UN CLIMATE CHANGE CONFERENCE UK 2021

FUTURES WE WANT

Water

Visions of feasible, desirable and resilient net-zero futures

WATER IN 2050

As part of the 'Futures We Want' project, academics and citizens in six global regions – the Arabian Peninsula, Brazil, India, Jamaica, Kenya, and the UK – shared their vision of a net-zero climate-resilient future, with water emerging as a key theme for some.

WATER IN 2050

Across four thematic documents, we explore content from our regional research and workshops in parallel, so that we can start to build a picture of how water might look different in 2050. We explore:

> How we secure supplies of water for drinking and sanitation

> How we manage other water demands, especially agriculture, without depleting groundwater supplies and critical ecosystems

> How we will mitigate the risks of floods and water scarcity, and adapt as climate change makes these more common in many regions

> The roles played by technology, infrastructure, policy, and human behaviour

ABOUT THESE VISIONS

This document presents visions of our relationship with water in 2050. These visions are not a prediction of exactly what will happen. The goal is to paint a picture of the challenges, changes, and opportunities that a net-zero, climate-resilient world could bring.

The visions are composites, bringing together:

> Evidence and insights, gathered by academics in each of the regions in focus for this project

> Workshop inputs from a cross sections of citizens in each region – with representation from government, civil society, youth, industry and Indigenous populations.

This document combines evidence and insights with the stakeholder views, organised according to themes that were common across regions. Throughout the document, evidence and insights are included in the form of regional illustrations of the some of the challenges and solutions relating to a net-zero and climate-resilient 2050. Workshop inputs are clearly signposted to show where these solutions are especially desirable. Pull-out quotes reflect the ideas and opinions shared in the workshops with in-region stakeholders, and while some are captured verbatim, others reflect the spirit of the views shared.

Discover more about the project online at **WWW.FUTURESWEWANT.WORLD**

KEY THEMES

By 2050, the world will have changed its relationship with water. Climate change will bring several water-related resilience challenges, including unpredictable rainfall, droughts, flooding, and rising sea levels.

Having water in the right place was clearly articulated as a challenge by workshop attendees. In India, fears were shared about access to drinkable water, while in Jamaica, an increased frequency and severity of storms, coupled with rising sea levels, was the key concern.

The best responses to these challenges will depend on local context, although there are some common themes. New infrastructure will help countries reduce water waste, and aid in its conservation – for example, by reusing domestic wastewater in agriculture. A mixture of new and old farming practices will reduce the water intensity of growing food and rearing livestock. The relationship between water and other resources will also change by 2050 - with more demand for energy, required to purify and distribute clean water.

Restored uplands in many regions will help to maintain groundwater and river supplies, as well as reducing flooding. Shifts in policy, investment and behaviour will help alleviate water issues, promoting water conservation and re-use.

KEY THEMES

ACCESS TO CLEAN WATER

Droughts and water scarcity will be exacerbated by climate change in many regions. Some are more challenged than others: Jamaica, for instance, depends on groundwater supplies for 90% of its water demands, making it highly vulnerable to the impacts of increased temperatures leading to higher evaporation, reduced rainfall causing drought, and increased sea levels and storm surges causing incursion of sea water. Meanwhile, by 2040 countries in the Arabian Peninsula are likely to be the most water-stressed countries in the world; this raises the risks of water contamination, poor sanitation, food and waterborne pathogens, and vector-borne disease in the region.

By 2050, a range of adaptation tactics will help alleviate this on a global scale.

Major infrastructure investments are essential across most of the regions we looked at as part of this project, to harvest and store rainwater, and pump water to where it needs to be – enhancing quality in the process. Brazil, for example, has a current average water loss rate of 37% due to leakages, a lack of management and theft.

Decentralisation may be part of the solution for 2050. Expanding the construction of water cisterns for rural populations could lower water loss, providing residents with resilience against the impacts of more frequent droughts. In regions like Kenya, this brings other advantages, especially for women and children - who might be saved long walks to collect water.

Enhancing access to quality freshwater offers many other co-benefits. A globally recognised success story in water conservation comes from the Indian state of Rajasthan, where the NGO Tarun Bharat Sangh worked in partnership with local women to help restore water supplies, and forest and soil regeneration, particularly in upper water catchments. This increased water availability in 1,000 villages, and greatly improved farmland productivity. Such techniques – bringing together low-cost infrastructure, natural solutions, and education – can be replicated globally.

WHAT PEOPLE SAID
UK

“BY 2050, WE MUST LOOK AT THINGS LIKE URBAN PLANNING IN TERMS OF WATER TOO”

– WORKSHOP PARTICIPANT

WHAT PEOPLE SAID
ARABIAN PENINSULA

"Let's not innovate for innovation's sake! Flashy drones and high tech are a bit of a distraction when water becomes too salty for desalination to work"

– WORKSHOP PARTICIPANT

"By 2050, I want us to have explored air to water capture solutions - solar panels that produce water"

– WORKSHOP PARTICIPANT

KEY THEMES

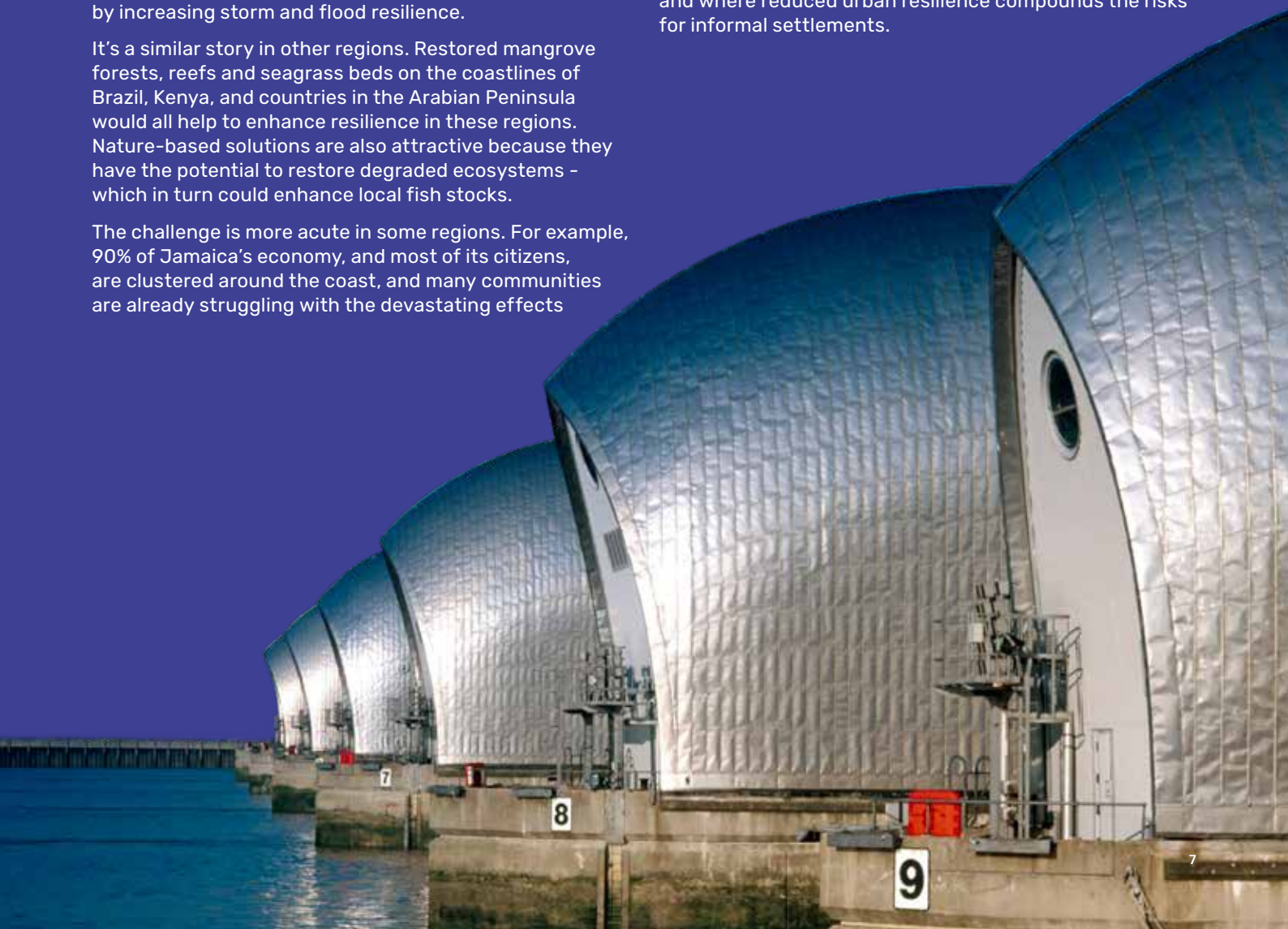
FLOOD RESILIENCE

While the impacts will not be felt equally around the world, rising sea levels will increase the global risk of flooding. The response will vary from region to region, considering geography and economic wealth. In the UK, major investment in flood defences will be required to protect coastal towns, and buildings on flood plains. Nature-based interventions will also play a role: restored fens and coastal marshes could potentially bring protection against negative impacts for people and the economy by increasing storm and flood resilience.

It's a similar story in other regions. Restored mangrove forests, reefs and seagrass beds on the coastlines of Brazil, Kenya, and countries in the Arabian Peninsula would all help to enhance resilience in these regions. Nature-based solutions are also attractive because they have the potential to restore degraded ecosystems - which in turn could enhance local fish stocks.

The challenge is more acute in some regions. For example, 90% of Jamaica's economy, and most of its citizens, are clustered around the coast, and many communities are already struggling with the devastating effects of tropical storms. Relocating people to more secure locations in Jamaica may be part of the solution - and workshop delegates in the region expressed a desire for a strong legal and regulatory framework to ensure careful management of the land and coastline by 2050.

Getting flood and coastal management right is especially critical in developing countries, where flooding increases the prevalence of water-borne diseases such as cholera, and where reduced urban resilience compounds the risks for informal settlements.



KEY THEMES

EVOLVING AGRICULTURE

Agriculture has a substantial effect on the water system: all crops require water, and many of the most economically important ones are highly water intensive. Coffee and tea, grown widely in developing countries such as Kenya, are just two examples.

In a world where tough decisions might need to be made about how to allocate water resources, agricultural practices will need to change, so that water is used more effectively. For example, using domestic wastewater for agricultural irrigation can reduce pressure on freshwater availability. Agroecology techniques, which combine crop cultivation with the protection of surrounding habitats, such as trees, may help to reduce water stress. This is particularly important in countries like Brazil and Kenya, where agriculture is economically crucial, and the preservation of water supplies, natural habitats, and hydroelectric power generation can come into conflict.

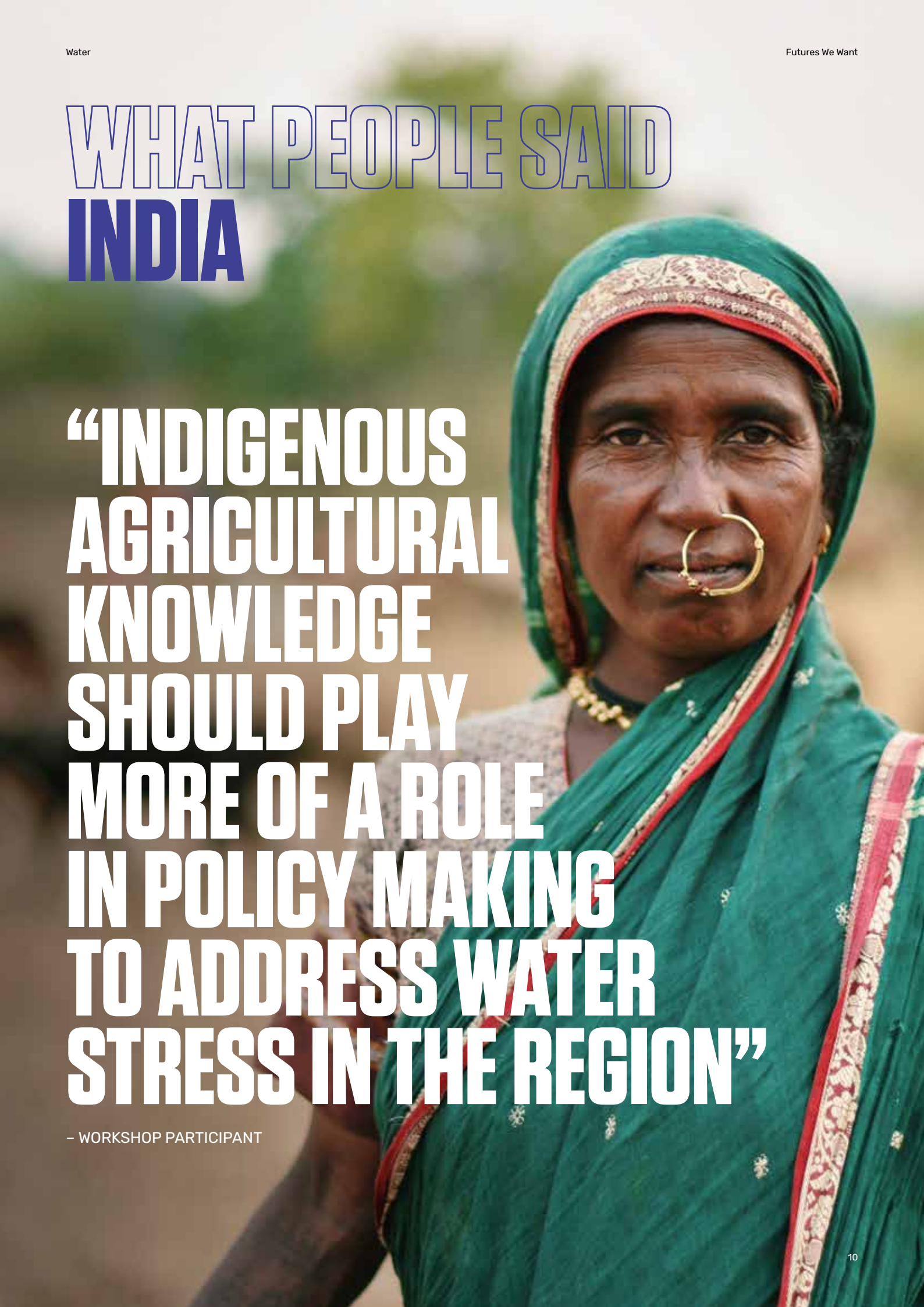
Newer techniques and technologies offer a glimpse of how we can reduce water intensity while feeding the world. In the Arabian Peninsula, farmers are using a range of different techniques including hydroponics – growing plants without soil – and vertical farming. Desalination technology will likely scale, and liquid nano clay treatments and the use of hydrophobic sand may also improve water retention in marginal soils.

WHAT PEOPLE SAID THE UK

"The circular economy isn't just about carbon. Water is a key part of it too"

– WORKSHOP PARTICIPANT

WHAT PEOPLE SAID
INDIA



"INDIGENOUS AGRICULTURAL KNOWLEDGE SHOULD PLAY MORE OF A ROLE IN POLICY MAKING TO ADDRESS WATER STRESS IN THE REGION"

– WORKSHOP PARTICIPANT

KEY THEMES

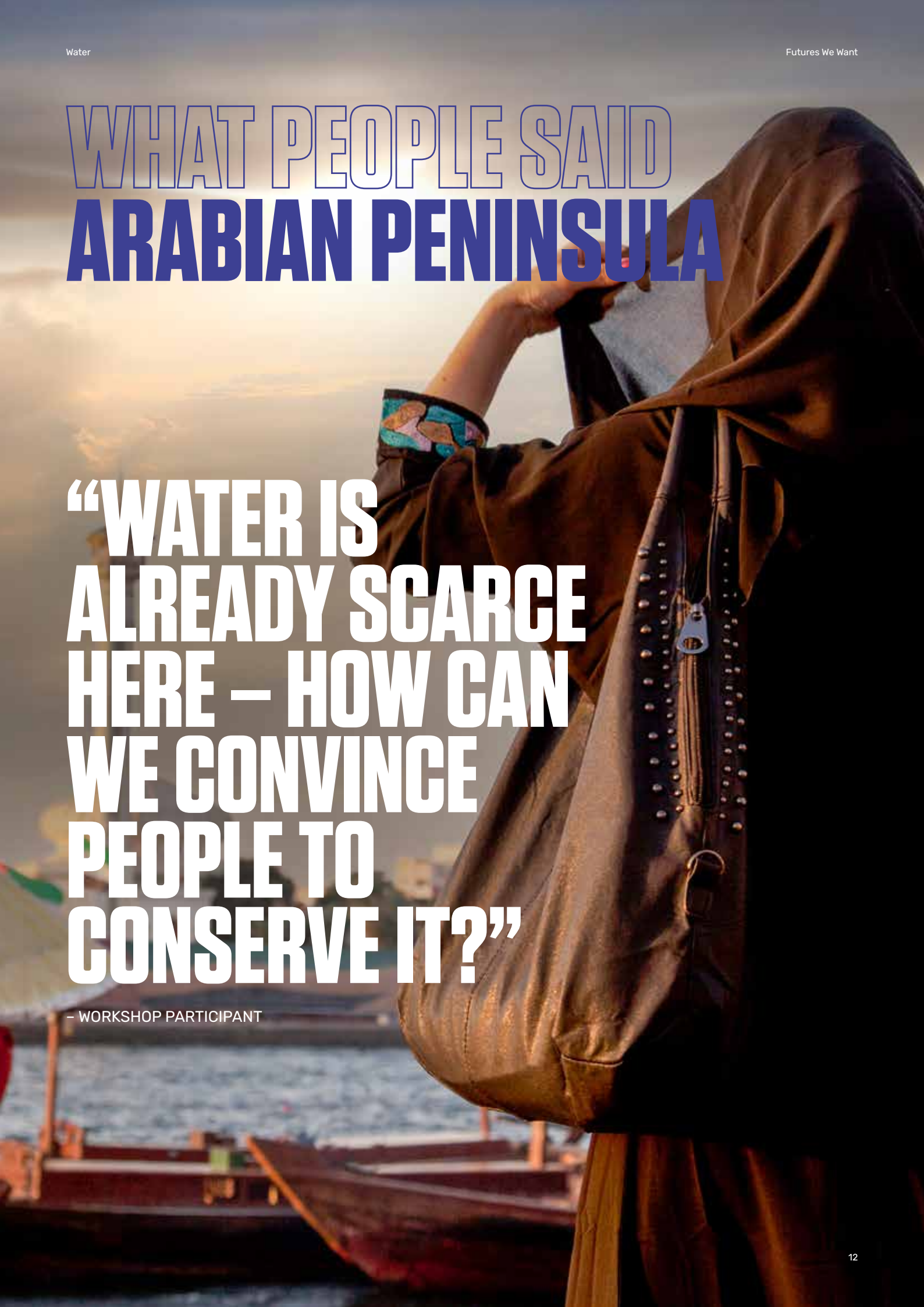
WATER RESPONSIBILITY

Against the backdrop of more widespread water stress, public policy and behaviour will also need to evolve to meet the world's needs in 2050. Water conservation efforts will include everything from water-saving technologies like low-flow taps and showers to awareness campaigns to promote citizen behaviour change.

One example of a policy intervention in this area comes from the Kingdom of Saudi Arabia, which has committed to reducing water use by 43% by 2030 through water awareness campaigns, new technologies like low-flush toilets, and by introducing cost-reflective tariffs for households.

In Kenya, the Ministry of Water rapidly built new water infrastructure including water storage tanks and over 5,000 handwashing stations in response to the COVID-19 pandemic. This shows how an urgent problem can drive infrastructure efforts, which is likely to be key in the global response to water challenges.

WHAT PEOPLE SAID
ARABIAN PENINSULA



"WATER IS ALREADY SCARCE HERE – HOW CAN WE CONVINCE PEOPLE TO CONSERVE IT?"

– WORKSHOP PARTICIPANT

WHAT PEOPLE SAID THE UK

"We need to develop a culture of water responsibility"

– WORKSHOP PARTICIPANT

WHAT PEOPLE SAID KENYA

"We need to prioritise water recycling – particularly for secondary uses"

– WORKSHOP PARTICIPANT

KEY THEMES

A JUST APPROACH

Water resources are not distributed evenly around the globe – for instance, one fifth of the world's freshwater lies within the Brazilian Amazon. Climate change will impact water availability in different regions to different degrees, with lower degrees of predictability about global precipitation patterns, and particularly acute effects in warmer countries. And while nature- and community-based solutions play a role, responding to water challenges will also require significant investment.

Inequalities are not just between countries, but within them too. In Kenya, for example, pastoral communities are already starting to encroach into game parks as they seek water and pasture for their communities. In 2017, violence broke out between pastoralists and cattle ranchers – which may become a more common global challenge if equitable access to water is not secured.

This demonstrates the vital importance of a cooperative response to water challenges, that takes into account both current discrepancies and issues arising from climate change.

WHAT PEOPLE SAID INDIA

"We need to make sure drinking water and groundwater is available across Northern India"

– WORKSHOP PARTICIPANT

"By 2050 we believe that India will have a sustainable supply of clean water. Both rural and urban communities will have access to clean drinking water"

– WORKSHOP PARTICIPANT

WHAT PEOPLE SAID JAMAICA

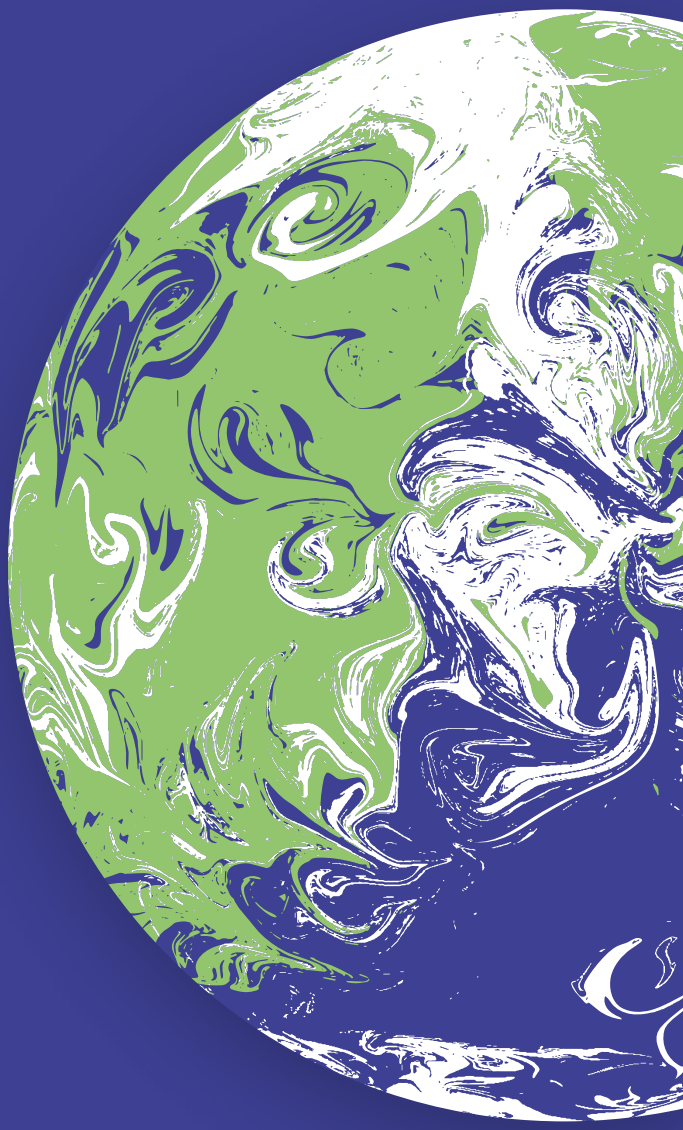
"As someone who lives outside of the city I'd like to see rural Jamaica have equal access to potable water as urban areas"

– WORKSHOP PARTICIPANT

CONVERSATION STARTERS

This project is a thought experiment, offering more access to leading-edge science from around the world, and a window into people's hopes, fears and ideas for a net-zero, climate-resilient future. It's designed to give citizens a voice, and policymakers a more international and more inclusive perspective.

By profiling some of the solutions and innovations where water is concerned, this document aims to inspire action on climate change around the world.



QUESTIONS TO START THE CONVERSATION INCLUDE:

> What role can new infrastructure projects play in securing a reliable supply of freshwater?

> How can nature-based solutions enhance the resilience of both freshwater systems and coastal regions?

> What policy gaps need to be closed most urgently – at a community or national level?

> What might need to shift to manage the risks of there being too much water in some places, and not enough in others?

ABOUT THIS PROJECT

This report is part of a set of visions commissioned in 2021 by the UK ahead of their COP26 Presidency. These visions aim to explore what the future could look like in a climate-resilient, net-zero world. They highlight some of the innovations that could make this future a reality, and explore what science can tell us about the wide-ranging benefits of achieving this future.

THE VISIONS COVER:

> A series of cross-cutting themes: Water, Land and Food, Energy and Built Environment.

> Six regions: the Arabian Peninsula (specifically focused on the Kingdom of Saudi Arabia and the United Arab Emirates), Brazil, India, Jamaica, Kenya, and the UK.

They were chosen to reflect the diversity of challenges and opportunities in building a sustainable future.

WHAT WE DID

These visions were created in three stages between April and August 2021:

> Collaboration by academics from the six regions, coordinated by the University of Cambridge, gathered existing research from around the world on science and innovation solutions that could support a global transition to a resilient, net-zero future.

> The findings of these academics were shared with groups of citizens, from each of the six regions, who were then asked to share their hopes and ideas for their own region in a resilient, net-zero, climate-resilient world. These citizens came from a variety of groups and backgrounds, with representation from industry, youth groups, civil society, government and Indigenous populations.

> The research from the academics and the ideas and perspectives from the citizens were brought together to create these visions.

ACKNOWLEDGEMENTS

We would like to thank the in-country experts and our workshop participants without whom this project would have been impossible.

Thank you all for your generosity, thoughtfulness, and enthusiasm.

The project was delivered by a consortium led by Deloitte, and including AECOM, the University of Cambridge, One Young World and Radley Yeldar.

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