

GAME▶on!
FOR ADAPTATION
Global Adaptation Month™

Nature-Based Adaptation Solutions

April 28, 2021

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Welcome & Introduction



- Please mute



- Use the question function



- Session will be recorded and posted on the Climate Adaptation Knowledge Exchange – www.CAKEx.org



- Slides & presenter information available for download



- Technology Used

Presenters



Natalie Snider
Environmental
Defense Fund



**Queen Quet,
Marquetta L. Goodwine**
Gullah/Geechee Sea
Island Coalition



Alpha Ntayomba
Population and
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Dr. Ralph Schielen
Netherlands Ministry of Infrastructure and
Water Management



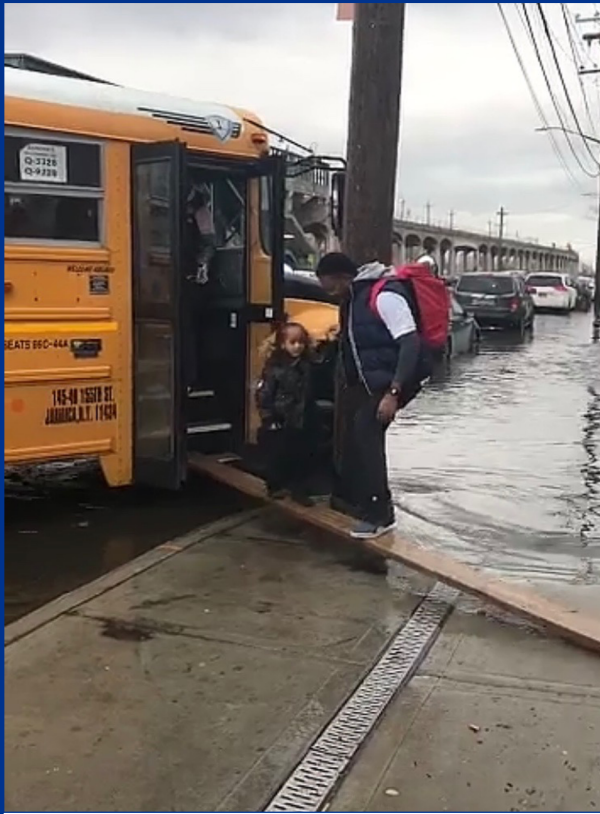
Baruch Figueroa-Zavala
Centro Ecológico Akumal



The Power of Nature

Using natural infrastructure to tackle the impacts of climate change

Multiple Coastal Flood Threats



Tidal “sunny day” flooding increasing with sea level rise

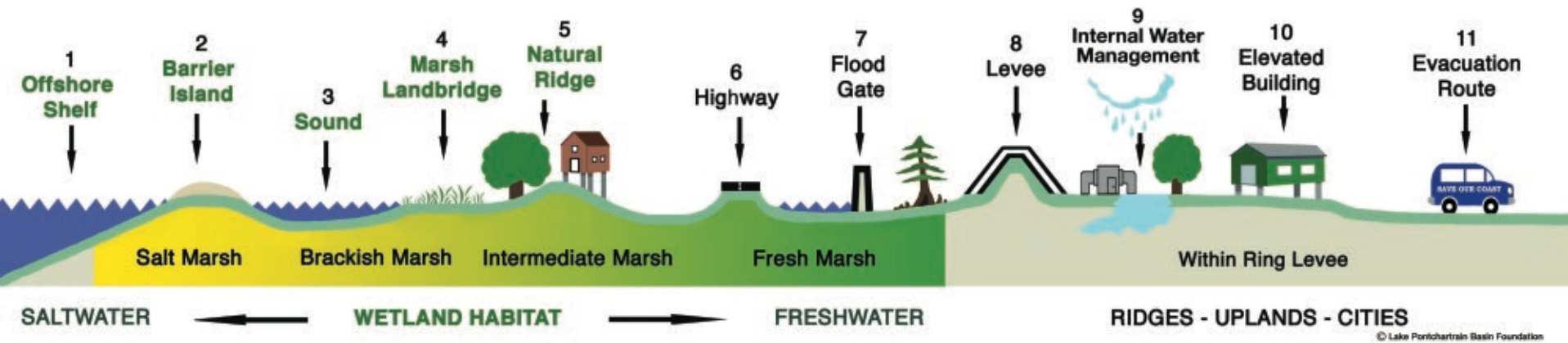


Flooding from storm surge and waves is increasing in intensity



Extreme rainfall events are increasing causing river flooding and stormwater flooding

*Globally, the costs of rising seas could reach **\$14.2 trillion** in lost or damaged assets by 2100, with 68% of costs attributed to tidal and storm flooding and 32% of those costs attributed to sea level rise. Could cost \$100 Trillion in GDP (9.3% of global GDP)*



Multiple Lines of Defense



The Future is a Holistic Approach

Example: Protecting the New York and New Jersey Harbor Region

Big Gates solutions are not the answer



- Focused on storm surge only (SLR and rainfall considered residual risk)
- Expensive (\$119 billion US)
- Long construction timeframe (25 years to complete once funded)
- Induces flooding on adjacent communities
- Sea level rise causes an exponential increase in gate closure frequency, a lengthening of the closure duration, and a rising probability of trapped river water flooding
- Environmental consequences including altering tidal flow/flushing and circulation, degrading water quality, restricting species movements and impacting ecology, habitat degradation and altering sediment movement and increased erosion.

The Future is a Holistic Approach

Example: Protecting the Boston Harbor Region

Big Gates solutions are not the answer



- Boston's "Green Ribbon Commission" recently recommended that surge gates would not be an effective approach for that city
- "Shore-based solutions would provide flood management more quickly at a lower cost, offer several key advantages over a harbor-wide barrier, and provide more flexibility in adapting and responding to changing conditions, technological innovations, and new information about global sea level rise."

The Future is a Holistic Approach

Natural infrastructure provides multiple benefits

Species and Habitat Diversity

Flood Risk Reduction to Multiple Threats

Improved Water Quality

Protect Groundwater and Drinking Water Supplies

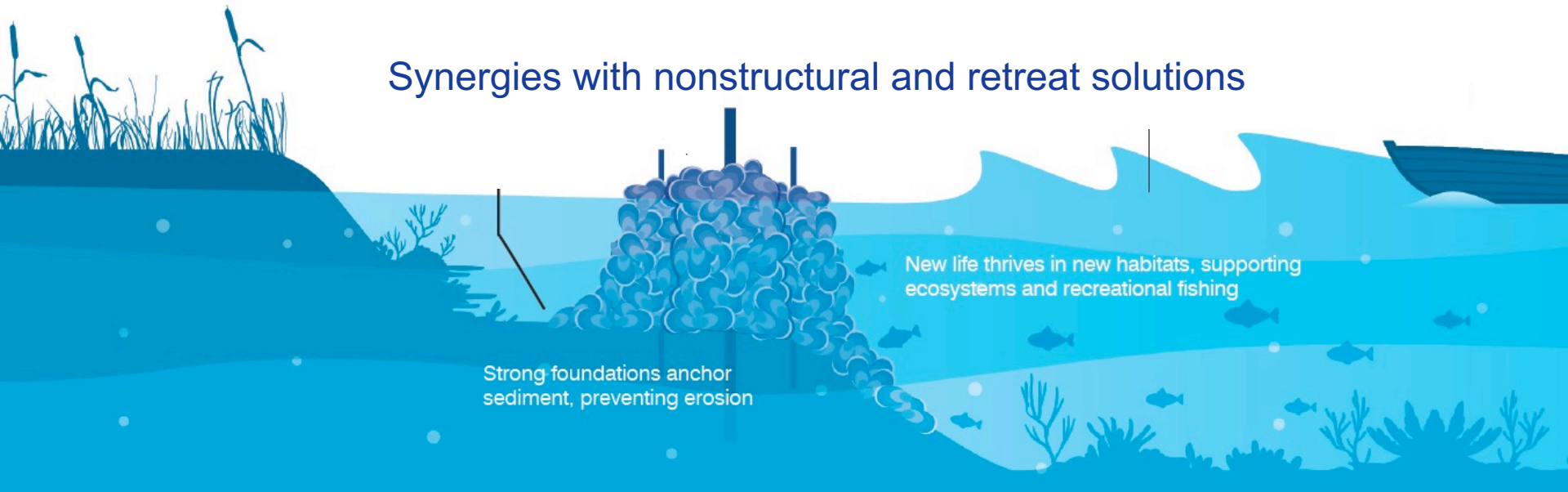
Restore Natural Processes and Sustainable

Carbon Sequestration

Recreation, Tourism and Quality of Life

Lower Costs and Timely

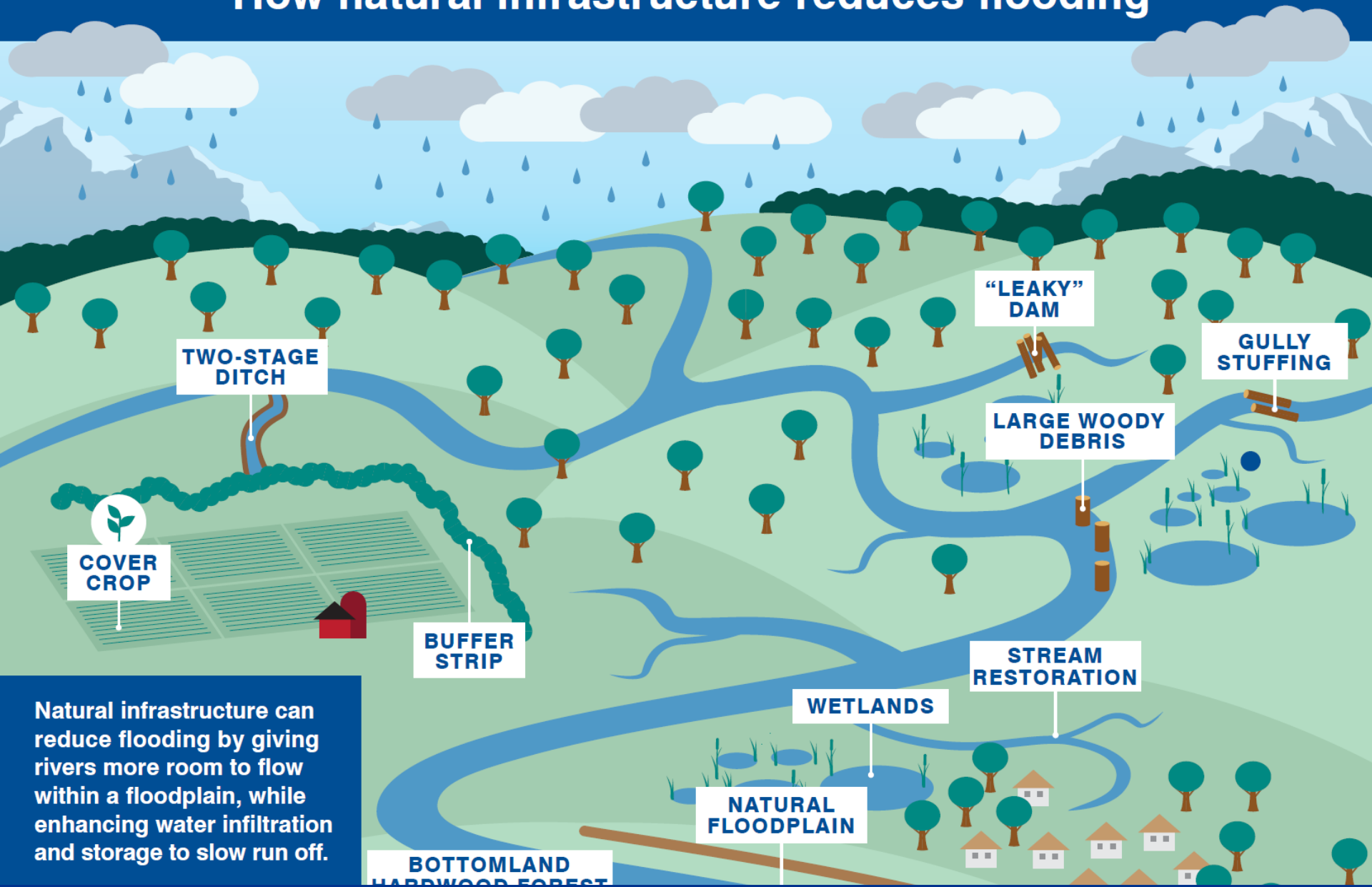
Synergies with nonstructural and retreat solutions



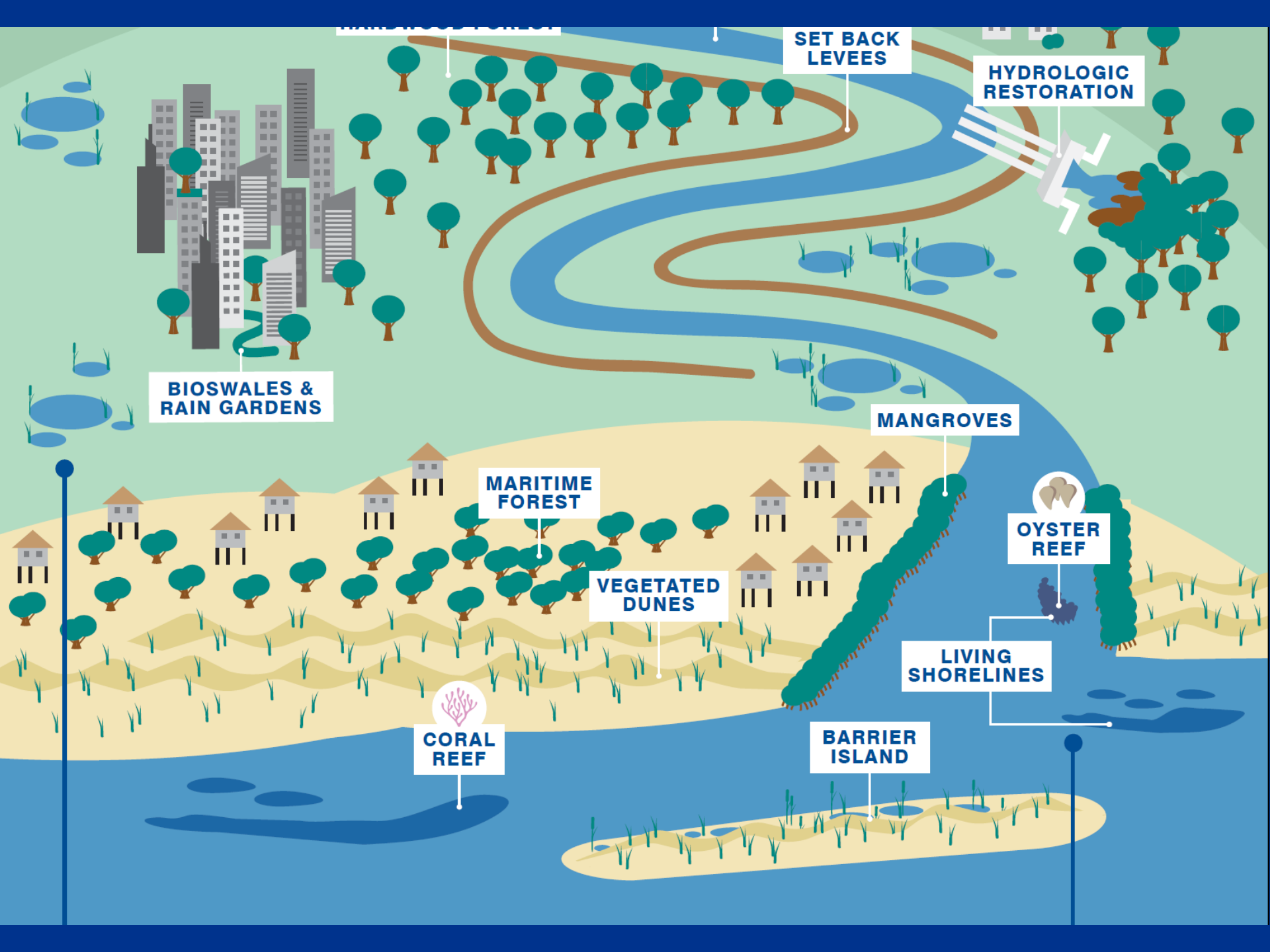
Strong foundations anchor sediment, preventing erosion

New life thrives in new habitats, supporting ecosystems and recreational fishing

How natural infrastructure reduces flooding



Natural infrastructure can reduce flooding by giving rivers more room to flow within a floodplain, while enhancing water infiltration and storage to slow run off.



BIOSWALES & RAIN GARDENS

MARITIME FOREST

VEGETATED DUNES

CORAL REEF

BARRIER ISLAND

MANGROVES

OYSTER REEF

LIVING SHORELINES

SET BACK LEVELS

HYDROLOGIC RESTORATION

With man-made & natural features

Beaches, dunes, oyster and coral reefs, mangroves, maritime forests, wetlands

Use new space for natural defenses

Wetlands, dunes, forests

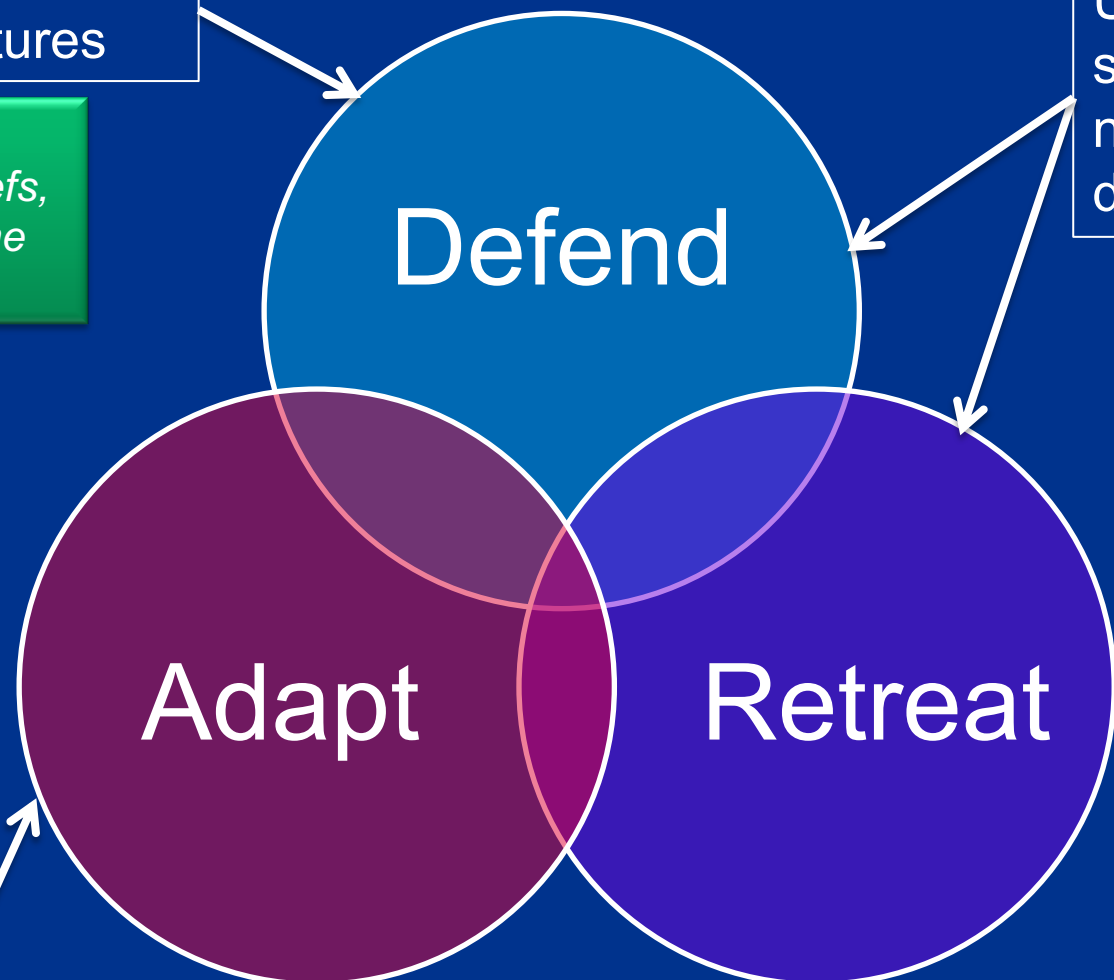
Defend

Adapt

Retreat

Live with water: use natural defenses and raising structures/infrastructure above projected flood levels

Wetlands, dunes, forests



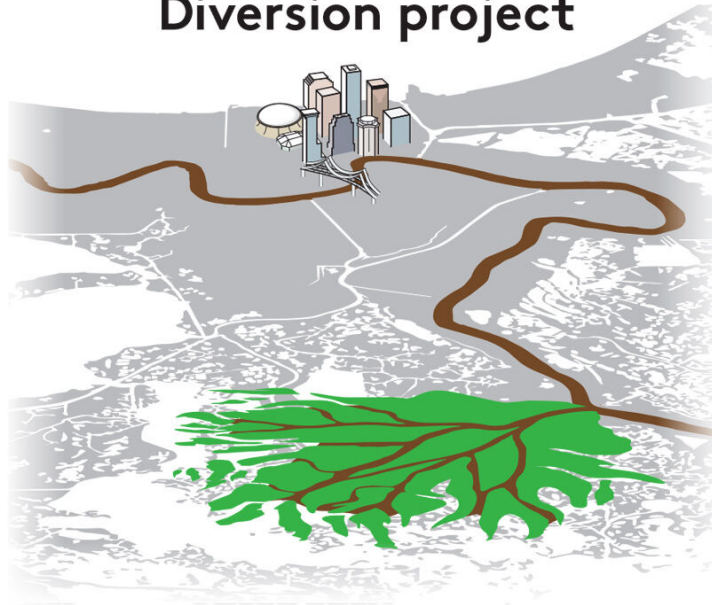
Project Highlight

Possibly the largest single restoration project in the world

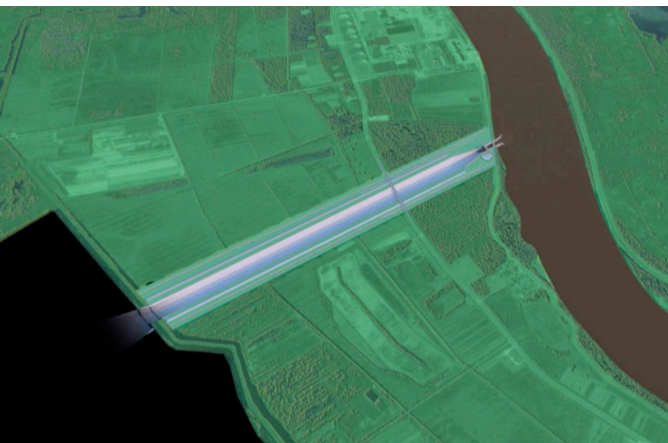
Reconnects the Mississippi River to its deltaic wetlands distributing freshwater, sediment and nutrients

75,000 cfs (~2100 cms) at full capacity

Mid-Barataria Sediment Diversion project



- \$2 Billion Project Cost
- 12,400 jobs created
- \$1.4 billion increase in local sales
- 17,300 acres by year 30
- Over 70 sq km by year 30
- Accounts for 20% of remaining marsh in basin



- Protects New Orleans region from storm surge and sea level rise
- Creates habitats
- Supports some species and impacts others



What Needs to Happen



- Planning to address multiple flood threats in a holistic manner
- Shift from post disaster investments to pre-disaster mitigation as the new norm
- Design guidelines for natural infrastructure (exists for some but not all)
- Continued quantification of risk reduction benefits + other ecosystem services
- Revise cost-benefit analysis methodologies and integrate social and ecological benefits in project selection
- Increased funding and innovative funding mechanisms
- Capacity-building and technical support, specifically for small, low-income and minority communities
- Protection of existing natural infrastructure features, such as mangroves and coral reefs
- More documented case studies, monitoring existing projects

POLICIES TO END SYSTEMATIC INEQUALITY AND RACISM IN FLOOD RISK

Working to build resilient ecosystems and communities along our coasts and rivers that thrive with water and are safe, equitable and prosperous places to live, work and play.

THANK
YOU!

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Application of Nature Based Solutions in an engineered lowland river

Dr. R. (Ralph) Schielen
Rijkswaterstaat-Delft University
of Technology



EcoAdapt™ **GAMEon!**
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Source: Beeldbank RWS, Ruimte voor de Rivier

Nature-Based Adaptation Solutions

Physical Map of the World, April 2004

- AUSTRALIA Independent state
- Bermuda Dependency or area of special sovereignty
- Sicily / AZORES Island / island group
- ★ Capital

Scale 1:33,000,000
Robinson Projection
standard parallels 28°N and 38°S



April 2004

Twenty of 22 Antarctic claimant nations have made no claims to Antarctic territory. Although Russia and the United States have reserved the right to do so and may do so, they do not recognize the claims of the other nations.

Boundary representation is not necessarily authoritative.

© 2004 NATURE

UNEP Adaptation Monitor

Ralph Schielen, April 28, 2021



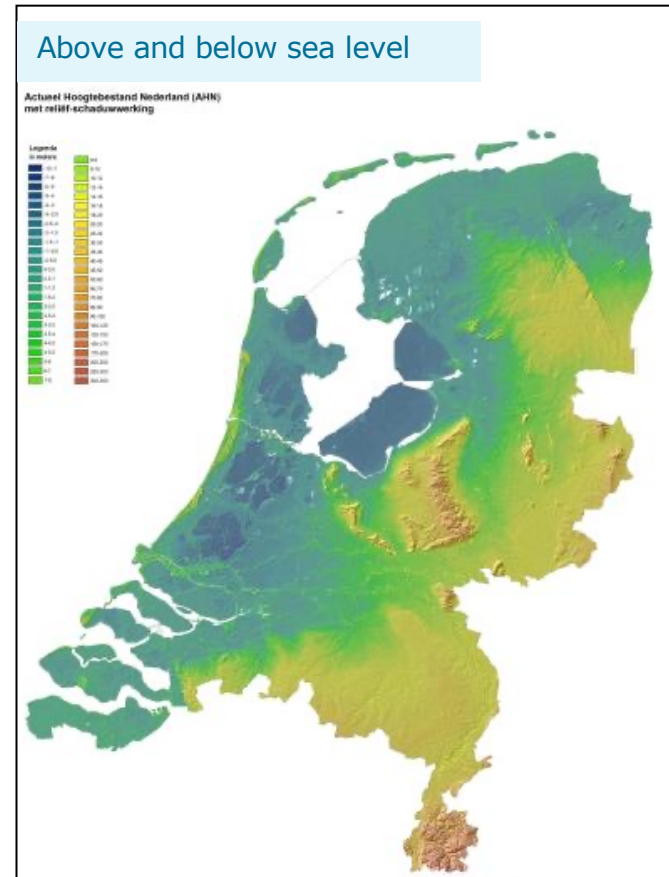


Similar systems!

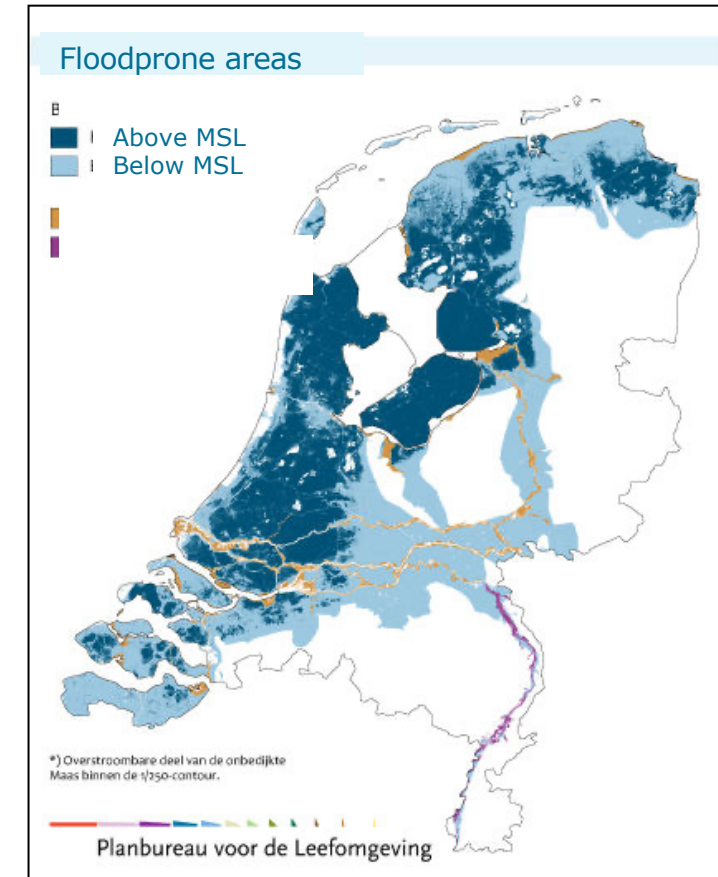


Importance of Water Management: key features and numbers

- Engineered rivers, since ~500 AD
- ~17 million people, 22nd largest economy, 5th most densely populated country
- 60% of people (9 million) live in, 70% of GDP (600 bln) produced in, areas between 1 and 6.5 meters below mean sea level
- ~600 km of rivers, 2500 km of flood defenses, hundreds of locks, sluices, etc.
- subsiding, changing climate
- water management is a matter of *national survival*
- water is an **opportunity**



Source: Actueel Hoogtebestand Nederland



Source: Netherlands Environmental Assessment Agency

The Netherlands: Scenery and Threats



High discharge event January 1995

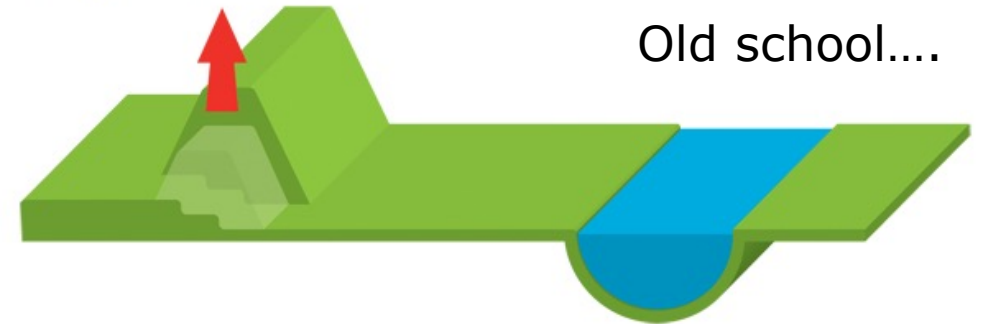




The value of NBS

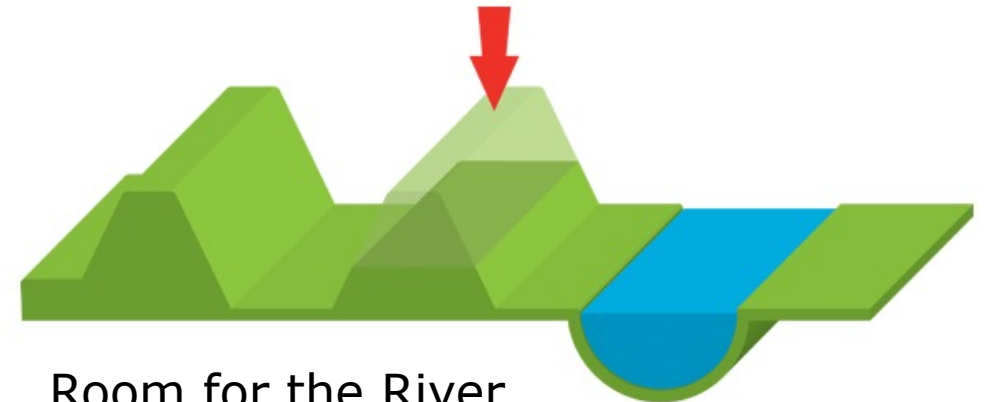


Strengthening dikes



Old school....

Depoldering



Room for the River





Vianen, Lek



Some examples



Zwolle, IJssel



Reevediep, IJssel

Characteristics

Navigation channel: 100-300 meter wide

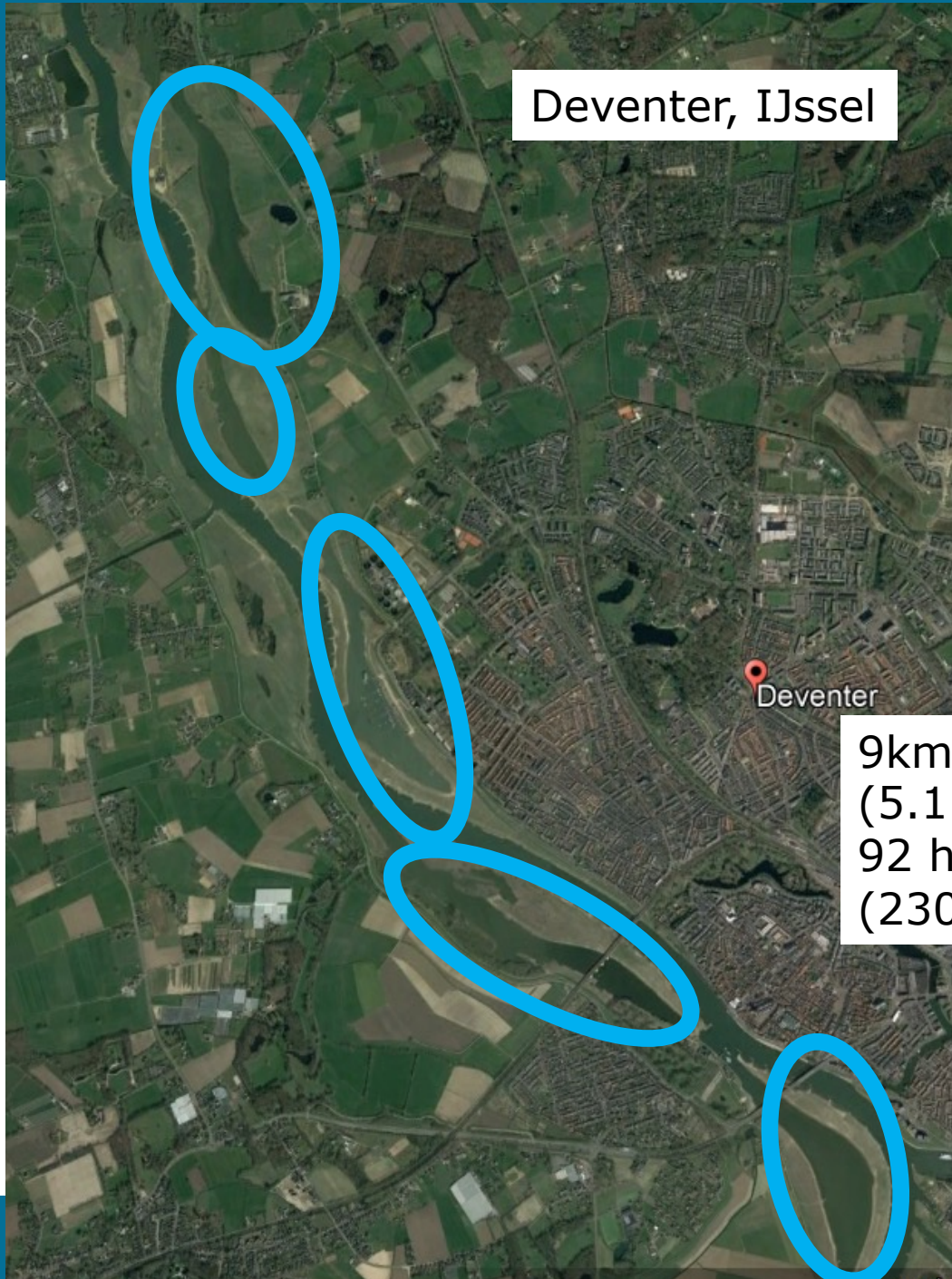
6-8 meters deep

Flood plains 100-500 meters wide

Discharge 200 m³/s – 8000 m³/s



Deventer, IJssel



Deventer

9km
(5.1 mi)
92 ha
(230 ac)

Nijmegen, Waal



Length side channel: 4.3 km. (2.1 mi)
Project area: 188 ha. (465 ac)



NBS leads to:

Reduction of flood risk **and**

- Reconnect floodplain with main channel
- Increase biodiversity
- Increase recreational possibilities
- Flora and fauna
- Appreciation of the landscape

General well-being!

Deventer, IJssel river



Connection to the United Nations Sustainable Development Goals



UN SDG provides a blueprint for peace and prosperity
For people and the planet
Now and into the future

- No poverty
- No hunger
- Good health and well being
- ...
- Climate action
- Life below water

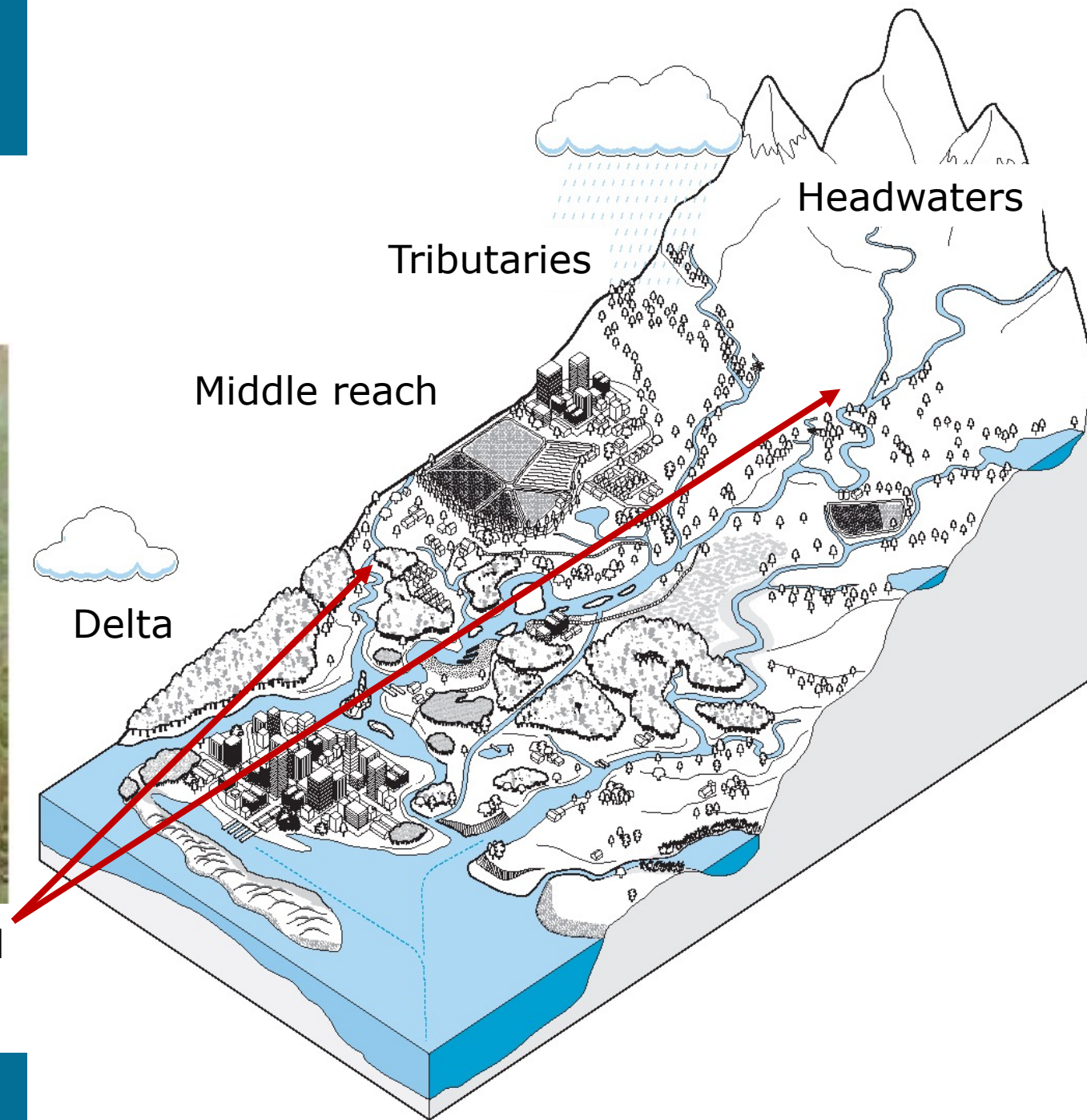
Connect NBS to UN SDG's !

We need a framework for this!

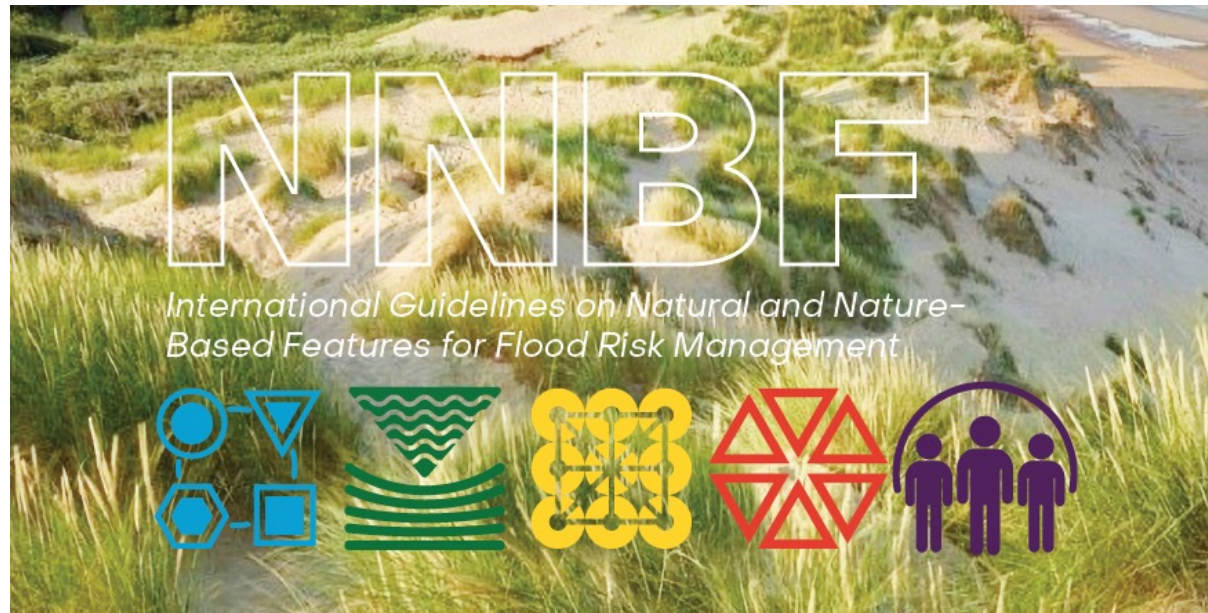
NBS work in bigger and smaller systems



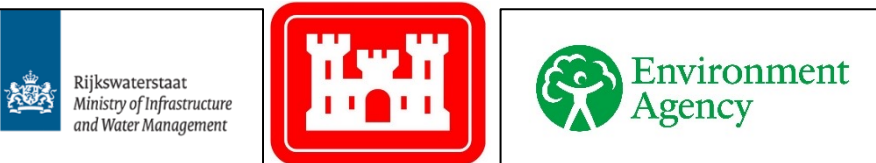
Leaky dam, Eddleston Water, Scotland



NBS in small streams



Under development!
(2021/2022)



Construction date:
2011 to 2019

Total cash cost of the project:
€ 0.2 Million

Measures included:

- 2011 to 2013—dead wood deposition (monitored) and shading (not monitored)
- 2014—dead wood deposition, shading, mowing management, 8000 m³ sand deposition (2014 to 2019), water level management, and nature-friendly riverbanks (NVOs), creating a 70-ha floodplain forest area or fluvial wetlands and filling up an artificially created brook upstream.

Project funder(s):

- Water board: Vallei en Veluwe
- Nature conservation agency: Natuurmonumenten

Main contact(s):

Water board: Vallei en Veluwe

Challenges addressed:

Challenge	Present
Channel instability	Yes
Land use change	No
Water quality degradation	No
Loss of flora and fauna	No
Salt water (tidal) intrusion	No
Removal of vegetation	No
Loss of floodplains and wetlands	Yes
Sediment imbalance	No
Hydropower, dams, and hydraulic structures	No

NNBF Guidelines

- Publication summer 2021
- >800 pages
- >170 authors and contributors from >70 organizations and 10 countries



International cooperation: European INTERREG project





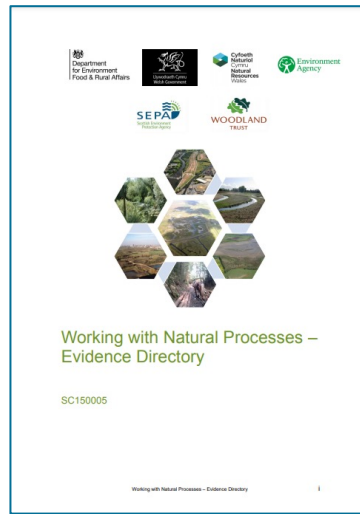
- Different scale
- Different geometry
- Different governance
- Different legislation
- Different interaction with stakeholders

Learn from each other!



Lessons learned

- (1) Create a solid performance evidence base and a BwN assessment framework.
- (2) Involve and align (local) stakeholders from the initial phase onwards.
- (3) Agree on how to value multiple benefits and functions.
- (4) Support member states in implementing BwN in national regulations.





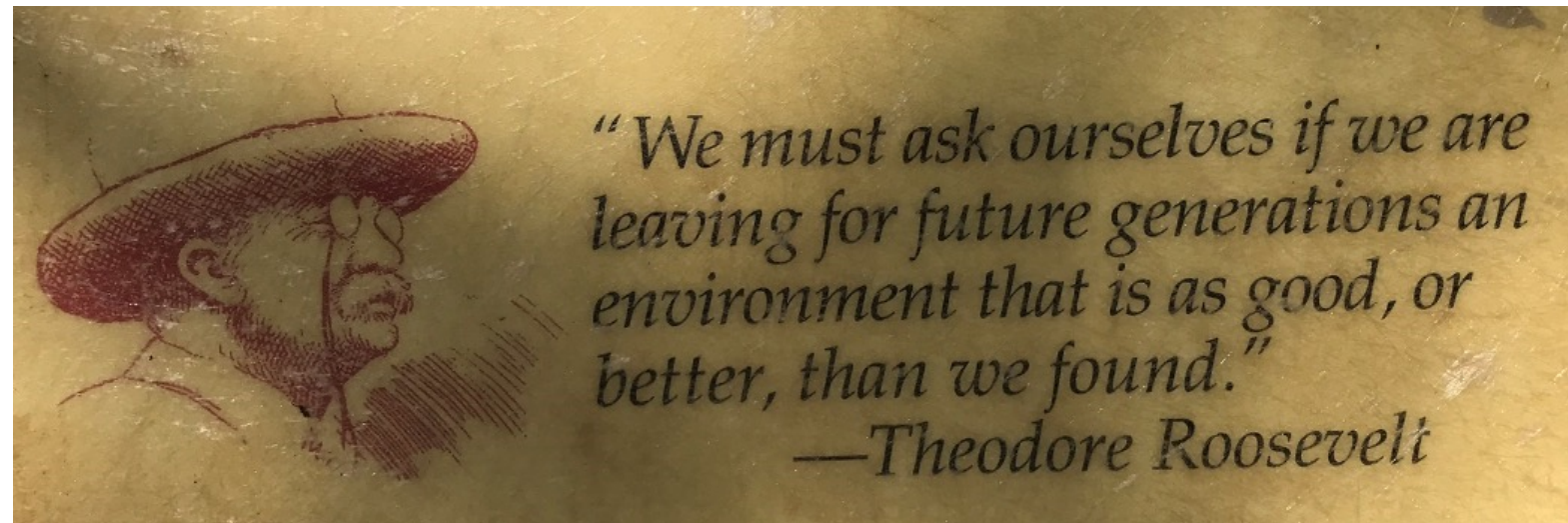
Future directions

- Development of an assessment framework (that connects to the UN SDG's)
- Note the importance of monitoring and adaptive planning programmes
- Invest in support at all levels from local authorities to international laws
- NBS approaches should inspire new stakeholders and stimulate participatory decision-making



Take away message

- NBS should be an integral part of FRM evaluation, and assessment should be scaled to the scale of the watershed and local conditions.
- NBS go along with multiple co-benefits and contribute to a general well being



Thank you for your attention!

Queen Quet

Chieftess of the Gullah/Geechee Nation



Tanzania Health Care and Environmental Conservation Organization (TAHECECO) and Population and Development Initiative (PDI)

Presentation on Tree Planting Campaign: Nature-based solutions for
climate actions in Tanzania

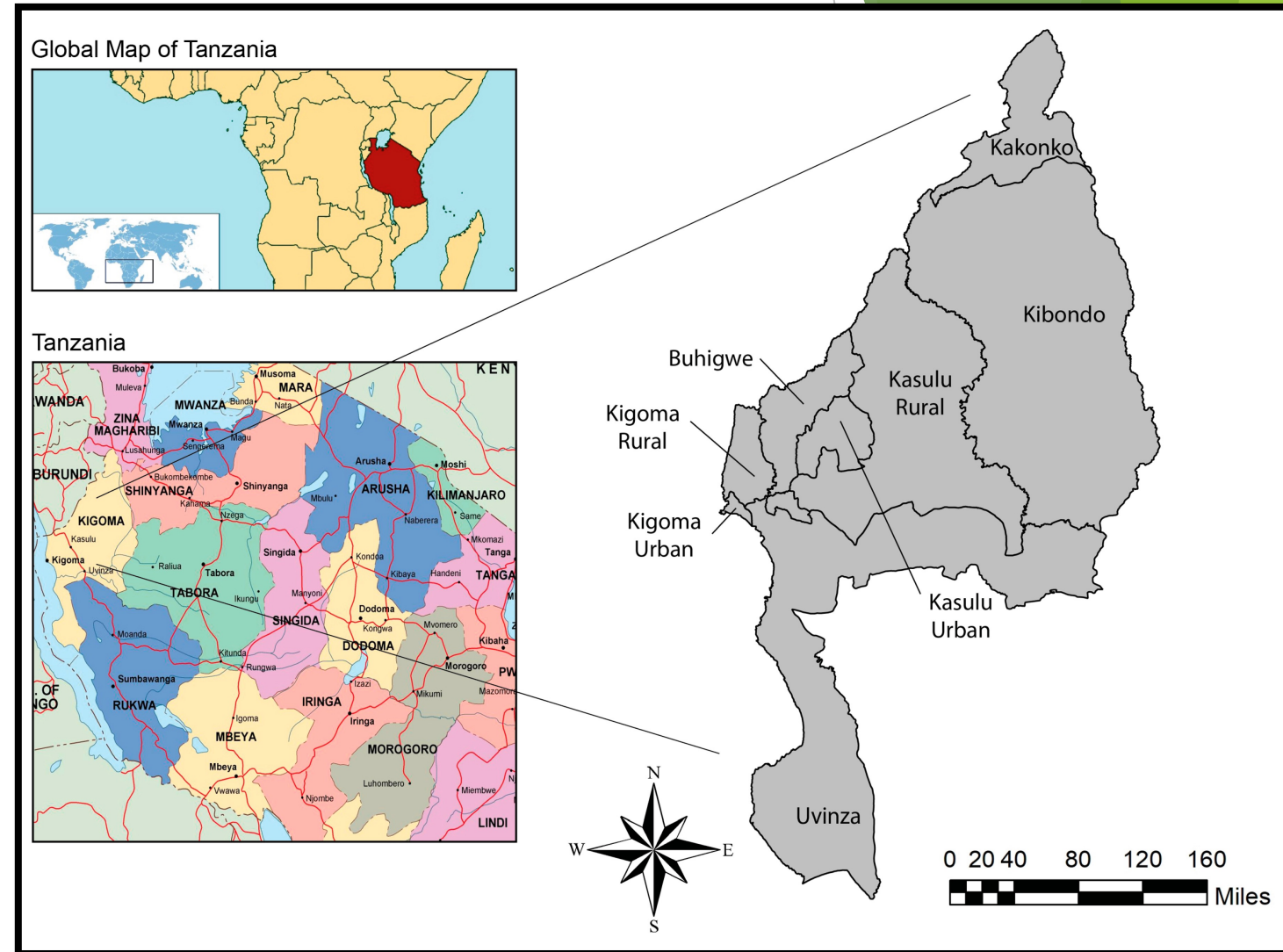
28th April, 2021

Presenter: ALPHA NTAYOMBA

KIGOMA, TANZANIA

1.0 Tanzania: Forests and Energy contexts

- ▶ Tanzania, an East African country has the population of nearly 60 million.
- ▶ In Tanzania forests and woodlands cover about 55% of the total land area (**88,359,000 hectares**).
 - ▶ provide wildlife habitat, unique natural ecosystems and biological diversity.
 - ▶ harbour important water catchments areas.
- ▶ These forests (**natural and plantations**) are highly threatened by human activities.
 - ▶ Energy consumption: 88% is originated from fuel wood, 7% from petroleum, 4% from charcoal and 1% from hydropower.
 - ▶ **92 % of energy** sources are provided by biomass, large part of it is wood.
 - ▶ Wood is taken from forests and in most cases illegally. This situation shows that the pressure on forests is very high something which disturbs the ecology of the country.



Source: <http://www.maphill.com/tanzania/kigoma/>.

1.1 Introduction: TAHECECO and PDI

- ▶ Tanzania Health Care and Environmental Conservation Organisation (TAHECECO) and the Population and Development Initiative (PDI)
 - ▶ Environmental conservation,
 - ▶ Water sanitation and hygiene (WASH),
 - ▶ Improved nutrition
- ▶ Together, they have implemented various projects:
 - ▶ Promotion of **investment** and **utilization** of Orange-Fleshed Sweet Potato (OFSP), Pro-Vitamin A Maize (PVA) and High Iron Beans (HIB) to combat hidden hunger women at reproductive age and children under the age of five years.
 - ▶ Mapping of socioeconomic and human rights situation among small scale miners in Kigoma region of Tanzania.
- ▶ The two have joined efforts to conduct tree planting campaigns in Morogoro and Kigoma regions following the commitments made to Global Adaptation Month for the year 2021.



2.0 The tree planting campaign

- ▶ Global Adaptation Month 2021: TAHECECO and PDI committed to conduct tree planting campaigns and conduct dialogues
 - ▶ Also contributes to national call that every district in Tanzania has to plant 1,500,000 trees annually.
 - ▶ The call means that national and local CSOs, companies and individuals have to actively participate in tree planting campaigns in villages, towns, colleges and schools to compensate with high deforestation rate in the country.
- ▶ In this sense TAHECECO and PDI will plant between 400-800 trees in 2 primary schools based in Kigoma and Morogoro regions in Tanzania.
 - ▶ The **campaign** will be conducted in the week of **26th-30 April, 2021**. The two organizations have worked hard to purchase, request and collect tree seedlings from various stakeholders in Kigoma and Morogoro regions.
 - ▶ The trees which will be planted will support nutrition and shade and will involve **mango trees, guava trees and orange trees and Senna siamea (among others)** which is commonly used as **shade tree species** in most schools in Tanzania.
 - ▶ **There will be a second phase of tree planting which will be done in early May 2021.**

2.1 Why trees?

▶ Deforestation

- ▶ Tanzania is losing more than 400,000 hectares of trees annually due to different reasons such as construction, charcoal making, logging and bush fires.
- ▶ Deforestation can be stopped by introducing **alternative cooking and construction and small scale mining technologies** which will play an important role in reducing pressure in existing forests.

▶ Climate Change

- ▶ The country, like other African countries, has started to witness the effects of climate change such as shortage of rainfall, unpredicted rain patterns.
- ▶ Appropriate tree species can play an important role in ecological restoration and offering other products such as fruits to women and youth groups as well as offering places for beekeeping (**bee apiaries**).

2.2 Why trees in schools?

- ▶ Conservation Education
 - ▶ Local government authorities and Civil Society Organizations join efforts to impart conservation education to young generations so that they can be active society of the community in which they come from.
 - ▶ When we plant trees in schools through school clubs and community groups we make future environmental conservation leaders who will lead the efforts to restore the earth for the wellbeing of all generations
- ▶ Establishment of school tree nurseries also play an important role in tree planting campaigns in most areas.

3.0 Deforestation in Kigoma region

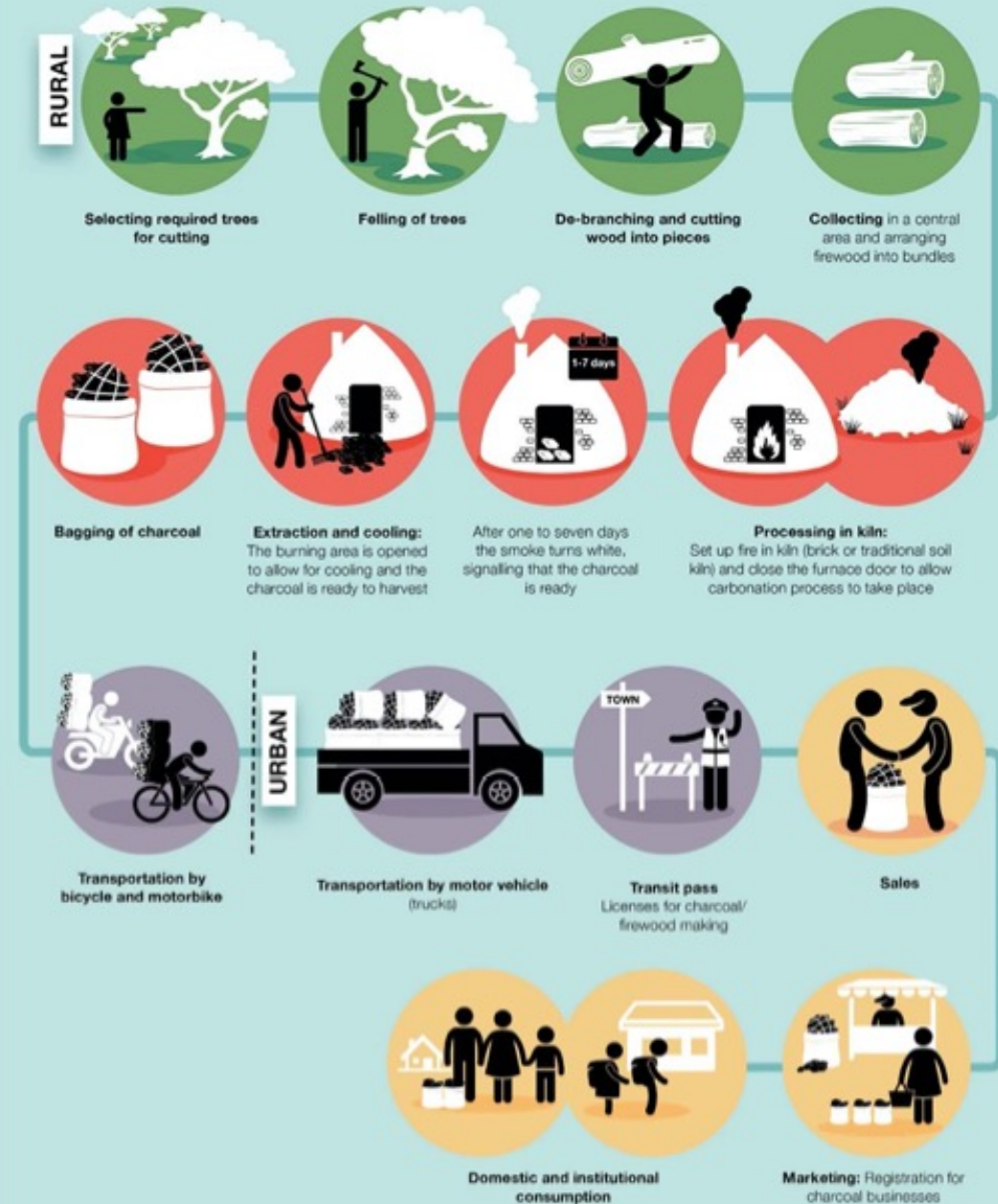
- ▶ Kigoma region is located in western part of Tanzania 1000 km from the city of Dar es salaam.
- ▶ The region is popular for its natural resources, water resources and trade opportunity with Burundi, Congo DRC and Zambia. The region is the home of more than 200 refugees available in three refugee camps in Kasulu and Kibondo districts.
- ▶ There are challenges of deforestation due to human activities like mining (salt, copper and gold), charcoal making and construction materials.
- ▶ The refugees in Nyarugusu, Nduta and Mtendeli refugee camps have caused deforestation in forest reserves such as Makere South Forest Reserve, Makere North Forest Reserve and other places.

3.1 Deforestation in Kigoma...continued.

- ▶ International Peace Information Service (IPIS) and local CSOs study shows:
 - ▶ One salt kiln may use up to 5-10 cubic meters of fire wood per one burning cycle.
 - ▶ one limestone Kilns may use up to 100 cubic meters of firewood per burning cycle, something which ruin the adjacent forests.
- ▶ Some limestone kilns in Kigoma region are also found in Makere North Forest Reserve something which has brought conflicts with the conservation authorities as well as reports of issues related with human rights when the miners are found in the forests.

Source: Sustainable woodfuel (charcoal and firewood) systems in Tanzania. https://www.ctc-n.org/system/files/dossier/3b/annex_f_grassroots_manual_sustainable_woodfuel_tanzania_22.10.18_english_finalb.pdf

Figure 9: Visual description of the current charcoal system from sourcing and harvesting of wood to consumption.



4.0 Deforestation in Morogoro region

- ▶ Morogoro region is located some 190 kilometers from the city of Dar es salaam (Mwalimu Nyerere International Airport).
- ▶ Its very important regions in environmental contexts because of presence of Eastern Arc Mountains which play an important role in biodiversity of the region and neighboring districts. The region is abundant in water resources (rivers and wetlands) which contribute to existence of Wami/Ruvu water basin.
- ▶ As in Kigoma region the deforestation in Morogoro region is caused by human activities such as small scale mining and search for firewood's and logs.
- ▶ The major problem in Morogoro region is bush fires which are caused by people during farm preparations, search for wild animals or during harvesting honey.



Photo by [samson tarimo](#) on [Unsplash](#)

4.1 Climate issues in Tanzania

- ▶ Tanzania is one of the largest countries in East Africa, with diverse topography that gives rise to four distinct climate zones.
- ▶ Most of the population lives in rural areas that are dependent on rain-fed agriculture which is threatened by increasing temperatures, longer dry spells, and intense rain events.
- ▶ Much of the population also depends on coastal and inland fisheries, which are vulnerable to sedimentation as well as warming ocean and freshwater temperatures.
- ▶ Despite abundant water resources, Tanzania experiences spatial and temporal water scarcity, which will be exacerbated by climate impacts on the country's nine major river basins and the continent's three largest lakes.

4.1 Climate change in Tanzania cont.....

- ▶ Climate change has proved to be a complex global issue affecting all aspects of life and hence there is a need of finding adaptive solutions by integrating climate change adaptation into everyday life starting with young generations and ready agents of change at local levels.
- ▶ A good number of agents of change call for better climate laws and practices which are compatible with Tanzania environments and by fully engaging local communities in addressing the issues at local contexts.

5.0 The work of Civil Society Organisations (CSOs)

- ▶ Civil Society Organisations (CSOs) in Tanzania are playing an important role in restoring the degraded forest through tree planting campaign and introducing beekeeping to serve as incentives for local communities living adjacent to local communities. Civil Society Organisations are also conducting research to understand the level of forest degradation in Tanzania.
- ▶ The CSOs support tree nursery in schools and among tree growers associations (TGAs) to boost production of tree seedlings of appropriate tree species for different tree planting campaigns in schools, towns and villages.
- ▶ CSOs also support designing and distribution among school clubs and local communities in Tanzania



Source: Tanzania Tree Growers Associations Union.
<https://www.ttgau.or.tz/index.php/about>

6.0 Challenges of tree planting campaigns in Tanzania

- ▶ Little knowledge of appropriate tree species among local communities meaning that they plant trees which are not compatible with their ecological zones
- ▶ Financial constraints among local CSOs limit tree planting campaigns at local levels especially in preparation of tree nurseries and strengthening of Tree Growers Associations (TGAs)
- ▶ Little knowledge on maintaining the trees for reasonable trees' survival rate
- ▶ Complicated land tenure systems which limits tree planting campaigns in rural areas especially in land owned by family members

7.0 Way forward

- ▶ TAHECECO and PDI will continue to mobilize resources and find new networking opportunities for tree planting campaigns at local levels
- ▶ TAHECECO and PDI will conduct training of tree growers associations to make them able to produce enough and appropriate tree species for tree planting campaigns in Kigoma and Morogoro regions
- ▶ TAHECECO and PDI will continue to work with local communities and school environmental clubs in designing of tree planting programs in schools and other public areas in Morogoro, Kigoma and other regions upon availability of resources

8.0 Conclusion

- ▶ Tree planting campaigns as nature-based solutions for climate change are very important in addressing environmental conservation and sustainable development goals in national and local contexts. In this sense these campaigns have to continue and be supported to reach a good number of schools, villages and towns in Tanzania and other places in East Africa.
- ▶ Government authorities and Civil Society Organizations (CSOs), Companies and individuals have to join efforts to address climate change through small and medium projects which can gather resources at district levels when making efforts to seek resources from international partners dealing with climate change issues.

8.0 Conclusion.....

- ▶ **TAHECECO and PDI** will continue to use Public Private Partnerships (PPP) in Tanzania to address the climate change challenges through tree plantings, the use of clean energy sources and conduct interactive dialogues in form of Communities of Practices (**CoPs**) and accountability mechanisms to gather efforts of state and non-state actors in climate change actions as well as advocating for better climate laws in ensuring that the current and future generations enjoy the healthy environments. TAHECECO and PDI will make **efforts to introduce small agroforestry project in schools to support nutrition and environmental conservation.**
- ▶ Because the government in Tanzania through the ministry of natural resources and tourism, Tanzania Forest Services (**TFS**) and local/national CSOs work in cooperation we see this as a supportive and enabling environment for advocating for climate actions in equitable, gender-sensitive and participatory way for the survival and sustainable development of populations in **Tanzania and across the globe.**

TAHECECO and PDI

THANK YOU

WELCOME TO KIGOMA AND MOROGORO REGIONS IN TANZANIA

Contact Us: tahececocollaboration@gmail.com

pdi4community@gmail.com



Questions?

Thank you!

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Suggested donation: \$25 for this session

