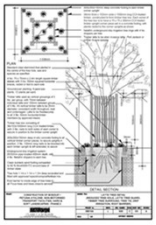
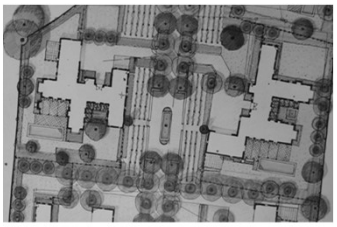
Bridging Waters Conversation Series

The Importance of Trees in Liveable Cities

Making our living spaces a better place to live





CLARE C A BURGESS

LANDSCAPE ARCHITECTURE ENVIRONMENTAL & PERMACULTURE DESIGN
12 KENT ROAD NEWLANDS 7700 CAPE TOWN TEL & FAX(021) 6712532
email: clarobel@telkomsa.net

The contrast between our green leafy suburbs and the township suburbs

Which would you prefer to live and work in?

A tree

is generally defined as a woody perennial plant, typically having a single stem or trunk growing to a considerable height and bearing lateral branches at some distance from the ground.

www.google.co.za/definition+of+a+tree&rlz=1C1GGGE_enZA516ZA523&oq=definition+of+a+tree&aqs=chrome.

Urban forestry

is generally defined as the art, science and technology of managing trees and forest resources in and around urban community ecosystems for the physiological, sociological, economic & aesthetic benefits that trees provide to society.

Defining urban forestry – A comparative perspective of North America and Europe

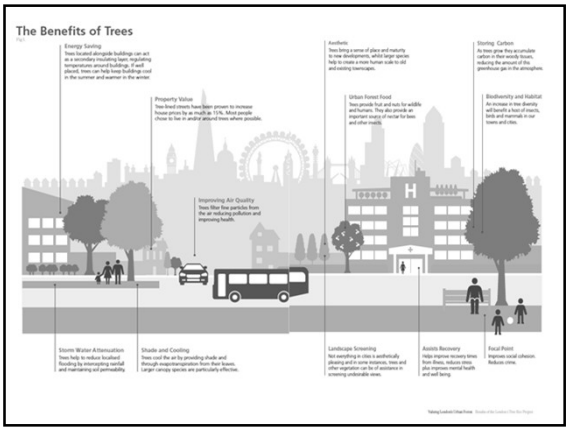
Cecil C. Konijnendijk[a,*], Robert M. Ricard[b], Andy Kenney[c], Thomas B. Randrup[d]

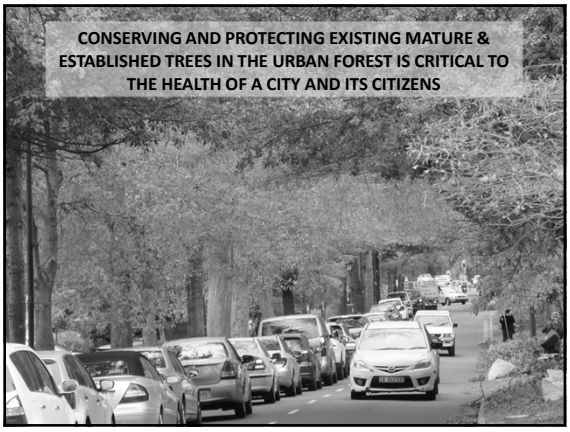
VALUING LONDON'S URBAN FOREST

Results of the London i-Tree Eco Project

"The urban forest is the ecosystem containing all of the trees, plants and associated animals in the urban environment, both in and around the city"

Sands 2005.





Why trees are important in cities and suburbs

- Provide shade in summer reducing the heat gain caused by a concrete jungle.
- Deciduous trees allow sun light & warmth to filter through to homes in winter
- Shelter us from the wind and create microclimates suitable for outside activities
- Filter air born pollutants and absorb carbon dioxide (CO_2)
- Trees provide oxygen (O_2) for life

Why trees are important in cities and suburbs

- Provide a safe refuge for birds and other wild creatures which increases biodiversity in the City
- Remind us of Nature, marking the changes in seasons by flowering or displaying autumn colours or a flush of bright green in spring

Why trees are important in cities and suburbs

- Condition and improve soil quality in our gardens, parks & public open spaces
- Provide us with biomass for composting and mulching throughout the year, supporting soil health, food security and urban agriculture
- Provide us with locally produced firewood for cooking & heating

Why big trees are important in cities and suburbs

- 'Green' and beautify our streets and homes, creating landscapes of cultural significance and providing a sense of place and identity for residents

Why big trees are important in cities and suburbs

- Add value to properties, which is evident in the 'Green' leafy, southern suburbs of Cape Town
- Provide tranquil places for children's play, relaxation & enjoyment

Why trees are important in cities and suburbs

- The healing power of Nature and particularly trees is critical to human wellbeing
- Capetonians are lucky to live adjacent to a National Park and extensive coastline making it easy to escape to these natural landscapes.
- Sadly for most urbanites, a local park or sometimes only a painting on the wall is all they can rely on to link them to Nature.

How trees calm us down

By Alex Hutchinson,
July 23 2015
The New Yorker magazine

Links between tree cover in cities and health improvements – Paris climate accord stressed the need to increase tree canopies in cities.

Khayelitsha Hospital gardens and landscapes parking areas

How trees help to reduce crime

ACTrees
Tree by Tree • Street by Street
Alliance for Community Trees

More Trees = Less Crime

Residents who live near trees have significantly less violence in their homes than people who live in places without trees.

- Kuo, F.E. & Sullivan,
- W.C. (2001).
- Environment and crime
- in the inner city:
- Does vegetation reduce
- crime?
- Environment and Behaviour,
- 33(3), 343-367.
- www.ACTrees.org

How to make the Green industry more resilient

Introduction to Cape Green Forum Workshop

RESILIENT LANDSCAPING AND WHY WATER RESTRICTIONS CAN BE A CATALYST FOR POSITIVE CHANGE

Clare Burgess, Pr. L Arch, Landscape architect
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Resilience

is the capacity of a social-ecological system to absorb or withstand perturbations and other stressors so that the system remains within the same regime, essentially maintaining its structure and functions.

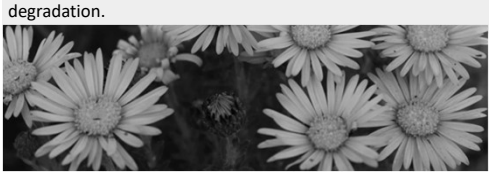
It describes the degree to which the system is capable of self-organization, learning and adaptation

(Holling 1973, Gunderson & Holling 2002, Walker et al. 2004).

SIMPLY PUT

The term resilience relates to the ability of any organism or entity to 'bounce back' successfully & thrive after disruption.

In the urban context, we can view densification and uncontrolled urbanisation as a disaster for the landscapes which are disturbed by these processes and thus we should be designing resilient landscapes to mitigate environmental degradation.



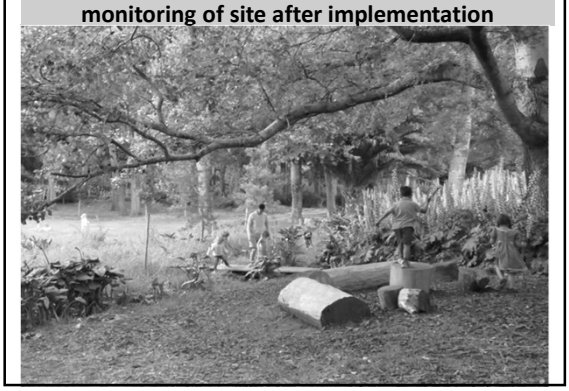
In the past, cities and urban populations aimed to create gardens & sustainable public open space which were attractive places for recreation and relaxing.

But now we are needing to RE – DEFINE SUSTAINABILITY

Adaptive environmental management

http://www.creditvalleyca.ca/watershed-science/watershed-monitoring/credit-river-watershed-health-report/chapter-2-integrated-watershed-monitoring-program/

A landscape story based on experience and monitoring of site after implementation



Papenboom Meadow Newlands 2011 - 2017

- Community driven project
- Landscape plan approval process
- Working with Nature & planting cycles
- Restoration of a stream course connected to a natural spring
- Allowing natural vegetation to emerge by changing horticultural maintenance regimes
- Utilising existing exotic trees as a nursery for new indigenous forest species
- Consulting with the Public over issues such as dog walking, fencing, paths.
- Improving visibility, safety and encouraging people to use the park

RESILIENT LANDSCAPING

- Working with nature -- instead of in opposition to it -- helps communities become more resilient and come back stronger after disruptive natural events.
- Long-term resilience is about continuously bouncing back and regenerating.
- It's about learning how to cope with the ever-changing "new normal."

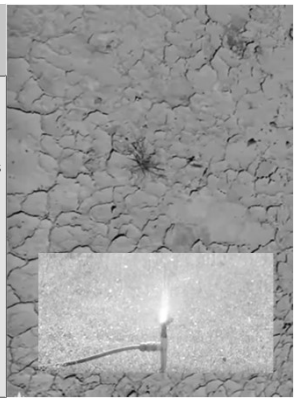
Cape Town's Silvermine Reserve in Table Mountain National Park is a prime example of a resilient landscape that has bounced back after the devastating fires of the past decades.

RESILIENT LANDSCAPING

- The goal of resilient landscape planning and design is to retrofit our communities to recover more quickly from extreme events, now and in the future.
- In an era when disasters can cause traditional, built systems to fail, adaptive, multi-layered systems can maintain their vital functions and are often the more cost-effective and practical solutions.

RESILIENT LANDSCAPING

- Drought affects human society, impacting food and water security .
- Water is a critical resource. To become resilient, communities must effectively manage their limited water resources through conservation and reuse.
- California is just coming out of a long drought period where it imposed strict rules on residential water use and issued fines for wasteful practices like watering lawns and CT is following suit



RESILIENT LANDSCAPING

- California encouraged the use of resilient landscape practices featuring underground drip irrigation systems, water storage and cisterns underground, use of native and drought tolerant plants, and natural approaches to boost the retention of water in soils.
- The message was clear – "Lush green lawns are a luxury of the past and 'brown can be beautiful" just like our spring flowers.
- Gravel and African Zen gardens should be considered

Water 2017 Market Intelligence Report

Available online for free
www.green-cape.co.za/market-intelligence

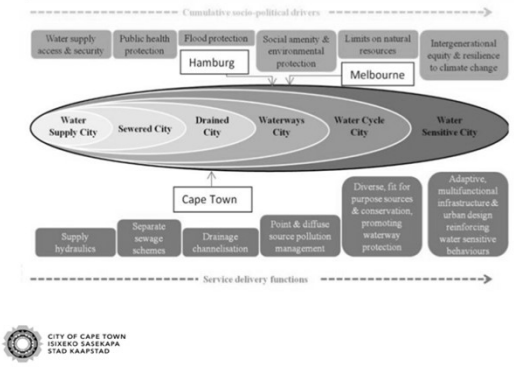
The current droughts are a "dry-run" for the future

The climate is changing
Our water resources are fully allocated
Water will get scarcer and more expensive

EVERY DROP COUNTS

- Consider alternatives to conventional water
- Look after the water we do have
- Reuse it where possible
- Harvest rain water
- Consider fit for purpose applications.
- Make this happen at all levels of community
- the individual,
- neighbourhood level,
- city level
- catchment levels.

The Future Cape Town – a Water Sensitive City



CITY OF CAPE TOWN
ISIXEKO SASEKAPA
STAD KAAPSTAD

LET'S LOOK AT THE URBAN FOREST IN CAPE TOWN

- Typical suburban neighbourhood, Kirstenhof, Cape Town – residents desire a green leafy environment.
- Approx. 5 trees / home & street.

COMPARED WITH THE LARGER URBAN FOREST IN NEWLANDS, HOME TO 5 MAJOR STREET TREE AVENUES – 7 to 8 /HOME

NEGATIVE IMPACT OF URBAN DEVELOPMENT ON URBAN FORESTS

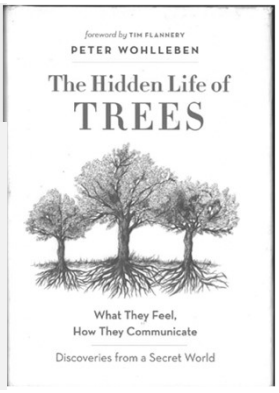
Densification policy leads to loss of trees in suburbs.

Forest trees are like a family & Urban trees are like the "street kids" of the Forest

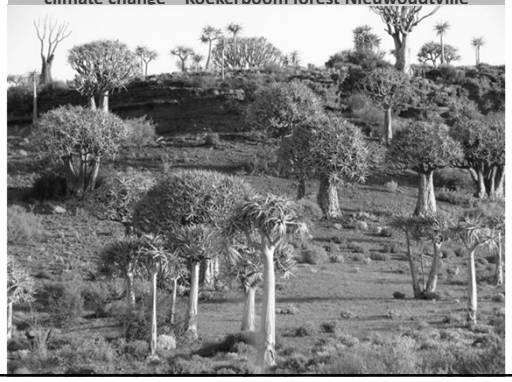
https://vimeo.com/ondemand/intelligenttrees/181082721

Peter Wohlleben and Professor Simard, a forest ecologist (University of British Columbia) discuss how trees communicate and care for each other.

Intelligent trees



Certainly our Bio diversity hotspots are under threat from climate change – Koekerboom forest Nieuwoudtville



So called protected species – Yellowwood trees removed with permit for new development in Rondebosch, Arbor Road.

Kommetjie protected Milkwood forest along our coastline removed illegally by client and contractor for better views

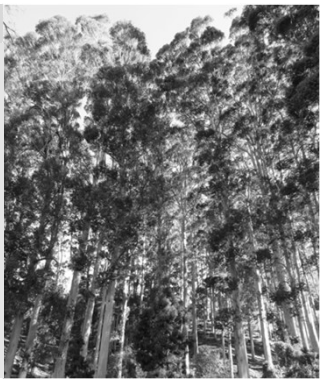
Cape Town Metropolitan area < 4 million pop. located in the Fynbos biome – the Cape Floral Kingdom.

SAVE OUR TREES !
STOP PEOPLE WHO WANT TO CUT THEM DOWN BECAUSE THEY ARE LISTED INVASIVES

BUT IF NO WATER FOR PLANTING NEW TREES – IS NOT IT EVEN MORE IMPORTANT TO SAVE OUR EXISTING TREES ?

A NEW WILD?

Might it be the case that "invasive species will be nature's salvation?''



Gums & Bees

A roadmap for landowners in SA

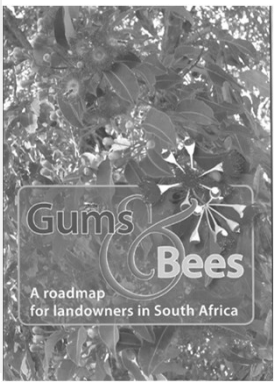
This booklet aims to help landowners protect and grow forage resources for honey bees, and understand why Eucalyptus trees are vital for the beekeeping and agricultural industries in South Africa.

New laws for invasive gum trees mean that the 6 gum species listed in SA as invaders need only be removed if they are not in the correct place in the landscape.

Not all gum tree species in SA must be removed and if you are approached by unscrupulous contractors who want to benefit from felling your trees, please check first on the website.

www.invasives.org.za

TreeKeepers aims to partner with the Bee keeping Association in the W Cape.



Issues, threats and challenges

Revised environmental legislation recognises trees with cultural heritage significance.

Too late for this Gum tree! ☹

Issues, threats and challenges to the urban forest

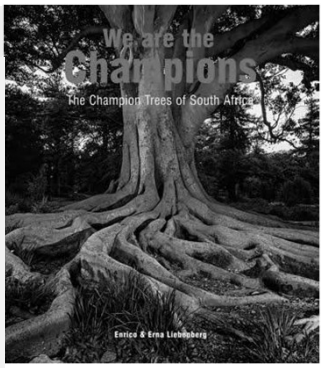
Exotic species from Europe, the Americas and Australia - Pines, Gums and Oaks were historically introduced since there were very few local trees

NEMBA and alien invasive species could pose a threat to local species and bio-diversity.

TreeKeepers partners

Enrico and Erna Liebenberg, authors of 'We are the Champions" have offered to partner with us by:-

- Including a write-up about TreeKeepers and tying it in to Champion trees and conservation & protection of our Natural heritage
- add a slide to their talks, promoting TKA work and encouraging the audience to become part of our project.



TreeKeepers aims and activities include:-

- nominating and securing **'Champion Tree'** and **'Significant Tree' status** for those trees that meet the criteria
- DWAF initiated a project to identify and protect trees worthy of special protection throughout South Africa.
- ***Champions*** are trees of exceptional importance that deserves national protection because of their remarkable size, age, aesthetic, cultural, historic or tourism value.
- Arderne Gardens has 6 official Champion trees and many more unofficial specimens

Arderne Gardens Champion trees
An educational and heritage resource located in the heart of the City and contributing to the urban forest

Are streets really the best place to be planting trees for our urban forests?
Consider all the problems which they create.
What are the alternatives?

Hello@TreeKeepers -frequently asked questions?

- How do we stop developers and Council contractors felling trees?
- What trees can we plant:-
  - In a small garden that won't get too big?
  - On the street outside our house?

PORTSIDE GREEN BUILDING

Existing Ficus tree root & canopy protection

PORTSIDE GREEN BUILDING

Street tree planting is extremely vulnerable in water restriction conditions.

TreeKeepers aims and activities include:-

- assisting educational institutions and community groups in disadvantaged areas to conserve and protect trees;
- undertaking media and advocacy campaigns to raise public awareness of the importance and benefits of trees in urban areas;

Issues, threats and challenges

- Trees planted in streets are always under stress due to the lack of space for growth and are prone to diseases and can collapse and cause damage to property
- Street trees need more frequent maintenance and care requiring City Council to prioritize and provide funds.

Issues, threats and challenges

- Early detection of fungal growths can prevent undue damage and careful tree pruning can minimise risks




Issues, threats and challenges

Bark stripping on recently planted locally indigenous



Issues, threats and challenges

- Tree roots: damage and solutions



City of Cape Town : Recreation and Parks draft strategy

Are our city parks also under threat?

Water restrictions for the Department involve

- Resorts,
- Sportsfields,
- Swimming Pools,
- Recreational Hubs,
- Parks & Street tree planting

Departmental initiatives and measures form part of the greater **City of Cape Town Resilience Plan** that is being developed. Design initiatives include Smart Parks with artificial lawn and SUDS around buildings such as the green star rated Mannenberg Housing office


TreeKeepers aims and activities include:-

- assisting in resolving disputes over the maintenance or felling of trees; **
- assisting with specialist expert advice in respect of trees, their management and their maintenance **


LANDSCAPE RESPONSES IN THE PUBLIC REALM include

- Public and Ward Councillors would like to continue planting trees and carry out conventional green landscaping and have allocated Ward allocation funds & request tree planting and landscaping.
- Water restrictions do not allow use of potable water and newly planted trees need 60 l water per week
- Alternative water sources could be pumped from rivers/springs into trucks and tanker watering carried out but this has limited viability.
- Instead of new planting the City could focus on horticultural management and maintenance of existing trees of all ages: watering; feeding; corrective pruning; mulching, etc.


TREES IN TOWNS
Maintenance and management

By

Brian Clouston & Kathy Stansfield

Publisher: Architectural Press, London 1981

Issues relating to root damage to services, buildings and pavements.

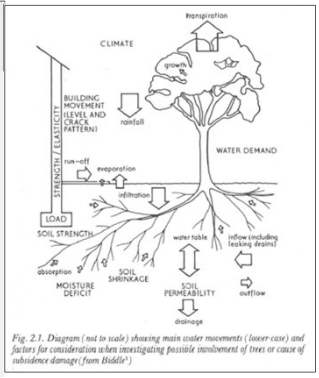
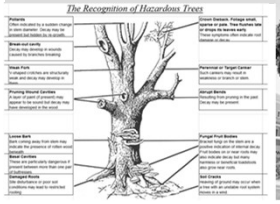


Fig. 2.1. Diagram (not to scale) showing main water movements (lower-case) and factors for consideration when investigating possible involvement of trees or cause of subsidence damage (from Biddle[3])

TreeKeepers aims and activities include:-

- gathering scientific and heritage data on significant trees in streets and parks;
- providing advice and support to members of the public and community groups regarding the preservation, conservation and wise management of trees.



Resilient landscape design is the future!

Can conserving our urban forests become part of the NEW NORMAL

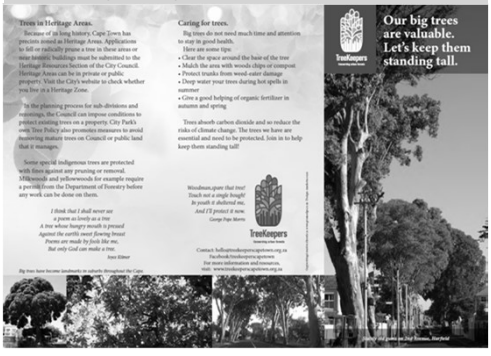
TreeKeepers Cape Town

"Our big trees are valuable. Let's keep them standing tall."

- There are many threats to our big trees and complex issues relating to the loss of trees from our city landscapes.
- The Who, Why & What about TreeKeepers ?

Cape Town TreeKeepers
Conserving urban forests

TreeKeepers Cape Town Association - brochure



Introduce Henk Egberink

From TreeKeepers Cape Town

Balance in nature for green house gases

absorptions	emissions
1. Sea	1. Fossil fuels
2. Land	1. Transport
– forests 55%	2. Mining
– agriculture & grass 25%	2. Meat production
– wetlands 20%	3. Humans
	4. Forest loss

FACTS ON TREES

80 % must be canopy trees with large leaf area

90 % of biomass on land is stored in forests

70 % of all carbon stored is accumulated in 2nd half of life of trees - older trees sequester more carbon and water use is reduced

0.5 gigatons of carbon is removed by tropical forests & unmanaged forests take up more carbon

PARIS CLIMATE ACCORD 2015

Leaders of countries and cities made commitment to:-

1. Reduce emissions
2. Reduce use of fossil fuels
3. **Reduce forest losses**

less well known commitments to : -

1. Increase absorptions
2. **Increase forest cover substantially**
3. Change agricultural practices

COUNTRIES THAT BOUGHT INTO REFORESTATION

- China
- India
- Brazil and several South American countries
- Europe
- America - limited
- African countries - some
- Asian countries - some

Indian reforestation pledges

- increase canopy cover from 24 % to 33 % by 2030
- creating CO2 sink of 2.5 to 3 billion tons
- requires planting of 7.8 billion trees by 2020
- #trees4earth campaign achieved planting 665 mill. trees since 2016
- in state of Chattisgarh 80 mill. trees were planted in single day

China's achievements

1. Planting millions of trees to push back the Gobi Dessert and reforesting Laos Plateau
2. Increasing canopy of Hainan Island from 20 to 40 % by 2030
3. Delegating 60 000 soldiers to plant 6.66 mill. hectares with trees in Hebei,
4. NE China, which is most polluted part of China, will increase its tree canopy to 35 % by 2020
5. China will increase its total canopy from 21.7 % to 23 % by 2020
6. And total tree canopy to 26 % by 2035

Additional motivation for increasing tree canopies in Cities

1. flood buffering
2. improved soil health and increased biodiversity
3. enhanced climate resilience
4. water filtration (soil moisture can be monitored from space and is a vital sign for predicting drought, floods, and crop yields)
5. reduced toxins in air and improve quality of life
6. reduced temperatures (fewer heat islands)

Cities that have already measured benefits conservatively

Cleveland	$ 28 mill p a ecosystem savings
Austin	$ 20 mill. energy savings
Denver	$ 7 mill. energy savings
Chicago	removes 18 000 tons of air pollution p a
Toronto	canopy structural value = $ 7 billion

Trees are an appreciating asset. Never too late to start planting.

Average benefits from urban trees for megacities (pop. 10 mill.)

$ 480 mill. pa
from reduced CO, NO, SO, PM 2.5, PM 10

$ 11 mill. pa
avoid costs of stormwater processing

$ 8 mill. pa CO_2 sequestration

Particulate Matter - major health threat.

Causes high level of lung cancer + other respiratory problems particularly from PM 2.5.

Fine carbon particles penetrate deep into lungs. It is all around us.

PM is expected to kill 6.2 mill. people by 2050

Tree canopy growth potential

	actual %	potential %
Beijing	25	40
Buenos Aires	20	42
Cairo	8	22
Istanbul	22	45
London	20	38
Los Angeles	15	40
Mexico City	19	36
Moscow	38	52
Mumbai	21	43
Tokyo	19	40

New York City study

Mapped selected districts using 2300 volunteers with monitors to establish economic benefits of every single tree. They logged 685,781 trees on their Urban Forest Registry with details: -

- ID number
- colour code to indicate species
- location via google view
- size
- age
- condition

RESULTS

240 species listed

London Plane tree - most common at 13 % (also most tolerant to pollution)

Calculated economic value of ecological benefit (water used annually, reduction in air pollution, electricity saved, etc.)

Average savings per tree was $ 500

Replanting plan prepared due to this positive economic equation.

London study

i-Tree ECO computer program - full survey of all 8,5 mill trees.

RESULTS

canopy cover	21 %
Pollution removal pa	126 mill Sterling
Storm water alleviation pa	2.8 mill Sterling
Carbon sequestration pa	4.8 mill Sterling
Building energy saving pa	0.26 mill Sterling
Total annual benefit	**134.00 mill Sterling**
Total carbon storage	147 mill Sterling
Replacement cost	6 120 mill Sterling
Reduction in PM pa	7 - 24 %

City intends to :-

increase canopy to 23 % by 2030 and 28 % by 2050