

CLIMATE VULNERABILITY MONITOR

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THE CLIMATE VULNERABLE FORUM

is a global partnership of leaders of countries most vulnerable to climate change actively seeking a firm and urgent resolution to the growing climate crisis. The Climate Vulnerable Forum was founded by President Mohamed Nasheed of the Maldives and first met in November 2009. The Declaration of the Climate Vulnerable Forum adopted then expressed alarm at the rate of changes and danger witnessed around the planet due to the effects of human-induced global warming and called for urgent most international cooperation to tackle the challenge.

DARA

is an international organization based in Madrid, Spain, committed to improving the quality and effectiveness of aid for vulnerable populations suffering from conflict, disasters and climate change. Since its foundation in 2003 by Silvia Hidalgo, DARA has conducted independent evaluations of major development and humanitarian assistance initiatives in over 40 countries across five continents, and developed innovative tools to promote the effectiveness of aid and good humanitarian donorship.

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CLIMATE VUL IN NUMBERS

Nearly

1 MILLION

CLIMATE CHANGE DRIVEN DEATHS* ESTIMATED EVERY SINGLE YEAR FROM 2030 IF ACTION IS NOT TAKEN

Some

5 MILLION

CLIMATE DEATHS ESTIMATED OVER THE NEXT TEN YEARS IN ABSENCE OF AN EFFECTIVE RESPONSE

Already

350,000

CLIMATE DEATHS ESTIMATED EACH YEAR TODAY

Almost

80%

OF ALL CLIMATE DEATHS ARE REGISTERED ONLY AMONG CHILDREN LIVING IN SOUTH ASIA OR SUB-SAHARAN AFRICA

Over

99%

OF ALL MORTALITY OCCURS IN DEVELOPING COUNTRIES

Close to

10 MILLION

PEOPLE ESTIMATED TO BE LIVING UNDER THREAT FROM CLIMATE DRIVEN DESERTIFICATION BY 2030, UP FROM 2.5 MILLION TODAY

*All estimated mortality statistics or deaths are representative of much wider harm. Every 100,000 deaths would normally indicate several million cases of illness or disability (DALYs), or people displaced, injured or in need of emergency assistance.

NERABILITY

Around

**150 BILLION
DOLLARS**

IN LOSSES TO TODAY'S
ECONOMY ESTIMATED TO BE
CAUSED BY CLIMATE CHANGE

More than

HALF

OF THE TOTAL ECONOMIC LOSSES TAKE
PLACE IN INDUSTRIALIZED COUNTRIES

More than

50

COUNTRIES ACUTELY VULNERABLE TO CLIMATE
CHANGE TODAY ARE IN URGENT MOST NEED OF SUPPORT

Some

170

COUNTRIES -- OR MOST OF THE WORLD -- HAVE HIGH VULNERABILITY TO
CLIMATE CHANGE IN AT LEAST ONE KEY IMPACT AREA ALREADY TODAY

Over

50

HIGHLY EFFECTIVE MEASURES INCLUDED IN THIS REPORT ARE READILY
AVAILABLE TO LIMIT VIRTUALLY ALL HARM CAUSED BY CLIMATE CHANGE
-- JUST A GLIMPSE OF THE MANY MORE OPTIONS AVAILABLE

PREFACE

Climate change is the most urgent challenge of our time. The future of the environment and the life it supports rests on the decisions we take over the coming years. This represents an enormous responsibility on our shoulders, which is not only a burden -- but also a tremendous opportunity for us all.

Previous generations were not aware of the environmental impact of economic development and the resource constraints of our planet. We are. They did not have the technology and the know-how to pursue a different path to prosperity. We do. Our generation must seize this unique moment to build a better, more equitable and more sustainable world. If not, our generation will carry a conscience that will never be clear, from failing to act when we had the chance.

The Climate Vulnerability Monitor lays bare the sheer scale and breadth of the impacts we already face. It breaks ground in pinpointing our vulnerabilities

THE CLIMATE VULNERABILITY MONITOR LAYS BARE THE SHEER SCALE AND BREADTH OF THE IMPACTS WE ALREADY FACE

to climate change all around the world. It shows how each country is vulnerable in different ways -- some due to health reasons or extreme weather patterns, and others as a result of economic factors or because of land loss from expanding deserts or rising sea-levels. It explains why many nations at the climate frontline feel the impacts of climate change more intensely. And it demonstrates how quickly vulnerability is accelerating almost everywhere, so that ultimately climate change could threaten the livelihoods, if not the survival, of all nations and peoples. The fate of the world is tied to the fate of the most vulnerable.

Yet such an outcome is not inevitable. The Monitor sends a strong signal of caution. But it sends an equally strong signal of hope.

This report identifies just how inexpensive it is to limit the majority of the negative impacts of climate change seen today, from the effects of the most violent storms and floods, to epidemics, severe drought, desertification, and even rising seas. There are even existing programmes like those addressing the main health issues linked to these causes which can be readily expanded. Countless other signs of hope exist. Countries around the world are beginning to understand that expanding modes of production established in nineteenth century Europe will incur enormous social and economic costs. Shifting

to a low-carbon economy, based on green technology and renewable energy, creates wealth, jobs and new opportunities for progress. Many countries of the Climate Vulnerable Forum, despite having contributed little to the climate change problem, are taking the lead in creating this new future. The Maldives, for example, is working to become carbon neutral by 2020. Others among us are pursuing similar pledges.

THE MONITOR SENDS A STRONG SIGNAL OF CAUTION. BUT IT SENDS AN EQUALLY STRONG SIGNAL OF HOPE

The Monitor was built to better identify the needs of communities facing serious climate impacts and to establish a firmer understanding of the nature of the climate crisis as it affects the world's nations today and in the near future. The impact of climate change is already a major global concern, increasingly relevant across areas such as business and trade, civil safety, nature conservation, human rights, and sustainable development.

The Monitor is not perfect. Some of the forecasts and conclusions will

IT IS WELL WITHIN OUR POWER TO SOLVE THE CLIMATE CRISIS

draw criticism for either overplaying or underplaying the seriousness of the problem. This we welcome and encourage. The report's methodology is new. The data worked with is not always ideal. And all predictions are marked by uncertainty and contain a margin of error. But without a report of this kind, the gaps in our understanding might never be filled. It is our hope that future Monitors will benefit from better data and knowledge. We hope the report will trigger more debate and focus more attention on improving our understanding of climate change.

But limitations aside, the types of impacts we will face in agriculture, in health, on the shores of the world's oceans and otherwise are unlikely to fundamentally change. Nor will better knowledge radically alter the truth of underlying vulnerabilities, like poverty or gender inequality, which amplify the impacts of climate change and are present in all societies to varying degrees. Some progress is being made in the global fight against poverty, but the momentum in addressing climate change is only beginning to pick up pace. The

negative effects outlined here would just be the beginning if we fail to act.

And let us be frank: time is running out. A near doubling in warming is unavoidable in the next 20 years or so as the lag in the planet's greenhouse effect catches up with us. We must meet this growing challenge. If not, the Monitor estimates that by 2030, over 130 countries will be highly vulnerable to climate change; while over 50 countries will suffer the kinds of acute impacts that just a handful of particularly fragile states are experiencing today. According to the scientific consensus, we must also begin reversing our patterns of emissions within the next five years to avoid even greater temperature change and greater harm.

As with every study of this kind, the Monitor lacks complete certainty, but highlights enough threats of serious, or even irreversible, harm that inaction is unconscionable. This report should act as a wake-up call to decision makers and to people everywhere that more, much more, has to be done, and quickly.

There is still time to act and it is well within our power to solve the climate crisis. A world free from pollution would be healthier for everyone; renewable technologies could bring energy to many who have no access today; protecting

communities against climate impacts will bolster the fight against poverty; and everybody would enjoy a safer, more prosperous world.

Is the world ready to act?

Those of us who believe in the potential of climate change, both as a threat and as a stimulus to kick-start a new twenty-first century revolution -- this time grounded in green growth and truly sustainable development -- should not despair. We must highlight the scale of the problem, now and in the future, and demonstrate the available options for

CLIMATE CHANGE SHOULD NOT DIVIDE US. QUITE THE OPPOSITE -- IT MUST UNITE

an alternative route. And we must argue -- and win the debate -- that it is in all of our interests to act now and act together. Each of us has common but differentiated responsibilities and abilities. But climate change should not divide us. Quite the opposite -- it must unite. The Climate Vulnerability Monitor is our contribution to the global debate. We hope that you will find it useful in your efforts.



MOHAMED NASHEED
President of the Maldives
Founding Chair,
Climate Vulnerable Forum



JOSÉ MARÍA FIGUERES
Trustee, DARA
Former President of
Costa Rica (1994-1998)

“Article 3. Principles. 3.

The Parties should take precautionary measures to anticipate, prevent or minimize the causes of climate change and mitigate its adverse effects. Where there are threats of serious or irreversible damage, lack of full scientific certainty should not be used as a reason for postponing such measures, taking into account that policies and measures to deal with climate change should be cost-effective so as to ensure global benefits at the lowest possible cost.”

– United Nations Framework Convention on Climate Change (UNFCCC), Rio de Janeiro, Brazil, 1992

“Humanitarian action should be guided by the humanitarian principles of humanity, meaning the centrality of saving human lives and alleviating suffering wherever it is found...”

–Principles and Good Practice of Humanitarian Donorship, Stockholm, Sweden, 2003

“The fate of the most vulnerable will be the fate of the world.”

– First Declaration of the Climate Vulnerable Forum, Male', Maldives, 2009

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NAVIGATING THE REPORT

● FINDINGS AND OBSERVATIONS

The main observations made by the report.

● RECOMMENDATIONS

Headline recommendations for tackling climate change and its negative impact on the world's communities.

● ABOUT THIS REPORT

An introduction to the objectives and approach of the Climate Vulnerability Monitor and how it was developed.

● CLIMATE VULNERABILITY MONITOR

A global assessment of vulnerability to different aspects of climate change including its Health Impact, Weather Disasters, human Habitat Loss and Economic Stress on key industries and natural resources. The Climate Vulnerability Monitor is a new tool aimed at advancing understanding of the impact climate change has on human society and actions needed to address the harm this causes.

● ADAPTATION PERFORMANCE REVIEW

A catalogue of measures and programmes valuable for reducing the negative effects of climate change in the areas of health, extreme weather, degradation of human habitats and other stresses to the economy and the environment.

● COUNTRY PROFILES

Snapshot studies of what the Climate Vulnerability Monitor implies for different types of countries around the world.

● METHODOLOGY

A detailed explanation of the methodology developed for the report and Climate Vulnerability Monitor, including all data, key assumptions, models and calculations used.

● MONITOR DATA TABLES

Basic information from the Climate Vulnerability Monitor in list format.

● CLIMATE BASICS

A brief introduction to the state of our climate and how it is evolving as the world heats up.

● RESEARCH GAPS

Knowledge limitations that must be urgently addressed in order to improve our understanding of climate change and its impact on communities around the world. Filling these gaps will be vital for effectively tackling the climate challenge.

FINDINGS A OBSERVATI

A HOTTER EARTH IS ALREADY CAUSING WIDESPREAD DAMAGE AND DEATH.

The artificial heating of our planet fuelled by human activities already interferes with earth's delicate climate leading to effects that are dangerous for people and nature. The alarming rate of change and spiralling effects of heat, wind, rain, deserts, sea-levels, and other impacts on the world's populations leave a human toll of 350,000 deaths every single year. Stifling heat, winds, and water shortages pressure the lands of some 2.5 million people in

arid regions degrading into desert. The effect of climate change on storms, floods, and wildfires is estimated to leave an additional 5 billion dollars (USD) of damage each year, while rising seas cost 1% of GDP to the lowest-income countries – 4% in the Pacific – with annually 65 billion dollars wiped off the world economy. Globally, the primary sectors and fisheries are already weighed down by a further 65 billion dollars every year from climate stresses.

MOST IMPACTS ARE HIGHLY CONCENTRATED ESPECIALLY ON CHILDREN AND THE POOR.

Over three quarters of the death toll linked to climate change is concentrated on children living in Sub-Saharan Africa or South Asia. Gradual, not sudden, impacts from climate change cause more than 90% of all damage. The roughly 50 least developed countries suffer more than one third of the global human toll linked to climate change, and emerging economies nearly two thirds. Overall, the few additional deaths in wealthy countries are likely offset by health gains due to warmer, shorter winters and other effects. Over 80% of people at risk from climate-driven desertification reside in high-growth emerging economies such as China and India. Half of the economic impacts of climate change are felt in industrialized countries. However,

lower-income countries suffer much greater relative stresses to their economies, mainly due to larger, less-robust agricultural sectors. Some 50 countries are considered acutely vulnerable to climate change today, collectively suffering most of all climate impacts. Recognized fragile or failed states like Afghanistan, Haiti, Myanmar, Sierra Leone, and Somalia are among the worst affected, as are low-lying island nations facing existential threats. An average of just 24 countries are assessed as having the most severe factor of vulnerability for each main impact area of health, extreme weather, habitat loss, and economic stress. In every case, some two thirds of the total global impact falls on just 10 countries.

INDICATORS

MUCH DAMAGE CAUSED BY CLIMATE CHANGE IS STILL READILY PREVENTABLE.

Half or more of today's human toll linked to climate change could be prevented with targeted distribution of salt-water solutions or basic dietary or vitamin supplements costing virtually nothing. A wide array of cost-effective actions can be taken to reduce climate vulnerabilities for each of the Monitor's four impact areas. Measures that reduce the impacts of climate change on health are the most effective, followed by those that reduce exposure to extreme weather. Preventing loss of human habitat to desertification, sea-level rise or loss of biodiversity, such as alpine species or coral, are the most challenging to address, but several relatively inexpensive and proven measures nevertheless exist. Greater impacts are inevitable however, and eventually damage may only be able to be limited or selectively avoided. But the worst impacts of climate change for which several measures would become futile can still be avoided if strong action is taken in the very near future to reduce greenhouse gas emissions that lead to the earth's warming. Enough market-viable opportunities also exist to substitute carbon-intensive means of production, transportation, and energy creation or avoid deforestation for an immediate and sustained transition to a low-carbon economy, which would stem the root causes of climate change.

THE CLIMATE VULNERABILITY MONITOR IN BRIEF

The Climate Vulnerability Monitor takes a new approach to assessing the climate vulnerability of the world and its regions, countries and communities. The Monitor looks at pre-existing characteristics of society that are knowingly affected by climate change and maps the level of vulnerability and expected impacts as implied by the effect that real or projected changes in the climate will have on these. The Monitor uses globally comparable information in order to establish reference points across countries. The Monitor's analysis is built around four distinct climate impact areas, five levels -- called factors -- of vulnerability to climate change, and two points in time, 2010 and 2030. The impact areas were chosen because they represent most of (but not all) the main impacts of climate change and form distinctive types of responses in each area -- although some measures to reduce impacts or vulnerability could have beneficial effects across several or all impact areas. The vulnerability factors are determined statistically and indicate how different an effect is expected to be from a baseline of zero impact due to

climate change. The factors remain static from 2010 to 2030 demonstrating how vulnerability would evolve under climate changes expected over the next 20 years if measures are not taken to reduce vulnerabilities. Climate change is never linked to any specific event, but considered an added stress, effect, or change that carries consequences we consider positive or negative. The estimative figures of impacts mentioned in this report are yielded from the Monitor's specific methodology and represent additional impacts due to climate change. They are a plausible snapshot of what is expected to already be taking place and what might eventuate in the near future. Wherever possible leading expertise and scientific modelling has been relied upon (see "Climate Vulnerability Monitor Architecture", p.54). Still, there are gaps in the base data the tool relies on as well as gaps in several research areas that restrict our full understanding of the effects of climate change. The Monitor represents just one possible way of measuring climate vulnerability that we expect can be greatly and continually improved upon.

CLIMATE IMPACT AREAS

- ♥ HEALTH IMPACT - additional mortality to climate sensitive diseases
- ⊙ WEATHER DISASTERS - additional mortality and damage in storms, floods and wildfires
- 🏠 HABITAT LOSS - additional loss of human habitat to rising seas, and degrading arid lands
- 📊 ECONOMIC STRESS - extra losses in the primary/agricultural sectors of the economy and to key natural resources

CLIMATE VULNERABILITY FACTORS

- ACUTE (most vulnerable category)
- SEVERE
- HIGH
- MODERATE
- LOW (least vulnerable category)

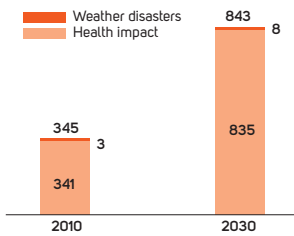
UNLESS MEASURES ARE TAKEN, THE NEXT 20 YEARS WILL SEE EXPLOSIVE GROWTH IN EVERY MAJOR CLIMATE IMPACT.

Twenty more years of inaction would lead to nearly 1 million climate deaths a year by 2030. The number of acutely-vulnerable countries would more than triple over that period with nearly half of the world's regions entering the ranks of the most vulnerable. Ten million people a year exposed to desertification and sea-level rise could lead to a relocation exodus. Economic costs would leap to 100 billion dollars of stress on the world's coastlines, 150 billion dollars worth of primary-sector and natural resource

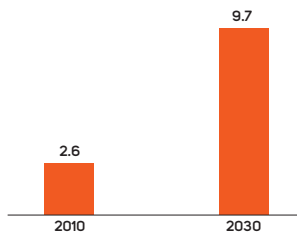
losses, and 10 billion dollars in storm, flood, and wildfire damages -- in a third of a trillion dollar annual economic crisis. By 2030, 132 countries would register an overall factor of High vulnerability or above. Unless actions are taken to meet the challenge by 2030, 42 countries would become acutely vulnerable to the health impacts of climate change, 20 countries to extreme weather, 48 countries to loss of human habitat, and 68 countries to wide-ranging economic stresses.

GLOBAL CLIMATE CHANGE IMPACT

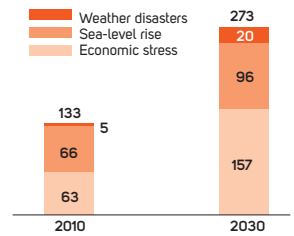
CLIMATE-RELATED MORTALITY. ADDITIONAL DEATHS (1000) AVERAGE PER YEAR



PEOPLE AT RISK FROM CLIMATE-RELATED DESERTIFICATION. ADDITIONAL (MILLIONS) AVERAGE PER YEAR



CLIMATE RELATED ECONOMIC COSTS (BILLION USD PPP) AVERAGE PER YEAR

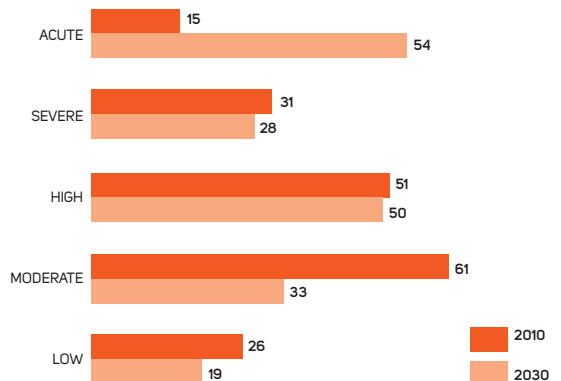


ALMOST EVERY COUNTRY HAS HIGH VULNERABILITY TO ONE MAJOR CLIMATE IMPACT.

Nearly every single country – 161 to 176 of the 184 countries assessed – registers high vulnerabilities to at least one climate change impact area (2010 to 2030). Most countries in the world are therefore facing climate insecurities of one kind or another, whether due to heat waves; wildfires, floods, and storms; economic losses in key sectors; ecosystem damage; or hunger, disease, and displacement. Climate stresses on the economy are the most widespread and include lost value in the agricultural sector, including forestry and fisheries, as well as impacts for natural resources like water and biodiversity. The next most-prevalent impacts are in losses to human habitat as a result of growing desertification and sea-level rise. In 2010, health impacts due to climate change are least dispersed, but they are set to expand, with some 55 countries attaining a vulnerability factor of Acute or Severe by 2030 (compared to just 34 countries similarly prone to extreme weather by that time). While most wealthy countries register a factor of High vulnerability in at least one impact area, only Spain and the United States have an overall vulnerability factor of High, which is similar to major emerging economies such as China, Indonesia, Iran, Philippines, and Thailand.

GLOBAL VULNERABILITY TO CLIMATE CHANGE

Number of countries per climate vulnerability factor



LOW HUMAN DEVELOPMENT INCREASES VULNERABILITY TO CLIMATE CHANGE WHILE CLIMATE CHANGE THREATENS KEY DEVELOPMENT GOALS.

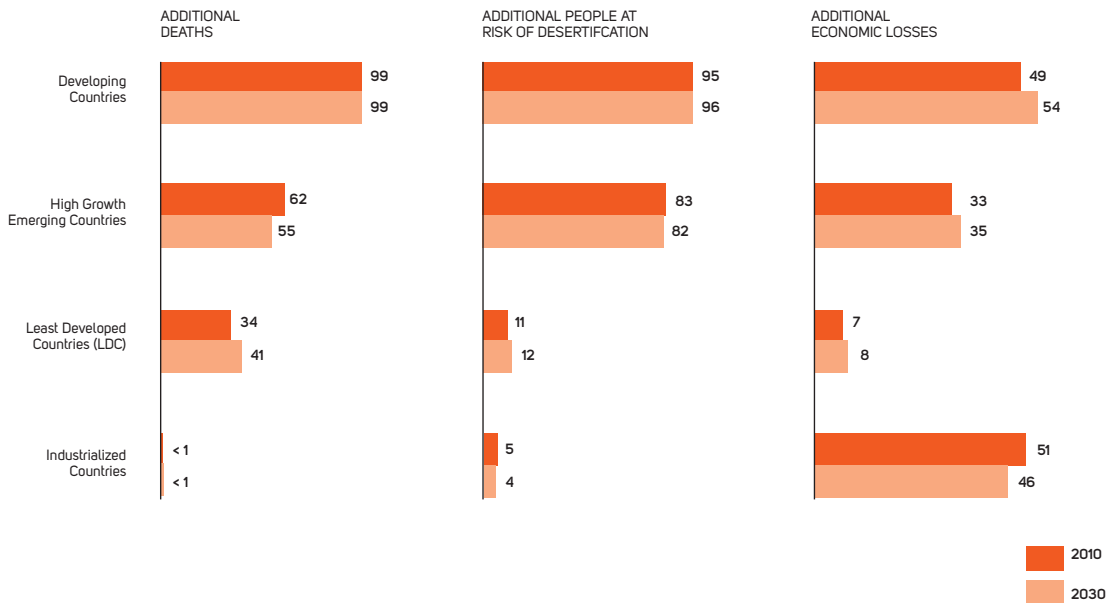
Every increase in vulnerability to climate change brings a greater likelihood of poverty, gender inequality, and lower human development. The Monitor also identifies countries with much higher climate vulnerability than their human development level would imply. In particular, countries with very low human development and very high climate vulnerability, including a number of highly fragile states, such as Afghanistan and Somalia, should be singled out for special attention. The impacts felt in some of the world's most acutely vulnerable countries may well be too extreme to be fairly reflected when considered in relation to other countries. Strong societal fabric, governance, gender

equality, and the rule of law will help diminish climate vulnerability and facilitate the implementation of effective countermeasures to the worst effects of climate change.

But climate change itself also wears down progress towards the Millennium Development Goals (MDGs), above all in the areas of extreme poverty and hunger where the world is not on track to meet its 2015 targets of eradication. If action is not taken, climate change risks threatening or reversing progress made in reducing child mortality and fighting major infectious diseases such as malaria.

SHARE OF TOTAL CLIMATE CHANGE IMPACT ON SOCIOECONOMIC REGIONS

% of total impact, Additional Deaths, Additional People at Risk of Desertification, Additional Economic Losses





Abandoned mud houses surrounded by flood waters following extremely heavy rains in Aweil, Sudan. Source: UN Photo/Tim McKulka.

TACKLING CLIMATE CHANGE IS A MAJOR OPPORTUNITY.

Right now, the same steps that minimize vulnerability to climate change collectively contribute to every major global target for poverty eradication and to the improvement of living standards. Effectively tackling climate impacts will be vital to bringing the international community back on track to achieving the MDGs in just five years' time. But opportunities will fade as warming increases. It will become more and more difficult to deal at a local level with global forces such as warming and rising seas as adaptation increasingly comes to involve choices about what to preserve. And protecting communities and the environment will be brought into ever-greater competition with narrow economic interests as costs ultimately become prohibitive.

Tackling the root causes of climate change is also a major opportunity. Adopting greener practices in a low-carbon economy will bring major societal benefits. Fossil fuel

pollution itself is a leading risk factor for a significantly greater human toll than the climate change it triggers -- it was estimated to be the cause of close to 3 million deaths worldwide in 2000.¹ The exploitation of increasingly scarce fossil fuels is also causing ongoing damage to the environment, as was glaringly demonstrated by the 2010 Gulf of Mexico oil spill disaster; and leading to human tragedies such as coal mining accidents in places as diverse as China or New Zealand. Decentralized forms of renewable energy are much safer, cleaner, and hold significantly more promise for the 20% of the world's population who have no electricity or grid system to access traditional sources of energy produced by large-infrastructure power plants. A green technology revolution could well hold the key to unlocking the global inequities that continue to plague the world as a result of unequal access to energy and other resources.

RECOMMEND

**DANGER IS PRESENT.
RESPONSES ARE
COST-EFFECTIVE.
INACTION IS
UNCONSCIONABLE.**

While climate change is fact, the science of its impacts is not yet exact. The full extent of its effects on communities remains uncertain. But we have enough indications to suggest widespread harm and danger is already being done all over the world. And we can tackle that harm with cost-effective measures readily at hand for limiting impacts and reducing greenhouse gas emissions that cause the warming -- both of which must happen in tandem. Major emitters must assume responsibility for this crisis in accordance with common but differentiated responsibilities and respective capabilities. Immediate action is needed to prevent further warming of the planet and any harm caused by warming we can no longer stop. We are already committed to levels of warming that could entail mass extinctions of species, the disappearance of the world's coral reefs, and much greater impacts on human society than are outlined in this report.² But the quicker we act, the more we reinforce the ability of vulnerable communities to withstand the changes, the more we can limit additional warming, and the more we can avoid the most devastating of consequences for this planet and the life it supports.

**EXPAND HUMAN
AND GENDER
DEVELOPMENT
EFFORTS IN MOST-
VULNERABLE
COUNTRIES.**

Climate change is already placing a burden on poverty-reduction efforts and is contributing to significant lost GDP potential in a number of worst-affected countries. The countries most vulnerable to climate change have the highest levels of gender inequality and the lowest levels of human development. Reinforcing the drive for climate-friendly development progress on all fronts is a crucial complement to any response aimed at reducing vulnerability to climate change. In particular, many of the countries most acutely vulnerable to climate change are also fragile states, on the limits of human development and stable social and political order. Elsewhere, low-lying island nations are facing imminent existential threats that significantly undermine development. In worst cases, vital efforts to manage fast-depleting natural resources such as water, or even the types of practical measures featured in this report's Adaptation Performance Review and in national plans (NAPAs), will face serious implementation challenges in countries with inadequate public institutions, unstable socio-political environments, or situations of armed conflict. Support to developing countries, in particular including facilitated access to green technologies, will be crucial for supporting sustainable development.

**IMMEDIATELY
REINFORCE
RESPONSES TO
MAJOR CLIMATE-
SENSITIVE HEALTH
CONCERNS:
MALNUTRITION,
DIARRHEAL
INFECTIONS,
AND MALARIA.**

Contrary to popular notions, the vast majority of human deaths linked to climate change are not caused by stronger storms and floods. Instead they are the result of climate-sensitive disease. Climate change is already causing an estimated 350,000 deaths -- and more than 10 million cases of illness every year -- mainly due to malnutrition, diarrheal infections, and malaria.³ Higher temperatures, water shortages, and other impacts are weighing down the fight against some of the world's most deadly diseases. Less than a quarter of existing national adaptation programmes of action (NAPAs) in most vulnerable countries adequately address health impacts due to climate change, including just 3% of priority projects that target health.⁴ Yet exceptionally cost-effective and established measures such as bed nets, dietary supplements, and oral rehydration therapies consisting of just water, salt, and sugar are readily available to help avert any additional deaths and reduce the extent of major climate-sensitive illnesses in the worst-affected areas.

ACTIONS

INVEST IN FILLING URGENT RESEARCH GAPS.

While we already have enough sound research and analysis available to point to serious dangers and harm taking place around the world and to take measures against those impacts. A more accurate and comprehensive understanding of the impact of climate change on human society is impeded by major gaps in research, science, and socio-economic knowledge. This report leaves out countries and known effects of climate change due to the absence of adequate data or research. Some key areas of socio-economic impact have clearly unsatisfactory or non-existent scientific bases for their estimation. And measures of the success of policies and actions to limit the negative effects of climate change are still inadequate. The Climate Vulnerability Monitor was built not only to improve responses to these effects but also to reveal the limitations on our knowledge and spur debate aimed at a better understanding of the impact of climate change. A detailed list of the main research gaps encountered during the development of the Monitor is found in this report. Urgent investment is needed to close those gaps. And national governments must also improve their mapping of human vulnerability to ensure that adaptation resources reach the most vulnerable. If such gaps are not dealt with, we risk seriously underestimating or adding unnecessary ineffectiveness to our response to this crisis when so much is already at stake.

WIDELY DISSEMINATE THE CLIMATE VULNERABILITY MONITOR'S FINDINGS.

The lack of public support for ambitious climate change policies continues to be a major impediment to mobilizing an effective response to this crisis. Political leadership on the issue is also weak, partially because of public indifference. A successful international agreement able to tackle the climate problem relies on national decisions based on the level of action (especially to reduce emissions) a country is willing to assume. Unfortunately, public and political concern is especially low in major emitting countries whose role is central to any solution to this crisis. The dynamics of international media and the politics of climate change mask a clear scientific consensus on global warming, its causes, and some of its key effects, feeding scepticism that undermines support for action desperately needed to tackle this issue. The findings of this report should therefore be subject to the widest possible dissemination with the goal of ensuring that everyone can at least be informed of the types of dangers we run by not tackling the climate crisis.

REINFORCE NATIONAL PLANS TO LIMIT CLIMATE IMPACTS.

Warming of the planet beyond the 0.8 degrees Celsius (1.4 degrees Fahrenheit) already seen since the industrial revolution is set to double or even possibly triple over the next decades.⁵ The humanitarian and environmental effects of this rapid warming should not be underestimated and will require large-scale responses in order to limit the harm done. Most countries highly vulnerable to climate change also lack resources and require external support to combat the additional stress it places on their communities, their economies, and their ecosystems.

Least developed countries have put together initial programmes (NAPAs) to respond to the local effects of climate change that are to be externally financed, but which still go largely unfunded despite many of them now being several years old. Non-negotiable resources derived from major emitters should not only be immediately released in order to realize these plans in their entirety -- and especially to implement priority projects, which amount to less than 2 billion dollars (USD) globally.⁶ The scale of impacts captured in the Monitor would imply that NAPAs are already inadequate to deal with the negative effects of climate change impacting vulnerable communities around the world. So national plans must be expanded in kind, in particular with respect to human health, where hundreds of thousands of lives are already being lost with every single year of inaction. But the rapid growth and widespread prevalence of vulnerabilities around the world imply that virtually all countries, especially all developing countries, should be preparing and implementing plans in order to protect populations and resources. Findings across the various impact area assessments of the Monitor serve as bare-minimum proxy indications for wider effects that must be addressed if harm resulting from climate change is to be prevented. International adaptation finance should be stepped up without further delay to protect communities at risk via a global funding mechanism with legitimate and inclusive decision-making processes.

ABOUT THIS

WHY THIS REPORT NOW?

DARA and the Climate Vulnerable Forum created the Climate Vulnerability Monitor to advance understanding of the growing negative effects of climate change on society and to identify a variety of key options to meet this new challenge.

Climate change is a global problem whose resolution requires global cooperation. As a result, global policies, legislation and collaboration frameworks, formal and informal, are under discussion if not already in place. It is critical that any global actions that stem from these efforts be informed by a clearer picture of what is at stake today and tomorrow as a result of climate change on a global level. Despite a wealth of knowledge on climate change, little consolidated information has so far been made available regarding the types, scales, and locations of its impacts around the world today.

CLIMATE CHANGE IS
A GLOBAL PROBLEM
WHOSE RESOLUTION
REQUIRES GLOBAL
COOPERATION

The Climate Vulnerability Monitor comes forward as a contribution to the debate in this respect. It is also entering publication against a context of slow progress on measures being taken to deal with impacts that climate change is already having around the world today. Negative effects are most often triggered when a community is unable to deal with small additional stresses. Vulnerability, or inability to withstand change or harm, varies greatly from community to community -- as do changes in weather and existing climate conditions. Wealthier communities may hardly notice changes that in other regions could well be life threatening. Flood defences or sophisticated health systems able to cope with new challenges in one place may be non-existent elsewhere. Impacts are worsened when local environmental conditions are already difficult due to water shortages, land degradation, or otherwise. When pre-existing environmental challenges, changing climate conditions, and vulnerability are all at their highest, the consequences can be devastating. And people suffer.

Progress, meanwhile, towards an international agreement on climate change that might halt the planet's warming is painstakingly slow. With

failure to reach a binding agreement at the Copenhagen climate summit in 2009 and no real signs of a breakthrough since, are we oblivious to the scale of the climate crisis already evident before us? A near doubling in temperature increase with correspondingly greater impacts over the next few decades is unavoidable and something we must prepare for. Far more serious damage and destruction than is outlined in this report can still be averted but will require a steady reduction in global greenhouse gas emissions that trigger the warming effect. That effort must begin in just the next few years, or we may well risk heating up the climate system beyond control, with ever worsening consequences.

ARE WE OBLIVIOUS
TO THE SCALE OF THE
CLIMATE CRISIS ALREADY
EVIDENT BEFORE US?

The lack of specifics on what is happening may well be holding back international cooperation and is even more likely to be restraining support to vulnerable

REPORT

communities that are inadequately equipped to face what, in some cases, is becoming an existential threat. Policy-makers, in particular, have had little indication about the relative sizes or breadth of the different stresses taking hold. And financial resources are difficult to mobilize for a problem that has no clear form. All of this has also kept people out of touch with the realities of a global crisis when strong public support is now so crucial to resolving the problem.

Yet well-researched if imperfect explanations of the effects of climate change on communities around the world do exist, as does information on the effectiveness of measures to limit any harmful effects. This report aims to bring such expertise to bear in response to simple questions: Where and how is climate change having its most serious effects? To what degree? And what measures can we take to minimize the harm? In this way, the report seeks to clarify the extent of the main impacts of climate change on human society and identify some of the most effective responses to that impact. It also aims to point out those areas where limits to our knowledge constrain a more accurate understanding of this challenge -- and a better response.

THE APPROACH

The purpose of the Monitor is to begin to provide an assessment of different kinds of vulnerabilities and to pinpoint who faces them, when, and where. The intention is to help guide, not to prioritise by exclusion or to provide some sort of assertive and closed list of preferences. It is not meant to rank some countries as vulnerable and others as not. The report is global, with information given on a country level, but not below that level except in isolated areas. The approach is pragmatic, aimed at establishing robust comparable estimates for the main types of impacts that are occurring, to better ensure we are dealing with them, and to better identify hurdles that stand between us and a more accurate picture of what is happening.

The report consists of three main parts. First is the Climate Vulnerability Monitor itself, which provides a map of key vulnerabilities to climate change across four major impact areas: Health, extreme weather, loss of human habitat, and stresses on the economy and natural resources. Second is a catalogue of some key practical actions that can be taken to reduce impacts identified in the Monitor. Third, is a limited set of country profiles that illustrate how the findings of the Monitor relate to a given country's situation.

The Climate Vulnerability Monitor is just one of many possible approaches to gauging vulnerability to climate change. The chosen methodology of the Monitor generates the results as outlined in this report. Other methodologies have and will lead to different findings.

This report understands "climate vulnerability" as the degree to which a community experiences danger and harm from the negative effects of climate change.⁷ That definition is taken to include both the characteristics of a particular community -- or *underlying* vulnerability -- and exposure to changes in climate conditions and weather -- or *physical* vulnerability -- both of which vary greatly around the world. The Monitor is not assessing adaptive capacity or resilience per se, but what results when combinations of climate stresses affect a specific community. Countries with lower vulnerability and impacts will invariably have higher adaptive capacity and resilience. The Monitor's focus on estimated negative or positive outcomes -- *impacts* -- triggered by the presence or absence of vulnerabilities differs from other tools. And "vulnerability" and "impacts" that *highlight* vulnerabilities are used somewhat interchangeably across the report.

The Monitor provides an indication of the scales of harm, or in some cases benefits, being triggered by climate change. This assists the targeting of actions that seek to reduce harm, such as those mentioned in the Adaptation Performance Review. But the Monitor also reveals important information about broader strategies to deal with vulnerability, such as the relationship between climate vulnerability and human development or gender inequalities. This information can be used to inform strategic socio-economic or development planning not covered in the Adaptation Performance Review.

The Adaptation Performance Review itself provides an assessment of practical, concrete measures that can be taken to reduce vulnerability and negative impacts due to climate change. "Adaptation" is taken to mean any actions that help communities or their ecosystems cope with a changing climate.⁸ The Adaptation Performance Review assesses actions for their effectiveness in reducing impacts that have been pinpointed in the Monitor. It only includes actions for which reliable information on cost-effectiveness and other key features of programmes has been readily available. It is non-exhaustive, but provides a useful indication of the array of options

available to limit impact and the varying degrees of cost-benefit returns that apply to each main impact area.

WHAT ARE THE REPORT'S LIMITATIONS?

In general, the measures of vulnerabilities relied upon and sometimes the indicators of impacts given are not always ideal.

The information drawn on must be comparable across the board and is often limited to the lowest common denominator of what is available globally -- in fact a handful of countries are excluded for not meeting even minimal data requirements, leaving a total of 184 countries assessed. Countries are not the best unit of analysis for climate changes, which may vary considerably across one nation. Climate scientists differ in their agreement on key changes -- such as tropical storm activity -- and the models themselves vary in their confidence or certainties in predicting a role of climate change today and in the near future, as well as in predicting where, for instance, changes like rainfall will ultimately occur. Neither do changes in weather conditions necessarily translate to effects on the ground in the same degree -- and yet, in some cases, there are simply no better estimates available. Occasional discrepancies in records used also have some effect on the accuracy of this report's assessments. Overall,

estimates of impacts could be higher or lower. However, they are more likely too conservative, if only because a number of known impacts have simply been excluded -- such as effects on freshwater marine life, infrastructure damage from permafrost melt, and many others -- which could well be significant to certain communities if not globally.

Despite these shortcomings, the rough picture this report sets out is still likely to be reasonably accurate. Most of the main impacts of climate change are covered and linked to well-researched scientific models. If adaptation efforts were put into effect to address the levels of impacts outlined here, vastly fewer human lives would be at risk, and many endangered species could be spared -- for the most part at a very low cost. It is also important to remember that most adaptation efforts also strengthen the general well-being of vulnerable communities and the world.

WHO DOES THE REPORT SERVE?

The report aims to be useful for a wide range of groups. It should complement in particular the array of tools already available to policy-makers and decision-takers. Senior officials at a national level will have an idea of the extent to which additional stresses due to climate change



Sandstorms are becoming increasingly common in Iraq. Source: Sinan Mahmoud/IRIN.

are likely weighing down or relieving a country's health system or the economy, damaging infrastructure and natural resources, or pressuring coastal or dryland communities. And one that is comparable to effects seen elsewhere.

Anywhere beyond moderate vulnerability implies that a country is experiencing a level of impacts significantly more than the average seen worldwide. Responses should be able to match, at minimum, the levels of indicative impacts mentioned in this report in order to bring vulnerabilities back to acceptably low levels. Detailed sub-national and community planning will be necessary in all cases, since measures take place on these scales. But if a national plan is in distinct misalignment with the Monitor, there is likelihood that some impacts may be going unaddressed, if not, the case could be used to help evolve the Monitor itself -- either way it would merit further investigation.

International experts involved in designing or organizing responses, including humanitarian and development actors, could also use the report to improve the identification of key vulnerabilities linked to climate change and enhance the targeting of strategies, advance planning and other activities that tackle these. It will take much preparation

to counteract the rapid growth in negative impacts expected over the next 20 years as a result of the increased warming of the planet.

In general, international climate negotiators, politicians, government officials, community groups, and the media could all benefit from a familiarization with this plausible snapshot of the growing climate crisis that the Monitor provides.

HOW WAS THE REPORT DEVELOPED?

The report has been produced by DARA, an independent humanitarian organization specializing in expert evaluation and analysis of humanitarian assistance and development aid, with the support of its research partner Commons Consultants, and local expertise and guidance provided by experts in Climate Vulnerable Forum (CVF) countries and other leading specialists and partners. The CVF itself is a unique partnership of leaders of countries worst affected by climate change from all regions of the world seeking an enhanced global response to climate change. This report is issued as part of the DARA-CVF Climate Vulnerability Initiative.

The Monitor was commissioned in order to better ascertain the current and short-

term dangers of climate change. Expert groups were established to assist with the development of an independent tool able to assess in a comparable way the climate vulnerability of nations, regions, and of the world. This first Monitor has already benefitted from the advice of leading experts from mainly climate change, development, and humanitarian backgrounds, which act as advisors to the Climate Vulnerability Initiative project and offer input on the content of the report. The tool was to provide mean estimates of the different levels of impacts being felt by populations around the globe with an indication of how those impacts would evolve in the near future. This first report publishes the results and methodology of that tool in full transparency. The intention is for it to serve as a departure point for generating discussions aimed at refining our understanding of climate vulnerability and improving both the methodology and the accuracy of this tool going forward. In seeking to improve understanding of the impact of climate change on human society, the report strives to:

- Better match responses to the needs of the most vulnerable communities
- Ensure that the public and decision-makers know what is at stake
- Encourage research to fill the major gaps in our understanding of this field

