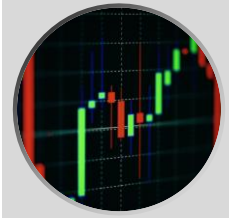
Climate change and health

Case studies and opportunities for sharing experiences

UN CLIMATE CHANGE CONFERENCE UK 2021

COP26 Campaign aims

Bringing countries together to tackle shared climate challenges and accelerate progress towards a zero emission, resilient global economy



	Adaptation and resilience	Energy transition	Clean transport	Nature	Finance
COP campaign aim	Encourage greater political ambition, tools, finance, coordination and commitments to support practical adaptation and resilience action	Seize the opportunity of rapidly falling renewables and storage costs to accelerate zero-carbon transition	Accelerate the transition to zero carbon road transport by phasing out petrol and diesel engines	Protect and restore our natural habitats and ecosystems on which our climate, air, water and way of life depend	A green transformation of the financial system so that all countries have access to funds for climate investment
Health aim	Build climate resilient health systems, and support adaptation in food systems, water and sanitation, transport and energy systems	Guide a rapid transition to clean renewable energy, to save lives from air pollution, particularly from coal combustion. Ensure energy security for health facilities and decrease energy poverty.	Promote sustainable, healthy urban transport systems, including active and public transport, and the rapid phase out of petrol and diesel engines	Protect and restore nature and ecosystems, the foundations for healthy lives and sustainable livelihoods	Invest in climate-resilient health systems. Value health gains from carbon mitigation and adaptation policies, fossil fuel-subsidy reform and carbon pricing

Action on finance underpins all other COP campaigns

Adaptation & Resilience

Evaluation status and which **COP26 campaign areas the case example links to** is indicated on the case slides

Adaptation & resilience and health

Even if we stopped emissions rising today, the world would **still need to deal with the consequences of climate disruption**

Impacts are already being felt across the world, with the **climate vulnerable communities hit the hardest**

Existing inequalities exacerbate the **impacts of climate change for individuals and communities**, limiting their resilience whilst constraining their options to act

Climate adaptation is crucial, and **includes strengthening the resilience of health and food systems, water and sanitation sectors amongst others- *urgently***

Through the COP 26 Presidency we will push for greater political ambition, tools, finance, coordination and commitment to support **practical adaptation and disaster preparedness/response**

Success will require coordination, collaboration and shared learning across scales, sectors and cultures

Health systems must urgently adapt for climate impacts

Adaptation of health systems is unavoidable…

The longer it takes to reduce emissions, the greater the adaptation needed to protect the vulnerable

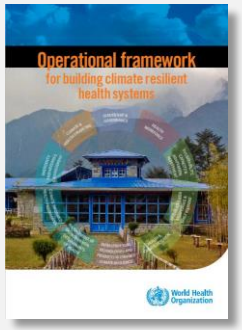
Supporting the adaptation of health systems and health determining sectors is essential whatever the extent of mitigation[1]

…but current efforts largely insufficient

- Just 10% (18 out of 184) of countries' Nationally Determined Contributions (NDCs) emphasise the health benefits of mitigation, and **3% (5 out of 184) emphasise the health benefits of adaptation**
- Of those 18 NDCs, only 2 signal quantifying or monitoring health benefits to inform decision making
- Only 1 in 5 NDCs refer to National Adaptation Plans (NAPs) or National Adaptation Plans of Action (NAPAs) in relation to public health[2]

Source: (1) COP24 special report: Health and Climate Change; (2) WHO Review: Health in the Nationally Determined Contributions (2020)

A&R | Tools and Initiatives (Health Systems Resilience)



WHO operational framework for climate resilient health systems, 2015[3]

Identifies 10 key components for action to strengthen health systems resilience and improve their ability to anticipate, prevent, prepare for and respond to climate-related health risks[3]

- Most NDCs (100 out of 184) refer to adaptation actions that correspond with at least 1 of the 10 components of the framework, only one current NDC considers all 10 components (2019)[2]

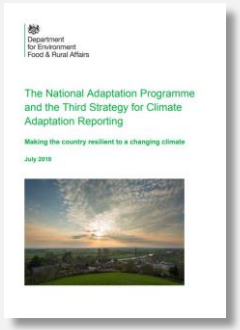
New Guidance – Climate Resilient and Sustainable Health Care Facilities (WHO)[22]

BRACE framework: Building Resilience Against Climate Effects[4]

- BRACE[4,5] (US CDC) sets out the steps for designing strategies and programmes that improve population resilience to climate change:
  - Anticipating and projecting health impacts
  - Implementing adaptation plan for both climate and health
  - Assessing public health interventions including quality
  - Evaluating impact

Source: (2) WHO Review: Health in the Nationally Determined Contributions (2020); (3) WHO Operational framework for building climate and resilient health systems; (4) CDC's Building Resilience Against Climate Effects (BRACE) Framework; (5) Marinucci et al (2014); (22) WHO Climate Resilient and Sustainable Health Care Facilities

A&R | UK initiatives



The National Adaptation Programme (NAP) 2018[7]

- The NAP sets out **actions that government and others will take to tackle climate change** in the UK
- NAP responds to the Climate Change Risk Assessment (CCRA), which the UK Govt is required to issue every 5 years under the 2008 Climate Change Act
- Important features of the NAP:
  - **Heatwave Plan** and **Cold Weather Plan** for England
  - Efforts already underway 'to **integrate climate in the health and planning systems**'
  - Commits to managing existing **plant/animal disease** and limiting new ones; and tackling non-native species
  - Commits to an **Environmental Land Management** scheme which will deliver environmental outcomes, protect soils and natural carbon stores

Heatwave Plan for England[8,9]

- Published annually since 2004
- Sets out **steps to deal with significant periods of hot weather** for frontline responders including the NHS, local authorities, public agencies, health professionals, individuals, local communities and voluntary groups
- Describes a **heat-health watch alert system** based on Met Office forecasts and data, that triggers levels of response
- Information updated to consider COVID-19
- Local heatwave plans exist for all NHS providers interviewed[9]
- New Single Adverse Weather plan under development to improve integrated response

Source: (7) The National Adaptation Programme (2018); (8) Heatwave Plan for England; (9) Evaluation of the Heatwave Plan for England

Evaluated; Links with Energy Transition, Nature

Collaboration is essential

The Risk-informed Early Action Partnership (REAP) launched at the 2019 UN Climate Action Summit (UNCAS)

Brings together partners to drive systemic shift towards preparedness and anticipatory action to save lives and protect livelihoods. Resilient health and social protection systems integrated into a multisectoral all hazards approach is central to this approach

REAP Risk-informed Early Action Partnership

REAP targets

50 countries have reviewed and integrated disaster risk management and climate adaptation laws, policies and plans

1 billion more people are covered by financing and delivery mechanisms linked to effective early action plans

$500 million invested in early warning systems to target early action in ‘last/first mile’ communities

1 billion more people are covered by new or improved early warning systems by 2025, including for heatwaves[6]

Source: (6) REAP: Risk-informed Early Action Partnership; Information provided by REAP Secretariat

Summary | Learnings from international A&R cases studies

Monitoring and evaluation of climate-health actions on the ground is currently weak

Health systems manage change better by **incorporating indigenous and local people's traditional knowledge and priorities** into collaboratively designed and co-implemented health plans[11]

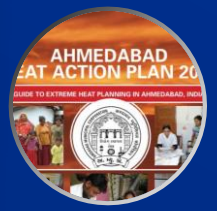
Improving **access to water** improves the health, sanitation, and nutrition of poorer communities[14]

Economically empowering poor women has shown multiplicative effects and translates to better child health development[11]

Adapted and resilient agricultural systems have multiple health co-benefits through increased incomes, diversified livelihoods (and hence risks) as well as improved food security amongst others[14]

A&R actions are potentially **financially self-sufficient and sustainable over time**[12]

Maladaptive trajectories of the Shawla People, Peru



Ahmedabad Heat Action Plan 2016, India

Partners for resilience Programme, Ethiopia

Y-Adapt Programme, Haiti

Source: (11) Zavaleta et al (2018); (12) Ahmedabad Heat Action Plan (2016); (14) Partners for resilience (PfR) Ethiopia integrated risk management program

Incorporating Indigenous and Local Knowledge (ILK)[10]

Maladaptive trajectories for the Shawi, Peru[11]

- Limited data exists on **impacts of climate change on populations already experiencing poor nutritional indicators**, such as indigenous Amazonian populations
- Potential maladaptive pathways of the food system in the Shawi community were identified using a series of interviews, workshops and community events
- **Community and user participation was integral**, with community leaders, women, and traditional healers as teachers and researchers being the learners
- Indigenous health workers were integrated into the regional health system, resulting in building a **medicinal plant garden** with a Shawi family volunteering to care for it
- Co-benefit: **empowerment of women**, who formed a handcraft organization as an offshoot of participation in the project

Key learning points for health systems

Health systems need to:

- **Understand cultural and nutritional value of food and resources**, and include indigenous people's traditional **knowledge and priorities** to collaboratively design health and nutrition plans to manage change better
- Innovate strategies to respond to population food preferences, nutritional and health needs, and **adapt to increasing extreme weather events**
- **Adapt to technological changes**, exploring adoption of techniques like photovoice and cell phone use
- Work with indigenous workers at the **local level** who understand and are trusted by communities

Poster created by Shawi male participants in the photovoice workshop to discuss current food security (Zavaleta et al.(2018)

Source: (10) Adapt To Eat, Peru; (11) Zavaleta et al (2018)

Evaluated; Links with Nature, Finance

Case studies

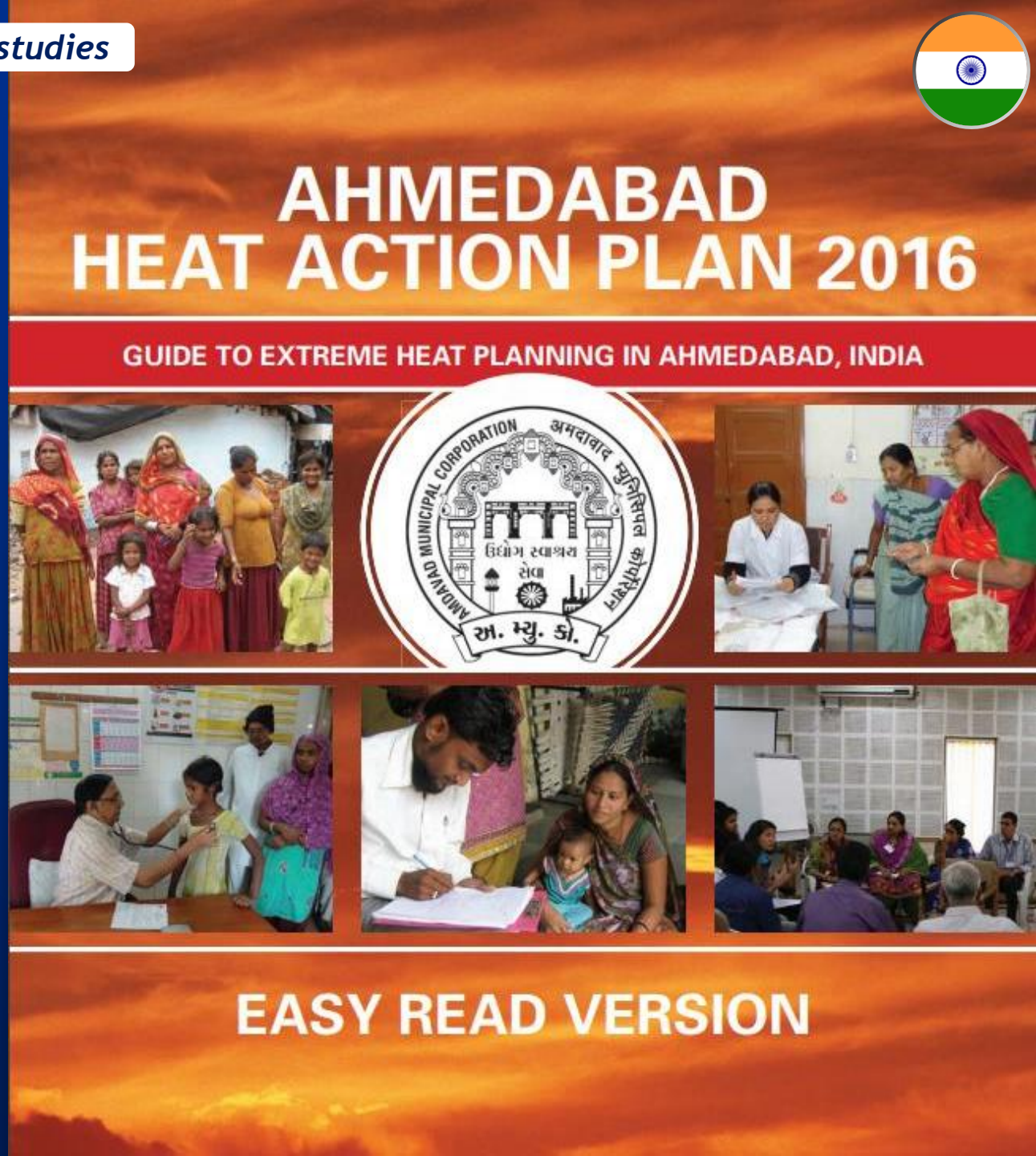
The city of Ahmedabad, India, saves ~1,000 deaths annually through its heat plan[12]

Detailed within the plan:

- Building public awareness and community outreach
- Implementing an early warning system and inter-agency coordination
- Developing warning messaging
- Capacity building among healthcare professionals
- Reducing heat exposure and promoting adaptive measures such as the Ahmedabad Cool Roofs Program; potentially contributing to reducing cooling demand

Meaningful outcomes since implementation:

- ~ 1,000 deaths annually avoided after implementation of the adaptation measures[13]
- Illustrates successful adaptation in a developing country without external funding



Source: (12) Ahmedabad Heat Action Plan (2016); (13) Hess et al. (2018)

Evaluated; Links with Energy Transition

Strengthening community capacity, capability and resilience

Partners for Resilience Programme (PfR), Ethiopia[14]

- PfR is an alliance of 5 Dutch NGOs, financed by the Dutch Ministry of Foreign Affairs
- Aims to **reduce the impact of natural hazards** on the livelihoods of community members
- PfR introduced **agricultural innovations** including improved preharvest technology and soil- and water-conservation techniques in program areas
- Improved the **resilience of communities** (increased incomes, diversified livelihoods, improved food security) and access to WASH[1]
- However, in absolute terms, some indicators remained low because PfR targeted communities with poorer-than-Ethiopian-average baseline conditions, and programme areas were affected by repeated, severe droughts

Y-Adapt Programme, example from Haiti[15]

- Y-Adapt is a curriculum for young people, to help them understand climate change and **champion practical adaptation action on the ground**
- Youth engage their local communities to reduce climate change impacts and **become part of the global Y-Adapt community**
- Three examples of youth-led adaptation strategies from around the world considered relevant to local context:
  - Advocate for learning to swim in Bangladesh to save lives during floods
  - Community gardens in Niger to provide food and income during the dry season
  - Street mapping of danger areas during storms and floods in the Philippines

Note 1: WASH = water, sanitation and hygiene. Source: (14) Partners for resilience (PfR) Ethiopia integrated risk management program: Final evaluation (2008); (15) Red Cross Red Crescent Climate Centre: Y-Adapt pilots' global launch in Haiti

Energy Transition

Evaluation status and which **COP26 campaign areas the case example links to** is indicated on the case slides

The value of health gains could be twice the cost of climate mitigation

Renewable costs are falling rapidly, and scaling them up at pace is needed to meet the Paris Agreement

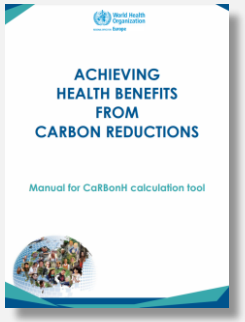
- Fossil fuels should be phased out as fast as possible, with coal being a particular priority
- Renewables are at 25% of global electricity production
- At least 65% renewables needed by 2050 to keep to 2°C[2]

Health benefits from the energy transition

- The pace and type of mitigation can have direct effects on health, with **improved air pollution** a major benefit to health from energy transition
- Social cost of carbon & social value of mitigation both increase when considering human health
- **Remote health and care facilities can benefit from stable electricity** supplies from renewable sources, improving service delivery through effective refrigeration of medicines and vaccines[1]
- Economic benefits from reduced reliance on imported fuel, improving energy security

Source: (1) COP24 special report: Health and Climate Change; (2) WHO Review: Health in the Nationally Determined Contributions (2020)

Energy Transition | tools and initiatives



Achieving health benefits from carbon reductions: Manual for CaRBonH calculation tool[16]

- Tool can help quantify health benefits of expected reductions in air pollutant emissions by country (for the WHO European Region)
- Indicates annual preventable premature deaths could be 138 000 across the region
- Equivalent to savings of US$244–564 billion, or 1–2% of GDP of the Region, with saved costs of treating illness (US$34.3 billion) amounting to 6–14% of the total economic benefit

Powering Past Coal Alliance[17]

- Campaign led by Canadian Association of Physicians for the Environment and the Pembina Institute resulted in commitment to phase out coal by 2030 in Alberta and across Canada[17]
- As a result, at COP23 Canada and United Kingdom launched the **Powering Past Coal Alliance**, where over 20 countries committed to phase out coal by 2030[18]
- Coal use must peak by 2020, and reduce quickly after, with unabated coal-fired power globally phased out before 2040 (some 10 years earlier than previous estimates) to keep global temperature rise below 1.5°C[19]

Source: (16) WHO CaRBonH tool (2018); (17) Backgrounder: phasing out Alberta's coal plants. Toronto: Canadian Association of Physicians for the Environment (2018); (18) Powering past coal alliance declaration. London: Department for Business, Energy & Industrial Strategy (2017); (19) Global and regional coal phase-out requirements of the Pari Agreement: Insights from the IPCC Special Report on 15°C: Climate Analytics (2019)

Energy Transition | Initiatives in the UK health sector

Established in 2008, the Greener NHS team (formerly NHS Sustainable Development Unit) has promoted sustainable environmental, social, and financial development in the health care system

Despite increased clinical activity, the NHS, public health and social care system has demonstrated significant progress:

- **62% reduction in emissions for the NHS Carbon Footprint, which significantly exceeds the 37% requirement for 2020 outlined in the Climate Change Act** (1990 baseline)
- **Wider NHS Carbon Footprint Plus has also delivered meaningful improvement on the 1990 baseline, with estimated reduction of 26% by 2020** (1990 baseline)

Delivering a Net Zero NHS:

- NHS England and NHS Improvement became the world's first health system to commit to become 'carbon net zero', backed by clear deliverables and milestones
- Reach net zero by 2040, with ambition to reach 80% reduction by 2028-2032

Source: (20) Delivering a 'Net Zero' National Health Service

Evaluated; Links with Clean Transport

Summary | learnings from international energy transition case studies

Burden of climate change falls hardest on health sector to mitigate its impact. Energy transition is an opportunity for health to show leadership on climate change.

Low-carbon health facilities are **more cost-effective to run, more productive and improve access to health care**, especially in energy-poor settings; broader health benefits result from reduced environmental pollution[21,23]

Renewable energy sources potentially reduce power interruptions and improve **cold-chain maintenance for vaccines and other essentials**[23,24,25]

Return on investment through cheaper electricity and less reliance on fuel imports – **improved energy security and opportunity for reinvestment into health systems**[23,24,25]

Actions **are potentially financially self-sufficient and sustainable in time**[21,25]

Rebuilding healthcare facility, British Virgin Islands

Lake Turkana Wind Power Project, Kenya

Solar for Health, Africa

Source: (21) PAHO Health Emergencies; Smart Hospitals Toolkit; (23) Benefits of low emission development strategies: The case of Kenya's Lake Turkana Wind Power Project; (24) Annual Sustainability Report,; (25) UNDP Capacity Development for Health: Solar for Health

Case studies

Build Back Better: Health Facility Restoration in British Virgin Islands[21]

Following hurricane Irma, the toolkit was used in **rebuilding a care home in the British Virgin Islands**, with support from WHO regional, UK and Canada

Efficient lights and air conditioning units, solar PV, low-flow taps/toilets, and cool roofs helped to reduce costs of energy and water, **reducing the carbon footprint of the facility**

It is estimated that the solar PV cells alone **offset 20-30% of the facility's energy use**, and the other measures have reduced costs significantly

Strengthened roof with cool coating

Solar PV on the roof

Source: (21) PAHO Health Emergencies; Smart Hospitals Toolkit

Evaluated; Links with Adaptation & Resilience, Finance

Lake Turkana Wind Power Project (LTWP), Kenya[23]

Created in 2006, LTWP is the largest capacity wind farm in Africa at 310 MW. It represents Kenya's largest single private investment ever (US$685m)

- Mitigates 740 kt CO_2 equivalent annually
- Reduces hazardous air pollutants
- Improve access to food, health facilities and water, education and government services particularly for rural households
- Reduces reliance on imported fuel, sometimes needed due hydropower, which has been unreliable during droughts
- Create >2000 local jobs, 150 permanent
- Supports a number of SDGs

Source: (23) Benefits of low emission development strategies: The case of Kenya's Lake Turkana Wind Power Project; (24) Annual Sustainability Report, ltwp.co.ke

Evaluated; Links with Adaptation & Resilience, Finance

Winds of Change (WoC) Foundation

Set up by LTWP, Kenya the foundation implements community development projects in a number of sectors, with projects identified and undertaken after community consultation[24]

- Improvement in facilities:
  - Solar PV improved cold storage for medicine and food
  - Proper medical waste disposal
  - Improved maternity facilities
  - Reserve tanks for storage of clean water
- Improved health outcomes:
  - Infant mortality declined from 4 in 5 to 1 in 5 babies, and maternal mortality rate significantly reduced
  - With refrigeration the facility can now administer vaccines and treat snake bites
  - Solar lighting allowed extended and emergency access to healthcare at night

Solar for Health Programme

(United Nations Development Programme, UNDP)

More than 70% of health facilities in sub-Saharan Africa lack reliable access to electricity, impacting storage of medicines and vaccines

Solar for Health focuses on installing solar PV systems in health clinics located in the poorest and most remote regions of world, helping to ensure that no one is left behind

The programme is installing solar panels in health facilities in Zimbabwe, Zambia, Libya, Namibia, Sudan and South Sudan[25]

The total installed capacity so far is 6.5 MWh and **over 20 million women and children** can now access quality health services

It is estimated that **health facilities will see a 100% return on their investment in solar photovoltaic cells** within 2–3.5 years, which could be reinvested in other health sector priorities

Support a number of SDGs: 3 (good health and well-being), 5 (gender equality), 7 (affordable, clean energy), 13 (climate action) and 17 (partnerships for meeting the goals)

Zimbabwe

More than 2/3 of health clinics have only 4 hours of power supply per day. Solar energy provided to 405 HIV clinics, and can now provide 24/7 health services to the population

This reduced energy bills up to 60%, and allows **safe storage of medicines and vaccines**, and clean water from solar-powered pumps

Zambia

Medical Stores Limited (MSL) stores and distributes health products, but power interruptions were preventing refrigeration of medicines and vaccines

300 kwh of solar energy was installed and a heat shield in the central medical warehouses – **now guarantee quality of vaccines and medicines**

Source: (25) UNDP Capacity Development for Health: Solar for Health

Evaluated; Links with Adaptation & Resilience, Finance

Clean Transport

Evaluation status and which **COP26 campaign areas the case example links to** is indicated on the case slides

Clean transport can reduce air pollution, mitigate climate change, and bring health co-benefits

Clear health benefits of improving air quality

Together, PM2.5 and ozone concentrations from transportation emissions resulted in 7.8 million years of life lost and ~$1 trillion (2015 US$) in health damages globally in 2015[26]

Health gains of improved air quality outweigh costs…

Health savings from reduced air pollution could be between 1.4-2.5 times greater than the costs of climate change mitigation, globally[27]

…but air pollution & short lived climate pollutants (SLCPs) are under-represented in NDCs

Only **18 NDCs cite the reduction of air pollution and/or SLCPs to be a priority** mitigation action[2]

Health co-benefits of public transport run on clean fuel

- Co-benefits include reduced non-communicable diseases burden (cardiovascular and respiratory disease), injuries, better mental health, among others[28]
- Access to public transport can reduce inequity, especially across vulnerable groups

Source: (2) WHO Review: Health in the Nationally Determined Contributions (2020); (26) Global snapshot of the air pollution-related health impacts of transportation sector emissions in 2010 and 2015, International Council on Clean Transport (2019); (27) Markandya et al. (2018); (28) World Health Organization. (2012). Health in the green economy : health co-benefits of climate change mitigation - transport sector

* Short-lived climate pollutants include black carbon, methane, tropospheric ozone, and fluorinated gases.

Clean transport & health | tools and initiatives

Urban Health Initiative[29]

Launched by the Climate and Clean Air Coalition, the initiative promotes an integrated approach to building cities in which good health is enabled and encouraged, with a focus on climate change, short-lived climate pollutants and air quality, including:

- **Mapping** the current situation
- Adapting and applying **health and economic tools** in a local context
- Developing and **testing scenarios**
- **Building capacity** to engage effectively
- **Communication and outreach** to sustain and mobilize support
- **Monitoring** results and refining policy

Full range of tools from the Urban Health Initiative link[30]
https://www.who.int/initiatives/urban-health-initiative/guidance-and-tools

Health Economic Assessment Tool (HEAT)[31]

Summary of tools and guidance to facilitate shift to walking and cycling

- Methods for economic assessment of transport infrastructure and policies related to health effects of walking and cycling
- Systematic reviews
- Considers health effects of road crashes, air pollution, and effects on carbon emissions

AirQ+ tool[32]

WHO tool to calculate effects of long-term exposure to ambient and household (indoor) air pollution, including changes in life expectancy and health effects as air pollution levels change

Source: (29) Urban health initiative. Geneva: WHO (2018); (30) Guidance and Tools: Urban Health Initiative, WHO; (31) HEAT for cycling and walking, WHO 2017; (32) AirQ+Software Tool)

Clean Transport | Initiatives in the UK

Clean Air Day Campaign 2018[33]

UK's largest annual air pollution campaign culminated in a day of mass public engagement, including an information portal, face-to-face activities, press and social media

- Total media reach was >950 million (2018)
- Increased public understanding; more awareness of indoor air pollution; 45% now aware cyclists and pedestrians often breathe cleaner air than drivers
- +37% more cycle/walk a route they previously drove
- +22% open windows for ventilation when cooking or cleaning

Global Action Plan's research **revealed a massive 89% drop in London's air pollution on the day of the Marathon when the streets were closed off to traffic**

Source: (33) UK Clean Air Day 2018; (34) ECO Stars Case Study; (35) Reducing bus emissions in Brighton and Hove; (36) Philips et al. (2020) Centre for Research into Energy Demand Solutions: Oxford

Evaluated; Links with Energy Transition, Finance

ECO Stars Fleet Recognition Scheme[34]

- ECO Stars (Efficient Cleaner Operations) scheme, aimed at buses, taxis and coach and HGV fleets
- Tools and ongoing support to reduce costs makes scheme highly attractive and beneficial to local economy
- **Engagement with transport sector** key for success

Reducing bus emissions in Brighton & Hove[35]

- Targeted government grants to roll out cleaner vehicle fleets
- On busiest bus lanes **25% reduction in roadside NO_2** and **3µg/m³ reduction in roadside levels of particulate matter ($PM_{2.5}$)**

Electrically-assisted bikes (E-bikes)[36]

- If as much car travel as possible is replaced with E-bikes, this could **save up to 30 million tonnes of carbon emission per year**, equivalent to **50% of current CO2 emissions from cars**
- Greatest opportunity in **rural and sub-urban settings**
- Scope for e-bikes to help **people most affected by rising transport costs**

Summary | learnings from international clean transport case studies

Promoting **active travel** (such as walking and cycling) could have significant benefits on public health including averting substantial health costs, while also reducing emissions

Encouraging and improving access to **public transport can also improve equity** e.g. those without private vehicles[36]

Electric Vehicles (EVs) can help reduce emissions of air pollutants and greenhouse gases

Existing **fuel mix for electricity is important for impact of EVs** on air pollution: **Countries with carbon intensive/polluting fuel mix may not benefit from EV introduction**[38-40]

Ambitious policy announcements have been critical in stimulating the electric-vehicle rollout in major vehicle markets in recent years

Increasing EV numbers and charging points linked to **need for reliable and renewable power** supply[38-40]

Introducing electric vehicles, EU

Kathmandu Valley reduces air pollution, Nepal

Source: (36) Philips et al. (2020) Centre for Research into Energy Demand Solutions: Oxford; (38) Accelerating Implementation of Nepal's Nationally Determined Contribution: National Action Plan for Electric Mobility, Global Green Growth Institute (2018); (39) Kathmandu to mitigate air pollution with UHI: First in Asia, WHO (2019); (40) Health impacts of Kathmandu's air pollution, Clean Energy Nepal (CEN) and Environment and Public Health Organization (ENPHO) (2003)

Health and environmental benefits from electric vehicle introduction in EU countries[37]

Comparing the societal impact of EV introduction in EU-27 under different **scenarios for electricity production** found countries that rely on low air pollutant emitting fuel mixes may gain millions of Euro/year in terms of avoided external costs

- Electric vehicles (EV) cause **less air pollution in countries with clean energy** fuel mix, but countries with carbon intensive energy fuel mix **may not benefit from EV introduction**

- Electric vehicles can also act as **energy storage capacity** and introduction of EV may stimulate the introduction of wind turbines (or the other way around)

Source: (37) Buekers et al. (2014)

Nepal's Kathmandu Valley: reduce air pollution

Health impact of air pollution in Nepal (2013)

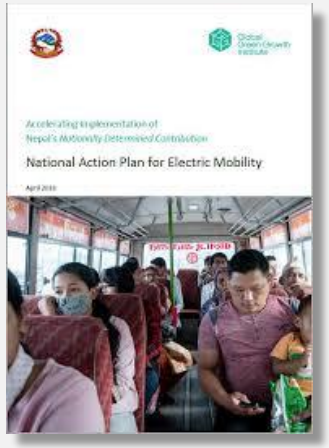
- >9000 deaths per year in Nepal are attributed to air pollution[38]
- Air pollution-induced loss of welfare US$2.8 billion (~5% of GDP), equivalent to ~40% of losses and damages caused by 2015 earthquake[38]

Urban Health Initiative provided data and advice on solutions, for the first time in Asia[39]

- Initiated by WHO, Ministry of Health and Population, in close collaboration with Ministry of Forests and Environment, International Centre for Integrated Mountain Development, UN-Habitat, and other local stakeholders
- UHI identified four major sources of air pollution - solid waste, transport, industry/brick kilns, and household energy sectors - in the Kathmandu Valley, as well as several viable solutions to mitigate air pollution and improve public health[39]

Reducing PM10 to WHO guidelines could:

- Reduce acute childhood bronchitis by ~135 000 cases
- Avoid half a million asthma attacks
- Cut chronic bronchitis by ~4000 cases[40]



National Plan for Electric Mobility (NPEM)[38]

Government set out ambitious targets which will have positive impacts on air quality and health and **link explicitly to Nepal's NDC targets**

The need to increase EV numbers and charging points is directly linked to the need for a **reliable and renewable power supply**

Source: (38) Accelerating Implementation of Nepal's Nationally Determined Contribution: National Action Plan for Electric Mobility, Global Green Growth Institute (2018); (39) Kathmandu to mitigate air pollution with UHI: First in Asia, WHO (2019); (40) Health impacts of Kathmandu's air pollution, Clean Energy Nepal (CEN) and Environment and Public Health Organization (ENPHO) (2003)

Nature

Evaluation status and which **COP26 campaign areas the case example links to** is indicated on the case slides

Nature-Based Solutions(NBS) are key to addressing climate related health threats

Current negative trends in biodiversity and ecosystems undermine progress towards 80% (35 out of 44) of assessed targets of Sustainable Development Goals related to poverty, hunger, health, water, cities, climate, oceans and land[41]

Health-impacts linked to nature are of largest concern in NDCs[2]

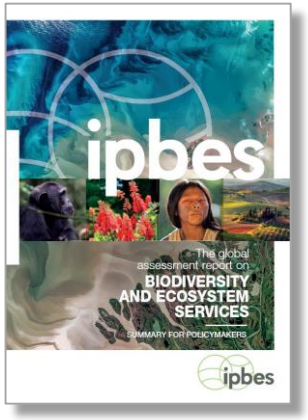
- **Vector-borne diseases** highlighted in 33 NDCs
- Food and **nutrition insecurity** emphasized in 27 NDCs

Many of the climate health threats could be addressed with nature-based, **often low-cost approaches, with multiple benefits**[42,43]

NBSs are a **realistic and economically viable** option for climate action, providing **over 30% of mitigation potential** and **scalable solutions** to increase resilience and adaptation[44]

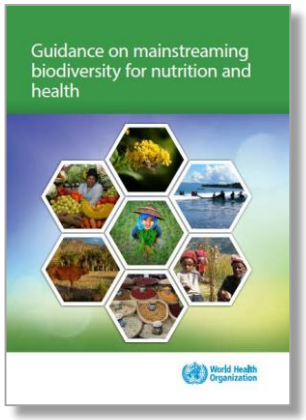
Health sector can **assess and advocate for such interventions** as part of a holistic approach to sustainable development[1]

Source: (1) COP24 special report: Health and Climate Change; (2) WHO Review: Health in the Nationally Determined Contributions (2020); (41) IPBES (2019): Summary for policymakers of the global assessment report on biodiversity and ecosystem services. IPBES secretariat, Bonn, Germany; (42) Kabisch et al. (2017); (43) Urban green space: a brief for action, WHO (2017); (44) Report of the Secretary-General on the 2019 Climate Action Summit and the Way Forward in 2020



IPBES* global assessment report on biodiversity and ecosystem services[41]

List of possible actions and pathways for sustainability, with suitability for place, system, decision-making process and scale

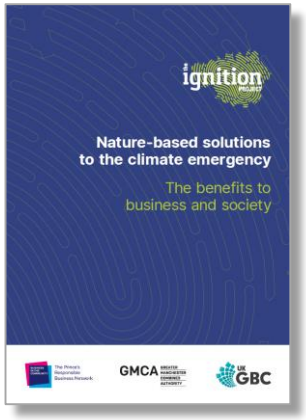


WHO Guidance on mainstreaming biodiversity for nutrition and health[45]

Support transition toward healthier sustainable diets and guide decision-makers in the health, nutrition and other sectors

Urban Green Spaces: a brief for action (WHO/Europe)[43]

Key findings from research and practical case studies, and lessons learned to inform design of urban green spaces that promote/maximize social and health benefits



IGNITION project: Nature-based solutions evidence base[46]

Open source evidence-based repository of knowledge on urban NBS in the UK[47]

Source: (41) IPBES (2019): Summary for policymakers of the global assessment report on biodiversity and ecosystem services. IPBES secretariat, Bonn, Germany; (43) Urban green space: a brief for action, WHO (2017); (45) Guidance on mainstreaming biodiversity for nutrition and health. WHO (2020); (46) IGNITION project; (47) Evidence Databases: IGNITION project

* Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services

Nature | Initiatives to address inequalities in health and wellbeing in the UK

Greener environments are associated with **better mental health and enhanced quality of life**[49]

UK study[49] on associations between contact with nature and health and wellbeing, used nationally representative data found:

- Likelihood of reporting good health/high well-being was significantly greater if participants reported **120 mins or more a week contact with nature**
- Did not matter if the 120 mins of contact with nature was achieved by **several shorter visits or one long visit**

A recent review on improving access to greenspace in the UK[48] identifies multiple co-benefits:

- In 2017, urban green and blue space in Great Britain removed 27,900 tonnes of air pollution – avoided health costs estimated at £162.6 million, with 70% of the avoided costs due to the positive effects of urban woodland[48]
- Disadvantaged groups gain larger health benefit and have reduced socioeconomic-related inequalities in health when living in greener communities, helping address inequity[48]

Source: (48) Improving Access to Greenspace: a new review (2020); (49) White et al. (2019)

Evaluated examples and recommendations

Summary | learnings from international nature based intervention case studies

Monitoring and evaluation is currently weak; challenges in measuring or predicting effectiveness of nature based solutions leads to high uncertainty about cost-effectiveness compared to alternatives[52]

Intervention success relies on understanding the **environmental, economic and social challenges** in the context of climate change[56]

Co-design and co-implementation with **active representation and application of indigenous knowledge are critical** to intervention success including maintenance in the long term[11,50-52]

Despite reported benefits of certain agricultural interventions (such as drought-resilient crops), wider adoption rates can be low and **information dissemination efforts alongside finance are crucial**[57]

Restoration of Mangrove Ecosystems, Viet Nam

Flood Protection and Improving Green urban Infrastructure, Mozambique

Climate Smart Agriculture, Kenya and regionally in West Africa

Drought tolerant Maize, Nigeria

Source: (11) Zavaleta et al (2018); (51) Partnership on Transparency: Restoration of Mangrove Forests in Vietnam; (52) Hai et al. (2020); (56) Partey et al. (2018); (57) Wossen et al. (2017);

Case studies

Restoration of mangrove forests Vietnam

Mangrove forests globally:

- Are **carbon-rich ecosystems ('blue carbon')**
- Provide >$80 billion/year avoided losses from coastal flooding, protecting 18 million people
- Contribute almost as much ($40–50 billion per year) in benefits associated with livelihoods recovery, and poverty alleviation, and are a 'win-win' approach
- Combined benefits from mangrove preservation and restoration are up to 10 times the costs[50]

Vietnam lost 80% of its mangrove forests since 1950 [51], leading to implementation of government-led restoration projects:

- Expansion of new mangroves forests by 18,000 hectares
- Reduce storm surge wave height from 4 to 0.5 m along a stretch of sea dike
- Reduce cost of dike maintenance by US$7.3 million per year

Success increased by **community participation,** and **incentives for long-term management beyond end of projects**

Monitoring and reporting procedures are crucial to provide a robust approach for future projects[52]

Source: (50) Adapt Now: A Global Call for Leadership on Climate Resilience (September 2019); (51) Partnership on Transparency: Restoration of Mangrove Forests in Vietnam; (52) Hai et al. (2020)

Evaluated scenarios; Links with Adaptation & Resilience, Finance

Flood Protection Beira, Mozambique[53]

The Chiveve tidal river no longer served as drainage channel; standing water promoted the spread of diseases like **malaria and cholera**

Measures included a new tidal outlet and flood barrier, a plan to re-establish the river course, and renaturation measures including planting of young mangroves

Improved drainage reduced the occurrence of flooding, and risk of infectious disease, and had positive co-beneficial impacts on ecosystem restoration

The project improved livelihoods through fishing port performance, with overall impact on decreasing poverty. However, 90% of the Beira area was destroyed by Cyclone Idai in March 2019 and evidence on recovery is awaited (IFRC)

Green Urban Infrastructure (GUI) Beira, Mozambique[54]

- Urban park with bicycle paths, botanical garden, sport facilities, sanitation facilities and lighting
- **Lessons learned are key for adjustment and scale up of approaches**
- Key message- design requires **visibility, flexibility and** adequate interaction between stakeholders for **higher acceptance of projects**

Source: (53) Spekker & Heskamp (2017); (54) Knowledge note: Upscaling Nature-based Flood Protection In Mozambique's Cities

Evaluated; Links with Adaptation & Resilience

Due completion 2020; Links with Adaptation & Resilience, Finance

Climate Smart Agriculture* (CSA)

Improved Food Security, Kenya[55]

- **Analysis of CSA practices** used by farmers in Teso North Sub-county, Busia County of Kenya
- Greatest impact if all categories of practices are included, with adopters **57% more food secure**
- **Mitigates and adapts** to impacts of climate change as well as **enhancing nutrient availability** in the soil
- Adoption is influenced by gender of household head
- **Learning from experiences of peers through established networks increases probability of technology adoption** as farmers trust more practical experiences demonstrated by peers, and exchange ideas

Strengthening National and Regional Capacity, West Africa (Ghana, Mali, Niger, Senegal and Burkina Faso)[56]

- The establishment of **multi-stakeholder innovation platforms**, national science policy dialogue platforms and the West Africa CSA Alliance was **crucial in promoting capacity development and awareness** of CSA technologies
- Success of CSA relies on **understanding the environmental, economic and social challenges in the context of climate change**
- **Remaining challenges** include lack of clear conceptual understanding, and **enabling policy and finance environments**

* CSA includes: Crop management, field management, farm risk reduction and soil management practices; Agroforestry, Agroforestry (farmer-managed natural regenerations); Soil and water conservation technologies; Climate information services

Source: (55) Wekesa et al. (2018); (56) Partey et al. (2018);

Drought-tolerant maize, Nigeria[57]

Drought-tolerant maize is used as an adaptation strategy to address food security in rural Nigeria

- "Win-win": increased maize yields 13% and reduced exposure to drought risk by 81%
- Led to a reduction in incidence of poverty (13%) and chance of food scarcity (84%)

Current adoption rates are low, despite reported benefits

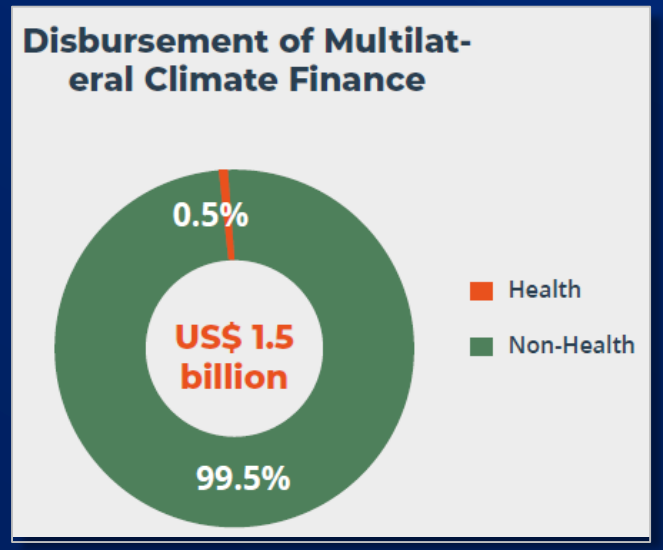
Future **dissemination efforts are crucial, including mainstreaming into national climate adaptation plans**

Source: (57) Wossen et al. (2017)

Finance

Evaluation status and which **COP26 campaign areas the case example links to** is indicated on the case slides

Despite health included in 70% of NDCs, climate finance for health is <1%[1]



COP24 special report (1)

Health financing in NDCs needs to be strengthened

- About 15% of NDCs (28 out of 184) link health to climate finance, majority of which make action conditional on additional finance[50]
- Only 6 NDCs assign specific amount/timeline for finance for health-climate actions[2]
- Financial needs and contributions should be regularly updated and communicated in the NDCs[2]

Source: (1) COP24 special report: Health and Climate Change; (2) WHO Review: Health in the Nationally Determined Contributions (2020); (50) Adapt Now: A Global Call for Leadership on Climate Resilience (September 2019)

Climate finance for health is not flowing at the pace or scale needed

Adaptation Gap Report 2018 - states that by 2030 the estimated costs of adaptation could be two to three times higher than the IPCC estimate of US$70-100 billion per year, and plausibly four to five times higher by 2050

- Accessible, available and efficient finance from public and private sectors critical to effective on the ground response
- Critical need for higher international financial support for adaptation in developing countries[50]
- Reduction or complete elimination of fossil fuel subsidies, and reassigning this finance to the health sector can make reduction of such subsidies more politically favourable[58]
- Greater appreciation of the health co-benefits can increase the political and economic acceptability of carbon taxation, among other climate policies[59]
- Important to ensure that carbon pricing interventions act as progressive, redistributive mechanisms for societal gains[59]

Source: (50) Adapt Now: A Global Call for Leadership on Climate Resilience (September 2019); (58) Recycling fuel subsidies as health subsidies, WHO Bulletin (2014); (59) Cuevas & Haines (2016)

Finance & health | Frameworks and initiatives supporting action on the ground[60]

Global Environment Facility (GEF) Established 1994

Special Climate Change Fund (SCCF)[61]: Mentions health and improving monitoring of diseases and vectors affected by climate change, forecasting and early warning systems to improve disease control and prevention. Capacity building for extreme weather events.

Least Developed Countries (LDC) Fund[62]: Despite human health identified as a priority area in 56.8% of country NAPA reports, only 8.3% implementation projects addressed human health as a priority area[63].

Green Climate Fund (GCF) Established Cancun Agreement, COP16 2010

- US$4.6 billion of projects under implementation
- 393.8m people with increased resilience

Climate Investment Funds (CIF)

Just Transition Initiative[64]: Systematic analysis and case studies to inform best practices; community of stakeholders and scholars.

Adaptation Fund Established under Kyoto protocol 2001

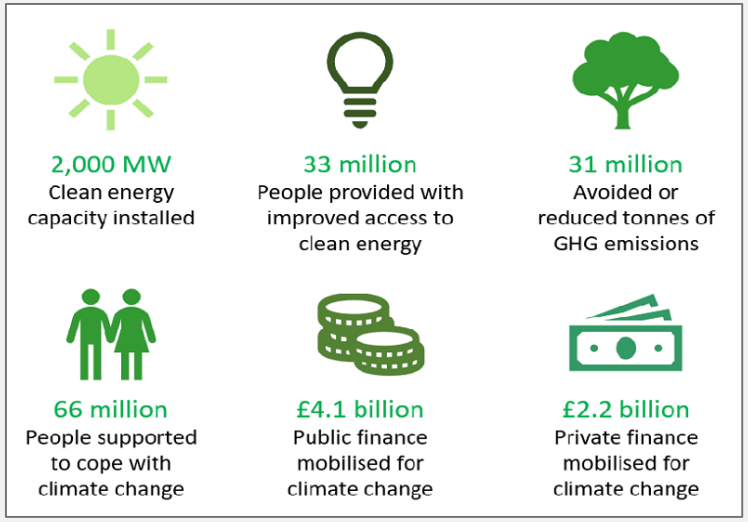
- Financed with a share of proceeds from the clean development mechanism (CDM)

Source: (60) UNFCCC Introduction to Climate Finance; (61) Special Climate Change Fund; (62) LDC Fund; (63) Program Evaluation of the LDC Fund (September 2016); (64) Just Transition Initiative, CIF

Funded by UK Government

Finance | UK International Climate Finance (ICF)

- Every £1 invested well in climate-related risk reduction saves more than £3 (and up to £50) in avoided disaster impacts[65]
- Every £1 spent cutting CO_2 pays for itself five- to twenty-fold by offsetting future costs of climate change[65]
- Cross-government responsibility for investing the UK's £5.8bn of ICF between 2016 and 2021[65]



2020 UK Climate Finance Results[66]

Sustainable Energy for Women and Girls (SEWG) programme, Uganda, Ghana[65,67]

Supports clean energy market operation, focusing on access and awareness of clean energy options that support health and economic opportunities for women in developing countries

- **Solar energy electricity solutions for 62 primary health clinics** across Uganda and Ghana
- Reliable energy source means **women can more safely give birth at night in well-lit delivery rooms**
- **Medical equipment and supplies can also be more effectively sterilised**

Source: (65) International Climate Finance, UK Govt; (66) UK Climate Finance Results (2020); (67) Powering Health Care: Phoebe's Story

Key outcomes reported; Links with Energy Transition

Summary | learnings from international finance intervention cases studies

Need to prioritise climate in all financial policies and decisions

Opportunity to add both human health & development as requirements/measures for climate finance. E.g. All World Bank development aid is to be screened for pollution prevention

Investment decisions in both government and private markets **do not systematically take physical climate risks into account yet-** though they are starting to do so

Decisions need to be based on methodologically strong science based assessments of **hazards exposure and vulnerabilities of people as well as assets**

Mainstreaming climate adaptation in health and health determining sectors is crucial and needs **urgent support from the finance sector**

Integrating Climate Change Risks into the Agricultural and Health sectors in Samoa

KawiSafi Ventures Fund – East African countries

Source: (11) Zavaleta et al (2018); (12) Ahmedabad Heat Action Plan (2016); (14) Partners for resilience (PfR) Ethiopia integrated risk management program

Integrating Climate Change Risks into the Agricultural and Health sectors in Samoa (ICCRAHS)[68] - US$4.15m

- Improve adaptive capacity and climate resilience of **coastal** communities in Samoa focusing agricultural production and **public health, including** metering/monitoring technologies
- **Climate early warning systems and services strengthened for health and agriculture sectors, improving preparedness and response, and potential reduction in vulnerability**
- **Mainstreaming climate adaptation in the National Health Service corporate plan for the first time, as well as in the agricultural sectors**
- Instrumental in **strengthening cross-sectoral collaboration** and setting the foundation for subsequent projects
- Evaluation indicates this is a good example of integration of climate change adaptation into agriculture and health policies, that support informed decision making[69]

Source: (68) Integrating Climate Change Risks into the Agriculture and Health Sectors in Samoa, GEF project ID 3358; (69) Program Evaluation of the Least Developed Countries Fund (September 2016)

Evaluated as part of GEF-LDF report; **Links with Energy Transition, Adaptation & Resilience**

KawiSafi Ventures Fund – East African countries[70] - US$110m

- New investment fund to support countries to leapfrog fossil fuel to clean energy
- Investments of USD$2-10m per company will be made in 10-15 clean energy small- and medium-sized enterprises
- World's first climate change fund targeting low-income populations - 15m expected to benefit
- Technical Assistance Facility (TAF) will identify and address core needs of portfolio companies to support scale and financial viability

Source: 71

Target beneficiary countries include:

- **Rwanda**: 70% live off-grid; massive investment from government still leaves >3.5 million without power. Energy costs high due to reliance on imports[70]
- **Kenya**: 80% live off-grid with 35 million without access to affordable/reliable electricity. Lighting costs high for rural off-grid Kenyans, who spend 26% of income on kerosene[70]

Source: (70) Kawasafi Ventures Fund, Greenclimate; (71) Kawasafi Investments (2020)

Evaluated; Links with Energy Transition, Adaptation & Resilience

Produced by UK COP26 Presidency

United Nations Climate Change

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