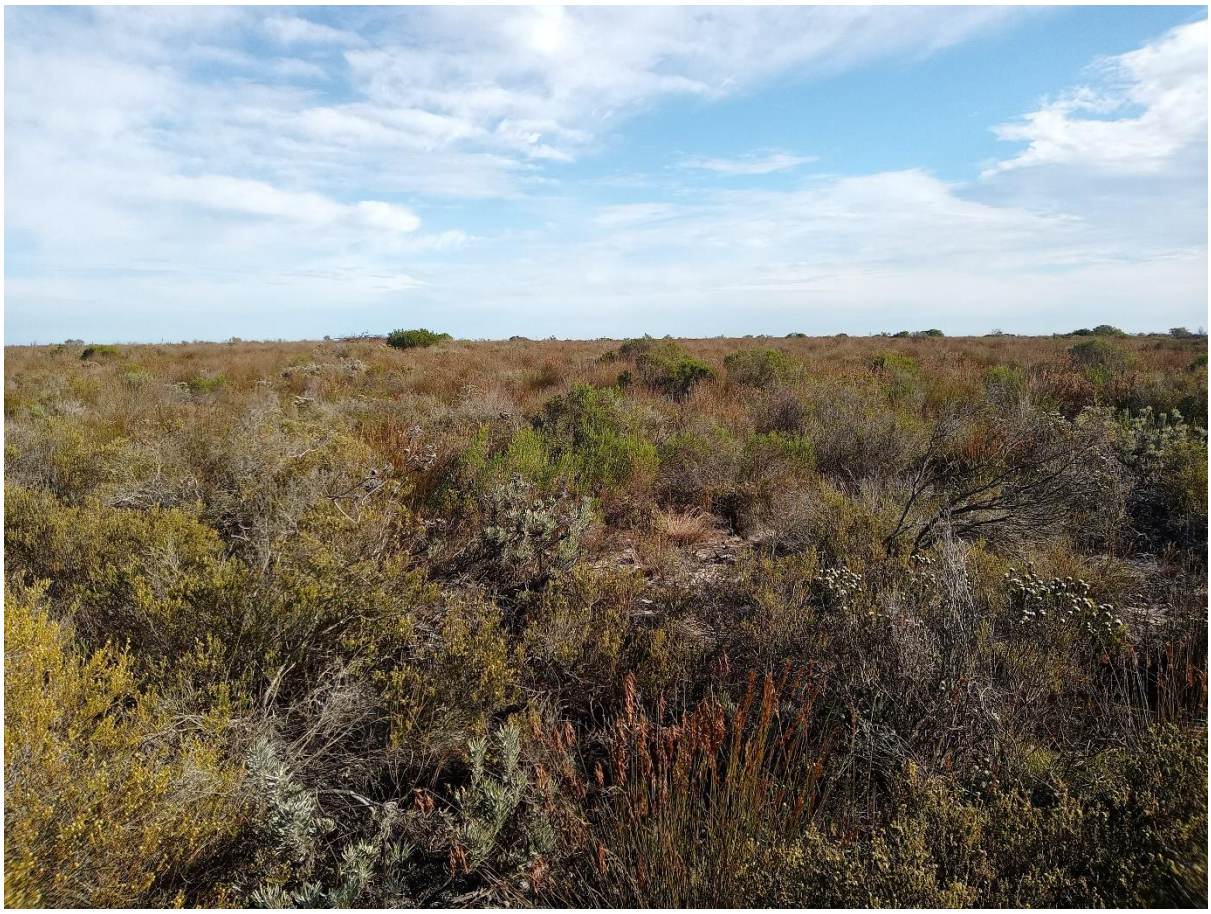
**INTEGRATING DIFFERENT FORMS OF KNOWLEDGE INTO BIODIVERSITY RESTORATION**

**Lessons from the !Khwa ttu restoration pilot project.**



!Khwa ttu

SAN SPIRIT SHARED

Prepared for !Khwa ttu San Culture and Education Centre

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**First People**

For millennia ancient humans were able to survive and even thrive in the environment of the West Coast of South Africa. They were able to forage, hunt or make everything they needed from the natural resources in this environment. From the shellfish on the coastline, to the Eland roaming the dunes and the plants growing on the rolling hills and mountain slopes. These people were as well adapted to survive in this landscape as any other indigenous species that evolved in this environment. The specific plants and animals in this environment not only helped early modern humans survive but they also shaped how we evolved. The date varies but archaeologists found evidence that San hunter-gatherer culture emerged out of this evolution of modern humans in Southern Africa about 100,000 years ago.

**Climate change and biodiversity**

Over the last 250,000 years early modern humans and their San descendants faced changes in climate. The plants and animals on the West Coast proved resilient to these changes and allowed people to persist in the region during periods when the rest of the Africa was uninhabitable. We are now amid another fast and extreme change in climate. However, over the last 370 years farming and other industry has transformed the landscape, leaving little indigenous vegetation behind and what natural habitat remains is fragmented. The climate is becoming hotter and drier, with more frequent and more extreme drought, storms, wind and wildfires. These changes are making the landscape increasingly unsuited to crops and viticulture. The population on the West Coast is growing and unemployment is rising leaving people vulnerable, with little means to adapt to climate change. To address this situation, it is essential that climate resilient natural ecosystems and biodiversity are restored, protected and used sustainably to support livelihoods.

**!Khwa ttu**

Twenty-four years ago, Grootwater Farm on the West Coast of South Africa was bought to create !Khwa ttu, an indigenous San heritage, culture and education centre. The 850ha property was a successful wheat and sheep farm for a long time but had become increasingly unproductive.

The !Khwa ttu team immediately set about clearing old fencing and structures from the landscape. They removed invasive trees, reintroduced a few head of wildlife indigenous to the area like eland, springbok, zebra and bontebok, and allowed natural vegetation to recover

passively. The land use was changed to conservation as it is the most in-keeping with San hunter-gatherer heritage. To protect nature is to protect San culture.

The beautiful old farm buildings were restored to create a visitor centre with a craft shop and restaurant and a training centre for young San. The Centre opened to the public in 2006 and San guides began making use of the recovering landscape to share their hunter-gatherer history. Later came lovely accommodation and much later a Heritage Centre with three small museums – First People, Encounters and Way of the San.

In 2020, just as COVID-19 hit South Africa, it became apparent that a severe and prolonged drought had left little grazing in the !Khwa ttu conservation area and was placing pressure on remnants of renosterveld vegetation, which is highly palatable but also endangered. With the support of the international IKI Small Grants Programme, Table Mountain Fund, the Lemonaid and ChariTea Foundation and Swiss Ubuntu Foundation, the !Khwa ttu team initiated a biodiversity restoration pilot project. The aim was to learn how to restore the historic natural ecosystem to support wildlife and sustainable foraging like the land did in the past.

**Integrating indigenous and other forms of knowledge into biodiversity restoration**

The project had several facets. Another article explores the outcome of the restoration pilot, a series of 3 booklets share ethnobotanical plant knowledge and explore related livelihoods, and a prospectus and lesson manual share the San Culture and Nature training curriculum that was developed for young ambassadors of biodiversity. This paper explores what was learned about integrating indigenous and other forms of knowledge to help restore the landscape.

**Approach**

The memories, knowledge and skills of the remaining indigenous hunter-gatherer cultures like the San of Southern Africa, are needed to help adapt and forge a new path of integrity for all humanity and all life on earth. Anthropologist and !Khwa ttu heritage advisor Chris Low has stated that “San are not invested in the antiquities of time, they live here and now, active participants in forging our future”.

During the pilot the project leaders explored the knowledge of local and San members of the !Khwa ttu team, as well as that of restoration, botanical (including archaeobotanical), ecological and holistic management specialists in relation to biodiversity restoration. A critical piece was the insight of Michael Daiber, !Khwa ttu's general manager, gained over 24 years of practicing restoration at !Khwa ttu.

Our approach was to create space for regular conversation with the team – "round the fire sessions" we called them. Space to reflect on what had happened since we last met, what we had learned ourselves and from others, what we could learn from traditions, where we were now and what the next step was. The intention was to understand what they know, to see how this knowledge could be applied to restoration and to evaluate the impact.

**What did we learn?**

Integrating different forms of knowledge and understanding is not easy. It requires parking your ego at the door, being humble and vulnerable, listening deeply and trusting the process. It gets confusing before it gets clear and at some point, you need to be brave enough to step out your comfort zone and act on the new information that emerges from the process. It is important to create the space for regular (at least quarterly) conversation with all the players. This does not necessarily need to be in the same room at the same time. The team needs to include bridge builders who can listen to all the different views, allow time for the information to process and integrate, and apply what emerges to the task at hand. It is often not a case of either or, this way or that way, but of process and timing. What was incredible is that the team always seemed to find the sweet spot, an action that they could take, that aligned with the thinking of all the different role players. Sometimes they took a wrong turn, but learned and adapted quickly, and with time everyone found their place in the system. Here are some key lessons and tips from the team.

**1. Know your territory.**

Quiet wisdom came from Hendreas Vaalbooi, the restoration team leader. "Know your place" he said at the outset. Contrary to popular thinking the San were not nomadic, they lived in territories which they needed to understand very well to survive and thrive. Restoration specialist Johann van Biljon and botanist Elzanne Singels said much the same. So, the team began there, identifying over 400 plant and animal species and their whereabouts on the farm, including over 20 species on South Africa's red data list.

**2. Know your goal and create a picture of what you want your place to look like**

The team articulated their goal as restoring palatable plants for animals, food and medicinal plants for people. They also identified what plants were missing by comparing the farm to neighbouring reference sites – places that they want the !Khwa ttu landscape to look like.

**3. Take your cue from the animals.**

Should we create a grid to observe the land systematically or should we just walk randomly? In the past we used to "follow the animals" said Hendreas, an approach that appealed to the team. Holistic manager Jozua Lambrechts agreed, showing the team how the animals had helped shape the landscape and facilitate the recovery of the natural ecosystem by spreading dung and seeds as they roamed the property. He explained how working with the number and mix of different animals and including or excluding them from certain areas could facilitate regrowth. !Khwa ttu needed to protect the renosterveld vegetation to help it recover and did so by erecting a game fence to exclude large grazers like eland from a 50ha renosterveld reserve on the property. However, the challenge the team grappled with was a bigger one, they needed to learn how to restore the whole ecosystem with grazing animals and foragers in it.

This notion of taking their cue from the animals stuck. The team felt that in the past the animals would have already moved off to find fresh food and water elsewhere, leaving the land to recover. Seeing that fences stop the animals from moving on to find fresh food and water, one possibility was to 'move' the animals around the property by enticing them into different habitat blocks using fodder and salt licks. Michael Daiber, the !Khwa ttu general manager, offered invaluable insight into the different habitats and animal movement on the farm, as well as past restoration efforts and recovery of the landscape. With this insight, Elzanne conducted a habitat assessment with the team and used this to develop a possible restoration plan for the farm. The bigger picture helped contextualise the pilot and focus activities.

**4. Spread the seeds.**

The habitat assessments showed that the natural ecosystem had recovered to some extent across all habitats and was stable. However, it also found that removing invasive trees and excluding animals was not enough to stimulate further natural succession because the seedbank has been depleted and the soil damaged by years of ploughing and invasive trees.

“Spread seeds like the animals do”, said the team. Johann agreed and suggested that the team establish a Mother Garden to yield the seeds they need to spread in the long term. He suggested that they develop it near the visitor centre which is in a fenced area (werf) so it is protected from large grazers and can be watered and maintained. As it grows it can spread through the werf and out into the landscape, turning the werf into a basket of medicine and food plants. The advantage of the werf is that it is in the ecotone between the renosterveld and sandveld vegetation types on the farm and can support both species. With Johann’s guidance and specialist experience in growing indigenous renosterveld plants the team began preparing and planting the garden.

Elzanne also agreed on the power of seeds to stimulate restoration, using the rehabilitation of Rondebosch Common as an example. With her guidance and the support of another specialist fynbos propagator Alex Lansdowne, the team collected seeds, cuttings and soil from reference sites to help grow the Mother Garden and to experiment with trial plots in the landscape.
The team’s purpose with the trial plots in the landscape was to explore methods to rebuild the seedbank and restore soil compacted by years of ploughing or changed by invasive trees. Michael’s practical approach helped to design trial plots exploring methods that would be effective and efficient to implement at farm-scale with limited resources.

**TEAM TIPS FOR GROWING INDIGENOUS PLANTS**

1. Identify which plants are most suitable for your area, location, vegetation type and goals.
2. Identify the location and layout of the garden consider the size, soil type, prevailing winds. Think and plan well, fynbos is sensitive to root disturbance.
3. Source plants, plant material - cuttings, bulbs and seeds from a local indigenous nursery or reference site – obtain any necessary permits and permission before harvesting plant materials. Consider the best time to make cuttings – autumn in the fynbos. Plant genetic material needs to be sourced locally to be of conservation value - if you are gardening on the West Coast, for instance, use plants and seeds sourced there.”
4. Prepare the soil – make use of soil milkshakes, avoid inorganic fertilizers, add compost to the soil to improve its moisture-retaining capability.
5. Prepare fynbos seeds – many fynbos seeds need environmental messages or cues before they germinate for example scarification and fire. The seeds of many Cape fynbos species respond positively to smoke treatment, even if they don’t exclusively need it to germinate. Some seeds cannot be dried and stored (e.g. Belladonna) and do not have a period of dormancy before they germinate.
6. Sow seeds and plant bulbs and cuttings during the rainy season. In the Western Cape this is during autumn and early winter. The general rule of thumb is to plant bulbs 2-3 cm under the soil.

7. Mulching with organic material such as leaves or wood chips helps to add nutrients to the soil, prevent weeds from growing and preserves water in the soil.
8. Watering – ensure that the new plants and seeds are watered every second day for the first two weeks and then twice a week for the next three months – rainfall depending. Continue to water the plants and seedlings during summer until the plants are established.
9. Bulbs – are watered during autumn and winter when the leaves are present. Stop watering bulbs as soon as the plant shows signs of dormancy - in summer.
10. Not all plants found naturally in the wild are suitable for propagation/gardens.

**5. Leave little trace behind**

"Harvest so you leave little trace behind" said Sanna Kruiper and others along the way. So, the team was careful when they collected seeds and cuttings to propagate the missing plants along with soil to mix and spread in the Mother Garden and trial plots.

**TEAM TIPS FOR HARVESTING / FORAGING INDIGENOUS PLANTS**

1. Never harvest endangered or protected species – Ensure that any necessary permits and authorisations have been obtained prior to harvesting.
2. Identify the species to harvest, when and where to find these species.
3. Harvest at the right time during the right season – do not harvest while the plant is seeding / fruiting.
4. Do not remove the whole plant - leave enough material for the plant to regenerate / Do not collect more than a few plants from a population / area.
5. Do not damage or destroy the mother plants – make use of the correct tools when harvesting/foraging plant material.

**6. Develop keen observation skills**

In young Jadre Kruiper and Bruce Anrade who joined the team for the project, we encountered a remarkable ability to adapt to a new environment and exceptional observation skills that seemed as natural as breathing. They were able to spot the tiniest seedling in the trial plots set up in different habitats. Jadre is from the Kalahari and went to school in Johannesburg, so the Fynbos biome on the West Coast was completely alien to him. Michael was astounded by how quickly he settled in and took to working with the plants. Jadre has just enrolled at the SA Wildlife College and is being replaced by another young San who will be mentored and guided by Bruce and the team. Hendreas often remarked that the ability to adapt is important and one of the reasons the San survived. Jadre and Bruce certainly demonstrated this ability and are both pursuing a livelihood in conservation and restoration.

**7. Work together.**

This team have a very special way they go about their work, and working with them is a favourite among trainees. They take time to laugh and talk and drink coffee, but when it is time to work, they work together, quickly, effectively and efficiently. Hendreas leads without leading, Sanna comes to the fore when it comes to harvesting, different leaders arise for different situations quite naturally. According to anthropologists like Chris Low, this collaborative and egalitarian way of being was a cornerstone of San culture.

**8. Restoration is a process.**

Reflecting on the lessons learned and steps taken, the team recognized that while plants and animals may be different from place to place the general lessons and overall process may be useful to others in other places.

**TEAM TIPS ON A GENERAL RESTORATION PROCESS**

1. Purpose (Know your goal) … food for animals and kitchen.
2. Where … know your place, habitats, condition.
3. Identify a reference site … what you want your place to look like.
4. Compare your place to the reference site to identify what is missing and needs to be planted to stimulate succession (what plants grow nicely together, different heights, different shapes).
5. Source permission and permits required to collect seed and plant materials from reference sites.
6. Experiment with how to grow plants - seeds, cuttings, transplant, etc. or commission plants to grow in a Mother Garden (future source of seeds and cuttings).
7. Store, clean, weigh and prepare seeds for sowing (e.g. smoke water to stimulate germination, seed balls to ensure right microbes and nutrients).
8. Prepare the soil, spread soil milkshake and prepared seeds in the landscape and Mother Garden.
9. Maintain and water Mother Garden, and check plots (monitor and evaluate).
10. Adapt and repeat process (same time same place).

**9. Inherent qualities are as important as knowing your territory.**

All of this was wonderful progress but there was also something else happening. While we sat and talked the team constantly tracked what was happening around us. I remember one day Roman Ndega the trainer stopped mid-sentence and remarked that a particular type of bird had just flown over, the conservation continued and then seemingly out of the blue someone else remarked that must mean a particular flower was in bloom, turning our thoughts to seed collection. Underlying all our conversations was this constant deep sense of connection, tracking and responsiveness to the natural environment. A connection many people have lost. I

don't know if we would call these attributes, values or behaviours but it became clear that the team's innate, inherent qualities were important on our journey of discovery. The team workshopped what qualities they felt were important – respect, care, honesty and deep connection / understanding were the top four qualities they felt people need to cultivate if we are to live in tune with nature once more.

| **TEAM TIPS – INNATE QUALITIES TO CULTIVATE TO PROMOTE BIODIVERSITY CONSERVATION** |
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| **Respect – all things link to this.** |
| **Care** |
| **Be honest – nature gives so we give in return, integrity.** |
| **Deep understanding – need to really know your place/location to live in tune with it.** |
| Openness |
| Connection |
| Relationship |
| Awareness |
| Vigilance |
| Seeing - keen observation |
| Constant tracking and interpretation |
| Respond |
| Adapt |
| Responsible |
| Leave little trace – know how to survive so don't need to much, secure in this knowledge. |
| Share what you have |
| Be friendly. |
| Gift |
| Collaborate |
| No hierarchy. |
| Pull your weight. |

**10. Collaborate with other land owners on activities to support conservation.**

Some of the team members have a felt sense of climate change and all of them agreed that the land needs help to recover. Through the project the team also explored various ways to protect the land for conservation. They found that the most effective way for !Khwa ttu as a San institution, to support conservation in the region is to set an example, build good relations and collaborate with neighbouring landowners around activities to support conservation and related livelihood development. This is much the same as small groups of San collaborating with each other around broader challenges, like a big hunt.

| **TEAM TIPS - PROTECTING YOUR LAND FOR CONSERVATION** |
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10-point process to guide other landowners based on !Khwa ttu's experience.

1. Verify the biodiversity value of your property
2. Choose an appropriate protection measure for your property
3. Prepare an application to the relevant authority
4. Work with the authority to agree regulations
5. Gazette or sign memorandum of understanding with the authority
6. Develop an environmental management plan
7. Appoint an environmental officer
8. Implement the environmental management plan
9. Monitor and evaluate progress
10. Update the plan accordingly

For !Khwa ttu this was an iterative process moving backwards and forwards between points, but it may be useful for landowners to have the whole process laid out before they begin.

Several options were explored but the most appropriate form of protection for !Khwa ttu as a San institution and heritage centre, turned out to be spatial planning and land use regulations, which is recognized in the 2030 Global Biodiversity Framework. As a conservation area established under a Swartland Municipal bylaw the development footprint is limited, and an environmental management plan and officer to implement the plan need to be in place. For external accountability !Khwa ttu is committed to regular assessments by independent experts, if necessary, but !Khwa ttu is a good example of the equal importance of internal accountability and responsibility.

!Khwa ttu found that legal processes to establish other types of protected areas can be lengthy, may not add to or help with what !Khwa ttu is already doing for conservation, and is probably easier to do for a single property than for a collective of properties. By setting an example and sharing what it is doing !Khwa ttu was able to bring more landowners together and inspire them to begin working together on conservation related activities.

!Khwa ttu is also exploring recognition as the UNDP driven "Other Effective Area Conservation Measure" system currently being piloted in South Africa and recognized by the 2030 Global Biodiversity Framework.

**Evaluating the impact**

This article shares 10 lessons on how indigenous and other forms of knowledge were integrated to support restoration, protection and sustainable use of biodiversity. It also shares general tips that may help people interested in restoring and protecting land for conservation.
It is still too early to assess the ecological impact of this approach, but it has yielded important insights that may well impact the way we do things.

In general, there was good alignment between the understanding and recommendations of the !Khwa ttu San team and specialists, but two important pieces emerged as a result of using the San lens.

Work with people as part of the ecosystem

In today's world people are often viewed as separate to nature and restoration, conservation and sustainable use of biodiversity seemingly have different objectives. When we use a San lens we go back thousands of years to a time when hunter-gatherers were part of the natural ecosystem and restored, protected and conserved biodiversity through the way in which they lived.

The "oumense" as my San colleagues sometimes put it, used to live in small groups that hunted and gathered in a particular territory, following the animals, spreading the seeds, moving on when the animals moved on to find food and water. They only took what they needed, left pregnant animals alone, left seeding plants to make new plants, and gathered a little from many plants to leave little dent on a plant or the population. They did not trade, but shared what they had and worked together with other groups when there was a larger task at hand, like a big hunt.

So, when we use a San lens and talk about restoring historic natural ecosystems, we are referring to a time when people were part of nature and palatable plants for animals, food and medicine plants for people were the same as what grew naturally in the environment. At that point in time, it seems there was little difference between restoration and conservation objectives. The disconnect between people and nature allows us to make decisions in isolation of nature and this leads to degradation of ecosystems. Using the San lens encourages us to reconnect with nature, to view people as part of the ecosystem and cultivate a way of being and doing things that works for the whole system.

Inherent qualities drive restoration and conservation

This links to the second piece that emerged as a result of using the San lens. If humanity is to live in tune with nature once more, we need to cultivate inherent qualities that will lead us in this direction. I have always thought specific plant and animal knowledge, deep understanding of the natural ecosystem and responsible local action would be important, and they are, but it is unlikely that humanity will shift its path without first cultivating a deeper sense of connection, collaboration, understanding and responsiveness to our natural world and each other. The question I leave you with, is how do we do this first on an individual and then on a collective level?