

JANUARY 2023

iCLIMA WHITE PAPER



CLIMATE CHANGE ADAPTATION

UPPING THE ANTE ON CLIMATE RESILIENCE AND ADAPTATION



SOLUTIONS CRITICAL TO AVERTING
SEVERE ENVIRONMENTAL IMPACTS



TABLE OF CONTENTS



1. Introduction	3
2. Situational Analysis	4
The Size of the Problem	4
What are the Impacts?	6
How are we Doing?	7
The Difficulties of Funding Adaptation	8
3. Roadmaps for Success	9
IPCC AR6	9
WRI Global Commission on Adaptation	10
Sharm El-Sheikh Adaptation Agenda	11
4. Global Tailwinds	12
Regulatory Factors Influencing Adaptation Investments	12
Market Factors Influencing Adaptation Investments	13
5. How to Solve the Problem	14
Monitoring Solutions	14
Climate Resilient Buildings & Infrastructure	15
Food Security and Availability	16
Water Scarcity	17
Nature Based Solutions	18
6. The Flaws in Current Investment Approaches	19
7. The iClima Approach	20
Methodology for Company Selection	22
ADPT Companies	23

INTRODUCTION

“The extent and magnitude of climate change impacts are larger than estimated in previous assessments (high confidence). Widespread deterioration of ecosystem structure and function, resilience and natural adaptive capacity, as well as shifts in seasonal timing have occurred due to climate change (high confidence), with adverse socioeconomic consequences (high confidence).”
- IPCC AR6 WG2, 2022

The impacts of climate change are becoming increasingly hard to ignore. The Northern summer of 2022 was record breaking, with heatwaves causing wildfires across Europe and North America, before September brought floods that submerged a third of Pakistan and two hurricanes that wreaked havoc across the Eastern United States and Caribbean.

Throughout the year, major global rivers such as the Rhine, Danube, Yangtze and Po have seen drastic drops in water levels with knock on effects on ecosystems, trade and tourism. Sub-Saharan Africa has been at the coalface of climate change for years already and 2022 was no different, particularly as the Ukrainian conflict disrupted global grain supplies.

Around the world climate change concern continues to rise, alongside increasingly ambitious commitments. Most of these, however, center around the mitigation of climate change. While this remains essential, scientists, developing countries and civil society alike are increasingly arguing that we are past the point where this is sufficient. **According to the IPCC’s Sixth Assessment Report, the impacts of climate change would cause inevitable intensifications in several climate vulnerabilities and present numerous threats to ecosystems and humans that no realistic volume of emissions cuts can stop.** This narrative is increasingly reflected each year at the Intergovernmental Panel on Climate Change’s (IPCC) Conference of the Parties (COP), the last of which was COP27 that recently

concluded in Egypt. In a major milestone, the COP27 Presidency launched the ‘Sharm-El-Sheikh Adaptation Agenda’, a detailed, collective agenda to galvanise international intervention around 30 adaptation objectives intended to tackle the adaptation gap by 2030.

Adaptation, then, is becoming increasingly important. Companies offering solutions to help vulnerable populations adapt to the effects of a warming world will benefit in the near, medium, and long term, generating both impact and economic returns. A broad range of these companies are represented in the world’s first adaptation focused equity index, the BITA iClima Climate Change Adaptation Index.

ADPT BENEFITS FROM:

- **A sole focus on adaptation:** As impacts visibly intensify, governments, scientists and NGOs are calling for more money to flow towards adaptation. For example, negotiators in Glasgow at COP26 in 2021 agreed that 5% of the ‘share of proceeds’ from compliance carbon markets would go into a global adaptation fund.
- **Exposure to high growth products & services:** These solutions are going to be growth segments, if only by necessity.
- **A data-based approach to company selection:** This helps fight ‘greenwashing’ and makes transparent the difficult process of compiling an index focused on adaptation.
- **Consumer demand shifts:** Consumers, whether they be individuals, companies, or local governments, will increasingly look to build climate change adaptation into their project plans.

The ADPT index represents a diverse portfolio of solutions across five broad sectors:

- *Monitoring Solutions*
- *Resilient Buildings*
- *Food Security and Availability*
- *Water Scarcity*
- *Nature Based Solutions*

SITUATIONAL ANALYSIS

THE SIZE OF THE PROBLEM

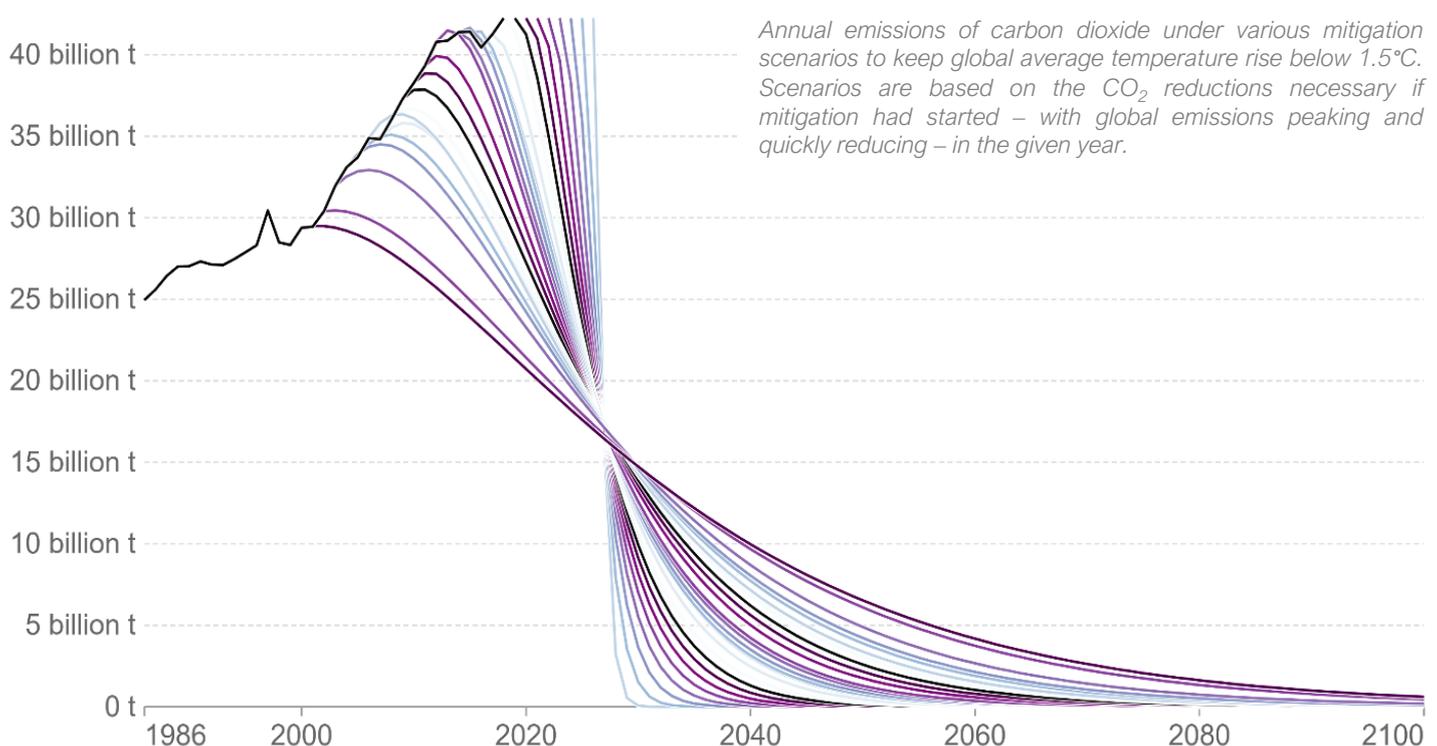
At COP21 in Paris, world leaders pledged to limit global warming to well below 2°C compared to pre-industrial levels, and preferably limit it to 1.5°C. The seven years since the Paris Agreement was signed have seen temperatures continue to rise, and the impacts have been intensifying. Last year's COP26 in Glasgow kept the goal of limiting global warming to 1.5 degrees Celsius alive, but the energy crisis, compounded by the invasion of Ukraine, poses additional challenges to reducing fossil fuel emissions faster.

The UN Environmental Program (UNEP) published its 2022 Emissions Gap Report at the end of October, stating that after a COVID-induced reduction in 2020, **2021 emission levels bounced back and reached 52.8 Gt CO₂e, exceeding 2019 levels.** The UNEP's Adaptation Gap Report 2022 was released before the start

of COP27, and the outlook was not encouraging. Global adaptation planning, financing, and implementation efforts continues to lag far behind the burgeoning climate-related risks. **According to the report, despite significant initiatives to prepare for adaptation, the projected costs of climate change adaptation in developing nations could reach \$340 billion annually by 2030. Currently, adaptation assistance for developing countries accounts for only about 10% of that total.**

With fraught negotiations at COP27 reaffirming the goal but failing to secure sufficient concrete commitments, each year of delay requires more drastic action to stay at safe levels of warming, as shown in the graph below, reproduced by Our World in Data using analysis undertaken by Robbie Andrews (2019).

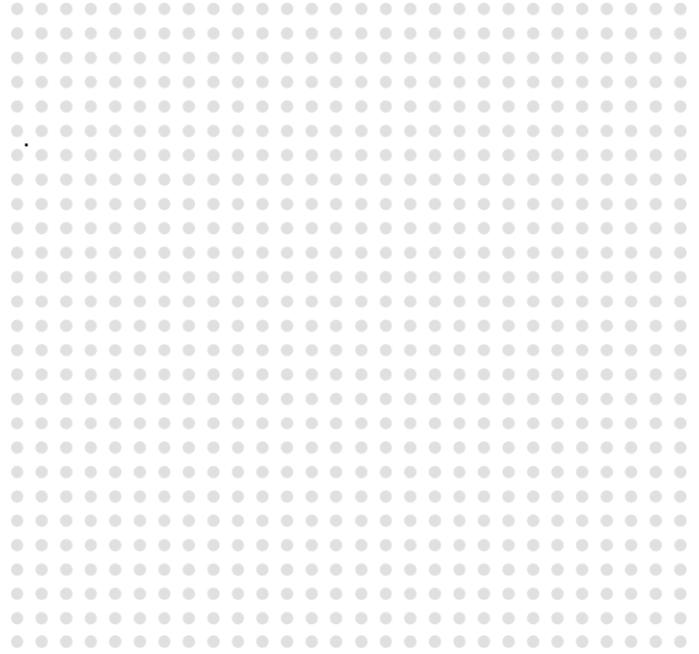
CO₂ Reductions Needed to Keep Global Temperature Rise Below 1.5°C



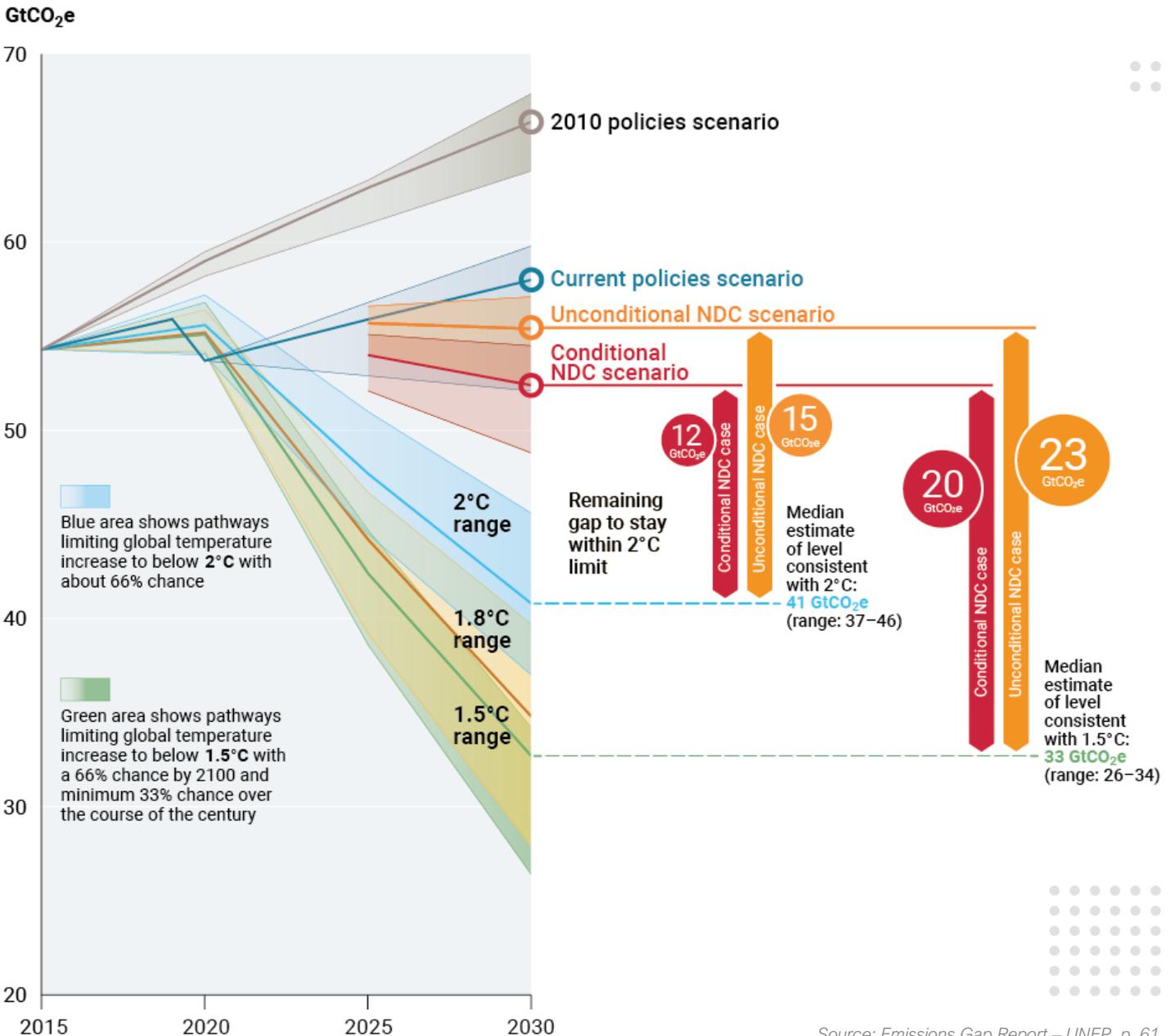
Source: Our World in Data

Note: Carbon budgets are based on a >66% chance of staying below 1.5°C from the IPCC's SR15 Report.

In 2021, 36.4 GtCO₂e was released into the atmosphere. For reference, 1 GtCO₂e is enough to cover the UK in a blanket of CO₂e 4.1 meters thick. To achieve the target of limiting temperature rise to 1.5°C, we must halve the current annual level of CO₂e emissions by 2030. That's a yearly reduction target of about 4 Gt of CO₂e, or 7%. Perhaps worryingly, this is roughly the same drop that was seen when the global economy ground to a halt in 2020, so incremental changes are clearly not sufficient. The graph below is taken from the latest UNEP Emissions Gap Report 2022, and shows the discrepancy between current and necessary action. As temperatures rise above 1.5°C, it is now clear that ecosystems will start to break down and livelihoods will be destroyed.



GHG Emissions Under Different Scenarios and the Emissions Gap in 2030



Source: *Emissions Gap Report – UNEP, p. 61*



WHAT ARE THE IMPACTS?

In order to assess the size of the problem we are facing, we need look no further than the IPCC's Sixth Assessment Report, published in stages from 2021-22. The first part of the report, produced by Working Group 1 (WG1), was titled 'The Physical Science Basis' and looked at our latest understanding of how humans are causing climatic changes. It showed an 'unequivocal' link between anthropogenic emissions and temperature rise,

but confirmed that Paris Agreement targets would keep us under 1.5°C of warming. The second part, and the focus of our ADPT index, looked at 'Impacts, Adaptation and Vulnerability.' The final segment, produced by WG3, looked at the 'Mitigation of Climate Change,' concluding that we have available all the necessary tools to be successful, but now need to take action and use them.

Here, we outline the key points from the 'Impacts' and 'Vulnerability' themes of the WG2 report, using Carbon Brief's impressive summary of the report for guidance. We recommend diving into this for more detail. The bullets are followed by a table taken from the WG2 report showing the impact of climate change on human systems.

Biodiversity:

- It is "likely" that **9% of species will reach a very high risk of extinction at 1.5°C**. This rises to 10% at 2°C and 12% at 3°C, with each loss having a knock-on effect on broader ecosystems and populations.

Exposure:

- 3.3-3.6 billion people live "in contexts that are highly vulnerable to climate change."**
- In these contexts, climate change is already "contributing to humanitarian crises" and "driving displacement," particularly in small island nations.

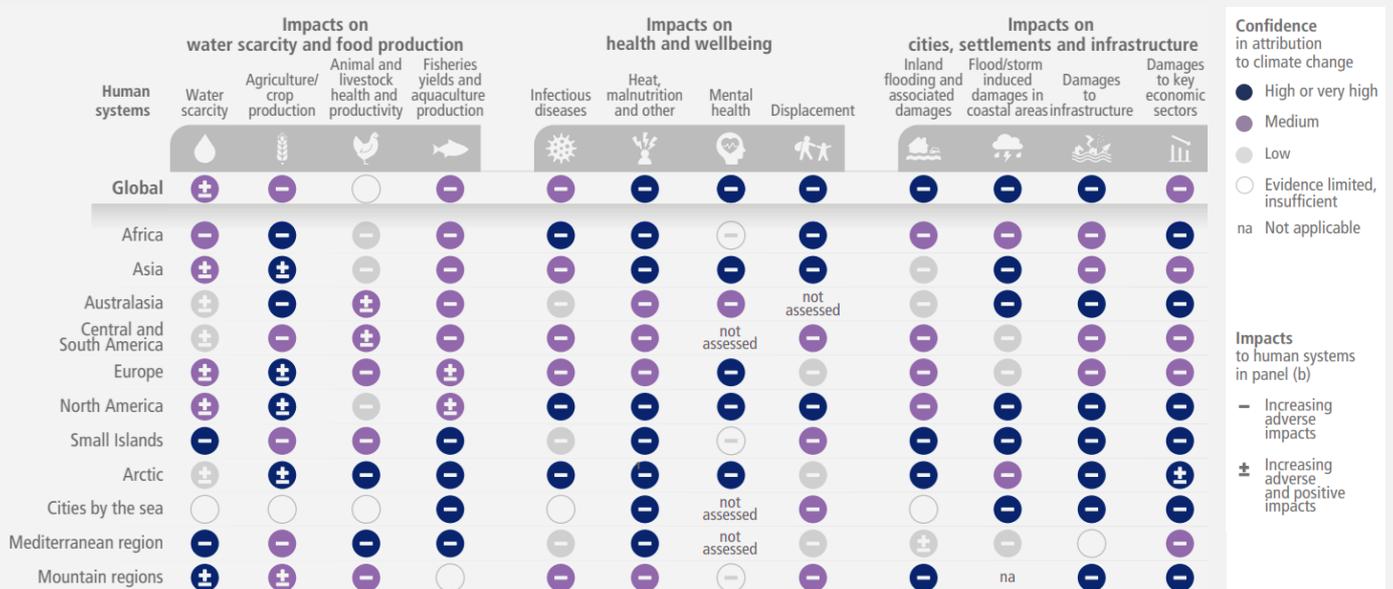
island nations.

Current consequences:

- Already, both weather and climatic extremes have "exposed millions of people to acute food insecurity and reduced water security." This is particularly the case in parts of Africa, Asia, Central and South America, small islands and the arctic.

Future consequences:

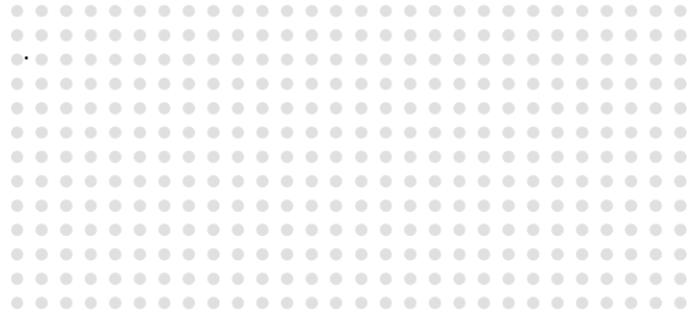
- 50-75% of people could experience "life-threatening climatic conditions" by 2100** because of extreme heat and humidity.
- Ill health and premature deaths will "significantly increase" due to climate change and extreme weather.
- Climate change "will increasingly put pressure on food production and access, especially in vulnerable regions, undermining food security and nutrition."



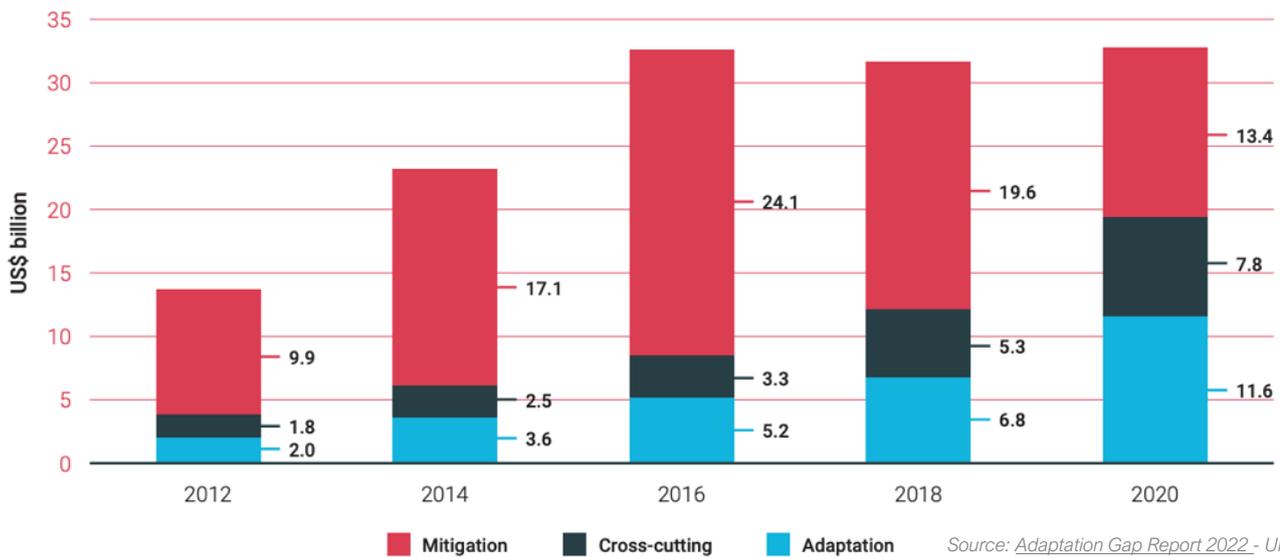
Crucially, the report highlights potential irreversible risks once certain emissions levels are reached. Some of these may even be 'tipping points' beyond which impacts cascade and intensify. Adaptive measures thus become exponentially more important as warming increases.

HOW ARE WE DOING?

Adaptation has become an increasingly large focus of the IPCC's COP events. Nations all over the world have continued to broaden their adaptation mechanisms with new proposals, approaches, regulations, and policies. **In 2022, 84% of countries had at least one adaptation planning instrument in place, a five-point increase from 2021.**



Adaptation, Mitigation and Cross-cutting Bilateral Flows
from Annex II countries to developing countries between 2012 and 2020



International adaptation finance to developing countries too is increasing, reaching US\$28.6 billion in 2020. This represents a 34% of total climate finance to developing countries in 2020, a 4% increase over 2019. **However, the combined adaptation and mitigation finance flows in 2020 was at least US\$17 billion short of the US\$100 billion pledged to developing countries.** If this trend continues, the US\$100 billion climate pledge target will not be met until 2025, and necessitates a significant increase in

adaptation finance, if the Glasgow Climate Pact's target of doubling 2019 finance flows by 2025 is to be met.

The annual adaptation costs is now estimated to be in the range of US\$160-340 billion by 2030 and US\$315-565 billion by 2050. **This implies that a target of US\$71 billion per year in adaptation finance flows between now and 2030 - five to ten times greater than the current levels.**

Comparison between the AGR and IPCC WGII AR6

Annual cost of adaptation for developing countries		
	2030	2050
AGR	US\$ 160 billion/year to US\$ 340 billion/year	US\$ 315 billion/year to US\$ 565 billion/year
IPCC WGII AR6	US\$ 15 billion to US\$ 411 billion/year (median US\$ 127 billion/year)	US\$ 47 billion to US\$ 1088 billion/year (median US\$ 295 billion/year)

Source: *Adaptation Gap Report 2022 - UNEP, p. 19*



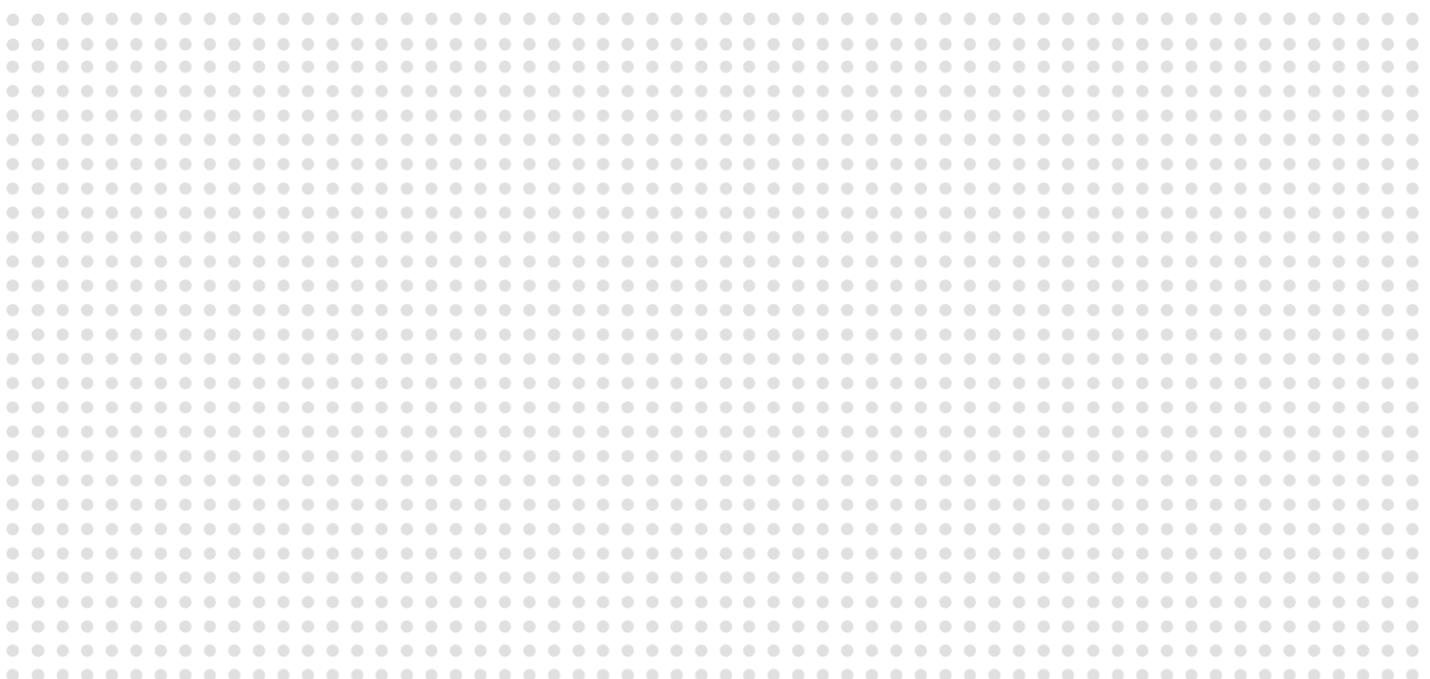
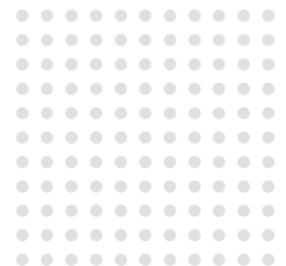
THE DIFFICULTIES OF FUNDING ADAPTATION

Currently, adaptation financing has been woefully inadequate. The problem here is two-fold. **Firstly, adaptation still gets less attention than mitigation within climate circles and is often considered more the sphere of development focused institutions.** Many countries, companies, civil society organizations and civilians in areas of the world more insulated from the impacts of climate change understandably prefer a focus on mitigation. However, mitigation and adaptation are both strategies that pay back in multiples, for the economic impacts if they are not undertaken are significant.

The second reason for this underfunding of adaptation **is the simple fact that it is very difficult to do.** Examples of mitigation solutions include renewable energy, low carbon transport, plant-based foods, energy efficiency and alternative production methods. Each of these entails a clear return on investment, and one that is almost inevitable to grow as we transition to a Net Zero economy. Examples of adaptation include resilient buildings, solving water scarcity, food security and monitoring systems, often for the most vulnerable populations. Some of the constituents of the ADPT Index demonstrate the dual impact of impact and

returns. For example, [Consolidated Water Co. Ltd](#) which operates seawater desalination services in regions with no access to potable water produces ca. 71 million gallons of drinking water daily. The stock is up 39.39% YTD. Likewise, [Valmont Industries](#), a global leader that provides vital technology to agriculture saves about 4 trillion gallons of water annually through its 228,000+ irrigation center pivots. The stock is up 32.60% YTD.

The calculations for return on investment are not always straight forward. Traditionally this has been the sphere of concessional finance, from governments, development finance institutions or NGOs. While we need the scale of private, non-concessional finance, it can be difficult to see where it fits in. The [World Resources Institute](#) reports that **every \$1 invested in adaptation generates a return between \$2 and \$10.** It will benefit all actors.



ROADMAPS FOR SUCCESS

IPCC AR6

3

Despite the magnitude of the task we face, we have several roadmaps to help us get there. Particularly important are those presented by the IPCC, most recently in their Sixth Assessment report (AR6). IPCC reports, released every six or seven years, have been imperative in guiding our understanding of the crisis. Influential analysis from actors as diverse as the IEA, Greenpeace and McKinsey use IPCC scenarios as a foundation, and the body's broader conclusions slide into climate-related

discourse in all corners of society. To produce AR6 alone, 234 scientists trawled through over 14,000 academic papers to set out the causes, consequences and solutions to climate change across three volumes. The contribution of WG2, which has already been highlighted, outlines a blueprint for adaptation alongside an assessment of impacts and vulnerability. The graph below is taken from this, offering a high-level view of the relative merits of different strategies.



Source: *Climate Change 2022: Impacts, Adaptation and Vulnerability* – IPCC, p. 23

The report emphasizes a few core points for considering adaptation. First, it requires strong and careful governance that spans and integrates various levels of decision making. Second, the report emphasizes indigenous knowledge and inclusion as a vital component of successful adaptation efforts. Third, it highlights the pivotal role of finance as a 'crucial

enabling condition and shaper of the solution space.' Unsurprisingly, it makes clear that **current financing efforts are insufficient and highlights the potential returns from properly investing in the space, which it estimates to be \$7.1tn for an up-front investment of \$1.8tn.**



Key solutions identified by the report include:

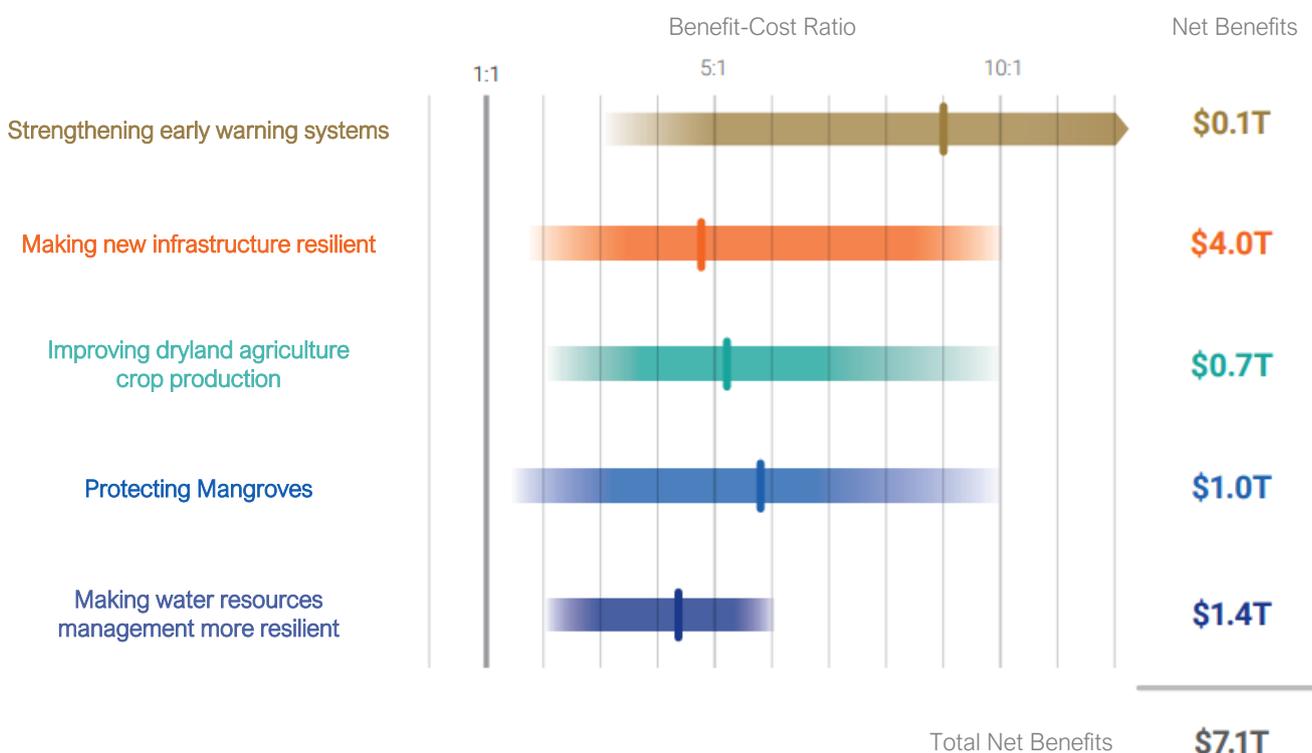
- Planting the right trees in the right places to provide shade and ecosystem stability.
- Restoring mangroves, saltmarshes, and seagrasses.
- Using irrigation to help farmers adapt to changing rain patterns.
- Taking an ‘agroecological’ approach to food systems, which means managing crops in a sustainable, regenerative manner alongside the natural environment.
- Flood proofing cities through hard defenses, nature-based solutions, and improved infrastructure design.
- Investing in assets such as water and sanitation, education, and healthcare to build resilience in the world’s poorest population.

WRI GLOBAL COMMISSION ON ADAPTATION

The WRI Global Commission on Adaptation seeks to accelerate adaptation by elevating the political visibility of adaptation and focusing on concrete solutions. The Commission’s flagship report, “Adapt Now: A Global Call for Leadership on Climate Resilience,” identifies five key areas for climate change adaptation investments; namely, early warning systems, climate-resilient infrastructure, improved dryland

agriculture crop production, global mangrove protection, and investments in making water resources more resilient. We will return to this segmentation further in this paper, as it provides the foundation of our approach to building the index. The graph below is a headline finding of the report, which outlines the cost-benefit ratio of key investments.

Benefits and Costs of Illustrative investments in Adaptation

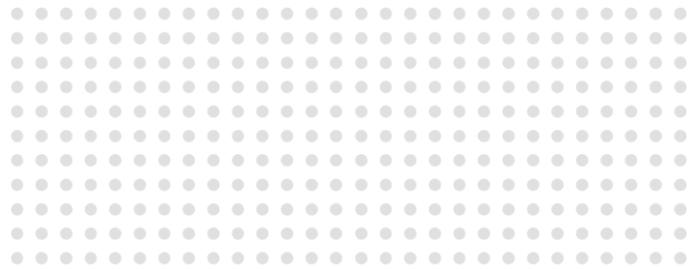


Source: *Adapt Now - WRI Global Commission*, p. 4

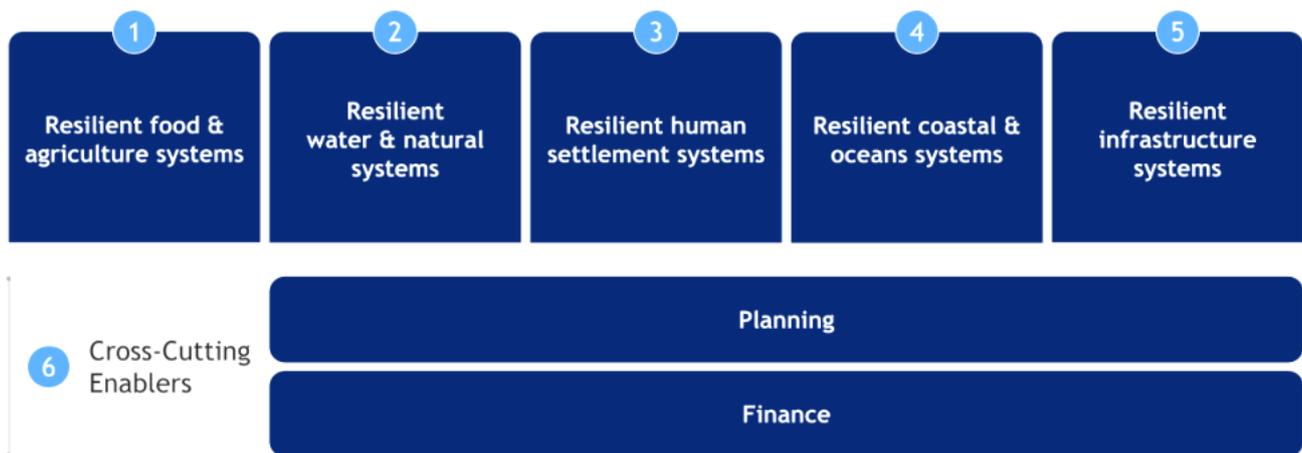


SHARM-EL-SHEIKH ADAPTATION AGENDA

One of the key highlights at COP27 was the launch of the Sharm-El-Sheikh Adaptation Agenda driven by the COP27 Presidency, the High-Level Champions and Marrakech Partnership and underpinned by the 2,000+ organisations spanning 131 countries in the Race to Resilience campaign.



Marrakesh Partnership Resilience Impact Systems



The Sharm-El-Sheikh Adaptation Agenda establishes 30 Adaptation Outcomes with the goal of increasing adaptability for the approximately 4 billion people impacted by climate-related uncertainties by 2030.

Each outcome provides global adaptation interventions across five impact systems: food and agriculture, water and nature, coastal and oceans, human settlements, and infrastructure, in addition to planning and financing solutions. These solutions can be implemented at the community level to adapt to regional climate scenarios while also delivering the system transformation required to protect vulnerable communities from rapidly increasing climate change effects such as extreme heat, drought, or flooding.

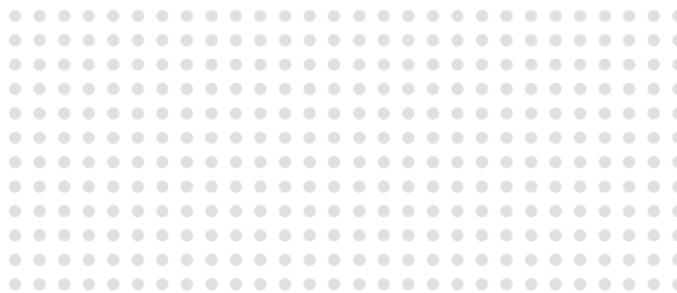
The 30 Adaptation Outcomes include urgent global 2030 targets related to:

- Transitioning to climate resilient, sustainable agriculture that can increase yields by 17% and reduce farm level greenhouse gas (GHG) emissions by 21%, without expanding agricultural frontiers, and while improving

livelihoods including of smallholder farmers.

- Protecting and restoring an estimated 400 million hectares in critical areas (land and freshwater ecosystems) supporting indigenous and local communities with use of nature-based solutions to improve water security and livelihoods and to transform 2 billion hectares of land into sustainable management.
- Protecting 3 billion people by installing smart and early warning systems
- Investing USD 4 billion to secure the future of 15 million hectares of mangroves through collective action to halt loss, restore, double protection and ensure sustainable finance for all existing mangroves.
- Expanding access to clean cooking for 2.4 billion people through at least USD 10 billion/year in innovative finance.
- Mobilising USD 140 to USD 300 billion needed across both public and private sources for adaptation and resilience and spur 2,000 of the world's largest companies to integrate physical climate risk and develop actionable adaptation plans

With awareness of the dangers of climate change growing, there are several tailwinds behind approaches that contribute to making progress against these roadmaps. These are primarily driven by regulatory changes, technological developments and consumer behavior shifts.



REGULATORY FACTORS INFLUENCING ADAPTATION INVESTMENTS

Across the globe, regulatory changes are being made that mandate or incentivize companies and individuals to lower their emissions.

Climate Finance Pledge

At COP15 in 2009, developed nations pledged \$100bn annually by 2020 to help developing countries transition and adapt to climate change. The target is now likely to be met in 2023. This will see money flowing towards adaptation solutions in developing countries.

Loss and damage

The UN Climate Change COP27 summit in Egypt concluded with a game-changing "loss and damage" fund deal to support affected countries in covering the rising costs of climate damage. Although, the specifics of how it will operate and where it will get its funding will only be spelled out in the coming year.

Increasing Climate Litigation Claims

There has been an uptick in damages claims against polluters, and this is expected to continue. As it does, it will make increasing financial sense for companies or governments to invest in adaptive measures to prevent the

damages in the first place. More than 1500 claims were filed in 38 countries by the middle 2017. These include the violation of human rights, government failings and corporate greenwashing.

Sustainability disclosures

The UK has made reporting mandatory in line with TCFD guidelines from 2022 for certain disclosures, and by 2025 for all. The US SEC has proposed a landmark similar measure. Elsewhere, several different standards are being merged to provide one standardized guideline for climate related disclosure, under the auspices of the newly formed ISSB. As exposures become clearer, it will increasingly be in the interest of companies and governments to manage them.

Increasing frequency of extreme events

While it is far from positive, the increased frequency and severity of extreme weather events has been a tailwind in raising the prominence of climate change in the global collective psyche. This increase was specifically highlighted by IPCC AR6 WG2. A direct effect of this will be a greater portion of budgets set aside for adaptation.



MARKET FORCES INFLUENCING ADAPTATION INVESTMENTS

In addition to regulatory factors, market forces are driving the adoption of adaptation solutions. This trend is less pronounced than in the field of mitigation, where rapid cost decreases in key technologies such as wind, solar and batteries are changing fundamental structures and processes, but it is still occurring. It is in part driven by changing consumer preferences, but also from technological breakthroughs and steady price deflation. Notable examples include the following:

Sustainable Finance:

Demand for ESG products is booming, with Assets under Management (AUM) projected to grow at a CAGR of 12.9% to US\$33.9tn by 2026, from US\$18.4tn in 2021. While still insufficient, climate related financial flows have risen from \$364 billion to \$632 billion over the past decade.

Advances in Controlled Environment Agriculture

The technology for controlled environment agriculture is developing rapidly. This allows for a greater diversity of products at ever cheaper costs. Key innovations include more efficient cooling technologies, automation, and AI management software.

Advances in monitoring technologies

This is another sector benefitting from rapid advances, particularly in drone technologies. Satellites also offer an increasingly granular and real time picture of environmental changes.



Adaptation plays a key role in reducing exposure and vulnerability to climate change.

The ADPT index intends to represent the most relevant solutions that can prevent people, fauna and flora from being in harm's way. The goal is to represent adaptation solutions that are both anticipatory (e.g. earth observation solutions) or reactive (e.g. irrigation), as well as incremental (e.g. HVAC systems) or transformational (e.g. nature based regeneration)



HOW TO SOLVE THE PROBLEM

KEY SOLUTIONS

5

This section offers a brief outline of the key adaptation solutions benefitting from these tailwinds:

1.



MONITORING SOLUTIONS

A diverse sector, monitoring has a range of purposes. First, it helps planners determine where and when to deploy other solutions such as water irrigation, hard defenses, or drainage systems. Second, it can be part of an early warning system to help prepare and relocate vulnerable communities before extreme events. Third, it can be useful to evaluate the impact of adaptation measures to ensure they are maximized. One key monitoring technology is drones, which can

efficiently gather readings from a wide area in difficult conditions. Another is satellite monitoring, which has a similar use case. These solutions can be complemented by on the ground sensors and accompanying software systems.

Examples:



2.

CLIMATE RESILIENT BUILDINGS & INFRASTRUCTURE

Infrastructure solutions are a core part of climate change adaptation from two points of view. First, because the built environment is vulnerable to climate related extreme events and therefore needs to be made more resilient and second, because built solutions can be a key defense in themselves. The first entails a broad range of key solutions like robust drainage systems, novel construction materials and techniques, insulation, and

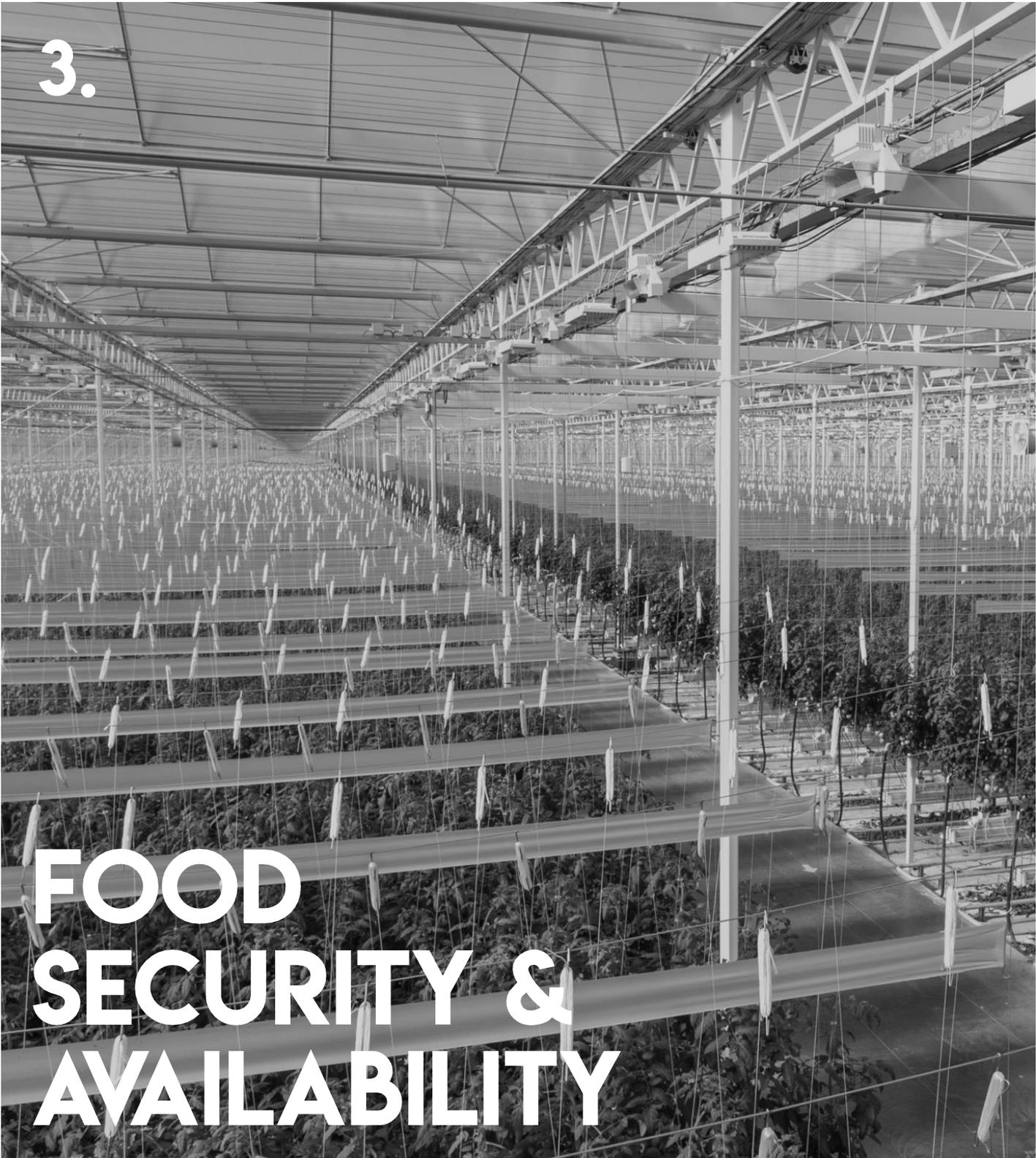
temperature control. The second category includes sea walls, levees, and other flood defenses. Built solutions are typically more suited to concentrated physical hazards such as storm surges versus diffuse ones like temperature rise or crop failure.

Examples:

view



3.



FOOD SECURITY & AVAILABILITY

Food security is one of the greatest threats posed by climate change. We are already seeing devastating examples in sub-Saharan Africa, most recently in Somalia. The solutions revolve around maintaining food supply as weather and climatic conditions change. As a result, they are primarily forms of controlled environment agriculture, which is mostly indoor agriculture and vertical farming. In both cases, conditions are

optimized for growing using technology and chemicals in a much smaller space than is necessary in traditional agriculture, often without the use of soil. Growing can be done in a variety of places and conditions, making it a particularly robust solution.

Examples:



4.



WATER SCARCITY

Alongside food security, a similar chronic threat from climate change is water scarcity. Once again, sub-Saharan Africa has been particularly affected, with Southeast Asia and parts of South America also deemed vulnerable. Solutions generally fall into two camps: accessing more water and treating currently available water. In the former category, irrigation and water transportation solutions are key, as is water efficiency which entails things like interceptors, improved

drainage, and waste management. Filtration (including saltwater) and purification are used for treating water. These are hugely impactful concepts, particularly as they are relatively low cost compared to newly engineered options.

Examples:



5.

NATURE BASED SOLUTIONS

Nature is critical to both mitigation and adaptation. Projects can include restoration, creation, management, and protection. In terms of adaptation, examples of ecosystems include mangroves, forests, salt marshes, sand dunes, urban vegetation, wetlands, peatlands, coral reefs, and soil management. Financing these projects remains difficult and is primarily done through concessional financing or the use of carbon credits and offset markets. As the world

develops its understanding of the potential and characteristics of nature-based solutions, new markets and instruments will develop as well, unlocking a huge swathe of opportunity. Much of this will be in the developing world where, if done properly, project co-benefits such as local employment should add further resilience.

Example:



THE FLAWS IN CURRENT INVESTMENT APPROACHES

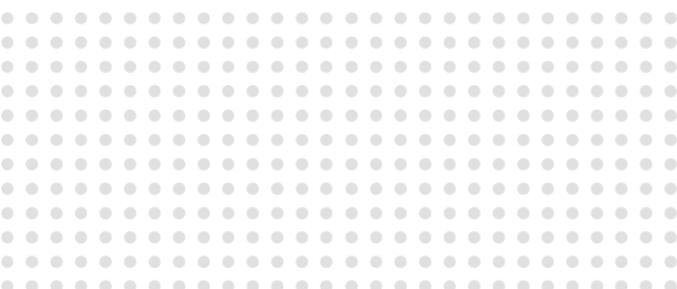


As highlighted above, many solutions are now available. While policymakers can have significant influence over their uptake, the financial sector also has a major role to play. As the IPCC noted in their sixth Assessment Report in mid-2022, neither group is doing enough. Here we delve into the flaws we perceive in the way that investors currently deal with climate change, with a particular focus on the public equity market. This sets the scene for the introduction of iClima's unique approach in the next section.

The investment world has been increasingly channeling resources towards products deemed to align with climate goals, and the Exchange Traded Fund (ETF) market is no different. Research from Morningstar [shows capital flows to sustainable mutual funds and ETFs rose 53% in 2021 to \\$2.7 trillion](#). Europe has led this growth.

As mentioned above, the demand for sustainable products has been driven by regulatory changes and consumer demand, but also a growing awareness of the material impact sustainable investments can have on long-term financial performance. The problem, however, is that there is no clear standard for what counts as sustainable.

The leading types of responsible investments are those that score well on Environmental, Social and Governance (ESG) ratings. The concept of ESG emerged from a UNEP working group in 2004 and was rooted in the best principles and practices of the UN SDGs. While it is important to remember the immense positive impact the term has had, it has now been somewhat coopted and de-valued.



There are three major flaws in current investment approaches, most of which fall under the broad banner of ESG. For more detail on these themes, please see our [2021 Impact Report](#).

1. OPAQUE RATINGS

ESG ratings are calculated by a small number of providers, and are usually provided at a very high level, making them effectively a 'black box' in terms of methodology. What is more, the correlation between providers is often very low; correlation for the same companies between two of the most prominent ESG rating providers is between [0.45](#) and [0.54](#), compared to [0.99](#) for credit ratings.

2. PREDOMINANCE OF CORPORATE RISK

In many cases, what is cleverly framed as risk from a company's activities to the environment actually measures risk to a company's activities created by the environment. If an environmentally damaging practice doesn't create a material financial risk for a company, it is often ignored. This situation was blown open by a [Bloomberg BusinessWeek investigation](#) in late 2021.

3. THE 'DOING LESS HARM' PARADIGM

Even if companies were rated in a robust and transparent manner with a focus on environmental impact, there would remain the issue that the companies coming out on top would be those simply doing 'less harm.' To elaborate, data is usually backwards looking and rewards companies for incremental improvements or for simply having intrinsically low footprints. ESG indices thus often end up dominated by tech giants like Apple and Google with business models that have no direct impact on solving climate change. At iClima, we believe that this will not enable the required systemic change.



THE iCLIMA APPROACH

iClima Earth set out to provide climate focused investment solutions grounded in forward looking data rather than opaque ESG scorecards, with a mission to reward the solution providers who can enable systemic change. For this index, we focus on solutions that can help keep humans, animals, and flora out of harm's way. The impact of the different solutions can be observed in terms of the volume of water purified, filtered, or not consumed; the number of people benefiting from better insulation; the number of buildings with hurricane resistance; the size of areas under fire monitoring and protection. While the data may not be readily available in all cases, the nature of the solution and its tangible impact is clear.

Our approach uses an innovative methodology. We started by triangulating three key resources to determine the scope of the index. These were the flagship reports of the WRI's Global Commission on Adaptation, the WG2 report of IPCC AR6, and the EU's Green Taxonomy.

The WRI Global Commission on Adaptation seeks to accelerate adaptation by elevating the political visibility and focusing on concrete solutions. The Commission's flagship report, "Adapt Now: A Global Call for Leadership on Climate Resilience," identifies 5 key areas for climate change adaptation investments, namely early warning systems, climate-resilient infrastructure, improved dryland agriculture crop production, global mangrove protection, and investments in making water resources more resilient.

The index strategy expands on these areas to explore sectors where commercially viable opportunities for climate change adaptation in the private sector exist. Therefore, the main segments of the index are identified as **Monitoring Solutions, Climate Resilient Infrastructure & Buildings, Food Security & Availability, Water Scarcity, and Nature-**

based Solutions.

Additionally, the IPCC AR6 WII report was referenced in the creation of an exhaustive list of key climate change adaptation activities to verify that the index addresses all such systems where private sector contributors exist. This was achieved via the inclusion of subsegments placed within the major segments identified by the WRI. The Working Group II contribution to the IPCC Sixth Assessment Report is further used in defining maladaptation and maladaptation activities.

The EU Taxonomy is a green classification system that translates the EU's climate and environmental objectives into criteria for specific economic activities for investment purposes, including climate change adaptation.

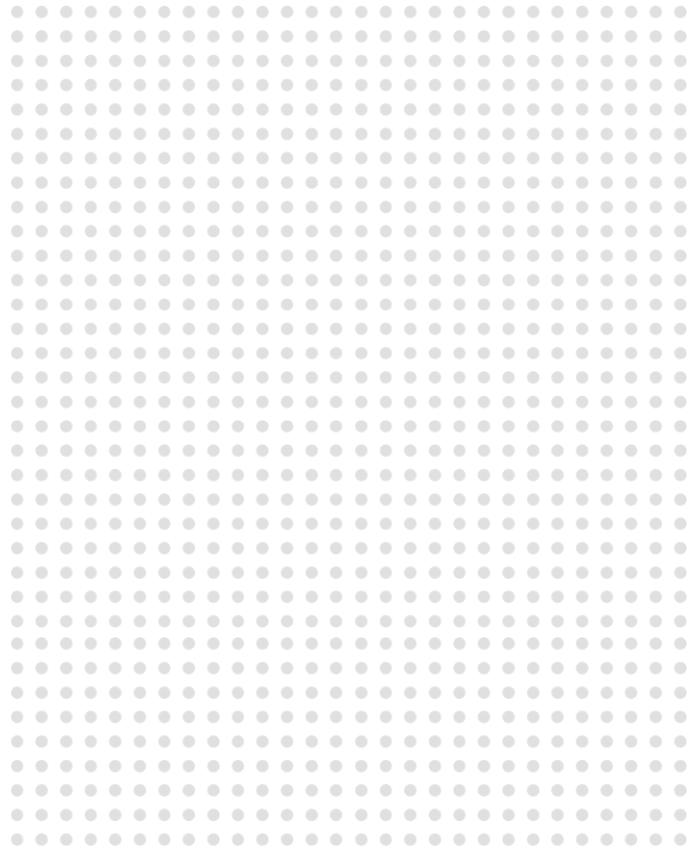
The index references the concepts for "Substantial Contribution" and "Do No Significant Harm" as defined by the EU Taxonomy to ensure all index constituents and their revenues match these standards. The EU Taxonomy's TEG also recognises that climate change will affect all sectors of an economy and all sectors must adapt to its impacts globally, meaning its principles can be applied for any economic activity in any location.

It also reinforced our view that the context-specific nature of adaptation means that it is not possible to produce a stand-alone and exhaustive list of activities that could be viewed as contributing to adaptation under all circumstances, thereby, strengthening the need for detailed qualitative assessment of companies and their activities. Additionally, the EU taxonomy was used to differentiate between Adapted Activities and Activities Enabling Adaptation. The primary focus of the index constituents is on activities enabling adaptation of economic activities, meaning they reduce physical climate risk and/or address systemic barriers to adaptation, and are themselves

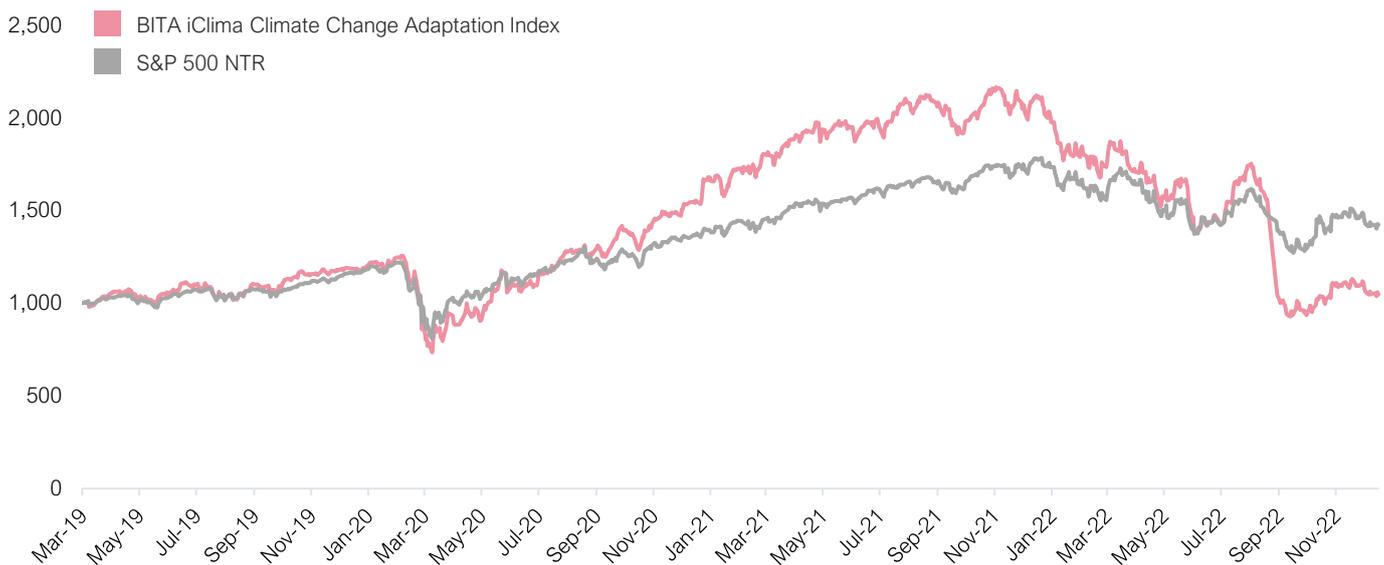
adapted to physical climate risks.

The result of this analysis is the ADPT index of companies offering products and services that contribute to climate resilience. iClima calls the companies in its index ‘Climate champions’ because they are delivering impactful solutions measured by the lives adapted potential of their products.

The ADPT index is a proprietary benchmark. At inception, the index is comprised of **31** of these Climate Champion companies that we estimate have the greatest impact on adapting to climate change. This benchmark went live in September 2022; ADPT is **up 4.61%** since launch, compared to **-2.28% for the S&P 500 index**. The ADPT index is **down 24.58%** for the year 2022, compared to **-19.67%** for the S&P 500 index and a **total return of 27.44%** in the past 3 years.



BITA iClima Climate Change Adaptation Index versus S&P 500 NTR



BITA iClima Climate Change Adaptation Index NTR

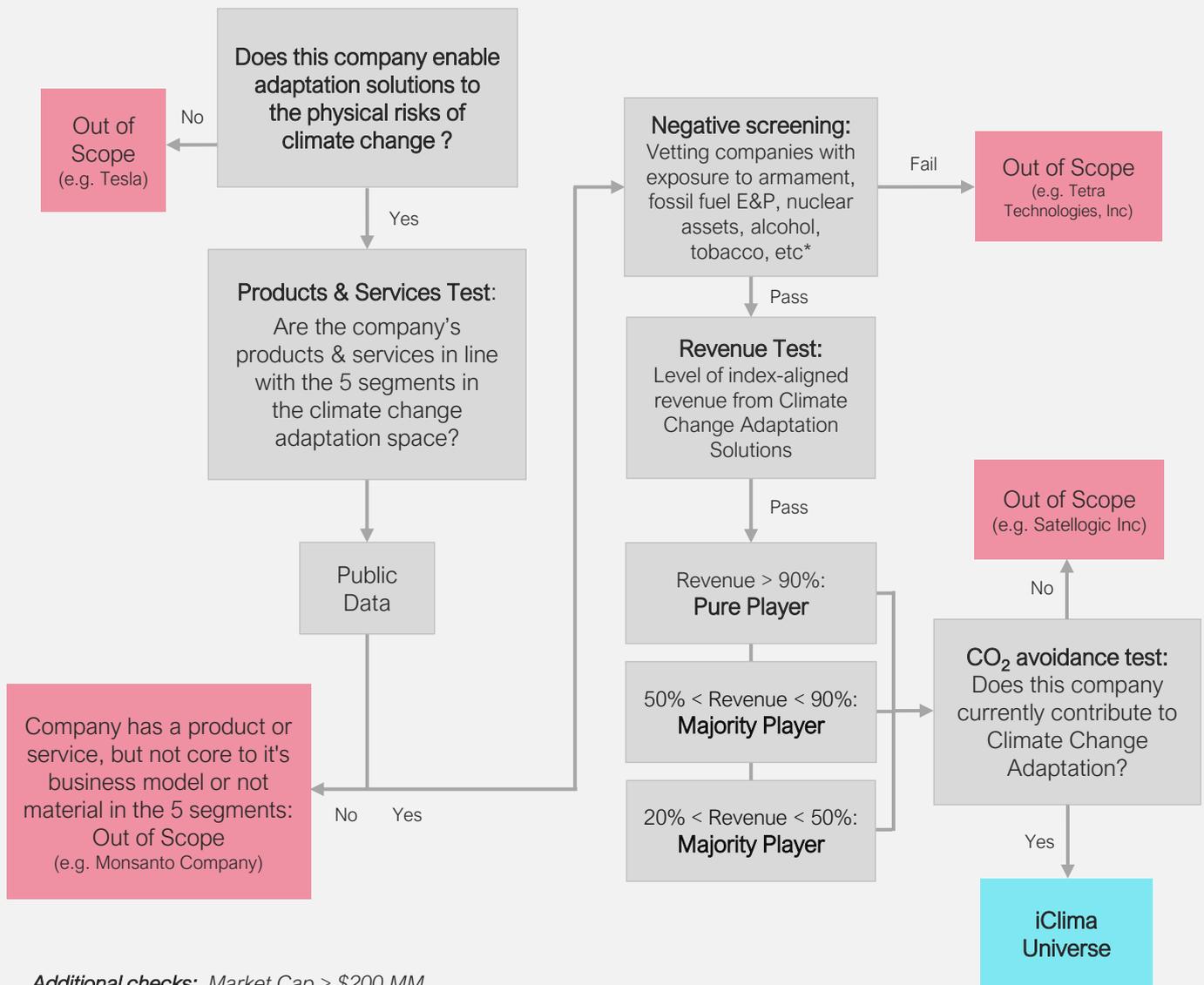
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	YTD	S&P500 YTD
2022	-13.02%	-2.78%	0.74%	-8.37%	-1.05%	-13.14%	16.27%	-4.70%	-8.78%	10.06%	6.34%	-4.98%	-24.58%	-19.67%
2021	1.80%	7.86%	6.33%	6.72%	1.80%	0.56%	2.76%	3.65%	-6.94%	4.29%	-0.51%	4.22%	36.71%	28.71%
2020	0.03%	-7.04%	-21.14%	11.15%	10.34%	3.87%	6.69%	8.39%	1.94%	1.21%	14.46%	5.10%	30.97%	18.40%
2019				6.46%	-6.36%	10.73%	-2.29%	-2.30%	3.92%	3.78%	3.20%	0.83%	18.26%	16.24%



iCLIMA'S METHODOLOGY FOR COMPANY SELECTION

iClima's methodology for company selection is built on a data-based methodology, triangulated using three key resources to determine the scope of the index. These were the flagship reports of the WRI's Global Commission on Adaptation, the WG2 report of IPCC AR6, and the EU's Green Taxonomy.

We identified five segments that can make a significant impact on CO₂e levels. Companies within each of these segments were included based on a rules-based funneling system as described in the following flow chart:



Additional checks: Market Cap > \$200 MM
*Please refer to Vetting & Screening Methodology

ADPT COMPANIES

The 31 Climate Champion companies in the ADPT index cover a wide range of activities and markets that are likely to provide both diversification and growth to investors. The CLMA index was built using the modified market capitalization method, which is a hybrid between equal weighting and conventional capitalization weighting. The top 10 companies by holding size represent 58% of the index. Here we highlight some of the most exciting companies in our index.



US-based Local Bounti is a disruptive indoor agricultural technology company that is redefining the future of farming and transforming the production and delivery of local, fresh, and sustainably grown living lettuce, herbs, and loose-leaf lettuce across the U.S. Local Bounti uses 90% less water and 90% less land than traditional agriculture, in addition to generating lesser delivery GHG emissions and food waste. The Montana-based company reported 2Q2022 revenue of \$6.3 million, compared to \$0.2 million in the prior year period.



Tecnoglass is a Colombia-based leading manufacturer of architectural glass and associated aluminum products for the global commercial and residential construction industries. Perhaps no more surprising, it is not your standard glass. Technoglass are specialists in tempered, laminated, and insulated glass. Strength, insulation, and flexibility in use are all vital features for climate resilient buildings. The company also manufactures similarly robust aluminum for building and infrastructure products. The company is growing rapidly, reporting a 53.3% increase in revenues to

\$201.8 million compared to \$131.7 million in the prior year quarter.



SPX Technologies is a supplier of highly engineered products and technologies, holding leadership positions in the HVAC and detection and measurement markets. From cooling towers, which can help reduce energy usage in buildings, to inspection equipment that helps remediate leakage of underground water and waste water pipes, SPX offers a wide array of highly efficient and innovative products for the maintenance of critical infrastructure. For the third quarter of 2022, the company reported revenue of \$370.5 million and operating income of \$37.3 million, compared to revenue of \$285.7 million and operating income of \$17.7 million in the third quarter of 2021.



Xylem is a leading water technology company committed to "solving water" by creating innovative and smart technology solutions to meet the world's water, wastewater and energy needs. A leader in the digital transformation of water, Xylem enables customers to leverage data, analytics and decision intelligence to optimize the way they manage water and realize bold water, energy and cost savings for the communities they serve. From collection and distribution to reuse and return to nature, Xylem's highly efficient water technologies, industrial pumps and application solutions not only use less energy and reduce life-cycle costs, but also promote sustainability. The company's 3Q2022 revenue was \$574 million, a 5 % increase, compared with third quarter 2021.

