THE BUFFELSDRAAI LANDFILL SITE
COMMUNITY REFORESTATION PROJECT

Leading the way in community ecosystem-based adaptation to climate change
Publication Details
This document was produced and published by the Environmental Planning and Climate Protection Department of eThekwini Municipality, Durban, South Africa © 2015.

Acknowledgements
This document was produced by the eThekwini Municipality’s Environmental Planning and Climate Protection Department. Input was received from: Errol Douwes, Kathryn Roy, Nicci Diederichs-Mander, Khulile Mavundla and Debra Roberts.

Suggested Citation

The following individuals are thanked for proofreading and provision of comments: Nokuphila Buthelezi, Joanne Douwes, Richard Boon, Joanne Lees, Benis Egoh, Nikara Mahadeo.

Credits
eThekwini Municipality, DANIDA and the National Green Fund are acknowledged for provision of funds.

Photography
Errol Douwes, Jon Ivins, Richard Boon
Contents

Foreword by Councillor James Nxumalo 2
Foreword by Ms Christiana Figueres 3
Foreword by Dr Debra Roberts 4
Introduction 5
Project Summary 6
The Climate Change Challenge 8
The Role of Forests 10
History of the Buffelsdraai Landfill Site 14
The Project Approach 15
How the Project has Changed People’s Lives 19
Advancing the Work of the Reforestation Project 22
Conclusion 26
Frequently Asked Questions 27
Further Reading and Information Resources 28
Foreword by Councillor James Nxumalo  
Mayor of eThekwini Municipality

During the course of the past five years, eThekwini Municipality has become a leader in the field of climate change adaptation. This is an important achievement for an African city, given that cities on this continent will likely face some of the most severe impacts associated with climate change. Africa’s people and communities need to understand what adaptation is, and how it can be realistically achieved. Pilot projects that demonstrate meaningful learnings are critical if we are to successfully plan and set in place the necessary adaptation measures.

Key to Durban’s success in this field is the Municipality’s flagship adaptation project, namely the Buffelsdraai Landfill Site Community Reforestation Programme. This innovative project is building an indigenous forest in the buffer zone of the Municipality’s Buffelsdraai Regional Landfill Site. Initially conceptualised to offset CO₂ emissions associated with hosting the 2010 FIFA World Cup matches, the project has also delivered several important adaptation benefits. Local community members are key partners, who have benefited in a number of ways, and the new forest is anticipated to provide a range of important ecosystem services. The project has highlighted the way that natural ecosystems support and protect human communities.
During the Durban Climate Change Conference in 2011, the United Nations Climate Change Secretariat launched the Momentum for Change initiative to shine a light on climate action underway across the globe. The initiative held its inaugural award ceremony in Durban, recognising 10 outstanding projects on the world stage. One of those projects was the Buffelsdraai Landfill Site Community Reforestation Project.

We selected it as a shining example of climate action because it demonstrates the strong and vital link that exists between natural ecosystems and the human communities they support and protect, and between the human communities that support, restore and protect local ecosystems.

When I visited the site, I was struck by how engaged the local community was in growing and replanting trees. That was more than three years ago. Since then, the Buffelsdraai Landfill Site Community Reforestation Project has grown and matured. I was pleased to learn that all tree planting is expected to be completed this year – the same year national governments have agreed to write a new universal climate change agreement in Paris, France.

As we travel down the road to Paris, the world can take inspiration from the Buffelsdraai Landfill Site Community Reforestation Project. This is the kind of project that should be encouraged and promoted as part of every city’s response to climate change.
Foreword by Dr Debra Roberts
Deputy Head: Environmental Planning and Climate Protection Department, eThekwini Municipality

It is important to acknowledge that COP17, held in Durban in 2011, effectively changed the world. The outcome of the long and often difficult negotiations held in Durban’s International Convention Centre was the agreement by nation states that we need to find a new and ambitious way to deal with the global climate change challenge. This new international partnership for climate action will be crafted during 2015 and agreed to in Paris at COP21.

While much of the attention in Paris will be on countries like China, India and the USA, we know that regardless of the final outcome, much of the responsibility for implementation of the final agreement will lie with local governments and local communities. Nowhere is the potential power of local action more evident than on the African continent and in African cities. As the world’s most rapidly urbanising continent, Africa’s choices about how it develops its towns and cities have the ability to transform our common global climate future.

To make the most of this significant opportunity, we need brave local leaders to give effect to visionary local ideas. The Buffelsdraai Landfill Site Community Project is just such a beacon of hope, showing how real people with limited resources and strong political leadership can begin to rebuild what has been lost and imagine a new future in the most unlikely of spaces! In the words or our icon, Nelson Mandela: “It always seems impossible until it is done”. The Buffelsdraai Landfill Site Community Reforestation Project is certainly a long way from being done, but it has shown us how to start the journey towards developing a better adapted and low-carbon Durban. At the end of the day, the secret lies in harnessing the power of Africa’s peoples and ecosystems to transform the African city.
Introduction

The world is now urbanising at a rate faster than any other time in human history, with the bulk of this growth occurring in the developing world. African and Asian cities are currently adding up to a million people a week to the global urban population, thereby cementing our 21st century transition from a rural to an urban species.

This era of formal and informal city building offers unique transformation opportunities, among which is the potential to significantly increase our adaptive capacity, to deal with climate change-related risk. The key to unlocking this potential lies at the local level, where rapid action and feedback allow new approaches to be tested and mainstreamed well ahead of what can be achieved through more cumbersome national and international processes. On this ‘planet of cities’, it is the cities themselves that offer the greatest potential to curb the drivers of global environmental change and to increase society’s capacity to engage with, and even thrive, under conditions of increased risk. Enhancing the adaptive capacity of urban communities and the ecosystems on which they rely is therefore one of the most significant challenges of the 21st century.

The need for African cities such as Durban to align the climate change adaptation agenda with development and poverty-alleviation agendas, is a high-level political priority. A cost-effective way of achieving this goal is through ecosystem-based adaptation, given that many of the urban poor still rely directly on ecosystem services as the basis for their survival and livelihoods. Using natural ecosystems to enhance the adaptive capacity of cities (through flood regulation, temperature reduction, improved water security etc.) also offers the opportunity to address high levels of unemployment by optimising jobs, which involve ecosystem management. This is a key component of the community ecosystem-based adaptation (CEBA) approach developed in Durban.

Africa’s development challenges mean that synergies must be sought, not only between adaptation and development needs, but also wherever possible between adaptation and mitigation agendas. Experience in Durban has demonstrated that while climate change adaptation remains the most immediate priority, mitigation interventions are a critical component in enhancing the city’s adaptive capacity through the avoidance of climate change. In this sense, mitigation may even be considered the ‘surest form’ of adaptation. A portfolio of co-ordinated, synergised and constantly re-evaluated adaptation and mitigation responses are a key part of Durban’s Municipal Climate Protection Programme.

The Buffelsdraai Landfill Site Community Reforestation Project (hereafter referred to as the ‘Reforestation Project’), implemented by eThekwini Municipality (the local government responsible for managing the Durban Metropolitan Area), is a flagship project that demonstrates numerous adaptation and mitigation co-benefits. It is believed that case studies such as the Reforestation Project offer interesting, new perspectives on how best to foster systemic and transformative change, through improved equity, social legitimacy and environmental sustainability in the climate-stressed cities of the 21st Century.

The purpose of this document is to present a current snapshot view of the various components of work underway within the Reforestation Project, and to briefly describe how they contribute to objectives of the Durban CEBA and the above vision of transformative change.
Project Summary

The eThekwini Municipality’s Environmental Planning and Climate Protection Department, in partnership with the Wildlands Conservation Trust and Durban Solid Waste, initiated the Reforestation Project in 2008. The aim of the project was to alleviate the climate change impacts of hosting the Durban-based elements of the 2010 FIFA™ World Cup. The restoration of forest ecosystems was identified as a way of absorbing event-related greenhouse gas emissions while enhancing the capacity of people and biodiversity to adapt to the inevitable effects of climate change. The site will sequester 42 214 tons over a 20-year period.

The project has been highly successful in showcasing the role that natural ecosystems play in underwriting the livelihoods and resilience of people. Local unemployed community members collect indigenous tree seeds, then grow tree seedlings and plant them in the buffer zone around the landfill site. It is anticipated that local people will also benefit from the improved ecosystem services provided by the forest, due not only to their high dependence on natural resources, but also vulnerability to the shocks and stresses of climate change. Benefits for the natural environment include a marked increase in biodiversity (both fauna and flora) in areas previously under sugarcane production. Tree species in those areas have increased from 0 to 51, and the total listed bird species have increased from 91 to 145 over the five-year period. The Wildlands Conservation Trust is the appointed implementing partner and oversees all tree growing and tree planting operations through the application of their ‘Indigenous Trees for Life’ model.

Tree species...have increased from 0 to 51, and the total bird species have increased from 91 to 145 over the five-year period.

Due to the success of the Reforestation Project implemented at Buffelsdraai, two other projects have subsequently also been initiated in eThekwini Municipality, one at iNanda Mountain and one at Paradise Valley Nature Reserve.
Vital Statistics
as at January 2015

595 476 trees planted, of which
532 016 are in the landfill site buffer zone
63 460 form a ‘living fence’

43 permanent jobs
16 part-time jobs
389 temporary jobs have been created

R13.5 M equivalent in benefits to the local community since the project began in 2009

Young local community members (tree-preneurs) with the goods they have bought with their trees.
Ecosystem-based Adaptation

Ecosystem-based Adaptation (EBA) is defined as: "...the use of biodiversity and ecosystem services as part of an overall adaptation strategy to help people to adapt to the adverse effects of climate change. EBA uses the range of opportunities for the sustainable management, conservation and restoration of ecosystems to provide services that enable people to adapt to the impacts of climate change. It aims to maintain and increase the resilience and reduce the vulnerability of ecosystems and people in the face of the adverse effects of climate change. EBA is most appropriately integrated into broader adaptation and development strategies (AHTEG, 2009)."

The Climate Change Challenge

It is important to understand the magnitude and severity of the looming climate change challenge in order to realise why this Reforestation Project and its various exploratory aspects are vital for a local government such as eThekwini Municipality. Climate change is now known to be an unavoidable reality due to the greenhouse gases (GHG) emitted into the Earth’s atmosphere as a result of human activities. The resultant warming triggers a cascade of changes to weather patterns, ocean levels, etc. Without effective mitigation, GHG emissions will continue to escalate and produce devastating consequences.

Even if GHG emissions were dramatically reduced today, however, our climate would continue to change due to time lags in the responses of earth’s climatic system. The complexity of climate change is such that the increasing stress it places on the built and natural environments will require cities to adopt entirely new servicing and management approaches.

While ‘mitigation’ of climate change is considered critical (i.e. reducing GHG emissions globally to reduce the extent of climate change), ‘adaptation’ to unavoidable climate change is equally important. Such adaptation requires anticipation of adverse climate-related impacts, and ensuring appropriate steps are taken to either prevent or minimise these impacts. Early adaptation will save money and lives.

African cities are considered particularly vulnerable to climate change due to high levels of unemployment and poverty, inadequate servicing, ageing infrastructure, rapid population growth, and poor governance. Fortunately, many such cities are still developing and are in a position to proactively mitigate and adapt to climate change.

In addition to the above, many African cities also have relatively high levels of biodiversity compared to their ‘global north’ counterparts. This is important from an Ecosystem-based Adaptation perspective, as the protection and management of biodiversity is a cost-effective way to reduce vulnerability to climate change.

The Reforestation Project has incorporated Ecosystem-based Adaptation principles as a means to achieve improved resilience to climate change. The project has already demonstrated that forest restoration, motivated by climate mitigation objectives, can provide direct socio-economic benefits to surrounding communities, as well as enhanced ecosystem functioning.

The ecosystem services derived from the restored forests will also produce benefits such as enhancement of

Resilience

Resilience can be described as the ability to ‘bounce forward’ and ‘move on’ following a disaster (Manyena et al., 2011). An increasingly unpredictable and climate-stressed future means that communities must not only be able to recover from the impact of rapid and slow onset disasters, but must also be able to bounce forward to a new developmental state that prioritises ecological integrity, equity and sustainability (IPCC, 2014).
The Buffelsdraai Landfill Site Community Reforestation Project was selected and showcased in 2011 by the United Nations Framework Convention on Climate Change (UNFCCC) Momentum for Change Initiative as one of ten 'Lighthouse Projects' from around the world. The announcement was made by the UN Secretary General, Ban Ki-moon, and South Africa’s President, Jacob Zuma, in Durban during the COP17/CMP7 event.

The Momentum for Change Initiative has been established by the UNFCCC in response to the negativity surrounding the complex and difficult process of working towards an international climate agreement, where climate change mitigation and adaptation are often perceived as burdens rather than opportunities. The Initiative seeks to focus on the positive action already underway and on successes already being achieved in respect to climate protection worldwide.

A number of ‘Lighthouse Projects’ have been selected each year, starting in 2011, to act as beacons of inspiration, pointing the direction towards fulfilling the objectives of the UNFCCC and its Kyoto Protocol. These Lighthouse Projects are intended to serve as models of best practice, and lend themselves towards introducing innovation in terms of delivering benefits on a global scale, and, in particular, for local communities in least developed areas of the world. The Initiative also aims to “transform the impression of slow progress in the negotiations into a much more positive ‘can do’ environment that both recognises action and progress, as well as encourages national governments to be more ambitious in their decisions, ultimately contributing to the creation of a virtuous cycle that will build momentum for climate change action.” (UNFCCC, 2011)

biodiversity refuges and water quality, river flow regulation, flood mitigation, sediment control, improved visual amenity and fire risk reduction. Such services enhance the long-term climate change adaptation benefits derived by local communities, as well as short-term resilience to dangerous weather patterns. Ongoing evaluation of the success of the Ecosystem-based Adaptation approach will guide decisions for possible roll-out to other areas.

A UNFCCC Momentum for Change ‘Lighthouse Project’

The Buffelsdraai Landfill Site Community Reforestation Project was selected and showcased in 2011 by the United Nations Framework Convention on Climate Change (UNFCCC) Momentum for Change Initiative as one of ten ‘Lighthouse Projects’ from around the world. The announcement was made by the UN Secretary General, Ban Ki-moon, and South Africa’s President, Jacob Zuma, in Durban during the COP17/CMP7 event.

The Momentum for Change Initiative has been established by the UNFCCC in response to the negativity surrounding the complex and difficult process of working towards an international climate agreement, where climate change mitigation and adaptation are often perceived as burdens rather than opportunities. The Initiative seeks to focus on the positive action already underway and on successes already being achieved in respect to climate protection worldwide.

A number of ‘Lighthouse Projects’ have been selected each year, starting in 2011, to act as beacons of inspiration, pointing the direction towards fulfilling the objectives of the UNFCCC and its Kyoto Protocol. These Lighthouse Projects are intended to serve as models of best practice, and lend themselves towards introducing innovation in terms of delivering benefits on a global scale, and, in particular, for local communities in least developed areas of the world. The Initiative also aims to “transform the impression of slow progress in the negotiations into a much more positive ‘can do’ environment that both recognises action and progress, as well as encourages national governments to be more ambitious in their decisions, ultimately contributing to the creation of a virtuous cycle that will build momentum for climate change action.” (UNFCCC, 2011)
Protection of our Natural Areas
As our cities continue to grow, we must not abandon the protection of natural areas to the pressures of urbanisation, but should instead defend such places, and indeed try to create new space for nature within the urban fabric - even within the centres of cities. We also need to make nature more accessible to people, providing interpretation and education wherever possible. Connecting people to nature should be an imperative for the whole conservation movement, and urban protected areas are well placed to do this (Trzyna, 2014).

The Role of Forests

Forests are dominated by trees and are often described as the ‘lungs’ of the planet because of the way trees produce oxygen and filter air. Forests are actually much more than this: they provide vital life-supporting ecosystem goods and services to people, including food, wood, fibre and medicine, and protect them from natural disasters such as floods and landslides through soil stabilisation. Poor people and those living in rural areas are often highly dependent on forests for their basic survival and safety. This is certainly the case in eThekwini Municipality but, as in other parts of the world, many local forests have either been lost or reduced in size.

It is only recently that people have begun to grasp the true extent to which forests support life on earth. The largest forest ecosystems, such as those that occur in the Congo Basin and other tropical regions, have a massive influence far beyond their boundaries. Forests help to generate and regulate rainfall and other weather patterns across many countries, and even entire continents. Due to the large density of biomass in forests (in the form of trees), these habitats also store a very high volume of carbon, thus playing an important role in reducing the amount of carbon dioxide (a powerful greenhouse gas contributing to global climate change) in the atmosphere.
Forests cover about one third of all land around the globe and deliver a multitude of important ecosystem services, both locally and globally. The rate of global deforestation has accelerated so rapidly over the past 100 years that it is estimated that every year approximately 5.21 million hectares of forest are lost (FAO, 2010).

While the crisis of deforestation should not be understated, there are also some positive forest protection efforts underway. Such efforts, in the form of multiple small forest protection and restoration projects worldwide, are making progress towards stabilising and perhaps eventually reversing forest loss. These projects contribute to an understanding of how climate change might be stabilised, while boosting local biodiversity, and ensuring improved resilience of landscapes and people.

Durban is situated in one of the world’s 35 Global Biodiversity Hotspots, namely the Maputaland-Pondoland-Albany corridor, and contains a variety of forest types including Northern Coastal Forest, Swamp Forest, Mangrove Forest, Eastern Scarp Forest and Dune Forest.
1. Landfill Zone
The Buffelsdraai Landfill Site, managed by Durban Solid Waste (DSW), was opened in 2006 and built to accommodate increasing waste produced from the northern suburbs of Durban and surrounding areas. The landfill footprint where waste is disposed is 100ha with a minimum lifespan of 75 years (see page 14 for history of the establishment).

2. Fence-line
The landfill footprint is fenced to separate it from the surrounding buffer zone. More than 7000 trees have been planted to provide an aesthetic border screening the landfill operations and assisting with wind dispersion (see page 14).

3. Living Fence
Thorny tree species are planted in a wide strip along the boundary of the landfill site buffer zone to create a living fence. As of January 2015, 63,460 trees were planted along the boundary. This thorny barrier will help reduce access to the site by goats and cattle, and also demarcate the boundary of the Reforestation Project.

4. Buffer Zone
All existing landfill sites are required by legislation to have a buffer zone between the adjacent communities and the active landfill. The buffer zone at the Buffelsdraai Landfill site is a minimum of 800m wide and 787ha in extent (see page 14).

5. Reforestation Hub
Ruins of a former chicken farm will be restored to establish a regional ‘Reforestation Hub’ at the Buffelsdraai Landfill Site, which will incorporate the actual building and a plant nursery. All the trees in the nursery will be indigenous and will be grown by local community ‘tree-preneurs’ at their homes (see pages 24 and 25).
The Buffelsdraai Landfill Site is the largest regional waste landfill site owned and managed by eThekwini Municipality’s Durban Solid Waste (DSW) department. The landfill is located north-west of the city near the small town of Verulam. It serves the area north of the Umgeni River through to Tongaat, close to King Shaka International Airport. Operations began in 2006, and has a design life of 75 years.

The Buffelsdraai Landfill Site comprises two valleys divided by an east-west ridge. The original farm, comprising 750ha of sugarcane fields, was purchased together with portions of the neighbouring farm to the east. All landfill sites are required by law to have a buffer zone between the active landfill and adjacent communities. The buffer zone at Buffelsdraai Landfill Site is a minimum of 800m wide and 787ha in extent. It ensures that neighbouring communities, namely Buffelsdraai and Osindisweni, are shielded from the impacts of the landfill. It is by far the largest buffer of all DSW’s landfill sites and as a result of the sugarcane farming, the area was extensively transformed, making it ideal for reforestation. The footprint of the active landfill area is 116.2ha and has been fenced to separate it from the surrounding buffer zone. A total of 7 000 trees have been planted along the landfill footprint perimeter fence by the reforestation team to screen the views and odours associated with the landfill operations and also to act as a firebreak.

Central to DSW’s environmental protection policy is the rescue, relocation and rehabilitation of any biodiversity affected by the construction and operation of its landfill sites. This strong environmental ethic prompted DSW to motivate for the establishment of a Nature Conservancy that encompasses both the landfill site and surrounding buffer zone.
The Project Approach

Building partnerships

The Reforestation Project has been led by eThekwini Municipality’s Environmental Planning and Climate Protection Department (EPCPD), but it would not have been possible without several important partnerships. The EPCPD partnered with the Municipality’s Durban Solid Waste Department (DSW) from the start, as DSW is both owner and manager of the land on which the project has taken place. The Municipality also partnered with the Wildlands Conservation Trust (WCT), which was appointed as an Implementing Partner and to undertake the required work on-site.

Subsequently, other partners and implementing agents have been engaged. These include: a Reforestation Research partnership, established with the University of KwaZulu-Natal (UKZN); an Environmental Education partnership with the Wildlife and Environmental Society of South Africa (WESSA); a partnership with the Municipality’s Coastal, Stormwater and Catchment Management Department, for construction of a weir for water monitoring purposes; and a partnership with the Municipality’s Energy Office, which has provided photovoltaic and solar geyser technologies. Importantly, the local community members are considered key partners, without whom the project could not have taken place. There have also been a number of key funding partnerships that have supported the project, the first with DANIDA and the second with National Government through its Green Fund.

Indigenous Trees for Life: local communities benefiting from forest restoration

The ‘Indigenous Trees for Life’ concept was developed by the Wildlands Conservation Trust. Local community members (tree-preneurs) are encouraged to grow indigenous tree seedlings in their ‘home nurseries’ until they reach a suitable height and are ready to be traded. On collection of the trees, tree-preneurs are paid with credit notes. These credit notes
can be used at ‘tree stores’ organised by Wildlands Conservation Trust to purchase groceries, bicycles, building materials, or to pay for school fees or vehicle driving lessons. Collected trees are kept in a holding nursery at the project site and are sorted according to size and species, ready to be hardened off prior to planting.

The adoption of the ‘Indigenous Trees for Life’ approach in the Reforestation Project has significantly increased the scope and depth of socio-economic benefits achieved by the project.

Tree-preneurs are drawn from local communities including Buffelsdraai, Osindisweni and KwaMashu. Buffelsdraai and Osindisweni are peri-urban areas and are directly adjacent to the Buffelsdraai Landfill Site. Due to their close proximity, the majority of people employed on the project are from these communities. Research has revealed that there are substantial levels of poverty and unemployment within all project communities. Furthermore, almost all of the project beneficiaries were previously considered to be living below South Africa’s poverty line.

In addition to the above, the local communities are also characterised by high levels of underdevelopment. For example, in 2010, over 10% of the total of 6 309 households in Buffelsdraai, Osindisweni and KwaMashu, did not have access to refuse disposal and almost 20% had no access to running water within their dwellings. Lack of public service delivery was more prevalent in specific areas such as Buffelsdraai, where 36% of households had no refuse disposal and 83% of households had no running water within their dwelling. These communities demonstrated a high reliance on the collection of natural resources for food, fire, water and medicine.
Given the above, it was considered essential that local people be capacitated to fully understand the benefits that they derive from natural ecosystems as a means to enhance meaningful climate change adaptation. To assist with this, a dedicated advocacy and outreach initiative has been developed to help explain and build awareness of natural ecosystems and to foster an understanding of how to protect and enhance them.

Selection of areas for reforestation

Tree planting, or ‘reforestation’, of the Buffelsdraai Landfill Site buffer zone is taking place on old agricultural lands, historically farmed (for over 100 years) with sugarcane. Of the 787ha landfill site buffer zone, only some 580ha will be reforested. Historically, the buffer area would have comprised a mixture of forest, grasslands, woodlands, wetlands and riparian areas. Many of these original ecosystems will be restored, but it is acknowledged that it will be impossible to recreate the exact network of ecosystems that previously occurred on the site.

Tree planting and maintenance

Tree planting is undertaken by a permanent tree planting team (38 people as of January 2015) employed from the local community. Site preparation involves the removal of sugarcane and invasive alien plants and weeds. Reforestation of the 580ha area is undertaken using approximately 51 locally indigenous tree species. The tree planting density is
A living fence

Thorny tree species are planted in a wide strip along the boundary of the landfill site buffer zone to create a living fence. As of January 2015, 63,460 trees were planted along the boundary. This thorny barrier will help reduce access to the site by goats and cattle, and also demarcate the boundary of the Reforestation Project.

Fire management by a Working on Fire (WoF) member.

Fire management is also undertaken to minimise the destruction of newly planted trees. For this reason, firebreaks are cut and maintained around all planted areas. Tree planting is done mostly in the spring and summer when rainfall is highest. Tree mortality is assessed some months after planting, and any dead trees are replaced with new saplings from the nursery stock. This stock of ‘insurance’ trees is kept in the nursery for instances when trees have died, usually due either to extreme drought or wild fires.

A separate team maintains the site after planting is complete. This includes cutting grass and controlling invasive alien plants. Approximately 1,000 trees per hectare, except for riparian areas where this density may increase to 2,000 trees per hectare.
How the Project has Changed People’s Lives

The project has highlighted the importance of natural ecosystems in supporting and protecting human communities, and the role that human communities can play in supporting, restoring and protecting local ecosystems. Since inception in late 2009 to early 2015, a total of 448 jobs (43 full-time, 16 part-time and 389 temporary) were created for local community members. At that time, over 540 active tree-preneurs were engaged through the project. An initial assessment of the benefits derived from tree trading and employment in the project confirmed that local people had more disposable incomes, increased availability of food, and many families reported improved education opportunities for schoolchildren.

Through employment of facilitators in each of the neighbouring communities, the Reforestation Project encourages recruitment and training of the tree-preneurs. Many tree-preneurs have achieved remarkable successes. A few of these examples are captured over the page.
Thandiwe Mthalane

Thandiwe is a resident in the Buffelsdraai community and joined the project as a tree-preneur in 2010. She recognised the opportunity to supplement her income by growing trees and quickly developed a passion for the work. She is now considered one of the Project’s ‘super growers’ and has produced many thousands of trees at her home nursery. She has traded most of the credit notes she received from the trees for bricks in order to build herself a larger home, but also uses some of the credit notes to pay for her children’s school fees. Since joining the project, she has sent her daughters to a better school. This is a clear example of how the project is building better lives.

Bongiwe Hlatshwayo

Bongiwe, a 50-year-old mother of ten children, is a resident of the Buffelsdraai community. She was unemployed when the Reforestation Project began in 2009 and at that time was looking for a way to supplement her income. Her husband is mostly unemployed, though occasionally takes on part-time jobs. Once Bongiwe realised the potential of the Project, she knew that she would be able to help not only her children, but also her seven grandchildren, many of whom attend a local school. As of January 2015, Bongiwe had grown trees to the value of about R80 000 and is now considered a ‘super grower’. For Bongiwe, the Reforestation Project has provided a chance to dramatically improve her life and the lives of her family. Bongiwe has registered a small company in order to sell trees to the private market.
Nondumiso Khumalo

Nondumiso started working at the Reforestation Project in 2009 and is currently employed as an Initiatives Manager. She’s well known for her passion for the environment, and is one of the driving forces behind the success of the project. Not only does she work hard, she’s also a keen scholar and an excellent manager. Prior to her current post, she worked as a field ranger, a tour guide, and a site manager at a nature reserve in northern KwaZulu-Natal. Since joining the Reforestation Project at Buffelsdraai, her skills base, knowledge about reforestation and people management have developed substantially. Her many hours of study, often undertaken late at night after a full day in the field, have paid off and she’s recently been awarded her Diploma in Nature Conservation. She has also completed a Diploma in Project Management and is finalising a Diploma in Supply Chain Management. Nondumiso now plans to enrol for a Bachelor of Technology in Nature Conservation.

Emmarencia Khumalo

Emmarencia, aged 40, resides in Buffelsdraai. She started working for the Reforestation Project in 2009 as a general worker planting trees and clearing alien invasive plants. Through ongoing self-development, including attendance at various training programmes such as computer literacy, leadership, and basic business skills, she has continued to advance. As a result of her excellent leadership skills, pragmatic approach to her work and her good literacy and reporting skills, she was appointed as the Nursery Caretaker in 2014. Emmarencia’s work includes maintaining records of tree stocks, and checking quantities of trees entering or exiting the nursery. Additionally, she supervises a team of ten staff and oversees control of invasive alien plants and other weeds in the nursery area, as well as watering and bagging of trees. She is passionate about the natural environment and is grateful for the opportunity to have a job that allows for advancement and skills development.
Advancing the Work of the Reforestation Project

Validation by the Climate, Community and Biodiversity Alliance

In 2014, the Reforestation Project was validated by the Climate Community and Biodiversity Alliance (CCBA). It received a Gold Standard for ensuring exceptional climate change adaptation benefits and for benefits to local communities and biodiversity.

The CCBA, founded in 2003, comprises a partnership of leading international NGOs with a mission to stimulate and promote land management activities that mitigate global climate change, improve the well-being and reduce the poverty of local communities, and conserve biodiversity. The CCBA Standards identify land management projects that deliver positive benefits for climate change mitigation, for local communities and for biodiversity. They can be applied to any land management project, including projects that reduce greenhouse gas emissions from deforestation and forest degradation or from avoided degradation of other ecosystems. They can also be applied in projects that remove carbon dioxide by sequestering carbon (e.g. reforestation, afforestation, re-vegetation, forest restoration, agroforestry and sustainable agriculture) or other land management, from design through to implementation to and monitoring.

Receiving the Validation Certificate was viewed as a major success, giving recognition to the project’s alignment with international best practice standards for people and biodiversity-centred climate adaptation.

Reforestation Research Partnership

Current climate change-related predictions include increased frequencies of droughts and floods of greater intensity, with corresponding flood damage and downstream pollution. These and predicted changes in temperature associated with climate change are expected to impact on biodiversity, ecosystem functioning and ecosystem services. It is anticipated, however, that the restoration of natural ecosystems and biodiversity, through a Reforestation Project such as this one, can alleviate such risks to both the environment and local communities. Nevertheless, further interrogation at local levels is required, prior to rolling out similar projects in other parts of the Municipality. Understanding and assessing the benefits linked to forest restoration will also contribute to the Municipality’s mainstream
The scope of the work includes:

• Researching biodiversity and ecosystem assets including pristine, degraded, and novel ecosystems within the eThekwini Municipality’s natural environmental areas. This will include investigations into local precipitation and air pollution patterns, soil carbon, water infiltration, and impact of forest regeneration on water tables, stream quality and water flows;

• Undertaking and promoting research on biodiversity, climate change, and socio-economic upliftment within the context of local ecosystem restoration and reforestation;

• Building local research capacity, including developing skills and competency of university and municipal staff in key aspects relating to rehabilitation and its benefits, and monitoring its success;

• Maximising high quality research opportunities for students and researchers who enter the programme.

The research will be conducted through a formal partnership known as the Durban Research Action Partnership (DRAP), established between eThekwini Municipality (EM) and the University of KwaZulu-Natal (UKZN). The research will include all eThekwini Municipality’s reforestation sites (Buffelsdraai, iNanda and Paradise Valley Nature Reserve). The partnership will promote an ethos of transdisciplinary research that spans a number of disciplines, including ecosystem-based adaptation, restoration ecology, reforestation and socio-ecological and economic development systems. This is considered important for bridging the science, policy, management and governance gaps inherent within the Municipality’s structures. The research is co-funded by eThekwini Municipality, the South African National Green Fund, and the University of KwaZulu-Natal.

Bridging the science policy divide

In June 2012, representatives from countries and governments around the world met in Rio de Janeiro at the Rio+20 Earth Summit where they re-established their commitment to sustainable development and an economically, socially and environmentally sustainable future for the planet. This vision was captured in a milestone document titled ‘The Future We Want’, which highlights the importance of projects that help bridge the science-policy divide, and ensure that practical steps are taken to implement real environmental sustainability for biodiversity, ecosystems, and people. The Buffelsdraai Landfill Site Community Reforestation Project is a good example of this.
Buffelsdraai Reforestation Hub: championing excellence and innovation in climate adaptation

Creating a space for research staff is important to ensure that the lessons learnt and innovations developed can be documented and shared at a national and international level. There are currently plans in place to restore the ruins of a former farmhouse at the Buffelsdraai Landfill Site in order to establish a regional ‘Reforestation Hub’. The building and plant nursery are anticipated to become the administrative centre for the eThekwini Municipality’s reforestation programme, as well a ‘Centre of Excellence’ for research. The Reforestation Hub will provide opportunities for scholars, community members and visitors to learn about climate change adaptation, and will provide a base for innovative research combined with practical and locally appropriate implementation. Environmental education and stewardship will be key tools and the Hub will play a central role in building local climate change adaptation capacity.

The Reforestation Hub incorporates some of the most innovative Green Building designs adopted within Durban.

Ruins of a former chicken farm building. Concept model of new Reforestation Hub.
The building design is considered a material manifestation and the demonstration of the principles used in Durban’s climate change adaptation work. The main building, a restored farmhouse, will mirror the restoration of local forests. Local labour will be employed to ensure that a direct benefit is realised by local community members.

The on-site ethos of the construction project will be to re-use and recycle where possible. Timber from local invasive species or locally sourced bamboo and stone from the landfill site will be used wherever possible. Construction materials with low or neutral carbon footprints as well as locally produced goods will be used. Transportation will be closely monitored and minimised, as will steel and aluminium due to their high carbon footprint. Maximising natural light and ventilation, and rainwater harvesting and re-use are important design imperatives. Phasing in of grey and even black water on-site treatment and re-use is included in the master plan for the project.
Conclusion

This document provides an overview of the many facets of work undertaken by the Buffelsdraai Landfill Site Community Reforestation Project. While the project has seen many successes, what is clear is that there is much work to be done and many challenges still lie ahead. Projects such as this are highly reliant on buy-in from politicians and local community members as well as secure, ongoing funding. Key to the sustainability of the Buffelsdraai Community Reforestation Project is also the need to consider the longer term transition of the project once the tree planting has been completed, so that the forest and its biodiversity continue to be enhanced and community job creation is sustained.

In a world that is transitioning as fast as ours, the lessons learnt at Buffelsdraai provide critical pointers towards the kind of innovation and collaboration that will be required if we are to keep our already fragile society from collapse. This fact is well recognised by eThekwini Municipality, which is committed to continue pioneering this important work.
Frequently Asked Questions

Q: Are trees maintained after planting?
A: Once trees are planted out they are neither watered nor fertilised. However, maintenance includes ongoing control of invasive alien plants and cutting of firebreaks to prevent the spread of fires. The trees are able to survive in this harsh environment as they are hardened off when still in the nursery through minimal watering, use of local soils, and no added fertiliser or mulch.

Q: Why are herbicides not used to control invasive alien plants in the buffer zone?
A: The use of chemicals in the buffer zone is strictly regulated to guard against contamination of groundwater surrounding the landfill site. Regular water quality audits are required to be performed to ensure there is no leakage of toxins from the landfill site. As such, any additional chemicals in the form of herbicides discharged from buffer zone, might influence the audit readings. Moreover, some herbicides fail to distinguish between the target species and desired crops, which could ultimately result in the destruction of the desired indigenous species on-site. A baseline for groundwater quality was set in 2005 and any new contaminants found on-site may be interpreted as non-compliance.

Q: Why is there a need to control fires on the site?
A: Firstly, landfill sites produce methane gas, which is dangerously flammable, and control of any open flames around the site is a priority. Secondly, during the initial planning for the landfill site, DSW agreed to manage it as a conservancy. This commitment was included as a minimum requirement in the terms of reference for operating the site, and control of fires is seen as a way to protect on-site forest biodiversity. Thirdly, the exclusion of fires from the forest is anticipated to ensure that the trees can grow quickly to full size, thereby ensuring optimal carbon storage.

Q: What are the main issues you face on-site?
A: Droughts are a challenge. In December 2013, Durban experienced very dry and hot periods. Unfortunately, the project’s water pump also malfunctioned and the resulting heat stress led to increased levels of tree mortality. There are also contestations regarding ownership of the buffer area. This has resulted in activities that damage trees such as browsing by goats and cattle that frequent the site, as well as arson fires. Other activities with indirect negative impacts include trespassing, illegal settlements, hunting and petty theft.
Further Reading and Information Resources

- http://www.youtube.com/watch?v=5M5tdgk5wGk
- http://youtube/4KpMCDAp_qE
- http://africanclimate.net/en/node/8831
- http://blog.sustainablecities.net/2011/12/08/community-reforestation-project-lights-the-way/
- http://unfccc.int/secretariat/momentum_for_change/items/6831.php


"The trees we grow can be traded for food, bicycles, school fees, building materials and so on. It depends on what we want. I traded the trees I grew for bicycles, which I sell to make extra money. I also needed money to pay for school fees. The trees help to give us a better life, but it’s the children who benefit the most.”

- Bongiwe Hlatshwayo.