FACULTY OF ENGINEERING & SCIENCE

UNIVERSITY of GREENWICH

Landscape Management in a Changing Environment

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CMLI FCIEEM SFHEA

Contents

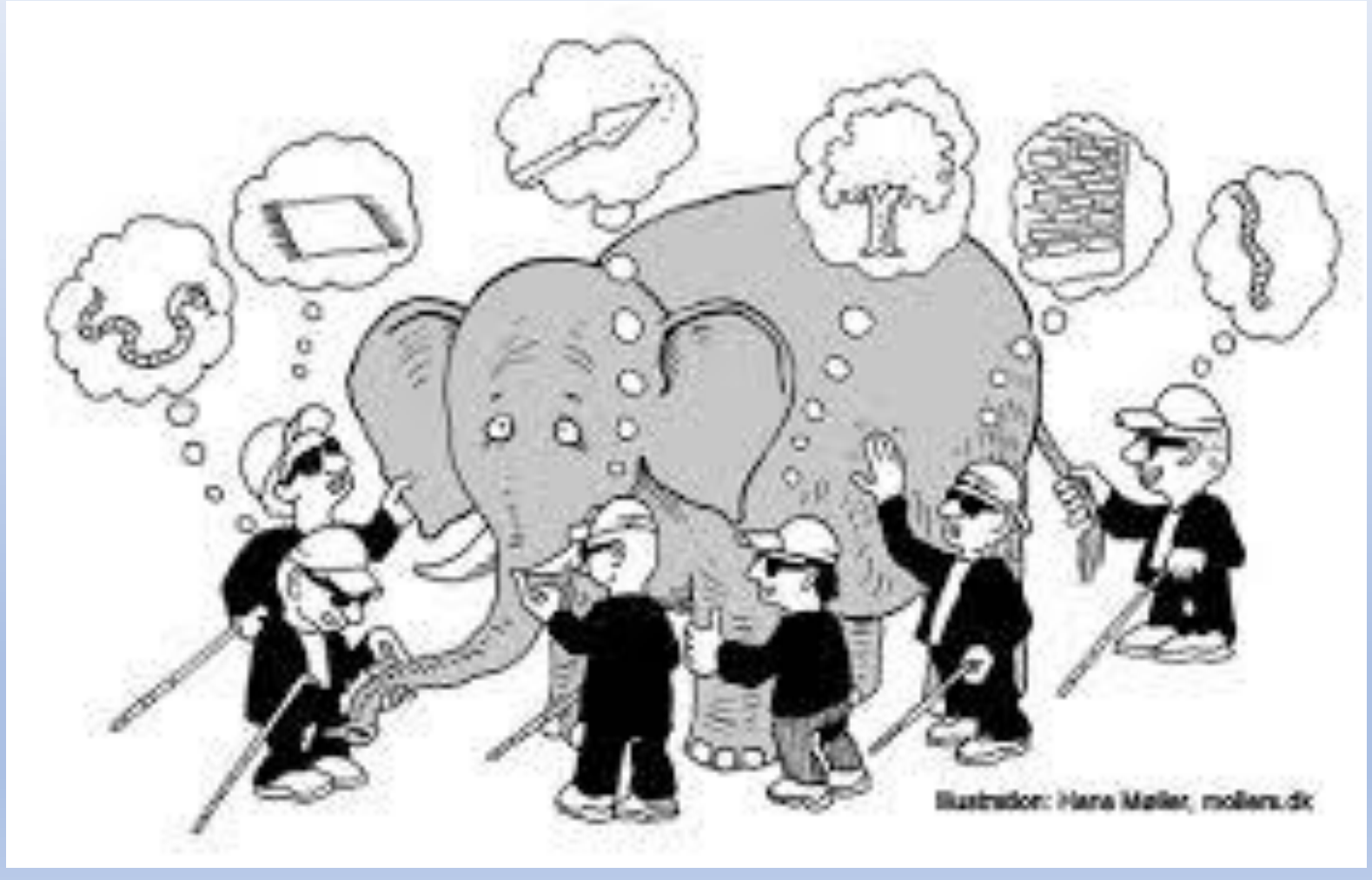
- Why landscape management?
- The changing environmental context
- Some examples from my work
- How can we find solutions?

Landscape ecology is the study of the interactions between the temporal and spatial aspects of a landscape and the organisms within it.

Landscape management means action, from a perspective of sustainable development, to ensure the regular upkeep of a **landscape**, so as to guide and harmonise changes which are brought about by social, economic and environmental processes.

(European Landscape Convention, 2011)

Different perspectives



So I'm interested in what the **economy can do for wildlife and people**

- So what are the interactions between the economy and wildlife?
- The first step in conservation is to UNDERSTAND what is affecting populations

Habitat
Invasive species
Population (human)
Pollution
Over harvesting

Aichi Biodiversity Targets

Strategic Goal C: To improve the status of biodiversity by safeguarding ecosystems, species and genetic diversity

Target 11
By 2020, **at least 17 %** of terrestrial and inland water, and 10 per cent of coastal and marine areas, especially areas of particular importance for biodiversity and ecosystem services, are conserved through effectively and equitably managed, ecologically representative and well connected systems of **protected areas** and other effective area-based conservation measures, and integrated into the wider landscapes and seascapes.

Is designating > 20% of a country practical?

How effective are protected areas?

- It depends ……
- Wildlife has this awkward tendency to move around!
- Environmental change means habitats may no longer suitable for specific species
- More, bigger, better, joined up areas of habitat are needed
- How can this be achieved with population increase and development pressure?

Views on Protected Areas

Crofts R (2004) Linking Protected Areas to the Wider World: A Review of Approaches. Journal of Environmental Policy and Planning 6 (2) pages 143 - 156

Nature Conservation view:

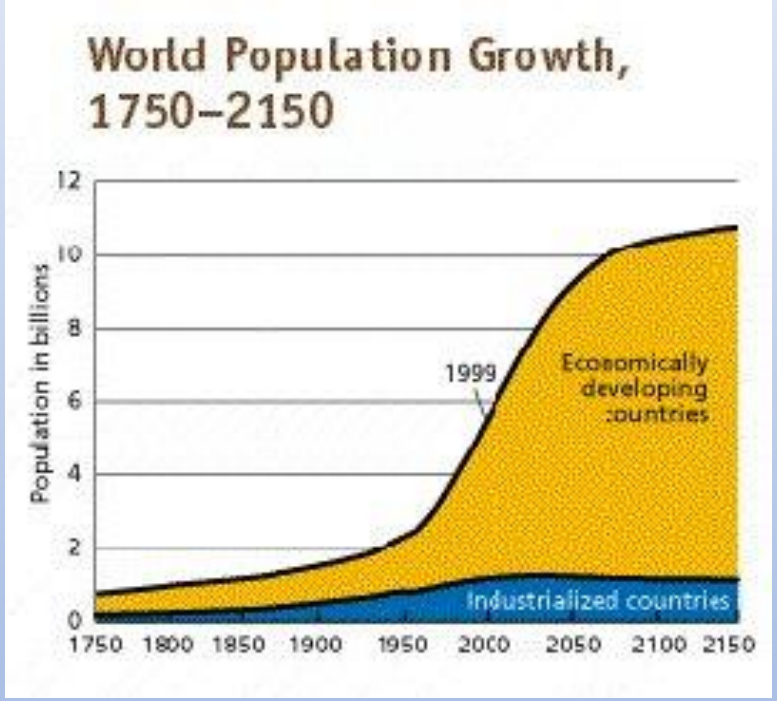
- Too few
- Too small
- No more tourist facilities
- Better protection
- More involvement
- Too much damage
- Too few controls
- Locals negative
- More conservationists

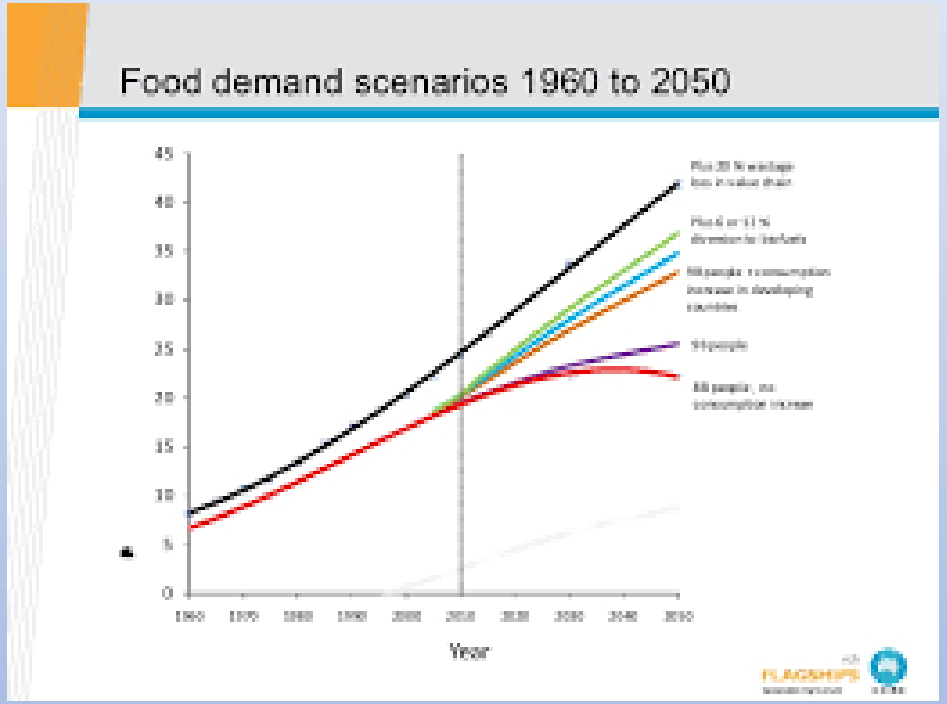
Community View:

- Too many
- Too large
- More visitor facilities
- Less protection
- Less involvement
- They stop development
- Too many rules
- Locals ignored
- Should be run by locals

Ahmed S and Bartlett D (2019) An evaluation of the effectiveness of the co-management approach in selected Protected Areas of Bangladesh. International Journal of Biodiversity and Conservation, 10 (12):pp. 510-516.

Conflicting demands ……





The ‘LS’ debate

Land Sparing

- Increasingly intensive high-yielding agriculture
- uses less land
- meets demand for food
- leaving greater areas of natural habitat untouched
- more efficient (more profit fewer jobs)

Land Sharing

- low-yield farming
- Widely spread across the landscape
- enables biodiversity to be maintained
- less efficient
- maintains livelihoods
- but at low wages

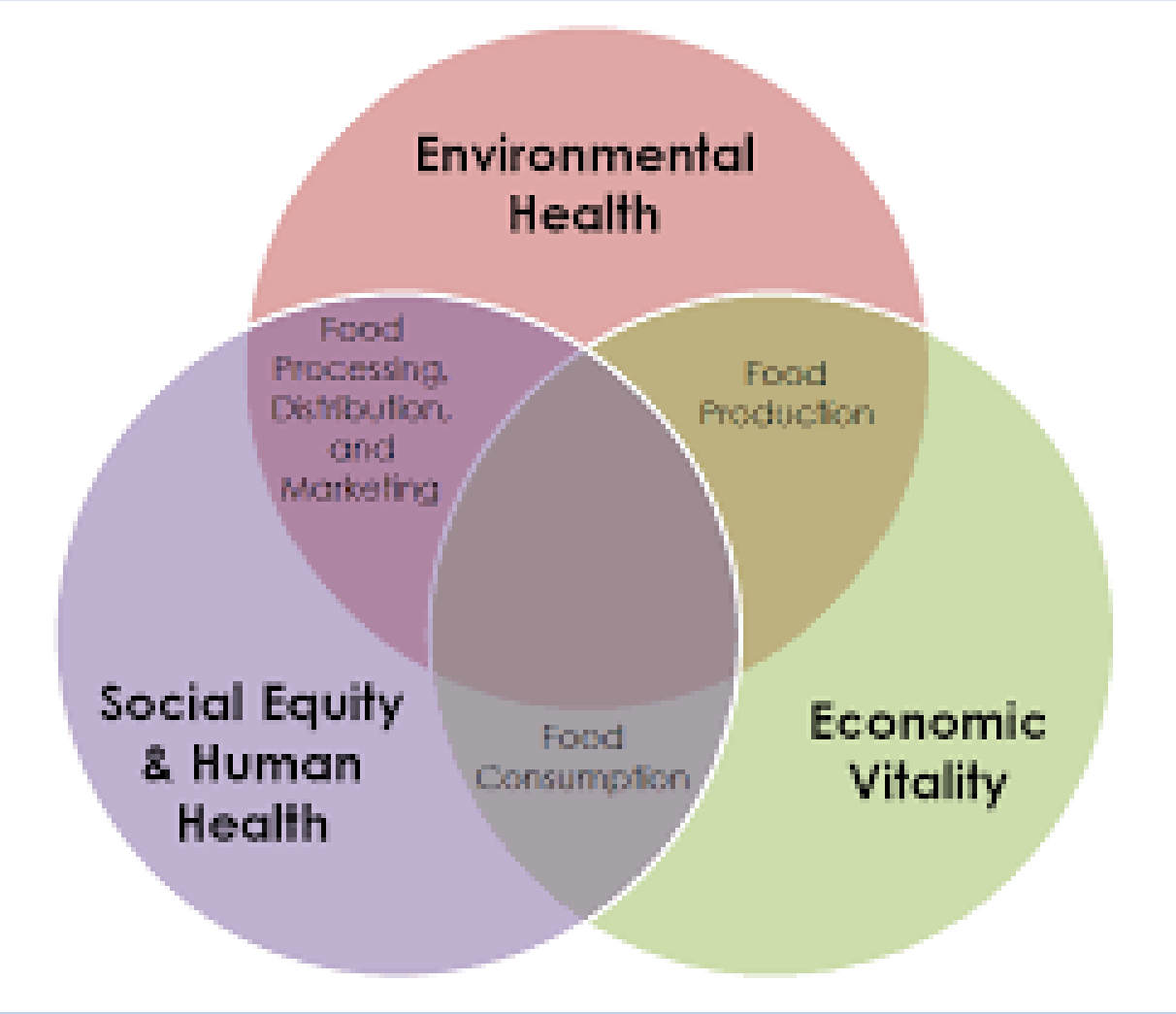
The Environment is Changing

National Happiness (Economic Well-Being)

The measure of a nation's well-being goes beyond the level or and rate of growth of GDP. Economic well-being is a **multi-dimensional concept**.

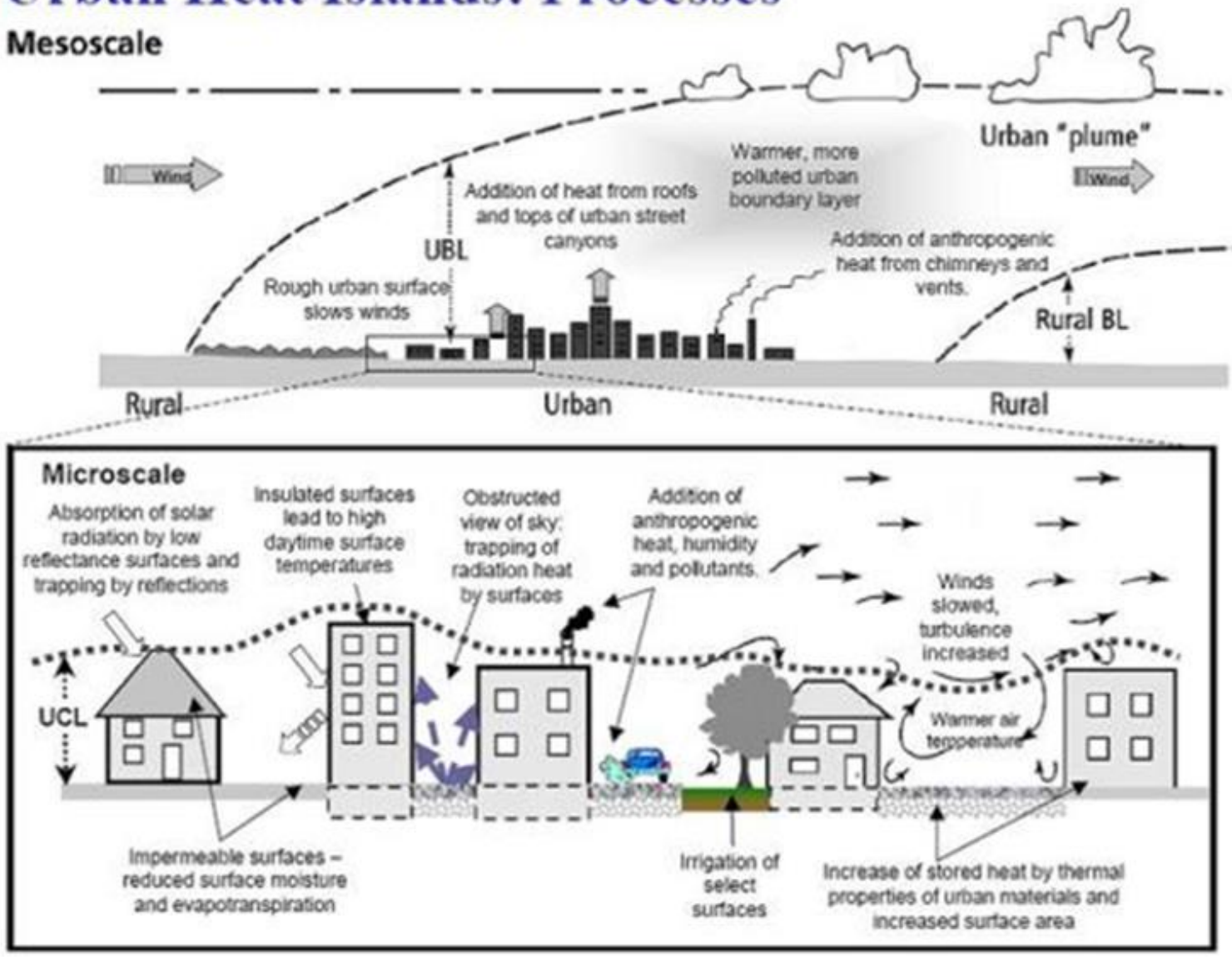
- Real Gross Domestic Product per capita
- Real Household Spending per head
- Median Household Income
- Household Net Wealth (i.e. value of assets – liabilities)
- Unemployment rate (household income and net wealth.
- Financial situation of households + feeling of security

Complex of inter-related issues

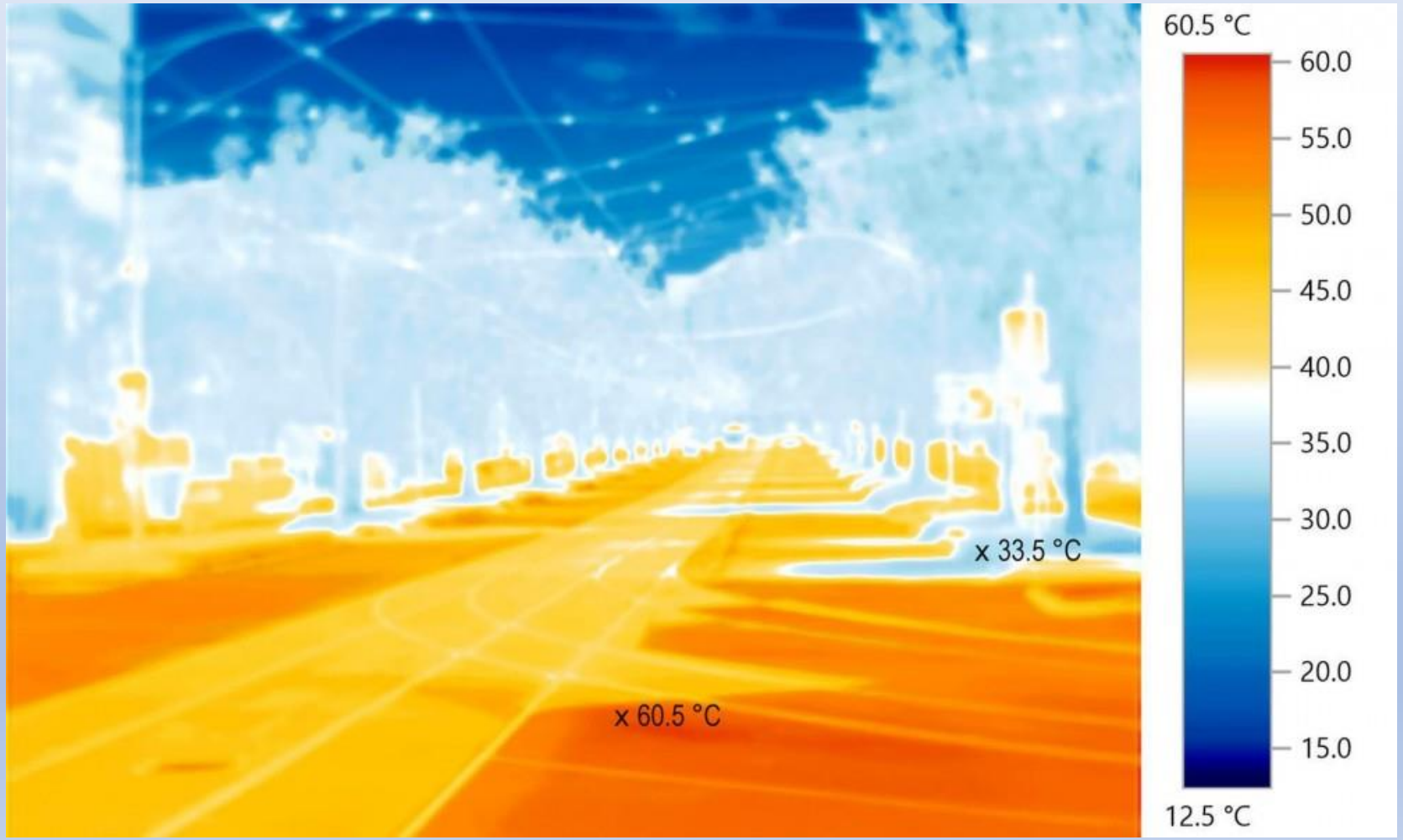


1. Heat stress effect on people (+) Northern Europe

Urban Heat Islands: Processes



Blue & Green Infrastructure: Spatial Adaptation for Heat Resilience in Cities



Science News

from research organizations

Heat-related deaths likely to increase significantly as global temperatures rise, warn researchers

Models show that the implementation of the Paris Agreement is critical to avoid a large increase in temperature-related deaths

Date: September 13, 2018

Source: Springer

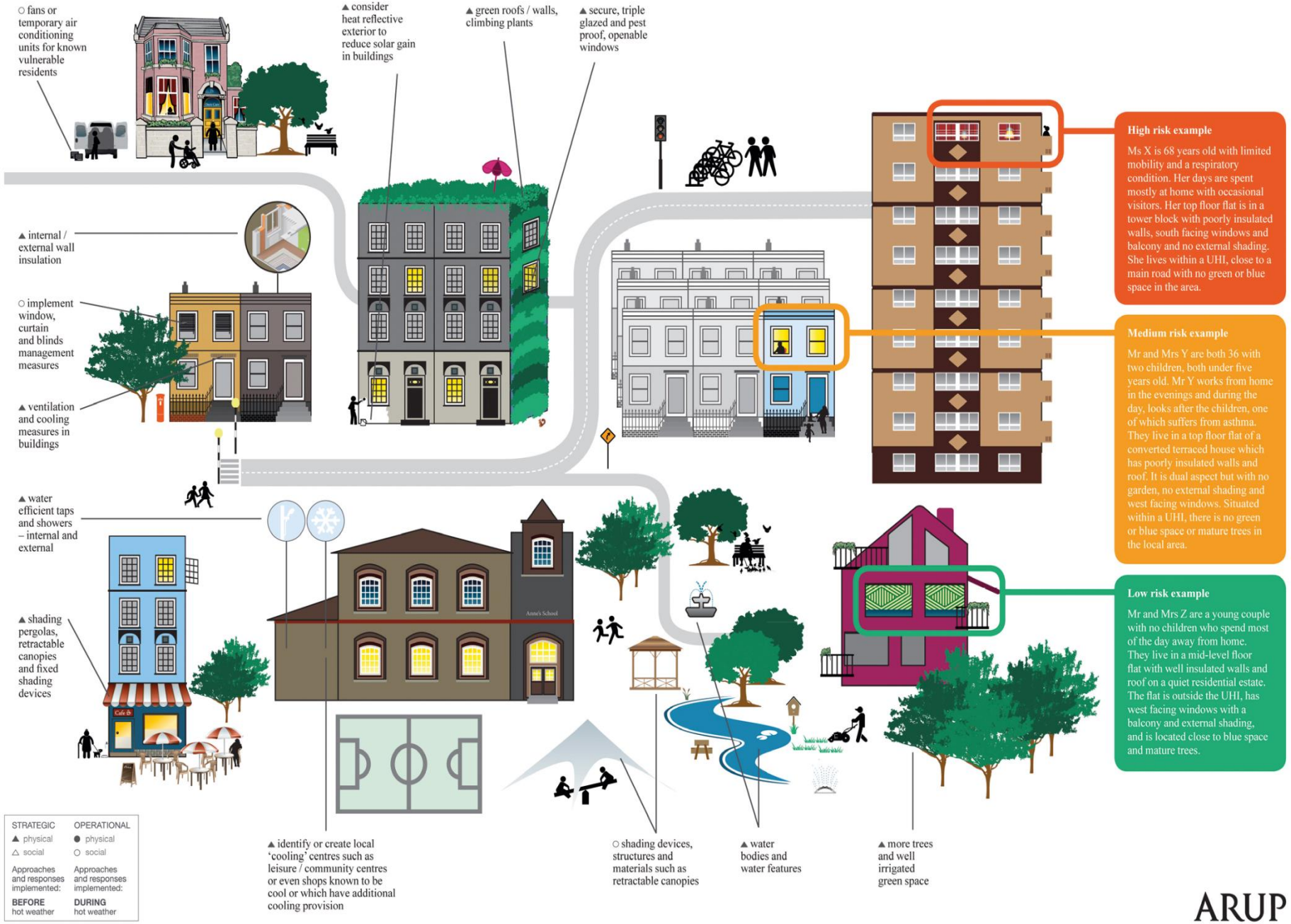
Summary: In a new article, experts argue that the world needs to keep global temperatures in check by meeting the goals set out in the Paris Agreement, or more people could die because of extreme temperatures.

https://www.sciencedaily.com/releases/2018/09/180913082151.htm

Built environment

Lack of air movement

people experiencing discomfort
In
public open space


○ fans or temporary air conditioning units for known vulnerable residents
▲ consider heat reflective exterior to reduce solar gain in buildings
▲ green roofs / walls, climbing plants
▲ secure, triple glazed and pest proof, openable windows
▲ internal / external wall insulation
○ implement window, curtain and blinds management measures
▲ ventilation and cooling measures in buildings
▲ water efficient taps and showers – internal and external
▲ shading pergolas, retractable canopies and fixed shading devices
Anne's School
Cafe
High risk example
Ms X is 68 years old with limited mobility and a respiratory condition. Her days are spent mostly at home with occasional visitors. Her top floor flat is in a tower block with poorly insulated walls, south facing windows and balcony and no external shading. She lives within a UHI, close to a main road with no green or blue space in the area.
Medium risk example
Mr and Mrs Y are both 36 with two children, both under five years old. Mr Y works from home in the evenings and during the day, looks after the children, one of which suffers from asthma. They live in a top floor flat of a converted terraced house which has poorly insulated walls and roof. It is dual aspect but with no garden, no external shading and west facing windows. Situated within a UHI, there is no green or blue space or mature trees in the local area.
Low risk example
Mr and Mrs Z are a young couple with no children who spend most of the day away from home. They live in a mid-level floor flat with well insulated walls and roof on a quiet residential estate. The flat is outside the UHI, has west facing windows with a balcony and external shading, and is located close to blue space and mature trees.
STRATEGIC
▲ physical
△ social
Approaches and responses implemented:
BEFORE hot weather
OPERATIONAL
● physical
○ social
Approaches and responses implemented:
DURING hot weather
▲ identify or create local 'cooling' centres such as leisure / community centres or even shops known to be cool or which have additional cooling provision
○ shading devices, structures and materials such as retractable canopies
▲ water bodies and water features
▲ more trees and well irrigated green space

ARUP

Reducing incident radiation
- Shade
- Reflecting radiation

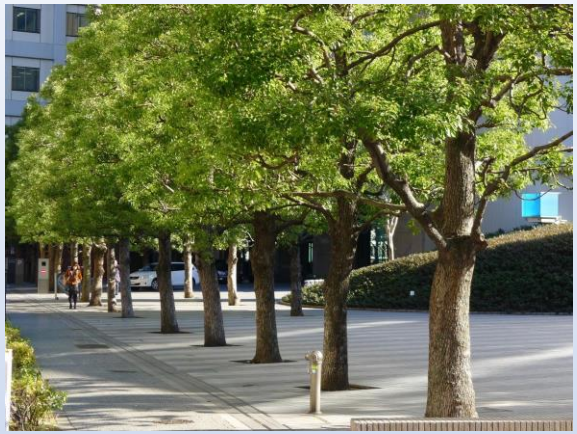
Reducing conductivity
- Light colour
- Texture

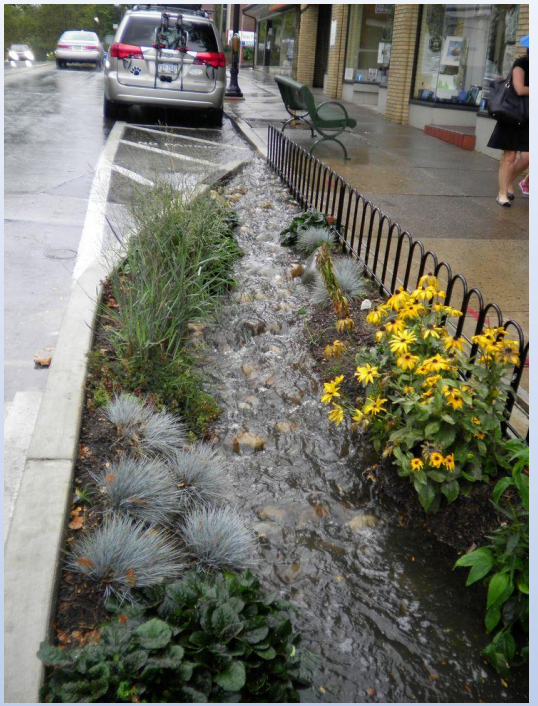
Cooling the microclimate

Perception of coolness
- Fluttering material
- Movement of water
- Rustling of leaves

Evaporation
- Water feature
- Misting/spraying on surfaces
- Vegetation

Air movement





Shade: trees and plants
textile sails
Insulation: green walls
green roofs
Water: aesthetics
flood management
SuDs

Each situation is different

□ What are the implications of climate change? Join the Institution of Civil Engineers's talk on the 8th of April and find out. This talk looks at the key climate change issues affecting bridges. Book now for FREE ☞ https://gre.ac/1g

ice

South East England
Kent & East Sussex

Bridges and Climate Change:

Carbon Footprint and Resilience

Monday 08 April 2019 at 18.00 (refreshments) for 18.30

University of Greenwich, Pembroke Building, Room 130, Chatham Maritime ME4 4TB

The earth's climate is changing, partly from a continued natural warming since the last ice age and partly man made. The talk looks at the key climate change issues affecting bridges. Our response to tackling climate change is on two fronts:

- Reducing carbon dioxide emissions to limit temperature rise
- Ensuring structures can withstand changes –providing resilience

The talk uses recent bridge projects, large and small, to illustrate the issues of carbon reduction and the need for resilience to changing environmental loads.

Our speaker is David Collings BSc CEng FICE. David is a Technical Director at ARCADIS, with a wide-ranging experience of major highway and railway infrastructure projects in the UK and overseas, from feasibility through to construction completion. His work has included projects like the award-winning UK-Bangladesh Friendship Bridge and the 17km long Second Penang Crossing. He has worked on many projects where environmental issues are an important consideration and is an expert on the environmental aspects of bridges, with published papers and research on this subject.

Interreg

EUROPEAN UNION

2 Seas Mers Zeeën

Cool Towns

European Regional Development Fund

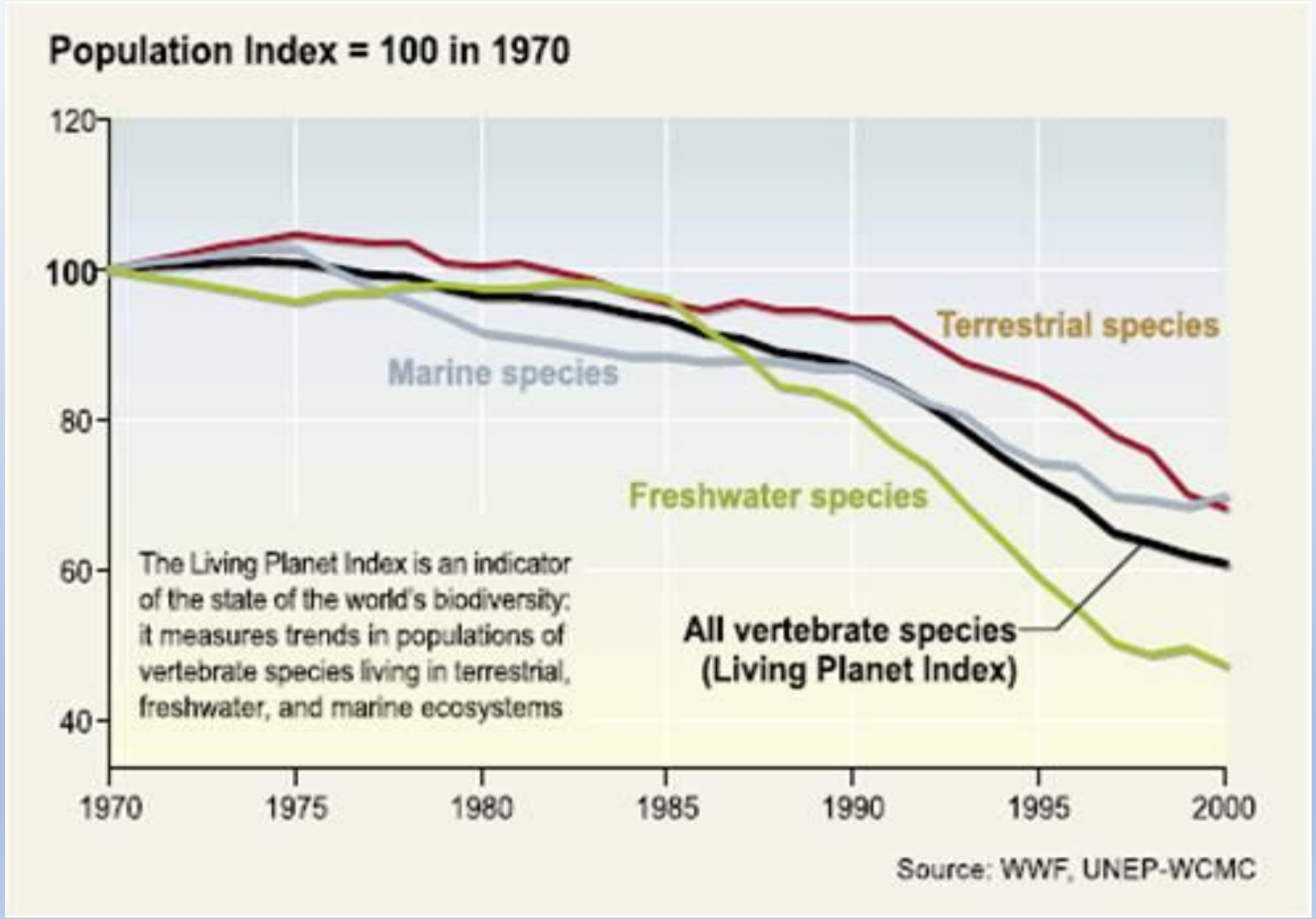
Cool Towns: European cooperation to combat heat stress in cities

Cool Towns is a cooperation between 13 European partners aimed to counteract the negative effects of climate change and find attractive solutions that make cities climateproof and robust so that heat stress is prevented or limited as much as possible. The project brings together leading European research/academic institutions, governmental organisations and industries from the climatology and climate adaptation domains. The project has received funding from the Interreg 2 Seas Programme 2014 – 2020.

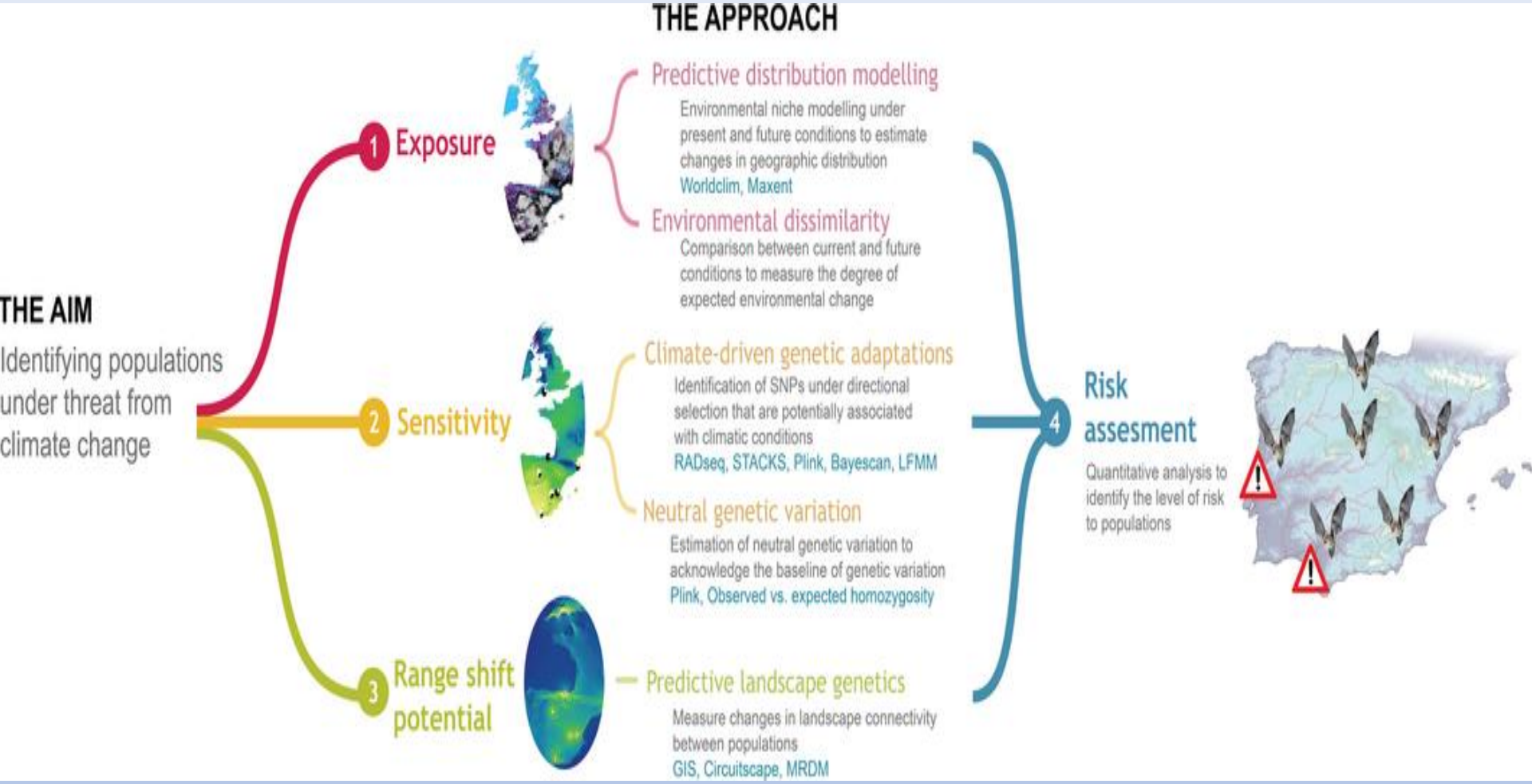
Projectpartners:

Gemeente Breda · Oost-Vlaanderen · Oostende · University of Greenwich · Southend · GreenBlue Urban · Kent County Council · AGENCE · Amsterdam University of Applied Sciences · SIOEN · CAPSO

www.cooltowns.eu


Population Index = 100 in 1970
120
100
80
60
40
1970
1975
1980
1985
1990
1995
2000
Terrestrial species
Marine species
Freshwater species
All vertebrate species
(Living Planet Index)
The Living Planet Index is an indicator of the state of the world's biodiversity: it measures trends in populations of vertebrate species living in terrestrial, freshwater, and marine ecosystems
Source: WWF, UNEP-WCMC

An integrated framework to identify wildlife populations under threat from climate change



Molecular Ecology Resources 25 JUL 2017 DOI: 10.1111/1755-0998.12694

2. Invasive Species: India

Gujarat Institute
Of Desert Ecology

UKIERI
UK-India Education
and Research Initiative

UNIVERSITY of GREENWICH

Prosopis julilflora

Where ?

How ?

- Standard landscape character assessment
- Desk study followed by fieldwork
- Participatory ecosystem service assessment
- Focus groups in coastal villages

Coastal plain

Main habitats

Coral reefs
Mangroves
Mudflats
Creeks
Estuaries.

Rural livelihoods are dependent on these ecosystems.

Agriculture
Horticulture
Animal husbandry
Salt making
Fishing

Industrial developments
Cement
Chemicals
Fertiliser
Mining

Ecosystem Assessment of the Habitats in the Ka

Village profile

- Population: 1848
- Majority of the villagers are involved in agriculture
- 1000 acres of pastureland have been protected by the government

Main livelihoods / Threats

- Agriculture
  - BT cotton, main crop
  - Depends on monsoon
  - Fodder

Threats: Rainfall; Water salinity; Use of chemical fertilizers; Number of people involved

- Livestock rearing
  - Buffalo
  - Cattle
  - Goats and Sheep

Threats: Drinking water; Soil salinity; People moving to the city

Sources of fuel

- Prosopis wood
- LPG gas
- People from outside hired by the government to produce charcoal

Challenges

- Create employment
- Improve water quality
- Balance agriculture with wildlife

Opportunities

- Promote charcoal production
- Promote the use of organic fertilisers
- Ecotourism
- Promote the use of traditional crops

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BRITI COUN

Ecosystem Assessment of the Habitats in the Kachchh District: **Ashira Vandh**, Abdasa taluka

Village profile

- Population: 150
- Maldhari
- Near mangrove forest
- Industry:
  - Cement
  - Salt pan
  - Wind turbines

Main livelihoods / Threats

- Livestock
  - Buffalo
  - Some people migrate for better grazing
  - Activity increasing

Threats: Drinking water; Water salinity; Grassland quality

- Fishery
  - Don't dry fish
  - Activity decreasing

Threats: Pollution; Mangroves; Fish population

Sources of fuel

- Prosopis and Mangrove wood
- Charcoal production

Drinking water

- Main problem of the village
- Increasing water salinity
- Salt company provide 1 tanker of water/day

Challenges

- Reduce water pollution
- Restore and enhance mangrove forest
- Increase fish population
- Improve drinking water quality
- Increase soil quality

Opportunities

- Effective anti-pollution legislation
- Create a mangrove restoration program
- Employ women for seed collection in mangroves
- Promote charcoal production

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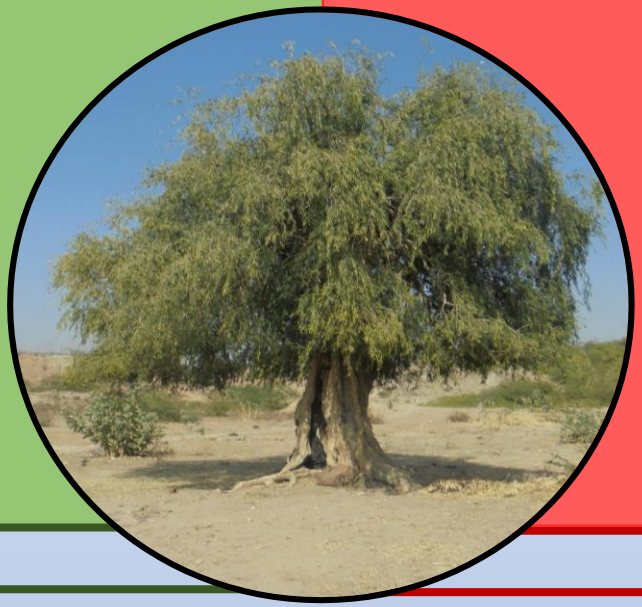
BRITISH COUNCIL

Gujarat Institute Of Desert Ecology

Verifying data

- **Pods**
- **Gum**
- **Honey**
- **Cotton like substance**
- **Alcoholic drinks**
- **Wood**
- **Charcoal**

calorific value (4800 k cal/kg)



Spread through:

- agricultural and grazing land
- protected areas

Displace native species:

- *Prosopis cineraria*
- Gugal (*Commiphora wightii*)

Thorns affecting cattle

Pods indigestible for buffaloes and cattle

SERVICES

DIS-SERVICES

The perception of the people upon this species depends on their economic needs and the benefits they can obtain from it

Natural Character Area profile:

Coastal Plain of Kachchh District

Community ecosystem services assessment

Lack of fences
Soil infertility,
Salinity, drought

Research into the potential for using *Prosopis juliflora* for hedge laying and retort charcoal production May 2016

"*In two years this living fence will definitely grow thick and keep out both wild boar and nilgai*" (a farmer)

"*I very much like this living fence as the current practice of dead hedging is not permanent. We will take and distribute the information sheet*" (Conservator of Forests)

"*People are admiring this living fence like anything and will definitely do themselves*" (A farm manager)

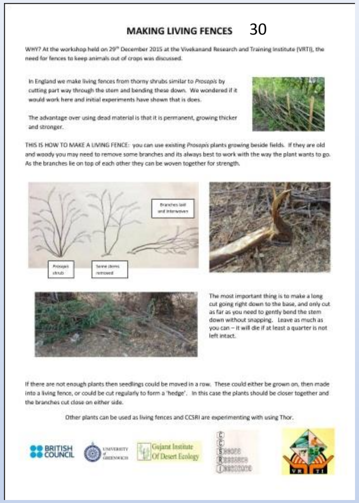
This led one person attending the demonstration to coin the phase

"Prosopis for Prosperity "

Information sheets

These are the handouts, produced in both English and Gujarati, that were handed out at the workshop and that have been subsequently distributed electronically.

The event was reported in the press and this lead to further requests for information



MAKING LIVING FENCES 30

WHY? At the workshop held on 29th December 2015 at the Vivekanand Research and Training Institute (VRTI), the need for fences to keep animals out of crops was discussed.

In England we make living fences from thorny shrubs similar to *Prosopis* by cutting part way through the stem and bending these down. We wondered if it would work here and initial experiments have shown that is does.

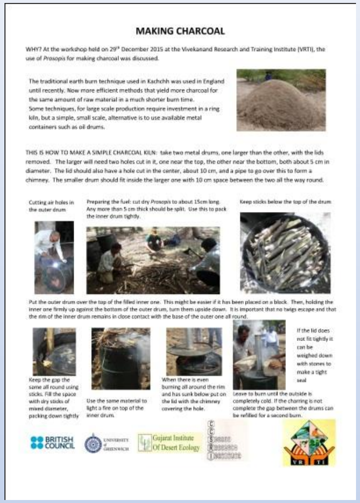
The advantage over using dead material is that it is permanent, growing thicker and stronger.

THIS IS HOW TO MAKE A LIVING FENCE: you can use existing *Prosopis* plants growing beside fields. If they are old and woody you may need to remove some branches and its always best to work with the way the plant wants to go. As the branches lie on top of each other they can be woven together for strength.

The most important thing is to make a long cut going right down to the base, and only cut as far as you need to gently bend the stem down without snapping. Leave as much as you can – it will die if at least a quarter is not left intact.

If there are not enough plants then seedlings could be moved in a row. These could either be grown on, then made into a living fence, or could be cut regularly to form a 'hedge'. In this case the plants should be closer together and the branches cut close on either side.

Other plants can be used as living fences and CCSRI are experimenting with using Thor.



MAKING CHARCOAL

WHY? At the workshop held on 29th December 2015 at the Vivekanand Research and Training Institute (VRTI), the use of *Prosopis* for making charcoal was discussed.

The traditional earth burn technique used in Kachchh was used in England until recently. Now more efficient methods that yield more charcoal for the same amount of raw material in a much shorter burn time. Some techniques, for large scale production require investment in a ring kiln, but a simple, small scale, alternative is to use available metal containers such as oil drums.

THIS IS HOW TO MAKE A SIMPLE CHARCOAL KILN: take two metal drums, one larger than the other, with the lids removed. The larger will need two holes cut in it, one near the top, the other near the bottom, both about 5 cm in diameter. The lid should also have a hole cut in the center, about 10 cm, and a pipe to go over this to form a chimney. The smaller drum should fit inside the larger one with 10 cm space between the two all the way round.

Cutting air holes in the outer drum

Preparing the fuel: cut dry Prosopis to about 15cm long. Any more than 5 cm thick should be split. Use this to pack the inner drum tightly.

Keep sticks below the top of the drum

Put the outer drum over the top of the filled inner one. This might be easier if it has been placed on a block. Then, holding the inner one firmly up against the bottom of the outer drum, turn them upside down. It is important that no twigs escape and that the rim of the inner drum remains in close contact with the base of the outer one all round.

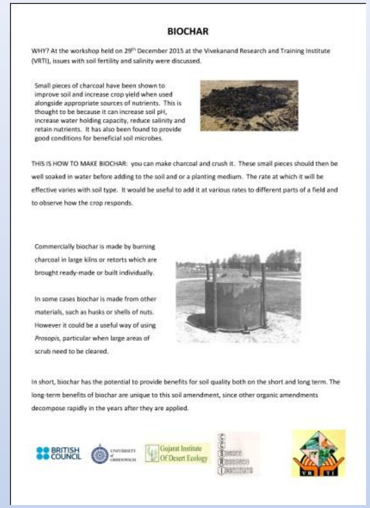
Keep the gap the same all round using sticks. Fill the space with dry sticks of mixed diameter, packing down tightly

Use the same material to light a fire on top of the inner drum.

When there is even burning all around the rim and has sunk below put on the lid with the chimney covering the hole.

If the lid does not fit tightly it can be weighed down with stones to make a tight seal

Leave to burn until the outside is completely cold. If the charring is not complete the gap between the drums can be refilled for a second burn.



BIOCHAR

WHY? At the workshop held on 29th December 2015 at the Vivekanand Research and Training Institute (VRTI), issues with soil fertility and salinity were discussed.

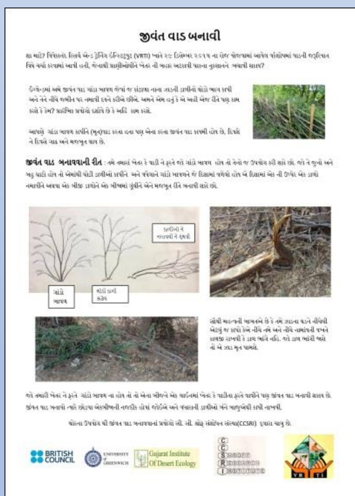
Small pieces of charcoal have been shown to improve soil and increase crop yield when used alongside appropriate sources of nutrients. This is thought to be because it can increase soil pH, increase water holding capacity, reduce salinity and retain nutrients. It has also been found to provide good conditions for beneficial soil microbes.

THIS IS HOW TO MAKE BIOCHAR: you can make charcoal and crush it. These small pieces should then be well soaked in water before adding to the soil and or a planting medium. The rate at which it will be effective varies with soil type. It would be useful to add it at various rates to different parts of a field and to observe how the crop responds.

Commercially biochar is made by burning charcoal in large kilns or retorts which are brought ready-made or built individually.

In some cases biochar is made from other materials, such as husks or shells of nuts. However it could be a useful way of using *Prosopis*, particular when large areas of scrub need to be cleared.

In short, biochar has the potential to provide benefits for soil quality both on the short and long term. The long-term benefits of biochar are unique to this soil amendment, since other organic amendments decompose rapidly in the years after they are applied.



જીવંત વાડ બનાવવી

કોલસો બનાવવાની રીત

જૈવકોલસો

કચ્છમિત્ર

કચ્છના કુદરતી સ્રોતોનું સંવર્ધન કરો

ઇંગ્લેન્ડની યુનિ. તથા 'ગાઇડ' દ્વારા માંડવીનાં આંગણે કાર્યશાળામાં શીખ અપાઇ

- **Bartlett D,** and Milliken, S (2019) How can landscape character and ecosystem services assessment be integrated into land-use planning in India? Landscape Journal Issue 1 2019 pp24-25.
- **Bartlett D,** Milliken, S and Parmar, D (2018) 'Prosopis for Prosperity': Using an invasive non-native shrub to benefit rural livelihoods in India. Current Science. Indian Academy of Sciences. ISSN 0011-3891 ISSN 0011-3891
- **Bartlett D**, Gomez-Martin E, Milliken S and Parmar D (2017) *Using Landscape Character Assessment and the Ecosystem Approach to evaluate the role of the invasive plant Prosopis juliflora in rural livelihoods of Kachchh, Gujarat, India*. Landscape & Urban Planning 167 p257–266
- **Bartlett, D** (2017) *Using British hedgelaying techniques in India.* Living Woods, 43. pp. 28-29.
- **Bartlett, D**., Milliken, S., Gomez Martin, E. and Parmar, D. (2016) *Natural Character Area Profile: the Coastal Plan of Kachchh, Gujarat, North Western India.*

3. Super Abundance: Caribbean

Darwin Project: Sustainable solutions for Sargassum inundations in Turks & Caicos 2019-2021

Journal of *Marine Science and Engineering*

MDPI

Review

Golden Tides: Problem or Golden Opportunity? The Valorisation of *Sargassum* from Beach Inundations

John J. Milledge * and Patricia J. Harvey

Algae Biotechnology Research Group, School of Science, University of Greenwich, Central Avenue, Chatham Maritime, Kent ME4 4TB, UK; P.J.Harvey@greenwich.ac.uk

* Correspondence: j.j.milledge@gre.ac.uk; Tel.: +44-0208-331-8871

Academic Editor: Magnus Wahlberg

Received: 12 August 2016; Accepted: 7 September 2016; Published: 13 September 2016

Abstract: In recent years there have been massive inundations of pelagic *Sargassum*, known as golden tides, on the beaches of the Caribbean, Gulf of Mexico, and West Africa, causing considerable damage to the local economy and environment. Commercial exploration of this biomass for food, fuel, and pharmaceutical products could fund clean-up and offset the economic impact of these golden

4. Woodland Management

Recreational value

Wildlife Value

MANAGING WOODLAND AS COPPICE IS IMPORTANT FOR WILDLIFE

Coppicing may look drastic but is essential for much of our best-loved woodland wildlife which may be threatened with extinction if this is not continued.

In this traditional management system, trees are regularly cut to the ground and re-grow with several stems, providing the wood needed for a wide range of products.

Time between cuts varies depending on the intended use of the wood but needs to be regular so that there are always some open areas. Here warmth and light can reach the ground.

This encourages plant growth and insect activity - but this effect decreases yearly as trees re-grow until branches meet overhead, and light can no longer reach the woodland floor.

So coppice cycles, with some cut each year, must be maintained, to ensure continuity of open space.

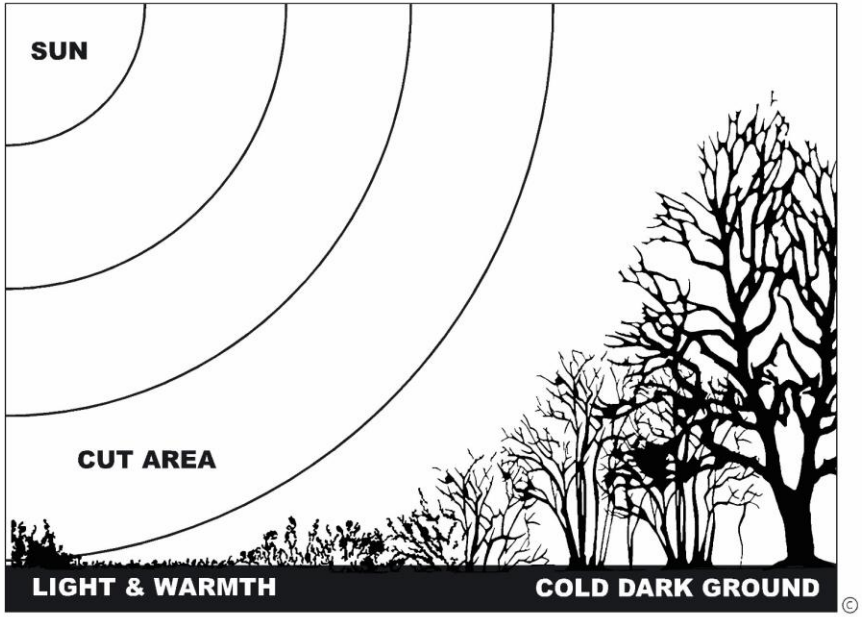


Diagram showing how coppicing affects ground temperature and light levels

Help wildlife by supporting the coppice industry buy local logs, charcoal and other wood products.

Forestry Commission England

The Wildlife Trusts

Woodland Trust

rspb giving nature a home

Butterfly Conservation

National Trust

Local Stockist

THE TIMES

Renewable energy

EU must not burn the world's forests for 'renewable' energy

A flaw in Europe's clean energy plan allows fuel from felled trees to qualify as renewable energy when in fact this would accelerate climate change and devastate forests

Letters

Thursday 14 December 2017 12.01 GMT

2,138

John Collingridge

February 26 2017, 12:01am,
The Sunday Times

Cutting down trees for fuel releases carbon into the air that would otherwise remain locked up in the forest. Photograph: David Cheskin/PA

The European Union is moving to enact a directive to double Europe's current renewable energy by 2030. This is admirable, but a critical flaw in the present version would accelerate climate change, allowing countries, power plants and factories to claim that cutting down trees and burning them for energy fully qualifies as renewable energy.

CONSTRUCTION OF £160M BIOMASS PLANT PROGRESSING WELL AT DISCOVERY PARK

2 MARCH, 2017

Six months on from the go-ahead by the Danish Pension Fund the vast metal skeleton of the buildings that will eventually provide all the power and energy needs of Discovery Park is fast taking shape.

Progress has been swift since August 2016 when agreement was reached by investors on the £160m required to build the combined heat and powered (CHP) plant on land located on 10 acres of land off Ramsgate Road, Sandwich.

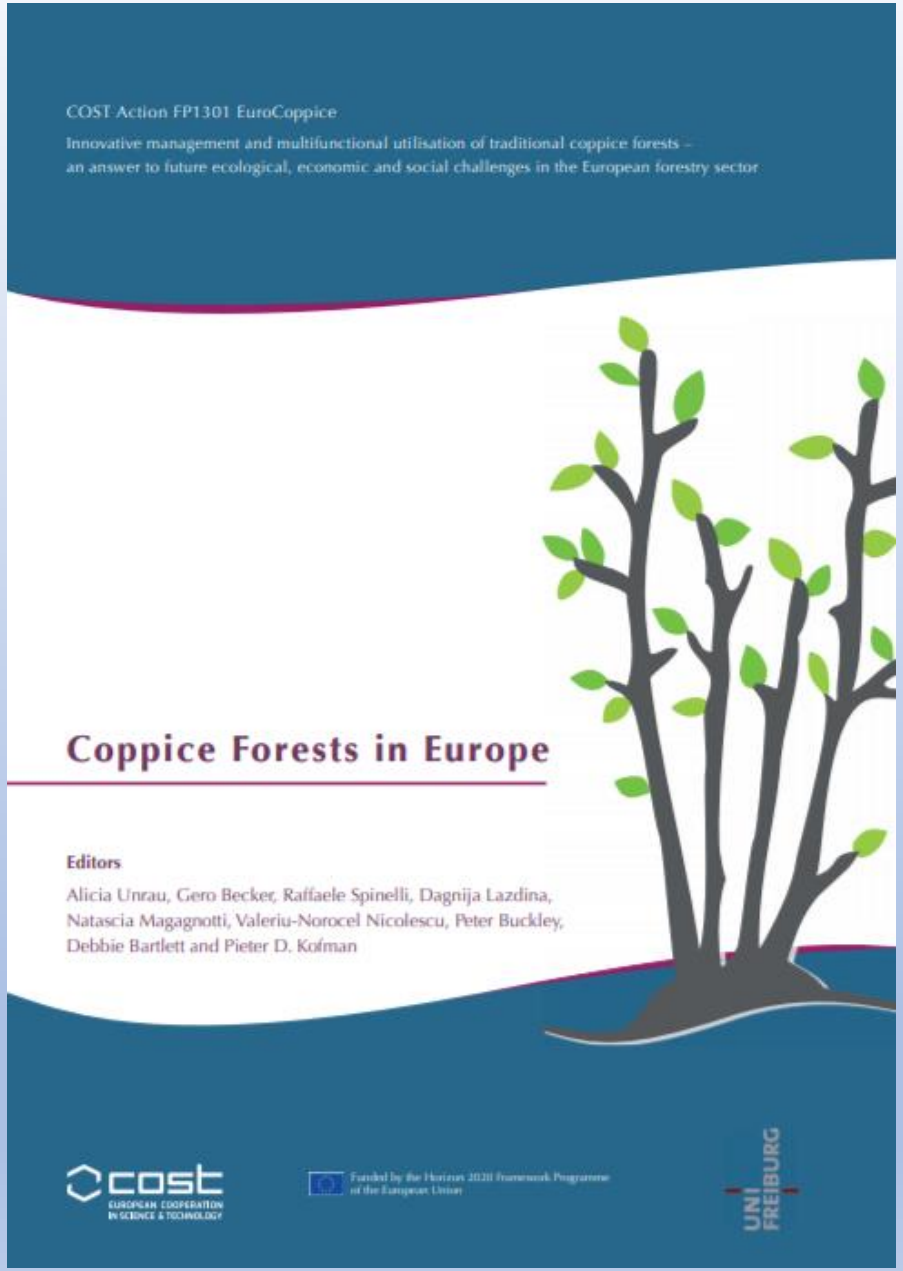
based at Discovery Park, Sandwich, Kent. The plant will require some 2 million tonnes of wood fuel material per annum, much of which will be sourced from the under managed broad leaved woodlands of Southern England. The plant is set to begin production in 2018 producing electricity for the equivalent of 50k homes and reducing carbon emissions by some 100k tonnes per annum.

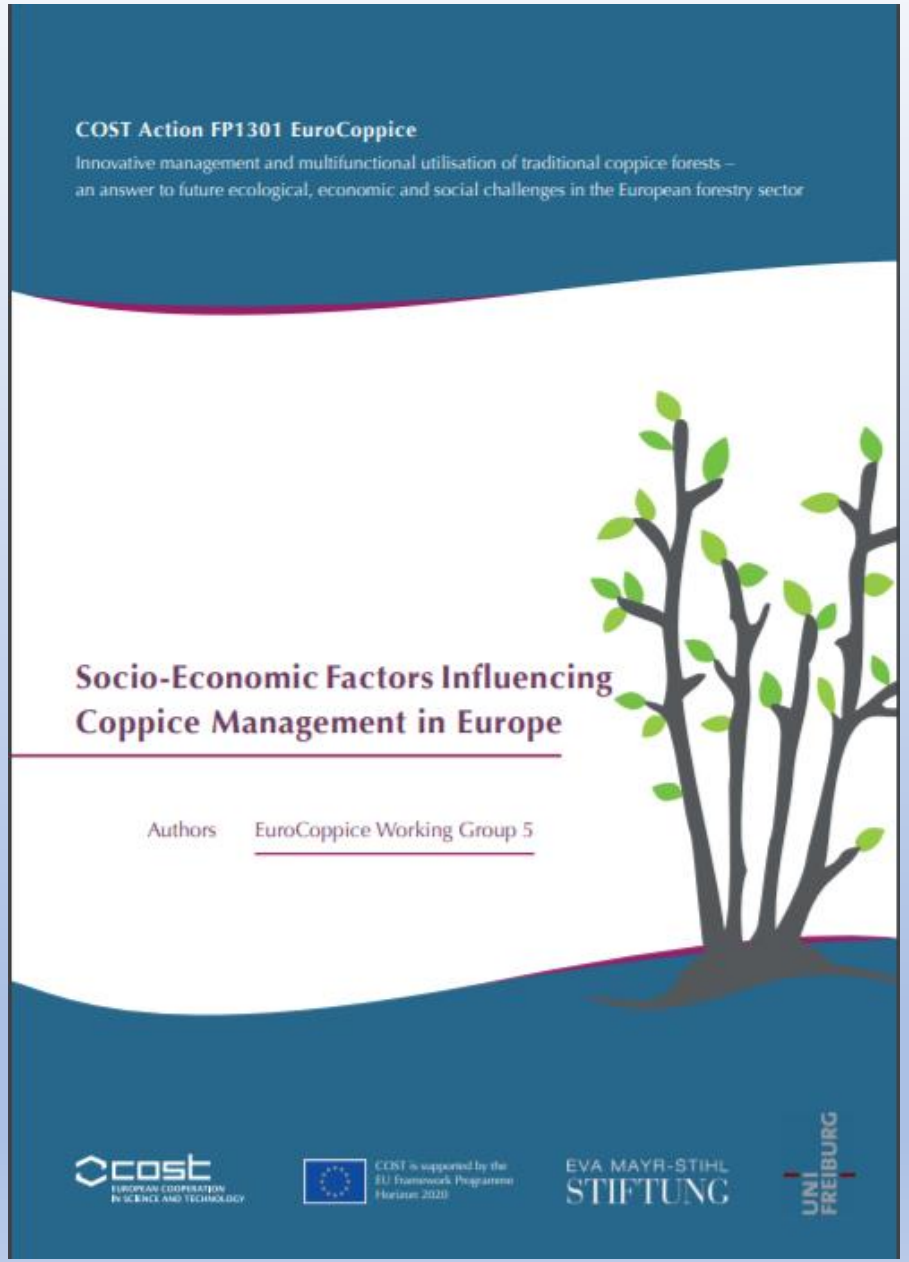
Please see the official press release below for all the details.

David Symons
Managing Director

Biomass is a globally traded commodity

What does this mean for the value added industry?
What livelihoods can those working in the sector expect?





Available to download: https://www.eurocoppice.uni-freiburg.de/reports

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4. Teaching Activities

Developing an Employer Led Assessment Strategy to Increase

Dr Debbie Bar
Principal Lectu
Deborah Sims
Senior Lecture
Elysia Salmon
MSc Environm

So are we preparing our students for jobs?

Sustainability at the University of Greenwich

The University of Greenwich a university proudly applying sustainable development across its activities.

We recognise that meeting sustainable development objectives is crucial to our students, our planet and ultimately our future success.

The University takes a strategic approach to sustainability, focusing on areas that reduce our negative impacts and continually improve our ways of working. Applying sustainability principles in our estates and operations allows us to operate our campuses efficiently and responsibly. This optimises resource use, minimises spend and ensures compliance and has, for example, enabled us to reduce our energy and waste generation.

We also work to integrate sustainability into our teaching and research, and work with our staff, students and our wider community to help raise awareness and drive behavioural change. This is particularly important as the decisions and actions we take as individuals collectively contribute to our overall impact on the environment and society as well as the University' running costs.

Our most recent **Annual Sustainability Report for 2016-17** illustrates key progress, including cutting carbon emissions by 44.5% since 2005 and reducing waste generation by 250 tonnes. It provides details of improvements, actions and recommendations for staff and students to help take action to make our university even more sustainable.

Our **Sustainability Policy** sets out the direction, the areas we focus upon and the goals we seek. Strategies and policies support this:

- Biodiversity Policy
- Fairtrade Policy
- Sustainable Food Policy
- Carbon Management Plan
- Travel Plan

NUS SDG Teach In

#SDGTeachIn !

We teach the SDGs in all the courses on the

MSC in Environmental Conservation at the University of Greenwich

Because they are

fundamental to everything

the students are aiming for in their learning

@EnvironConsUofG


SUSTAINABLE DEVELOPMENT GOALS
1 NO POVERTY
2 ZERO HUNGER
3 GOOD HEALTH AND WELL-BEING
4 QUALITY EDUCATION
5 GENDER EQUALITY
6 CLEAN WATER AND SANITATION
7 AFFORDABLE AND CLEAN ENERGY
8 DECENT WORK AND ECONOMIC GROWTH
9 INDUSTRY, INNOVATION AND INFRASTRUCTURE
10 REDUCED INEQUALITIES
11 SUSTAINABLE CITIES AND COMMUNITIES
12 RESPONSIBLE CONSUMPTION AND PRODUCTION
13 CLIMATE ACTION
14 LIFE BELOW WATER
15 LIFE ON LAND
16 PEACE, JUSTICE AND STRONG INSTITUTIONS
17 PARTNERSHIPS FOR THE GOALS

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- Adaptation is needed for resilience in the face of environmental change
- But can we have everything?
- How can we achieve a balance between conflicting demands?


Turn Back Time

Moving into a new era

- Ecosystem services
- Natural Capital Accounting
- Paying for delivering ‘public goods’ as well as marketable commodities

The rural economy, livelihoods and wildlife are inextricably linked

Understanding the links and anticipating change is vital for any effective conservation action

- **support livelihoods that make a positive contribution**
- **identify threats and take action**
- **encourage policy makers to understand the economic value of ecosystem services**

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Milk cheaper than water: supermarket price war drives down price of a pint

News › UK › Home News

How did milk become cheaper than water?

The price of milk has fallen by more than 50 per cent over the past 12 months

Kashmira Gander | @kashmiragander | Tuesday 20 January 2015 15:59 GMT | 0 comments


REAL DAIRY ICE CREAM
A scrumptious taste of the Yorkshire Dales!


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YOGURT
WITH A LEMON
CURD LAYER
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MADE WITH
YORKSHIRE MILK

THANK YOU
for listening
Now I want to hear
your ideas