

## FINAL PROJECT COMPLETION REPORT

### I. BASIC DATA

**Organization Name:** South African Protea Producers and Exporters Association

**Project Title:** Sustainable Utilization: A Tool for Managers and Workers in the Cape Floristic Region

**Project Dates:** April 2003 – December 2004

**Date of Report:** December 12, 2004

### II. OPENING REMARKS

*Provide any opening remarks that may assist in the review of this report.*

### III. ACHIEVEMENT OF PROJECT PURPOSE

**Project Purpose:**

The long-term goal is to bring the conservation message to all who utilize floral resources of the Cape Floral Kingdom.

To promote innovative private sector and community involvement in conservation in landscapes surrounding Cape Floral region biodiversity corridors

#### Planned vs. Actual Performance

Indicator	Actual at Completion
<b>Purpose-level: To promote innovative private sector and community involvement in conservation in landscapes surrounding Cape Floral region biodiversity corridors</b>	
<i>Indicator 1: Sustainability of the natural resource bio-diversity conservation is promoted.</i>	The message of the importance of conserving bio-diversity and sustainable use and harvesting of the natural resources has been clearly articulated to a wide audience. This includes landowners, workers, tourism, hobbyists and even conservators who had a superficial knowledge of fynbos per se.
<i>Indicator 2: All harvesters of products from the Cape Floristic Kingdom, destined for the fresh and dried floral trade items, as well as those involved in craft products and eco-tourism are contacted.</i>	The invitation to the workshops was distributed to various Associations, i.e. Honeybush tea, Rooibos, Buchu and others for onward dissemination to their members. SAPPEX sent notices to all its members throughout the Cape Floral Kingdom. Farming magazines, the publication of the Dept of Agriculture and the daily press (city and rural) were notified, and SAPPEX members were requested to submit the information to regional newspapers in their area.
<i>Indicator 3: All harvesters of products from the Cape Floristic Kingdom, destined for the fresh and dried floral trade items, as well as those involved in craft products and eco-tourism are contacted.</i>	See above (repeat)
<i>Indicator 4: An easily understood handbook is</i>	The bilingual handbook, written in a user-

<i>produced and workshops are conducted in various centers of the Cape Floral Region</i>	friendly manner with a glossary provided for terms that might not be familiar to the layman was supplied to each participant at the nine workshops that were conducted in various centers of the Cape Floral Region and the handbook was also distributed to key people and organizations who did not attend the workshops.
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**Describe the success of the project in terms of achieving its intended impact objective and performance indicators.**

The project was successful and feedback has been positive. A number of people expressed gratitude for our efforts and feel that there should be follow up. This project served as an introduction to the Flower Valley/Agulhus Biosphere Initiative (ABI) training course, which will be offered in 2005. This model could well be adapted to other regions outside the Agulhus Plain.

While we may not have reached as many people as we had hoped for, it has generated much interest and enthusiasm. Information has been disseminated further by word-of-mouth.

**Were there any unexpected impacts (positive or negative)?**

The facilitators made a transcript of questions raised and comments made during the workshop and drew up a SWOT analysis from this input. This has been forwarded to CapeNature and other stakeholders identified by us, who might benefit from the result for further action where appropriate. *Copy appended*

**IV. PROJECT OUTPUTS**

**Project Outputs:** *Enter the project outputs from the Logical Framework for the project*

**Planned vs. Actual Performance**

<b>Indicator</b>	<b>Actual at Completion</b>
<b>Output 1: A handbook will be developed by specialist and will be supplied to each workshop participant.</b>	
<i>Indicator 1.1 A list of specialists has been identified to make inputs for the workbook</i>	After extensive consultation with the various stakeholders specialists were identified and a list was drawn up. These specialists made contributions for various chapters for the workbook
<i>Indicator 1.2 A handbook is developed by specialists</i>	Papers were submitted by the above-mentioned specialists, which a consultant used to develop and compile the handbook. This booklet and the workshops dealt specifically with Wildflowers, Buchu, Honeybush, Seed trade, Thatch, Reeds sedges and Grasses, and finally Ferns. A short chapter on crafts and secondary or value added products with hints of further opportunities to add value, concluded the book. A few colour plates in the centre fold of the book, as well as a list of Associations and other supporting organisations and contact numbers, in addition to legislation and policy governing the Cape Floral

	Kingdom were incorporated for easy reference. Copy of the handbook has been sent to Nina Marshall
<b>Output 2: Workshops are held in various rural areas of the Cape Floristic Region where eco-tourism and harvesting for fresh and dried is considered to have a high impact</b>	
<i>Indicator 2.1 Areas where workshops are to be held have been identified.</i>	A total of 9 successful workshops were held in the following areas: Kleinmond, Genadendal, Citrusdal, Cape Town (Kirstenbosch), Baardskeerdersbos, Jonkershoek (Stellenbosch), Jeffrey's Bay, George, Reins Nature Reserve. <i>Appended: Invitation to workshops</i>
<i>Indicator 2.2 A specialist facilitator is identified and hired</i>	Mike and Ann Scott of Overberg Conservation Services cc were recommended by the Steering committee and were appointed to present the workshops. They are fully bilingual and experienced facilitators.
<i>Indicator 2.3 16 workshops are held in key areas in the CFR</i>	It was recommended that areas be combined as this would be sufficient to reach the target audience and that the workshops be tied to the Nature Conservation offices in those areas so as to ensure that they be closely involved in the process.
<i>Indicator 2.4 A power-point presentation is prepared and given at each workshop.</i>	The framework for the power-point was developed by the specialist consultant who wrote the workbook, for further input from the steering committee, and was then finalized by the facilitator. This power-point presentation was given at each workshop. Copies were sent to CapeNature offices and interested parties who requested a copy as well as to leaders in the field of conservation identified by the steering committee. <i>Copy of power-point sent to Nina Marshall</i>
<i>Indicator 2.5 A copy of the handbook is supplied to each workshop participant</i>	Each participant received a copy of the workbook as well as a certificate of attendance.

**Describe the success of the project in terms of delivering the intended outputs.**

The outputs:

1. *Workbook*: The workbook was completed in time and has received favourable comment. Lee Jones of Indigenous Vegetation Consultancy did a wonderful job in pulling together all the different papers into a format that made sense. Starting with an explanation what the Cape Floral Kingdom really is, all the way to how to protect bio-diversity and emphasizing principles of sustainability, not just for harvesting, but also seed-stores, insects, soil, special habitats, laws and regulations, details were presented in an easy to understand format. *The workbook is attached.*
2. *Workshops*: The power-point presentation was prepared and workshops were held. Environmental posters were put up at each workshop meeting. People attending these presentations, ranged from farm workers, to environmentalists. I attended the first workshop at the request of the facilitators and was pleased to see lively discussion and participation. The facilitator reported afterwards that she learnt more

and more at each workshop and was able to adjust the power point presentation accordingly.

Input from the audience was recorded by the facilitators and summarized for organizations that can take the process further. This information has been disseminated to CapeNature, CAPE, WWF-SA, Tourism bureaus, the Department of Agriculture, and Chairmen of commodity organizations (Rooibos, Honeybush, Indigenous Bulbs) and other stakeholders. Participants were also given a Questionnaire to complete.

***Were any outputs unrealized? If so, how has this affected the overall impact of the project?***

All our objectives were reached. It was unfortunate that, in spite of having advertised as wide as possible, the attendance was disappointing. However, we consider the project a success as we have convinced a number of people, who will now have the necessary facts at hand to convince others of the necessity to apply the principle of sustainable harvesting.

**V. SAFEGUARD POLICY ASSESSMENTS**

***Provide a summary of the implementation of any required action toward the environmental and social safeguard policies within the project.***

A clear understanding of the importance of maintaining biodiversity for future generations was aimed for in this project. The outcome would be that utilization would take place on a sustainable basis, minimizing the danger of over-harvesting, while simultaneously encouraging job creation in the impoverished rural area.

**VI. LESSONS LEARNED FROM THE PROJECT**

***Describe any lessons learned during the various phases of the project. Consider lessons both for future projects, as well as for CEPF's future performance.***

Due to the large distances involved it is not easy to reach people at grassroots level. Follow up workshops and similar projects are most definitely recommended. Intensive training specifically aimed at the veld-harvesters would be beneficial

***Project Design Process: (aspects of the project design that contributed to its success/failure)***

The project was not a complicated one and just needed a "champion" to make it a success in terms of keeping to schedule and keeping people involved and interested.

***Project Execution: (aspects of the project execution that contributed to its success/failure)***

Having the necessary expertise on the steering committee, professional people with dedication and technical know-how who were prepared to go the extra mile, all contributed to the success. It was, for instance, unexpected that the facilitators would have made notes and summarized these into a SWOT type analysis so that conservation authorities and others could use this information in order to enhance their service levels.

**VII. ADDITIONAL COMMENTS AND RECOMMENDATIONS**

It seems there is a need for good extension service from CapeNature as organization with good scientific information regarding what sustainable harvesting levels are of the different plant types harvested. This offers opportunities for scientific research and information dissemination.

This project was a first for SAPPEX, and therefore the budget details were difficult to assess in advance.

The fluctuations of the exchange rate during the project made forecasting difficult. The project started at R8.12 to a US\$ and currently it fluctuates between R6.19 to R6.53. Distribution via post was found to be necessary to spread the information as far and wide as possible.

What was truly amazing is that all the collaborators were willing to give freely of their time and expertise, thereby cutting costs so that we could employ the services of the necessary professionals for the very important job of writing the handbook and running the workshops, therefore the project funds were under spent.

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**AN INTRODUCTION TO  
SUSTAINABLE HARVESTING  
OF SOME COMMERCIALY UTILISED  
INDIGENOUS PLANT SPECIES  
IN THE CAPE FLORISTIC REGION**

**A BOOKLET FUNDED BY THE  
CRITICAL ECOSYSTEMS  
PARTNERSHIP FUND**



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This booklet is the foundation of a sustainable harvesting “road-show” presented at key centres throughout the Cape Floristic Region during 2004. Any developments relating to the road-show will be announced on the CAPE website.

This booklet may be freely distributed and copied.  
Please acknowledge the source of information.

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# AN INTRODUCTION TO SUSTAINABLE HARVESTING OF SOME INDIGENOUS PLANT SPECIES IN THE CAPE FLORISTIC REGION

## FOREWORD

Landowners, farmers, harvesters and workers are custodians of the natural resource and therefore we have a responsibility to ensure that bio-diversity of the Cape Floral Kingdom is preserved. But, we also have the right to utilize the natural resource in such a way that it will still be available and intact for future generations.

WHY? The fynbos has a direct and indirect value as well as a non-use value. One of the direct values is that of utilization, but this must not be done at the expense of the indirect ecological functions value which, for instance, provides us with clean water, or at the expense of “non-use” value; the conservation of bio-diversity and preservation of endangered species.

We must use the natural environment in such a way that it gives maximum profit in the long term, while ensuring that the resource quality and potential remains intact, and where possible is improved.

***What does “sustainable farming” actually mean? It has been defined in many ways, but at its core lies a kind of farming that is:***

environmentally sound  
economically viable  
and socially acceptable

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This booklet is intended as a guideline for those who use the natural resources of the Cape Floral Kingdom, to ensure that we do not over-exploit that which is a national treasure, and which is recognised as one of the floral kingdoms of the world. Whether harvesting for flowers, medicinal plants, thatching or craft products, or even just to make others around you aware of the treasures that lie at our doorstep, we hope that the notes will assist you in making the right decisions for managing what you do, and what you say to others about the importance of conservation.

We hope that you too will become one of the many dedicated people who have the well-being of our natural environment at heart.

Maryke Middelmann  
Chairman, SAPPEX

## **ACKNOWLEDGEMENTS**

This booklet is dedicated to the many people who have collaborated on this project. Sincere appreciation is given to the Critical Ecosystem Partnership Fund.

## **1 WHAT IS THIS BOOKLET ABOUT?**

This booklet is an introduction to ideas about **sustainability**, for all those who harvest natural crops. We hope to provide you with some of the reasons for thinking about tomorrow while you harvest today. Harvesting in ways which make sure that our children and their children will be able to harvest the same natural crops in ten, or even a hundred years from today.

This booklet also explains how important it is to look after the areas that surround your crop, in order to make sure that your crop, whether it is buchu or thatch, rooibos or wildflowers, is protected. Protected so that it will continue to produce leaves or flowers so that you can continue to earn a living. We hope to stimulate your interest, directing you to further information, including organizations, institutions, associations and other bodies that can assist you to learn more.

The first section provides a background to the importance of the Cape Floristic Region, as well as to **sustainability** and **biodiversity**. The background information offers a glimpse of present day ideas about sustainability, or ensuring that crops and natural systems will persist despite regular harvesting.

The middle section of this booklet provides background information and some harvesting guidelines for a selection of regularly harvested species and groups of plants, from wildflowers and honeybush to thatching reeds.

The final section explains some of the words used in the text (those that are in **bold** letters when they first appear) and provides a reading list as well as contact details for various projects, government and non-government agencies.

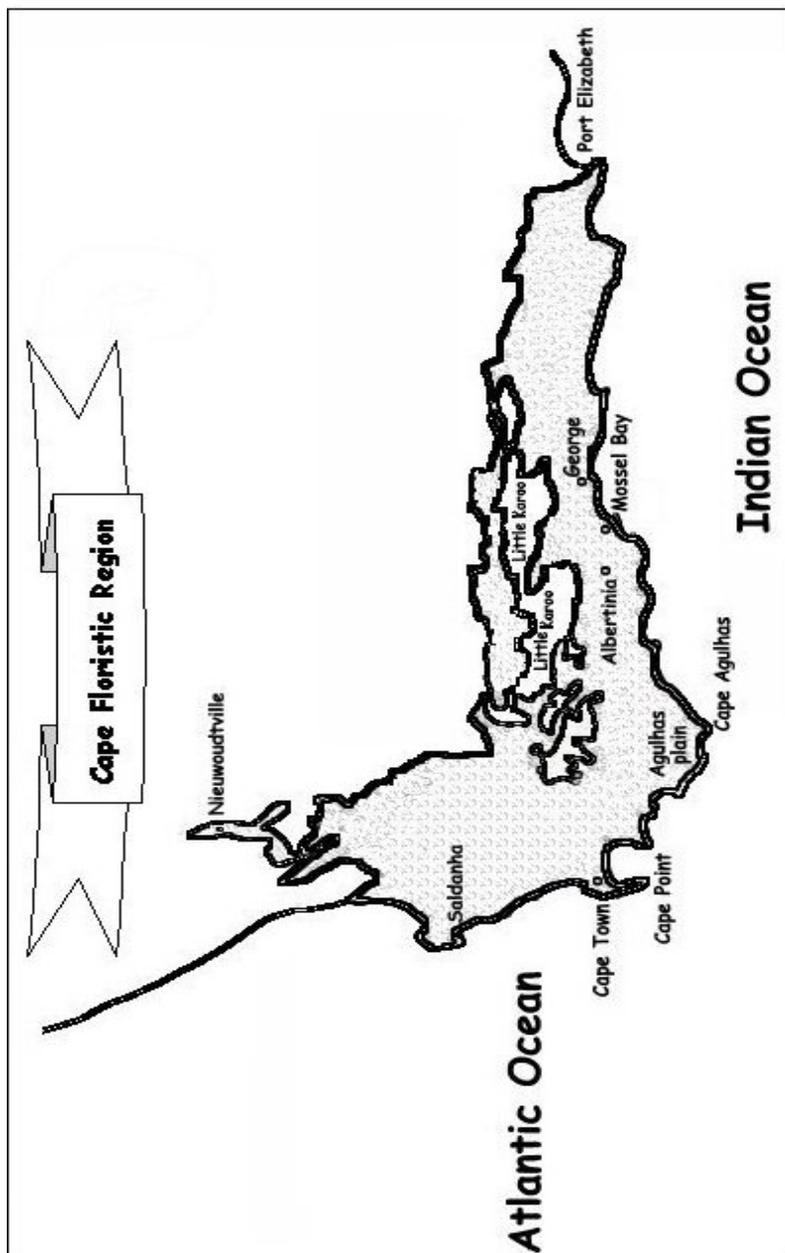
## **2 WHAT IS THE CAPE FLORISTIC REGION?**

The Cape Floristic Region (abbreviated to “CFR”) stretches from the Northern Cape – just north of Nieuwoudtville (near Clanwilliam on the Cape West Coast) - all the way to Port Elizabeth in the Eastern Cape. A picture of the boundaries of the CFR can be seen on the next page. The CFR is set apart from other parts of South Africa and the rest of the world, by the types of plants (known as “flora”) that grow in the CFR.

The CFR is also called the Cape Floral Kingdom, one of only six floral kingdoms in the world. It is by far the smallest floral kingdom, covering 90 000 square kilometres. By comparison, one of the other floral kingdoms (the Boreal Forest Kingdom) covers 50 000 000 (50 million) square kilometers!

The main types of vegetation (plant life) found in the CFR are **fynbos** (usually growing on grey, sandy soils), **renosterveld** (usually growing on red, clay soils) and even some karoo veld (growing in the drier areas of the CFR, in the Little Karoo).

Fynbos (the fine-leaved vegetation so familiar to us all) is the most common type of vegetation found in the CFR, comprising 80% (four-fifths) of all the plant life in the region. Although only some of the plant types (species) in fynbos have fine (narrow) leaves, one of most the distinctive features of fynbos are the ericas, which have extremely fine leaves. Proteas, ericas, restios and buchus are the most typical (often found) plant types in natural fynbos. The presence of these plants, distinguish fynbos from other types of vegetation, such as forests, grasslands or karoo veld.



The Cape Floristic Region extends from Nieuwoudtville to Port Elizabeth

### 3 WHY IS THE CAPE FLORISTIC REGION SPECIAL?

The CFR is home to 9 000 **indigenous** (natural) plants and is very “rich” in different plants. To compare the CFR with some other parts of the world:–

- ◆ California (on the west coast of North America) is three and a half times the size of the CFR but has less than half the number of indigenous plant species ( $\pm$  4 300);
- ◆ South-west Australia is three times the size of the CFR but has about 8 000 indigenous plants; and,
- ◆ New Zealand, is three times the size of the CFR, and only has about 2 000 plant species!

Most of the plants in the CFR are found in a type of veld known as “fynbos”. Over two-thirds of these plant species (types of plants), are found only in the Cape Floristic Region. These plants are found nowhere else in the world (unless of course they have been planted by humans), not even in other parts of South Africa. These species include:

- ◆ most of the proteas, cone bushes and pincushions;
- ◆ most of the other beautiful flowering bushes sold as cut-flowers and filler material, such as knoppiesbos and ericas;
- ◆ many of the bulbs (such as *Gladiolus*, *Watsonia* and *Freesia*);
- ◆ rooibos tea and honeybush tea;
- ◆ all of the commercially harvested buchus; and,
- ◆ most of the restios (such as dekriet) and many of the other types of reeds used for thatching, making baskets or mats and even as decorative filler material for the cutflower trade.

Millions of tourists from other countries, and other provinces of South Africa, visit the CFR every year to enjoy the beautiful Cape Mountains and Cape flowers.

#### **4 WHAT PROBLEMS THREATEN THE CAPE FLORISTIC REGION?**

Large parts of the Cape Floristic Region have been changed from their natural state.

Some of the reasons for these changes are:

- ◆ Cities, towns and villages cover some areas, changing them forever;
- ◆ Farms - for cattle and sheep as well as for planted crops, such as wheat, apples and grapes – cover very large areas;
- ◆ **Alien** (exotic) plants, from Australia, Europe, America and Asia have **invaded**, or begun to invade, large areas including cities, farmlands, mountains, rivers and **wetlands** and are killing our natural plants in the process;
- ◆ Illegal harvesting – or even just harvesting too much, too often, or during the wrong season – can result in the decrease or complete loss of plants in nature; and,
- ◆ Fire that burns the same place too often, or too soon, kills plants before they have a chance to grow; flower; and, make seeds.

Most of these problems and changes are most easily seen in the lowland areas – such as on the low-lying areas on the West Coast (Darling/Hopefield) and parts of the Agulhas Plain (around Napier/Bredasdorp).

Although the mountain areas are less suitable for the development and expansion of cities and farms than the lowlands, they are also at great risk of alien plant invasion, frequent fires, and unsustainable or illegal harvesting practices.

## **5 WHY IS THE LOSS OF HABITATS A PROBLEM?**

**Habitats** are natural areas or places where plants and animals are normally or naturally found. Many plant and animal species are only able to survive in one type of habitat. For example, some bulbs only survive in rocky habitats away from mole-rats, other plants only survive in wet areas (in wetland or river habitats), or on top of a mountain (in high altitude habitats).

Keeping habitats in a natural state is important because the habitats conserve plants as well as the animals that depend on the plants for food and shelter. These animals may be needed for pollination (e.g. butterflies, bees and birds); spreading seeds (e.g. ants, birds and mice); or, keeping down the numbers of rats that feed on the plants (e.g. mongooses). Healthy habitats produce products such as medicinal plants, wildflowers, fuel for home fires, thatch and many other harvestable items. Healthy habitats also ensure that rivers and wetlands that pass through the habitats are kept pure and free from silt and mud.

Damage to habitats can include frequent fires; ploughing at the wrong time; ploughing on too steep a slope; and, excessive (too much) harvesting. These types of damage expose the soil and cause erosion. Erosion means that the upper layer of soil (topsoil) is washed away by water, or blown away by wind. Topsoil contains all sorts of things that plants need to grow healthily and produce leaves and flowers, such as compost and natural plant foods. Topsoil also contains seeds (the soil-stored “seed bank”), which germinate when the rains start. So, losing topsoil means the loss of both plant food and seeds.

If a habitat is damaged, then it may lose its ability to support the plants that you harvest. If a habitat is totally destroyed, so are the plants and animals that depend on the habitat.

## **6 WHAT IS BIODIVERSITY?**

Biodiversity (short for biological diversity) is a fairly new term used to describe the whole natural **environment**. This means all the living things (plants, animals, birds and insects) as well as the way/s in which they live with each other. In other words, how they influence (and are influenced by) their surroundings. Biodiversity includes all the building blocks of nature such as soils, rocks, mountains, rivers and vleis (wetlands). Biodiversity can be thought of as all parts of the natural environment working together, much like a jigsaw puzzle or a mosaic. If even one piece of the jigsaw puzzle or mosaic is removed then the environment may be less functional, less stable or simply less complete than it should be. The more pieces that are missing the harder it is to see the whole picture.

All the parts (plants and animals, habitats and **landscapes**) are linked together in one way or another in a mosaic. For example, a species of butterfly may pollinate one particular plant species but the larvae (caterpillars) of that butterfly feed on a different plant species (called the food or larval “host” plant). If all the host plants are removed (by ploughing, or fire, or too much harvesting) then most (or all) of the caterpillars will die because there is too little food. There will then be very few butterflies, and the plant species that is usually pollinated by the butterfly will be poorly pollinated. Very few seeds (if any) will be made and over a few years that plant species may also die out. This can lead to bare soils and then to erosion during the first rains. Erosion usually removes the important topsoil (and the seed banks). The eroded topsoil may be washed into rivers (making the water dirty) or cover other places with a slick mud, leading to more damage to the habitat.

The term “**veld mosaic**” is often used to describe the variety of plants that live together. In general, it is best to ensure that as many plants (and animals) as possible be allowed to live together. Much like an artistic mosaic, removal of one or several of the pieces reduces the meaning and even the value of the larger picture.

## **7 WE HAVE ALWAYS USED THESE PLANTS**

Yes, indeed we have always used these plants but the times and the pressures have changed. There is a need to change our ideas, and our ways, to make sure that we can conserve our natural heritage and keep our livelihoods for the future.

Harvesting a small amount of leaves (or flowers) is unlikely to kill a plant. Most plants benefit from a small amount of pruning, especially at the right time of year. Most of the plants that we harvest from our Cape countryside are able to easily grow new shoots and flowers after we harvest them. Harvesting too much, especially during the wrong season, can reduce the wild **populations** to the point where they are no longer able to survive droughts and wildfires.

In the past, our grandparents and their grandparents before them harvested buchu and thatch, honeybush and wildflowers. Most of the harvesting was for their own use but a part of the crop was sold to shops in the towns and cities as well.

Since Democracy in 1994, South Africa trades freely with countries all over the world. As a result, the number (and size) of markets for our natural products has increased greatly over the past ten years. Today, crops such as buchu, rooibos, honeybush and many wildflowers are exported (sold overseas). This places an increased burden on the natural crops.

It is our shared responsibility to make sure that we harvest no more than the natural crops can provide.

## **8 WHAT DOES “SUSTAINABLE” MEAN?**

Think of your bank account. A savings account earns you interest every month on your savings. Let's assume that you have R1 000 in the account and you earn 6.5% interest on this every year. That means you will earn interest of R65 every year (just over R5.40 every month) on your savings. Now, you can leave the interest in the bank to add to your savings, or you may decide to use the interest every year to buy good things for yourself and your family. Both of these options are **sustainable**, since at all times the savings are safe. If you start using more than the interest (for example R100 of your savings every year) then your savings will slowly shrink, leaving less in the bank and providing less interest every year. Eventually, no savings will be left.

A stand of buchu, thatch, rooibos or other wild-harvested crop is much like your savings account. It produces seeds (every year) and young plants (most years). These seeds are like the interest on your savings, which allow your savings to grow and to be kept safe. Seeds that remain in the soil are known as a “seed bank”, for a very good reason. These ensure that you can continue to harvest for years, because even after a fire, or a drought, the seeds germinate and produce new plants.

Harvesting too much of the crop (the interest AND some of the savings) too often (or at the wrong season), reduces the numbers of adult plants and the numbers of seeds for the “seed bank”. To harvest sustainably you have to control your annual withdrawal (harvest) from the savings account (crop). Make sure that your harvest is no greater than the interest (growth) for the previous year. In good years, your interest will be higher, but in bad years your interest will be low. But, harvesting sustainably makes sure that your hard-earned savings (the crops) remain safe for the future.

## 9 WHAT IS “SUSTAINABLE HARVESTING”?

There are many definitions of the word “sustainability”. One of the most suitable meanings is the following:

*“To be able to meet today’s requirements without reducing the quality of life for our children and their children”.*

“Sustainable harvesting” thus means a great deal more than just the *amount* harvested. While “sustainable harvesting” includes the use and harvesting of a crop species, there is a condition. The condition is that sufficient leaves, flowers, fruits, and most importantly *seeds* must be left on the plant (or plants) during each harvest. Enough to ensure that the individual plant, the plant population in which it grows, and the associated animals (such as pollinators and seed distributors) are able to thrive and reproduce to ensure future generations of the crop as well as future harvesting seasons.

“Water for all for ever” was a vision adopted by the Department of Water Affairs and Forestry. This vision wisely recognizes the need to ensure sustainable water supplies for all citizens of this country, for the present as well as the future. Water and plants can both be viewed as “sustainable” or “**renewable**” resources. Unlike coal, oil or gold, which have a limited quantity (**non-renewable** resources), plants can continue to produce harvestable resources from year to year as long as they are sustainably managed and harvested, and their habitat is kept intact and healthy. So... “**plants for all for ever**”?

An important aspect of sustainable harvesting is that the crop should be harvested, or used, without causing damage to the habitat. Sustainable harvesting of plants and other natural products requires a well-managed balance between harvesting and a reasonable regeneration time for the product harvested.

## **10 WHY SHOULD WE HARVEST SUSTAINABLY?**

Too much harvesting (particularly when done at the wrong time) can lead to the death of a plant or even a whole group (population) of plants. Sometimes, this may have less to do with the harvest itself and much more to do with a drought, a very bad frost, extremely hot fire or too frequent fires.

Plants that are harvested to the limit (all available leaves or flowers removed) are more at risk of being affected by climate (drought, heat, frost) or other changes (such as fire). If too few seeds are left in the soil, then there will not be enough to germinate and replenish your harvest for future years.

Plants that are harvested “sustainably” (at, or below, the limit and at the right times) are able to produce enough leaves, shoots, flowers, and especially seeds, to allow the population to survive most bad events such as fire, frost or drought.

If plants ARE harvested sustainably, then even if the individual plants die in a fire, or from drought or frost, then there will still be enough seeds in the topsoil (the “seed bank”) to allow many seedlings to grow and survive, producing a new crop after a few years, when the plants have matured.

If plants are harvested unsustainably (too much, too often, and at the wrong times) then there will only be a few seeds in the topsoil and too few seedlings will germinate to replace the dead adult plants.

The goal is to harvest enough to provide a good income, and still make sure that the plants remain strong enough to make seeds that will produce the future crops.

## **11 ARE THERE LAWS THAT CONTROL OR GUIDE SUSTAINABLE HARVESTING?**

### **11.1 LAWS TO PROTECT AND GUIDE THE USE OF NATURAL RESOURCES**

As with all parts of life, there are various laws and regulations that guide harvesting. The good news is that most of these laws protect natural plants and habitats. The laws also control, or regulate, the use of natural resources. These laws and regulations are not just in place to punish people. The laws are there to protect us, our natural heritage, and to protect our source of income.

All commercial harvesters (and all the people working for the business) need to know and to follow the laws in order to continue harvesting.

There are laws that control and regulate the picking or harvesting of wildflowers and / or seed. Anyone wanting to pick any indigenous plants (or seeds) must have a permit from the conservation authorities before they are allowed to do so. Anyone picking plants without a permit is breaking the law and may be fined many thousands of rand by the courts. Permits are also required to clear land for planting.

There are other laws that protect rivers and wetlands, mountain areas and nature reserves. Other laws guide the removal of alien **invasive** plants and weeds. There are even laws which protect our homes and the natural veld from fires.

A summary of environmental legislation that is relevant to sustainable harvesting is provided in section 21.4 at the end of this booklet.

South Africa has some of the best environmental laws in the world, designed to guide us to protect our heritage, use it wisely and ensure sustainable livelihoods for the future. It is up to us to follow the laws, and encourage others to do the same.

Report illegal harvesting and improve your own livelihoods!

## **11.2 ACCREDITATION**

It is important for growers, harvesters, exporters and potential exporters to bear in mind that there is increasing pressure to conform to production standards. This requires subscribing to accreditation systems and certification standards governing:

- Social standards, i.e. working conditions, workers health and safety; and,
- Environmental standards, i.e. pesticide use, water consumption and pollution, sustainable farming.

For the wildflower industry these systems and standards include:

- Europe: EurepGAP, Milieu Programma Sierteeld (MPS) the German "Blumen"; and,
- USA and Japan: HACCP (Hazard Analysis of Critical Control Points) governing foodstuffs and a step up from EurepGAP.

The relevant associations can assist with further details of accreditation requirements where these apply.

## **12 WHAT ARE THE IMPORTANT THINGS TO REMEMBER FOR SUSTAINABLE HARVESTING?**

Natural veld more or less “manages” itself. Unfortunately, as the pressures on natural systems increase it becomes increasingly necessary for us to get involved in order to ensure veld health and sustainability. Important aspects of sustainable harvesting are described here in order to encourage sustainable use of natural resources.

### **12.1 PROTECT SOIL-STORED SEED BANKS**

Seeds and seed banks (the seeds stored in the soil around the plants) lie at the very heart of sustainable harvesting. Without seeds, there can be no regeneration of vegetation and no future harvesting. When seed-producing material is harvested (e.g. flowers, fruits, or even just large quantities of the leaves and shoots that would result in future flowers that produce seed), some of the pollinated flowers and seeds must always be left on the bush and allowed to fall to the ground to replenish the soil-stored seed banks every season. Leaving too little seed means that fewer plants (of your valuable harvest species) may germinate after the next fire, reducing your harvest crop.

### **12.2 SET HARVESTING LIMITS**

Each species has its own unique set of harvesting limits and methods. These may differ according to the time of year or season, or the average rainfall for a particular year. Some species can only be harvested every three years. How can one ensure that there is sufficient material for harvesting but also enough to allow the plants to grow strongly and produce enough seed to replenish the natural soil-stored seed banks? Some harvesting limits for selected species are provided later on in the booklet but decide for yourself the type of harvesting you do by comparing the information in the table on the next page with your own harvesting methods.

**Description of different harvesting methods and the sustainability of each method**

METHOD	DESCRIPTION	SUSTAINABILITY LIKELIHOOD WITH REASON/S
Total cropping:	All available material is harvested without consideration for future harvesting. Records may be kept, but these are likely to provide information on income rather than on sustained harvesting potential.	<b>Unsustainable in the medium- and long-term:</b> The individual plant is either removed entirely or pruned so severely it may never recover from the harvest.
Maximum cropping:	All available material is harvested but the recovery of the plant is important for future harvesting from the same plant. Records may be kept but these are more likely to be income-related than sustainability related.	<b>Unsustainable in the medium- and long-term:</b> No consideration is given to issues such as building up a seed bank, support of pollinator species, etc.
Haphazard cropping:	No limits are set for maximum or minimum harvesting. No records are kept.	<b>Unsustainable or sustainable:</b> Depending on how frequently, how much and how many plants are harvested. Not recommended as a method simply because there is no defined method.
Optimum cropping:	A defined ecologically sustainable percentage (e.g. no more than 35%) of available material is harvested from each plant, leaving some flowering, fruiting and vegetative material on each plant. Clear records are maintained which <b>monitor</b> the harvest and adjust the percentage allowable for the next season.	<b>Sustainable in the long-term:</b> This method has the benefits of allowing continued pollinator/plant relationships; replenishing seed banks; and, ensuring sufficient leaves remain for photosynthesis (the process whereby plants make food), rapid recovery and growth.
Systematically random cropping:	A defined ecologically sustainable percentage (e.g. no more than 35%) of available material is harvested from randomly selected populations and / or plants, as for optimum harvesting but with some plants and / or populations not being harvested at all for a season or more. Maintenance pruning might be required depending on the crop harvested. Clear records are maintained which track and monitor the harvest and adjust the percentage allowable for the following season.	<b>Sustainable in the long-term:</b> This method allows all the benefits of the "optimum" method but contributes to improved habitat and biodiversity sustainability by reducing disturbance to randomly selected populations and / or plants. This method has the added benefit of stockpiling "extra" material which may be available for those rare seasons where commercial demand or raw produce return is extremely high and a once-off optimum- or even maximum harvest is possible without compromising the ecological sustainability of the crop.

### **12.3 PROTECT NECESSARY INSECTS**

Pollinators are not the only vital insects needed to ensure long-term sustainability of your crop. For example, some ant species collect and eat seeds of various plant species, but there are other species of ant that collect seeds and take them underground, eating only a part of the seed coat without damaging the seed. These seeds germinate safely from the ants' underground storage chambers, protected from fires and also from other seed-eating insects, birds and mammals.

Using pesticides to kill a pest may do more harm than good if you are also killing the pest's natural predators or the plant's natural pollinators. When a pest-outbreak occurs, remember that ladybirds, praying mantises, spiders and other insect friends are often as potent as the most poisonous pesticide.

### **12.4 PROTECT SOILS FROM EROSION**

Topsoil is one of the most precious possessions we have and it is crucial to safeguard this resource, since our lives are dependent upon it. When topsoil is lost then the nutrients and compost and the seeds are also lost.

The most effective way to reduce topsoil erosion is to ensure that the soil surface is covered with plants, growing together in a healthy veld mosaic. Footpaths and access roads must follow natural contours (ACROSS the slope, not DOWN the slope), stream-bank and wetland vegetation should be left intact in order to support these areas during floods. Alien vegetation (particularly gum trees) shades out natural groundcovers and leads to bare soils.

Where erosion is noticed, use wood-chipped mulch, rock-bars and logs to slow down water speed across the soil surface. While erosion is natural, unwise human actions and activities can speed it up unnecessarily and detrimentally.

## **12.5 FIRE – FRIEND OR FOE?**

The law requires that all landowners (and land users) must prepare and maintain a firebreak to prevent fire from spreading to or from neighbouring land; that does not cause soil erosion; and, is reasonably free of inflammable material. Landowners and authorities have to jointly manage the threat of wildfire.

Controlled burns are necessary to reduce the threat of unplanned wildfires but also because fynbos needs to burn occasionally in order to conserve the biodiversity. Reducing the threat of wildfire is relatively easy to understand, but how can one conserve biodiversity by setting fire to the veld?

In the CFR, plants have adapted in all sort of ways to fire. Some plants resprout after fire (e.g. berg-boegoe), while the seeds of other plants are stimulated to germinate after fire (e.g. vlei-tee). The most important thing is that veld should not burn too often. Planned fires are important. Planning should allow at least one full season of no harvesting prior to a planned burn to allow plants to **set seed**. Accidental fires are bad because they often damage veld that is too young to burn and should be prevented at all times. Natural fire cycles are thought to vary from six to about 40 years between fires.

Most wildfires in the CFR occur during summer but can happen in any season if conditions are dry, warm and sunny such as in berg wind conditions. Controlled burns are usually done in late April (autumn) to reduce the risk of wildfires. It is best to discuss what conditions are most appropriate for your veld, and your crop, with Nature Conservation authorities and the Department of Agriculture.

Alien trees (such as rooikrans, pines, gums and hakeas) can increase the risk of fires, especially fires that burn too often, or too hot and damage the veld.

## **12.6 INVASIVE ALIEN PLANTS**

Weedy and invasive alien plants, those from other countries (such as gums, wattles, pines and hakeas) grow fast, spread rapidly and lead to a variety of problems including the loss of natural species, too frequent fires, soil erosion and reduced soil water. Alien plants have invaded large parts of the CFR, reducing biodiversity and in some instances leading to extinction or near extinction of indigenous plant species.

The law requires that alien invasive plants and weeds must be removed unless they are grown under controlled conditions. These laws are not simply a big stick forcing us to do “the right thing”. Problems caused by alien plants can be far more expensive if they are left to spread and invade than if they are removed as soon as possible in a well-planned way. As with so many things, it is more expensive to do nothing.

Some of the most important areas to clear of alien plants are areas with young, less dense alien trees, which have smaller seed banks and should be targeted first. Wetlands, rivers and other sensitive areas should also be cleared as a priority. High fire-risk areas (e.g. near buildings or flammable vegetation) must be included early on during the alien plant removal plan.

In order to make sure that alien plant removal is effective, there should be erosion control to prevent loss of topsoil, follow-up clearing at regular intervals to remove or poison re-sprout growth and / or seedlings.

Make sure you know the best way to remove the alien tree that is causing the problem. Some trees will die if they are cut down or ring-barked (e.g. pines); others need to be cut down and their stems painted with poison (e.g. most wattles and gum trees). In all cases seedlings must be removed regularly.

## **12.7 PROTECT SPECIAL HABITATS**

Some areas require special protection as they are either fragile, under threat and are also extremely important in the countryside. These include the following types of habitats.

### **12.7.1 Wetlands, streams and rivers**

Wetlands (vleis) are thought to be one of the most **threatened** habitats on this planet. Streams, rivers and wetlands, whether seasonal (flowing after rainfall) or perennial (flowing all year), are crucial to our survival and to the survival of all plant and animal components of biodiversity. Wetlands and rivers play a vital role in supporting both human livelihoods and natural systems. It is our responsibility to clear alien vegetation from these water-bodies, to improve water quality and to make sure that all measures are taken to use water resources wisely.

### **12.7.2 Indigenous forests**

Forests used to cover vast parts of southern Africa. Over time, due to harvesting of timber, changing climates and frequent fires these forests cover much smaller areas. These last remaining patches of forest need protection.

### **12.7.3 Corridors and links between special habitats**

Cultivated fields or pine plantations may surround the areas where your crop plants grow. This **isolates** (keeps them separated) them from other populations of the same species. In order to allow pollinators and seed distributors to move freely between your crop and your neighbour's crop ensure the presence of corridors of natural or semi-natural vegetation. Some examples of corridors are narrow road- and rail-verges as well as rivers. Identify and protect corridors in your own environment. Where they already exist, see whether their condition can be improved. Work with those around you to create corridors between your crop, and special habitats such as wetlands.

## **13 SUSTAINABLE HARVESTING OF WILDFLOWERS**

South Africa, particularly the CFR, exports wildflowers to other countries. Many tons of fresh and dried proteas, ericas, restios and other wildflowers are exported to overseas markets annually, bringing millions of rand into this country. Fynbos flowers and bouquets are regularly on sale in supermarkets and florists throughout the country. Where do these beautiful flowers come from? Although some producers grow their own wildflowers and cultivars for harvest, many wildflowers are still regularly harvested from natural populations. By 1990 it was estimated that 75% of flowers were still harvested from the veld (mainly in the Western Cape and the Overberg), but more recent studies estimate that just less than 60% of the total flower market is now harvested from the wild.

### **13.1 WILDFLOWER HARVESTING - HOW MUCH IS TOO MUCH?**

Each wildflower species tolerates a certain quantity of material harvested during a specific harvesting period. Some species can be harvested lightly every season without risk to the stock plant while others are able to tolerate quite heavy harvesting but only every few years. The most important thing to remember is that whenever flowers or flower-bearing stems are removed from the plant, so too are the seeds - the future of that plant. Every flower or fruit has the potential to produce seeds that will replenish the natural soil-stored seed banks.

To ensure that seeds annually replenish the seed banks, it is recommended by several sources that no more than a maximum of 50% (half) of all flowering material can be removed from any plant or any population during any harvest season. Some people recommend that only 25% of all flowers can be harvested without showing any signs of reduced seed banks. Further, harvesting should not begin until at least 50%

of the individual plants in the population are flowering; and that no harvesting at all should take place the year before a planned or controlled burn. This ensures that more seeds will be available to germinate after a burn.

### **13.2 WHAT ARE THE SPECIAL REQUIREMENTS FOR WILDFLOWER HARVESTING?**

Plant species can be over-picked in certain areas, to the brink of localized extinction. The beautiful everlasting *Syncarpha vestita* (*Helichrysum vestitum*) was thought to have been over-harvested during the early to mid 1900's. Demand for this species dropped and the numbers of plants have increased again, but other wildflower species (e.g. buchu) remain at great risk in some areas, simply because too many flowers (the seed production "factories") and shoots have been removed, often by illegal harvesters.

The Nature Conservation authorities allow permit-bearing seed collectors to collect a maximum of between 10 – 20% of available seed from any population. This should ideally set the harvesting limits for sustainable wildflower harvesting as well since the flowers represent the future seed crop.

### **13.3 EXISTING MARKETS FOR WILDFLOWERS**

The export market for fresh wildflowers has become highly competitive. Many of the flowers currently exported are cultivated varieties or hybrids with showy flowers and perfect foliage. The demand for dried wildflowers is increasing pressure on the veld, but the equipment required for drying, sterilizing and otherwise treating the flowers requires the investment of a lot of money. Some of the larger wildflower exporters buy in certain flowers and foliages. Addresses are available from the S.A. Protea Producers and Exporters Association. See contact details at the end of the booklet.

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### **13.4 WHAT RESOURCES EXIST TO AID WILDFLOWER HARVESTERS?**

There are various organizations and institutes that study various aspects of wildflower cultivation, production, identification and management. These include:

- Agricultural Research Council (ARC) based at Elsenburg near Stellenbosch (cultivated wildflowers and management);
- South African Protea Producers and Export Association (SAPPEX) (dried and fresh flower production and export);
- Nature Conservation offices (permits, biodiversity management)
- National Botanical Institute (NBI) (Conservation Farming)
- Kirstenbosch (NBI) (seeds and smoke treatment); and,
- Botanical Society of South Africa (wildflower guides).

Contact details for these and other groups with an interest in wildflowers are given at the end of this booklet in section 21.3.

### **13.5 WHAT INFORMATION IS STILL NEEDED ABOUT SUSTAINABLE WILDFLOWER HARVESTING?**

Sustainable harvesting limits for most wildflowers are still unknown or unclear. Recommendations vary from leaving one flower per square metre, to leaving at least 50% of flowers, to leaving 75% of all flowers on the plants (depending upon the species). Research and information is needed to assess the harvesting limits for each individual species.

The total extent of wildflower harvesting is unknown. Illegal picking continues and the consequence for permit-bearing harvesters is that despite their efforts to harvest sustainably, illegal harvesting threatens their crop. More information is needed about illegal harvesting since it compromises all those whose harvesting is ethical, sustainable and legal.

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## 14 SUSTAINABLE HARVESTING OF BUCHU

Highly aromatic (scented), with many medicinal properties, “buchu” or “boegoe” belongs to the citrus (orange and lemon) family. Nurseries countrywide grow indigenous members of this family, such as the delicate confetti bush, the superb Cape chestnut and, of course, buchus (*Agathosma* spp.), for their striking flowers and / or for their attractive and aromatic foliage. Commercially harvested buchu species are:

- *Agathosma betulina* (round-leaf buchu or bergboegoe) grows from the Groot Winterhoek to the Cederberg Mountains and includes Piketberg. Resprouting (and germinating from seeds after fire) round-leaf buchu usually flowers from June to November.
- *Agathosma crenulata* (long-leaf buchu or anysboegoe) grows from the Helderberg Mountains to the Groot Winterhoek Mountains. Usually flowering from June to November, long-leaf buchu germinates well from seed after fire.
- *Agathosma serratifolia* (kloofboegoe) is found naturally from Caledon to Riversdale. Flowering usually from July to September, this species is also a reseeder.

These buchu species grow on sandy soils, more usually in rocky areas and prefer a slightly moist environment, often in close association with streams. Bee-pollinated, these and other members of the family, add a distinctive flavour to Cape wildflower or fynbos-honey.

In addition to being beautiful garden plants, many of the buchus are used in traditional medicine preparations for bladder, kidney and stomach ailments, for rheumatism, gout, sprains and bruises. Some are reported to have calming effects. The natural aromatic oils are used in beauty products and food flavourants (buchu is an ingredient of many soft drinks). Buchu brandy is used to treat stomach disorders and “lift the spirits”.

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## 14.1 COLLECTING SEED FOR GROWING BUCHU PLANTS

All three buchus are usually propagated through collection and germination of seeds. Remember that the more seed you remove, the less seed remains in the soil! All three species (particularly round-leaf and long-leaf buchu) have a long flowering period, starting in mid-winter and ending in spring or early summer. Seed ripening is thus staggered over a long period with the main seed-fall (or seed-rain as it is sometimes called) taking place from November to January when ripe seed is released from the capsules with a trigger-like mechanism. The seed capsules have five little compartments (green when immature) that turn a straw-like brown when mature. Two seed-harvesting techniques are available:

Hand-picking: Once plants start releasing seed, capsules that appear ripe are picked by hand two to three times a week. Harvested capsules are placed in a bag in cool dry storage to release the seed. Seed quality is usually not very good and germination is seldom more than 50%. Improved seed viability and germination can be achieved by ensuring that you can recognize fully-ripened, unparasitized capsules.

Covering capsules with bags: After flowering, capsule-bearing branches are covered with bags made from material that will let air and light through (e.g. mosquito-net) and secured with a “cable-tie” around the stem at the base of the bag. The bags are removed as soon as the mature seeds are all released from the capsules. Seed quality and viability is improved by maturing on the plant, with germination rates of around 80%.

Harvested seeds are cleaned, placed in airtight containers and can be stored in the refrigerator (between 4-6°C) for up to 18 months. This cold treatment is a critical factor for germination. Smoke treatment can also be used to improve germination.

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## **14.2 WHY SHOULD WE CONSIDER CULTIVATING BUCHU RATHER THAN HARVEST FROM NATURE?**

Wild populations of buchu plants are being noticeably depleted through harvesting. The market demand for the wild-harvested plant is far greater than the amount available for sustainable production. This has led to uncontrolled harvesting, theft of wild plants in their natural habitat areas and frantic efforts to develop cultivation systems for the new crop. Buchu seed can be a challenge to germinate and cuttings are difficult to root. Often, the availability of seeds and cuttings is scarce. *Flowers and seed are usually produced on two-year-old wood*, but since even many of the legal pickers usually collect material annually to ensure a harvest (and an income), this reduces the quantity of seed returned to the seed banks every year.

A mature buchu plantation that will produce an income takes four to six years to establish, but provides a more stable income than harvesting from the wild. A brief summary of buchu growing requirements is provided below.

Soil should be plowed to a depth of 600 mm. Seedlings need sturdy supports and irrigation. Between 10 000 and 30 000 plants can be planted per hectare. The optimum time to establish plants is in early winter so the plants can benefit from the winter rainfall. Once the plants have established, growth tips should be pinched at about 100 mm above ground level, the second year at 150 mm, resulting in bushy plants with an abundance of shoots for oil and seed.

## **14.3 SUSTAINABLE HARVESTING LIMITS AND METHODS**

Although it is difficult to determine the yield (in tons of buchu) that can be harvested from a natural area a rough estimate is that buchu plants can produce 0.5kg of raw material per plant

per year (from 5 to 15 tons per hectare). The areas are usually not very accessible and the buchu is not distributed evenly through an area. The buchu industry recommends a *three-year cycle* for harvesting from wild stands.

How? The area is divided into units with fixed boundaries. The available area is divided into three regions and is harvested in sequence. In this way, each unit is subjected to harvesting during one year and then allowed *two years to grow and produce seed*. The second harvest (three years after the first harvest) is *only done after the plants have produced and dropped their seed*. This sustainable harvesting can only be done successfully in areas where uncontrolled picking / poaching does not occur. This is another good reason to maintain good communication with neighbours and authorities.

Round-leaf buchu (*Agathosma betulina*) has large underground storage organs, and resprouts vigorously from the base after fire or after harvesting. Harvesting is done in the following way:

- Sickles are traditionally used but can easily uproot young plants. Scissor-action garden-shears are the best harvesting tools although they are slower to use;
- The best time to harvest is in late summer (March to April). The oil yield drops significantly from September to December;
- Shrubs with 3-4 year growth are about one meter tall (the amount of growth and vigor are influenced by habitat) and can be cut to just above soil level (~10 cm).
- Leaves and branches are placed in bags and collected or taken to the distiller.

Long-leaf buchu (*A. crenulata*) and kloofboegoe (*A. serratifolia*) both germinate from seed after fire. No formal studies have yet

been concluded on the wild harvesting of these species of buchu, but it can be safely assumed that a 3-year harvesting cycle in the wild will also have the best result on plant survival, seed production and regrowth rates. Because these species are not resprouters, the intensity of cutting must be *much* lower than for round-leaf buchu. Remove only half to two-thirds of the green material from the shrubs every three years.

A recent study (which is continuing) has shown that the oil-yield of round-leaf buchu increases with the age of the plant, and that the number of flowers and fruits increases if allowed to reach 3 or 4 years of vegetative growth without harvesting. The study has also shown that plants, which are harvested every year or every second year, are less likely to survive than those harvested every third year. Harvesting cycles of 3 years allow buchu plants to generate higher oil yields, to produce **viable** seeds and to re-establish carbohydrate (food) reserves between harvesting events, which will lead to higher regrowth rates and reduced deaths.

#### **14.4 WHAT ARE THE SPECIAL REQUIREMENTS FOR HARVESTING BUCHU?**

As with all wildflowers, a permit is needed for producing, picking and selling buchu. It is a criminal offence to trade in buchu without a valid permit or license. The Western Cape Nature Conservation Board issues permits for the Western Cape and keeps records of all buchu transactions. Firm control over buchu exploitation can only be possible with the honest help of all involved in buchu.

Since this product is mainly used in medicines and flavourants, etc., stringent health standards are set by international buyers. The distillation of essential oils demands highly technical processing requiring advanced chemical skills.

#### **14.5 WHAT ARE THE EXISTING MARKETS FOR BUCHU?**

Buchu is sold for a high price because the demand currently outstrips supply. The high price is unstable and the price can drop sharply. However there is a considerable demand for buchu oil and it should stay economically viable. There is a big market for buchu seeds since these are scarce. Plantation production of high quality (viable) seed can be economically viable for those with the patience to harvest seed. Remember, the more seed you harvest in the wild, the less seed goes into the seed bank! Harvest seeds sustainably.

Buchu has been exported since 1823. The North American market remains wide open for the export of buchu oil as well as dried leaf material. However, they require guaranteed large quantities of cultivated buchu on an annual basis.

Production within South Africa is limited to a few commercial operations that export most of their product. Buchu can be sold at good prices, making it a good source of income for the legal producer, but unfortunately also for the poacher. Buchu is being poached at alarming rates with no sustainability of the crop in mind. Help to stop this illegal and damaging practice.

#### **14.6 WHAT ASSOCIATIONS AND ORGANIZATIONS CAN ASSIST BUCHU HARVESTERS?**

The Agricultural Research Council (ARC), and the University of Cape Town's Institute for Plant Conservation are currently conducting research into buchu production and sustainable harvesting limits. Section 21.3 provides contact details for these institutions.

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**14.7 WHAT INFORMATION IS STILL NEEDED ABOUT SUSTAINABLE BUCHU HARVESTING?**

More information about the sustainable harvesting limits of the reseeded species (long-leaf buchu and kloofboegoe) is needed.

More research is required into the levels of illegal poaching of wild (and cultivated) buchu and the long-term implications for survival of the wild populations. This may include for example, assessments of, and comparisons between, the total oil-yield and declared (permitted) harvesting and the amount of oil actually exported.

More information is required as to the implications of hybridization (crossing one species with another species – e.g. round-leaf buchu with long-leaf buchu) of the different buchu species.

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## 15 SUSTAINABLE HARVESTING OF HONEYBUSH

Honeybush (*Cyclopia*) is a legume, a member of the pea and bean family. Honeybush is well known in South Africa as a delicious hot tea and is gaining international recognition amongst herbal tea lovers. Honeybush is currently being investigated for its medicinal qualities as well as its usefulness as a beverage. According to Lizette Joubert from the Agricultural Research Council in an article for the South African Honeybush Tea Association (SAHTA) newsletter... *“In future not only taste and aroma of a particular species may be of importance, but its antioxidant potency may play a role in value-adding and marketing”*.

With their beautiful yellow flowers and attractive foliage it is surprising that these plants have not yet become popular with nurseries for sale to private gardeners. At least five species of honeybush are harvested. These are:

- Kustee or heuningtee (*Cyclopia genistoides*) is the most widespread of the honeybush species, growing from Malmesbury on the West Coast to Albertinia. Flowering from September to November this species resprouts after fire.
- Genadendaltee or vleitee (*C. maculata*) grows mainly near streams from Bainskloof to Riversdale. With a short flowering period in early spring, this species seldom resprouts but relies on seed germination following fires.
- Kougabergtee or bergtee (*C. intermedia*) grows high on the slopes of the Witteberg and Langeberg Mountains to the Van Staden’s Mountains in the east. Flowering from September to November this species resprouts after fire.

- Heidelbergtee (*C. sessiliflora*) grows in the Langeberg and Warmwaterberg Mountains. Usually flowering from April to September, this species is also a resprouter.
- Vleitee (*C. subternata*) grows mainly in moist areas in the Langeberg to Tsitsikamma Mountains. With a short flowering period in early spring, this species relies on the germination of seeds following a fire.

While Kustee and Genadendaltee, are found mostly in lowland fynbos and on lower-lying mountain slopes, the other three species tend to favour mountain slopes more than lowland areas. All species grow on sandy soils and grow more lushly in acid (pH5.5), slightly moist, but well-drained conditions.

### **15.1 COLLECTING SEED FOR GROWING HONEYBUSH PLANTS**

Seedpods of Heidelbergtee are collected in September to October, while the other species are collected in November to December. Ripening must be watched regularly, as warm, dry weather can speed up the ripening process. Seedpods must be completely hard and brownish/black when harvested, with no fleshiness or green coloration. Harvested pods should be left in the sun for two to three days in thin layers on a suitable surface (e.g. canvas or plastic sheeting) or container (e.g. a cardboard box). Cover the seeds with shade cloth to prevent seeds popping out of the container. Don't forget, the more seeds harvested, the less seeds return to the seed bank.

Honeybush seeds have very hard coats. In order to make sure that they will germinate when sown, these seed-coats have to be lightly damaged (scarified) using either a mechanical sander (except kustee) or using concentrated sulphuric acid (in a glass container). Scarification of the seed-coat must not

damage the inside of the seed but allow water to penetrate the seed-coat and initiate germination when sown and watered.

Don't forget that sulphuric acid is extremely dangerous, and must be handled very carefully. The seeds and the glass container MUST be completely dry before pouring the acid over the seeds. Never pour water into a container with acid, but slowly pour acid into water.

Kustee needs at least one hour of scarification in the sulphuric acid, while the other species need from 15 minutes to one hour of this treatment. Drain the seeds and rinse thoroughly with water to remove all traces of acid from the seed-coat. Smoke extract has been found to improve germination success, leading to more uniform germination. *Rhizobium* inoculum is also often used to improve the growth and development of the nodules on roots of seedlings.

## **15.2 WHY SHOULD WE CONSIDER CULTIVATING HONEYBUSH RATHER THAN HARVESTING FROM THE WILD?**

At present, honeybush is not under the heavy harvesting pressures which buchu or rooibos tea face. The main reason for cultivating honeybush is that there is great variation in the quality of the honeybush plant material harvested. The more consistent the crop, the greater the financial returns.

There is a great deal of research being done on the selected forms of honeybush. SAHTA is following all of these studies and all honeybush tea growers and harvesters are urged to contact and join this association. SAHTA also provides excellent information on growing and harvesting honeybush tea from both wild and cultivated populations.

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### **15.3 SUSTAINABLE HARVESTING LIMITS AND METHODS**

The recommended harvesting cycle is four to five years for wild and cultivated plants. How? The area is divided into units with fixed boundaries. The available area is divided into four to five regions and is harvested in sequence. In this way, each unit is subjected to harvesting during one year and then allowed four or five years to grow and produce seed. The second harvest (four or five years after the first harvest) is only done after the plants have produced and dropped their seed.

In the years when no harvesting is being done, plants must be lightly pruned to reduce “woodiness” and promote shooting of fresh material. Remember to leave sufficient stems to produce flowers and seeds to replenish the soil-stored seed banks!

The resprouters (kustee, Kougabergtee and Heidelbergtee) can be harvested more severely than the reseederers but it should be remembered that heavy cutting can harm both resprouters and reseederers. Remove only half to two-thirds of the green material from the reseederers every four to five years, but up to 80% of the bush can be harvested from resprouters.

### **15.4 WHAT ARE THE SPECIAL REQUIREMENTS FOR HARVESTING HONEYBUSH?**

As with all wildflowers, a permit is needed for producing, picking and selling honeybush plants and seeds. It is a criminal offence to trade in honeybush without a valid permit or license. Honeybush should be harvested and transported on cool days to reduce damage to the harvested material.

### **15.5 WHAT ARE THE EXISTING MARKETS FOR HONEYBUSH?**

Vleitee can produce from 10 to 12 tons of wet tea per hectare under very good conditions while kustee may produce from 4 to 7 tons/ha. In 2001, roughly 200 tons of honeybush were exported, while during the same period some 5 000 tons of rooibos was exported. The demand for honeybush is growing and there are various opportunities for producers and harvesters to make a good living from this natural product. SAHTA can provide information about potential buyers.

### **15.6 WHAT ASSOCIATIONS AND ORGANIZATIONS EXIST TO ASSIST HONEYBUSH FARMERS AND HARVESTERS?**

There is a great deal of research currently being undertaken by the Agricultural Research Council into the cultivation of honeybush. Most of the information coming out of this research is published in the SAHTA newsletters. It is well worth your while to join SAHTA so that you can benefit from the experience and information that this active association offers. Section 21.3 provides contact details for these and other organizations.

### **15.7 WHAT INFORMATION IS STILL NEEDED ABOUT SUSTAINABLE HONEYBUSH HARVESTING?**

There are 24 species of *Cyclopia*, only four of which (kustee, Kougabergtee, vleitee and Heidelbergtee) have been cultivated to any great extent. All these species as well as Genadendaltee are harvested from the wild. More information is needed about the other 19 *Cyclopia* species, including information that will help to conserve them as potential future harvest crops.

## **16 SUSTAINABLE SEED HARVESTING**

Seeds are obviously a basic component of the plant life cycle. Many plant species can be grown relatively easily from seed, as long as the conditions needed for germination are known and can be replicated. South African plants have had an enormous amount of appeal to the international market for several centuries. Various South African species of *Gladiolus* and *Watsonia*, *Protea* and *Pelargonium*, as well as countless succulents and spring and autumn-flowering annuals have been grown, hybridized and enjoyed by gardeners in Europe, Australia and the Americas. Oddly enough, many South African gardeners preferred “exotic” species, such as roses and azaleas, hydrangeas and camellias but more recently, a local shift to planting and enjoying South African indigenous species has been increased by active campaigns such as the “Waterwise Gardening” campaign during the 1990s. Today there are great opportunities for collection and / or cultivation of indigenous seeds for both local and international markets.

### **16.1 WHAT RISKS ARE ASSOCIATED WITH SEED COLLECTING?**

Seed collection is dependent on skilled seed harvesters who are able to recognise ripe, viable seeds from a broad range of species. A seed harvesting business is at risk when weather conditions are bad. Bad weather can either reduce seed production (e.g. by frost, excessive heat or drought), or can simply limit the movement of harvesters. Seed parasites and pests can also reduce the numbers of viable seeds.

### **16.2 WHAT MARKETS ARE THERE FOR WILD-HARVESTED SEEDS?**

There is a small local market for wildflower seeds but a greater international market. As for all wildflowers, collecting, trade and

export of wildflower seed requires permits. The market is still relatively new and there is still a good profit to be made. Various “niche” markets exist, for example collecting large quantities of seeds for the reseeded and **restoration** of degraded areas, collecting seeds of highly sought after species such as buchu or specialist horticultural species such as bulbs and succulents. There are only a few indigenous seed companies, but some of the larger seed companies may also buy in wildflower seed for resale on the local and international markets.

### **16.3 WHAT SPECIAL REQUIREMENTS ARE THERE FOR SUSTAINABLE HARVESTING OF SEEDS?**

Remember that all seed removed from the wild reduces the number of seeds in the soil-stored seed banks! For plants to continue from one generation to the next, to allow us to continue harvesting seeds from the same species, we must ensure that the wild populations remain through sustainable harvesting.

The more diverse your veld, the less your harvesting time is restricted by season. Almost throughout the year, there are seeds produced by different species. At those times when few seeds are available for harvesting, the collected seeds can be cleaned and sorted. Seed quality needs to comply with local and international phytosanitary (plant health) regulations and there are various precautions that must be taken to avoid spreading seed-borne diseases. Therefore it is recommended that seed be dusted with a fungicide prior to germination. Seed should be sold with instructions on how to sow and how to germinate.

### **16.4 SUSTAINABLE HARVESTING LIMITS**

A permit is required from Nature Conservation authorities to collect seed of protected and unprotected indigenous flora. The permit-application process sets harvesting limits for seed collection. It is very important to remember that these limits are

set in order to ensure long-term sustainability of the plants that provide the seeds. Depending on what the seed is to be used for, it will have various conditions attached to the permit. These conditions might set a limit on the amount of seed that may be collected (e.g. only 10% of the seed per plant with a maximum of 20% of the seed per locality or population). These are valuable limits to set as guidelines for sustainable harvesting. Illegal harvesting of seeds means that plant populations may decrease over time.

Each year you will be required to submit a report to on which species were collected, as well as the quantity and locality of each. To sell the seeds requires further permits. Should you want to export seeds to other countries, this requires further registration (as an exporter) through the Department of Trade and Industry (“the dti”).

#### **16.5 WHAT ASSOCIATIONS AND ORGANIZATIONS EXIST TO ASSIST SEED HARVESTERS?**

- Western Cape Nature Conservation Board (WCNCB) (permits, biodiversity management);
- Dept of Economic Affairs, Environment and Tourism (Eastern Cape) (permits, biodiversity management);
- Kirstenbosch (at NBI) (seeds, plants and smoke treatment).

Section 21.3 provides contact details for these and other organizations.

#### **16.6 WHAT INFORMATION IS STILL NEEDED ABOUT HARVESTING WILDFLOWER SEEDS?**

More information is needed for various aspects of seed harvesting of most wildflower species. This includes the season of harvesting; percentage viability; seed parasites; the localities harvested; and, so on. Give support by contributing your plant records.

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## 17 SUSTAINABLE HARVESTING OF THATCH

Indigenous grass and reed species are used throughout South Africa (and the world) for thatch material. Most of the plants used for thatching in the CFR belong to the restio family. With only a few exceptions (Madagascar and other subtropical parts of southern Africa), most of the restios (“Cape reeds”) are found only in the CFR and do not naturally occur anywhere else. Cape reeds look like a thin grass or sedge but they belong to a different family altogether, the Restionaceae. Many (but not all) restios grow in moist areas such as in wetlands and near streams. Most restios do not bear male and female flowers on the same plant. Male and female plants of the same species can look so different when flowering that they can easily be mistaken for two different species. Two species of Cape reed are used commercially for thatch:

Dekriet or mannetjiesriet (*Thamnochortus insignis*) grows on limestone hills and sandy flats in coastal areas from Albertinia to Bredasdorp. Flowering from March to April, dekriet does not resprout after fire but the seeds are stimulated by fire. Dekriet is the only restio considered to have real commercial value for thatch. The most popular thatching reed (it is hard-wearing and long lasting) seeds falling from trucks carrying harvested dekriet have germinated and dekriet plants now grow along roadsides from Port Elizabeth to the Cedarberg.

Dakriet (*Chondropetalum tectorum*) grows in seasonal wetlands from Clanwilliam to Port Elizabeth, mainly in coastal lowlands. A taller growing form found on the West Coast is usually used for thatching. Flowering from March to April, the seeds of this resprouter are also stimulated to germinate by fire.

A third restio, buigiesriet or wyfiesriet (*Thamnochortus erectus*) grows from Malmesbury to Knysna and flowers from September

to October. Despite the broad distribution of this resprouter, wyfiesriet is less commonly used than dekriet.

“Common thatching grass” or dektamboekiegras (*Hyparrhenia hirta*) is widely distributed and harvested throughout South Africa as thatching material. This is the main commercial grass used for thatching but it is more commonly harvested in the rest of the country rather than in the CFR, where restios are the primary thatch crop.

### **17.1 WHY SHOULD WE ACTIVELY PROPAGATE THATCH REEDS?**

Dekriet (*T. insignis*) does not resprout after fire, although its seeds are stimulated to germinate by fires. Unfortunately, seed viability is extremely low (normally less than 5%). According to research, there is a continual decline (reduction) in the overall population size of dekriet. Even though it is a slow rate of decline (around 1.3% every year), it is sufficient to be of great concern to all those whose livelihoods depend on harvesting dekriet, as well as to those who wish to conserve the species.

Local and international export markets for dekriet are growing. In order to supplement the dwindling wild populations and halt the population decline, it is becoming necessary to investigate active cultivation opportunities as well as to ensure sustainable harvesting of the existing wild populations.

Dakriet (*C. tectorum*) and wyfiesriet (*T. erectus*) do not appear to be under as much harvesting pressure as dekriet and the wild populations of these species are relatively stable.

The National Botanical Institute (NBI) has produced a booklet called “Grow restios” (see Section 21.1), available through the Botanical Society of South Africa. Contact details for the NBI and the Botanical Society are given in Section 21.3.

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## **17.2 SUSTAINABLE HARVESTING LIMITS AND METHODS**

Dekriet is slow-growing and is a long-term crop. In order to ensure good quality culms (stalks) harvesting should be done on a four to five year cycle and should only be done after seeds have ripened (during early winter). Dekriet is known in some areas as “winterriet” because it is harvested in winter.

Dakriet is faster-growing than dekriet and requires a two to three year harvesting cycle. It is extremely important that only the old culms are harvested. The young shoots must not be cut back otherwise the plants may die prematurely. The old culms require a full season to mature on the plant otherwise they may fall apart soon after harvesting leading to a bad quality product. Harvesting of dakriet is done during early winter when the new shoots first start to appear.

Wyfiesriet is harvested after seeds have ripened (during mid to late summer). Wyfiesriet is known in some areas as “somerriet” because it is harvested during summer. This resprouter requires a two to three year harvesting cycle.

## **17.3 WHAT SPECIAL REQUIREMENTS ARE THERE FOR SUSTAINABLE HARVESTING OF THATCH?**

One of the most important requirements for thatch harvesting is patience! Dekriet is slow-growing and although the financial return per hectare is relatively good it is crucial that harvesting is carried out sustainably in order to maintain the plants (and their habitat) in good condition. A permit is needed to produce, pick and trade in thatch plants and seeds. It is a criminal offence to trade in indigenous plants without valid permits.

At all times, it is crucial to remember that all seed removed from the wild reduces the numbers of seeds in the soil-stored seed banks! For plants to continue from one generation to the

next (allowing us to continue harvesting seeds from the same species) we must ensure that wild populations remain stable, or increase, through sustainable harvesting. This is especially the case for dekriet where seed viability is extremely low.

#### **17.4 WHAT ARE THE EXISTING MARKETS FOR THATCH?**

Both the local and the international demand for thatch outstrip the supply, leading to stable and even rising prices. Locally dekriet is transported all over South Africa while international markets, especially in the Mediterranean and North America, have risen considerably. The export market increases the local price because exported thatch is paid for in foreign currency.

An average stand consists of about 7 000 clumps (each containing about 10 plants) per hectare.

#### **17.5 WHAT ASSOCIATIONS AND ORGANIZATIONS EXIST TO ASSIST THATCH HARVESTERS**

- The Agulhas Biodiversity Initiative (ABI);
- Western Cape Nature Conservation Board (WCNCB) (permits, biodiversity management); and,
- Kirstenbosch (at NBI) (seeds, plants and smoke treatment).

Section 21.3 provides contact details for these organizations.

#### **17.6 WHAT INFORMATION IS STILL NEEDED ABOUT HARVESTING THATCH?**

More information is needed about the extremely low seed germination percentages of dekriet. According to information from the National Botanical Institute, the low germination is less to do with good germination techniques or methods, and more to do with extremely low seed viability.

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## 18 SUSTAINABLE HARVESTING OF REEDS, SEDGES AND GRASSES

Various small industries use reeds and grasses for making an array of useful and artistic items such as brooms, mats, baskets, woven reed chairs and grass or reed hats. A number of species are used for these industries, mainly dependent on which species are readily available to the harvester. A number of decorative species are used in the fresh flower trade.

Species most commonly used in the CFR include:

- Besemgoed (*Calopsis paniculata*) is a restio that grows mainly along stream banks from the Cedarberg to KwaZulu-Natal. The short, wiry stems are used for making brooms.
- Besemriet (*Ischyrolepis subverticillata*) is a resprouting and reseeding restio growing on stream banks and near rivers from Paarl to Caledon. Branched stems are used to make brooms.
- Fonteinriet or besemriet (*Elegia capensis*) is a tall (2–5 m) resprouting restio growing near streams from Clanwilliam to Port Elizabeth. Fonteinriet is used as filler material in flower arrangements as well as for making brooms.
- Fluitjiesriet (*Phragmites australis*) is a large grass species that grows in or next to streams, rivers and wetlands. This species is cosmopolitan (grows worldwide) and has many different uses, including thatching, making mats and even for building grass houses.
- Matting rush or “biesie” (*Juncus kraussii*) is a sedge or rush that grows in salt marshes (such as estuaries) from the Cape west coast to Mozambique. Biesie is also found in Australia and South America. Harvested in autumn, after seeding, biesie is commonly used for making mats, blinds and other woven products. Only non seed-bearing leaves are harvested,

as those with seeds are too brittle for weaving. The demand for this product in KwaZulu-Natal currently outweighs supply but this has yet to be seen in the CFR.

- Matjiesgoed (*Cyperus textilis*) is a sedge that grows in low altitude marshes and streams from Piketberg to southern KwaZulu-Natal. Matjiesgoed is used to weave a variety of products including mats and baskets.
- Papkuil or bulrush (*Typha capensis*) is a reed that grows in or next to streams, rivers and wetlands. Also a cosmopolitan species, papkuil is used for grazing, making mats, baskets and various other woven products.

### **18.1 SUSTAINABLE HARVESTING LIMITS**

In most instances, regrowth after cutting is relatively fast for most species, but it can take several seasons for the resprouting stems or regrowth to mature. It is recommended that no more than 30% (one third) of the total number of large reeds in the population be harvested. A harvesting cycle of two to three years is also recommended to allow young shoots to mature into large, usable reeds and to minimize impact on the plants, the habitat and the associated wildlife.

A variety of other reeds, sedges and grasses are harvested throughout South Africa and the CFR. Reeds (non thatch species), grasses and sedges are in many ways still a relatively under-exploited resource in the CFR but more research will need to be done to investigate the potential impacts of harvesting on the populations as well as on the natural habitats, should demands on wild populations increase. Biesie and fluitjiesriet are both receiving attention elsewhere in the country due to localized harvesting pressures.

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## 19 SUSTAINABLE HARVESTING OF FERNS

The CFR is home to at least 114 indigenous species of fern (spread across 46 genera in 24 families), although only nine are **endemic** to the CFR. Ferns indigenous to the CFR range from the ancient family Lycopodiaceae (many of this family's species resemble mosses) to majestic 5 m high tree ferns, delicate maidenhair ferns to water-immersed aquatic ferns. Many ferns have common names, which may be descriptive, such as carrot fern, toothbrush fern and adder's tongue, or have other meanings or derivations, such as spleenwort, deer fern and mother fern. Fern fronds make an attractive addition to cut-flower arrangements.

The most commonly harvested ferns are:

- Seweweeksvaring (*Rumohra adiantiformis*) is widespread in forests and rocky ravines in South Africa and the southern Hemisphere.
- Sword fern (*Blechnum punctulatum*) grows in moist forests from the Pakhuis Mountains to Zimbabwe and Madagascar.
- Todea (*Todea barbara*) grows along streambanks from the Cedarberg to East Africa.

### 19.1 SUSTAINABLE HARVESTING LIMITS AND METHODS

Due to a decreased demand for wild harvested seweweeksvaring and increasing availability of cultivated fern, only 26% of the production is harvested in indigenous forests and the balance comes from cultivation projects.

In indigenous forests, seweweeksvaring is harvested on a 15-month cycle and only 50% of the exportable leaves are

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removed from a plant. Minimum leaf size picked is 25 cm. In plantation projects there are at least two harvesting cycles per annum. This is possible because of supplementary irrigation and fertilization. All exportable leaves are removed, but plants are never stripped of all their foliage. In shade houses it is possible to maintain 3-4 cycles per annum. Due to the density of the fern and the danger of malformation of the leaves, all mature leaves are removed. At times it is necessary to remove the spored and old leaves in order to reduce the density of the fern stand.

Sword fern is very seasonal, since the major supply comes from the Seattle area in the USA. As soon as the first winter frosts and snow arrive, these areas in the Northern Hemisphere go out of production and there is a gap in the market from February to June. For the rest of the year only small quantities of sword fern are moved into the international markets from South Africa. Sword fern is picked on an annual cycle, and due to the fact that only fully mature leaves, and leaves which are unblemished and perfect in shape are picked, the average take-off from a plant is between 20% to 25%.

Very small quantities of *Todea barbara* are harvested, so there is little or no impact on the plant and the environment. The take off per plant is less than 15%.

As with *all* indigenous plants, permits are required to trade with these plants.

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## **20 CRAFTS AND SECONDARY, OR VALUE-ADDED, PRODUCTS**

The CFR produces numerous “raw” products that are sold elsewhere in South Africa or exported to other countries. These raw products are processed and the processed goods are sold for much greater amounts than the original raw product. There are great opportunities to encourage entrepreneurship, supporting local industry to “add-value” to our own CFR raw produce.

### **20.1 WHAT OPPORTUNITIES ARE THERE TO ADD VALUE TO NATURAL RESOURCES?**

Potential exists for the secondary and tertiary processing of essential oils, fragrances, buchu brandy and other products from buchu, which could increase the profit margins as South Africa mainly exports the raw buchu oils and leaves. Buchus are not the only producers of essential oils. Many indigenous plants such as “geraniums” (*Pelargonium* species); wild rosemary (*Eriocephalus* species); wildeals (*Artemisia afra*); and, wild sages (*Salvia* species) are rich in oils and fragrances. Although the processing of the oils may be highly technical, the growing or harvesting of these plants does not require particularly high skilled labour but does require some level of entrepreneurship. The Agricultural Research Council can be of assistance in this regard.

Alien plants can be turned into a lucrative firewood industry and a number of projects are currently making paper products as well as other wood products (walking sticks, furniture, and picture frames) from thinner wood that is less suitable for firewood.

Various “waste” products can also be turned into cash. The cleanings from seed collection can be used for compost or added to handmade paper to provide texture.

Stems and seeds from various indigenous species can be used to make beads or other artistic decorations.

Mats, hats, ceilings, footwear and other woven goods can be made from reeds and grasses

## **20.2 WHY SHOULD I CONSIDER THESE VALUE-ADDING ALTERNATIVES?**

Many harvesting industries are highly seasonal. Including value-added aspects to one's industry provides numerous opportunities for skills development and labour employment during off-peak months/seasons as weavers and crafters.

The added benefit is that the business is diversified. Should one crop "fail" then other aspects of the business or other crops can provide a secondary income.

## **20.3 TOURISM AND CRAFT ROUTES**

Tourism in South Africa and in the CFR particularly has increased dramatically over the past decade. More and more tourist and craft routes are emerging. Route 66 links the Little Karoo with the Southern Cape, while numerous wine routes include craft stalls selling local products.

The more successful you become, the more potential there is to harvest sustainably. Continue to work together with each other, with your neighbours, as well as the conservation and agricultural authorities to build and maintain a sustainable future for the Cape Floristic Region.

## 21 GENERAL SOURCES OF INFORMATION

### 21.1 BIBLIOGRAPHY AND FURTHER READING

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### **SMOKE TREATMENT OF SEEDS**

**(information from National Botanical Institute website)**

Seeds of many wildflowers are dormant and require very specific conditions for germination. In 1990 it was discovered that in addition to the more obvious effect of heat, smoke from fynbos fires was one of the triggers responsible for breaking **dormancy** and stimulating the germination of certain seeds.

Kirstenbosch researchers have developed "instant smoke" for growers who want to germinate the dormant seeds of wildflowers. The primer solution contains a combination of natural substances that overcome dormancy and stimulate seed germination.

The degree of response varies with the species, but on average, treated seed samples give at least double the number of seedlings when compared to untreated samples.

For treating seeds of *Proteas*, *Leucospermums* (pincushions), *Leucadendrons* (conebushes), *Ericas*, *Helichrysums* (everlastings), buchus, restios (Cape grasses), *Lobelias*, grasses, sedges, mesems (vygies), and many other species Kirstenbosch "Instant Smoke Plus" Seed Primer can improve germination by up to 50%.

To purchase Kirstenbosch "Instant Smoke Plus" Seed Primer or find out more about this product:

Email: [seedroom@nbi.ac.za](mailto:seedroom@nbi.ac.za),  
Phone: 021-797 5885

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## 21.2 GLOSSARY

**Alien** – A plant or animal, occupying a habitat, region or other defined area in which it is not indigenous (does not naturally or historically occur). See also **invasive**.

**Biodiversity** – A broad term representing the enormous variability among living organisms and the ecological systems in which they are found. Biodiversity includes landforms, landscapes and habitats, the term further embraces **ecosystems**, plant and animal assemblies and interactions, as well as genetic variation.

**Community** – An association of interacting species living in a particular area; also defined as all of the organisms living in a particular area. A community may consist of a number of **populations** of different plant species.

**Dormancy** – Seeds of many species may last for many years without germinating. This is referred to as dormancy. The seeds may have a hard seed coat, or simply require a trigger (such as smoke treatment; being passed through a bird or animal's gut; cold treatment; or, hot treatment) to stimulate germination.

**Ecology** – The study of all living things and the way/s in which they interact naturally with each other and their environment.

**Ecosystem** – A dynamic (actively interacting) complex of animal, plant and micro-organism communities and their non-living environment interacting as a functional unit (definition from the Biodiversity Bill).

**Endemic** – Describes a plant or animal that is naturally limited to a clearly defined area and is not found naturally outside of this area. See also **indigenous**.

**Environment** – A broad term used to describe the total natural and even the developed (built) surroundings including biodiversity, climate, soils, etc.. The word may also be used to describe the prevailing social and economic conditions.

**Fynbos** – The distinctive, species-rich vegetation of the Cape Floristic Region. It comprises mainly ericas, proteas, restios, and a diversity of bulb-like plants. Proteas and ericas are integral elements of fynbos, while the restios clearly distinguish fynbos from other southern African vegetation types. Fynbos favours nutrient-poor, coarse, acid soils characteristic of the region. Along the coast, on alkaline, marine sands, fynbos occurs in a mosaic with thicket species. See also **renosterveld**.

- Habitat** – The place, or type of site, where a species or ecological community most usually occurs. The term describes elements such as the type of soil, soil moisture, slope, aspect, and altitude surrounding the natural locality of the species and may include a broad description of the type of vegetation (e.g. thicket, moist fynbos, montane forest, etc.).
- Indigenous** – A plant or animal that is found naturally in a specified area.
- Invasive** – A plant or animal species that does not naturally occur in a given area and that tends to invade an area at the cost of locally indigenous species. See also **alien**.
- Landscape** – Similar to habitat and environment, the landscape is descriptive of the inorganic or non-living elements of biodiversity, but at a very large scale (e.g. from one mountain peak across a valley to the next mountain peak).
- Monitor / monitoring** – keeping records of various aspects of a business or job and using these records to improve performance.
- Non-renewable** – Describes naturally limited resources (e.g. coal, gold). See also **renewable**.
- Population** – A recognizable and fairly continuous group of the same species living naturally together in the same area (usually in combination with other plant species in a plant **community**).
- Renewable** – Describes resources which can be used indefinitely as long as they are used sustainably. See also **non-renewable** and **sustainable**.
- Renosterveld** – A fine-leaved shrubland found on rich, fine (clay) soils in winter rainfall regions. On richer soils in the lowlands, renosterveld has been mostly replaced by agriculture (e.g. deciduous fruit orchards and wheat fields) and persists today only as small fragmented remnants. See also **fynbos**.
- Restoration** – Describes the active effort to improve (or rehabilitate) a degraded or **transformed** landscape back to, or as close as possible to, its original or natural state (including the removal of the cause of degradation or transformation).
- Seed set (set seed)**– Fruit, flower, etc. ripening to the point that mature, viable seeds are “set” (produced).
- Sustainable / Sustainability** [Definition from the Biodiversity Bill] – In relation to the use of an indigenous biological resource, means the use of such resource in a way and at a rate that –

- 1) Will not lead to its long-term decline;
- 2) Will not disrupt the ecological integrity of the ecosystem in which it occurs; and,
- 3) Will ensure its continued use to meet the needs and aspirations of present and future generations of people.

**Threatened** – Describes a plant (or animal) species which is under threat of extinction as a species unless the threats, or pressures, which are causing the decline of the species are removed. Threats may include the loss of natural habitat, unsustainable harvesting, alien plant invasion or even changes to the habitat, such as a lowered water table or erosion.

**Transform/ed** – Describes change to a habitat or landscape through various factors, including permanent transformation (e.g. total alteration from natural to unnatural landscape such as buildings and similar development) or temporary transformation (e.g. invasion by alien vegetation). Temporarily transformed landscapes or habitats may become permanently transformed if the cause/s of transformation are not removed.

**Veld mosaic** – Describes the large number of combinations of different types of plants that naturally occur together across a landscape. This includes not only the various different species but also the variety of different growth forms (e.g. large, medium and small shrubs, groundcovers, bulbs and annuals), and small habitats that occur within (and comprise) the landscape (e.g. wetlands and water courses, rocky outcrops and koppies).

**Viable** – A seed is viable if it can germinate successfully. Seeds naturally lose viability eventually through various normal processes, including deterioration of the seed coat. Seeds of some plant species are viable for only a few weeks or months, others remain viable for one or two seasons, while others may remain viable for as long as a century, requiring only the correct set of conditions for them to break dormancy and germinate.

**Wetland** – Any area that is perennially or seasonally inundated with water. These areas have a high water table and usually have recognizable wetland plant (and animal) species closely associated with them. Types of wetlands include “marsh”, “vlei”, “seep” and “pan”.

### 21.3 CONTACT DETAILS OF GOVERNMENT DEPARTMENTS, ORGANIZATIONS, ASSOCIATIONS AND INSTITUTES

SPECIALISATION / INTEREST	INSTITUTION, ORGANIZATION	CONTACT PERSON OR DEPARTMENT	CONTACT ADDRESS	WEBSITE	EMAIL ADDRESS	TELEPHONE FACSIMILE
Agriculture	Infruitec-Nietvoorbij		Private Bag X5026 Stellenbosch, 7599			Tel: 021-809-3100
Agulhas Plain Biodiversity conservation	Agulhas Biodiversity Initiative (ABI)	Tertius Carinus ABI Project Coordinator	Agulhas National Park P.O.Box 120, L'Agulhas 7287		<a href="mailto:tertius@sanparks.org">tertius@sanparks.org</a>	Tel: 028 435 6078 Fax: 028 435 6225
Alien invasive plants	Global Invasive Species Programme (GISP)	1) Dr. Greg Sherley Chief Executive 2) Ms Kobie Brandt Communication officer	Global Invasive Species Programme Secretariat Claremont 7735 Cape Town, South Africa	<a href="http://www.gisp.org/">www.gisp.org/</a>	1) <a href="mailto:Sherley@nbict.nbi.ac.za">Sherley@nbict.nbi.ac.za</a> 2) <a href="mailto:Brandt@nbict.nbi.ac.za">Brandt@nbict.nbi.ac.za</a>	Tel: 021 799 8800 Fax: 021 797 1561
Alien invasive plants - Biological control	Plant Protection Research Institute (PPRI)	Dr Alan Wood	Private Bag X5017 Stellenbosch 7599	<a href="http://www.arc.agric.za/v-arcroot/institutes/ppri/main/home.htm">www.arc.agric.za/v-arcroot/institutes/ppri/main/home.htm</a>	<a href="mailto:vredaw@plant3.agric.za">vredaw@plant3.agric.za</a>	Tel. 021 887 4697 Fax 021 887 5096
Alien plant control	Working for Water, Department of Water Affairs and Forestry	Christo Marais (Programme Development Manager)	P/Bag 4390, Cape Town, 8000, SA	<a href="http://www.dwaf.pwv.gov.za/wfw/">www.dwaf.pwv.gov.za/wfw/</a> <a href="http://www.listserv.ru.ac.za/mailman/listinfo/wetlands-l">www.listserv.ru.ac.za/mailman/listinfo/wetlands-l</a>	<a href="mailto:chris@cis.co.za">chris@cis.co.za</a> <a href="mailto:chris@dwaf.gov.za">chris@dwaf.gov.za</a>	toll free (SA) 0800 005 376 Tel: 021 405 2200 Fax: 021 425 7880
Biodiversity conservation	Wildlife and Environment Society of South Africa (WESSA)			<a href="http://www.wildlifesociety.org.za/">www.wildlifesociety.org.za/</a>		
Botanical & biodiversity conservation	National Botanical Institute			<a href="http://www.nbi.ac.za/">www.nbi.ac.za/</a>		
Botanical / books / other publications	Botanical Society of South Africa	1) National Branch 2) Bookshop	1) P/Bag X 10, Claremont 7735 2) P.O. Box 195, Newlands, 7725	<a href="http://www.botanicalsociety.org.za/">www.botanicalsociety.org.za/</a>	<a href="mailto:info@botanicalsociety.org.za">info@botanicalsociety.org.za</a> <a href="mailto:botbkshp@iafrica.com">botbkshp@iafrica.com</a>	
Botanical and biodiversity conservation	Cape Action for People and the Environment (C.A.P.E. Project)	Mr. Trevor Sandwith (Co-ordinator)	P/Bag X7, Claremont, 7735, Western Cape, South Africa	<a href="http://www.capeaction.org.za/">www.capeaction.org.za/</a> <a href="http://www.fred.csir.co.za/extra/cape/">www.fred.csir.co.za/extra/cape/</a>	<b>Error! Hyperlink reference not valid.</b> <a href="mailto:trevor@capeaction.org.za">trevor@capeaction.org.za</a>	Tel: 021 799 8790 Fax 021 797 3475
Botanical and biodiversity conservation	Conservation Farming project – National Botanical Institute	Dr. John Donaldson (Scientific co-ordinator:)	P/Bag X7, Claremont, 7735	<a href="http://www.nbi.ac.za/consfarm/frames/cfframe.htm">www.nbi.ac.za/consfarm/frames/cfframe.htm</a>	<a href="mailto:donaldso@nbict.nbi.ac.za">donaldso@nbict.nbi.ac.za</a>	Tel: 021 799 8800 Fax: 021-797-6903
Botanical and biodiversity conservation <i>Buchu research</i>	Institute for Plant Conservation, University of Cape Town	Dr. Timm Hoffman	Private Bag, Rondebosch, 7701	<a href="http://www.uct.ac.za/depts/ipc/">www.uct.ac.za/depts/ipc/</a>	<a href="mailto:thoffman@botzoo.uct.ac.za">thoffman@botzoo.uct.ac.za</a>	Tel: 021 6502440 Fax: 021 6504046
Botanical and biodiversity conservation	Protea Atlas Project	Tony Rebelo		<a href="http://www.protea.worldonline.co.za/">www.protea.worldonline.co.za/</a>	<a href="mailto:zoot@nbict.nbi.ac.za">zoot@nbict.nbi.ac.za</a>	Tel: 021 761 1425

Contact details of government departments, organizations and associations

SPECIALISATION / INTEREST	INSTITUTION, ORGANIZATION	CONTACT PERSON OR DEPARTMENT	CONTACT ADDRESS	WEBSITE	EMAIL ADDRESS	TELEPHONE FACSIMILE
Buchu – research <i>See also the Institute for Plant Conservation UCT</i>	Agricultural Research Council (ARC) Elsenburg	Louisa Blomerus	ARC Roodeplaat Western Cape, P. Bag X1, Elsenburg 7607.	<a href="http://www.arc.agric.za/">www.arc.agric.za/</a>	<a href="mailto:Louisa@iqs5.agric.za">Louisa@iqs5.agric.za</a>	Tel: 021-8085440, Fax: 021-8085437
Government Departments	Department of Environment & Tourism (DEAT)		P/Bag X447, Pretoria 0001, SA	<a href="http://www.environment.gov.za/">www.environment.gov.za/</a>		Tel: 012 310-3911 Fax: 012 322-2682
Government Departments	Department of Land Affairs (DLA)			<a href="http://www.land.pww.gov.za">www.land.pww.gov.za</a>		
Government Departments	Department of Trade and Industry (the “dti”)	CEO: Mr Lungiswa Magwentshu		<a href="http://www.thedti.gov.za">www.thedti.gov.za</a>		Call center tel: 0861 843 384
Government Departments	Department of Water Affairs and Forestry (DWAF)			<a href="http://www.dwaf.gov.za/default.asp">www.dwaf.gov.za/default.asp</a>	<a href="mailto:bda@dwaf.gov.za">bda@dwaf.gov.za</a>	Tel: 012-336-7500
Government Departments	Government of South Africa			<a href="http://www.gov.za/dept/index.html">www.gov.za/dept/index.html</a>		
Government Departments	Government Printers		90 Plein Street, Cape Town	Subscriptions: 012 334 4735 Publications: 012 334 4508		Cape Town branch: 021 465 7531
Government Departments	National Department of Agriculture (NDA)		National Department of Agriculture, Private Bag X250, Pretoria 0001, SA	<a href="http://www.nda.agric.za/">www.nda.agric.za/</a> <a href="http://www.agric.za">www.agric.za</a> <a href="http://www.agis.agric.za/agisweb/wip">www.agis.agric.za/agisweb/wip</a>		Tel: 012-319-6000 Fax: 012-325-3618
Honeybush	South African Honeybush Tea Association (SAHTA)	Secretary: Astrid Moehrke	17 Niblick Street, Lakeside Cape Town 7945		<a href="mailto:honeybush@mweb.co.za">honeybush@mweb.co.za</a>	Tel: 021-7886654 Fax: 021-7886654 Cell: 0824203224
Honeybush (Rhizobium inoculum)	Plant Protection Research institute		Private Bag X 5017 Stellenbosch 7599			Tel: 012 8080952 Fax: 012 8081489
National conservation authority	South African National Parks (SANParks)			<a href="http://www.parks-sa.co.za/">www.parks-sa.co.za/</a> <a href="http://www.weedwarriors.co.za">www.weedwarriors.co.za</a>		
Provincial conservation authority	Dept of Economic Affairs, Environment and Tourism		Private Bag X5001 Greenacres Port Elizabeth 6057			Tel: 041- 508 5800 Fax: 041-585 1958
	Western Cape Nature Conservation Board			<a href="http://www.cnc.org.za/">www.cnc.org.za/</a> <a href="http://www.capenature.org.za/">www.capenature.org.za/</a>		
Provincial Departments	Department of Agriculture, Western Cape, Elsenburg		P/Bag X1, Elsenburg, 7607, SA	<a href="http://www.wcape.agric.za/">www.wcape.agric.za/</a>		Tel: 021 884-4620
Renosterveld conservation	University of Stellenbosch, Dept. of	Prof. Sue Milton	P/Bag X1, Matieland, 7602, SA	<a href="http://www.sun.ac.za/consecol/">www.sun.ac.za/consecol/</a>	<a href="mailto:sjm@sun.ac.za">sjm@sun.ac.za</a>	Cell: 082 770 0206 Tel: 023 5411 828

Contact details of government departments, organizations and associations

SPECIALISATION / INTEREST	INSTITUTION, ORGANIZATION	CONTACT PERSON OR DEPARTMENT	CONTACT ADDRESS	WEBSITE	EMAIL ADDRESS	TELEPHONE FACSIMILE
	Conservation Ecology					
Restoration specialists	Cape Ecological Services	Dr. Patricia Holmes	23 Dreyersdal Road, Bergvliet 7945		<a href="mailto:prebelo@mwweb.co.za">prebelo@mwweb.co.za</a>	Tel: 021 712 7816 Fax: 021 712 7816
River conservation	River Health Programme	Toni Belcher		<a href="http://www.csir.co.za/rhp/">http://www.csir.co.za/rhp/</a>	<a href="mailto:BelcheA@dwaf.gov.za">BelcheA@dwaf.gov.za</a>	
Rooibos tea	Environmental Monitoring Group (Organic Rooibos Tea project)	Mr. Noel Oettle	PO Box 13378, 7705 Mowbray, South Africa	<a href="http://www.emg.org.za/">www.emg.org.za/</a>	<a href="mailto:info@emg.org.za">info@emg.org.za</a>	Tel: 021 448 2881 Fax: 021 448 2922
Scientific services	Council for Scientific and Industrial Research (CSIR)	Division of Water, Environment and Forestry Technology				Tel: 021 888 2400 Fax: 021 888 2693
Seed suppliers	Silverhill Seeds & books	Dr. Rachel Saunders	PO Box 53108, Kenilworth 7745	<a href="http://www.silverhillseeds.co.za/">www.silverhillseeds.co.za/</a>	<a href="mailto:info@silverhillseeds.co.za">info@silverhillseeds.co.za</a>	Tel: 021 762 4245 Fax: 021 797 6609
Seed suppliers and smoke treatment	Kirstenbosch seed room	Ms Alice Notten	P/Bag X7, Claremont, 7735	<a href="http://www.nbi.ac.za/">www.nbi.ac.za/</a>	<a href="mailto:seedroom@nbi.ac.za">seedroom@nbi.ac.za</a>	Tel:
Seed treatment	Smoke treatment of seeds – National Botanical Institute	Dr. Neville Brown	P/Bag X7, Claremont, 7735	<a href="http://www.nbi.ac.za/research/hortresearchseedprimer.htm">www.nbi.ac.za/research/hortresearchseedprimer.htm</a>		
Value-added products	Agricultural Research Council (ARC)		Private Bag X1 Eisenburg, 7607		<a href="mailto:fynbos@igs5.agric.za">fynbos@igs5.agric.za</a>	Tel: 021 808 5431 Fax: 021 808 5440
Wetland conservation	Mondi Wetland Project	David Lindley	PO Box 338, Irene, 0062, South Africa	<a href="http://www.wetland.org.za/home.htm">www.wetland.org.za/home.htm</a>	<a href="mailto:info@wetlands.org.za">info@wetlands.org.za</a>	Tel: 012 667 6597 Fax: 012 667 5720
Wetland conservation	Working for Wetlands			<a href="http://www.ccvr.ac.za/wetlands/rehab.htm">www.ccvr.ac.za/wetlands/rehab.htm</a>		
Wildflowers – sustainable harvesting projects and training	Flower Valley Conservation Trust	Lance Kabot Leslie Richardson	P.O. Box 393, Gansbaai, 7220	<a href="http://www.flowervalley.org.za">http://www.flowervalley.org.za</a>	<a href="mailto:info@flowervalley.org.za">info@flowervalley.org.za</a>	Tel: 028 388 0178 Fax: 028 388 0442
Wildflower and seed collecting permits	Western Cape Nature Conservation Board	Deon Hignett - Section Head: Permits	P/Bag X100, Cape Town, South Africa 8000	<a href="http://www.cnc.org.za/permits/html/parent_template.html">www.cnc.org.za/permits/html/parent_template.html</a>	<a href="mailto:dhignett@pawc.wcape.gov.za">dhignett@pawc.wcape.gov.za</a>	Tel: 021 483-3539 Fax: 021 483-4158
Wildflower and seed collecting permits	Dept. of Economic Affairs, Environment and Tourism		P/Bag X5001 Greenacres Port Elizabeth 6057			Tel: 041-508 5800 Fax: 041-585 1958
Wildflowers – commercialization, cultivation and export	SAPPEX	Maryke Middelman	Private Bag X12 Botrivier 7185	<a href="http://www.sappex.org.za">www.sappex.org.za</a>	<a href="mailto:sappex@honingklip.com">sappex@honingklip.com</a>	Tel: 028 284 9745 Fax: 028 284 9777
Wildflowers – research	Agricultural Research Council (ARC)	Dr. Emmy Reinten	P/Bag X1; 7607 Eisenburg, South Africa.	<a href="http://www.arc.agric.za">www.arc.agric.za</a>		Tel: 021 808-5436 Fax: 021 808-5440

*Contact details of government departments, organizations and associations*

SPECIALISATION / INTEREST	INSTITUTION, ORGANIZATION	CONTACT PERSON OR DEPARTMENT	CONTACT ADDRESS	WEBSITE	EMAIL ADDRESS	TELEPHONE FACSIMILE
Wildflowers – research	Department of Botany, UCT	Dr. Mike Cramer	Private Bag Rondebosch 7700		<a href="mailto:mcramer@botzoo.uct.ac.za">mcramer@botzoo.uct.ac.za</a>	Tel. 021 650 2444 Fax 021 650 4010

## 21.4 SELECTION OF SOUTH AFRICAN LEGISLATION, POLICIES AND STRATEGIES APPLICABLE TO THE HARVESTING OF NATURAL RESOURCES<sup>1</sup>

TITLE	ABBREVIATION	COMMENT/S
South African Constitution Act 108 of 1996	"The Constitution"	National, provincial and local government are obliged to introduce legislative and other measures to prevent ecological degradation; promote conservation; and, secure ecologically sustainable development and use of natural resources, while promoting justifiable economic and social development.
National Environmental Management Act Act 107 of 1998	NEMA	Principles in NEMA include amongst other (a) that disturbance of ecosystems and loss of biological diversity are to be avoided, or, where they cannot be altogether avoided, are minimised and remedied; and, (b) that sensitive, vulnerable, highly dynamic or stressed ecosystems require specific management and planning, especially where they are subject to significant human resource usage and development pressure.
National Environmental Management: Biodiversity Bill 2003	Biodiversity Bill	This draft legislation effectively takes a section on biodiversity from NEMA (107 of 1998) and expands it greatly. Defining biodiversity in the broadest terms, this Act will protect our incredible natural diversity while promoting sustainable utilization and " <i>fair and equitable sharing of benefits arising from the commercialization through bioprospecting of traditional uses and knowledge of genetic resources</i> ".
National Environmental Management: Protected Areas Act Act 57 of 2003	Protected Areas Act	" <i>Provides for the protection and conservation of ecologically viable areas representative of South Africa's biological diversity and its natural landscapes and seascapes</i> ".
Environmental Conservation Act Act 73 of 1989	ECA	Provides for the Environmental Impact Assessment regulations (promulgated in 1997), which seek to ensure sustainable development in both urban and rural contexts.
National Water Act Act 36 of 1998	NWA	The NWA is revolutionary in its broad approach to biodiversity conservation, protecting aquatic ecosystems in order to ensure ecologically sustainable development and use of the water resource. Activities, which impact negatively on wetlands, such as draining or cultivating them, or allowing livestock to graze on them, are now controlled by this Act and in most cases will require licensing.
Conservation of Agricultural Resources Act Act 43 of 1983	CARA	Regulations promulgated under section 29 of this Act include a listing of, and requirements for the control of, various categories and types of declared invasives and weeds in both urban and rural areas.
Draft Sustainable Utilisation Of Agricultural Resources Bill 2003		Draft legislation that will replace the Conservation of Agricultural Resources Act (43 of 1983).
Mountain Catchment Areas Act Act 63 of 1970		Provides for the establishment of fire protection committees and preparation of fire protection plans.
National Veld and Forest Fire Act Act 101 of 1998	Veldfire Act	Imposes a duty on landowners to prepare and maintain firebreaks (that do not cause soil erosion and are free of inflammable material that reasonably prevent or allow control of a veld fire).
National Forests Act Act 84 of 1998	NFA	Protects indigenous forests and woodlands as well as specified tree species.
Nature Conservation Ordinance Ordinance 19 of 1974	The Ordinance	Read in conjunction with the Western Cape Nature Conservation Board Act (1998) and the Western Cape Nature Conservation Laws Amendment Act (2000). This Ordinance is applicable in the Western and Eastern Cape and protects the natural (indigenous) flora and fauna at a Provincial level.
National Heritage Resources Act Act 25 of 1999	NHRA	The NHRA promotes an integrated and interactive system for natural heritage resource management and to promote good governance at all levels.

<sup>1</sup> Most of the legislation listed on this page may be sourced directly from the Government Printers (90 Plein Street, Cape Town – Tel: 465-7531) or through Internet. on <http://www.gov.za/dept/index.html> or <http://www.polity.org.za>