conversely how changing ecological conditions help to shape on human behaviour. The application of interdisciplinary perspectives to humans' interactions with their floral environment is commonly known as ethnobotany. The rationale for this brand of interdisciplinary research is well-established, as Martin (1995) explores the conceptual and practical integration of the different disciplines involved in ethnobotany (including anthropology, ecology, linguistics, economics, phytochemistry and botany) to answer multifaceted research questions. Within ethnobotany, the place of historical research in understanding human ecology has been more marginal. However the strong precedents provided by the work of Cronon (1983) and Harries (1984; 1987) demonstrate that historical perspectives—whether rooted in written or oral traditions—can make direct contributions to contemporary understandings of human interactions with the environment.

As part of this research, a total of 14 weeks of field research was conducted in Nkandla district during the periods January to March 1998 and again during January and February 1999. Field research was conducted by the primary investigator and a research assistant/translator, who were based within the village of Nkonisa over these periods. This continued close contact allowed the researcher to observe and participate in the daily lives of local residents. This 'participant-observation' serves as a foundation for the techniques described below.

4.1 Rapid assessment techniques

Household survey

Ninety household surveys were conducted during January and February 1998. Household surveys covered the following topics: household composition and demographics; household income and expenditure; market-based food purchases; field and garden production; and knowledge and consumption of *imifino*. While some questions were fully structured, much of these interviews involved the unstructured exploration of participants' responses to structured questions. Interviews lasted approximately one hour each; data were collected on questionnaire forms with additional notes taken by the researcher.

Households were randomly selected using the most recent (1992) aerial photographs available, enlarged to 1:10 000 scale (from the South African Department of Land Survey and Mapping). Each household in the village was enumerated and a random numbers table was used to select participating households (ground-truthing of the aerial photographs revealed

that there was minimal post-1992 settlement). When possible, the *de facto* household heads were interviewed (55% household heads; 19% spouse of household head). When household heads were not available, other senior members of the household were interviewed (23% children of household heads; 2% parents of household heads). In many instances, more than one member of the household would participate in the interview. As a result, these interviews provide insights into household features but it is impossible to disaggregate the information presented here by individuals' demographic profiles.

Key informant interviews

Eleven key informant interviews were conducted during the study period. These interviews, lasting one to two hours each, were largely unstructured and involved in-depth conversations on a variety of relevant topics. Data were collected in the form of fieldnotes taken by the researcher. Participants in key informant interviews were selected subjectively from participants identified during the household surveys with particular knowledge of *imifino* and/or the local ecological history of the study areas. Other participants were selected due to their leadership roles (whether as political officials or unofficial social leaders) within the community. Additional participants were identified using 'snowballing' from these initial participants.

Focus group discussions

Additional qualitative data was collected during seven focus group discussions. In most instances, these discussions involved prior arrangements with a specific group of participants. These groups included village elders and *indunas* (local headmen), senior female village residents, high school children, and others. While most of these discussions were arranged in advance, several discussions involved the impromptu gathering of individuals from several (often neighboring) homes. In all instances, data in the form of fieldnotes were collected by the researcher. In a few cases discussions were recorded and transcribed by the research assistant.

4.2 Ecological techniques

Herbarium research

Baseline botanical research took place over a one week period at the Herbarium of the National Botanical Institute (NBI) in Pretoria. Additional research was conducted at the Bolus Herbarium (University of Cape Town). Specimen information was examined primarily for species distribution and ecogeographic variation. Additional ethnobotanical data was collected from the notes of specimen collectors.

Transects in habitats

As part of the household survey, informal transects were conducted in and around household gardens and marginal areas. These took place for 20 households (22% of the total), identified on a convenient basis. With the help of household members, these transects involved identifying which *imifino* species were present and recognised within each household. In many instances collection practices were also observed. Additional field walks were made in the company of several key informants during their trips to collect *imifino*. These walks were used to identify the habitats of traditional vegetable species found away from human habitation and provided the opportunity to observe *imifino* collection practices of participants.

4.3 Historical techniques

Maps

Detailed aerial photography was obtained from the South African Department of Land Survey and Mapping. Magnified to a scale of 1:10 000, these photographs were available from survey flights undertaken in 1937, 1953, 1967, 1975 and 1992. In addition, 1:50 000 photographs were viewed using a stereoscope to provide more detailed three-dimensional images of local landscapes. This technique is particularly useful in viewing macro-vegetation changes.

Archival material

Historical research took place at the Fort Nongqayi/Zululand Historical Museum (Eshowe) and the Centre for African Studies at the University of Cape Town. Additional primary and secondary sources were identified through the work of the Surplus Peoples Project of the Association for Rural Advancement (AFRA). Historical maps were located through the Empangeni Historical and Cultural Society.

4.4 Nutritional assessment techniques

Accurate and reliable data on food preparation and consumption can be notoriously difficult to collect for a number of reasons (Johnston 1987). To help overcome these difficulties, a range of techniques was employed in triangulation to gauge the dietary intake of residents in the village of Nkonisa.

- Meal preparation and consumption was observed in several households on a convenient basis to document cooking practices, eating habits, and their potential impact on nutrient availability;
- Six households randomly selected from the participants in the household survey were asked to complete a month-long 'food journal'. This involved filling out a small diary (provided by the researcher) in which the head of household described all of the meals eaten by the household for the entire month of February 1998. However of the six initial participants, only one journal was returned to the researcher. This low rate of return may be linked to the high degree of illiteracy in the study area. While the attrition rate means that this data can not be used to speak for the study area more broadly, this journal is still valuable in understanding the structure of daily food intake and patterns of food consumption and meal selection⁵.
- Two-hundred structured interviews on dietary intake and *imifino* consumption were conducted during January 1999. These interviews, lasting approximately 15 minutes each, were administered to a random study population stratified into four age groups (5-20, 21-35, 36-50 and over 50). One-hundred and two households were selected for participation using the enumeration process described above. Two refusals were encountered, in both cases from acting household heads who refused to grant permission for research without the consideration of the actual household head. From each of the remaining 100 households, two participants were randomly selected from different strata; no refusals for research were encountered from prospective participants. This survey included a 24-hour recall of all foods consumed and a one week recall of all *imifino* species consumed. Additional attention was given to the free-listing of *imifino* species as well as a check-list of the knowledge and availability of specific types of *imifino*.

⁵ This journal is summarised in Appendix 11.3.

4.5 Analysis

Quantitative data from the household and individual surveys were captured and analysed using Epi-Info 6.04b (CDC/WHO 1997). Quantitative analysis was limited to chi square and Fishers' tests. Qualitative analysis centred on content analysis of notes and transcripts from semi-structured and unstructured interviews as well as researchers' field notes. The cross-referencing of data for validity (triangulation) was employed for all research topics.

4.6 Reflections on methodology

While the ways in which data were collected draws directly from several different fields, this methodological approach is founded solidly within the realm of anthropology. The influences of anthropology can be seen in various aspects of research: the holistic study design to approach the problem of the decline in *imifino* use; the reflexive approach to data collection, in which ongoing review gives rise to new research questions; and the comparative way in which discrete forms of data are analysed and synthesised.

Increasingly the requirements of social research demand close understandings of complex issues from multiple perspectives. One potential response to these needs is demonstrated here in the adaptation of popular rapid assessment techniques, such as Participatory Rural Appraisal (PRA) (Beebe 1995) and Rapid Assessment Procedures (RAP) (Scrimshaw and Hurtado 1990; Chambers 1993). These are generally comprised of a discrete body of research techniques, such as key informant interviews, focus group discussions, and ranking exercises, and are based on the notion of participatory research and the sharing (rather than extraction) of knowledge between researchers and local communities. In their essence, rapid assessment methods showcase the adaptation of traditional anthropological ethnography into a more focused set of techniques which enable researchers to access deeply rooted local understandings more efficiently. Inevitably a single discipline must serve as the foundation upon which other fields can build in a multidisciplinary research setting, and anthropology is well placed to work at the centre of such ventures.

Although it carries the ability to speak to multifaceted issues in a way that single approaches can not, the practice of interdisciplinary research is not without drawbacks. The most problematic aspect encountered here is the lack of specialist expertise within technical disciplines. To collect data, and to do it well, in any single field requires much more than thorough knowledge of field manuals. It requires an understanding of a host of nuances: shortcuts, hunches, critical reflection—in short, experience. A single researcher attempting to employ a multidisciplinary approach is unlikely to possess this type of valuable experience; perhaps this is why interdisciplinary research is more often conducted by teams. In being a 'jack of all trades', a single interdisciplinary researcher is highly likely to become a master of none.

With this in mind, the clear strength of this interdisciplinary research is its ability to assess the roles of *imifino* within the lives of local residents, drawing at once from history, ecology, anthropology, botany, and nutrition. The resulting work which follows is a combination of diverse local insights, which are variously compared and blended to understand what the values of traditional vegetables are, how and why *imifino* use has declined, and how the use of these resources may be enhanced in the future.

5.0 Contexts

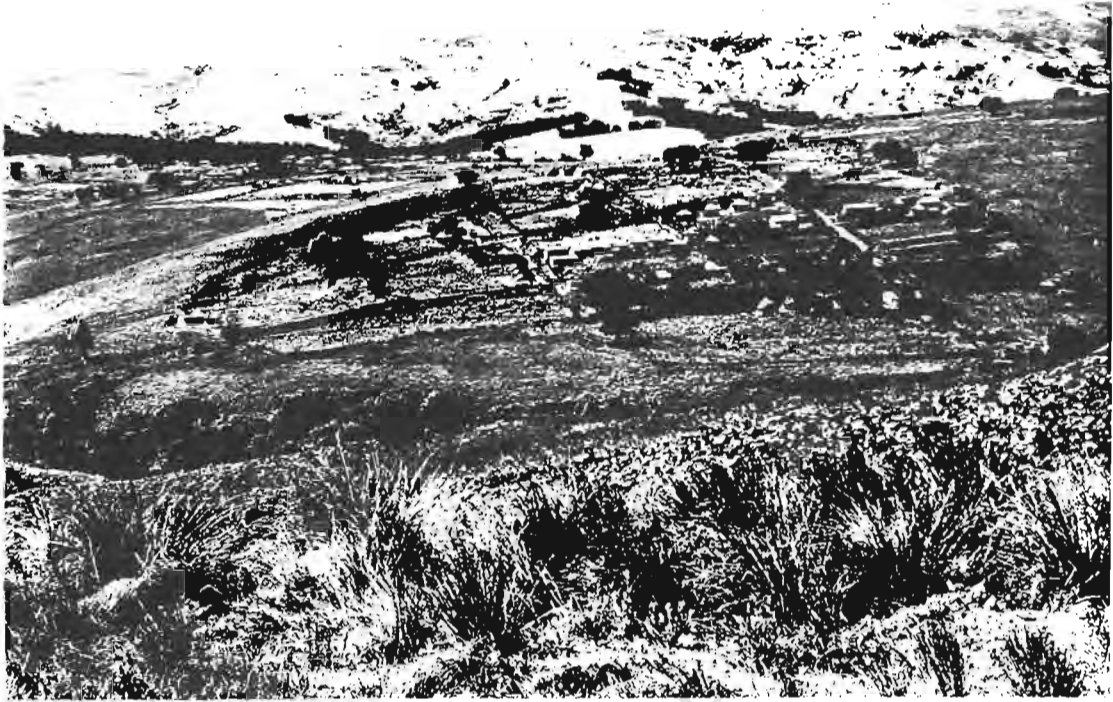


Figure 1: Part of the village of Nkonisa



Figure 2: A typical household in Nkonisa

This section, divided into two parts, presents the contexts which act as a foundation for the study results. The first half is devoted to a general outline of forced relocations in KwaZulu and Natal, based on primary and secondary historical sources. Two impacts of forced relocations and the homeland system are emphasised here in particular: the emergence of market systems and the patterns of environmental degradation. The second half describes in detail the study site, including local demographics, history, economics and subsistence.

5.1 Forced relocations in KwaZulu and Natal

Although the relocation of non-white populations⁶ into defined areas reached its peak during the National Party government's social and economic planning during the apartheid era (1948-1994), the practice of forced resettlement had considerable precedent. The most common approach to the political and economic domination of African populations by Europeans involved the limitation, and when deemed necessary relocation, of Africans to an extensive series of scattered rural 'native reserves' during the 18th and early 19th centuries (Platzky and Walker 1983). The reserve system expanded during the late 19th and early 20th century, maintaining an accessible pool of labour to fuel the mining industry's expansion; from this, the system of migrant labour was gradually developed by forcing urban industrial labourers to make their permanent homes in reserves (Bundy 1979).

In colonial Natal, the native reserves were formalised after the annexation of the Zulu kingdom by the British Crown in 1887. Although most reserves were small and scattered across rural regions, they were substantial in total, covering approximately 14 000 square miles by 1905 (Davenport and Hunt 1974). The boundaries of these reserves underwent countless alterations over the following years in the attempt to consolidate the area of KwaZulu into fewer, more manageable units.

Despite its expansion, the reserve system of colonial Natal was by no means total in its coverage as hundreds of thousands of Zulu-speakers across the colony lived outside of the native reserves. While some of these individuals were members of a small African middle class of farmers who had bought title to their land before 1900, the vast majority were labourers who lived with their families on white-owned farms. These workers were often indentured as sharecroppers or labour tenants who worked in return for access to small plots of land for personal use. As reserve boundaries changed over the next century, African residences which fell outside the changing reserve boundaries came to be known as 'black spots'. Although technically illegal, these areas were generally tolerated until the emergence of the apartheid system during the 1950s.

Forced relocations in rural Natal and KwaZulu reached their peak in the early 1960s, usually targeting 'black spots' and labourers on white farms. The process of moving families, and often entire communities, was routine by this time; through its legal precedent, individuals were almost completely powerless to resist. First, local officials would visit the targeted communities to announce the relocation and survey the houses to be moved. Families were given minimal compensation for their possessions which could not be moved, and were often forced to sell their livestock well below market prices. Following this, government trucks, often accompanied by police or army troops, would begin to move families. In some cases, entire communities were moved in a single day; in other instances, relocations could take weeks or months (SPP 1983).

⁶ Defined according to the categories employed by the government under the Population Registration Act of 1950 the entire South African population was classified as 'Native' (later 'Bantu', then 'black'), 'Indian', 'Coloured' or 'White' (West 1988).

The reality of this process is presented in the narrative of one of the founding members of the village of Mzimhlophe, a relocation village several kilometres from the study area:

We were removed from a farm of whites together with tenants who were staying at Utrecht and also children. We only saw whites arriving with police....On the 15th July 1976 G.G. trucks arrived with soldiers, police and their dogs. They said they don't need any argument but have just come to move us to Qudeni. We were told that what was happening was [the government's] instructions. They also told us that we were already provided with 4 roomed houses, which we discovered to be false. All our building equipment was left behind and on arrival we had to start from nothing, buying building material. In addition this place had no schools, no clinics, no grazing land for our stock and no lands for cultivating. We have got absolutely nothing..... (Department of Cooperation and Development 1981).

5.1.1 Impacts of the homeland system

While the impacts of forced relocations were massive and far-reaching, two aspects of the homeland system have particular relevance in the study of *imifino*: the development of market-based subsistence systems and the processes of environmental degradation. While the former has reduced the potential demand for traditional vegetables, the latter has affected many of the ecological niches in which these plants thrive.

Market dependence

Over the course of the 20th century, the simultaneous increase in migrant labour and the homeland system combined to help shape an increasing reliance on cash-based subsistence economies among many rural households. Migrant labourers, whether working on the mines near Johannesburg or on white-owned farm closer to home, were paid in cash which could be transported during home visits (as infrequently as once a year) or more commonly sent home as a remittance via postal banking. This money would then be used by the *de facto* household head (often the wife of a migrant labourer) to meet household needs.

As households came to rely increasingly on cash incomes from migrant workers, cash-based market networks developed to supplant agricultural production in meeting local food requirements (Beinhart and Bundy 1987). These networks involved regional markets in rural white towns as well as small-scale 'tuck shops' in even the most rural and isolated communities. While larger markets were (and still are) accessed occasionally for large purchases, tuck shops were (and still are) at the centre of community subsistence. These typically sell a narrow range of staple food items, including maize meal, seasonal produce, flour, oil and sugar.

The emergence of cash economies and local markets in shaping rural subsistence has two major implications for the use of wild or weedy leafy green vegetables. First, the importance of cash economies helps to shift the focus of subsistence away from subsistence based on local resources, including wild or weedy vegetables. Moreover, the extent of market systems have helped to make exotic and commercially produced vegetables, most notably spinach and cabbage, readily available in even the most rural areas.

Environmental degradation

While cash economies introduced alternatives to local agriculture, widespread environmental degradation severely reduced the potential for locally-based subsistence in most rural areas. Most homelands were located on land with very little agricultural potential, characterised by

dense mixed grasslands with scattered Sweet Thorn trees (*Acacia karoo*).

The local indigenous vegetation is described by Low and Rebelo (1998) as Coast-Hinterland Bushveld. The poorly conserved status of this vegetation type (synonymous with Acock's Veld Type A5: Nongoni Veld) is attributable primarily to the widespread disturbances of its original range due to agricultural intensification. Coast-Hinterland Bushveld occupies a total of 10 185 square kilometres, or roughly 11% of the province of KwaZulu-Natal. Approximately 3.5% of the range of this vegetation type lies within conserved lands, a relatively low proportion by South African standards.

5.2.1 Household demographics and origins

The household composition within the village of Nkonisa is common among African families in rural South Africa, and again emphasises the absenteeism of working age males (see figure 3). Households participating in the study are generally large (mean household size = 7.6; median/mode = 7.0; maximum = 21) and most often headed by women (women were the *de facto* heads of over 80% of the households interviewed). This can be attributed largely to the absence of adult men, who commonly migrate to urban centres for employment⁸.

Figure 3: Household composition by age

Age range	Mean number in HH	Total number in all HH (n = 90)	Percentage of all HH
Under 10	2.0	182	26%
11-20	2.4	218	32%
21-30	1.1	99	14%
31-40	0.6	50	8%
41-50	0.4	31	5%
Over 50	1.1	102	15%
<i>Total</i>	<i>7.6</i>	<i>682</i>	<i>100%</i>

As a resettlement site, most of the households in Nkonisa were founded by individuals forcibly removed from other parts of the province. Of the 90 households participating in the household survey, 92% were founded by individuals moved to Nkonisa during the apartheid era (the remaining 8% originated either within Nkandla district or were represented by household members who did not know the household's origins—see figure 4). The most common origins of households were white owned farms and 'black spots' (areas of African land tenure beyond the native reserve boundaries) near the towns of Vryheid, Danhauser, Weenen, Escourt and Newcastle. These areas, which are over 90 km away from Nkonisa, account for the reported origins of almost two-thirds of the households sampled.

It is also interesting to note that households were also relocated from regions closer to Nkonisa, and often from areas which fall within the former KwaZulu homeland. The towns of Nqutu, Mahlabatini, Msinga (Tugela Ferry), Nongoma and Babanango all fall in or on the edge of the boundaries of what was KwaZulu, and some 12% of households in Nkonisa reported their origins from the areas around these towns.

Of the households which traced their origins outside of Nkandla district, the median year of

⁸ Although it is a vital level of analysis between the individual and the community, the concept of a household is particularly difficult to define in the South African context because of the widespread phenomena of population fluidity (between households as well as communities) and male absenteeism (largely for migrant labour) (Thornton and Ramphela 1988). For this survey, household members were defined using the Government Census definition, as those who are currently resident in the household and spend less than a month away from the home working each year (Statistics South Africa 1996).

arrival in Nkonisa was 1974, ranging from 1963 to 1991. Even today there is some movement of individuals, and much less frequently entire households, within the province. Often this is motivated by the prospects of jobs, or to be closer to family members. For example, one participant was planning a move to Osizeweni (an African township outside of Newcastle) to be closer to her sister's family.

Figure 4: Origins of households forcibly removed to Nkonisa

Original Household site	Distance from Nkonisa and direction	Percentages of HH originating there (n = 90)	Year moved to Nkonisa: median (range)
Vryheid	92 km N/NW	22%	1975 (1966-1978)
Danhauser	110 km NW	14%	1973 (1967-1980)
Weenen	95 km W	11%	1970 (1966-1976)
Escourt	120 km W	10%	1967 (1963-1976)
Newcastle	140 km NW	7%	1981 (1976-1986)
Babanango	30 km NW	6%	1971 (1964-1973)
Dundee	90 km NW	6%	1974 (1968-1976)
Greytown	65 km SW	5%	1971 (1967-1976)
Mooi River	120 km SW	3%	1978 (1978-1985)
Msinga/Tugela Ferry	60 km W/SW	2%	1985 (1978-1991)
Nongoma	95 km N/NE	2%	1976 (1968-1985)
Paulpietersburg	130 km N	2%	1976 (1973-1979)
Nqutu	55 km NW	1%	1968
Mahlabatini	40 km NW	1%	1971
elsewhere in Nkandla	<i>n/app</i>	3%	<i>n/app</i>
not known	<i>n/app</i>	5%	<i>n/app</i>

5.2.2 Local economy

The mean monthly household income during the month of January 1998 was approximately 924 Rand (US \$177) (median R 840), with a minimum of R110 and a maximum of R4200⁹. These statistics reflect the general state of poverty throughout the study area, fueled by a high rate of unemployment. They also highlight the heterogeneous nature of the local economy, with pockets of relative wealth and poverty co-existing within a single village.

Most household income comes from pensions for the elderly or disabled (during the study period these stood at R420 per month) or the remittances of migrant labour. While the mines which once fueled the migrant labour system are downsizing, men (and less often, women) still venture to Johannesburg or Durban in search of employment. Usually they find little success. Within Nkonisa there are even fewer prospects of employment. Scattered jobs do exist, such as working at the nearby school, but openings are rare.

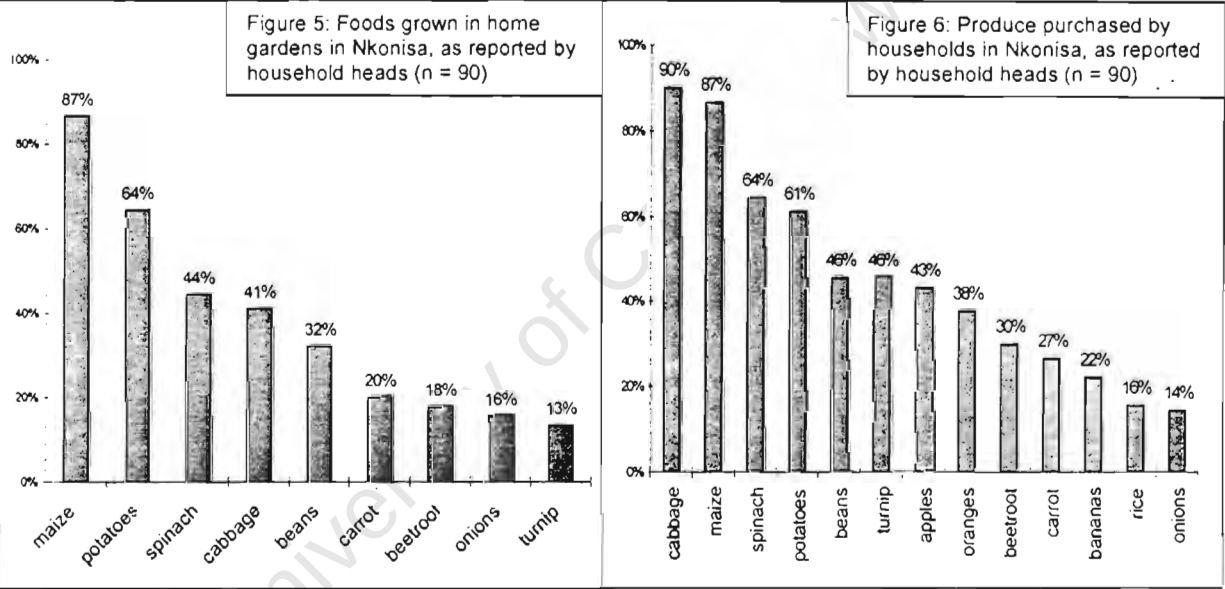
Beyond pensions, most income generated locally is from household entrepreneurs. Some families operate 'tuck shops' selling bread and cool drinks from a room in the home, or women may sew at home, buying second-hand clothes to repair and sell in the village. Should these income generating ventures fail, individuals may work as agricultural labourers for other households, receiving a meal for their family or a small amount of cash (R3-R5/day) in return

⁹ In January 1998 the exchange rate between Rand and US Dollars was R5.2 = \$1.

for a days work. Another common form of local business is the production and sale of agricultural produce. The most common among these are maize, potatoes, cabbage, spinach, usually grown on a large scale in fields on the margins of the village. In addition, many families keep stands of *insangu* (*Cannabis sativa*) for sale to merchants from Johannesburg and Durban. This is widely known to be illegal, and is rarely consumed in the village (except for medicinal purposes), but represents a significant source of income for many households.

5.2.3 Local subsistence

In light of the local economic situation, subsistence is a daily concern for most families in Nkonisa. In gross terms, sources of food can be loosely divided into cash purchases and local agricultural production. Most households described themselves as relying on cash purchases for 40%-70% of their subsistence, and on agricultural production for 30%-60% of their subsistence¹⁰. These proportions can fluctuate heavily, as a poor rainy season or the loss of a job can force a family to rely more heavily on cash incomes or agricultural production, respectively. The unsteady balance between these two sources illustrates the relative food insecurity which faces most households.



Cash purchases typically take place at markets either within the village, at Nkandla town (15 km), or Melmoth (50 km). The most commonly purchased produce items include cabbage, maize meal, spinach and potatoes—all foods which can also be grown locally. Other regular purchases include sugar and vegetable oil. When available in local markets and economically accessible to households, fruits produced in the region, including bananas, oranges and apples, may also be bought.

Almost every household in Nkonisa has a small plot of land (from 0.5 to 2 hectares) adjoining the homestead. In this home garden, maize, potatoes, spinach, and cabbage are commonly grown. Other foods, such as carrots, beetroot, onions or turnip may be grown as well. As mentioned above, agricultural crops can be used in period of cash shortfalls to compensate for the foods which can not be bought. However agricultural production can not be separated entirely from household cashflow. For many garden products, seed must be purchased, and in

¹⁰ Although general, these proportions indicate the relative lack of food security among the families of Nkonisa. In the context of rural South Africa, in which reliance on cash purchases for subsistence is commonplace, a household's regular use of over 50% of its cash income for basic subsistence purposes is an effective indicator of food security (R Swart, personal communication).

some cases additional inputs (usually fertiliser) are used to improve yields.

Livestock play only a minor role in local agricultural production. Although the wealthier households in the community have one or more cattle, these are reserved for slaughter on special occasions only. Goats and chickens are also common among medium- and upper-income families in Nkonisa, and are sometimes bought and sold between villages in local entrepreneurial activities.

In viewing the foods procured from local purchases and agricultural production jointly, the prominence of four crops—maize, potatoes, spinach and cabbage—is immediately apparent. That these four foods are the most commonly bought and grown emphasizes their relative importance. It also illustrates the inadequacies of both cash income and local production in meeting local subsistence requirements. Most households in Nkonisa could not rely on either of these alone.

5.3 Conclusion

Each half of this section presents background understandings with implications for *imifino* use and disuse in Nkonisa. The processes of forced relocations, particularly market expansion and the impacts of environmental degradation, have created unique socio-economic and ecological contexts which help to shape local subsistence. These contexts are described at the local level, as the household economics and subsistence within Nkonisa create an environment in which *imifino* are situated.

6.0 Ethnobotanical and social perspectives on *imifino*



Figure 8: Children washing clothes in a stream; it is during household chores like these that *imifino* collection often takes place



Figure 7: Woman collecting *imifino* on the edge of a household garden

This section presents findings on the ethnobotanical and social aspects of *imifino*. These include a broad range of topics, from local taxonomies and collection practices to the social differentiation and communication of traditional vegetable knowledge. These data are presented to explore the nuances in the local knowledge and use of *imifino* in Nkonisa.

6.1 Definitions of *imifino*

Throughout this research, the Zulu term *imifino* is employed as a salient category which includes all leafy green vegetables and refers particularly to non-cultivated or traditional species. This definition is standard across Nkonisa, and indeed most of rural KwaZulu-Natal. It is important to note that the term may in fact have several different precise local definitions even within a single community.

According to most participants in in-depth interviews, the most accurate meaning of the term *imifino* is *undomesticated leafy green vegetables*. This definition includes both exotic and indigenous species, semi-cultivated as well as wild. In all likelihood, this definition comes the closest to approximating the pre-colonial use of the term. Indeed, early European students of Zulu language agree that *imifino* can be described as “any wild growing vegetable or plant with edible leaves” (Gerstner 1938, cf. Bryant 1907). All senior participants in this study, including village *indunas* and others, provided this definition without exception. In all, over half (58%) of participants described *imifino* in this manner.

However *imifino* may also be commonly used in a more inclusive manner. Another popular definition is simply *leafy green vegetables*, including both fully cultivated exotic species (such as spinach and cabbage) as well as traditional leafy green vegetables (which are either semi-cultivated or completely wild). While this definition was encountered less frequently in interviews (34% of participants defined *imifino* in these terms), it was commonly given by younger participants.

At its most general, *imifino* may simply mean *vegetables*. In this instance the term is broad enough to include both root crops and leafy vegetables, exotic and indigenous, cultivated and wild. This gross translation of the term is found in most contemporary dictionaries. However, this interpretation was found to be rare in the study area: in the household survey, less than one-twentieth of respondents defined *imifino* in this way. Among those who employ the broader definitions of *imifino*, traditional leafy green vegetables still fall under the rubric of *imifino*, but are referred to more specifically as *imifino yasendle* (“wild vegetables”) or *imifino isiZulu* (“Zulu vegetables”).

6.2 Knowledge of *imifino*

Within the general term *imifino*, a total of 39 different names for types of undomesticated leafy green vegetables were collected in the study area, representing 27 known species, three synonyms for known species, and another nine unknown species¹¹. A list of *imifino* names, additional spellings or alternate names, and their scientific equivalents is presented in figure 9 (below). On average, each participant in the survey (200 total) could name five species (median = 5). The most named by one individual was thirteen, while only one participant could name no *imifino*.

¹¹ When possible species were identified using various lists of Zulu and scientific plant names. These ranged from herbarium specimen data (courtesy of the National Botanical Institute, Pretoria), to early Zulu-English dictionaries (ex. Bryant 1907, 1909; Doke and Vilikazi 1964; Gerstner 1938, 1939, 1941) to contemporary botanical summaries (Hutchings, et.al. 1996; Tooley 1996).

Figure 9: Zulu and Scientific names for imifino species in Nkonisa¹²

Zulu Name	Scientific Name	Family	Synonyms	Other names ¹³
amazambane	Generic tuber/foot			
ibisi	unknown		isibisi	
idoyea	<i>Maesa alnifolia</i>	Myrsinaceae	idoi	
ikhelengese	<i>Lepidium capense</i> , <i>Lepidium</i> spp.	Brassicaceae		
iklabeklabé	<i>Sonchus oleraceus</i>	Compositae	ihlabehlabé	ugamtemfe
imbati	<i>Urtica</i> spp., <i>Fleurya</i> spp.	Urticaceae		
imbilikicane	<i>Chenopodium</i> spp.	Chenopodiaceae		common lambsquarter
imbobela	<i>Asystasia schimperi</i>	Acanthaceae		
imbuya	<i>Amaranthus</i> spp.	Amaranthaceae	imbitho	pigweed
imoni	unknown		imonika	
impasha	unknown			
indebeza	<i>Colocasia esculenta</i>	Araceae	umdumbe (corm)	taro, manioc
inkhaza	<i>Euclea natalensis</i>	Ebenaceae		igabhe
intanga	<i>Cucurbita</i> sp.	Cucurbitaceae	amaphuzi (fruit)	iloshane, pumpkin leaves
intebe	<i>Zantedeschia albomaculata</i>	Araceae		ugcagcambane
intshungu	<i>Momordica foetida</i>	Cucurbitaceae		uqoboboqo
iqangi	<i>Buddleja salvifolia</i>	Loganiaceae	igqange	wild sage, sage tree
isgejane	<i>Portulaca oleracea</i>	Portulacaceae		incisili (flowers), purslane
isikhwa	<i>Thulbaghia alliacea</i>	Liliaceae		wild garlic
isiphuthumani	<i>Aloe cooperi</i>	Liliaceae		
isishulu	unknown			
ubatata	<i>Ipomoea</i> spp.	Convolvulaceae		ugwaba, sweet potato
ugobho	<i>Gunnera perpensa</i>	Haloragaceae	ugobhola	
ugwabuzela	<i>Riocreuxia torulosa</i>	Asclepiadaceae		
umadoya	<i>Asclepias albens</i>	Asclepiadaceae		
umalalavele	unknown			amalenjane
umamsangwini	unknown			umathoyisa
umasihlalisane	unknown			
umcaza	<i>Crotalaria capensis</i>	Fabaceae		sunhemp
umkhulu	<i>Strychnos madagascariensis</i>	Loganiaceae		
umpampini	<i>Cucurbita pepo</i>	Cucurbitaceae		pumpkin or squash leaves
umsobo	<i>Solanum nigrum</i>	Solanaceae		common nightshade
ungontsha	<i>Sarcostemma viminalis</i>	Asclepiadaceae		
uqadolo	<i>Bidens pilosa</i>	Asteraceae	ucucuze, ucadolo	blackjack
usankuntshane	<i>Ophioglossum engelmanni</i>	Ophioglossaceae		
ushukeyana	unknown			

A number of the plant names mentioned by participants were synonymous with those mentioned by others (i.e., two names referring to the same species of plant). These duplications took two forms. First, synonyms from dialects of Zulu or closely related languages, such as Xhosa or Siswati, appeared¹⁴. This is the case for *imbuya* (*Amaranthus* spp.), which is sometimes referred to as *imbitho* (Xhosa). Similarly, *uqadolo* (*Bidens pilosa*) was sometimes referred to by its Siswati name, *ucucuze*. Another type of *imifino* synonym comes from differing names for specific parts of a single plant. For instance, *indebeza* is used to refer to the edible leaves of the taro plant (*Colocasia esculenta*), while *madumbe* is used to

¹² Photographs of various *imifino* species can be seen in figure 19 (*imbuya*, *Amaranthus* spp.), figure 20 (*intanga*, *Cucurbita* sp.), figure 31 (*intshungu*, *Momordica* spp.), appendix 11.6 (*uqadolo*, *Bidens pilosa*), 11.7 (*intanga*, *Cucurbita* sp.), 11.8 (*imbilikicane*, *Chenopodium* spp.), 11.9 (*umadoya*, *Asclepias albens*), 11.10 and 11.11 (*intebe*, *Zantedeschia albomaculata*).

¹³ These include other Zulu names as well as common English names where they exist.

¹⁴ In other instances, Zulu and Siswati names are identical, as in the case of *ugobho* (*Gunnera perpensa*).

refer to its edible corm; however, some participants referred to *madumbe* (and not *indebeza*) as a kind of *imifino*. This is not true of all plants, however, as *ubatata* is used to refer to both the edible leaves as well as roots of the sweet potato (*Ipomoea batatas*.)

The body of knowledge presented here is a synthesis of evidence generated by two separate techniques designed to measure each participant's knowledge of *imifino* species. First, free listing exercises allowed participants to mention all of the species they could think of without prompting of any sort. Immediately afterwards, a checklist of 40 *imifino* names, compiled from the earlier in-depth interviews and documentary sources, was tested for species knowledge with each participant. If a species was recognised in the checklist, participants were also asked whether the species was available locally.

The results of each of these techniques are presented in figure 10 (below). The free-listing and checklist techniques generated slightly different results for most species, as the percentage of times a species was mentioned without prompting was generally somewhat lower (usually between 10 and 40 percentage points) than the number of times it was recognised among a list of names (with prompting). However, this phenomenon is inherent in the differential techniques: participants are often more likely to recognise a name which is presented to them than they are to provide it without prompting. Of the forty names only one species was mentioned more often in free-listing than it was recognised in checklists (*umamsangwini*, scientific name unknown).

Moreover the results of the free listing and checklist exercises are broadly parallel. There are few large discrepancies between the percentage of times a species was mentioned in free lists compared to the percentage of times it was recognised in checklists; most results fall between ten and forty percentage points. There are several notable exceptions to this, primarily among species which may be widely known but not as *imifino*. For example, *ubatata* (*Ipomoea batatas*) was actively mentioned as an *imifino* in only 1% of free listing exercises, but was recognised in 92% of checklists; presumably this recognition stems from the widespread consumption of the plant's tuber, the sweet potato, rather than its leaves.

These results indicate that a large number of species are recognised as edible wild leafy green vegetables. The total sum from the listing exercise of 36 species appears extensive, particularly in comparison with other examples from the region. In South Africa, Cunningham (1988) reports 27 "wild spinaches" eaten by the Tembe Thonga of the Ingwavuma area of northern KwaZulu-Natal, and Gomez (1988) lists 20 wild vegetables consumed in Zimbabwe. In addition, Ogle and Grivetti (1985b) report 25 edible wild greens from a comprehensive survey of Swazi diet.

This relatively high figure is deceptive, however, because the majority of the species mentioned are not widely known. Two-thirds of the 36 species are known as *imifino* by less than 5% of those surveyed, and of the remaining 12 species, only three were mentioned by more than three-quarters of respondents. This indicates a definite 'core' knowledge of *imifino* which is shared by most residents of the village, accompanied by a large number of edible plants which are scarcely known. *Imbuya* (*Amaranthus* spp.), *intanga* (*Cucurbita* sp.) and *uqadolo* (*Bidens pilosa*) are very well known (all mentioned by more than 75% of participants). Although less prominent, *intebe* (*Zantedeschia albomaculata*), *intshungu* (*Momordica foetida*), *imbilicane* (*Chenopodium* spp.), *umsobo* (*Solanum nigrum*) and *indebeza* (*Colocasia esculenta*) also appear to be widely known. The remaining 28 species are known as *imifino* by less than 10%, and most by less than 5% of those surveyed.

profile further illustrates the considerable variation in knowledge of *imifino*. The number of *imifino* species known was clearly patterned along lines of age and gender. Only 34% of participants less than 25 years old could name more than 5 types of *imifino*, compared to 65% of those over 25 (chi square = 26.99; $p = 0.00015$; $df = 6$). 40% of men could name more than five kinds of *imifino*, while 56% of women could name more than five types of *imifino* (chi square = 10.49; $p = 0.016$; $df = 2$). On average, women could name at least one more species of *imifino* than men in free listing exercises.

The frequency distribution and socio-economic variations in the knowledge of species help to indicate that the body of indigenous knowledge around *imifino* in the study area is unevenly distributed. This is demonstrated in part by the relatively small core of widely known *imifino*, especially in comparison to the sizeable total number of known species. In addition, this body of knowledge is held by a specific subset of the population, particularly senior women. In some respects, the highly patterned nature of this knowledge may be normal, as there are numerous examples of similar patterning of indigenous knowledge from other communities (Chweya and Eyzaguirre 1999). Looking into other aspects of *imifino* knowledge and use beyond the simple recognition of species can help to understand how these findings may be interpreted.

6.3 Classification of species

In comparison to scientific classifications, the local taxonomy of *imifino* operates at a generic level, best seen in the example of *imbilikicane* (*Chenopodium* spp.), which is a general term referring to either *C. murale*, *C. album* or *C. botrys*. Although it may be possible to link some *imifino* names to individual species, rarely does the classification of *imifino* extend to the specific level: the application of some *imifino* names to specific level is probably less indicative of a sensitivity to species differentiation within genera than they are due to the local presence (and/or recognition) of only one species within the genus (Berlin 1992).

There are a few exceptions to this rule, however. In the case of *imbuya* (*Amaranthus* spp.) several participants, most of them with considerable knowledge of *imifino*, noted that there were several different types of *imbuya* available in the Nkonisa area. Specific reference was made to *imbuya batwa*, a thorny type of *imbuya*; in all likelihood this name refers to *Amaranthus spinosa*. Additional references were made to a special *imbuya* with a distinct reddish leaf colour, *imbuya ebomvu*, which is said to grow in certain parts of KwaZulu-Natal. However, no participants were able to locate either plant during field transects for verification.

Similar evidence for sub-generic local taxonomies comes in the distinction between the *intanga* and *amaphuzi*. Most participants agreed that *intanga* and *amaphuzi* refer simply to the leaf and fruit, respectively, of the same plant, *Cucurbita* sp.. However several participants (again, those who demonstrated exceptional knowledge of *imifino* in this and other aspects) felt that the terms *intanga* and *amaphuzi* referred to different species of plants or different varieties of the same species. The distinction in their names arises from the preferred parts of each: *intanga* is favoured for its palatable leaves, while *amaphuzi* produces superior gourds (in fact the name seems to refer to the Zulu verb to drink, *phuza*) (P Mabuza, personal communication). Today the difference between these plants or at least any sensitivity to such difference appears to have been lost in most quarters, and the basis of such a distinction in scientific taxonomy is not known.

scientific taxonomy is not known.

Figure 10: Knowledge and availability of imifino from free-listing and checklist exercises

Zulu Name	Scientific Name	Percentage of times mentioned in free listing* (number)	Percentage of times mentioned in checklist** (number)	If known, local availability*** (from checklist)
imbuya	<i>Amaranthus</i> spp.	93% (186)	99% (197)	100%
intanga	<i>Cucurbita</i> sp.	84% (167)	99% (198)	99%
uqadolo	<i>Bidens pilosa</i>	75% (149)	98% (196)	98%
intebe	<i>Zantedeschia albomaculata</i>	46% (92)	68% (136)	98%
intshungu	<i>Momordica foetida</i>	40% (80)	71% (142)	98%
imbilikicane	<i>Chenopodium</i> spp.	40% (79)	86% (171)	98%
umsobo	<i>Solanum nigrum</i>	38% (76)	70% (140)	98%
indebeza	<i>Colocasia esculenta</i>	17% (33)	28% (55)	100%
imbati	<i>Urtica</i> spp., <i>Flourya</i> spp.	7% (14)	26% (51)	78%
ugobho	<i>Gunnera perpensa</i>	7% (14)	23% (45)	93%
umamsangwini	Unknown	6% (12)	3% (6)	100%
iklabeklabek	<i>Sonchus oleraceus</i>	5% (10)	37% (74)	97%
usankuntshane	<i>Ophioglossum engelmanni</i>	4% (8)	10% (19)	89%
umcaza	<i>Crotalaria capensis</i>	4% (8)	6% (11)	82%
iqangi	<i>Buddleja salvifolia</i>	3% (6)	9% (17)	65%
isishulu	Unknown	3% (6)	14% (28)	89%
imbobela	<i>Asystasia schimperii</i>	3% (6)	19% (37)	57%
umpampini	General Curcubit (exotic)	3% (5)	85% (170)	98%
imoni	Unknown	3% (5)	14% (27)	52%
ibisi	Unknown	2% (4)	6% (11)	82%
idoyea	<i>Maesa alnifolia</i>	2% (4)	2% (4)	100%
ushukeyana	Unknown	2% (3)	36% (72)	93%
umasihlalisane	Unknown	1% (2)	2% (3)	67%
amazambane	Unknown	1% (2)	0% (0)	0%
ubatata	<i>Ipomoea</i> spp.	1% (1)	92% (184)	98%
umadoya	<i>Asclepias albens</i>	1% (1)	2% (4)	50%
impasha	Unknown	1% (1)	2% (3)	100%
isikhwa	<i>Tulbaghia alliacea</i>	1% (1)	2% (3)	67%
ugwabuzela	<i>Riocreuxia torulosa</i>	1% (1)	1% (2)	50%
umkhulu	<i>Strychnos dysophylla</i>	1% (1)	1% (1)	100%
isgejane	<i>Portulaca oleracea</i>	1% (1)	1% (1)	100%
umalalavele	Unknown	1% (1)	1% (1)	100%
inkhaza	<i>Euclea natalensis</i>	0% (0)	2% (4)	100%
ikhelengese	<i>Lepidium capense</i> , <i>Lepidium</i> spp.	0% (0)	2% (4)	100%
isiphuthumani	<i>Aloe cooperi</i>	0% (0)	1% (2)	50%
ungontsha	<i>Sarcostemma viminalis</i>	0% (0)	1% (1)	100%
Synonyms				
ucucuze	<i>Bidens pilosa</i>	5% (10)	11% (21)	90%
imbitho	<i>Amaranthus</i> spp.	2% (3)	16% (31)	94%
amaphuzi	<i>Cucurbita</i> sp.	1% (1)	91% (183)	99%

* This item was phrased, "Please list all the different types of imifino you know."; (n = 200)

** This item was phrased "Please say whether or not you know each of the following types of imifino"; (n = 200)

*** This item was phrased "Is this type of imifino available in this area?"; it was asked only if participants recognised the plant name from the checklist, and thus the percentages presented represent the number of times a species was said to be locally available divided by the number of times that species was recognised in the checklist

6.4 Collection

Within households, the collection of imifino is a task generally allocated to the women and/or

children. If both are unavailable, men will collect *imifino*, though adult (and even adolescent) men usually find the task somewhat demeaning because of its association with women. In the words of one 16 year-old male, "I am still young, and without a wife, so I will collect *imifino* myself if my sisters are away. But when am older I will stop—if people see me picking plants in the bushes, they will think I can not have a wife."

Regardless of age or gender, trips are rarely made away from the house solely to collect *imifino*. The daily activities of most people in Nkonisa, particularly women and children, take them into areas where *imifino* can be found: from agricultural work, to collecting water, washing clothes, or tending cattle. Often children will be given the job of collecting *imifino* on their (often long) walks back from school. It is on these trips during the day that *imifino* are collected for an evening meal.

In almost all instances, only the leaves of plants are eaten (except in the case of plants with edible tubers, such as *indebeza*, *Colocasia esculenta*). Additionally, the whole shoots of young plants will be eaten. In general, young leaves are preferred as the older leaves of many species possess a coarser texture and more bitter flavour, especially *imbuya* (*Amaranthus* spp.) and *uqadolo* (*Bidens pilosa*).

6.5 Storage

The storage of *imifino* is known to be possible by the majority of participants, but practised by less than one-tenth of households. Households which commonly store *imifino* are often those whose members lack the ability to collect fresh plants regularly, such as the elderly or the sick living alone. The most widely recognised method involves drying leaves in the sun for up to three days, and then placing them in a covered container in a cool, dry place, where they may keep for up to six months. Relatively few species (*imbuya*, *intanga*, *uqadolo* and *intshungu*) are preserved in this manner, and most wild species are considered unfit for storage. One benefit of this approach to storage is that because the leaves of most species have high water content, and they lose much of their volume during drying; as a result, a large amount of *imifino* can be kept in a small pot. It is also possible to store *imifino* in water, an approach much less commonly known and practised. This entails keeping *imifino* leaves in a container of water in the shade for several days at most. While storage in this manner may help to keep the leaves fresh, the maximum period of storage is not very long. All those who store *imifino* in this way commented that the leaves sometimes lose their taste.

6.6 Marketing

The buying and selling of *imifino* is occasionally practised at the various trading centres frequented by residents of Nkonisa. Within the village, girls and young women sometimes go from house to house selling mixed bunches of *imifino*. In the market centres of Nkandla town and nearby Melmoth, a handful of older schoolchildren use their summer holidays to collect and sell *imifino*. In these cases, bunches of leaves sell for R1-R3 (US \$0.20-\$0.60) each, and are usually comprised of various combinations of *imbuya* and *uqadolo*. *Intshungu* leaves are slightly more difficult to find in markets, and are generally more expensive and usually sold separately from other species, probably because their collection requires somewhat more time and energy due to the habitats in which *Momordica foetida* grows. Although *imifino* is available at markets in season, it is not common practice to buy *imifino*. Only 22% of 90 household interview respondents said that they had ever bought *imifino*, though another 36% said that they were aware that *imifino* was sold; the remaining 42% of participants did not know that the plants were sold at all.

6.7 Medicinal values

Of particular interest is the handful of *imifino* species which are purported to have medicinal as well as nutritional values. Three species in particular were noted by participants as having special properties in addition to their use as foodstuffs. For some participants, the medicinal values of these species far outweighs their significance as foods, or vice-versa. But for most, these plants provide dual benefits as food and medicine.

- *Intshungu* (*Momordica foetida*) is well known as an effective agent in the reduction of high blood pressure and hypertension. It is widely consumed for these purposes, particularly by the obese and elderly, and is self-prescribed as well as recommended by traditional healers. Its medicinal properties are attributed to its extremely bitter flavour.
- In addition to its role as an *imifino*, *ugobho* (*Gunnera perpensa*) is commonly known for its medicinal values. Its central properties are its ability to prevent complications during pregnancy and childbirth, and also to ease the pain of giving birth. It is effective for both cows and women, and is increasingly prescribed for almost any ailment affecting cattle.
- *Isiphuthumani* (*Aloe cooperi*) is also commonly known for its role in facilitating pregnancy, but is prescribed primarily for women (and not cattle). Gerstner (1941) describes *inembe* (or *isihlambezo*), a medicine used by pregnant women in which *isiphuthumani*, along with *ugobho*, play a central part:

...This infusion is kept covered up in a clay pot by a pregnant woman, and from it she drinks a spoonful now and then during the last three months of pregnancy, which the *isihlambezo* is supposed to make successful, with easy delivery. This medicine must not be drunk by any other women or be looked at by another person except an *inyanga*, otherwise the child will take the likeness of that person, the reflection of the person in the water being presumably swallowed by the women in the drinking and transferred to the child....

6.8 Communication of *imifino* knowledge

Given the obvious ties between the knowledge and use of *imifino*, continued learning about *imifino* is basic for their continued use. The ways in which knowledge of *imifino* is (or is not) communicated between individuals have direct implications for *imifino* use and disuse through time. Here we see that the persistence of knowledge of *imifino*, like all forms of local or indigenous understandings of the environment, is based largely on direct communication between individuals within social networks (Quiroz 1994).

In Nkonisa, most of the current adults participating in the study first learned the names of *imifino* as children between the ages of five and ten years old. Within the household, older female members of the family commonly teach children of both sexes the names of popular types, often as part of learning the names of foods and the preparation of meals. Indeed today most children can name the most commonly known *imifino*—including *imbuya*, *intanga*, and *uqadolo*—well before they can recognise them.

It is only a few years later that elder children, between eight and thirteen years, learn how to identify *imifino* through their collection. This often happens as children accompany and assist adults (usually women) on daily chores around the household, including fetching water, washing clothes or working in home gardens. Such chores usually lead women and children through habitats in which *imifino* may be found. On such trips children are likely to learn to recognise *imifino* first by observing adults collecting particular plants. With time, the children

of a household will be sent out to collect *imifino* without supervision, often returning to the habitats where they have observed adults collecting plants. The first such trips alone may be exercises in trial-and-error, as children collect plants which are not edible. After several attempts they will return with *imifino*.

Through this process, children learn the types of *imifino* which are most commonly consumed within the household. There are numerous more obscure species, however, which are known by name only. Most of these lesser known *imifino* are learned of not through collection as children but rather as teenagers or adults, through conversation with individuals who are particularly knowledgeable of *imifino*. Grandparents and elder female family members are often mentioned as sources of knowledge regarding traditional *imifino* species. There is some indication that these paths of communication, by which children learn the names of *imifino* and how to recognise particular species, are beginning to erode. The reasons for this erosion are diverse, and may be often linked to changing social values (discussed in the following section).

6.9 Social values associated with *imifino*

In Nkonisa and across South Africa, *imifino* are involved in the everyday interaction of social values, revolving around perceptions of the past, 'tradition' and modernity, as well as poverty and wealth. It is important to recognise that the dynamics described here are by no means limited to leafy green vegetables, but are rather a small part of the complex changing contexts of life in Nkonisa, and indeed across KwaZulu-Natal and even South Africa. Nevertheless, these interactions have a significant impact on the use of *imifino*.

By their very nature as resources which pre-date colonial influence, *imifino* are widely associated with a more 'traditional' way of life for many residents of Nkonisa. This conceptual link is inescapable and is integrated into how community members of all ages and stations think about *imifino*. For many youth, *imifino* are "ancient foods" (in the words of one young man) of "deep" or rural Zulu tradition, out of touch with the images of modernity which many young people envision for themselves. Conversely many older members of the community feel *imifino*'s close association with Zulu traditions is its greatest asset; these plants are one of the few remaining symbols referring back to the pre-relocation lifestyles which are usually remembered as times of plenty—a sentiment often summarised in the phrase "*inyama, amasi, imifino*". Literally meaning "meat, sour milk and wild vegetables", this phrase refers to three traditional Zulu foods which are commonly associated with prosperous (and to some degree, traditional) life.

For both young and old, *imifino*, like a host of other 'traditional' symbols, are in many ways at odds with competing elements of modern life and the changes which are gradually embracing the Nkandla area. In comparison with the daily chores of *imifino* collection, modern home gardens with spinach, cabbage and other exotic vegetables represent a far more civilised way of life for many locals. In the words of one 26 year-old woman approached for an in-depth interview "I am too modernised to know about *imifino*—you should speak to my grandmother, she likes those plants."

One corollary of this phenomenon is the direct association of *imifino* with poverty. For most families living in rural Nkandla, change and modernisation (as opposed to tradition) connote 'development', economic prosperity, further integration into the commercial economy, and a decreased reliance on the subsistence production which is at the heart of many household

economies. On the other hand, traditional forms of subsistence are often widely associated with poverty, as those who can not afford more sophisticated means of subsistence—including exotic vegetables—are forced to rely on the widely available *imifino*.

In varying ways, the association of *imifino* with poverty is widely recognised across Nkonisa. When asked who eats the most traditional vegetables in Nkonisa, over 60% of respondents suggested that poorer families, or those without jobs, are likely to eat *imifino* more often than the comparatively wealthy. Indeed, fewer than 10% of respondents felt that the wealthy or employed ate *imifino* more often than other families. It is important to note that many participants were quick to add that there were many reasons to eat traditional vegetables beyond wealth or poverty, and that some prosperous families in fact preferred *imifino* for other reasons including their taste or nutritional value. Nonetheless, the general perceptions of *imifino* as a resource of poverty, along with their place in Zulu tradition, are pervasive social values which impact the consumption of *imifino*.

6.10 Conclusion

Several factors which impact on the local use or disuse of *imifino* emerge from this social and ethnobotanical exploration. First is the clear parallels between the knowledge of traditional vegetables and their use, which indicate that knowledge may be an important limiting factor affecting *imifino* use. As a result the communication of *imifino*-related knowledge becomes especially important. The communication of this knowledge is sensitive to the complex social values which are commonly associated with these resources.

7.0 Ecology of *imifino* in the local past



Figure 11: A stream near Nkonisa, one microenvironment in which some types of *imifino* grow



Figure 12: The foundations of a white-owned farm building from the 1950s in the middle of Nkonisa

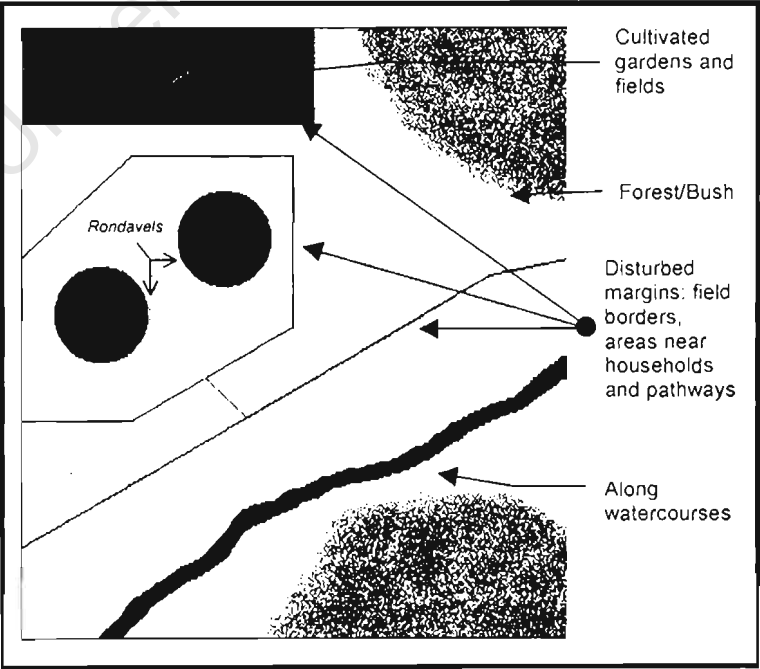
This section outlines the radical changes which have taken place in the last 60 years in the land use and local habitats of the Nkonisa area. The habitats in which *imifino* grow and the issues of the access to and availability of those habitats are discussed. Aerial photographs and interviews with local leaders are used to illustrate a fundamental shift in the vegetation of the area which carries major implications for the availability of many kinds of undomesticated vegetables. Resettlement and environmental degradation are explored as factors affecting the availability and use of *imifino* in Nkonisa.

7.1 Habitats

Most participants made a series of basic distinctions regarding the environments in which *imifino* can be found. There is a clear boundary between land immediately around living and working spaces which is affected in some way by human activity, and the more distant 'wild' areas away from homesteads and villages. Such differences in plant environments can sometimes have considerable impact on the frequency with which species are eaten through the availability of and access to varying habitats.

In very broad terms, the areas in which *imifino* are collected may be categorised into two broad and four specific environments: cultivated areas and marginal and disturbed areas are classified as human-impacted environments; forests, valleys and thick bush, and swampy areas or water-courses are always classified as 'wild' areas. Cultivated areas include the home gardens around homesteads, as well as larger fields farther away. Marginal and disturbed areas are more diverse, ranging from the borders of fields, paths and roadsides to cattle kraals and refuse deposits. One prime example of such marginal areas comes from the term *amabuya* (from which *imbuya* likely derives its name) meaning areas cleared of bush where fields are to be cultivated (cf. Doke and Vilikazi 1964). The types of ecological niches which are characterised by watercourses and areas of forests and thick bush are more straightforward (see figure 13). One micro-environment notably absent from this list is the grassland which dominates much of the landscape of the study area; no participants reported collecting *imifino* from these areas.

Figure 13: The local habitats of *imifino*



Although some types of *imifino* can be found growing in more than one environment, most

are harvested primarily from a particular habitat. The distribution of species across the various habitats is presented in figure 14 (below). This shows that only a moderate range of *imifino* species are found in the cultivated and marginal areas near homesteads. The ‘wild’ bush areas around the village is home to the greatest number of *imifino* species (14), while the fewest species are found in the most delimited habitat, watercourses and swampy areas (five). Although a greater number of species may be found in other habitats, six of the seven the most popular species (*imbuya*, *intanga*, *uqadolo*, *intshungu*, *mbilikicane* and *umsobo*) can all be found in gardens, fields and/or disturbed or marginal areas. Only one—*intebe*—can be only be found away in a habitat away from human activity.

Figure 14: Distribution of *imifino* species among local micro-environments

Habitat	Species (n = 27)*	Total number**
gardens, fields	<i>imbuya</i> , <i>intanga</i> , <i>uqadolo</i> , <i>umadoya</i> , <i>indebeza</i> , <i>ubatata</i> , <i>umpampini</i>	7
HH margins, disturbed areas, kraals	<i>imbuya</i> , <i>intshungu</i> , <i>uqadolo</i> , <i>umsobo</i> , <i>mbilikicane</i> , <i>umadoya</i> , <i>isgejane</i> , <i>iklabeklabé</i>	8
valleys, forests, bush areas	<i>intshungu</i> , <i>mbilikicane</i> , <i>iqangi</i> , <i>isikhwa</i> , <i>inkhaza</i> , <i>imbobela</i> , <i>isiphuthumani</i> , <i>ugwabuzela</i> , <i>ungontsha</i> , <i>umkhulu</i> , <i>ikhelengese</i> , <i>iklabeklabé</i> , <i>umcaza</i> , <i>idoyea</i>	14
watercourses, swampy areas	<i>intebe</i> , <i>imbati</i> , <i>usankuntshane</i> , <i>ubatata</i> , <i>ugobho</i>	5
*The 7 species which could not be identified in the field or linked to a scientific name are excluded from this analysis		
**One species can be found in more than one habitat		

The contrast between the distribution of species (which favours ‘wild’ environments) and their popularity (which favours cultivated or marginal habitats) raises the questions around the relative availability of and access to various types of species.

7.2 Availability

The habitats in which species grow can influence their use or disuse, particularly in relation to other *imifino* species, for a series of reasons related to availability and access. In very broad terms the availability of a species is based on the continued survival of an *imifino* population in the face of various pressures and the continued existence of an appropriate microenvironment in which a particular species can exist. The ease of access to a given habitat is crucial. Even if a particular species exists in an appropriate micro-environment, that species is unlikely to be collected frequently if its location is distant or difficult to reach. Conversely the species which live in accessible microenvironments may be more likely to be harvested than those in less accessible habitats (this may even hold true given equivalent availability of two species).

In the case of *imifino* in Nkonisa, it is apparent that accessibility and availability are important factors in determining which wild and weedy leafy green vegetables species are known and in turn used. For example, there is a clear link between the knowledge of an *imifino* species and its local availability. From the checklist exercise, an *imifino* species was noted as **not** being locally available in less than 5% of cases (91 of 2021) in which that species was known¹⁵. In other words, the vast majority of recognised *imifino* species are locally available and participants know of relatively few types of *imifino* which are not locally available. This trend suggests that availability may be a strong factor in limiting the knowledge, and subsequent use, of *imifino*.

Another factor in determining the local availability of any species is the existence of suitable habitats to support plant populations. Given the local environmental disturbances of the past 40 years there is clearly scope for a significant reduction in some of the environmental niches in which *imifino* are found, particularly the ‘wild’ areas around watercourses and in forests

¹⁵ Participants were not asked to comment on the availability of species which they did not recognise.

and undisturbed bushveld. This is confirmed in interviews with some of the first individuals to be resettled to Nkonisa, who note a decline in the availability of wild species:

- LM: ...and what about the wild *imifino*, do you still eat as much wild *imifino* today as when you were a child?
- P3: No we [our family] eat very little wild *imifino* today. Except for *intshungu*, which I still eat when I can find it, just for my health. But other *imifino* we don't eat often. I send the children, but they always said they can not find it. I thought they were lying to me, so I went once on a Sunday, but could find nothing—no *imbati*, no *intebe*—none of the ones we could find before.
- LM: Before—before you came to Nkonisa, when you were still in Babanango?
- P3: No. After we moved to Nkonisa. We did find some of the wild *imifino* when we came here. There was *imbati*, *intebe*. Madladla [a neighbor's] children would fetch *ugobho* for us also. But now, we can not find any wild *imifino*, only the ones from the garden.
- LM: Why do you think this has happened?
- P3: I don't know... Maybe it is because Madladla's children are older and don't fetch for us. But even if someone goes to get for the old people today, they will not find any *imifino* in the bush. I don't think they grow there anymore—there is no place for them to grow....

7.3 Seasonality

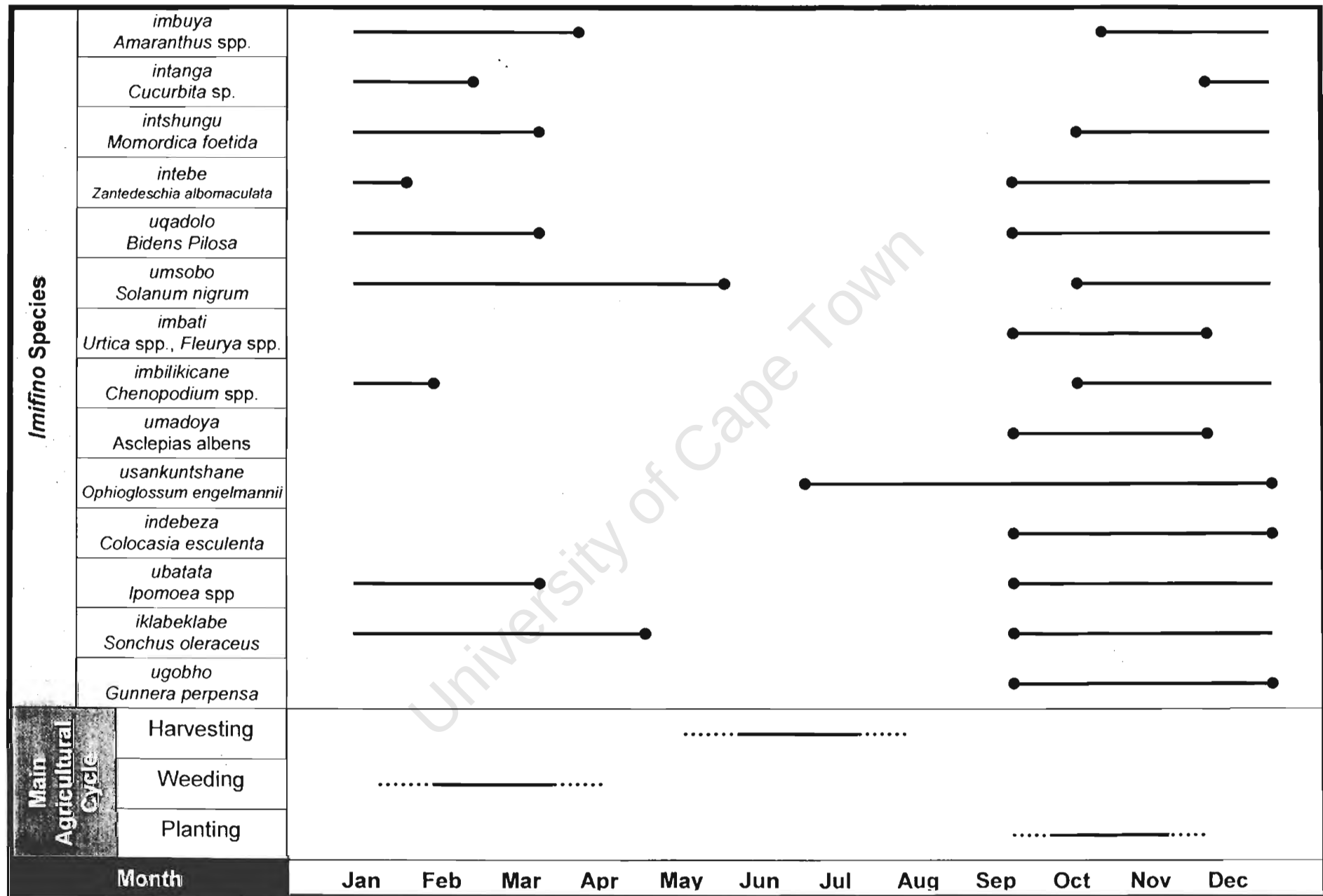
Seasonal variations are a significant factor in determining *imifino* availability and subsequent use. Regardless of habitat, the majority of *imifino* are found in the spring and summer months, emerging between September and November and continuing their availability through March and April (see figure 15, below). In fact, traditional vegetable consumption drops significantly in the winter: most households estimated that they eat less than half as much *imifino* in the winter as in the summer. This drastic decline is due in part to reduced availability, as only a handful of species is available in the winter and all of them are found only in wild settings. Another factor contributing to this seasonal variation in consumption is the main agricultural cycle, as most cultivated plants are harvested in the winter months of May, June and July.

7.4 Access

While availability is likely to be limited by seasonal and ecological dynamics, accessibility is affected largely by human factors. One focus of access is the labour necessary for collecting *imifino* as the participant in the above interview mentions. Whether in the form of one's own family members or the neighbor's children some kind of labour is necessary to collect *imifino* and most households have the capacity for such labour, usually in the form of children or women. If free labour is not available, it is not unheard of to pay someone outside the family—usually children from the village—a small sum (about R 0.50, or US \$0.10) to collect bunches of leaves. This is comparatively uncommon, but does take place among older residents of the village living alone, who may have a special preference for *imifino* but lack the mobility to collect it themselves.

Another element of access is property rights and the socio-legal ability to access the habitats in which various *imifino* grow. With the exception of homesteads and adjacent home gardens, almost all of the environments in which *imifino* grow are broadly treated as communal lands. This applies to the 'wild' habitats, such as along streams and rivers, bushveld and forests. In addition, most agricultural field space in Nkonisa (much of which is located away from the village) is treated as communal land with regard to *imifino*. Although a single household may be allotted a particular parcel of land to work for a season by the village *inkosi* (chief), any

Figure 15: Seasonal availability of selected *imifino* species



resident may collect *imifino* growing in or around that field. Disputes over access to *imifino* collecting areas are unheard of. This is largely because most species harvested from the wild are eaten infrequently and thus there is little demand; most participants felt that the *imifino* species which are found in and around disturbed areas are available in abundance in season, creating an excess of supply.

While both labour and property rights can help influence accessibility, the single greatest factor limiting access to *imifino* is knowledge. Knowledge of *imifino* is comprised of a number of different topics which touch on all aspects of *imifino* use: where and when a plant is available, how to harvest it, if and how to store it, how to prepare it, etc. Within these diverse topics the ability to recognise a particular species is of overriding concern. Without this capacity, putting any other aspect of *imifino* knowledge into practice is difficult.

Numerous participants in this study knew the names of some *imifino* species and were sure that these were locally available, but admitted that they did not know what the plant looked like and thus were unable to locate it. In light of this trend, it is probable that research techniques investigating *imifino* knowledge which are based on naming exercises (such as checklists and free listing) may be likely to *overestimate* the useful knowledge of *imifino*.

7.5 Changing landscapes

For the purposes of analysis, local ecological history is divided into four phases, each with a distinct environmental footprint: the relatively undisturbed era of pre-European settlement in the area (1930s-1940s); the years of European-owned plantations (late 1940s-early 1960s); the period of forced removals (mid-1960s-early 1980s); and present (mid-1980s-present). A series of aerial photographs from these periods (from 1937, 1953, 1965, 1975 and 1992) provide a general overview of changing local vegetation and settlement density, while ethnohistorical accounts from the 1960s to the present provide more detailed insights into the area's changing landscapes.

Pre-European Settlement (c. 1930s-1940s)

Although it was mapped by colonial authorities (along with the rest of the Natal) during the 19th century, there is no historical account of a significant European presence in the area of what is today Nkonisa before the late 1920s. A map of Zululand (as it was then called) from 1905 denotes the area as part of Native Reserve XIX. The sole outpost in this area was a Lutheran mission station at Nkandla town (Altern 1905). By all accounts the nearest European farming settlements were probably some 30-50 kilometres away, as families from northern Natal moved to Eshowe to avoid the conflict of the Anglo-Boer War (1899-1902). From Eshowe, these few families resettled in the Tugela valley south of the Nkandla mission station (J Hawke, personal communication; Japha et. al. 1993).

Although no (ethno-)historical accounts exist referring to the area's vegetation during this period, it is possible to approximate the species present in the area from aerial photographs of the 1930s and analogies with undisturbed indigenous vegetation elsewhere in the district. From the 1937 aerial photograph, the area was clearly dominated by highly palatable seasonal grasslands of Natal Redgrass (*Themeda triandra*), Hairy Tridentgrass (*Tristachya leucothrix*) and Speargrass (*Heteropogon contortus*). Scattered Sweetthorn trees (*Acacia karroo*) were likely to be found scattered throughout and were densely abundant in sheltered valleys. Less prevalent grasses in this ecogeographic region include *Trachypogon spicatus*, *Diheteropogon amplexans*, and *Eulalia villosa* (Low and Rebelo 1997; Moll 1976, 1978).

European farming (late 1940s-early 1960s)

By the mid-1950s large portions of the area in what would become Nkonisa had come under the control of European farmers. An aerial photograph taken in 1957 shows a number of European farmhouses and large tracts of fenced land. These farms appear to be under mixed agriculture, with small cultivated fields (probably maize) and larger areas of fenced-off rangeland for cattle around western-style homesteads. This intensification in land use is accompanied by the cultivation of large stands of exotic forest (although it is difficult to discern the precise species). In addition, the first signs of industrial agricultural production are apparent in vast areas of mechanically-prepared fields and large farm sheds, areas which later accounts indicate were organised into plantations.

Forced resettlements (mid-1960s-1980s)

Sometime in the early 1960s, the white-owned farms of the area were purchased in bulk by the government to receive resettled households. This was a common practice in the process of forced relocations, and was happening elsewhere in Nkandla at the time (Desmond 1970). With the influx of inhabitants forcibly removed to the Nkonisa area during the mid-1960s and 1970s, individual accounts of the resettlement practices and local land use—obviously not available before this time—can provide an important guide for the interpretation of the aerial photographs taken in 1967 and 1975. The first families relocated to Nkonisa were moved by government vehicles, also known as “GG” trucks, in 1964 and 1965. Although families came from across Natal the majority were taken from black spots around the towns of Weenen, Danhauser, Vryheid and Escort. In the words of one of the first individuals to be moved to Nkonisa:

We came in 1964, with the others from Nombamba [a black spot near Weenen]. The GG trucks moved us, with all the possessions we were able to carry. We came with Sosibo, Ngcobo, Madladla and S'khosansa [other families]. Others came the next year, and many more after.... When we came here, a GG told us we could work on the farm with *usiligwana* [sisal, *Agave sisalana*]. We were told to not plant gardens, there was a market in Nkandla where we could buy all the food we needed.

According to an early resident, the first families at Nkonisa were each allotted one acre parcels of land and provided with tents until they built their own homes. In time, other smaller groups composed primarily of evicted tenant farmers were moved from elsewhere within KwaZulu, most notably Msinga, Babanango and other areas of the Nkandla district:

We came in September 1969, after Chief Gilbert Mbhele had come from Weenen. But we came from Babanango, where my father was working on a farm. We came with everything—cattle, sheep, horses, goats, and all our house. But after a year here, the man from GG said there were too many animals, and we must only keep five cattle and sell the rest. Many people were upset by this. Later they said we could keep all we wanted, but must pay 25 cents a year for every animal more than five. This was too much, we were already paying R3 each year for every kraal—too much. My father had to work with the *iwattela* [wattle, *Acacia mearnsii*], but had to ask before he could use the trees for our new home.

The oral testimonies by residents of Nkonisa begin to shed light on the local land use activities during the height of forced relocations in the 1960s and 1970s. As in other cases in KwaZulu, the relocation of families helped to provide labour for a series of white-owned industries, in this case plantations of Phormium, sisal and wattle¹⁶. According to early

¹⁶ Phormium (*Phormium tenax*) was first widely grown as an industrial crop in Natal during the 1930s. It was subsidized by the government to produce rope fibre during World War Two, but became economically unsustainable in the 1950's after subsidies

residents, wages on these plantations were minimal although workers were expected to spend their wages on subsistence for themselves and their families. Despite the government's insistence that families do not cultivate gardens, it appears that most did.

These insights are confirmed by aerial photographs of the area from 1967 and 1975. In both images, modern farm buildings and mechanically contoured rows are clearly visible, as are the homesteads of many of the relocated families intended as local labourers. According to residents, these plantations operated through the late-1970s. But in the first years of the 1980s, the owners of the plantations moved out with little warning. In the words of an *induna* of Nkonisa:

At one of our meetings in 1983, eight men, whites, came from Pietermaritzburg and told us that they were sent by the government. They said that the sisal and wattle land was going to be given to Mbhele [the *inkosi*]. He could have the land to do what he wished....After that, the GG came and built a fence around the village, on the other side of these hills. They told us that we can have as many cattle as we wish, but we must keep our cattle within that fence.

As the land was handed over to the *inkosi*, he distributed it among local households. While every family continued cultivating a garden around their homestead, they were also allocated field space to grow the crops of their choice (usually maize or potatoes). In the years that followed, the former plantation areas were gradually razed: farm sheds were raided for building materials, and a series of bush fires were used by locals to clear the grounds of the former plantations.

Mid-1980s—Present

A new plantation moved into Nkonisa in the late 1980s, as Mondi Forests (one of South Africa's largest timber companies) began to rent the plantation lands from the government of KwaZulu to grow pine (*Pinus* sp.). This modern plantation is still active in the area today, coexisting alongside the cultivated fields given out by the *inkosi* fifteen years ago.

In addition to the pine plantation, the ecology of the Nkonisa area bears only vague resemblance to the indigenous vegetation which originally occupied the region. Today the grasslands are dominated by Ngongoni Bristlegrass (*Aristida junciformis*) and scattered forests of Bluegum (*Eucalyptus* sp.), Wattle (*Acacia mearnsii*) and pine. Valleys, water courses and low-lying areas are dominated by dense clusters of forbs, including Natal Vernonia (*Vernonia natalensis*), Wild Verbena (*Pentanisia prunelloides*) and Rasp Thistlethorn (*Berkheya setifera*) (Moll 1976, 1978).

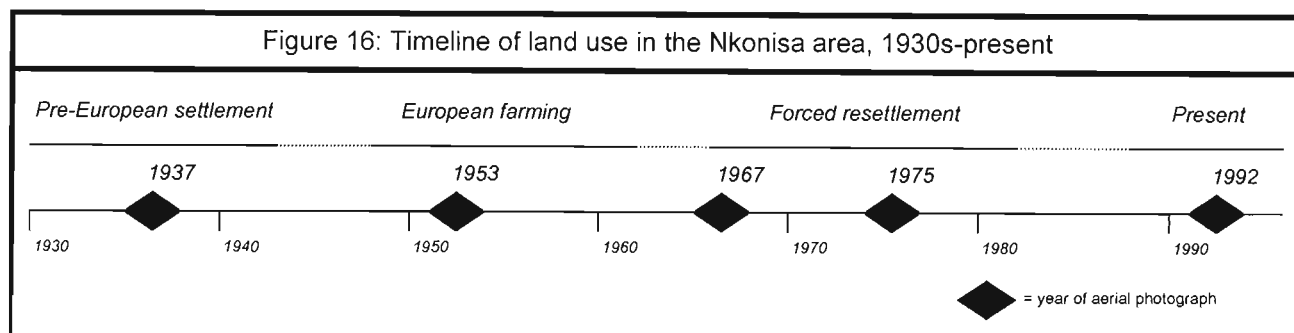
The crumbling foundations of the old plantation house, overgrown with exotic forbs, gives some hint of the area's recent history. Nearby, the size of scattered fruit trees—including litchi, mango, guava, avocado, pear and apple—indicate that they were tolerated remnants of the area's former occupants.

7.6 Discussion

This local history of settlement and ecology raises two issues which potentially impact the knowledge and use of *imifino*. First, the resettlement of families from different parts of KwaZulu-Natal raises the possibility of placing them in a new and relatively unfamiliar

were removed (R Farren, personal communication). Sisal was also grown for fibre production, and can be seen across KwaZulu-Natal today as a weedy invader species. Wattle was used in the production of tannins for the leather industry and more recently as raw material for paper pulp.

ecological setting where there knowledge of *imifino* may be different. Second, the changing land use patterns in the area and an increase in population density is likely to have had profound effects on the local vegetation.



7.6.1 Resettlement

In moving to Nkonisa many families were relocated into an environmental setting which was likely to be somewhat different from their previous location. Looking at the indigenous (i.e., undisturbed) vegetation and biome types of the areas from which resettled households came, we see that none of the households originated from areas with the same type of indigenous vegetation as Nkonisa (Coast-Hinterland Bushveld), while some 29% of households were moved from biomes which are radically different from the Savanna of Nkonisa (see figure 17; see also appendix 11.1 for a map of KwaZulu-Natal with these sites).

Figure 17: Vegetation and biome types of areas from which Nkonisa households were resettled

Original Household site	Percentages of HH originating there (n = 90)	Original site vegetation type (Low and Rebelo 1998)	Original site biome
Vryheid	22%	Natal Central Bushveld	Savanna
Danhauser	14%	Natal Central Bushveld	Savanna
Weenen	11%	Valley Thicket	Thicket
Escourt	10%	Natal Central Bushveld	Savanna
Newcastle	7%	Northeast Mountain Grassland	Grassland
Babanango	6%	Natal Lowveld Bushveld	Savanna
Dundee	6%	Natal Central Bushveld	Savanna
Greytown	5%	Short Mistbelt Grassland	Grassland
Mooi River	3%	Moist Upland Grassland	Grassland
Msinga/Tugela Ferry	2%	Valley Thicket	Thicket
Nongoma	2%	Natal Central Bushveld	Savanna
Paulpietersburg	2%	Northeast Mountain Grassland	Grassland
Nqutu	1%	Northeast Mountain Grassland	Grassland
Mahlabatini	1%	Moist Upland Grassland	Grassland
elsewhere in Nkandla	3%	n/app	n/app
not known	5%	n/app	n/app

Clearly this evidence suggests that many of the households relocated to Nkonisa came from areas with entirely different kinds of flora. It is difficult to speculate as to how ensconced residents were in the vegetation surrounding their original homes, and thus how new and unfamiliar the vegetation and *imifino* of Nkonisa may have been immediately after their relocation. Certainly some of the elder participants in this study noted their encounters with ‘unknown’ flora when they first moved to Nkonisa, along with the subsequent changes in local landscapes.

By moving families between different environments the process of resettlement has been likely to emphasise the use of *imifino* which were available both in the original location as well as in Nkonisa. These species, including *imbuya* (*Amaranthus* spp.), *uqadolo* (*Bidens pilosa*), and *intshungu* (*Momordica foetida*) are widely adapted across the region (and indeed most of Africa), and can be found in each of the different vegetation types and biomes from which Nkonisa households came¹⁷. The influence of resettlement on *imifino* use was compounded by the environmental disturbance of changing land use patterns of the area, discussed below.

7.6.2 Changing land use

In addition to the human adjustment to new vegetation types, the changing land use patterns around Nkonisa and the increase in the local population over the past 60 years has potentially had indirect impacts on the availability and use of *imifino*. As seen in figure 18 (below) the density of settlements has increased dramatically during this period. From a settlement density of 0.6 households per square kilometre in 1937, the population in the area increased slightly to 0.9 settlements per square kilometre in 1953. During this period almost all the settlements in the area appear to be white-owned farms. After the first families were forcibly moved to Nkonisa in the early 1960s, the settlement density grew to 2.1 per square kilometre in 1967 and 6.1 in 1975. By 1992, the settlement density stood at 8.5 households per square kilometre, a four-fold increase in 30 years.

Figure 18: Approximate Settlement Densities in Nkonisa, 1937-1992, as calculated from aerial photographs

Year of Aerial Photograph	Number of HH Visible	Approximate Area of Aerial Photograph (km ²)	Approximate Settlement Density (HH per km ²)
1937	12	20	0.6
1953	32	36	0.9
1967	98	46	2.1
1975	297	49	6.1
1992	414	49	8.5

As in other 'homelands' across South Africa, this massive increase in the population of the Nkonisa area inevitably had significant impact on the local environment. The most obvious is the demands on grazing space for livestock. Despite the attempted limit on five head of cattle per household, many households (particularly the wealthy) are reported to have had as many as 20 head of cattle when they arrived in Nkonisa. The subsequent overgrazing of most rangelands led in turn to widespread erosion of hillsides, creating deep ravines which are plainly visible in the aerial photographs of 1975 and 1992.

In addition to the increased population, the presence of plantation agricultural systems in the area clearly had radical impacts on local vegetation. Specifically, the disturbances which the sisal and wattle plantations created, along with their associated human habitations, created a foothold for weedy local and exotic species in the area. In time, these species would thrive and eventually replace many of their indigenous counterparts. These exotic species include intentional introductions, such as the plantation crops themselves and other useful species. In other instances, unintentional introductions would come to dominate niches within the

¹⁷ Conversely, several participants remembered varieties of *imifino* that were available at their previous residence but were not known to be found in or around Nkonisa. These include *isiphuthumani* (*Aloe cooperi*), *isikhwa* (*Tulbaghia alliacea*), *iqangi* (*Buddleja salvifolia*), *ugwabuzela* (*Riocreuxia torulosa*) and *imoni* (species unknown), all of which were recognised by participants but often noted as being locally unavailable. All of these kinds of *imifino* are relatively obscure, however, due at least in part due to their local unavailability.

environment.

The best example of unintentional but significant vegetation changes is the shift in dominant grass species of the area. When the first households arrived in Nkonisa much of the area had been freshly burned, and shoots of highly palatable grass species, among them buffalo grass (*Panicum maximum*) and Natal red grass (*Themeda triandra*), were available. But within several seasons, these 'soft' grasses were replaced by the much less palatable bristlegrass (*Aristida junciformis*):

When we came... everything was burned, and the cows liked the *insinde* [*Themeda triandra*] which grew. There was also *ubabe* [*Panicum maximum*], but it wasn't as common... But after a year or two, the *ingongune* [*Aristida junciformis*] began to come, and a few years after that, there was no more *insinde* or *ubabe*, except in the areas very far away. But our cows don't like the *ingongune*, it is very hard and makes their teeth turn out too quickly¹⁸.

In additional changes in local vegetation affecting *imifino* are observed in the herbaceous species found in sheltered and marginal 'wild' areas, such as along natural clearings and forest borders. In the undisturbed indigenous ecosystem these habitats are occupied by a diverse set of species including the many types of *imifino* which are described by participants as being found in 'wild' habitats, like *iklabeklabe*, *umcaza* and *idoyea*. Disturbances of various forms allow invader and pioneer species, including *iloyi* (thorn apples, *Datura stramonium*), and a range of tenacious forbs, such as *ubhongabhonga* (*Vernonia natalensis*) and *ikhakhasi* (rasp thistlethorn, *Berkheya setifera*), to dominate their habitats in thick stands. As these species come to dominate 'wild' micro-environments, the *imifino* which grows in these areas are commonly supplanted.

Through environmental disturbances and the dominance of non-indigenous 'invader' species, it is clear that many *imifino* habitats are significantly reduced. This in turn has direct implications for the availability and use of many species. It is important to note, however, that these ecological disturbances can also help to cause the creation of some kinds of habitats where *imifino* may thrive. The population pressure and changing land use patterns of the Nkonisa area have created a range of marginal or disturbed areas, such as along footpaths, in and around cattle kraals, in and around cultivated spaces, etc. These are precisely the micro-environments in which specific types of *imifino* thrive, including *imbuya* and *uqadolo*. Given their increased habitat space, it is logical that these species should be more available than those traditional vegetables whose habitats have been significantly reduced by environmental disturbances. Given their wide availability in disturbed environments, it is no coincidence that these are some of the most widely consumed varieties of *imifino*.

7.7 Conclusion

This evidence suggests that the current patterns of *imifino* use and disuse have been shaped in part by the historical ecology of the Nkonisa area. While the impact of forced resettlement on knowledge of the floral environment and subsequent *imifino* use is difficult to gauge, it is clear that changing land use patterns have given rise to environmental degradation which has affected *imifino* habitats fundamentally. While some habitats have been reduced substantially, ecological degradation has favoured traditional vegetable species which thrive in marginal or disturbed micro-environments.

¹⁸ Today, the grasslands around Nkonisa are periodically burned to create palatable grasslands of young grass shoots (see also Appendix 11.5).

8.0 *Imifino* in food and nutrition



Figure 19: *Imbuya* (*Amaranthus* spp.) growing in a home garden in Nkonisa

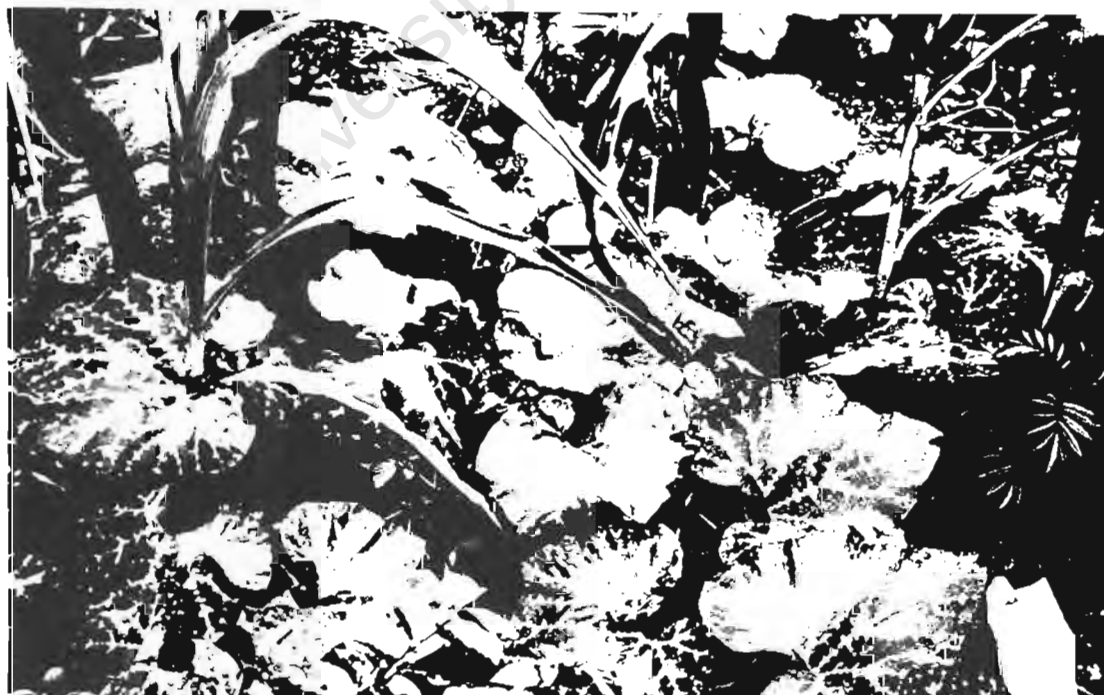


Figure 20: *Intanga* (*Cucurbita* spp.) growing in a home garden in Nkonisa

This section describes the foods eaten in the study area, with special emphasis on the frequency and nature of *imifino* consumption within meals. It also documents the nutritional values of wild and weedy leafy green vegetables within the context of malnutrition in rural South Africa. This information, coupled with data on food intake, is used to demonstrate the current and potential contributions of *imifino* in local diets.

8.1 Meals

Food intake for most residents of Nkonisa revolves around two or three meals each day. Morning meals are eaten either just after rising at dawn or in mid-morning during a break from the day's activities. If eaten at all, lunch takes place around midday. Supper is usually the main meal of the day, eaten in the late evening or around dusk. Snacks over the course of the day are common and are often comprised of potato chips, cookies and other processed foods or wild fruits encountered during daily activities.

The mainstay of the diet for most residents in the village, as for many South Africans, is maize. It is a key product of both home gardens and larger communal fields, and is also commonly purchased locally¹⁹. Most meals are centered around maize prepared in a wide range of ways. The most common preparation of maize involves the fine grinding of dry kernels, then boiling in water to produce varying consistencies from thick porridge to a stiff, dry solid. In most forms, ground maize meal is known as *uphuthu*. Other preparations involve boiling whole kernels (*izinkobe*) or grinding partially cooked kernels and then mixing the resulting paste with other foods (*umcaba*). Dry crushed kernels (*samp*) may also be boiled with beans to produce a popular combination.

In addition to maize a number of starchy foods are increasing in prominence in local meals. Potatoes, either grown in fields or purchased locally, are usually boiled, often with the addition of curry spices as flavourants (see below). Rice is purchased in bulk in either Nkandla or Melmoth and is served plain. In addition bread is commonly eaten throughout the day. While it may sometimes be prepared at home (usually by steaming cooked maize kernels with bread flour), families are increasingly relying on the mass-produced white and brown breads sold locally.

In most evening meals large portions of starches are usually accompanied by vegetable 'relishes' of some sort, either mixed in or served separately. Such relishes are served in small portions and are widely seen as providing flavour and texture as contrast to the main starch. Common relishes include varying mixes of tomatoes, *imifino* (or spinach or cabbage), onions, and pumpkin. These are either boiled or fried in vegetable oil bought locally. Red beans, either grown in home gardens or purchased, are another common accompaniment to the main starch²⁰.

8.2 Foods eaten

Despite the general availability of a wide variety of foodstuffs through local markets, subsistence for most residents of Nkonisa is based on a relatively narrow range of foods. A 24-hour recall survey, conducted during January 1998, shows that the food intake of most participants is based on starchy foods, primarily maize, prepared in various forms (see figure 21 below).

¹⁹ Although most locally grown maize is common yellow maize, all purchased maize meal is degerminated and bleached white.

²⁰ For more on traditional recipes see Fox 1938.

Figure 21: Results of 24-hour recall survey of foods eaten

Food type	Food	Percentage of participants eating in last 24 hours* (n)	Mean serving size	Median serving size	Serving Units**
Starches	Maize	89% (178)	3.2	4	Cups
	Bread	61% (121)	2.8	2	Slices
	Potato	46% (92)	1.2	1	Cups
	Rice	29% (58)	1	1	Cups
	<i>Mahewu</i> †	21% (43)	1.3	1	Cups
	Porridge	15% (30)	1.9	2	Cups
Legumes	Beans	41% (82)	1.3	1	Cups
Vegetables	Relish ††	40% (79)	0.8	0.5	Cups
and Fruits	Cabbage	26% (52)	1.1	1	Cups
	<i>Imifino</i> †††	23% (46)	1.2	1	Cups
	Spinach	8% (16)	1.1	1	Cups
	Guava	6% (12)	1.2	1	Pieces
	Prickly pear	4% (8)	1	1	Pieces
	Apples	3% (5)	1	1	Pieces
Dairy	<i>Amasi</i>	7% (13)	2.8	3	Cups
	Eggs	2% (3)	1	1	Eggs
Meats	Chicken	8% (16)	1.5	1.8	Cups
	Beef	8% (15)	1.1	1	Cups
	Fish	4% (8)	1	1	Cups
Other	<i>Vetkoek</i> ††††	3% (6)	3.8	4	Pieces
	Potato Chips	2% (3)	1	1	25g packets
	Soup	1% (1)	1	1	Cups

* The total number of participants in this exercise was 200

**Serving sizes were determined using sample containers ranging from ¼ cup through one cup

† *Mahewu* is a slightly fermented beverage made from maize meal

†† Relish is a cooked mixture of vegetables, often containing tomatoes and/or onions

††† This includes all types of *imifino*

†††† *Vetkoek*, an Afrikaans term translated as "fat cookies", are dumplings of flour and milk fried in oil

Based on these estimates of dietary intake, several points emerge with implications for nutritional status within the community. First, the central role of starches is apparent, whether in the form of cereals, potatoes, or starchy beverages. This seems to indicate a high carbohydrate, high energy diet. Liquid carbohydrates such as porridge and sugared tea are likely to be of special importance for children and infants, particularly during weaning.

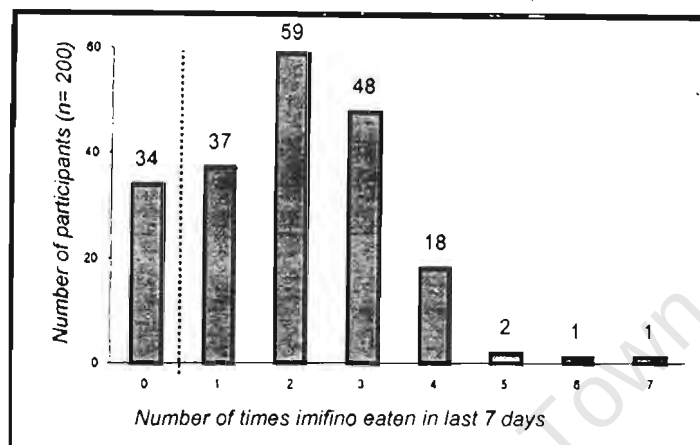
Meat proteins are sparse in the diets reported here, as less than 20% of participants reported eating some form of meat in the previous day. This suggests that protein sources for plant foods are likely to be particularly important, raising issues of protein complementarity. Micronutrient intake is likely to vary widely across the community. Dairy products are relatively uncommon, and the bulk of dietary calcium is likely to come from plant foods. Leafy vegetable intake was high, as 52% of participants (n = 104) reported eating at least one serving of leafy green vegetable in the last 24 hours.

Some of the secondary foodstuffs which do not appear in this survey are worthy of comment as well. The processed sugar which is added to foods—usually tea or porridge—provide carbohydrates. Vegetable oil is used in almost every preparation of meat or vegetables, making this an important source of dietary fats.

8.3 *Imifino* consumption

Although only 23% of participants reported having eaten *imifino* in the previous 24 hours, 83% reported having eaten some kind of leafy green vegetable (including spinach or cabbage) at least in the past seven days. Of these participants, the mean and median number of times was 2.0 (see figure 22). The majority of participants ate leafy green vegetables two to three times a week; only 2% reported eating these more than 4 times in the previous week.

Figure 22: Leafy green vegetable consumption from 7-day recall



One important correlation emerging from this evidence is the strong relationship between the knowledge of *imifino* and its use. Participants who could list more than five types of *imifino* were four times more likely to have eaten *imifino* more than three times in the last week than those who could name less than five types. Conversely, participants who listed fewer than five types of *imifino* were three times more likely to have eaten *imifino* once or not at all in the previous week than those who could list more than five types of *imifino* (chi square = 24.13; $p = 0.00049$; $df = 6$). This evidence again demonstrates the clear correlation between the knowledge of *imifino* and its use. Although knowledge is not a cause of *imifino* consumption, lack of knowledge is probably the most potent factor limiting the use of these resources.

Figure 23: *Imifino* species consumed in 7-day recall

Name	Species	Percentage of participants reported eating this <i>imifino</i> in last 7 days	Mean serving size (cups*)	Median serving size (cups*)
<i>imbuya</i>	<i>Amaranthus</i> spp.	63% (125)	1.0	1.0
<i>intanga</i>	<i>Cucurbita</i> sp.	41% (82)	1.1	1.0
<i>uqadolo</i>	<i>Bidens Pilosa</i>	22% (43)	0.7	0.5
<i>iklabishi</i>	<i>Brassica oleracea</i>	14% (28)	1.3	1.0
<i>intebe</i>	<i>Zantadeschia albomaculata</i>	11% (22)	0.8	1.0
<i>ispinashi</i>	<i>Spinacia oleracea</i>	9% (17)	1.1	1.0
<i>umsobo</i>	<i>Solanum nigrum</i>	8% (15)	0.7	0.5
<i>intshungu</i>	<i>Momordica foetida</i>	5% (9)	0.5	0.5
<i>imbilikicane</i>	<i>Chenopodium</i> spp.	4% (8)	0.9	1.0
<i>ubatata</i>	<i>Ipomoea</i> spp.	1% (1)	1.0	1.0
<i>imbobela</i>	<i>Asystasia schimperi</i>	1% (1)	1.0	1.0
<i>amazambane</i>	unknown	1% (1)	0.5	0.5
<i>umamsanwgini</i>	unknown	1% (1)	1.0	1.0

*Serving size was determined using sample containers ranging from ¼ cup through one cup

For the 166 survey participants who reported eating leafy green vegetables in the previous week, 353 different meals were reported to contain some kind of leafy green vegetable.

Imbuya (*Amaranthus* spp.) was the most commonly consumed, followed by *intanga* (*Cucurbita* sp.) and *uqadolo* (*Bidens pilosa*). The exotic cultivated leafy green vegetables, cabbage and spinach, were the fourth and sixth most prominent, respectively. In all, thirteen species were reported being consumed in the previous week (see figure 23).

In considering these results, the position of *imifino* relative to exotic cultivated vegetables appears positive. It is important to remember however that this data was collected during the month of January when traditional vegetable availability is near its highest. Meanwhile the harvesting of exotic vegetables from home gardens, which takes place in mid-winter, is still months away. Most of the cabbage and spinach reported were probably purchased locally. In light of these factors, the *imifino* consumption described here is likely to be at or near its highest levels of the year.

8.4 Preparation

The preparation of *imifino* is a simple affair, particularly in comparison to the amount of time and energy which goes into the preparation of other foodstuffs. After being removed from their stalks, the leaves of vegetables are sometimes rinsed in water, and large leaves may be torn by hand into smaller pieces. These are then cooked, usually by boiling in water, although frying in vegetable oil is also popular. Rarely are *imifino* cooked with other foods except when a specific recipe calls for it. The cooking time for most *imifino* is no more than a few minutes, and most cooks consider the leaves to be ready to eat when they have gone completely limp and/or the water in which they are boiled has taken on a slightly green hue²¹. The cooking water is usually discarded after the vegetables have been removed; this practice has particular implications for the nutritional value of *imifino* as water soluble nutrients are likely to be leached from the vegetables during cooking and discarded with the cooking water.

One exception to this general procedure is the preparation of *imifino* species which possess an extremely bitter or sour flavour (see below). In these instances, the leaves may be left to soak in cold water for up to an hour before cooking and additionally may be boiled twice. Even after these preparations strongly flavoured *imifino* species will retain much of their original taste. Although it is possible to eat *imifino* raw (without cooking), it is unheard of and was not reported by any participant.

Serving sizes average between half a cup and a cup (125ml-250ml) but vary considerably depending on the meal and the individual. In cooking, *imifino* lose a large proportion of their volume and as a result a popular rule of thumb in preparing a meal is two handfuls of dry leaves per adult and one per child. Despite this guide, preparing too much or too little *imifino* (and other foods) is commonplace. Excess cooked *imifino* is discarded after a meal, although uncooked leaves may be kept overnight for use the next day.

Probably the most common presentation of *imifino* within a meal is as a side dish, sometimes as part of a 'relish', separate from the main starch and other foods. However there are a number of recipes which call specifically for *imifino* to be cooked and served mixed with other foods. The most popular of these is *isijabane*, prepared by adding maize meal and *imifino* together to boiling water. In the resulting mixture of *uphuthu* and *imifino*, the maize meal takes on some of the taste and colour of the vegetable.

²¹ Although this is true of all the types of *imifino* known and used within the Nkonisa area, there are examples of *imifino* from other parts of South Africa whose preparation is more complex. For instance, *igusha* (*Grewia occidentalis*) is prepared by boiling the leaves in water and adding small amounts of ash, either from a fire or freshly burned aloes (*umhlaba*, *Aloe* spp.). The resulting mix has a dense, gelatinous texture which is widely sought after.

8.5 Perceptions of nutrition

For many participants in this study, the scientific notion of nutrition is not readily understood and ideas of micronutrient content are largely incomprehensible. But when asked, most participants had definite opinions about the ‘healthiness’ of various foods, translated loosely as “goodness for the body”. These opinions and their origins help provide useful insights into the use of *imifino*, particularly in comparison to exotic vegetables.

One of the most commonly encountered sentiments, particularly among older participants, was that traditional Zulu foods such as *imifino* imply special qualities for those that consume them regularly. These qualities are applied largely to individuals, in the sense that *imifino* may have a positive effect on the physical body. In some cases these effects are general in nature, as one informant noted “rough foods like *imifino* make people strong, young and old”. In other instances, the effects are positive for a specific part of the body, encapsulated in the assertions that “they [*imifino*] are good for the blood” or “they help my stomach”. Here, as in the case of *imifino* with special medicinal qualities, the perceived biophysical properties of *imifino* blend nutritional and medicinal values.

In other cases the positive attributes of *imifino* may also be felt by entire homesteads and families. This is reflected in the comments of one 76 year-old woman:

- LM: Who eats more *imifino* in Ezibhembeni [an area within Nkonisa]?
P11: Ay, I don't know, everyone eats *imifino*, but some more and some less.
LM: Then which families in Ezibhembeni eat *imifino* more often than others?
P11: Yes, I see.....Mlangeni's family does not eat *imifino*, they buy so much food, every Saturday the daughter comes from town with bags of food from Spar.... but Kubheka and others eat more. The ones who live over the ridge.....I forget....
P12: Mthethwa.
P11: Eh, Mthethwa.... they eat a great deal of *imifino*. Every afternoon you see the granddaughter, looking for *imifino*.
LM: Why do they eat more? Don't they have money to buy food?
P12: No, they have money, their son works in Durban. They eat *imifino* because they like it, because they are a good family. Their parents and grandparents have taught the children well. The children respect old people, and always help me when I am in need.
LM: ...and is this because they eat *imifino*?
P12: Yes, because they eat *imifino*—the children learn about the old ways like *imifino* from their parents, and they like them. They do not get into trouble like those others, but they help people. The *imifino* is good for them.

Despite this body of sentiment, there are others in Nkonisa who feel that *imifino* contain little nutritional value, and may even be potentially dangerous. One teenage girl asserted that the healthy foods come only from cultivation. Although she still eats *imifino* with her family, she likened the nutritional benefits of eating *imifino* to those of grass. Similarly, one young man carried some fears of eating *imifino*, primarily because he knew that some plants could be poisonous and “all cooked *imifino* look the same, and you will never know if that person [who collected the *imifino*] knows what they are doing.”

8.6 Preferences in taste

While some participants claim that most *imifino* have similar tastes, many feel that particular *imifino* have unique tastes, and these have become important criteria for selecting plants. For instance a number of species are noted as having tastes or textures described as rough or

coarse by participants. These adjectives were often applied to *imbilikicane* (*Chenopodium* spp.), *intebe* (*Zantedeschia albomaculata*), *iklabeklabbe* (*Sonchus oleraceus*), *umadoya* (*Asclepias albens*) and *umsobo* (*Solanum nigrum*), and also to older leaves of *uqadolo* (*Bidens pilosa*). A distinctly sour taste comes from *intshungu* (*Momordica foetida*). Other leaves, such as *indebeza* (*Colocasia esculenta*) are reported to have a much milder flavour. Most participants agreed that the single most palatable leaves were *intanga* (*Cucurbita* sp.) and those from the young shoots of *imbuya* (*Amaranthus* spp.), whose taste and texture most closely approximate those of exotic cultivated vegetables like spinach and cabbage.

When asked to rank their preferences of taste for all the species of *imifino* they knew, along with spinach and cabbage, most individuals noted *imbuya* as their favourite, followed by spinach, cabbage and *intanga*. *Imifino* noted for their more distinctive flavours, such as *intshungu* and *umsobo*, appear to carry a general perception of lesser palatability.

Figure 24: Taste rankings of leafy green vegetables

Taste Rank	Zulu Name*	Scientific Name	Taste Score ²²
1	<i>imbuya</i>	<i>Amaranthus</i> spp.	0.40
2	<i>ispinashi</i>	<i>Spinacia oleracea</i>	0.54
3	<i>iklabishi</i>	<i>Brassica oleracea</i>	0.68
4	<i>intanga</i>	<i>Cucurbita</i> sp.	0.74
5	<i>intshungu</i>	<i>Momordica foetida</i>	2.34
6	<i>uqadolo</i>	<i>Bidens pilosa</i>	3.61
7	<i>intebe</i>	<i>Zantedeschia albomaculata</i>	4.38
8	<i>imbati</i>	<i>Urtica</i> spp., <i>Fleurya</i> spp	12.04
9	<i>umsobo</i>	<i>Solanum nigrum</i>	18.17
10	<i>iklabeklabbe</i>	<i>Sonchus olerachus</i>	19.29
11	<i>indebeza</i>	<i>Colocasia esculenta</i>	31.07
12	<i>isankuntshane</i>	<i>Ophioglossum engelmanni</i>	31.50
13	<i>imbilikicane</i>	<i>Chenopodium</i> spp	32.50
14	<i>ubatata</i>	<i>Ipomoea</i> spp	38.57
15	<i>ugobho</i>	<i>Gunnera perpensa</i>	45.00
16	<i>umadoya</i>	<i>Asclepias albens</i>	75.00

*species not listed here were not included by participants in taste ranking exercises

These rankings seem to indicate that bitter or more flavourful species are less popular than their more mildly-flavoured counterparts. According to several key informants, this has not always been the case, as plants with potent flavours (even bitter ones) were widely valued as foodstuffs in the past. Their role was not as a staple *imifino*, but as a flavourant, mixed in small quantities into other types of *imifino*.

Today, some people still enjoy bitter-tasting *imifino* because they help to introduce varying textures and tastes into meals which may often be relatively bland. But the roles of strongly flavoured *imifino* within local diets have been largely filled by flavourings purchased locally.

²² Species rankings for taste were calculated using the formula:

$$\text{Rank} = \left(\frac{\sum \frac{R}{S}}{H} \right)$$

Where *R* is the rank (first, second, third, etc.) which an individual assigned to a species (relative to other species) in indepth interviews; *S* is the total number of species ranked by an individual; and *H* is the total number of individuals ranking the species in question. In addition the score for each species was weighted according to the frequency with which that species appeared in the ranking exercises. This was done by multiplying the unweighted ranking by the factor:

$$\left(\frac{90}{H} \right)$$

where 90 is the total number of individuals participating in ranking exercises, divided by *H*, the total number of individuals ranking the species in question.

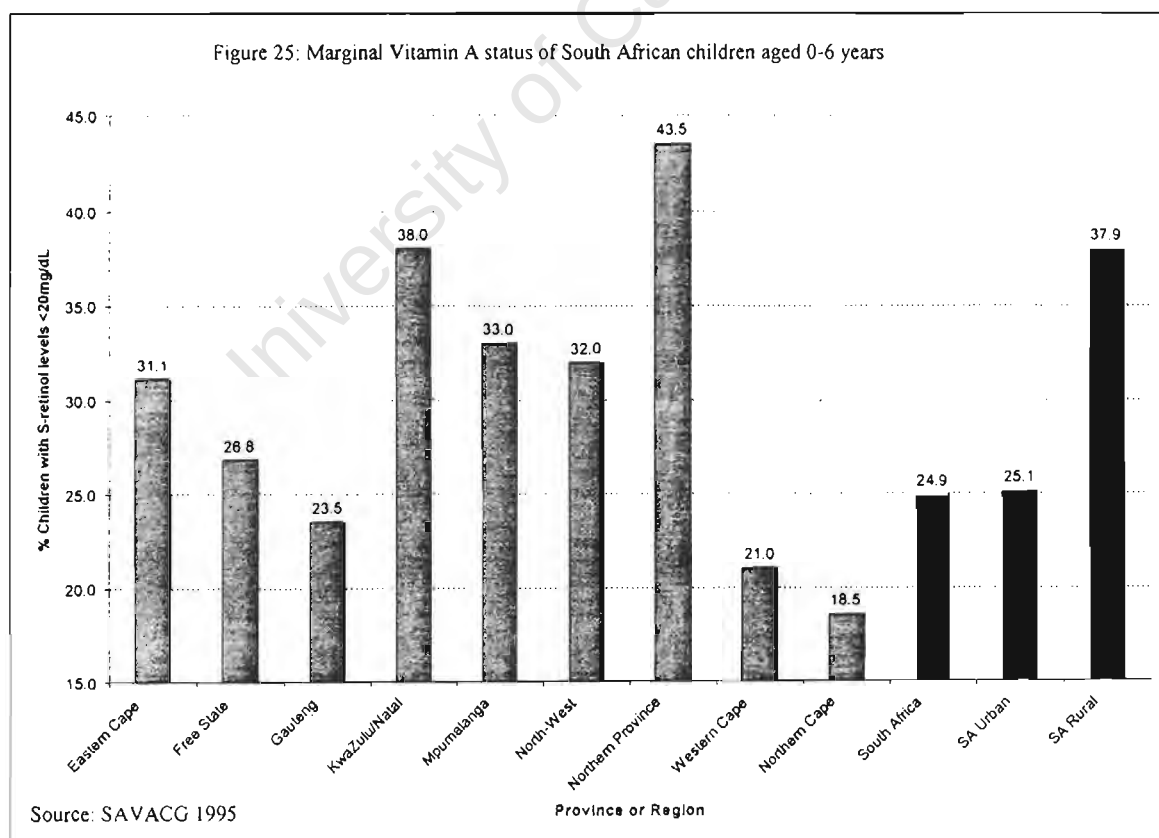
These range from simple additions, like salt and pepper, to widely consumed commercial products such as monosodium glutamate (MSG) and curry powder. These additions help to improve the taste of foods, but also help to make redundant strongly flavoured *imifino* varieties.

8.7 Micronutrient malnutrition in South Africa

Micronutrient malnutrition is a significant public health problem in South Africa, as the dietary deficiency of vitamins and minerals leads to learning disabilities, mental retardation, poor health, low work capacity, blindness and even premature death. This is despite the fact that protein-energy malnutrition (PEM) is relatively low in comparison with other sub-Saharan African countries (D Saunders, personal communication). Although the impacts of micronutrient deficiencies are felt commonly nationwide, the greatest problems are usually found in rural populations. In these groups, young children and their mothers are usually the most affected (Vorster, et. al. 1997). As in other parts of the world, the three greatest micronutrient deficiencies from a public health perspective are vitamin A, iron and iodine²³.

Vitamin A

Although clinical manifestations of vitamin A deficiencies such as xerophthalmia are comparatively rare in South Africa, the prevalence of marginal vitamin A status is extremely high. Recent surveys show that one-third of children under 5 years have marginal vitamin A status, as indicated by serum retinol levels of less than 20mg/dL. This problem is particularly severe in rural regions of the country (see figure 25).



²³ In addition to this discussion, a conceptual framework for malnutrition is outlined in Appendix 11.4.

Iron

A series of local studies point to school-aged children, infants and pregnant women as the groups most likely to suffer from iron deficiencies across South Africa. Anaemia is an especially severe problem among youth: up to 20% of children were found to be anaemic and 10% to be iron deficient in a recent national survey (SAVACG 1995); iron deficiency anaemia was diagnosed in 5% of young children. Moreover anaemic children were at greater risk of having low serum retinol level. Among adults, pregnant women are particularly likely to be at risk of anaemia or iron deficiencies (Lamparelli, et. al. 1988).

Iodine

While the clinical signs of iodine deficiency are low on a national level; iodine deficiencies are thought to exist in rural areas across the country. KwaZulu-Natal is included in this trend, particularly in areas like Nkandla where iodised salts are not widely used (SAVACG 1996). Moreover, there is some indication that iodine and other micronutrient deficiencies may in some instances accompany protein-energy malnutrition (Steyn, et. al. 1994).

8.7.1 Factors influencing malnutrition

Understanding the factors which help contribute to micronutrient malnutrition in South Africa is crucial for understanding the potential impact *imifino* may have among the range of possible nutritional interventions. While the factors involved in micronutrient malnutrition are much broader in scope, four particularly severe problems in South Africa are singled out for attention here: dietary intake, disease, household food security and poverty.

Individual dietary intake

Although limited detailed information is available on dietary intake in South Africa, some inferences can be made from localised studies. Several works on the dietary intake of children have illustrated that the diet of the majority of the population, particularly in rural areas, is high in refined cereals, adequate in meat, but low in dairy, vegetables and fruit (Bourne, et. al. 1994; Steyn et. al. 1994). As children grow older, their fat and refined carbohydrate intake escalate, while their fibre intake is likely to drop (Vorster et. al., 1997).

Disease

In South Africa, as in other developing countries, poor health often contributes heavily to malnutrition. Poor water quality and sanitation facilities help contribute to the omnipresence of diarrhoea in many rural areas (Byarugaba 1991). High prevalences of parasitic infections such as *Ascaris lumbricoides* (round worm), *Trichuris trichuria* (whip worm) and *Taenia* spp. (tape worm) have been observed in all rural areas and can be massive: one survey from KwaZulu-Natal found the prevalences of *Ascaris* and *Trichuris* to be 50% and 54%, respectively (Walker and Walker 1994; Schutte, et. al. 1995; Fincham, et. al. 1996). The burden of disease is further exacerbated by the limited availability of and poor access to adequate health care for many rural communities (HST 1997).

Household food security

It is clear that a significant proportion of South African live in a state of food insecurity. According to one estimate of rural households across the country, 57% of households fall below a 2100 kcal/day poverty line (May et. al. 1995), and up to 40% of rural African households report having to 'go hungry' for some part of the year (Hirschowitz and Orkin 1995). The disturbing conclusion from these findings is that by at least one standard, some 45% of the South African population, or seventeen million people in 1994, may be considered

food insecure (Vorster, et. al. 1997).

Poverty

In many respects the key factor underlying the problems of dietary intake, disease and food security is poverty. In many rural areas poverty is rooted as deeply in the structural conditions of the past (see section five) as in the economic dynamics of the present. In most parts of the country, the geographic and social distribution of poverty is identical to that of malnutrition. The two share a symbiotic relationship: the lack of access to economic and social resources contributes to poor nutritional status, which in turn impacts negatively upon the economic prospects of individuals, families and communities.

8.8 *Imifino* and nutrition

While traditional leafy green vegetables may have little chance of improving the most basic causes of malnutrition, there is evidence that they may be able to have a significant impact on key nutrient levels in those who eat them regularly. While a detailed nutrient analysis falls well beyond the scope of this research, it is possible gain insights into the composition of several prominent *imifino* species from outside sources (Ogle and Grivetti 1985d; Lewis, Shanley and Hennessy 1972; Leung 1968).

8.8.1 Macronutrient content

Figure 26 shows the moisture and crude protein contents for selected species of *imifino*. The crude protein content of documented *imifino* species is relatively low in comparison to other dietary sources of plant protein, ranging from 1.36% (*ungontsha*, *Sarcostemma viminale*) to

Figure 26: Moisture and protein content (from dry weight) of selected *imifino*

Zulu name	Scientific name	Moisture %	Crude Protein %	
		Ogle and Grivetti 1985d	Ogle and Grivetti 1985d	Lewis, Shanley & Hennessy 1972
<i>imbuya</i>	<i>Amaranthus</i> spp.	11.85	4.41	4.7
<i>uqadolo</i>	<i>Bidens pilosa</i>	12.46	4.19	2.29
<i>intshungu</i>	<i>Momordica foetida</i>	17.31	4.76	—
<i>intebe</i>	<i>Zantedeschia</i> sp.	12.42	3.33	—
<i>imbilikicane</i>	<i>Chenopodium album</i>	14.65	4.36	—
<i>umsobo</i>	<i>Solanum nigrum</i>	13.13	4.71	—
<i>ubatata</i>	<i>Ipomoea</i> spp.	14.18	3.65	—
<i>umadoya</i>	<i>Asclepias</i> spp.	14.00	2.17	—
<i>usankuntshane</i>	<i>Ophioglossum engelmannii</i>	11.34	3.29	3.58
<i>isgejane</i>	<i>Portulaca oleracea</i>	6.80	2.14	—
<i>ugwabuzela</i>	<i>Riocreuxia</i> sp.	13.28	5.06	—
<i>iklabeklabe</i>	<i>Sonchus oleraceus</i>	11.16	2.21	—
<i>ungontsha</i>	<i>Sarcostemma viminale</i>	11.97	1.36	—
<i>isiphuthumani</i>	<i>Aloe coopeni</i>	3.72	0.46	—
<i>imbobela</i>	<i>Asystasia schimperi</i>	—	—	4.9

just over five percent (*ugwabuzela*, *Riocreuxia* sp.). These levels are not normally sufficient to make appreciable contributions to dietary intake. However, there are indications that the amino acid composition of *Amaranthus* spp., *Bidens pilosa* and *Portulaca oleracea* are low in methionine and cystine, but are particularly high in lysine (Oliviera and de Carvalho 1975). Thus while the protein value of these species on their own is low, their high lysine content may allow them an important place in local diets by improving the biological value of maize

protein (which is low in lysine). Given the relatively low meat and legume intakes (seen in the 24-hour recall exercise), the consumption of *imifino* in conjunction with maize in various forms is likely to make an important contribution to individual protein intake.

8.8.2 Micronutrient content

The micronutrient and mineral content of selected *imifino* species is shown in figure 27. Calcium levels vary widely, from 922 mg/100g in *intebe* (*Zantedeschia* sp.) to less than 30 mg/100g in *isiphuthumani* (*Aloe cooperi*) and *usankuntshane* (*Ophioglossum engelmannii*). It is important to note that the biological availability of calcium may be heavily limited in many *imifino*, however, by the presence of oxalic acid (which in the presence of calcium forms calcium oxalate, an insoluble crystal). Potassium levels are generally high, ranging from 98.46 mg/100g in *isiphuthumani* to 636 mg/100g in *imbilicane* (*Chenopodium album*).

Given the problems of anaemia and iron deficiency in rural South Africa, the iron content of *imifino* is of special interest. Ogle and Grivetti's nutritional analysis (1985d) shows that the iron content of *imifino* can vary considerably. The lowest levels, recorded for *isiphuthumani* (*Aloe cooperi*), were just more than 1 mg/100g; several species had over 10 mg/100g and three species over 20 mg/100g. Of particular note are *ubatata* (*Ipomoea* spp.) and *intebe* (*Zantedeschia* sp.), which were found to contain 45 and 35 mg/100g.

Figure 27: Mean mineral and trace element content of selected *imifino* (mg/100g fresh, wet plant material)
Source: Ogle and Grivetti 1985b

Zulu Name	Scientific Name	Ash	Calcium	Potassium	Iron
<i>imbuya</i>	<i>Amaranthus</i> spp	19.80	171.30	216.58	14.47
<i>uqadolo</i>	<i>Bidens pilosa</i>	12.20	110.37	301.93	14.19
<i>intshungu</i>	<i>Momordica foetida</i>	11.01	128.99	359.58	23.79
<i>imbilicane</i>	<i>Chenopodium album</i>	22.01	125.59	636.14	11.08
<i>umsobo</i>	<i>Solanum nigrum</i>	13.56	167.39	315.80	16.51
<i>ubatata</i>	<i>Ipomoea</i> spp.	17.87	166.56	428.10	35.42
<i>umadoya</i>	<i>Asclepias</i> spp.	11.56	146.92	245.64	13.22
<i>unsankuntshane</i>	<i>Ophioglossum engelmannii</i>	10.02	29.66	218.94	5.37
<i>isgejane</i>	<i>Portulaca oleracea</i>	22.02	54.50	295.40	6.41
<i>ugwabuzela</i>	<i>Riocreuxia</i> sp.	10.75	95.65	258.89	4.17
<i>iklabeklabek</i>	<i>Sonchus oleraceus</i>	14.46	129.15	334.80	10.21
<i>intebe</i>	<i>Zantedeschia</i> sp.	13.07	922.78	†	45.49
<i>ungontsha</i>	<i>Sarcostemma viminalis</i>	7.66	53.86	196.26	2.50
<i>isiphuthumani</i>	<i>Aloe cooperi</i>	13.52	25.72	98.46	1.15

† Too high for recording in analysis

8.9 Comparison with other foods

The real contributions of *imifino* to local nutrition are best viewed within the context of existing food intake. Figure 28 shows the macro- and micronutrient values of commonly eaten foods in Nkonisa, including maize, *imbuya*, *uqadolo*, spinach and cabbage. While the bulk of energy and protein are supplied by maize (with the increased protein levels which *imifino*'s lysine levels allow), *imbuya* and *uqadolo* may clearly provide as much or more ascorbic acid (vitamin A), niacin and carotene as any other common foodstuff. *Amaranthus* spp. and *Bidens pilosa* have the highest iron contents per 100 g (it is important to note, however, that maize meal is eaten in much greater quantities than any of the other foods listed).

Figure 28: Nutrient values of common foods in Nkonisa, per 100g edible portion

Source: Ogle and Grivetti 1985d and Leung 1968

Food		KJ	Energy (kcal)	Moisture %	Protein %	Ash %	Calcium (mg)	Phosphorus	Iron (mg)	Carotene (mcg)	Thiamin (mg)	Riboflavin (mg)	Niacin (mg)	Ascorbic acid (mg)
maize meal	<i>Zea mays</i>	1697	353	12.2	9.3	1.3	17	218	4.2	25	0.3	0.08	1.8	3
cabbage	<i>Brassica oleracea</i>	125	26	91.4	1.7	0.8	47	40	0.7	100	0.04	0.04	0.3	54
spinach	<i>Spinacia oleracea</i>	125	26	90.6	2.1	1.8	61	46	1.7	—	0.03	0.27	—	46
pumpkin	<i>Cucurbitaea pepo</i> (fruit)	110	23	92.6	1	0.8	25	32	1.4	3565	0.05	0.02	0.5	8
intanga	<i>Cucurbitaea pepo</i> (leaves)	129	27	89.2	4	2.2	477	136	0.8	3600	—	0.06	0.32	80
tomato	<i>Solanum lycopersicum</i>	101	21	93.5	1	0.5	10	24	0.6	450	0.06	0.04	0.6	26
uqadolo	<i>Bidens pilosa</i>	206	43	87.5	4.2	1.5	340	67	14.2	1800	—	—	—	—
imbuya	<i>Amaranthus spp.</i>	202	42	88.25	4.41	2.4	171	103	14.5	5616	0.05	0.42	1.2	64

In addition, it is possible to combine the data presented here on *imifino* intake with existing data on *imifino* nutrient content to develop a very broad understanding of the potential micronutrient contribution of *imifino* to local diets²⁴. Based on the available data for *imifino* micronutrient content, the focus here is on iron content. In light of the daily iron requirements for various aspects of the population, it is possible to gain insight into the potential significance of improved *imifino* intake (see figure 29).

Figure 29: Average daily vitamin A and iron requirements

Group	Median weight (kg)	Vitamin A (µg)	Iron (mg)	Iron requirements per kg
Infants (months)				
3-6	7.0	350	14	2.0
6-9	8.5	350	14	1.6
9-12	9.5	350	14	1.5
Children (years)				
1-2	11.0	400	8	0.7
2-3	13.5	400	9	0.7
3-5	16.5	400	9	0.5
5-7	20.5	400	9	0.4
7-10	27.0	400	16	0.6
Adult males				
10-12	34.5	500	16	0.5
12-14	44.0	600	24	0.5
14-16	55.5	600	24	0.4
16-18	64.0	600	15	0.2
over 18	70.0	600	15	0.2
Adult females				
10-12	36.0	500	16	0.4
12-14	46.5	600	27	0.6
14-16	52.0	600	27	0.5
16-18	54.0	500	29	0.5
over 18	55.0	500	29	0.5
Pregnant	--	600	47*	--
Lactating	--	850	17	--

*Supplementation is usually required as it is difficult to meet this requirement through dietary intake alone
Source: FAO 1988

This figure illustrates the considerable variation with gender and age in daily micronutrient requirements. Daily iron needs can vary from 14 mg for infants, to 8 or 9 mg for young children, to up to 29 mg for female adults. Although infants and adults have the same iron requirements, when adjusted for body mass children require twice the iron intake of adults. For both males and females, requirements escalate rapidly around puberty. Although men's needs are reduced after puberty, adult women's iron needs remain high for most of their reproductive age due largely to blood loss during menstruation and pregnancy.

²⁴ However it is important to note that any calculation of the dietary intake of micronutrients are notoriously difficult. Any number of factors can significantly affect the human intake and absorption of vitamins and minerals from plant foods, including intraspecific differences in nutrient content, variable foods preparations, the presence or absence of other foods which block or facilitate nutrient absorption, and even individual state of health.

Figure 30: Estimated Iron content of *imifino* and exotic leafy green vegetables (mg/per portion)

Zulu Name	Scientific Name	Mean serving portion (cups)*	Mean serving size (g)**	Iron content (mg/100g fresh material)***	Estimated iron content per portion (mg)
<i>imbuya</i>	<i>Amaranthus spp</i>	1	125	14.47	18
<i>intanga</i>	<i>Cucurbitaea pepo</i>	1	125	0.8	1
<i>uqadolo</i>	<i>Bidens pilosa</i>	0.5	65	14.19	9
<i>intshungu</i>	<i>Momordica foetida</i>	0.5	65	23.79	15
<i>imbilikicane</i>	<i>Chenopodium album</i>	1	125	11.08	14
<i>umsobo</i>	<i>Solanum nigrum</i>	0.5	65	16.51	11
<i>intebe</i>	<i>Zantedeschia sp.</i>	1	125	45.49	57
<i>iklabishi</i>	<i>Brassica oleracea</i>	1	125	0.7	1
<i>ispinashi</i>	<i>Spinacia oleracea</i>	1	125	1.7	2

* As reported by survey participants

**Calculated at 1 cup cooked edible portion = 125g fresh leaves

*** From Ogle and Grivetti 1985d and Leung 1968

In figure 30 (above), we see that certain types of *imifino* contain high levels of iron per average serving, particularly in comparison with other leafy green vegetables. A single portion of *imbuya* or *imbilikicane* (estimated at 125 g fresh leaf material) is likely to satisfy the iron requirements of most infants and young children, and provide more half the iron requirements of adult women. Some 5-10 average servings of spinach (625 g – 1.25 kg fresh leaf material) or 10-20 average servings of cabbage (1.25 kg – 2.50 kg fresh leaf material) would be needed to provide the same levels of iron. Thus to meet their daily iron requirements, a child would need to eat at least five times more spinach or ten times more cabbage than *imifino*. Assuming uninhibited absorption²⁵, these amounts are enough to make substantial contributions to the iron intake. These contributions are particularly important for individuals susceptible to iron deficiencies or anaemia, particularly infants, children and women of reproductive age.

8.10 Conclusion

This analysis illustrates the clear potential contributions which *imifino* may make to micronutrient intake. From this questions emerge as to how the contributions to local diets of *imifino* may be secured, and possibly even improved upon, in the future. These issues are discussed in the final section, which focuses on the dynamics of *imifino* use presented here and discusses the possibilities around interventions to enhance use.

²⁵ The absorption of iron is directly facilitated by the presence of vitamin C in dietary intake, but given the apparent lack of vitamin C-rich foods within local diets the bioavailability of iron may be somewhat lower than the levels present in various foods.

9.0 Discussion and recommendations

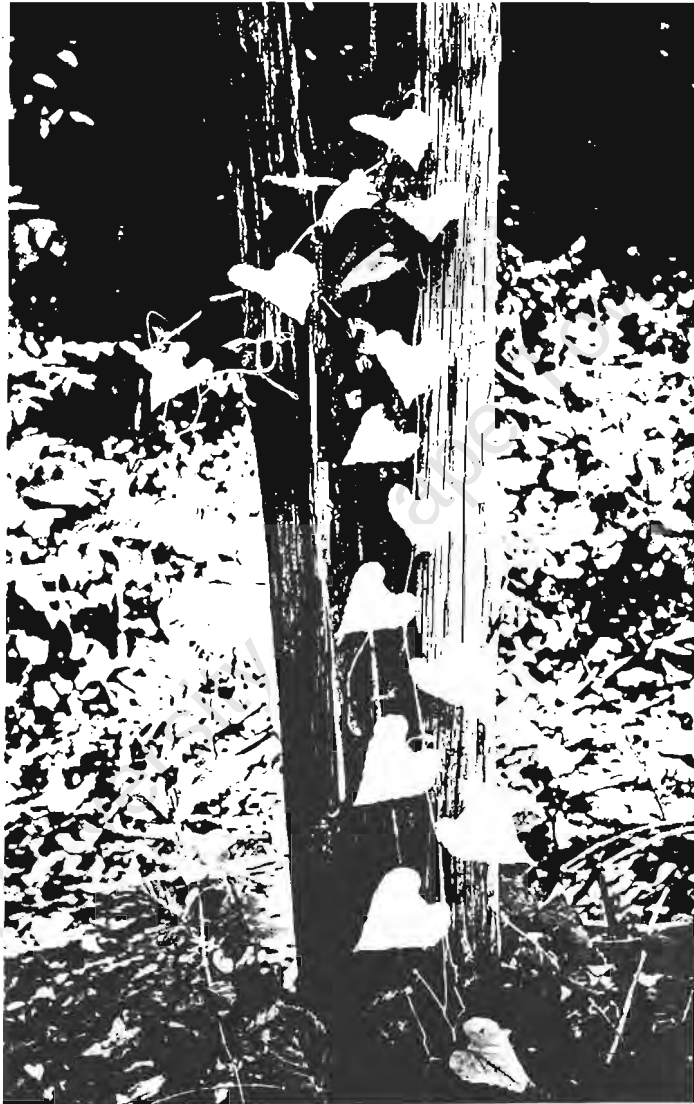


Figure 31: *Intshungu* (*Momordica* spp.) growing in a forest clearing near Nkonisa

The preceding sections of this report have provided insights into the use and disuse of *imifino* in Nkonisa from several diverse perspectives. Guided by the state of current research on traditional vegetables as well as by the local contexts of the study site, this multidisciplinary approach incorporates anthropological, ethnobotanical, ecological, nutritional and historical data. The analysis of these diverse data provides more holistic insights into the dynamics of *imifino* use and disuse than allowed by any single discipline. Here, these findings are reviewed and explored to help inform the design of interventions promoting the use of traditional vegetables. Options involving market-based and educational initiatives are discussed in detail, and the latter is explored as a particularly promising option.

9.1 Key findings

Ethnobotanical research shows that a relatively large number of species are known across Nkonisa. However most individuals participating in the study know only a handful of common or core species which are used relatively frequently within the household and are locally available. There is a scattered body of knowledge of lesser known species, many of which can not be recognised in the field by most participants and are generally thought to be locally unavailable.

Knowledge of the core body *imifino* is communicated to children at a young age. Only later in life are more obscure species learned about through conversations with individuals particularly knowledgeable in *imifino*, most notably elder women. Increasingly the process of communication from old to young is being interrupted, most notably by changing social values which often favour 'modern' foods, including cultivated exotic vegetables. In turn traditional vegetables are increasingly viewed as resources associated with poverty. Additional evidence shows that the knowledge and use of *imifino* are closely correlated, and so the interruption of the transfer of knowledge is likely to contribute directly to the increasing disuse of traditional vegetables.

Historical and ecological research show that land use practices around Nkonisa have changed considerably over the past 60 years. Commercial plantations and forced resettlements have combined to change the local environment from a sparsely inhabited and relatively pristine landscape to a densely populated village characterised by heavily disturbed ecological conditions. These changes have generally reduced the 'wild' habitats in which many types of *imifino* live, and thus are likely to have contributed to an overall reduction in the availability of numerous species. However, the *imifino* which thrive in disturbed and marginal environments have benefited from these changing landscapes. For the most part, these are also the species that comprise the core body of *imifino* knowledge.

Most participants in nutritional research reported eating *imifino* twice a week during the summer, the peak season for traditional vegetable consumption. At other times of the year *imifino* consumption is greatly reduced, as exotic vegetables such as spinach or cabbage play a greater part in household subsistence. While *imifino* can be eaten in mixed vegetable relishes, or mixed into starchy foods, they are usually served lightly boiled as a side dish. Traditional vegetables contain high levels of micronutrients, including iron and vitamin A, and have the potential to make important contributions to the diets of individuals at risk of micronutrient malnutrition, most notably children and women of childbearing age.

In addressing the original aims of this study—to recommend possible interventions promoting *imifino* use—these findings are useful in identifying the central factors contributing to *imifino* disuse. In Nkonisa, it is apparent that the disuse is the result of a complex interaction of social, economic, ecological and historical factors, the data here highlight four major trends which contribute in varying ways to the disuse of traditional vegetables in Nkonisa:

- (a) *Reduced local knowledge of imifino*. Knowledge of *imifino* is a prerequisite to use, and evidence shows that the reduced ability to recognise species hinders access. The decline in local knowledge is aided by the lack of communication of *imifino* knowledge, particularly between generations;
- (b) *Reduced availability of many types of imifino locally*. Processes of ecological disturbance over the past 60 years have significantly reduced the habitats of many types of *imifino*, while increasing the potential habitat space of others;
- (c) *Increased availability of access to exotic local vegetables as alternatives to imifino*. These are shaped by the wide extent of local markets as well as the increasing reliance on cash economies for local subsistence;
- (d) *Resettlement of households between areas of different vegetation*. The process of forced resettlement has introduced households to different vegetation types, including *imifino*. Although the impact of physical displacement on *imifino* use is not clearly delineated by the data presented here, this is a possibility which requires further investigation.

9.2 Possible interventions

Any interventions to enhance the use of traditional vegetables should be based on close contextual understandings of the factors that contribute to the local disuse of *imifino*. In the case of Nkonisa, each of these four factors can be addressed with different types of interventions. For instance the limited availability of wild leafy green vegetable species due to ecological disturbances could be addressed through conservation-oriented collection practices promoting locally rare *imifino* species, or through ecological programmes to recreate specific 'wild' habitats for traditional vegetables to live. Similarly, the resettlement of populations into unfamiliar ecological settings could be addressed through ecological awareness campaigns to acquaint residents with local useful wild plant resources, or through relocation programmes to move households back to the biomes of their original homes. For each of the intervention factors above (a-d), the range of possible intervention options and some of the characteristics of each are presented in figure 32 below.

Not all possible interventions are equally feasible. Initiatives to improve *imifino* availability may not actually have an impact on consumption, while interventions to improve traditional vegetable consumption may be hampered by limited availability. Financial constraints are likely to make some forms of intervention wholly unrealistic (such as a re-resettlement programme). Moreover, different types of interventions are likely to prove effective over different time scales. An intensive education programme could have immediate results but an ecological rehabilitation scheme could take years to become effective.

In surveying the range of options, three general categories of possible interventions emerge: educational programmes promoting a particular aspect of *imifino* (such as sustainable collection practices or nutritional values); programmes to physically alter human-ecological relationships (such as the rehabilitation of disturbed environments to create *imifino* habitats); or marketing initiatives to create incentives supporting traditional vegetables (or disincentives around exotic species). Each of these tend to operate on different time frames. Educational programmes can be implemented over the short-term (on the order of weeks or months) while marketing programmes or physical interventions can take effect over months or years. Similarly, each initiative has different resource requirements: physical interventions are likely to be capital intensive, and developing market systems can have high start-up costs. Educational campaigns can operate effectively at relatively low costs, however.

The contexts of life and subsistence in Nkonisa, coupled with the insights presented here into *imifino* use and disuse, are important tools in evaluating various intervention options. The

Figure 32: Evaluation of possible interventions to enhance the use of *imifino*

Contributing factor	Possible interventions	Cost	Implementation timeframe	Positive attributes	Potential problems
(a) Reduced local knowledge of <i>imifino</i>	Education programme to increase knowledge of <i>imifino</i>	low	short-term	knowledge and use are closely correlated	ability to recognise species is not easily communicated (requires practise)
	Education programme promoting nutritional benefits of <i>imifino</i>	low	short-term	direct awareness-raising of health and nutritional concerns	potentially unsustainable as social values may remain unchanged over medium- to long-term
(b) Reduced availability of many types of <i>imifino</i> locally	Ecological rehabilitation of key micro-environments, especially forest/bush or wetland habitats	high	long-term	- positive contributions to general ecosystem health - other positive spin-offs (job creation, etc.)	- sustainable ecological rehabilitation is extremely difficult to engineer - may only increase <i>imifino</i> availability (and not necessarily consumption)
	Education programme promoting sustainable use of <i>imifino</i> types in sensitive habitats	low	short-term	- helps to improve general environmental knowledge and behaviour - may be applicable to other resources	may only have an indirect impact on <i>imifino</i> consumption
(c) Increased availability of and access to exotic local vegetables as alternatives to <i>imifino</i>	Discouraging marketing of exotic leafy green vegetables	high	medium-term	direct and immediate impact on competition between traditional and exotic vegetables	- very high cost and complexity - likely to be unsustainable over long-term
	Promoting <i>imifino</i> in local markets alongside exotic leafy green vegetables	high	medium-term	- takes advantage of existing market systems - potential income generation device - long-term sustainability (if successful)	- potentially high start-up costs - sufficient demand may not exist - only some species are available for large-scale harvesting
(d) Resettlement of households between areas of different vegetation	Education programmes to build awareness of local <i>imifino</i> in relocated communities	low	short-term	- helps to improve general environmental knowledge and behaviour - may be applicable to other resources	- would not necessarily improve <i>imifino</i> availability - may only have an indirect impact on <i>imifino</i> consumption
	Resettlement of households to areas of origin	high	long-term	may be socially or politically desirable (land restitution, etc.)	- very high cost and complexity - would not necessarily improve <i>imifino</i> availability - would not necessarily improve <i>imifino</i> consumption

intervention possibilities based on physical alterations to human-ecological interactions may have significant added benefits, such as job creation, but could only indirectly impact *imifino* consumption by increasing the availability of traditional vegetables. When the high costs and long-term approaches of such methods are taken into account, it seems that these are not realistic intervention options. The possibilities of developing market systems or educational programmes have lower costs and operate in a shorter timeframe, and are worthy of more in-depth consideration.

9.2.1 Market initiatives

The idea of employing market forces to promote the use of traditional vegetables has been advanced by a number of researchers working in Africa (Chweya and Eyzaguirre 1999; Goode 1989; Guarino 1997; Ogle, et. al. 1990; Shackleton, et. al. 1998). To date there are very few practical experiences in this area and most researchers advancing the microeconomic promotion of traditional vegetables do so using insights into the existing state of traditional vegetable marketing to recommend intervention possibilities. In most parts of Africa, including KwaZulu-Natal, informal trading in traditional vegetables already exists, and promotion initiatives can aim to develop existing infrastructures²⁶. Such interventions may either involve disincentives aimed at the products which compete with traditional vegetables in the marketplace or incentives to directly promote the marketing of traditional vegetables. Markets can be used to promote resource use locally, regionally, or even nationally, but are appear to have the greatest potential efficacy on smaller scales.

Interventions involving disincentives for the exotic vegetables which compete with traditional vegetables, especially spinach and cabbage, could be highly effective in increasing demand for *imifino*. Disincentives can take the forms of taxes or levies on the sale of exotic vegetables, thereby making them less attractive food purchase options. While such disincentives have some precedent, their implementation on a local or regional level is likely to require the development of complex policy mechanisms and capital-intensive enforcement structures which are difficult to implement and unsustainable over the long term, particularly in developing country settings. In addition it is unclear whether creating market disincentives around commonly consumed types of foods may present a threat to overall food security.

While disincentives for exotic vegetables seem somewhat unrealistic, developing market incentives to promote wild and weedy leafy green vegetables has greater potential. Interventions could seek to enhance the supply-side of the market, either by facilitating the harvesting of vegetables on a larger or more efficient scale (hypothetically lowering market costs and raising the numbers of potential consumers) or by increasing access to markets and allowing traders access to a greater consumer population. Conversely, market initiatives could aim to build demand by increasing the knowledge and popularity of traditional vegetables as bought food options.

The potential for income generation is a unique benefit of initiatives aimed at enhancing existing markets. Local sellers are the most obvious beneficiary of this, but profits could fuel secondary employment opportunities if collection and/or transport take place on a large scale (Nekesa and Meso 1997). The market-based approach is not without limitations, however. While supply- or demand-side interventions each can be employed alone, the efficacy of either may be limited by the other. An increase in the supply of traditional vegetables in local markets is not particularly useful if it is not accompanied by an increase in demand; similarly, an increase in market

²⁶ In areas where the marketing of traditional vegetables is unknown, detailed subsistence and market assessments are probably required to ensure that there is appropriate potential. If there is some indication that the sale of traditional vegetables may be a self-sustaining venture, developing demand and supply systems is likely to require considerable effort and will probably be a capital-intensive process.

demand can not benefit traders fully if supply is limited. In theory these limitations can be overcome by detailed market and ethnobotanical assessments to discern the existing and potential levels of both supply and demand. If necessary, promotional schemes to develop demand can be coordinated with harvesting schemes to increase supply.

In addition one of the key features of any economic initiative is the reliance on existing market systems, usually in the informal sector, as the basis for intervention. What remains unclear is the degree to which the existing market systems are receptive to enhanced marketing initiatives. The microeconomics of the informal sector are widely thought to be extremely sensitive to localised fluctuations in supply and demand (Anderlini and Sabourian 1992). If informal markets are indeed so responsive, it is unclear why existing informal markets have not already capitalised on the potential for enhanced marketing of traditional vegetables.

9.2.2 Educational programmes

Educational interventions present a short-term and low-cost approach to disseminate knowledge on many of the issues involved the availability, access and consumption of *imifino*. Possible topics include basic ethnobotanical information (describing edible species, preparation, etc.), the nutritional value of traditional vegetables, or the sustainable use of species growing in certain habitats. Educational initiatives could operate through a range of mechanisms, including the media, agricultural or health extension, or community-based outreach.

Most educational promotion activities are likely to be highly cost-effective as they can reach a broad range of people with relatively low inputs. The precise target population and costs will vary considerably with medium involved. Mass media—most notably radio—is a relatively expensive option but can reach a wide population²⁷. Printed matter could be an effective form of mass media, though it is obviously based on literacy and thus may be ineffective among older or less educated aspects of the population. Other more direct communication methods could be based on extension outreach techniques (IIRR 1998). These include community workshops or peer-based outreach using community leaders (Rogers and Shoemaker 1971). These forms of community-based, person-to-person education are likely to be more intensive and less expensive than mass media methods, but obviously are limited to a much smaller population.

Educational activities can be employed to promote almost any aspect of *imifino* use. The access to species can be improved in part by disseminating knowledge of edible species and their preparation while the availability of less common species can be enhanced through promotion of improved management practices. Educational messages could also focus on the potential values of *imifino*, whether expressed in nutritional or economic terms. The messages involved in educational campaigns may help to shape the media involved. Visual media (printed matter or direct interactions) are required to convey some information effectively—such as the identification of *imifino* species. Most other types of information, including sustainable management practices for rare species or the nutritional values of traditional vegetables, could be disseminated equally effectively using the written or spoken word.

Locally-based education programmes are likely to rely heavily on community participation to be successful. Insofar as all educational ventures require the participation of those involved, this is self-evident. Any intervention can have an impact on the knowledge of participants, and we know that knowledge can be an important limiting factor to *imifino* use. However, the true efficacy of education-oriented interventions must be gauged in their impacts on behaviour—in this case an increase in the consumption of traditional vegetables. Educational interventions can be more effective in facilitating behavioural change through their relevance to local needs and

²⁷ Radio reception is possible in most parts of South Africa and several stations cater to listeners in rural KwaZulu-Natal.

contexts (Win 1997). The best way to accomplish this is by including local communities in the design of their own educational interventions, and including local perspectives in decisions regarding the content and medium of educational interventions.

In reviewing the two intervention options detailed here, it is clear that market-based initiatives as well as educational programmes can both make important contributions towards the improvement of *imifino* consumption. There is some potential for their overlap, as educational programmes could help fuel market demand. But generally, these two approaches operate using very different mechanisms and have very different input requirements. In the case of traditional vegetables in Nkonisa, the insights presented in this work do not adequately address to the possibility of the promotion of *imifino* using market initiatives. Further research is needed to understand the marketability of different species as well as household subsistence and economic decision-making. Additional data may be required on the local population sizes of various types of wild and weedy leafy green vegetables with market potential to understand if systematic harvesting is sustainable over the long-term. An accurate assessment of the potential for market interventions to promote *imifino* use can only be made here once these types of insights are available.

9.3 Design of an educational intervention

The findings presented here suggest that a locally-based educational intervention could be an effective tool to promote the use of *imifino*. Such an initiative presents a cost-effective possibility which can be easily customised to fit local contexts and incorporate local needs. As mentioned previously, any educational intervention would need participatory inputs before final decisions regarding the content and medium can be made. However some of the insights of this study can help to outline the potential nature of such an intervention.

An educational intervention could be used to communicate information on each of the key aspects of *imifino*. The most basic need is for information to facilitate the identification of *imifino* species in their habitats. To be effective this clearly requires visual communication: if the education initiative is based on person-to-person contact, this could take place in the field, while botanical illustrations (including the size and shape of leaves and plants) could be used if the education campaign is based on visual media. Additional detail should be given to the values of *imifino* species. This can be expressed in nutritional terms, emphasising the micronutrient content of various species, and their special importance for the health of children and women. Value can also be expressed in the possibility of marketing traditional vegetables—although this should be qualified with warnings of the potential hurdles facing any microeconomic venture. A third topic for coverage in educational campaigns is sound management practices for *imifino* species growing in wild habitats. These can take the form of sustainable harvesting practices (such as removing only a few leaves of a less common species, rather than all the leaves or the entire plant), or the management of micro-environments in which some species thrive (e.g., clearing natural forest or bush, or draining swampy areas, will reduce the availability of some types of *imifino* but could promote others).

While an educational intervention could focus on any of these topics alone, an integrated intervention which incorporates ethnobotanical, nutritional and ecological information may be more appropriate. Although these aspects of *imifino* are dealt with separately in this analysis, for residents of Nkonisa they are all an integrated part of food consumption decisions and daily interactions with the ambient environment. If organised clearly, basic information on recognising, collecting and preparing *imifino* can best expressed as a whole.

This information could be communicated in various formats, but for a locally-based intervention,

extension activities and small-scale printed media appear the most likely options. Outreach activities would rely heavily on community participation, whether in the form of person-to-person extension or community workshops. The success or failure of such an intervention would be based on the educators involved in promotional activities. If they are drawn from the local community, the efficacy of educators can be compromised by unforeseen dynamics within the community. At the same time, outside or semi-professional educators would require remuneration and many not be well-accepted by local residents.

Small-scale printed media, such as pamphlets or booklets, present another possibility. If designed with community input and disseminated locally these could provide an intensive intervention which would, at least in theory, reach a broader population than extension-based education activities. However, the audience which can be reached using print media is limited by (il)literacy, as high literacy rates are found in Nkonisa only among youth. Young people may be an effective target population for an *imifino* education intervention however, as the findings of this study indicate that the changing social values of youth form one hurdle to *imifino* use.

Here it is necessary to revert to the edict of community participation. Given the central role of community inputs in the design of educational interventions, these ideas must be limited to preliminary recommendations. As success or failure of an attempt to promote *imifino* will be determined in large part by its relevance to local contexts, the needs of the local community must be at the centre of any intervention.

9.4 Conclusion

This research has aimed to provide detailed insights into the ethnobotanical, nutritional and ecological aspects of *imifino* use in rural KwaZulu-Natal. The recommendations presented in this section represent a preliminary foray into possible interventions to enhance the use of traditional vegetables. However a more detailed intervention decisions, including their precise structure and content, will require additional focused socio-economic research as well as the direct input of local communities.

Beyond these recommendations, it is hoped that this report represents a first step towards greater attention in research and development to wild and weedy leafy green vegetables in South Africa. In developing holistic understandings of these resources, this work illustrates that the daily use of traditional vegetables is affected by, and in turn affects, a wide range of socio-economic, historical, ecological and nutritional issues. It also demonstrates how interdisciplinary methods can be used to research these issues, and how the resulting insights can be applied towards the design of intervention programmes to enhance the use of these resources.

Building on the insights of this report and the techniques that were used to generate them, further research is necessary into traditional vegetables in other parts of South Africa. Data from other rural regions of the country would provide interesting insights into the comparative differences in traditional vegetable use in varying ecological, economic and social conditions. In addition the use or disuse of wild and weedy leafy green vegetables in urban and peri-urban areas would require special attention in light of the growing migration of rural populations to urban areas. These further insights into contexts of traditional vegetable use and disuse are likely to serve as the foundation of efforts to enhance the use of these resources. As recognition grows of the contributions traditional vegetables can make in the daily lives of many South Africans, such a foundation will prove to be of vital importance.

10.0 Works Cited

- Allan, W. 1965. *The African Husbandman*. London: Oliver and Boyd.
- Altern, L. 1905. *Map of Zululand*. Pietermaritzburg: Zulu Lands Delimitation Commission.
- Altieri, M., L. Merrick and K. Anderson 1987. Peasant agriculture and the conservation of crop and wild plant resources. *Conservation Biology* 1 (1): 49-58.
- Anderlini, L. and H. Sabourian. 1992. Some notes on the economics of barter, money and credit. Pp. 75-106 in C. Humphrey and S. Hugh-Jones, eds. *Barter, exchange and value*. Cambridge: Cambridge University Press.
- Ardington, E. 1984. Poverty and Development in a rural community in KwaZulu. Paper presented the Second Carnegie Inquiry into Poverty and Development in Southern Africa, Cape Town, 1984.
- Barnard, A. 1984. *The Perception and Utilisation of Morama and other food plants by the Nharo of Western Botswana*. Occasional Paper #4, Centre for African Studies, University of Edinburgh. Edinburgh: University of Edinburgh.
- Beebe, J. 1995. Basic concepts and techniques of Rapid Appraisal. *Human Organization* 54: 42-51.
- Beinhart, W. and Bundy, C. 1987. *Hidden struggles in rural South Africa: Politics and popular movements in the Transkei and the Eastern Cape*. Johannesburg: Ravan Press.
- Berlin, B. 1992. *Ethnobiological classification*. Princeton, NJ: Princeton University Press.
- Berry, S. 1989. Environment and access to resources in Africa. *Africa* 59: 18-40.
- Bicchierri, M. 1972. *Hunters and Gatherers Today: Socioeconomic Study of eleven such cultures in the 20th century*. New York: Holt, Rhinehart and Winston.
- Bieseke, M., J. Bousquet and G. Stanford. 1979. A Kalahari food staple: *Ricinodendron rautanenii*. Pp. 341-356 in J.R. Goodin and D.K. Northington, eds. *Arid Land Plant Resources: Proceedings of the International Arid Lands Conference of Plant Resources*. Lubbock, Texas: ICASALS.
- Bourne, L., M. Langehoven, K. Steyn, P. Jooste, J. Laubscher and D. Bourne. 1994. Nutritional status of 3-6 year-old African children in the Cape Peninsula. *East African Medical Journal* 71: 695-702.
- Brandao, M. and M. Zurlo. 1988. Weeds in Human Nutrition. *Informe Agropecuario* 13: 14-17.
- Brokensha, D. and B.W. Riley. 1980. Mbeere knowledge of their vegetation and its relevance for development: A case study for Kenya. Pp. 113-129 in D. Brokensha, M. Warren and O. Werner, eds. *Indigenous Knowledge Systems and Development*. Lanham, Maryland: University Press of America.
- Bryant, A. 1907. *A description of native foodstuffs and their preparation*. Pietermaritzburg: Archives of the Natal Museum.
- Bryant, A. 1909 (1921). *Zulu medicine and medicine men*. Pietermaritzburg: Shooter and Shuter.
- Bundy, C. 1979. *The Rise and Fall of the South African Peasantry*. Berkeley: University of California Press.
- Byarugaba, J. 1991. The impact of urbanisation on the health of black pre-school children in the Umtata district. *South African Medical Journal* 79: 444-448.
- Campbell, A. 1986. The use of wild food plants and drought in Botswana. *Journal of Arid Environments* 11: 81-91.
- Campbell, B. 1987. The use of wild fruits in Zimbabwe. *Economic Botany* 41(3): 375-385.
- Campbell, D. 1984. Response to drought among farmers and herders in southern Kajiado District, Kenya. *Human Ecology* 12 (1): 35-64.
- Cernea, M.M. 1990. *Poverty risks from Population Displacement in Water Resources Development*. Development Discussion Paper No. 355, Harvard Institute for International Development. Cambridge: Harvard University.
- Chambers, R., ed. 1989. Vulnerability: how the poor cope. *IDS Bulletin* 20 (2).
- Chambers, R. *Rural appraisal: Rapid, relaxed and participatory*. Sussex: Institute of Development Studies.
- Chweya, J. and P. Eyzaguirre, eds. 1999. *The Biodiversity of Traditional Leafy Green Vegetables*. Rome: IPGRI.
- Colson, E. 1951. The plateau Tonga of Northern Rhodesia. In E. Colson and M. Gluckman, eds. *Seven Tribes of British Central Africa*. Oxford: Oxford University Press.
- Cronon, W. 1983. *Changes in the Land: Indians, colonists and the ecology of New England*. New York: Hill and Wang.
- Cunningham, A. 1987. Commercial craftwork: Balancing out human needs and resources. *South African Journal of Botany* 53 (4): 259-266.
- Cunningham, A.. 1988. Collection of Wild Plant Foods in Thembe Thonga society: A guide to iron age gathering activities? *Annals of the Natal Museum* 29 (2): 433-446.
- Cunningham, A.. 1990. Income, sap yield and effects of sap tapping on palms in south-eastern Africa. *South African Journal of Botany*, 56(2), 137-144.
- Cunningham, A. 1991. Development of a conservation policy on commercially exploited medicinal plants: A case study from Southern Africa. Pp. 287-358 in V. Heywood, H. Synge and O. Akelere, eds. *Conservation of Medicinal Plants*. Cambridge: Cambridge University Press.
- Cunningham, A. 1993. *African medicinal plants: Setting priorities at the interface between conservation and*

- primary healthcare*. People and Plants Working Paper 1. Paris: UNESCO.
- Davenport, T., and K. Hunt. 1974. *The right to land*. Cape Town: David Philip Publishers.
- De Garine, I. and G. Koppert 1988. Coping with seasonal fluctuations in food supply among savanna populations: the Massa and Mussey of Chad and Cameroon. Pp. 210-259 in I. de Garine, and G. Harrison, eds. *Coping with Uncertainty in Food Supply*. Oxford: Clarendon Press
- Dei, G., M. Sedgley and J. Gardner. 1989. Hunting and gathering in a Ghanaian rain forest community. *Ecology of Food and Nutrition* 22: 225-243.
- Department of Cooperation and Development, Republic of South Africa. 1981. *General Circular 1 of 1981*. Pretoria: Department of Cooperation and Development.
- Department of Native Affairs, Union of South Africa. 1944. *Native Reserves in the Northern Areas*. Pretoria: Department of Native Affairs.
- Doke C., and B. Vilikazi 1964. *Zulu-English Dictionary*. Johannesburg: University of the Witwatersrand Press.
- Eder, J. 1988. Hunter-gatherer/farmer exchange in the Philippines: Some implications for ethnic identity and adaptive well-being. In Rambo, A., K. Gillogly and Hutterer, L., eds. *Ethnic Diversity and the Control of Natural Resources in Southeast Asia*. Michigan Papers on South and Southeast Asia, Center for South and Southeast Asia studies.
- Eyzaguirre, P. 1997. Conservation through use: Complementary approaches to conserving Africa's traditional vegetables. Pp. 16-19 in L. Guarino, ed. *Traditional African Vegetables*. Rome: IPGRI.
- FAO. 1985. *The Role of Minor Crops in Nutrition and Food Security*. FAO Committee on Agriculture, Session 8. Rome: FAO.
- FAO. 1988. *Traditional Food Plants*. FAO Food and Nutrition Paper 42. FAO, Rome.
- Feldstein, H. and J. Jiggins, eds. 1994. *Tools for the Field: Methodologies handbook for gender analysis*. New York: Kumarian Press.
- Ferguson, E., S. Gibson, L. Thompson, S. Ounpuu and M. Berry. 1988. Phytate, zinc and calcium contents of 30 East African foods and their calculated phytate: Zn, Ca: phytate, and [Ca]/[phytate]/[Zn] molar ratios. *Journal of Food Composition and Analysis* 1: 316-325.
- Fincham, J., A. Evans, M. Kruger and A. Benade. 1996. Intestinal parasites and the nutrition of children. *Policy Briefs*. Tygerberg: Medical Research Council.
- Fox, J. 1939. Some Bantu recipes from the Eastern Cape Province. *Bantu Studies* 13: 65-74.
- Gerstner, J. 1938. A preliminary checklist of Zulu names of plants with short notes. *Bantu Studies* 12: 215-236, 321-342.
- Gerstner, J. 1939. A preliminary checklist of Zulu names of plants with short notes. *Bantu Studies* 13: 49-64, 131-149, 307-326.
- Gerstner, J. 1941. A preliminary checklist of Zulu names of plants with short notes. *Bantu Studies* 15: 277-301, 369-383.
- Gillespie, S. and J. Mason. 1991. *Nutrition-relevant actions: Some experiences from the eighties and lessons for the nineties*. Nutrition policy discussion paper #10. Geneva: UN Administrative Committee on Coordination/Subcommittee on Nutrition.
- Gomez, M.. 1988. A resource inventory of indigenous and traditional foods in Zimbabwe. *Zambezia* 15 (1): 53-73.
- Goode, P. 1989. *Edible Plants of Uganda: The Value of Wild and Cultivated Plants as Food*. FAO Food and Nutrition Paper 42/1, FAO, Rome.
- Grivetti, L. 1979. Kalahari agro-pastoral-hunter-gatherers: The Tswana example. *Ecology of Food and Nutrition* 9: 235-256.
- Grivetti, L. 1987. Bush foods and edible weeds of agriculture: Perspectives on dietary use of wild plants in Africa, their role in maintaining human nutritional status and implications for agricultural development. Pp. 51-81 in R. Akhtar, ed. *Health and Disease in Tropical Africa: Geographical and Medical Viewpoints*. London: Harwood Publishers.
- Guarino, L., ed. 1997. *Traditional African Vegetables*. Rome: IPGRI.
- Harlan, J. 1992. *Crops and Man* (Second Edition). New York: AACS.
- Harries, P. 1984. 'A Forgotten Corner of the Transvaal': *Reconstructing the history of a relocated community through oral testimony and song*. Paper presented at the University of the Witwatersrand History Workshop: Class, Community and Conflict: Local Perspectives. Johannesburg, 31 January to 4 February.
- Harries, P. 1987. *Songs, stories, rhymes and riddles: African folklore and people's history*. Paper presented at the University of the Witwatersrand History Workshop: The Making of Class. Johannesburg: 9-14 February.
- Hart, B. and A. Hart. 1986. The ecological basis of hunter-gatherer subsistence in African rain forests: the Mbuti of eastern Zaire. *Human Ecology* 14: 29-55.
- Hirschowitz, R. and M. Orkin 1995. *A national household survey of health inequalities in South Africa*. Report prepared by the Community Agency for Social Enquiry (CASE) for the Henry J. Kaiser Foundation.
- Health Systems Trust. 1997. *South African Health Review*. Durban: HST.

- Hurtado, A. and R. Hill. 1987. Early dry season subsistence ecology of Cuiva (Hiwi) foragers of Venezuela. *Human Ecology* 15: 163-187.
- Hussain, M. 1985. Seasonal variation and nutrition in developing countries. *Ecology of Food and Nutrition* 11 (2): 23-27.
- Hutchings, A., A. Scott, G. Lewis and A. Cunningham. 1996. Zulu medicinal plants: An inventory. Pietermaritzburg: University of Natal Press.
- International Institute for Rural Reconstruction. 1998. *Sustainable agricultural extension manual for eastern and southern Africa*. Nairobi: IIRR.
- Japha, D., V. Japha, L. LeGrange and F. Todeschini. 1993. *Mission Settlements in South Africa: A report on their historical background and prospects for conservation*. Pretoria: Department of Environmental Affairs.
- Johannson, E. 1989. *Cultivated, semi-cultivated and wild vegetables used in Zambia. A pilot investigation for the regional SADCC genebank programme*. IDRC Working Paper #119. Uppsala: Swedish University of Agricultural Sciences.
- Johnston, F. 1987. *Nutritional Anthropology*. New York: A.R. Liss Publishers.
- Juma, C. 1989. *Biological Diversity and Innovation: Conserving and Utilising Genetic Resources in Kenya*. Nairobi: African Centre for Technology Studies.
- Kingamkono, R. and J. Lindstrom. 1990. *Forests and Fields: The role of Livestock and Collected Food Products in Food Production and Security Systems: The Case of Babati District, Tanzania*. Preliminary Research Report prepared for Forest, Trees and People Project: A Project under Community Forestry Section. Dar es Salaam: Food and Nutrition Centre, Ministry of Land, Natural Resources and Tourism.
- Kituyi, M. 1990. *Becoming Kenyans. Socio-Economic Transformation of the Pastoral Maasai*. Nairobi: African Centre for Technology Studies.
- Lamparelli, R., T. Bothwell, A. Macphail, J. van der Westhuizen, R. Baynes and R. Macfarlane. 1988. Nutritional anaemia in pregnant coloured women in Johannesburg. *South African Medical Journal* 73: 477-481.
- Leach, M. 1994. *Rainforest Relations: Gender and resource use among the Mende of Gola, Sierra Leone*. Washington: Smithsonian Press.
- Lee, R. 1969. !Kung bushman subsistence: An input-output analysis. Pp. 47-49 in A. Vayda, ed. *Environment and Cultural Behavior*. Garden City, New Jersey: Natural History Press.
- Lee, R. and I. de Vore. 1976. *Kalahari Hunter-Gatherers: Studies of the !Kung San and Their Neighbours*. Cambridge: Harvard University Press.
- Lee, R.B. 1973. Mongongo: The ethnography of a major wild food resource. *Ecology of Food and Nutrition* 2: 307-321.
- Leimar Price, L. 1997. Wild plants in agricultural environments: A study of occurrence, management and gathering rights in northeast Thailand. *Human Organization* 56 (2): 209-221.
- Leung, W. 1968. *Food composition tables for use in Africa*. Food consumption and planning branch, Nutrition Division, FAO. Rome: FAO.
- Lewis, O., P. Shanley and E. Hennessey. 1971. The leaf protein nutritional value of four wild plants used as dietary supplements by the Zulu. Pp. 95-102 in J.W. Claasens and H.G. Potgieter, eds. *Proteins and Food Supply in the Republic of South Africa*. Cape Town: A.A. Blakema.
- Longhurst, R. 1985. Cropping systems and household food security: evidence from three West African countries. *Ecology of Food and Nutrition* 11: 10-16.
- Low, A. and Rebelo. 1998. *Vegetation of South Africa, Lesotho and Swaziland*. Pretoria: Department of Environmental Affairs and Tourism.
- Madisa, M. and E., Tshamekang. 1997. Conservation and utilisation of indigenous vegetables in Botswana. Pp. 149-153 in L. Guarino, ed. *Traditional African Vegetables*. Rome: IPGRI.
- Malaisse, F. and G. Parent. 1985. Edible wild vegetable products in the Zambezi woodland area: A nutritional and ecological approach. *Ecology of Food and Nutrition* 18: 43-82.
- Martin, G. 1995. *Ethnobotany: A Methods Manual*. New York: Longman Hillman.
- Maundu, P. 1987. The importance of gathered fruits and medicinal plants in Kakuyuni and Kathama Areas of Machakos. Pp. 56-60 in K. Wachira, ed. *Women's use of Off-Farm and Boundary Lands: Agroforestry Potentials*. Nairobi: ICRAF.
- Maxwell, S., ed. 1991. *To Cure All Hunger: Food Policy and Food Security in Sudan*. London: Intermediate Technology Publications.
- May, J., M. Carter and D. Posel. 1995. *The composition and persistence of poverty in rural South Africa: The entitlements approach*. LAPC Working Paper 15. Braamfontein: Land and Agriculture Policy Centre.
- Mnzava, N. 1997. Vegetable crop diversification and the place of traditional species in the tropics. Pp. 1-15 in L. Guarino, ed. *Traditional African Vegetables*. Rome: IPGRI.
- Moll, E. 1976. *A plant ecological survey of the Three Rivers area, Natal*. Natal Town and Regional Planning Commission, Pietermaritzburg.

- Moll, E. 1978. The Indian Ocean Coastal Belt II: Vegetation and Ecology. In Werner, M., ed. *Biogeography and Ecology of southern Africa*. The Hague: W Junk.
- Moll, H. 1987. *Oil Palm in Cameroon: The Economics of Oil Palm*. Wageningen, Netherlands: Centre for Agricultural Publishing and Documentation.
- Moore, H. and M. Vaughan 1987. Cutting down trees: Women, nutrition and agricultural change in the province of Zambia 1920-1986. *African Affairs* 86 (345): 523-540.
- Moreno-Black, G. and L. Price. 1993. The marketing of gathered food as an economic strategy of women in northeast Thailand. *Human Organization* 52 (4): 398-404.
- Myer, L. 1997. *The ethnobotany of 'wild' plant resources in Mole Catchment*. Report submitted to Lesotho Highlands Development Authority. Maseru: LHDA.
- Nekesa, P. and B. Meso. 1997. Traditional African Vegetables in Kenya: Production, marketing and utilisation. Pp. 98-103 in L. Guarino, ed. *Traditional African Vegetables*. Rome: IPGRI.
- Ogle, B. and L. Grivetti. 1985a. Legacy of the Chameleon: Edible wild plants in the Kingdom of Swaziland, Southern Africa. A cultural, ecological and nutritional study. Part I: Introduction, objectives, methods, Swazi culture, landscape, and diet. *Ecology of Food and Nutrition* 16: 193-208.
- Ogle, B. and L. Grivetti. 1985b. Legacy of the Chameleon: Edible wild plants in the Kingdom of Swaziland, Southern Africa. A cultural, ecological and nutritional study. Part II: Demographics, Species Availability, dietary use and analysis by ecological zone. *Ecology of Food and Nutrition* 17: 1-30.
- Ogle, B. and L. Grivetti. 1985c. Legacy of the Chameleon: Edible wild plants in the Kingdom of Swaziland, Southern Africa. A cultural, ecological and nutritional study. Part III: Cultural and Ecological analysis. *Ecology of Food and Nutrition* 17: 31-40.
- Ogle, B. and L. Grivetti. 1985d. Legacy of the Chameleon: Edible wild plants in the Kingdom of Swaziland, Southern Africa. A cultural, ecological and nutritional study. Part IV: Nutritional Analysis and Conclusions. *Ecology of Food and Nutrition* 17: 41-64.
- Ogle, B., Malambo, L. Mingochi, A. Mkomesha and I. Malasha. 1990. *Traditional Vegetables in Zambia: A Study of Procurement, Marketing and Consumption of Vegetables in Selected Rural and Urban Areas in Zambia*. Uppsala: Swedish University of Agricultural Sciences.
- Oliviera, J. and M. De Calvalho. 1975. Nutritional value of some edible leaves used in Mozambique. *Economic Botany* 29: 255-263.
- Opole, M. and D. Kiambi. 1993. Conserving traditional vegetables in Kenya. Pp. 111-117 in W. de Boef, K. Amanor, K. Wellard and A. Bebbington, eds. *Cultivating Knowledge: Genetic diversity, farmer experimentation and crop research*. London: Intermediate Technology.
- Platzky, L. and C. Walker. 1985. *The Surplus People: Forced Removals in South Africa*. Johannesburg: Raven Press.
- Posey, D. 1984. A preliminary report on diversified management of tropical forest by the Kayapo Indians of the Brazilian Amazon. *Advances in Economic Botany* 1: 112-126.
- Prescot-Allen, R. and C. Prescot-Allen 1988. *Genes from the wild. Using Wild Genetic Resources for Food and Raw Materials*. London: Earthscan Publications.
- Quek, P. 1997. Documenting indigenous knowledge: A challenge for all. Pp. 20-28 in L. Guarino, ed. *Traditional African Vegetables*. Rome: IPGRI.
- Quiroz, C. 1994. Biodiversity, indigenous knowledge, gender and intellectual property rights. *Indigenous Knowledge and Development Monitor* 2 (3): 12-15.
- Rahmato, D. 1988. Peasant survival strategies in Ethiopia. *Disasters* 12: 326-344.
- Richards, A. 1939. *Land, Labour and Diet in Northern Rhodesia: An Economic Study of the Bemba Tribe*. London: International Institute of African Languages and Cultures.
- Richards, A. and E. Widdowson. 1936. A dietary study in North-East Rhodesia. *Africa* 6: 166-196.
- Rocheleau, D., K. Wahcira, L. Malaret and B. Wanjohi. 1989. Local Knowledge, innovations, and ethnological approaches for agroforestry and indigenous plants. In R. Chambers, A. Pacey and L. Thrupp, eds. *Farmer First*. London: Intermediate Technology Publications.
- Rocheleau D.E. 1991. Gender, ecology and the science of survival: Stories and Lessons from Kenya. *Agriculture and Human Values* 8 (1): 156-165.
- Rogers, E. and F. Shoemaker. 1971. *Communications of Innovations: A cross-cultural approach*. New York: The free press.
- SAVACG (South African Vitamin A Consultative Group). 1996. Anthropometric, vitamin A, iron and immunization coverage status in children aged 6-71 months in South Africa, 1994. *South African Medical Journal* 86: 354-357.
- Schippers, R. 1998. The domestication of indigenous vegetables for sub-Saharan Africa: A strategy paper. Pp. 125-136 in R. Schippers and L. Budd, eds. *Workshop on African Indigenous Vegetables: Limbe, Cameroon, 13-18 January 1997*. London: Natural Resources Institute.
- Schutte, C., P. Fripp and A. Evans. 1995. An assessment of schistosomiasis situation in South Africa. *South*

- African Medical Journal*, Supplement (July): 13-14.
- Scoones, I., M. Melnyk and J. Pretty. 1992. *The Hidden Harvest: Wild Foods and Agricultural Systems*. Uppsala: Swedish International Development Authority (SIDA)
- Scrimshaw, S. and E. Hurtado. 1990. *Rapid Assessment Methods for Nutrition and Primary Health Care*. Los Angeles and Tokyo: UCLA and United Nations University.
- Scudder, T. 1962. *Ecology of the Gwembe Tonga*. Manchester: Manchester University Press.
- Scudder, T. 1971. Gathering among African woodland Savannah cultivators, a case study: The Gwembe Tonga. *Zambian Papers* 5: 316-324.
- Shackleton, S., C. Dzerefos, C. Shackleton and R. Mathabela. 1998. Use and trading of wild edible herbs in the central Lowveld Savannah region, South Africa. *Economic Botany* 52 (3): 251-259.
- Shanley, M. and O. Lewis 1969. The protein nutritional value of wild plants used as dietary supplements in Natal. *Plant Foods in Human Nutrition* 1: 254-258.
- Sreemulu, N. 1982. Chemical Composition of some green leafy vegetables grown in Tanzania. *Journal of Plant Foods* 4: 139-141.
- Statistics South Africa. 1996. *Individual and Household Survey for 1996 Census*. Pretoria: Statistics South Africa.
- Steyn, N., J. Nel, H. Tichelaar, J. Prinsloo, M. Dhansay, A. Oelofse and A. Benade. 1994. Malnutrition in Pedi schoolchildren, their siblings, and their caretakers. *South African Journal of Clinical Nutrition* 7 (4): 12-8.
- Surplus Peoples Project. 1983. *Forced Removals in South Africa: Volume 4, Natal*. Pietermaritzburg: Association for Rural Advancement.
- Swaney, J. 1990. Common Property, Reciprocity and Community. *Journal of Economic Issues* 24 (2): 451-462.
- Thompson, B. 1954. *Two studies in African nutrition: An Urban and Rural community in Northern Rhodesia*. Rhodes-Livingstone Papers 24.
- Thornton, R. and M. Ramphela. 1988. The quest for community. Pp. 29-39 in E. Boonzaier and J. Sharp, eds. *South African keywords: The uses and abuses of political concepts*. Cape Town: David Philip.
- Tooley, J. 1996. The use of indigenous trees by local communities within and surrounding the Thukhela Biosphere Reserve, with an emphasis on the woodworking industry. M.Sc. Theses, Department of Geographic and Environmental Sciences. Durban: University of Natal.
- UNICEF. 1991. *Strategy for improved nutrition of children and women in developing countries*. UNICEF Policy Review Document. New York: UNICEF.
- Van den Heever, E. 1997. The use and conservation of indigenous leafy vegetables in South Africa. Pp. 154-158 in L. Guarino, ed. *Traditional African Vegetables*. Rome: IPGRI.
- Vorster, H., W. Oosthuizen, J. Jerling, F. Veldman and H. Burger. 1997. *The nutritional status of South Africans: A review of the literature from 1975-1996*. Durban: Health Systems Trust.
- Wachira, K., ed. 1987. *Women's Use of Off-Farm and Boundary Lands: Agroforestry Potentials*. Final Report, ICRAF, Nairobi, Kenya.
- West, M. 1988. Confusing Categories. Pp. 121-148 in E. Boonzaier and J. Sharp, eds. *South African Keywords: The uses and abuses of political concepts*. Cape Town: David Philip.
- Wheeler, E.F. 1988. *Intra-household Food Allocation: A Review of Evidence*. Occasional Paper #12. London: Department of Human Nutrition, London School of Hygiene and Tropical Medicine.
- Wilson, F. and M. Ramphela. 1989. *Uprooting Poverty: The South African Challenge*. Cape Town: David Philip Publishers.
- Wilson, K. 1990. *Ecological Dynamics and Human Welfare: A Case Study of Population, Health and Nutrition in Southern Zimbabwe*. PhD Thesis, Department of Anthropology. London: University College, London.
- Win, E. 1997. *Our community, ourselves: A search for food security by Chivi's farmers*. Harare: Intermediate Technology Development Group.
- Zmarlicki, C., A. Wehmeyer and E. Rose. 1984. Important indigenous plants used in the Transkei as food supplements. *Ecology of Food and Nutrition* 15: 23-34.

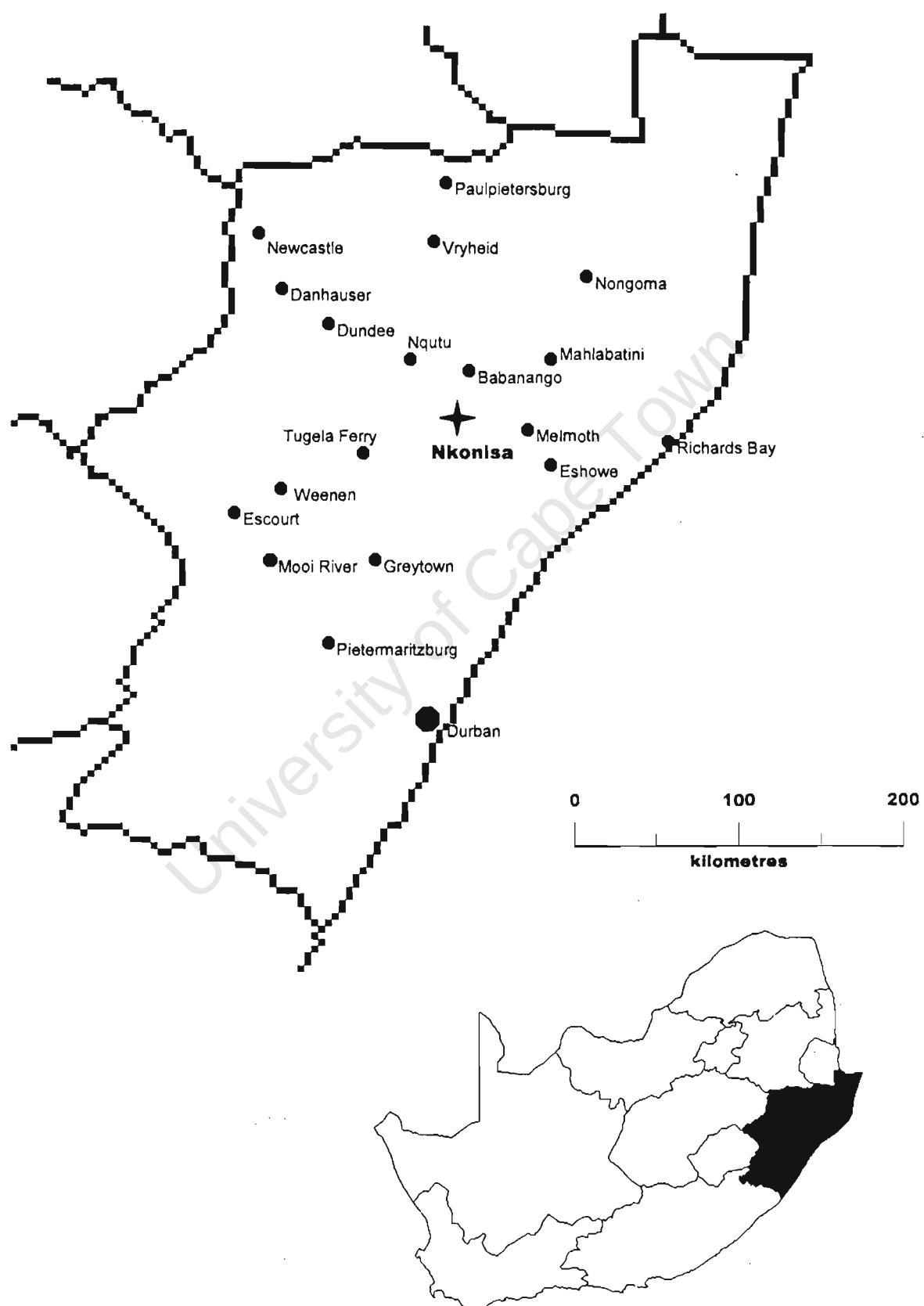
10.1 Personal Communications

- Mr Roger Farren, Pietermaritzburg
- Ms Jennifer Hawke, Fort Nongqayi/Zululand Historical Museum, Eshowe
- Dr Phumzile Mabuza: School of Biological Sciences, University of Birmingham (UK)
- Dr David Saunders: School of Public Health, University of the Western Cape
- Ms Rina Swart: School of Public Health, University of the Western Cape

11.0 Appendixes

University of Cape Town

11.1 KwaZulu-Natal with areas mentioned in this report



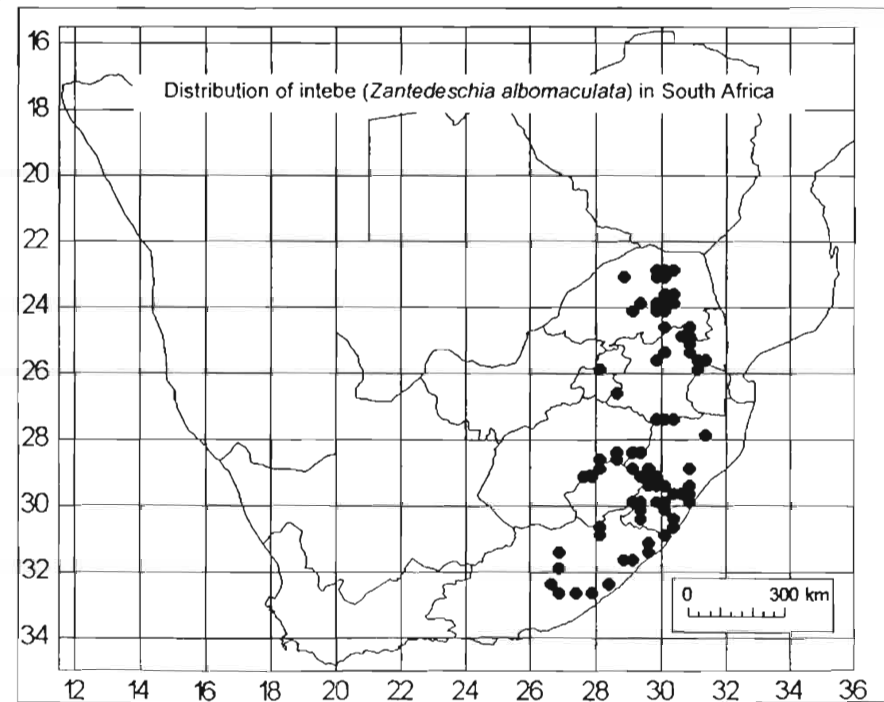
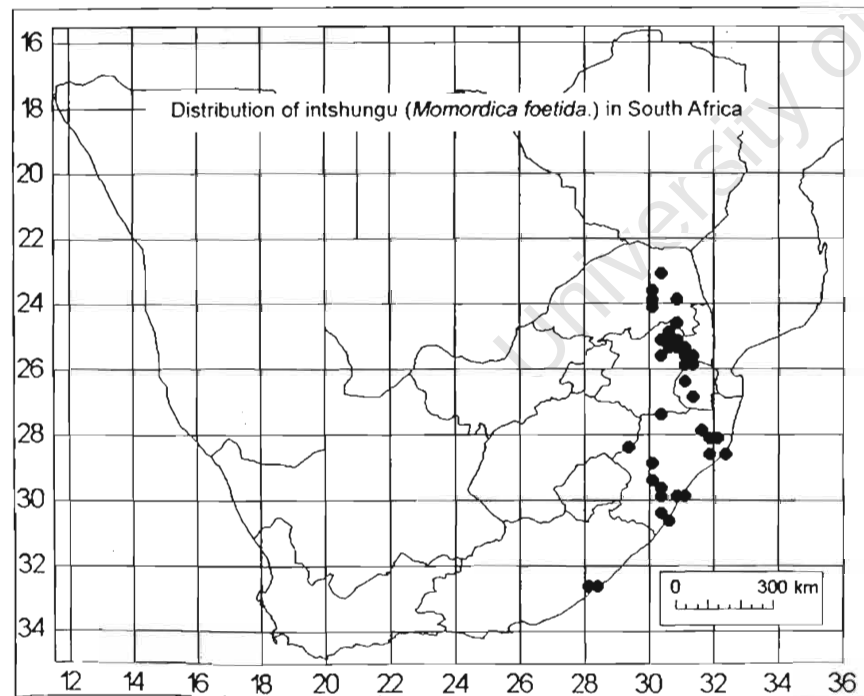
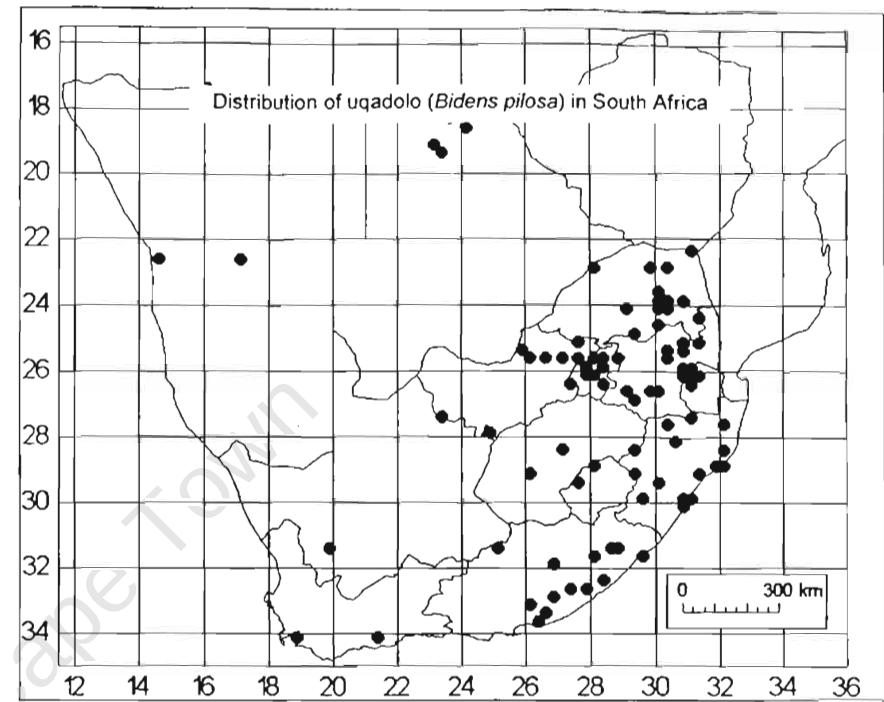
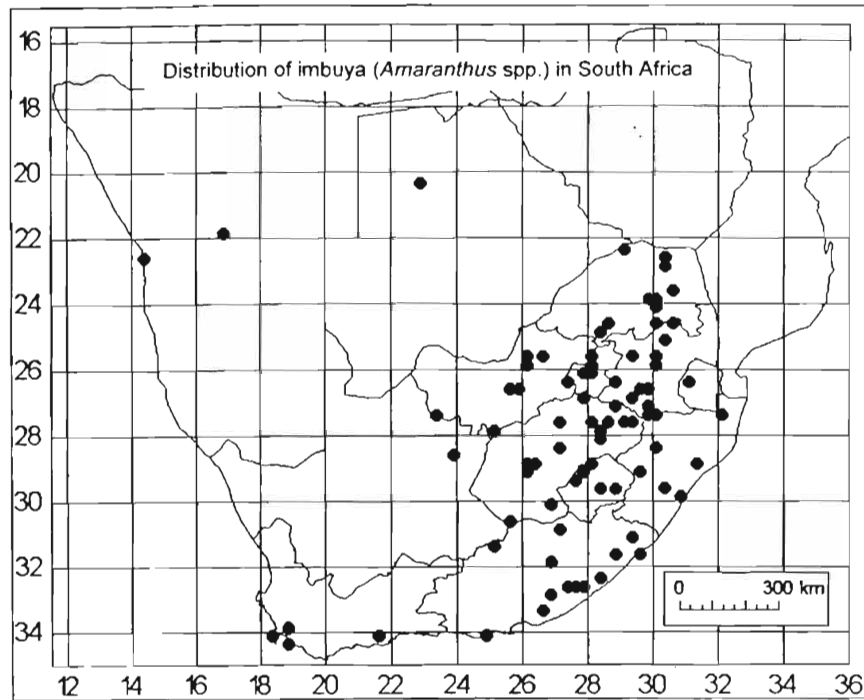
11.2 Distribution of selected *imifino* species in South Africa

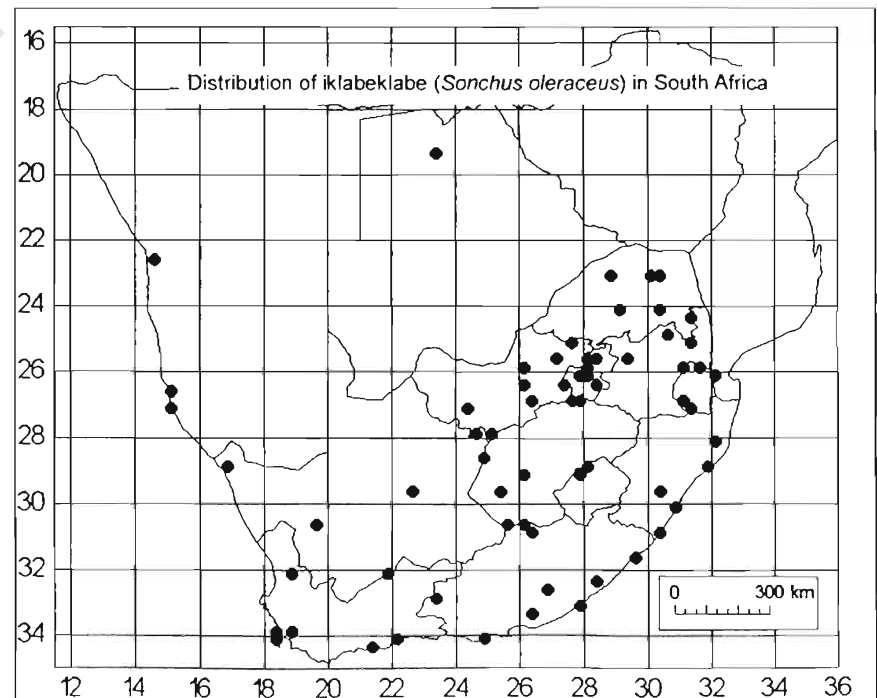
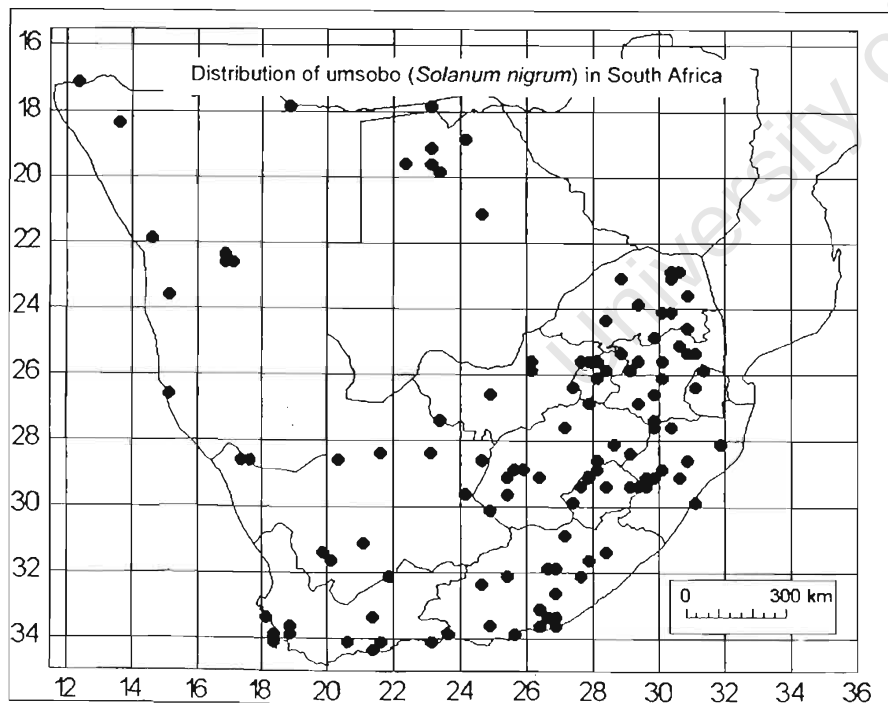
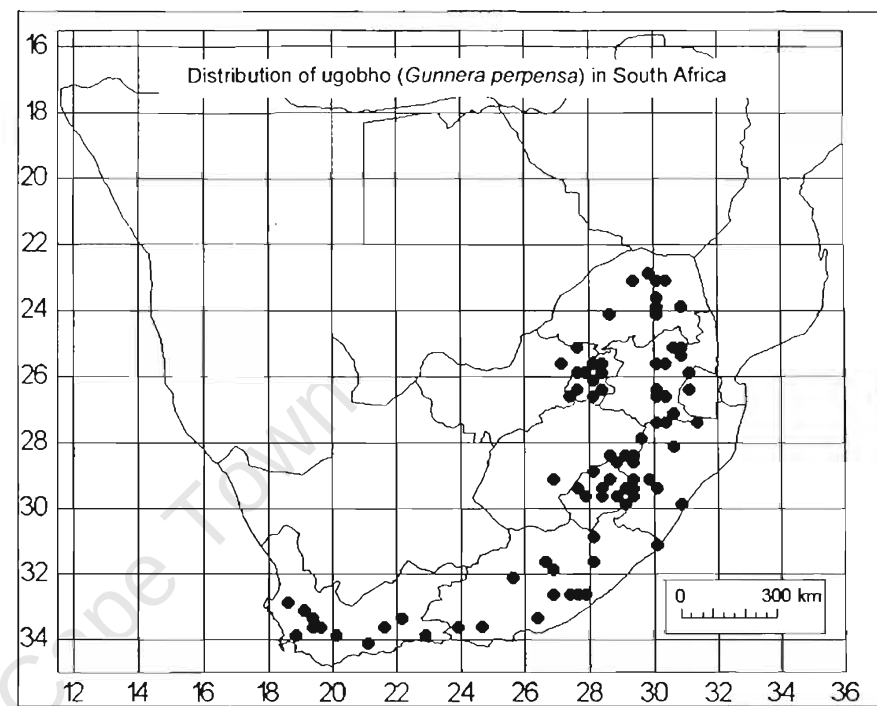
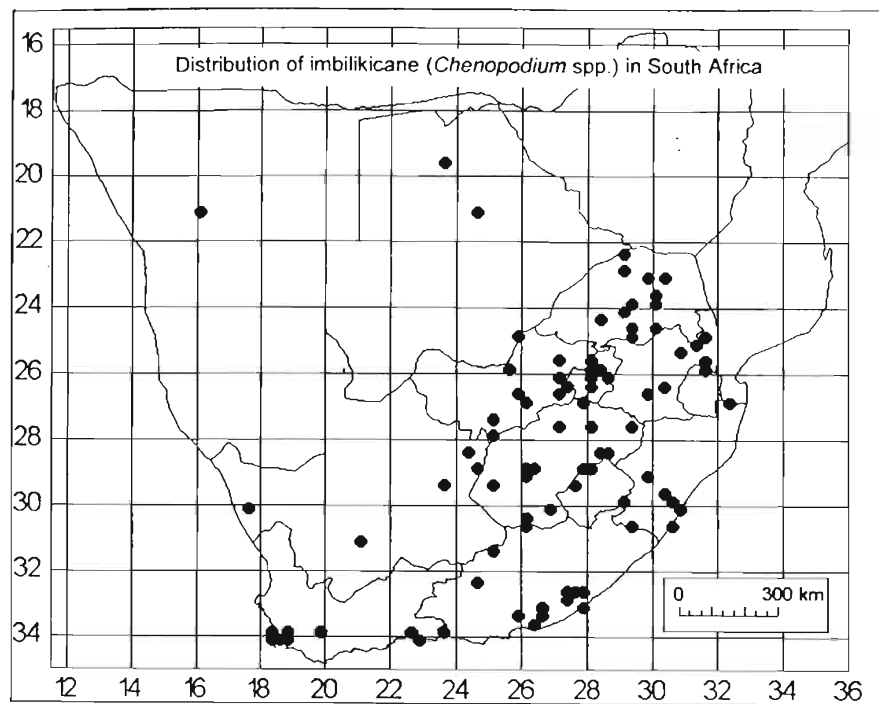
The following maps present distribution information for the following *imifino* species:

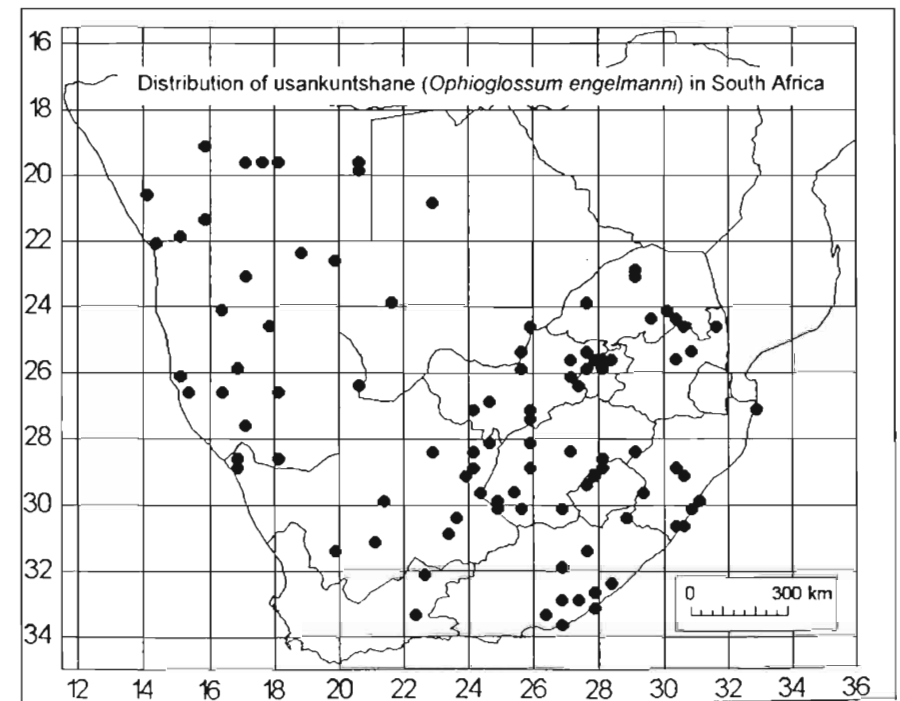
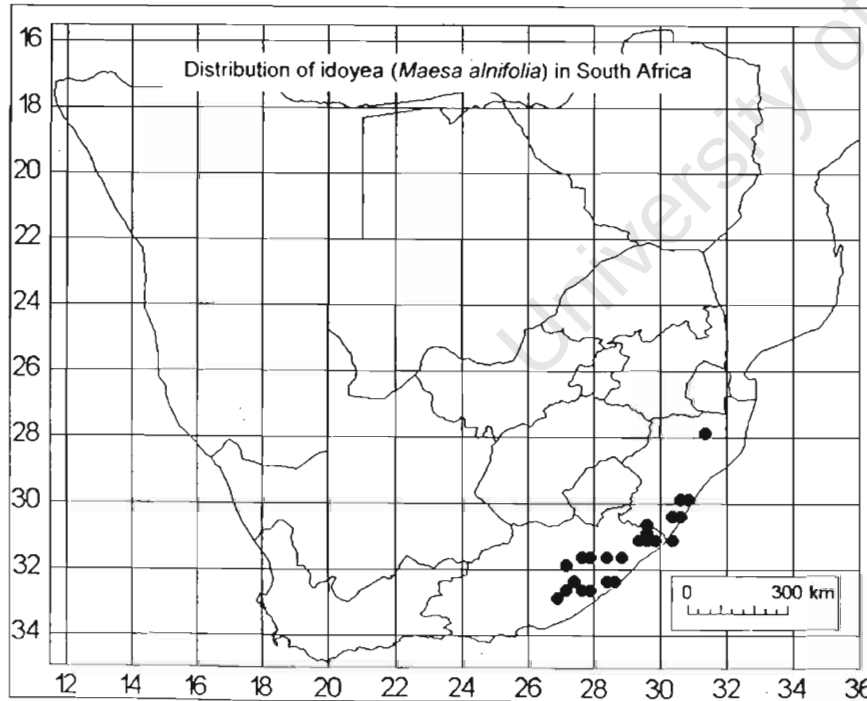
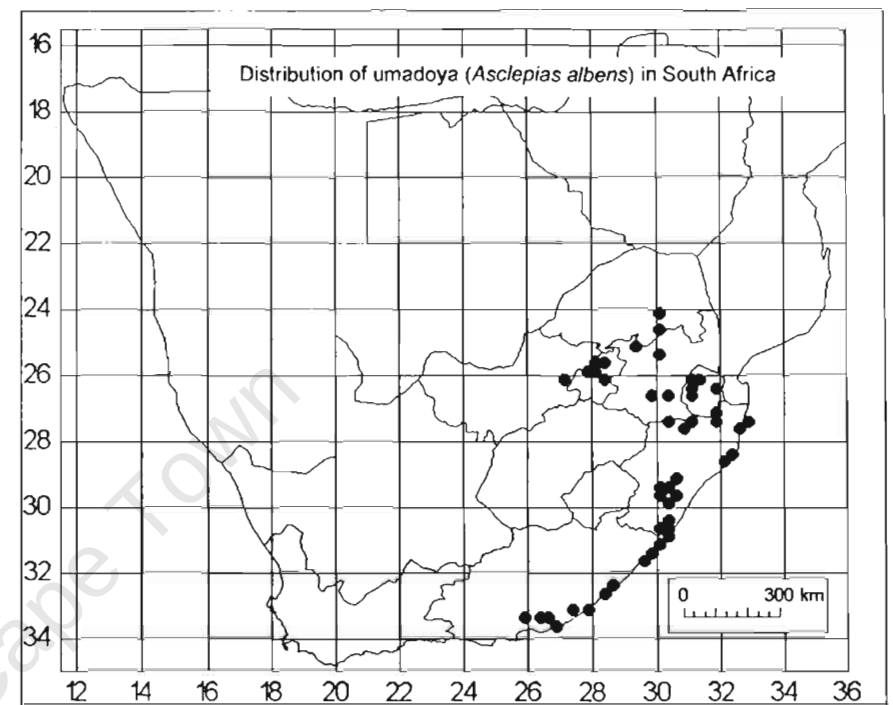
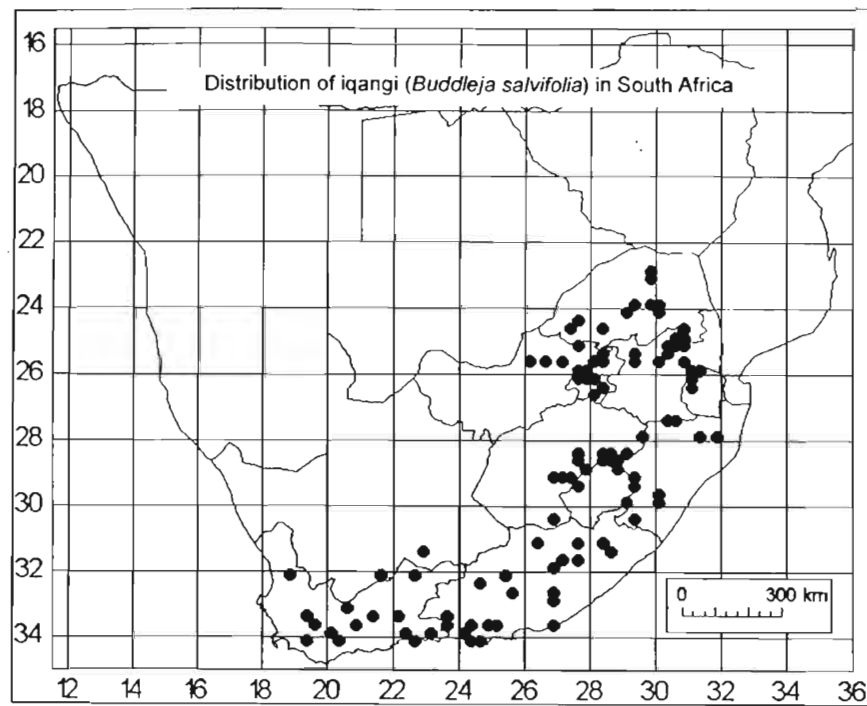
- *imbuya* (*Amaranthus* spp.)
- *uqadolo* (*Bidens pilosa*)
- *intshungu* (*Momordica foetida*)
- *intebe* (*Zantedeschia albomaculata*)
- *imbilikicane* (*Chenopodium* spp.)
- *umsobo* (*Solanum nigrum*)
- *ugobho* (*Gunnera perpensa*)
- *iklabeklabe* (*Sonchus oleraceus*)
- *iqangi* (*Buddleja salvifolia*)
- *umadoya* (*Asclepias albens*)
- *idoysa* (*Maesa alnifolia*)
- *usankuntshane* (*Ophioglossum engelmanni*)

The data presented in these maps represent the geographic distribution of herbarium specimens held in the collections of the National Botanical Institute, Pretoria. Each dot represents the collection point of one specimen. These are intended to provide a general outline of the distribution of each species.

This information is provided courtesy of the PRECIS database of the National Botanical Institute, Pretoria.







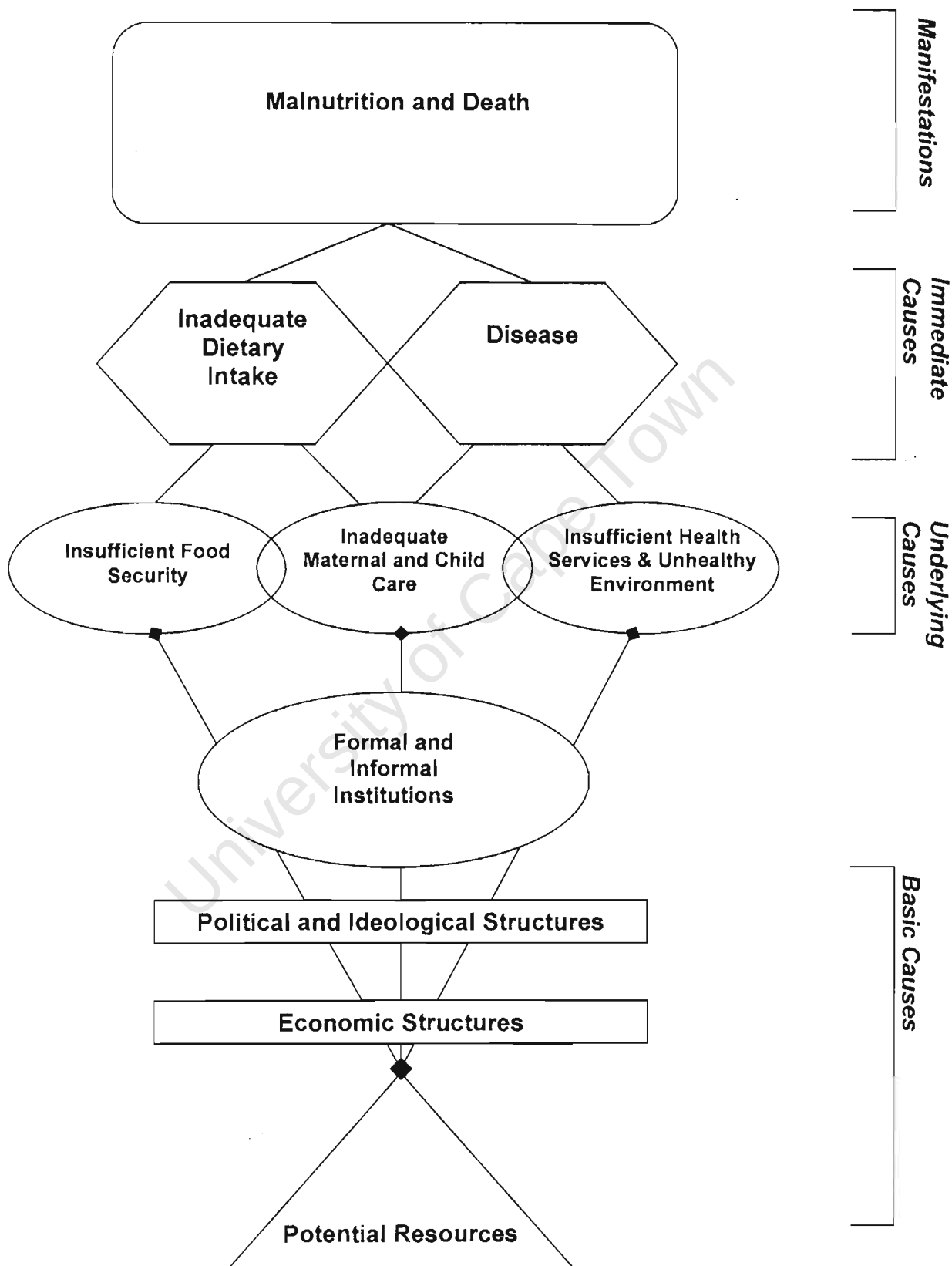
11.3 Food intake journal

Six households randomly selected from the participants in the household survey were asked to complete a month-long 'food journal'. This involved filling out a small diary (provided by the researcher) in which the head of household described all of the meals eaten by the household for the entire month of February 1998. Of the six initial participants, only 1 journal was returned to the researcher. The content of this journal is presented below.

The attrition rate encountered in deploying this technique means that this data can not be used to speak for the study area. However, this journal does provide insights into the structure of daily food intake as well as patterns of food consumption and meal selection. The participant who provided this data was a 46 year-old woman, the head of a household of 6. At the time of the household survey, the monthly income of this household was approximately 1120 Rand. This makes this household one of the wealthier households in Nkonisa, and this information should be considered accordingly.

Day	Breakfast	Lunch	Dinner
Sunday	Brown Bread	Rice, chicken, imbuya	Amasi mixed with phuthu
Monday	Sorghum porridge	Samp and beans, fish	Phuthu mixed with imimfino
Tuesday	Maize porridge and steamed bread	Phuthu and cabbage with beef	Maize, beans and tea
Wednesday	Sorghum porridge with white bread	Phuthu mixed with intanga	Steamed maize bread
Thursday	Sorghum porridge with white bread	Phuthu mixed with imimfino	Sour milk with maize bread
Friday	Brown Bread with milk	Pumpkin and phuthu mixed	Beans and phuthu
Saturday	Maize porridge and brown bread	Beef, imimfino and cabbage	Fish and bread
Sunday	Sorghum porridge with white bread	Potatoes and maize meal, mixed	Intshungu and phuthu
Monday	Tea and bread	Rice, chicken, imimfino	Melon and maize meal, mixed
Tuesday	Sorghum porridge	Amasi and maize bread	Maize and beans
Wednesday	Pumpkin and phuthu mixed	Samp and beans	Phuthu mixed with imimfino
Thursday	Sorghum porridge with white bread	Phuthu mixed with intanga	Steamed maize bread and tea
Friday	Vetkoek and tea	Phuthu, beef and beans	Bread and tea
Saturday	Porridge and eggs	Samp and beans	bread and milk
Sunday	Sorghum porridge	Rice, chicken, pumpkin and spinach	Vetkoek and tea
Monday	Maize porridge	Bean soup and maize bread	Soup and bread
Tuesday	Vetkoek and tea	Maize bread and mahewu	Madumbe and mahewu
Wednesday	Tea and bread	Phuthu and imimfino	Eggs, bread and mahewu
Thursday	Maize porridge	Potatoes and maize meal, mixed	Fish and bread
Friday	Sorghum porridge	Spinach and phuthu	Sour milk and maize
Saturday	Brown bread and tea	Maize and beans	Rice and potatoes
Sunday	Maize porridge	Chicken, dumplings and imbilikicane	Amasi mixed with phuthu
Monday	Maize bread and tea	Potatoes and maize meal, mixed	Spinach and maize bread
Tuesday	Sorghum porridge with white bread	Samp and beans	Amasi and maize
Wednesday	Vetkoek and tea	Cabbage and Phuthu	Steamed bread and fish
Thursday	Maize porridge and brown bread	inNshungu and potatoes with phuthu	Amasi mixed with phuthu
Friday	Brown bread, eggs and milk	Beans with phuthu and mahewu	Steamed bread and tea
Saturday	Steamed bread and tea	Rice, beef, spinach and pumpkin	Amasi with sorghum

11.4 Conceptual framework for malnutrition (adapted from UNICEF 1991)



11.5 A freshly burned hillside near Nkonisa

Local residents periodically set fires in the grasslands surrounding the village to improve grazing for livestock. The young shoots which sprout from burned fields are preferred by cattle.



11.6 Uqadolo, *Bidens pilosa*

Photo taken in a maize garden in Nkonisa.



11.7 *Intanga, Cucurbita* sp.

Photo taken in a maize garden in Nkonisa.



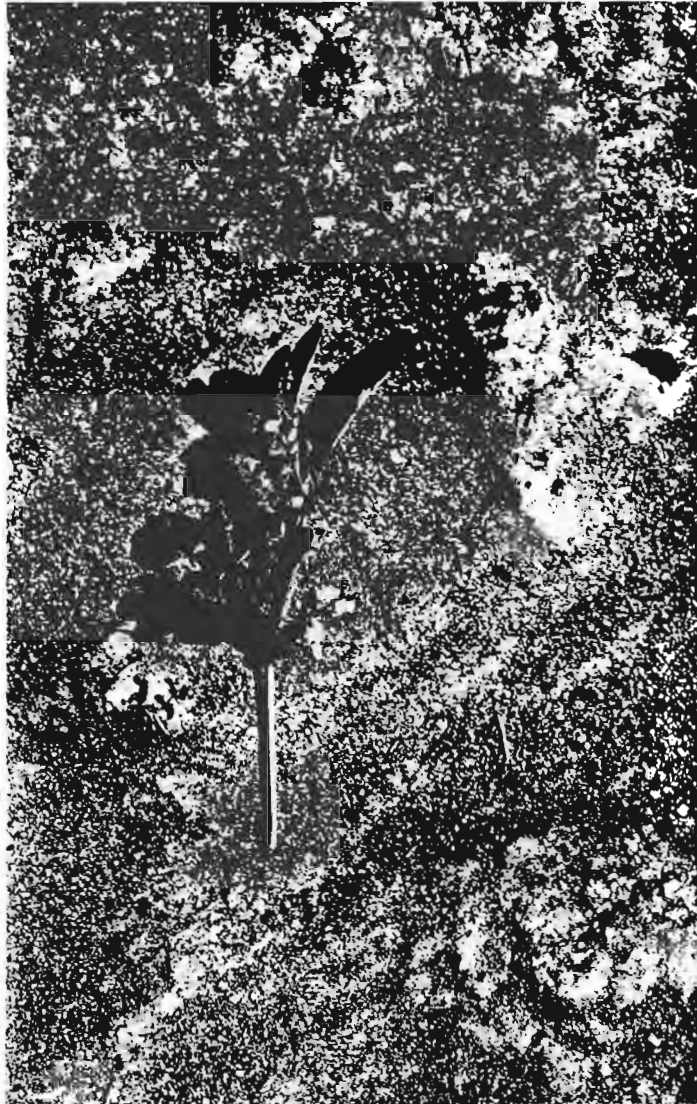
11.8 *Imbilikicane, Chenopodium* spp.

Sample collected from a field boundary in Nkonisa.



11.9 *Umadoya, Asclepias albens*

Sample collected from a maize field near Nkonisa.



11.10 Intebe, *Zantedeschia albomaculata*

Sample collected from bushveld bordering a river near Nkonisa.



11.11 *Intebe*, *Zantedeschia albomaculata*

Growing in a clearing bordering a river near Nkonisa.



12.0 Acknowledgements

My profound thanks go to the residents of Nkonisa who participated in this research. In particular the advice and insights of Johan Mlangeni were crucial in undertaking fieldwork. His friendship and humour helped to make my time in Nkonisa enjoyable as well as enlightening.

Research was funded by research grant #0300-6 from the Thrasher Fund for Micronutrient Research. Additional support was provided by the International Plant Genetic Resources Institute and the Swiss Grants for Historical Research from the Centre for African Studies at the University of Cape Town.

Many of the ideas underpinning this work emerged from discussions with Pablo Eyzaguirre and Luigi Guarino of the International Plant Genetic Resources Institute, and their inputs at various stages have proven invaluable. Field research itself would have been impossible without the generous insights of Rodger Farren, and Mdunga Manzi helped to translate interviews and focus groups. During the writing of this report the patient guidance of Owen Sichone in the Department of Anthropology at the University of Cape Town was greatly appreciated. He, Sally Frankental, Luigi Guarino and Emmerencia Ngxabi each provided valuable comments to various drafts of this document.

Finally, my greatest thanks go to Chelsea Morroni, whose patience and support has made this work possible.

Despite the many people who have contributed to this research, I am solely responsible for any shortcomings herein.

BLM