

# Behavior Change in Impact Investing

University of Michigan  
School for Environment and Sustainability (SEAS)  
Capstone Master's Project Report

Max Berry, Laura Dyer, Nathan Lohrmann, and Max Odena  
In collaboration with project partner, CapShift  
Advisor: Andrew J. Hoffman

Special thanks to our professors whose classes had a major impact on this work:  
Dr. Raymond K. DeYoung and Dr. Joe Árvai

April 2022

*To view final project output, "The ABCs of Climate Investing",  
please proceed to p.22*

## ABOUT THE AUTHORS



**MAX BERRY** // Max is passionate about using investment capital to drive environmental sustainability, and will explore this passion as a member of the Erb Institute and Ross Social Venture Fund. Prior to Michigan, Max worked at Deloitte in San Francisco, most recently in the M&A Advisory group where he specialized in transactions in the software industry for both private equity and strategic clients. Prior to that he worked in the Audit practice, focusing on broker/dealers. Max is a licensed CPA and holds a B.A. in Economics & Accounting from the University of California, Santa Barbara.



**LAURA DYER** // Laura is passionate about narrowing the capital gap for emerging startups, technologies and entrepreneurs combating climate change. She helped launch Michigan Climate Venture, the first student-run climate tech fund, and after school plans to work in climate tech venture capital. Laura worked as a licensed CPA in the investment management industry in Los Angeles before graduate school. Most recently, she worked on the revenue team at Ares Management Corporation. Previously, she worked in Deloitte's audit practice and specialized in investment valuation for hedge funds, mutual funds, and private equity clients. Laura holds a B.A. in Economics & Accounting from the University of California, Santa Barbara.



**NATHAN LOHRMANN** // A member of Michigan's Erb Institute and leader of the Social Venture Fund, Nathan is on a mission to fight climate change by finding and scaling sustainable solutions in food and agriculture. Prior to Michigan, Nathan built his food system knowledge and network through roles in management consulting, corporate strategy, futuring and insights, and ecosystem development. Through his career, Nathan has collaborated with a wide range of stakeholders, from startups and major NGOs to Fortune 50s and US federal agencies. After school, Nathan plans to work in climate- and agrifood-focused venture capital. Nathan is a proud Hoosier (by way of Chicago), lifelong fisherman of the Great Lakes – St. Lawrence Seaway's urban and remote waters, and avid cyclist.



**MAX ODENA** // Max Odena is a Michigan native, triple legacy at the University of Michigan, and two-time student at the Ross School of Business (BBA and MBA). As an Erb Business Sustainability Dual Degree, he is studying entrepreneurship and sustainable food systems and hopes to pursue food and agriculture entrepreneurship upon graduation. Prior to Ross, he worked as a consultant in Chicago with The Cambridge Group, a boutique firm with a consumer-facing growth strategy focus. He is the co-founder of an e-commerce firm selling mass-market art and in his free time is an avid fly fisherman, scuba diver, and hunter.

## TABLE OF CONTENTS

*To view final project output, “The ABCs of Climate Investing”, please proceed directly to p.22*

ABOUT THE AUTHORS	2
TABLE OF CONTENTS	3
BACKGROUND	4
METHODOLOGY	4
CLIMATE PRIMER PHASE 1: LANDSCAPE OVERVIEW	6
CLIMATE PRIMER PHASE 2: FRAMEWORK DEVELOPMENT	10
Overview	10
Fast Facts Framework	10
Solutions Frameworks	12
Communication Methods	14
Investment Goals And Strategy	15
CLIMATE PRIMER PHASE 3: PRIMER FINALIZATION	15
AGRIFOOD PRIMER DEVELOPMENT	16
CONCLUSION	21
APPENDIX	22
Appendix A. Final Climate Primer: <i>The ABCs of Climate Investing</i>	22
Appendix B. Climate Primer Landscape Assessment	46
Appendix C. Fast Facts Sets B & C	50
Appendix D. Agrifood Primer Landscape Assessment	50

## BACKGROUND

Climate change poses an existential threat to humanity, but funding to mitigate and adapt to a changing climate is not commensurate with the scale of the problem at hand. Across asset classes, there is insufficient funding for climate change mitigation and adaptation solutions. At the same time, however, over 140 billion dollars in private wealth is sitting idle, waiting to be deployed by its owners into philanthropic initiatives, charities, and income-generating investments, for example. There is a higher use for these funds, namely helping humankind mitigate and adapt to climate change.

CapShift, our project partner, is a platform that empowers philanthropic and financial institutions, along with their clients, to mobilize capital for social and environmental change. It was founded with the idea that there needed to be a better way to give away and invest large sums of money in ways that benefit society and the environment. In 2020, they focused their energies on developing a racial justice framework to facilitate funding of racial justice-related opportunities. In 2021, their focus is on funding climate change mitigation and adaptation opportunities. In 2022, their focus is on funding agrifood solutions. Our team's focus was on these 2021 and 2022 goals.

CapShift found it's hard to give away billions of dollars, let alone find uses for that money that will generate financial returns. While the latter makes intuitive sense for laypeople who might dabble in the stock market or retirement accounts, the former may sound nonsensical on its face; there should be plenty of people and organizations willing to accept money, the thinking goes. However, upon closer inspection, we see that it can, in fact, be challenging for high-net-worth individuals (HNWIs) and their fiduciaries, pensions, and other private wealth holders (together, "CapShift clients") to ensure their money will have the impact they want once it is given away, *if* they can find a worthy opportunity to which they can give their assets. Goals must be set and outputs, outcomes, and impacts of that money must be measured, reported, verified, and communicated. "Giving away" money for impact is sometimes as complicated as investing it for financial gain.

Climate change mitigation, adaptation, and agrifood solutions represent an opportunity for CapShift clients to allocate their capital. Unfortunately, however, funding these opportunities are not presented to current and prospective CapShift clients in a way that inspires and mobilizes them to invest. We aim to change that.

## METHODOLOGY

The SEAS Team ("the team") agreed to work with CapShift to develop primers (reports) with the goal to change HNWIs' investing behavior such that they would allocate more of their funds to climate- and agrifood-focused sustainability investments. These primers incorporated

learnings from sustainability curriculum, behavior change psychology, and more to support our audience's behavior change to invest more philanthropic capital in fighting climate change and improving our agrifood system. To achieve this goal, the team employed a phased approach to produce a series of deliverables which CapShift finalized into a published primer which they disseminated online.

The primers aim to provide an actionable lens for current and prospective CapShift clients to make climate investments and drive more investors and investment dollars to climate adaptation and mitigation solutions. While the initial scope included a fully written report, legal constraints did not allow the team to author the final product. However, the team was heavily involved in editing, reviewing, and finalizing the published primers.

In the first phase, the team provided CapShift with a landscape overview of existing climate change literature, which was used to inform an overall framework recommendation for the primers. The team performed secondary research into over 50 existing climate investment frameworks produced by relevant stakeholders including foundations, banks, impact investing funds, and other types of experts in the space. The team collated that research into a single database and identified key learnings and common themes to share with CapShift and incorporate into the final climate primer.

Alongside the landscape overview, the team conducted research with the help of the University of Michigan Library to deepen our understanding of the psychology of climate change to inform our content. The team also leveraged the work and teachings of SEAS and Ross faculty who are experts in the fields of finance, climate solutions, and decision-making. The team also incorporated learnings from SEAS coursework related to behavior change to supplement the research detailed above. Applicable learnings from SEAS coursework are detailed further in subsequent sections.

In Phase 2 of the project the team synthesized the learnings from Phase 1 and ideated on different ways to present a framework for the climate investing primer. This involved incorporating salient facts, stories, and climate change psychology theory into a single cohesive narrative. The team provided CapShift with multiple options for structuring the primer based on our findings.

CapShift then took the team's recommendations from Phase 2 and produced a first draft outline of the climate primer. In the third phase of the project, the team worked with CapShift to heavily edit, structure, and refine the outline based on our learnings from phases one and two. Further, the team constructed anecdotal narratives in order to provide a human element to the primer in accordance with behavior change theory. Finally, the team reviewed the final written

primer produced by CapShift. The team was tasked with citing every statement and fact in the report not attributed to common knowledge.

To develop the second primer, focused on agrifood, phases one and two were repeated as described above. Phase 3 remained materially similar, with the key exception being the team directly prepared the draft outline, as opposed to editing an initial draft. As of the writing of this paper, the final agrifood primer is expected to be written in long form and released by CapShift later in 2022.

## CLIMATE PRIMER PHASE 1: LANDSCAPE OVERVIEW

The purpose of the landscape overview was to familiarize our team to the reports and primers that existed in the space. It was important to both our team and to CapShift to add value to the space by providing a new framework for investing in climate solutions. Our goal with the landscape overview was to not only provide a clear view of what existed, but determine common themes and identify gaps. This provided a base for our framework development.

Our team created a spreadsheet to track our landscape overview research. We sourced reports and primers from web searches, leading firms in impact investing, and resources through the University of Michigan library. To gain a complete picture, we brainstormed categories of authors and potential users to ensure we conducted a thorough review of the ecosystem. Examples of target authors included public charities, venture capital, investment advisory firms, and donor advised funds. Examples of target users included HNWIs, asset managers, family offices, and financial institutions. For each synthesized report or primer, in addition to collecting relevant identifying information, we identified the purpose of the work, answering the question ‘so what?’. We also pulled out applicable themes or common frameworks we saw across the ecosystem. See the screenshot below for our final landscape assessment, with the full landscape included in Appendix B.

### Climate Primer Landscape Assessment Spreadsheet

Landscape Assessment						
2021 02 22 1130 EST						
Erb Team Focus Areas						
User	Framework	Author	Author_Role	Relevant as Framework?	So what? - Subjective	Description - Objective
HNWIs, Family Offices, Foundation Asset Owners	Catalytic Potential	Prime Coalition	Public Charity / Venture Capital	Y	Empowers investors knowing that the technology may not exist without their investment & gives investors a clear	Prime Impact Fund invests in young companies based on emission reduction potential when fully scaled & fit for catalytic capital. Aims to close the capital gap for technology in nascent solutions categorized by the IPCC Economic Sectors.
HNWIs, Family Offices, Foundation Asset Owners	Tonic SDG Impact Theme Framework	Tonic	"Global Community of asset owners seeking deeper positive net	Y	One of many potential ways to organize around the SDGs. Likely too granular but useful to reference	Tonic maps their impact investment themes to the 17 SDGs, essentially creating sub-goals under the SDGs
No clear user	Symbolic vs Broad vs Deep	Y. Choi	Think Tank	Y	Deep and/or catalytic impact is an area in which CapShift clients could be particularly impactful. Due to the constraints of fiduciary	This breaks out impact categories by the materiality (net impact on GHG emissions) and the additionally (inverse relationship with the probability the investment would have taken place without the actions of a specific investor) of the impact. Our interpretation is that deep impact
HNWIs, Family Offices, Foundation Asset Owners	Access Impact Framework	Cornerstone Capital	Investment Advisory	Y	A best-in-class version of an actionable impact investing framework with strong parallels to what our project is trying to	The Framework maps each SDG to each of the 11 access themes (see categories) and weights that mapping by the strength of alignment between the SDG and the theme
Widely used	SDGs	United Nations		Y	The most broadly recognized categorization of impact themes	United Nations Sustainable Development Goals
Family Offices	Clean, Renewable, and Environmental Opportunities	CREO Syndicate	Platform	Y	CREO's framework is literally their name. It seems catchy enough to be effective, though not MECE.	CREO is a 501(c)3 and CapShift competitor platform. Family offices focus. CREO educate investors on clean, renewable, and environmental opportunities (CREO), help them collaborate, accelerate investment. They use partnerships to develop engagement materials.

Additionally, the primer needed to meet people from various stages of change as outlined in the Transtheoretical Model, including those in the precontemplation stage who may be unfamiliar with investing in climate solutions.<sup>1</sup> Therefore, we chose to provide information about the climate problem and emphasize the advantages of investing in climate solutions. To inform this work, we identified resources that highlight climate investing information and advantages, and summarized the most useful theses as shown in the screenshot below.

### *Climate Investing Information and Advantages by Source*

Institution	Work Title	Thesis	Key Datapoints	Link	Owner
CREO	Pathways to Sustainable Investing	Nine-step investing cycle for wealth owners to follow (doesn't frame the investments themselves like we want for this exercise)	Outlines investment journey / cycle	<a href="#">URL</a>	Nate
CREO	WATER AN IMPACT INVESTMENT PRIMER FOR FAMILY OFFICES AND FOUNDATIONS	The need for water management is increasing and family offices can play a major role in doing so	Outlines "why" and "how"	<a href="#">URL</a>	Nate
Veris Wealth Partners	The Convergence of Regenerative Agriculture, Forestry and Climate Solutions	Outlines 4 key themes to address climate change through regenerative agriculture and forestry & ends with a call to action for these investments	Outlines "what", "why" and "how"	<a href="#">URL</a>	Laura
Stanford Social Innovation Review	The Investment Gap that Threatens the Planet	Capital is needed to fill the funding gap for unexplored and nascent solutions. Charitable investors are uniquely positioned to help fill this gap	Outlines specific examples within IPCC Economic Sectors that are primed for catalytic capital	<a href="#">URL</a>	Laura
Bank of America	Emission Impossible? Global Climate Change Primer	Action against climate change as been insufficient, while climate risks and opportunities to make money fighting them have grown	Helpful primer on climate change generally	<a href="#">URL</a>	Nate
Divest Invest	Divest-Invest Philanthropy	Divest-Invest is about getting out of the problem and getting into the solution. Signatories commit to investing in "climate solutions, broadly defined."	Helpful primer on climate change generally	<a href="#">URL</a>	Nate
Morgan Stanley	Climate Change and Fossil Fuel Aware Investing Primer	Investors cannot assume economic growth will rely on fossil fuels going forward. Their investment portfolio and opportunities need to adjust with that	Helpful framework for a transition from being aware to changing investment focus	<a href="#">URL</a>	Laura

Our landscape assessment yielded ten key learnings which informed how our team and CapShift worked on our primer(s) moving forward:

- 1. Catalytic, or deep, impact will resonate with HNWI's:** This theme shone through in multiple papers, notably in the article *The Investment Gap that Threatens the Planet* by Scott P. Burger, Fiona Murray, Sarah Kearney & Liqian Ma. The call to action for private wealth managers and high net worth individuals is clear – “due to the constraints imposed by the current conception of fiduciary duty, it is largely up to private wealth owners to deliberately allocate a share of their portfolio towards deep climate impact, thereby essentially trading off some financial return in exchange for additional emission reductions.”<sup>2</sup> Further, “thoughtful philanthropic intervention to support nascent climate solutions at scale is a crucial tool in the fight against climate change. Existing asset classes will continue to fall short due to their risk tolerance and returns requirements. Philanthropists are uniquely positioned to intercede. We must do so for the good of humanity.”<sup>3</sup>

<sup>1</sup> Prochaska JO, Velicer WF. The transtheoretical model of health behavior change. *Am J Health Promot.* 1997 Sep-Oct;12(1):38-48. doi: 10.4278/0890-1171-12.1.38. PMID: 10170434.

<sup>2</sup> Burger, Scott P., Sarah Kearney, Liqian Ma, and Fiona Murray. “The Investment Gap that Threatens the Planet.” *Stanford Social Innovation Review*, 2018.

<sup>3</sup> Ibid.

2. **There may be a tradeoff between interest and impact:** After reading over 50 reports, the team discussed a common theme of interest versus impact. Consider the following questions: What are the most popular climate solution areas right now? Which solutions receive the most traction, and therefore represent an exceptional investment opportunity? These areas come with a potential tradeoff on impact. The verticals within climate solutions that need the most risk tolerant capital to develop and scale are not the most popular. Rather, they are nascent, often “unsexy” solutions. This tradeoff was important to consider as we created a framework for CapShift that would hold readers’ attention *and* drive climate impact.
3. **There may be a tradeoff between simplicity and specificity:** Climate change is a complex problem which can require complex solutions specific to unique circumstances. This complexity, however, can create a barrier to behavior change. Oversimplification, however, can result in miscommunications. As such, we sought to provide our audience with sufficient information to make investment decisions without creating barriers to change. This tradeoff was specifically mentioned in papers by Toniic and CREO.<sup>4</sup>
4. **Resonant frameworks do not reinvent the wheel:** Every report or primer we reviewed tied back to the United Nations Sustainable Development Goals (SDGs), which are 17 interlinked global goals that serve as a global call to action.<sup>5</sup> This proved that a good framework did not need to create something new just for the sake of it. As CREO calls out, “Several frameworks and toolkits already exist, and although they continue to evolve, there is no reason to create them de novo just because an investor is new to the space”.<sup>6</sup> Given the SDGs are one of most widely used frameworks, we believe that a high quality framework geared towards HNWIs and CapShift clients should map back to the SDGs in some way. As stated by GIIN, the “SDGs provide context for impact investors to see how their strategies and objectives fit into broader sustainable development efforts.”<sup>7</sup>
5. **“If I’d had more time, I’d have written less”:** While the jury is out on who first said this, it holds true in the world of investing primers. It is easy to write a lot. It is harder to write concisely, where every word delivers meaning and impact. We came across several frameworks written in long form that we suspect lost many readers part way through. The most effective frameworks are to the point and engaging.
6. **Asset classes don’t make for good marketing:** We saw a variety of frameworks applicable to a variety of asset classes (e.g., stocks, bonds), but few that attempted to classify them all.

---

<sup>4</sup> Ma, Liqian, and Daniel Matross, Ph.D. “Pathways To Sustainable Investing Insights From Families And Peers.” CREO Family Office Syndicate Inc, 2019.

<sup>5</sup> “The 17 Goals”, *United Nations Department of Economic and Social Affairs, Sustainable Development*. Retrieved from <https://sdgs.un.org/goals>.

<sup>6</sup> Ma, “Pathways To Sustainable Investing Insights From Families And Peers.”

<sup>7</sup> “Achieving The Sustainable Development Goals: The Role Of Impact Investing.” GIIN, 2016.



As CREO claims, “there is no global database for sustainability investing across asset classes, meaning there is no easy way to analyze these stories quantitatively”.<sup>8</sup> Though the applicable asset classes are important to investors, that will not draw investors in and enable behavior change.

7. **You can not invest in just one impact area:** There are many relationships between climate solutions; when one invests in a solution, they invest in those to which it is related, too. For example, one cannot invest in agriculture alone and avoid affecting climate change, water security, and human health as well.
8. **Resonant frameworks make it real:** To some, the impacts of climate change seem far away, in terms of both geography and time. Therefore, it is important to provide relatable content (e.g., stories, anecdotes, imagery) that demonstrates the impacts of climate change we can observe today. By putting a face to each story, we can make it personal, outline the consequences of inaction, and facilitate behavior change from our audiences.
9. **Resonant frameworks directly explain ‘what’ and ‘why’:** The most effective frameworks were those that specifically called out the ‘what’ and the ‘why’. Based on the investment, what is the expected outcome and how will it be measured? Additionally, why is this important in fighting climate change? Veris Wealth Partners<sup>9</sup> did a great job of this in their brief on regenerative agriculture and forestry for climate change solutions.
10. **It’s easy to make a bad framework – or not make one at all:** Overall, we identified a lack of detailed frameworks that exist for our specific user base: HNWIs and other CapShift clients. Some primers presented themes without a clear compelling reason why their audiences should care. Some large investment firms did not have sustainable investing themes within their research centers at all. Although we believe this will change in the near term, it was an important learning for us as we began to create CapShift’s climate framework.

These ten key learnings from our landscape overview set the stage for us to deliver an impactful framework for our primers, and concluded Phase 1 of our project.

---

<sup>8</sup> Ma, “Pathways To Sustainable Investing Insights From Families And Peers.”

<sup>9</sup> “The Convergence of Regenerative Agriculture, Forestry and Climate Solutions.” Veris Wealth Partners LLC, 2020.

## CLIMATE PRIMER PHASE 2: FRAMEWORK DEVELOPMENT

### OVERVIEW

After completion of the landscape overview, and a synthesis of the key learning from that process, the next step towards the completion of the climate primer was to develop “Fast Facts” on climate change and a framework to guide investors towards the climate solutions that match their investment goals. These two sections, working in concert, would allow us to activate both system one and two thinking (as coined by Daniel Kahneman) to engage would-be investors. The fast facts – succinct information and imagery on the impacts of climate change – would activate system one thinking by eliciting an immediate emotional response to prime our audience for action. The solutions framework would stimulate system two thinking by guiding readers through a methodical approach to determining investment area interest.<sup>10</sup>

### FAST FACTS FRAMEWORK

The Transtheoretical Model suggests that behavioral change takes place over six, unique “stages of change”: *precontemplation*, *contemplation*, *preparation*, *action*, *maintenance*, and *termination*. Much of CapShift’s audience exists somewhere between *precontemplation* – where they are unaware of the climate problem or unconvinced of the need to change – and *contemplation* – where they are aware of the problem but not yet prepared for behavioral change. The goal of the fast facts was to move the audience squarely into the *contemplation* stage of behavior change prior to preparing them for action. To do so, we relied on three specific levers: providing information on climate change to raise awareness, outlining the impacts of current behavior surrounding climate change, and emphasizing the avenues for, and advantages of, behavior change.<sup>11</sup>

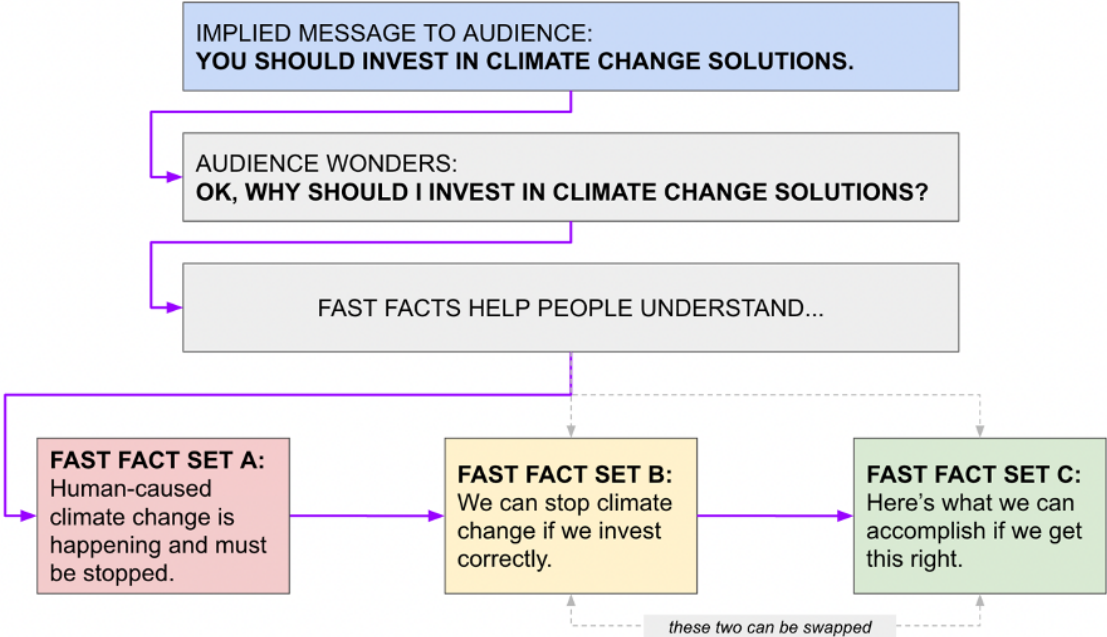
The initial draft of our fast facts framework took on the structure that can be seen in the figures below. *Fast Fact Set A* covered both climate change basics and the impacts of our behavior, *Fast Fact Set B* laid out the avenues for change through an analysis of climate investing needs, and *Fast Fact Set C* outlined what can be gained and saved if behavior change takes place. After iterating with CapShift, the final climate primer (Appendix A) took on a very similar layout with a discussion of the climate crisis at large, an outline of the major categories of climate risk, and an analysis of investment gaps and opportunities.

---

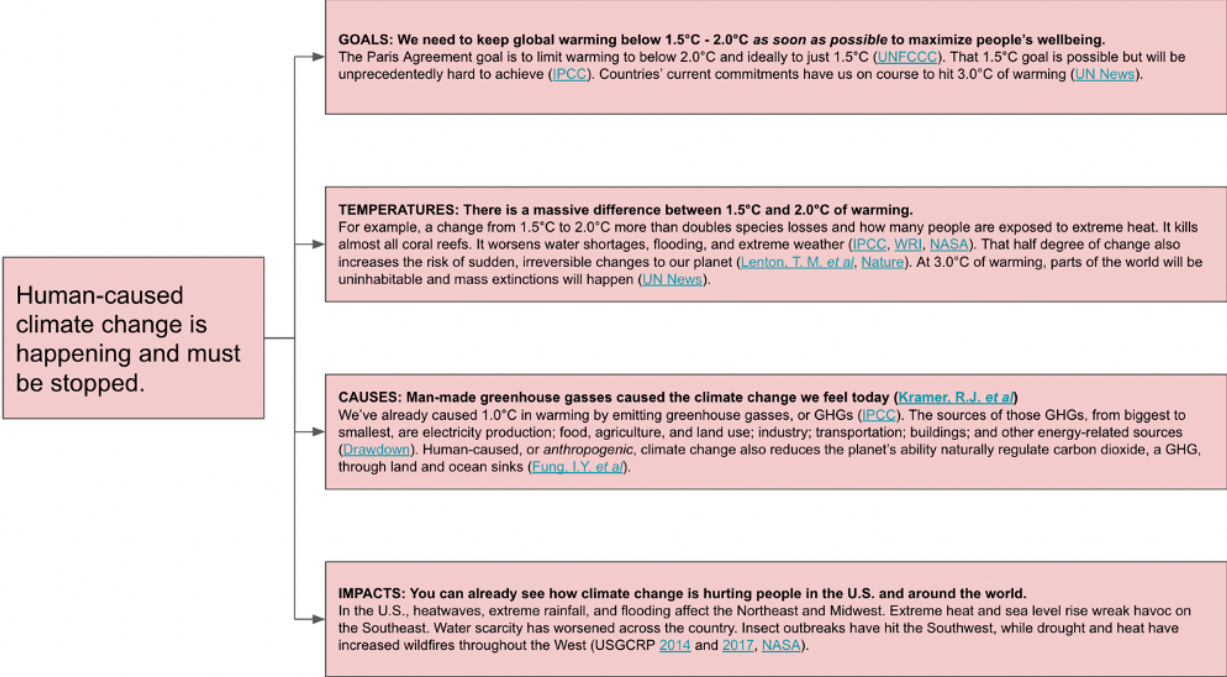
<sup>10</sup> Kahneman, Daniel. *Thinking, Fast and Slow*. Farrar, Straus and Giroux, 2011.

<sup>11</sup> Prochaska, The transtheoretical model of health behavior change.

**Fast Facts Sets A-C as Used in Climate Primer Storyline**



**Fast Facts Set A as Given to CapShift for Use in Climate Primer (see B and C in Appendix C)**



## SOLUTIONS FRAMEWORKS

Once the audience is aware of the problem (in *contemplation*), the next step is to prepare them for action (*preparation*)<sup>12</sup> by providing the necessary resources to make climate-related investment decisions. To do so, we needed a framework that would allow investors to decide on where they hoped to make an impact, the returns they were seeking, and the stage of investments they were interested in. To do so, we developed a variety of potential frameworks and ways for communicating them. Below are select frameworks (more were created but excluded from this final document) and communication methods from our brainstorming documents with brief descriptions, followed by a discussion of how these frameworks informed the climate investing goals and investing strategies of the primer.

**Sector x Life Stage:** *Leaning into investor desire to pursue investments within specific industries or sectors (X-axis), this framework helps readers select between proven investment areas and promising solutions that require more support (Y-axis).*

	how we plug in	how we grow things	how we make things	how we get around	how we live	how we improve society	how we remove greenhouse gas
<b>Emission Source (%)</b>	Electricity (27%)	Food, Ag & Land Use (19%)	Industry (31%)	Transportation (18%)	Buildings (7%)	Health, Education, Adaptation (N/A)	Carbon Capture & Sequestration (N/A)
<b>Scalable Today</b>	<ul style="list-style-type: none"> <li>Utility-Scale Solar Photovoltaics</li> <li>Wind and solar power</li> <li>Lithium-ion batteries</li> <li>Power system optimization software solutions</li> <li>Demand response and consumer engagement solutions</li> <li>Thermal energy storage</li> <li>Nuclear power</li> </ul>	<ul style="list-style-type: none"> <li>Advanced technology crop, soil, and water solutions</li> <li>Crop waste recycling</li> <li>Forest management and reforestation</li> <li>Anaerobic (Methane) digesters</li> <li>Biotechnology assisted animal breeding</li> <li>Genetic modification of crops</li> <li>Reduced Food Waste</li> <li>Conservation/Regenerative Agriculture</li> <li>Improved Rice Production</li> <li>Sustainable intensification for smallholders</li> </ul>	<ul style="list-style-type: none"> <li>Low-grade industrial heat production</li> <li>Combined heat and power systems</li> <li>Composting</li> <li>Recycling</li> <li>Bioplastics</li> </ul>	<ul style="list-style-type: none"> <li>Electric vehicles</li> <li>Sugarcane feedstock biofuels</li> <li>Composite materials for vehicle lightweighting</li> <li>Efficient Aviation</li> <li>Efficient Ocean Shipping</li> <li>Public Transit</li> <li>Waste-to-energy technology powered trucks</li> </ul>	<ul style="list-style-type: none"> <li>LED Lighting</li> <li>Residential cold climate heat pumps</li> <li>Building automation and smart control technologies</li> <li>Building Retrofitting &amp; Insulation</li> <li>High-Performance Glass</li> <li>Improved Clean Cookstoves</li> <li>Refrigerant Management &amp; Alternative Refrigerants</li> <li>Carbon-sink (engineered) Timber Buildings</li> </ul>	<ul style="list-style-type: none"> <li>Educate girls (e.g. affordable education, reduction in distance and time to get to schools, etc.)</li> <li>Family planning</li> <li>Ecosystem resiliency</li> <li>Water security/Access to clean water</li> <li>Plant-Rich Diets</li> <li>Policy changes (e.g. Adopting a Climate Budget, Deciding a Climate Emergency, Carbon Price, etc.)</li> </ul>	<ul style="list-style-type: none"> <li>Coastal wetland, tropical forest, and abandoned farmland restoration</li> <li>Indigenous People's Forest Tenure</li> <li>Tree Plantations &amp; Bamboo Production</li> <li>Biochar Production</li> <li>Peatland Protection and Rewetting</li> <li>Multistrata Agroforestry</li> <li>Managed Grazing &amp; Silvopasture</li> <li>Tree Intercropping</li> </ul>
<b>Emerging Solutions</b>	<ul style="list-style-type: none"> <li>Fuel cell technologies</li> <li>Long-duration energy storage solutions</li> <li>High-efficiency transmission</li> <li>Hydrogen Energy Production</li> <li>Marine Energy</li> </ul>	<ul style="list-style-type: none"> <li>Carbon-neutral fertilizer production processes</li> <li>Livestock methane capture</li> <li>Cell-cultured and fermented meat production</li> <li>Vertical farming</li> <li>Genetic engineering</li> <li>FoodTech solutions</li> </ul>	<ul style="list-style-type: none"> <li>Low-carbon steel, aluminum, and cement production</li> <li>High-efficiency industrial motors</li> <li>Waste heat recovery technologies</li> <li>Circular Economy Solutions</li> </ul>	<ul style="list-style-type: none"> <li>Biofuels</li> <li>Fuel cell vehicles</li> <li>Advanced combustion engines</li> <li>Electric Trains</li> </ul>	<ul style="list-style-type: none"> <li>Hyper-efficient building technologies, refrigeration and freezing</li> <li>Wide bandgap semiconductors</li> <li>Green and Cool Roofs</li> <li>District Heating</li> </ul>	<ul style="list-style-type: none"> <li>Conscious consumerism</li> <li>Narrative economics (New Media Ventures)</li> <li>[Adaptation of people, communities and regions at the risk of being ravaged by climate change]</li> </ul>	<ul style="list-style-type: none"> <li>Direct Air Capture</li> <li>Bioenergy with carbon capture and storage (BECCS)</li> <li>Carbon capture and sequestration</li> <li>Carbon credits markets</li> </ul>
<b>Transformational R&amp;D</b>	<ul style="list-style-type: none"> <li>Fusion energy</li> </ul>	<ul style="list-style-type: none"> <li>Non-fuel-based ammonia production</li> </ul>	<ul style="list-style-type: none"> <li>Petrochemical production</li> <li>Carbon-negative cement</li> <li>Space-based mining</li> </ul>	<ul style="list-style-type: none"> <li>Hyperloop</li> <li>Solar fuels</li> </ul>	<ul style="list-style-type: none"> <li>Space-based living and terraforming</li> <li>Subterranean living</li> </ul>	<ul style="list-style-type: none"> <li>Space colonization</li> </ul>	<ul style="list-style-type: none"> <li>Phytoplankton</li> <li>Geneengineering</li> </ul>

<sup>12</sup> Prochaska, The transtheoretical model of health behavior change

**Sector x ABCs:** An update to the Sector x Life Stage framework above, the ABC (Align, Build, Catalyze) Y-axis places more emphasis on an investment’s opportunity for impact. An investor might, for example, begin with aligning their portfolio with their climate values (e.g., fossil fuel divestment), then seek to more explicitly build climate solutions (e.g., private investments in clean tech), and finally, seek to catalyze solutions that have an outstanding opportunity for impact. In general, as investments move from A to B, impact opportunities increase as probable investment returns decline.

ABCs	how we plug in (27%)	how we grow things (19%)	how we make things (31%)	how we get around (16%)	how we live (7%)	how we improve society	how we remove greenhouse gas
<b>ALIGN</b>	Silicon-based photovoltaics Power system optimization software solutions Demand response and consumer engagement solutions	Advanced sensing solutions Crop resource optimization technologies Crop waste recycling Carbon-neutral fertilizer production processes	Low-grade industrial heat production Combined heat and power Systems Low-carbon steel and aluminum production Composting Low-carbon cement production	Light- and medium-duty electric vehicles	LEDs Residential cold climate heat pumps Transparent photovoltaic window coatings	Plant based diets/meat alternatives Family planning Conscious consumerism	Divestment from oil Reduced Food Waste Conservation/Regenerative Agriculture
<b>BUILD</b>	Offshore/onshore wind and solar power Nuclear energy Long-duration energy storage solutions High-efficiency, low-cost transmission Next-generation photovoltaics	Forest management and reforestation Livestock methane capture Vertical farming techniques	High-efficiency industrial motors Thermoelectrics, rectennas, and other waste heat recovery technologies	Low carbon hydrogen production and storage Algal or cellulosic biofuels Fuel cell vehicles Advanced combustion engines Third- and fourth generation biofuels (solar fuels)	Hyper-efficient building envelope technologies and refrigeration and freezing	ESG opportunities Educate girls (e.g. affordable education, reduction in distance and time to get to schools, etc.) Water security/Access to clean water Ecosystem Resiliency	Sustainable Intensification for smallholders Abandoned Farmland Restoration Coastal wetland Protection Indigenous People’s Forest Tenure Improved Rice Production Tree Plantations Bamboo Production
<b>CATALYZE</b>	Biomass energy Fuel cell technologies Fusion energy Solar geoengineering	Non-fuel-based ammonia production Genetic engineering for sustainable food production Fermented protein	Carbon-negative cement Non-fossil petrochemical production Space-based mining [Closed loop solutions]	Next-generation transportation solutions (e.g. “hyperloops”)	Space-based living and terraforming	Space colonization [Adaptation of people, communities and regions at the risk of being ravaged by climate change]	Phytoplankton Carbon capture and sequestration

**Mitigation vs. Adaptation:** While this framework still includes a sector focus, the primary goal is to help investors decide between solutions that seek to mitigate the impacts of climate change (largely via reductions in emissions or carbon sequestration) and solutions that help the world adapt to a changing climate.

	THEME	DESCRIPTION	SOLUTIONS
MITIGATION	Agriculture, forestry and other land use	Support sustainable land use and forest management by providing country-tailored solutions that protect and rejuvenate forests.	Solutions go here — and can appear in more than one cell (e.g., regenerative ag under both “Food, Ag, & Land Use” and “Carbon Capture”)
MITIGATION	Buildings, cities, industries and appliances	Aim to reduce emissions from buildings, cities, industries and appliances by supporting policies, standards and technologies that reduce the need for energy.	
MITIGATION	Energy	Aim to reduce emissions through increased low-emission energy access and power generation, by helping speed up investments in modern renewable technologies to reduce reliance on fossil fuels.	
MITIGATION	Transport	Aim to reduce emissions through increased access to low-emission transport, through supporting low- and zero-emission public and private transport systems.	
ADAPTATION	Ecosystems and ecosystem services	Help improve resilience of ecosystem services by addressing risks brought about by degrading ecosystems affected by climate change.	
ADAPTATION	Health, food, and water security	Help increase the resilience of health and well-being of communities, as well as improve food and water security through integrated strategic interventions.	
ADAPTATION	Infrastructure	Support the increased resilience of infrastructure and the built environment to climate change threats by building climate-strengthened cities	
ADAPTATION	Livelihoods of vulnerable communities	Promote the increased resilience of livelihoods of people, communities and regions at the risk of being ravaged by climate change.	

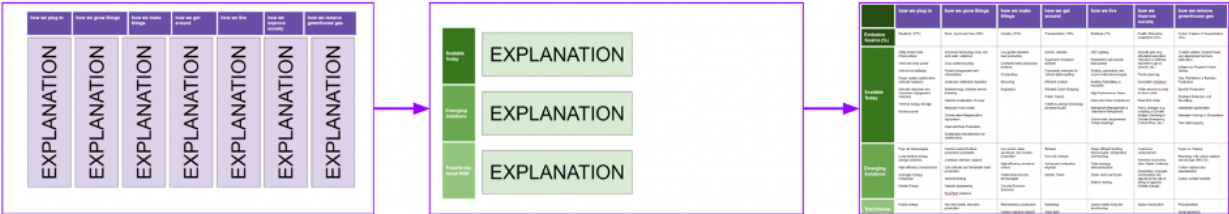
**Passions:** This framework aimed to align investor’s interests with climate change solutions. For instance, an investor that loves sea creatures driven by a passion for scuba diving could be shown solutions related to biodiversity, sustainable fisheries, and animal welfare. This method could help move investors from the aforementioned contemplation stage to the preparation stage by facilitating prospection and reinforcing positive beliefs about climate solutions.



**COMMUNICATION METHODS**

Next, we provided two options for CapShift to present these frameworks to their audience. They eventually settled on a hybrid approach; first breaking down the investment goals framework and then building on that approach by layering in investment strategies.

**Build:** This method explains the axes and only then reveals the framework.



**Breakdown:** This method begins with the framework and then breaks down the axes.



## **INVESTMENT GOALS AND STRATEGY**

When looking at the primer, it's clear how the proposed solutions and communication methods came together to create the investing goals. The primary climate investing goals are mitigation, resiliency, and alpha. While resiliency is primarily a rephrasing of adaptation from the Mitigation vs. Adaptation framework, alpha was added to address return-focused investors more explicitly. These primary goals are first explained in detail before being broken down into more granular cross-sections.

For each primary investing goal there are sub-goals also informed by the proposed solutions. For mitigation, investment options are bucketed as either proven solutions or emerging solutions. This approach was inspired by the Y-axis of the Sector x Lifestage Framework. With "Scalable Today" becoming "Emerging Solutions". For resiliency, investment options are either community solutions or resilient infrastructure. While these are not explicitly pulled from any framework axis, they are found as sub-themes in the Mitigation vs. Adaptation framework.

The investment strategies laid out in the primer were also heavily influenced by the original solutions frameworks provided. The final primer presents an Align, Build, Catalyze approach to portfolio development (Sectors x ABCs framework). While the ABCs were not explicitly crossed with sectors as in the framework, they were overlaid onto the mitigation, resiliency, alpha venn diagram on page 11 of the primer (Appendix A) so that these intersections were apparent.

## **CLIMATE PRIMER PHASE 3: PRIMER FINALIZATION**

After providing both fast facts and solutions frameworks, CapShift developed an outline for the eventual primer, structured around these items. Our next task as a team was to edit and reorganize this outline with the primary goal of creating a cohesive storyline that would both draw the audience in, and guide them towards action on their climate investing aspirations. To do so, we relied heavily on insights from BEC coursework at SEAS. Specifically, Ray De Young's "features that enhance interestingness".<sup>13</sup> We emphasized coherence, legibility, and problem resolution. With these features in mind, we paraphrased the storyline provided in the primer executive summary, and developed a new outline for the draft based on this storyline. The storyline and short outline are laid out below.

---

<sup>13</sup> Monroe, Martha & De Young, Raymond. (1994). The Role of Interest in Environmental Information: A New Agenda. *Children, Youth and Environments*. 10.2307/41515266.

### ***Storyline Devised for CapShift to Reorganize Primer***

- I. Climate change is a bigger threat – and investment opportunity – than ever before.
- II. Families we work with have three main goals for their climate investments: mitigate, adapt to, and/or monetize climate change.
- III. We have identified three investment strategies investors can use to realize any or all of these goals:
  - A. *Align* their portfolio to investments that are low climate risk and low CO<sub>2</sub>e;
  - B. *Build* climate solutions that are scalable today; and
  - C. *Catalyze* climate solutions that need to be de-risked before they scale.
- IV. To determine which of the ABCs is best for you, start by
  - A. Setting your own investment goals and priorities and
  - B. Building your diversified portfolio.
- V. Here is an example of what a climate investing portfolio looks like.
- VI. You can get started on this right now by emailing CapShift.

### ***High-Level Outline Devised for CapShift to Reorganize Primer***

- I. The Big Risk: Changing Climate
- II. The Shortage of Capital to Fight Climate Change
- III. Climate Investing Goals: Mitigate, Adapt, & Monetize
- IV. Climate Investing Strategies: Align, Build, & Catalyze
- V. Combining Goals & Strategies: The CapShift Climate Investing Framework
- VI. Bring it to Life: An Example Climate-Focused Portfolio
- VII. Next Steps: Build Your Climate-Focused Portfolio

After developing this new outline and editing the original draft to reflect it, the final draft was provided to CapShift. From there, CapShift produced the final primer, “The ABCs of Climate Investing”, which can be found in Appendix A.

## **AGRIFOOD PRIMER DEVELOPMENT**

The second primer we developed with CapShift was dedicated to investments in agriculture and food (agrifood) systems. We approached agrifood from two angles: solutions and problems. We also chose to address agrifood solutions and problems beyond climate change because agrifood has impacts on (and is impacted by) a number of planetary boundaries, human wellbeing, and animal welfare.

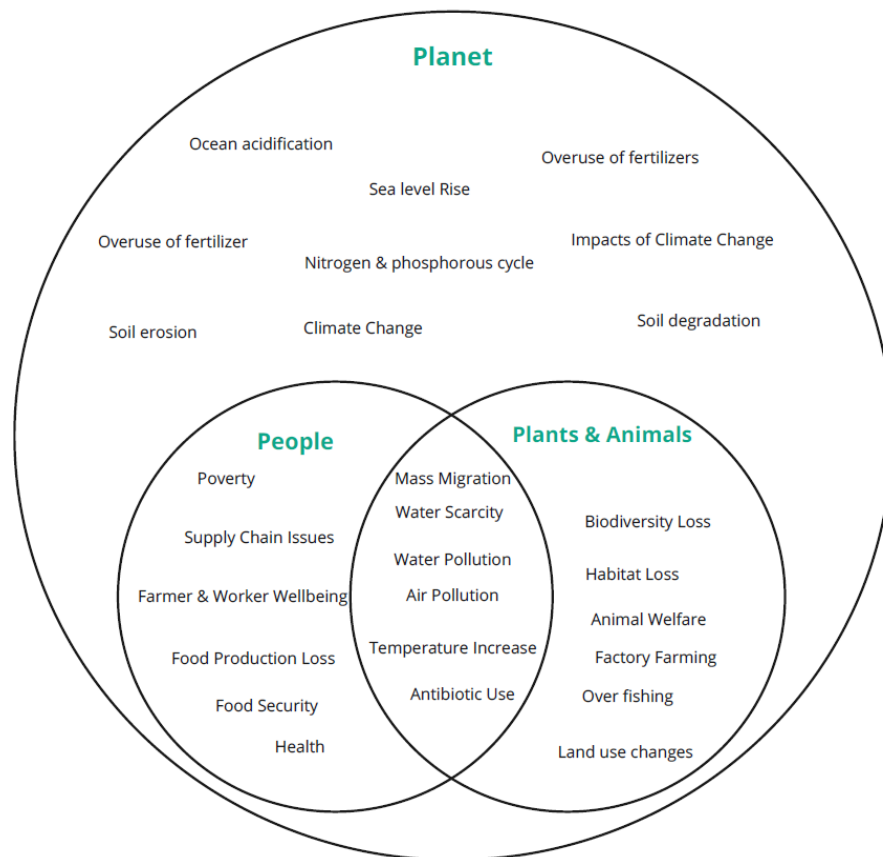
In order to develop a framework specific to agrifood, we first wanted to gain an understanding of what problems are solved by investing in agrifood. We conducted a landscape overview by building on top of our climate landscape overview to include any additional



material related to investing in agrifood. We followed a similar structure to what was outlined for our climate primer. Please see Appendix D for our final agrifood landscape assessment.

As described in the Transtheoretical Model, we needed to address precontemplation, where investors may be unaware of the problems agrifood imposes on *people, plants and animals*, and *planet*. We wanted to orient people to this, and therefore proposed a section of the agrifood primer called “The Negative Impacts of the Agrifood System”. This section would identify problems that could be used as motivators for investors to put money towards a solution. Our first step was to determine which negative impacts to call attention to. The agrifood system, however, is complex and interrelated. This led us to organize our thoughts in a Venn Diagram of problems, pictured below. These problems were pulled from themes within our landscape overview, as well as numerous courses offered at SEAS.

### ***Venn Diagram of the Negative Impacts of the Agrifood System***



We wanted the negative impacts section in the agrifood primer to serve a similar role as the fast facts section of the climate primer — to move the audience into the *contemplation* stage prior to preparing them for action. Rather than calling out every negative impact (and favoring simplicity over specificity), we focused on two or three problems in each of our focus areas — *people, plants and animals*, and *planet*. We utilized our key learnings from Phase 1 to help us

determine which negative impacts were best to call out to prepare investors for action. The following three key learnings proved most relevant:

1. **You cannot invest in just one impact area:** Climate impacts everything on Earth. That is why, in the above venn diagram, we have *people* and *plants and animals* within the broader context of *planet*. Therefore, for *planet*, we chose to anchor investors on planetary boundaries, specifically soil (nitrogen and phosphorus cycle), freshwater use, and climate change. These planetary boundaries are the most negatively impacted by our agrifood system.<sup>14</sup>
2. **Resonant frameworks make it real:** Putting a face to a story can be helpful in making a problem more tangible. As it related to *plants and animals*, two themes stuck out from both our landscape overview and recent news: biodiversity loss and animal welfare.
3. **Resonant frameworks do not reinvent the wheel:** Every report or primer we reviewed as part of the climate or agrifood landscape overview tied back to the SDGs. Approximately half of the SDGs are specific to people and are widely used by organizations and nonprofits focused on reducing inequalities or improving people's lives. Therefore, in the *people* section, for example, we chose to anchor investors on SDGs where people and agrifood intersect: 1) farmers livelihood, which is related to SDG 1 (no poverty) and SDG 8 (decent work and economic growth); and 2) human health, which is related to SDG 2 (zero hunger) and SDG 3 (good health & well-being).

After identifying these seven impact topics (soil, freshwater use, climate change, biodiversity loss, animal welfare, farmers livelihood, and human health) within *people*, *plants and animals*, and *planet*, we conducted secondary research to answer the following for each:

- What is a real example of this topic to orient investors?
- Why is this topic a big deal?
- Why or how does agrifood impact this topic?

For example, for freshwater use, we provided CapShift with the following:

- I. What is a real example of this topic to orient investors?
  - A. Lake Erie Algal Blooms:
    1. The Great Lakes hold roughly 20% of the earth's freshwater
    2. "Cyanobacteria blooms (blue-green algae) are a frequent occurrence in the Great Lakes, particularly in Lake Erie, Green Bay, and Saginaw Bay" ([NOAA](#))

---

<sup>14</sup> Campbell, B. M., D. J. Beare, E. M. Bennett, J. M. Hall-Spencer, J. S. I. Ingram, F. Jaramillo, R. Ortiz, N. Ramankutty, J. A. Sayer, and D. Shindell. 2017. Agriculture production as a major driver of the Earth system exceeding planetary boundaries. *Ecology and Society* 22 (4):8. <https://doi.org/10.5751/ES-09595-220408>.

3. These harmful algal blooms (HABs) “cause fish kills, foul up nearby coastlines, and produce conditions that are dangerous to aquatic life, as well as humans.” ([Michigan Sea Grant](#))
4. “Blue-green algae that form HABs have been known to produce a wide array of neurotoxins, liver toxins, cell toxins, and skin irritants. Humans or animals that consume large amounts of these toxins may experience muscle cramps, twitching, paralysis, cardiac or respiratory difficulty, nausea, vomiting, and liver failure.” ([Michigan Sea Grant](#))
5. “Lake Erie’s algae blooms are caused by runoff pollution. This type of pollution occurs when rainfall washes fertilizer and manure spread on large farm fields into streams that flow into Lake Erie.” ([Alliance for the Great Lakes](#))

II. Why is this topic a big deal?

- A. Crucial for drinking, agricultural production, transportation, energy, sanitation, and manufacturing
- B. “Only 2.5% of all water on Earth is freshwater, of which less than 1% is accessible” ([Freshwater Watch](#))
- C. “10% of the world’s animal species live exclusively in freshwater habitats, many of which are threatened with extinction.” ([Freshwater Watch](#))
- D. “By 2050, nearly half of the world’s population will be living in areas where water is scarce, and over a quarter of cities globally are already facing water stresses.” ([Freshwater Watch](#))
- E. “The quality of fresh water is just as important as the quantity. Poor water quality is the cause of more deaths each year than from all forms of violence, including wars. Poor water quality is also putting over 50% of freshwater fish species and 30% of amphibians at risk of extinction.” ([Freshwater Watch](#))

III. Why or how does agrifood impact this topic?

- A. Water use:
  1. “Agriculture accounts for 70% of water withdrawals worldwide” ([FAO](#))
  2. “Agriculture accounts for 80 percent (in Western states, up to 90 percent) of all freshwater use in the US” ([Foodprint](#))
  3. Industrial agriculture “methods encourage use of large quantities of water, draining underground aquifers. The Ogallala Aquifer, which stretches from Wyoming and South Dakota to the Texas panhandle and supports nearly one-fifth of US wheat, corn and beef cattle, has already run dry in some places and is reduced by as much as 60 percent in others.” ([Foodprint](#))
- B. Water Pollution:

1. “Industrial agriculture is one of the leading causes of water pollution in the United States. 1 According to the 2017 National Water Quality Inventory of Environmental Protection Agency (EPA), 46 percent of the nation’s rivers and streams are in “poor biological condition,” and 21 percent of lakes are “hypereutrophic” (meaning that high levels of nutrients and algae are degrading water quality)” (Foodprint)

We concluded the outline with example solutions that were related to our seven problem areas. A key callout we made for CapShift is that the biggest problem doesn't equate to the biggest solution. For example, the biggest source of greenhouse gasses is electricity while the biggest potential solution is supporting land sinks.<sup>15</sup> Further, as seen in the venn diagram, all problems are interrelated. Therefore, we recommended that for each investing opportunity CapShift presents investors, it explains how this solution benefits *people, plants and animals*, and the *planet*, and refers back to the seven problem areas (where applicable). For example:

### **Solution: Food Loss & Waste Mitigation**

- I. High-level overview of solution:
  - A. One third of all food created for human consumption each year is never eaten (UN FAO)
  - B. When we waste food like that, we waste all of the finite resources that went into that food – labor, land, fertilizer, water, all of it (ReFED).
- II. Reducing food waste is good for planet (ReFED)
  - A. Reducing food waste is a top solution to climate change (Drawdown)
    1. Global food waste accounts for more GHG emissions than every country except the US and China (Poore)
    2. Reducing food waste reduces GHGs because it reduces:
      - a) Unnecessary emissions generated when we make wasted food (ReFED)
      - b) Deforestation and land use changes (Drawdown)
      - c) The release of GHGs from rotting food in landfills (US EPA)
  - B. Reduces use of other finite resources like water and soil (ReFED)
- III. Reducing food waste is good for plants and animals, too, as it decreases the number of them needed to feed us as well as the biodiversity loss caused in making food we don't eat (UNEP / FAO)
- IV. Reducing food waste is good for people: Perfectly healthy food at risk of being wasted can help feed people who are food insecure now or may be in the future (Feeding America)

---

<sup>15</sup> “Solutions”, *Project Drawdown*. Retrieved from <https://drawdown.org/solutions>.

- V. Learn more from our friends at [ReFED](#), the authority on food waste
- VI. Tags: climate change, biodiversity, human health

The CapShift team is actively converting our outline into the final agrifood primer in the mold of the climate primer. Please check CapShift's website ([www.CapShift.com](http://www.CapShift.com)) for the final report in the coming months.

## CONCLUSION

Throughout the development of these primers, a key takeaway that continually rose to the top was the outstanding impact that HNWI's can have if their capital is leveraged appropriately. While financing climate solutions across the board is crucial, the patient capital of HNWI's provides a unique opportunity to fund solutions that wouldn't otherwise be financed by run-of-the-mill, return-seeking investors. This incrementality highlights the importance of primer's such as The ABCs of Climate Investing, and the disproportionate impact of effective behavior change tools targeting these individuals.

Surprisingly, few of these tools currently exist. Simple behavioral techniques are often overlooked in similar primers — perhaps because their efficacy is hard to quantify. It is difficult to determine whether these techniques drove investments, and even more difficult to measure the impact of these investments, which often have long time horizons. However, there are proxy metrics that provide some insight into the effectiveness of behavior change tools. By looking at repeat investments by the same individuals, one can infer these tools resulted in durable behavior change that has been maintained. Additionally, if these investments continue to raise capital, it suggests that others are following along and believe in the difference that they can make.

While this measurement difficulty calls attention to the need to rely on sound theoretical models for behavior change, more work can be done to guarantee the success of future primers. Informational interviews of both behavior change experts and the target audiences of these primers should be conducted to better align content with goals. By moving beyond the literature and engaging experts, more techniques can be employed that apply more directly to the task at hand. And, by bringing in the opinions of would-be readers, authors can ensure that their content is tailored for maximum positive impact.

## **APPENDIX**

### **Appendix A. Final Climate Primer: *The ABCs of Climate Investing***

*Please proceed to following page.*

# THE ABCs

## OF CLIMATE INVESTING

—  
How Families Can Unlock the Trillions  
Needed for Climate Solutions

By Adam Rein, Jesse Simmons, Mike Ilardi, Bochu Ding, and  
the University of Michigan's Erb Institute for Global  
Sustainable Enterprise graduate student consulting team



## INTRODUCTION

Over the past year, a spate of positive climate stories has cropped up in the news cycle. For some, it's been a rare silver lining to the Covid-19 pandemic, as hikes in annual greenhouse gas (GHG) emissions were brought to a halt amid the economic downturn<sup>1</sup>. Just this past September, numerous prominent institutions — from academia to regulatory bodies — recognized the climate crisis as an issue falling into their purview: Harvard committed to divesting from fossil fuels<sup>2</sup>, the SEC pushed companies to disclose climate-related risks to their investors<sup>3</sup>, and the Pope joined other Christian leaders in calling for climate action<sup>4</sup>.

For the first time in a while, it has felt like the right people are listening and acting — and that we're back on track to tackle the climate crisis.

But despite this momentum, there remains a sizable gap in funding for climate solutions. Current investments are only providing 20% of the trillions of dollars needed annually to limit global warming to 1.5° C and prevent the worst impacts of climate change.<sup>5,6</sup> And this chasm isn't just an abstract number — it translates into material consequences, such as the displacement of over 20 million refugees each year due to severe weather events.<sup>7</sup>

Many families recognize that climate change is one of the existential global challenges of this generation and work actively to lower their own carbon footprints and support green policies. Now, some are also exploring how they can use their investment portfolios to bulwark against the climate crisis. They — along with other forward-thinking advisors, foundations, and corporations — have the power to harness trillions of dollars of investable assets<sup>8</sup> and use their investments to turn the tide on the climate crisis.

**This primer shows how your investments can help mitigate the intensity of climate change, protect vulnerable communities from its effects, and build financial resiliency to looming climate-related risks.** To help you take the first step, we provide frameworks to assess your climate goals and investment strategies, a review of investable climate solutions, and an example climate portfolio. We conclude with recommended steps to take action, including how CapShift can help you build climate-smart portfolios that integrate with donor advised fund providers, financial advisors, philanthropic consultants, family offices, and other institutions.

---

*This primer is intended to be a guide for climate investing, not a comprehensive examination of climate science, technological innovations, policy, grant-making, data collection, or corporate behavior. We include additional reading on these topics in the Appendix.*



# TABLE OF CONTENTS

<b>Introduction</b>	<b>i</b>
<b>The Climate Crisis and the Funding Chasm</b>	<b>1</b>
The Encroaching Tides of Climate Change	2
Why Invest in Climate Solutions Now?	2
<b>Find Your North Star: Common Climate Investing Goals</b>	<b>3</b>
Mitigation	3
Resiliency	4
Hand in Hand: Gender and Climate Change	5
Alpha	6
<b>Select All That Apply: Overlapping Climate Investing Goals</b>	<b>7</b>
<b>Ways and Means: Climate Investing Strategies</b>	<b>8</b>
Align	8
Build	9
Catalyze	10
<b>Mix and Match: A Sample Climate-focused Portfolio</b>	<b>11</b>
<b>Ebb and Grow: Steps to Build a Climate-focused Portfolio</b>	<b>13</b>
<b>Appendix</b>	<b>A-1</b>
Appendix I: Further Resources on Climate-focused Investing	A-1
Appendix II: Climate Alpha in Public Markets	A-2
Appendix III: CapShift Climate Mitigation Solutions Map	A-3
Appendix IV: Climate Investing by Asset Class	A-4
<b>Works Cited and Notes</b>	<b>A-5</b>

## THE CLIMATE CRISIS AND THE FUNDING CHASM

Globally, we have crossed 1° C of average warming over prehistoric levels, and baked-in emissions are expected to bring us to 1.5° C. Current warming has already contributed to more frequent and severe extreme weather events around the world. And the effects of climate change are exacerbating — and creating new — global development challenges, including those related to hunger relief, health, clean water, and stable ecosystems.<sup>9</sup>



*Shown above: Forest fire in California<sup>10</sup>, Drought in French Guinea<sup>11</sup>, Flooding in India<sup>12</sup>, and Smoke-filled sky in San Francisco<sup>13</sup>.*

To prevent the worst of the climate crisis, nations have coalesced around the target of limiting net warming to below 1.5°–2.0° C. **However, if we proceed on our current trajectory — one expected to result in 3° C of warming — the effects are hard to imagine: catastrophic droughts and floods, mass extinctions, tens of millions of climate refugees, and regions becoming entirely uninhabitable.**<sup>14, 15</sup> Because of its potential for such wide-scale disruption and destruction, many families consider the climate crisis to be the defining issue of our time.

There may also be unforeseen systemic risks that are hard to estimate. For example, while average atmospheric greenhouse gas (GHG) concentrations and global temperatures have increased linearly so far<sup>16</sup>, feedback loops — such as reduced snow cover or the release of trapped methane<sup>17</sup> — could greatly accelerate warming.<sup>18</sup> And, as long as emissions are increasing, we raise the probability of reaching a tipping point of runaway warming we cannot easily recover from.<sup>19</sup> These risks underscore the urgency for climate solutions — from reducing emissions to building resiliency in communities.

# The Encroaching Tides of Climate Change

The threats of a volatile climate are manifold, but the vast majority fall into the following four categories:



**Extreme heat threatens the health and livelihoods of the vulnerable.** Continued warming will increase the prevalence of heat-related illnesses and deaths, cause disease vectors to shift to new geographies, and create more regions where it will be too hot to work outdoors.<sup>20</sup>



**Harsher droughts are poised to disrupt food and water systems.** Agriculture yields could drop by 35% by the end of the century while global food demand doubles, raising the volatility of staple food prices. Water scarcity in stressed regions will worsen, hurting crop yields and driving local conflict.<sup>21</sup>



**Stronger floods, storms, and sea level rise will destroy homes and infrastructure, threatening the displacement of up to 1.2 billion climate refugees by 2050.**<sup>22</sup> In the past three decades, the number of people put at risk by rising sea levels has increased by more than 60% to 260 million — 90% of whom live in poor countries and small island nations.<sup>23</sup>



**Stronger forest fires, melting glaciers, and warming oceans threaten our natural capital.** The current species extinction rate is expected to accelerate<sup>24</sup>, and the natural systems that maintain our supply of freshwater, fish stocks, and precious habitats will be increasingly disrupted.<sup>25</sup>

## WHY INVEST IN CLIMATE SOLUTIONS NOW?

- 1 INVESTMENT GAP:** Climate solutions require immense financial investment, and we are significantly underinvesting.<sup>26</sup> For example, upgrading energy systems to limit warming to below 2° C will require annual investments of up to \$1.6 - \$3.8 trillion through 2050<sup>27</sup> while the cost of climate adaptation in developing countries could rise to \$500 billion annually by 2050.<sup>28</sup> Current investment in clean technologies and climate solutions is estimated at \$632 billion annually and will need to grow ~7x larger in the coming decade.<sup>29, 30</sup>
- 2 NEED FOR PRIVATE CAPITAL:** Private capital is particularly suitable for solutions that are not typically funded by traditional public and development sector finance: high risk technology, distributed project finance, private real asset upgrades, and community investing.<sup>31</sup>
- 3 NEED FOR CATALYTIC CAPITAL:** Patient capital with high risk tolerance and long investment horizons is critical to develop transformational solutions. Keeping warming below 2° C requires continued investment in nascent climate solutions; in contrast, 87% of venture cleantech investments went to late-stage projects in recent years.<sup>32</sup> Families with intergenerational timelines, high risk tolerance, and a commitment to climate outcomes can fill this critical gap.

## FIND YOUR NORTH STAR: COMMON CLIMATE INVESTING GOALS

Working with dozens of families already engaged in climate investing, we have found that there are three common goals to climate investing, which also have significant overlaps.

	MITIGATION	RESILIENCY	ALPHA
<b>DESCRIPTION</b>	Slow the pace of climate change by reducing emission sources and creating emission sinks.	Help communities adapt to a changing climate and build resilience to its effects.	Reduce risk and enhance financial return for an investment portfolio.
<b>METRIC</b>	Emissions reduced	Vulnerable people protected	Long-term financial return and reduced volatility
<b>TYPICAL DRIVER</b>	Impact and financial returns	Impact	Financial returns
<b>APPROACHES</b>	<ul style="list-style-type: none"> <li>• Proven solutions</li> <li>• Emerging solutions</li> </ul>	<ul style="list-style-type: none"> <li>• Community solutions</li> <li>• Resilient infrastructure</li> </ul>	<ul style="list-style-type: none"> <li>• Risk mitigation</li> <li>• Upside capture</li> </ul>
<b>COMMON THEMES</b>	Renewables, Transport, Manufacturing, Energy efficiency	Climate justice, Agriculture, Access to water, Gender equity	Low-carbon portfolios, Low-carbon transition

### 1 MITIGATION



Reduce, prevent, or remove heat-trapping emissions in the atmosphere, addressing the root cause of warming.

Many climate-focused investors see their primary goal as slowing the advance of climate change by mitigating the emission and atmospheric concentrations of greenhouse gases. The correct approach is up for debate: some investors prefer to focus on proven solutions that have already demonstrated

climate benefits, while others prefer to target emerging solutions that require risk-tolerant capital to grow. A common success metric is the *volume of greenhouse gases reduced in the atmosphere by decreasing emissions and creating carbon sinks*.

## PROVEN SOLUTIONS

Slow the pace of climate change by reducing emission sources and creating emission sinks.

---

**EXAMPLES** Renewable energy generation, energy efficiency, electric vehicles, and biofuels<sup>33</sup>

---

**WHAT SUCCESS LOOKS LIKE** Scale the deployment of solutions as quickly as possible.

---

**INVESTMENT EXAMPLE** Real asset fund that invests in a portfolio of income-producing renewable energy power facilities that sell long-term electricity contracts to large, creditworthy purchasers.

## EMERGING SOLUTIONS

Support promising solutions that require further technical innovation or require support from many different stakeholders to scale.<sup>34</sup>

---

**EXAMPLES** Animal agriculture, residential energy efficiency, food waste, cement production, steel production, and cross-border forest conservation

---

**WHAT SUCCESS LOOKS LIKE** Develop improved technologies that can mitigate emissions at a significantly lower cost. Support public-private partnerships, new financing structures, and business-model innovation.

---

**INVESTMENT EXAMPLE** Venture capital fund that invests in entrepreneurs developing plant, fungi, fermented, and cultivated replacements to animal products.

## 2 RESILIENCY



Help vulnerable communities and economic systems adapt to the impacts of climate change, reducing potential risks and damage.

Another major objective is to reduce the damage caused by climate change by fostering resiliency and adaptation. Solutions that advance this goal often address the climate crisis and community challenges concurrently — in areas like housing, nutritious food, clean water, equity, and income opportunities.

<sup>35</sup> A common success metric is the *number of people and communities protected from climate-related damage*.<sup>36</sup>

## COMMUNITY SOLUTIONS

Improve the lives of the poor and help build their resilience to an increasingly volatile climate.<sup>37</sup>

<b>EXAMPLES</b>	Drought-proof and water-efficient small-scale agriculture, distributed water purification, distributed green water infrastructure, off-grid renewable energy, and flood- and storm-resistant affordable housing
<b>WHAT SUCCESS LOOKS LIKE</b>	Low-income communities have access to basic services at lower costs, greater income-generation opportunities, and protection from climate change effects.
<b>INVESTMENT EXAMPLE</b>	Debt fund that provides blended capital to emerging market institutions that help people access safe water and sanitation services through affordable financing such as small loans. <sup>38</sup>

## RESILIENT INFRASTRUCTURE

Strengthen large-scale food, water, energy, and supply chain systems to be more resilient to climate extremes.<sup>39</sup>

<b>EXAMPLES</b>	Smart electric grids, flood-resistant water infrastructure, controlled environment agriculture, risk modeling and weather forecasting, supply chain analytics, natural and built storm surge buffers, and desalination technology
<b>WHAT SUCCESS LOOKS LIKE</b>	Macro risks to the economy and infrastructure have been reduced and benefit all members of society.
<b>INVESTMENT EXAMPLE</b>	Venture capital fund that invests growth equity in companies that provide technologies, products, and services to build resilience, including investments in supply chain analytics, weather modeling, precision agriculture, distributed energy, and disaster response. <sup>40</sup>

## Hand in Hand: Gender and Climate Change

Women and girls are more likely to suffer the adverse consequences of climate change. An analysis of 130 peer-reviewed studies finds that the health risks tied to climate change — such as death and injury from extreme weather, food insecurity, mental illness, and poor reproductive and maternal health — are disproportionately experienced by women and girls.<sup>41</sup> On the other hand, gender equity can drastically improve the mitigation of emissions. By modeling the impact of providing universal education and family planning resources to women and girls, Project Drawdown found that increased access to and the improved quality of voluntary reproductive healthcare, family planning resources, and 12–13 years of schooling could reduce emissions by as much as 85 gigatons from 2020-2050.<sup>42</sup>

### 3 ALPHA



Boost investment returns and reduce volatility by mitigating climate-related risks and investing in climate opportunities.

Finally, some investors may look to climate investing as a means to outperform financially. There are two prevalent ways to do so: investing in low-carbon solutions and mitigating climate-related risks. Commitments by major corporations and national governments to reach “net-zero” emissions have created growing demand for emissions-reduction solutions such as clean energy, low-carbon industrial processes, and carbon sinks.<sup>43</sup> On the other hand, assets impacted by climate change can pose a financial risk. Understanding the financial risks and opportunities tied to climate change can help investors outperform while also contributing to climate change mitigation. A common success metric is *reduced volatility and stronger investment returns relative to the portfolio benchmark*.<sup>44</sup>

#### RISK MITIGATION

Decrease exposure to assets susceptible to a loss in value due to climate change.

##### EXAMPLES

Portfolios with low carbon intensity, fossil-fuel-free private portfolios

##### WHAT SUCCESS LOOKS LIKE

Portfolios with decreased downside risk.

##### INVESTMENT EXAMPLE

There are many ways to reduce the carbon exposure of public portfolios.<sup>45</sup> In most regions, low carbon intensity strategies performed in-line with or slightly better than the benchmark, due to increasing interest in carbon investing, greater firm efficiency, and increasing carbon taxes.<sup>46</sup>

#### UPSIDE CAPTURE

Increase exposure to assets positioned to outperform with the transition to a low-carbon economy.

##### EXAMPLES

Electric vehicle infrastructure, renewable energy generation, energy efficiency technology, carbon credit generation

##### WHAT SUCCESS LOOKS LIKE

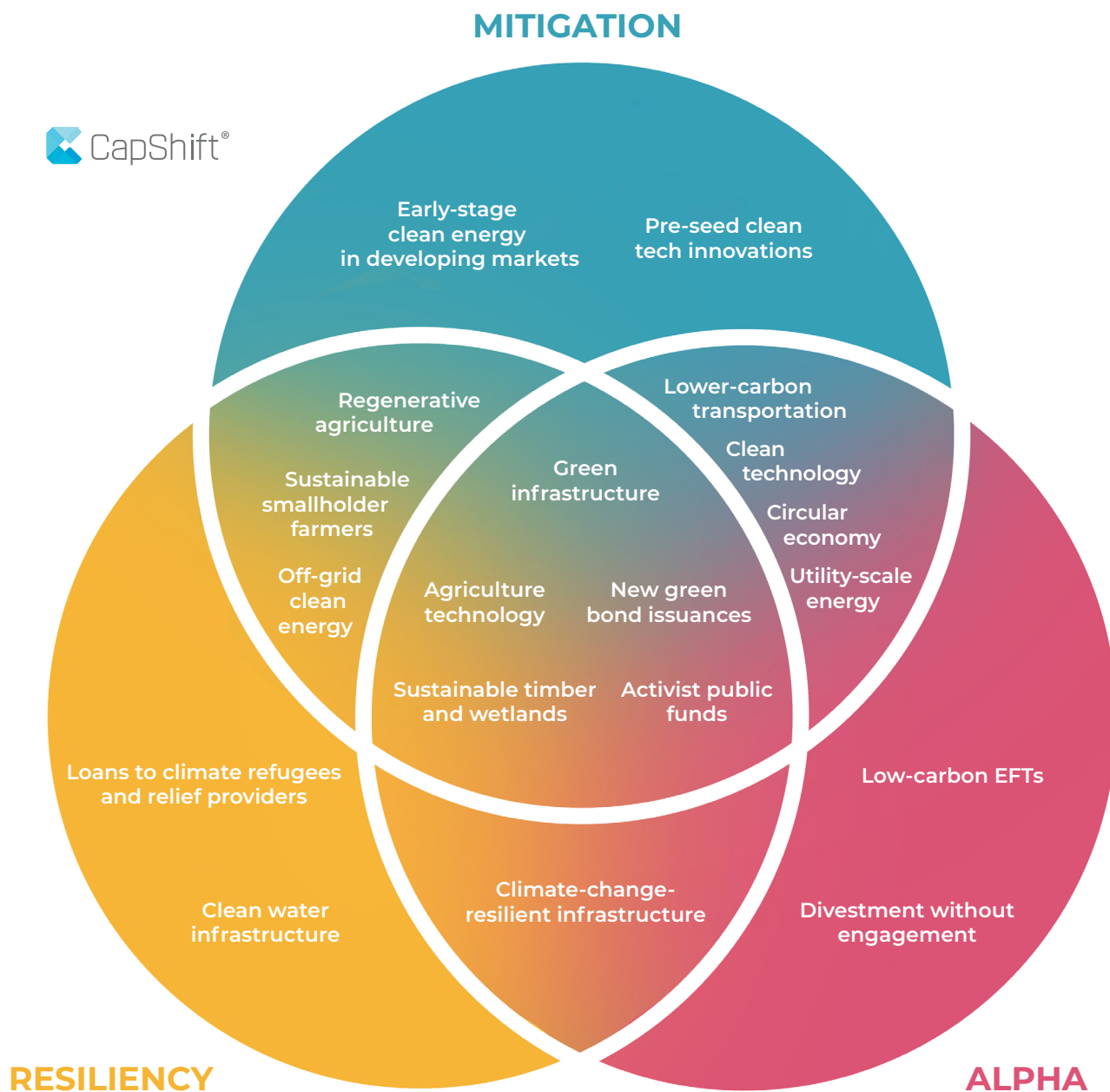
Strong returns generated by macro trends.

##### INVESTMENT EXAMPLE

Real asset fund that invests in electric vehicle charging, among other opportunities. EV registrations increased 41% in 2020 amid a pandemic-related drop in global car sales of 16%.<sup>47</sup> The global electric vehicle market is expected to grow at 40.7% annually from 2020 to 2027.<sup>48</sup>

## SELECT ALL THAT APPLY: OVERLAPPING CLIMATE INVESTING GOALS

These three goals identified — Mitigation, Resiliency, and Alpha — are not mutually exclusive, and investors can choose to combine and blend them within their investment portfolio. This approach allows investors to identify and invest in the asset classes and strategies that most closely align with their climate objectives.



Individual sectors — and even specific investment opportunities — may fulfill multiple goals. One example is agriculture. Accounting for almost a quarter of global emissions,<sup>49</sup> the sector can limit its contributions to global warming with mitigation strategies. Adverse effects such as desertification and drought require agricultural innovation that helps communities adapt and build resiliency.<sup>50</sup> Finally, the plant-based food market has attracted significant venture investment/deal flow in recent years.<sup>51</sup>



## WAYS AND MEANS: CLIMATE INVESTING STRATEGIES

Once initial goals are set, investors can bring climate considerations into their portfolios using three common investment strategies: **Align**, **Build**, and **Catalyze**.<sup>52</sup> Think of these strategies as building blocks — most investors begin by incorporating easily accessible liquid investment strategies that align with their values. As they look to increase their focus and impact, they may help build up existing solutions through investments in private markets. Finally, to catalyze outsized impact, investors may direct their capital to innovative and higher-risk opportunities that market-rate capital will not back.

### ALIGN

### BUILD

### CATALYZE

#### DESCRIPTION

Divest or realign public portfolios to avoid climate-related risks and engage companies to improve climate practices.

Invest in private equity, debt, or project finance to scale deployment of profitable solutions.

Support trailblazing ideas with patient capital by accepting a higher risk, lower return, or a longer lock-up period.

#### INVESTMENT CHARACTERISTICS

- Divest from assets with large carbon footprints
- Invest in companies that have adopted best climate practices
- Arbitrage climate risk

- Provide equity to build companies scaling better climate solutions
- Provide debt or project finance to scale proven climate solutions

- Accept a higher risk, lower return, or longer lockup to fund outcomes that market-rate capital cannot
- Enhance additionality by investing in solutions neglected by the market

#### FINANCIAL RETURN TARGET

Market-rate<sup>53</sup>

Market-rate

Impact-first

#### LIQUIDITY

Liquid

Illiquid and Semi-liquid

Illiquid

### ALIGN

For many investors interested in climate investing, a common starting strategy is to align their current portfolio with their climate values. Investors can activate their public portfolios for climate impact by pursuing strategies that mitigate climate risk or help drive climate solutions. These strategies can include divesting from fossil fuel companies, investing in projects and funds driving climate solutions,

and engaging with portfolio companies to improve environmental performance that drives growth or mitigates risk. Align strategies also typically reduce exposure to the profits of fossil fuel companies and increase exposure to climate solutions, which can therefore reduce risk and drive financial outperformance.<sup>54</sup>



### DIVEST

Divestment from fossil fuel companies is the form of climate-focused investing with the weakest link to climate impact. Without other measures in place, divestment alone is not a strong tool to advance climate goals. Investors should instead couple divestment with advocacy campaigns and shareholder engagement, which can drive significant climate outcomes.

At the institutional level, research finds that increasing oil and gas divestment pledges by non-financial organizations and non-governmental organizations (NGOs) is associated with lower new capital flows to domestic oil and gas companies.<sup>55</sup>



### INVEST

Fund climate solutions through bond issuances for green infrastructure, clean energy, or climate adaptation.

Green bond issuance hit a record high of \$290 billion in 2020 (a 246% increase from 2016) and is on track to hit \$500 billion in 2021, providing funding for renewable energy, green buildings, sustainable water, and clean transportation.<sup>56</sup>



### ENGAGE

Invest with fund managers who have a proven track record of engaging companies to improve their environmental practices.

There has been a new wave of impact hedge funds that have taken large positions in fossil fuel or carbon intensive companies, such as Exxon, and undertaken activist campaigns to adopt a climate-friendly board and strategy.



## BUILD

---

A common next step for investors is to focus on developing, building, and deploying climate solutions directly — generally focusing on market-rate, private investments. A Build strategy often balances the objective of generating Alpha with the goal of supporting Mitigation and/or Resiliency. This investment strategy supports climate solutions that offer the potential to generate strong risk-adjusted returns while filling key capital gaps across private markets.<sup>57</sup>

Build strategies lost popularity after billions of dollars of investments in “Cleantech 1.0” in the late 2000s yielded weak financial returns.<sup>58</sup> However, a new wave of climate-focused private funds and strategies

have raised hundreds of billions of dollars over the past few years, showing a renewed appetite.<sup>59</sup> These span asset classes, including venture capital, private equity, project finance, sustainable forestry, sustainable agriculture, and green real estate. In addition, the past year has also seen a wave of public market SPAC mergers providing capital to build out electric vehicle, novel battery, and other novel technologies that are expected to address a trillion-dollar market opportunity for climate solutions.<sup>60</sup>

Many investors see investing in Build solutions as the best chance to generate both outsized returns and impact. Depending on the capital need of the fund and the underlying solution, the additional impact created by individual investors will vary significantly across the Build category.



## CATALYZE

The most impactful strategy that investors can adopt is to catalyze high-impact climate solutions that otherwise would not be supported by return-maximizing investors.<sup>61</sup> A Catalyze approach puts Mitigation and/or Resiliency squarely as the primary goal, with the potential to reduce risk or generate strong returns as a limited secondary factor. These investments tend to feature higher risks or lower returns than the market can bear. These private debt, equity, and nonprofit investments are generally suited for charitable capital, with a focus on creating additionality.

Opportunities designed to Catalyze are often structured to attract “impact-first” charitable dollars, often through program related investments or recoverable grants. Program related investments and recoverable grants are two examples of alternative structures for contributing charitable dollars to opportunities that are potentially returns-generating, allowing charitable asset holders to multiply the impact achievable with the same set of charitable dollars. Private foundations and donor advised funds are common vehicles for funding these opportunities.<sup>62</sup> Examples include:



### VENTURE

Climate funds designed to invest equity in transformational climate technologies that are too early or risky for conventional venture capital to fund.



### DEBT

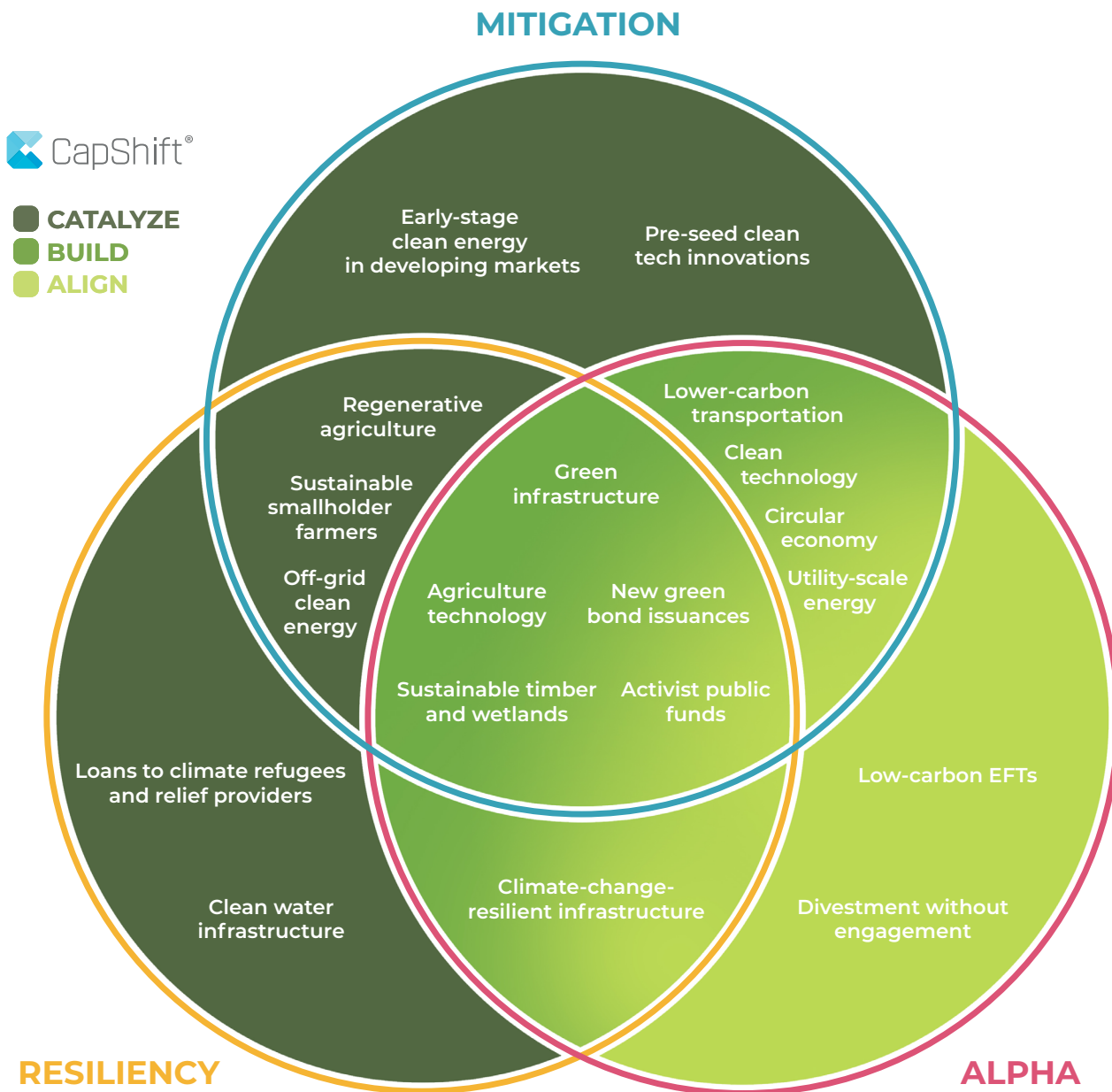
Low-interest loans that help farmers adopt sustainable and regenerative farming practices to better enhance soils and sequester carbon.



### BLENDED FINANCE

Funds designed to leverage flexible capital to attract larger debt investors to deploy renewable energy (Mitigation) or green infrastructure (Resiliency) projects in low-income communities that are often overlooked by traditional developers and financing.

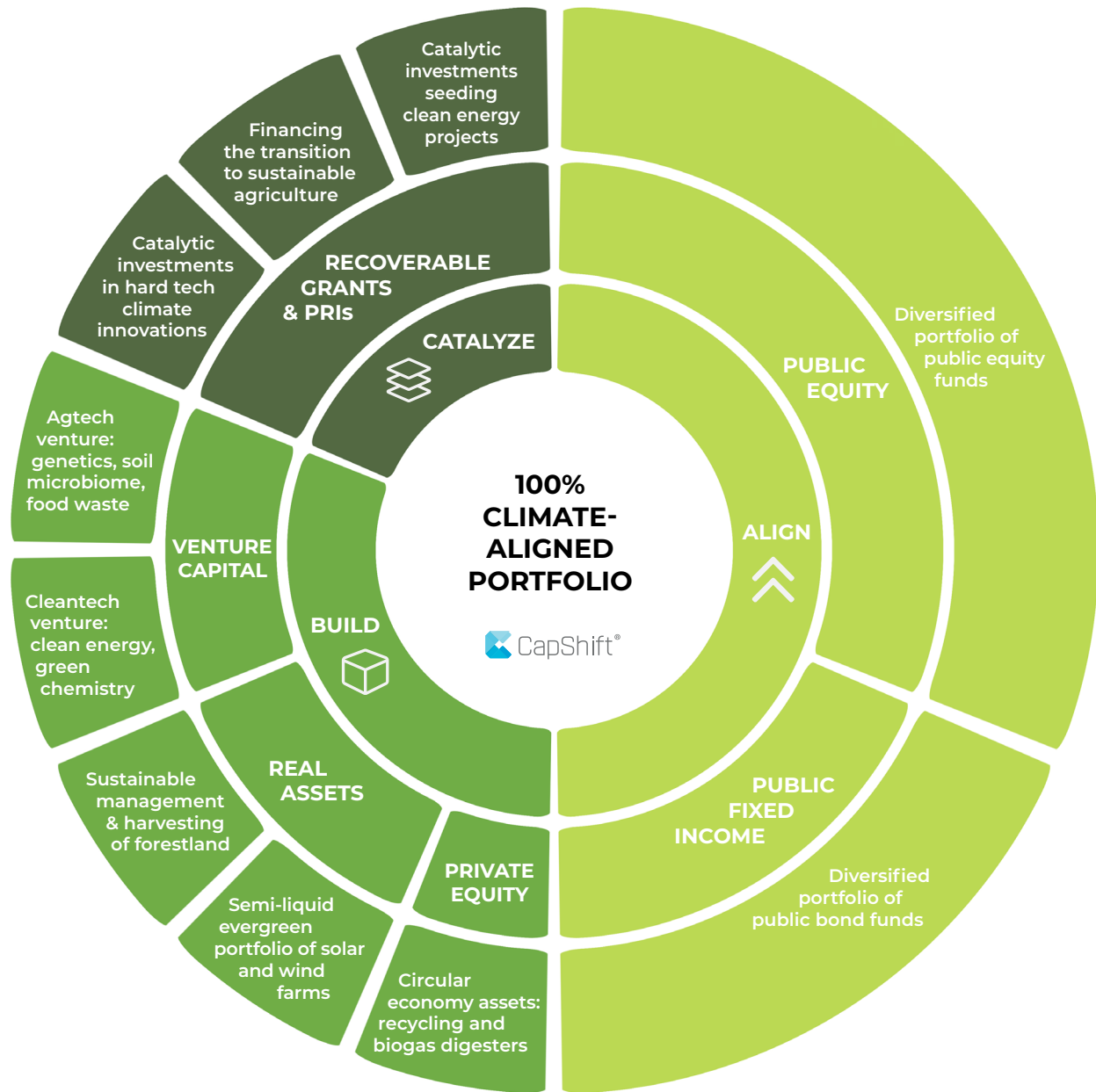
Below, we also show how the Align-Build-Catalyze framework interacts with the three overlapping goals vis-à-vis climate-focused investing.



## MIX AND MATCH: A SAMPLE CLIMATE-FOCUSED PORTFOLIO

Many investors have already successfully built a 100% climate-aligned investment portfolio that spans multiple asset classes and strategies. On the following page, we provide a sample climate portfolio with a 50-50 public-private split and a portion of the private sleeve in catalytic, impact-first investments. This example portfolio is suitable for charitable asset owners seeking to drive impact out of the portfolio; other asset owners may add more diversification to the portfolio.

A diversified portfolio is a common strategy for reducing the overall risk or volatility of a portfolio by investing in different types of assets. While many investors approach climate investing with only one type of asset in mind, climate impact can be achieved through investments in all asset classes. Appendix IV shows how each asset class can cover multiple goals and strategies.



There is no right way to build a climate-focused investment portfolio. But all investors should know that there are investment funds and vehicles in nearly every asset class that allow investors to contribute to climate solutions and mitigate climate risks across their portfolio.

*Portfolio illustrative of an investor with a significant exposure to private markets and an allocation to catalytic investments. The above is meant to be demonstrative of how a family might approach building a climate-aligned portfolio; it is not a recommendation or a solicitation to invest. Investors should do their own research prior to investing and should make decisions based on their own needs and risk tolerance.*

## EBB AND GROW: STEPS TO BUILD A CLIMATE-FOCUSED PORTFOLIO

Each investor's unique circumstances shapes their blend of financial risk, return, and liquidity requirements, as well as thematic areas of focus. While investors' priorities and approaches may vary, the following steps can offer a basic roadmap for integrating climate investments into your portfolio:<sup>63</sup>



**Set goals.** Identify which goals are the most important to you (Mitigation, Resiliency, Alpha) and what metrics you may use to measure success over time.

**Develop your strategy.** Identify what pools of capital will be invested, as well as specific return, risk, liquidity, or other constraints, culminating in a budget or target amount to be allocated towards climate solutions over time. This will allow you to identify which strategies (Align, Build, Catalyze) will play a role in your portfolio, helping you develop an asset allocation framework.

**Take action to invest.** Develop processes for building a pipeline of opportunities, conducting appropriate financial and impact diligence, and making investments within a target dollar range.

**Create feedback loops.** Implement a process to periodically review reports on the financial health and impact results of the investment portfolio, as well as learnings that can help you adapt your strategy and portfolio approach over time.

## About Us



CapShift provides sourcing, diligence, reporting, and other services to help families create climate-focused portfolios, with a particular focus on investment portfolios of charitable assets. If you would like to learn more about how we integrate with donor advised fund providers, financial advisors, philanthropic consultants, foundations, and family offices, please reach out to us at [hello@capshift.com](mailto:hello@capshift.com) to begin a conversation.

*This report and included sample portfolio does not constitute an offer to sell or a solicitation of an offer to purchase any security. Any such offer or solicitation would only be made pursuant to a offering memorandum or prospectus. All investments entail a high degree of risk and no assurance can be given that the investment objective will be achieved or that investors will receive a return of their capital. Any investment opportunities highlighted in this presentation are presented for illustrative purposes only. Opportunities may not be suitable for all investors due to differences in risk tolerance, investor status, and investment time horizons, amongst other factors. Additionally, investments may not achieve stated social, environmental, or similar objectives.*

*Advisory services are provided by CapShift Advisors LLC, an SEC registered investment advisor. Investments in securities are not FDIC insured, are not bank guaranteed and may lose value. Investing in securities involves risks, and there is always the potential of losing money when you invest in securities. Before investing, consider your investment objectives and CapShift Advisors LLC's charges and expenses. CapShift Advisors LLC's advisory services are designed to assist clients in achieving discrete financial goals. They are not intended to provide financial planning with respect to every aspect of a client's financial situation, they do not incorporate investments that clients hold elsewhere, and they do not provide tax advice. Past performance does not guarantee future results, and the likelihood of investment outcomes are hypothetical in nature. Nothing in this presentation constitutes an offer, solicitation of an offer, or advice to buy or sell securities in jurisdictions where CapShift Advisors LLC is not registered.*

## APPENDIX

We would like to thank the following individuals for reviewing a draft of this primer: Dwight Poler, Michael Ferrante, Bill Weil, Mark Tercek, Charles Ewald, Bruce Usher, Michele Martin, Ramsay Ravenel, and Eric Smith. We would also like to thank Max Berry, Laura Dyer, Nathan Lohrmann, and Maxwell Odena of the University of Michigan’s Erb Institute for Global Sustainable Enterprise for consulting on this primer.

Beyond investing, there are a number of complementary activities that families can take to pursue a pro-climate agenda. These include grant-making to policy, science, community, justice, and research nonprofits; joining coalitions to elevate the voice of asset owners in climate debates; and pushing corporate interests, advisors, and service providers to take more proactive positions on climate action. There is also a wealth of outstanding scholarship around climate science, policies, solutions deep dives, and investor case studies that has been written by other thought leaders. We feature a few examples below for future exploration.

### APPENDIX I: FURTHER RESOURCES ON CLIMATE-FOCUSED INVESTING

#### INVESTOR CASE STUDIES

- [Edwards Mother Earth Foundation Case Study](#). A case study of a small foundation that built a 100% climate-focused portfolio.
- [Sierra Club Article: We are Facing a Planetary Crisis](#). An overview of the Sierra Club Foundation’s rationale for and approach to climate-focused investing.
- [The Road Through Paris: Building a Low-Carbon Economy with Investing & Philanthropy](#). An overview of the McKnight Foundation’s approach to climate-focused investing.
- [CREO White Paper: Pathways to Sustainable Investing](#). An examination of the typical path taken by sustainable investors, the questions many of them face, and the way that many of them successfully develop a winning strategy that generates both returns and impact.

#### A FEW LEADING ORGANIZATIONS

- [Project Drawdown](#): A nonprofit that seeks to help the world reach “Drawdown”— the future point in time when levels of greenhouse gases in the atmosphere stop climbing and start to steadily decline.
- [Prime Coalition](#): A nonprofit that partners with mission-aligned investors to support extraordinary companies that combat climate change, have a high likelihood of achieving commercial success, and would otherwise have a difficult time raising adequate financial support to scale.
- [Breakthrough Energy’s Grand Challenges](#): An outline on accelerating innovation in sustainable energy and in other technologies to reduce greenhouse gas emissions from the five major sources: manufacturing (31 percent), electricity (27 percent), agriculture (19 percent), transportation (16 percent), and buildings (7 percent).



## OTHER DEEP DIVES

- The Nature Conservancy: The Playbook for Climate Finance. An outline of five ways to drive more funding towards climate change solutions.
- ImpactAlpha: Deploying catalytic capital to bridge financing gaps for climate action. An examination of catalytic capital use cases for climate impact.
- Cambridge Associates: Summary of climate science for investors: A high-level overview of the current climate science and a discussion of a few economic implications.

## APPENDIX II: CLIMATE ALPHA IN PUBLIC MARKETS

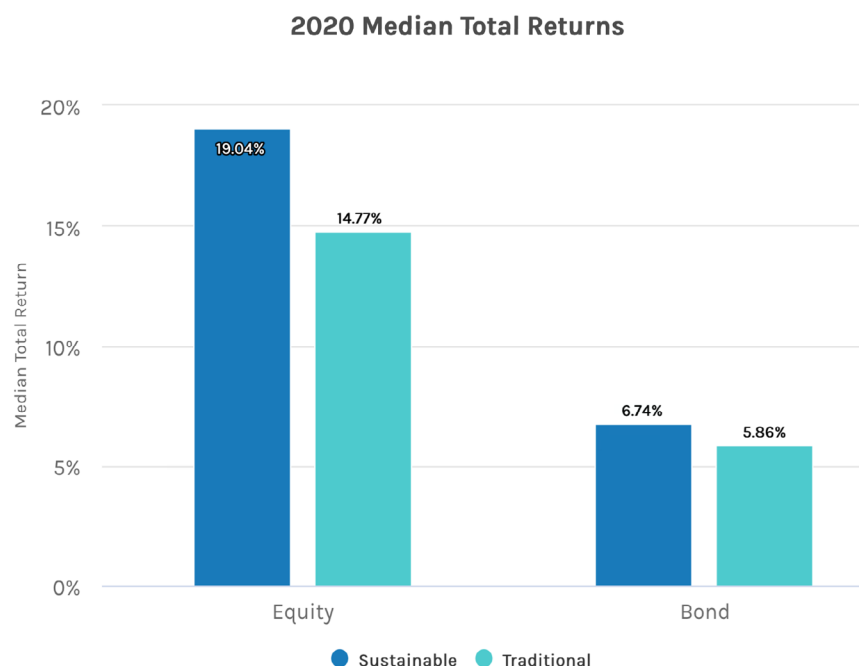
Research shows that integrating climate risks and solutions into public portfolios can be a driver of financial competitiveness.

**Risk Mitigation:** The International Monetary Fund’s 2020 Global Financial Stability Report found that equity investors are not adequately pricing how the physical risks related to climate change (loss of life and property as well as disruptions to economic activity) impact financial stability.

Example: A climate-proof portfolio strategy can also help investors avoid stranded assets, which are assets that have suffered from unanticipated write-downs, devaluations, or conversion to liabilities as a result of market developments. Stranded assets are an issue in the oil and gas sector as the industry transitions to renewable assets in the wake of climate change.

**Outperformance:** Morningstar’s 2021 Sustainable Funds US Landscape Report found that the returns of 69% of sustainable funds ranked in the top half of their Morningstar Category, and 37% in the top quartile returns.

In 2020, Morgan Stanley found U.S. sustainable equity funds outperformed their traditional peer funds by a median total return of 4.3 percentage points, as shown in the chart.



## APPENDIX III: CAPSHIFT CLIMATE MITIGATION<sup>64</sup> SOLUTIONS MAP

Another way to segment climate mitigation priorities is by identifying Sources (drivers of emissions to be curbed), Sinks (sequestration points to be increased), and Society (population pressure). CapShift has synthesized frameworks from Project Drawdown, Breakthrough Energy, and Prime Coalition into a Solutions Map:

	CapShift®	% OF GLOBAL EMISSIONS	PROVEN SOLUTIONS	EMERGING SOLUTIONS
SOURCES	<b>ELECTRICITY</b> How we plug in	27%	<ul style="list-style-type: none"> <li>- Solar &amp; Wind</li> <li>- Battery storage</li> <li>- Efficiency/demand response</li> <li>- Energy efficiency</li> </ul>	<ul style="list-style-type: none"> <li>- Hydrogen/fuel cell</li> <li>- Next gen storage</li> <li>- High efficiency transmission</li> <li>- Next gen nuclear and fusion</li> </ul>
	<b>TRANSPORT</b> How we get around	16%	<ul style="list-style-type: none"> <li>- Electric vehicles</li> <li>- Biofuels</li> <li>- Light/efficient vehicles</li> <li>- Expanded public transit</li> </ul>	<ul style="list-style-type: none"> <li>- Next gen biofuels and solar fuels</li> <li>- Advanced engines</li> <li>- Hydrogen transport</li> <li>- Smart cities</li> <li>- Aviation and shipping fuels</li> </ul>
	<b>MANUFACTURING &amp; INDUSTRY</b> How we make things	31%	<ul style="list-style-type: none"> <li>- Combined Heat &amp; Power</li> <li>- Reuse &amp; recycling</li> <li>- Industrial heat capture</li> </ul>	<ul style="list-style-type: none"> <li>- Low/negative carbon cement, steel, chemicals</li> <li>- Waste heat recovery</li> <li>- Upcycling and product reuse</li> <li>- Circular economy</li> <li>- Manufacturing of cement, steel, and chemicals</li> </ul>
	<b>BUILDINGS</b> How we live	7%	<ul style="list-style-type: none"> <li>- LED lighting</li> <li>- Smart HVAC</li> <li>- Retrofits</li> <li>- Refrigerant management</li> </ul>	<ul style="list-style-type: none"> <li>- Low carbon / timber building materials</li> <li>- Green/solar roofing</li> </ul>
SINKS	<b>FOOD &amp; AGRICULTURE</b> How we live	19%	<ul style="list-style-type: none"> <li>- Sustainable farming</li> <li>- Food waste prevention</li> </ul>	<ul style="list-style-type: none"> <li>- Regenerative and vertical farming</li> <li>- Livestock methane reduction</li> <li>- Carbon neutral fertilizer</li> <li>- Cellular agriculture</li> <li>- Alternatives to animal agriculture</li> </ul>
	<b>FORESTRY &amp; SEQUESTRATION</b> How we remove carbon	NA	<ul style="list-style-type: none"> <li>- Forest conservation</li> <li>- Reforestation</li> </ul>	<ul style="list-style-type: none"> <li>- Carbon capture &amp; storage</li> <li>- Geoengineering</li> <li>- Ocean sequestration</li> <li>- Direct air capture</li> </ul>
	<b>SOCIETAL CHANGE</b> How we mitigate population pressure	NA	<ul style="list-style-type: none"> <li>- Educate girls</li> <li>- Family planning</li> <li>- Grow incomes</li> <li>- Plant-rich diets</li> </ul>	NA

## APPENDIX IV: CLIMATE INVESTING BY ASSET CLASS

 CapShift®	PRIMARY GOAL	MITIGATE APPROACH	RESILIENCY APPROACH	ALPHA APPROACH	EXAMPLE FUND
<b>PUBLIC EQUITY</b>	Align	Proven solutions	NA	Risk mitigation	Shareholder engagement for reduced corporate impact on climate change
<b>PUBLIC FIXED INCOME</b>	Align & Build	Proven solutions	Resilient infrastructure	Risk mitigation	Asset-backed loan to residential solar & energy storage provider
<b>PRIVATE EQUITY</b>	Build	Emerging solutions	Resilient infrastructure	Upside capture & Risk mitigation	Growth of recycling and sustainable waste management facilities
<b>REAL ASSETS</b>	Build	Proven solutions	Community solutions & Resilient infrastructure	Upside capture	Sustainably managed forests for conservation outcomes and sustainable timber harvest
<b>PRIVATE DEBT</b>	Build & Catalyze	Proven & Emerging solutions	Community solutions	Upside capture	Funding microfinance institutions that finance access to solar energy or clean water
<b>VENTURE CAPITAL</b>	Build & Catalyze	Proven & Emerging solutions	Resilient infrastructure	Upside capture	Seeding and supporting potentially transformative climate innovations
<b>PRIs AND RECOVERABLE GRANTS</b>	Catalyze	Proven & Emerging solutions	Community solutions	NA	Concessionary debt to fund transition to sustainable agriculture

## WORKS CITED AND NOTES

1. Nature. [COVID curbed carbon emissions in 2020 — but not by much](#)
2. The New York Times. [Harvard says it will not invest in fossil fuels](#)
3. The Wall Street Journal. [SEC Asks Dozens of Companies for More Climate Disclosures](#)
4. NPR. [Pope Francis And Other Christian Leaders Are Calling For Bold Climate Action](#)
5. IPCC. [SPECIAL REPORT: GLOBAL WARMING OF 1.5 °C](#)
6. Climate Policy Initiative. [Global Landscape of Climate Finance 2021](#)
7. UNHCR. [Displaced on the frontlines of the climate emergency](#)
8. Federal Reserve. [Financial Accounts of the United States](#)
9. Intergovernmental Panel on Climate Change. [Special Report on the Impacts of Global Warming of 1.5 °C](#)
10. Wikimedia Commons. [Woolsy Fire](#)
11. Wikimedia Commons. [Drought, French Guinea](#)
12. Wikimedia Commons. [Flooding in India](#)
13. Wikimedia Commons. [North Complex smoke in San Francisco](#)
14. Frontiers in Climate Science. [Underestimating the Challenges of Avoiding a Ghastly Future](#)
15. ProPublica. [New Climate Maps Show a Transformed United States](#)
16. Columbia Climate School. [The Science of Carbon Dioxide and Climate](#)
17. National Snow and Ice Data Center. [Methane and Frozen Ground](#)
18. Climate Central. [Global Warming’s Compounding Dangers](#)
19. Intergovernmental Panel on Climate Change. [Climate Change 2021: The Physical Science Basis](#)
20. Grantham Research Institute. [The missing economic risks in assessments of climate change impacts](#)
21. Columbia Climate School. [How Climate Change Will Alter Our Food](#)
22. Institute for Economics and Peace. [Ecological Threat Register 2020](#)
23. World Economic Forum. [Climate Refugees – the world’s forgotten victims](#)
24. Science.org. [Accelerating Extinction Risk from Climate Change](#)
25. Intergovernmental Panel on Climate Change. [Climate Change 2014: Impacts, Adaptation, and Vulnerability](#)
26. Stanford Social Innovation Review. [The Investment Gap that Threatens the Planet](#)
27. Climate Policy Initiative. [Global Landscape of Climate Finance 2019](#)
28. UNEP. [Adaptation Finance Gap Report](#)
29. Hewlett Foundation. [Climate Finance Strategy 2018-2023](#)
30. Climate Policy Initiative. [Global Landscape of Climate Finance 2021](#)
31. Ibid.
32. Hewlett Foundation. [Climate Finance Strategy 2018-2023](#)
33. Stanford Social Innovation Review. [The Investment Gap that Threatens the Planet](#)
34. A 2021 [International Energy Agency report](#) finds that nearly half the pathways to cut global greenhouse gas emissions to net-zero by 2050 come from technologies that are still under development in either demonstration or prototype phases.
35. UNFCCC. [What do adaptation to climate change and climate resilience mean?](#)
36. The UN Refugee Agency. [Climate change and disaster displacement](#)
37. Green Climate Fund. [Thematic brief – Adaptation](#)
38. OECD. [Making blended finance work for water and sanitation](#)
39. Brookings Institute. [The climate wolf at the door: Why and how climate resilience should be central to building back better](#)
40. Climate Finance Lab. [Climate Resilience and Adaptation Finance & Technology Transfer Facility \(CRAFT\)](#)
41. Carbon Brief. [Mapped: How climate change disproportionately affects women’s health](#)
42. Project Drawdown. [Health and Education](#)
43. Thomson Reuters Foundation. [Net-zero emissions targets adopted by one-fifth of world’s largest companies](#)
44. S&P Global. [The “Trucost” of climate investing: Managing climate risks in equity portfolios](#)

45. Morgan Stanley. [Managing Climate Change Risks with High Quality, Low Carbon Portfolios](#)
46. UBS. [Carbon investing: does a lower carbon intensity portfolio sacrifice return](#)
47. International Energy Agency. [Global EV outlook 2021](#)
48. Precedence Research. [Electric vehicle market size, growth, report 2020 to 2027](#)
49. UN FAO. [Food systems account for more than one third of global greenhouse gas emissions](#)
50. IPCC. [Special Report on Climate Change and Land: Desertification](#)
51. More than 20 faux meat startups raised about \$1.4 billion from venture investors in the first seven months of 2020. Source: [Farm Animal Investment Risk & Return](#)
52. Impact Management Project. [How investors manage impact](#)
53. Market-rate: investments which prioritize returns aligned with the amount of risk the investor is taking. For example, if the investor is taking higher risk, they are anticipating that returns will also be higher and that those risks and returns are aligned with what the market will bear.
54. Journal of Sustainable Finance & Investment. [ESG factors and risk-adjusted performance: a new quantitative model](#)
55. Journal of Economic Geography. [Does the fossil fuel divestment movement impact new oil and gas fundraising?](#)
56. Morningstar. [What are Green Bonds?](#)
57. The Stanford Social Review. [The Investment Gap that Threatens the Planet](#). Page 32, Section *Sources of Capital for Climate Solution Stages*
58. Medium. [Cleantech's Comeback](#).
59. Climate Tech VC Newsletter. [Climate tech \\$16b mid-year investment action report](#).
60. Cleantech Group. [SPACs in Cleantech: Seven Weeks into 2021, There are no Signs this 2020 Trend is Abating](#).
61. The Stanford Social Innovation Review. [The Investment Gap that Threatens the Planet](#). Page 33, Section *The Unique Position of Philanthropists*.
62. The Stanford Social Innovation Review. [Using Donor-Advised Funds to Invest in Early-Stage Entrepreneurs](#).
63. See also CREO and Cambridge Associates for roadmaps to integrating impact into an investment portfolio.
64. Framework built from CapShift analysis, synthesizing data from Project Drawdown, Breakthrough Energy, Prime Coalition, and other industry sources.

**Appendix B. Climate Primer Landscape Assessment**

*Please proceed to following page.*

## Landscape Assessment

2021.02.22 1130 EST

### Erb Team Focus Areas

User	Framework	URL	Author	Author_Role	Relevant as Framework?	So what? - Subjective	Description - Objective
HNWIs, Family Offices, Foundation Asset Owners	<b>Catalytic Potential</b>	<a href="#">URL</a>	Prime Coalition	Public Charity / Venture Capital	Y	Empowers investors knowing that the technology may not exist without their investment & gives investors a clear understanding of the emissions impact	Prime Impact Fund invests in young companies based on emission reduction potential when fully scaled & fit for catalytic capital. Aims to close the capital gap for technology in nascent solutions categorized by the IPCC Economic Sectors.
HNWIs, Family Offices, Foundation Asset Owners	<b>Tonic SDG Impact Theme Framework</b>	<a href="#">URL</a>	Tonic	"Global Community of asset owners seeking deeper positive net impact"	Y	One of many potential ways to organize around the SDGs. Likely too granular but useful to reference	Tonic maps their impact investment themes to the 17 SDGs, essentially creating sub-goals under the SDGs
No clear user	<b>Symbolic vs Broad vs Deep</b>	<a href="#">URL</a>	Y. Choi	Think Tank	Y	Deep and/or catalytic impact is an area in which CapShift clients could be particularly impactful. Due to the A best-in-class version of an actionable impact investing framework with strong parallels to what our project is trying to accomplish	This breaks out impact categories by the materiality (net impact on GHG emissions) and the additionality (inverse relationship with the probability the investment would have taken place without the actions of a specific investor) of the impact. Our interpretation is that deep
HNWIs, Family Offices, Foundation Asset Owners	<b>Access Impact Framework</b>	<a href="#">URL</a>	Cornerstone Capital	Investment Advisory	Y	The most broadly recognized categorization of impact themes	The Framework maps each SDG to each of the 11 access themes (see categories) and weights that mapping by the strength of alignment between the SDG and the theme
Widely used	<b>SDGs</b>	<a href="#">URL</a>	United Nations		Y	CREO's framework is literally their name. It seems catchy enough to be effective, though not MECE	United Nations Sustainable Development Goals
Family Offices	<b>Clean, Renewable, and Environmental Opportunities</b>	<a href="#">URL</a>	CREO Syndicate	Platform	Y	Interesting bucketing of sectors and activities (e.g., "food security") mapped to SDGs (though not done well).	CREO is a 501(c)3 and CapShift competitor platform. Family offices focus. CREO educate investors on clean, renewable, and environmental opportunities (CREO), help them collaborate, accelerate investment. They use partnerships to develop engagement
Financial Institutions	<b>Sectors, Activities, &amp; SDGs</b>	<a href="#">URL</a>	Deutsche Bank	Financial Institution	Y	Their buckets are a good narrowing down of SDGs, though eight is still a lot. Similar to Deutsche Bank frame, but better.	Sustainable Finance Framework outlines how to classify financial products and services offered by Deutsche Bank as sustainable finance. Specifies "sustainable finance" classification logic, eligibility criteria, environmental and social due diligence requirements
Institutional Investors / Private Sector Generally	<b>"Results Areas"</b>	<a href="#">URL</a>	Green Climate Fund	Fund	Y	This option allows donors to invest in social/environmental investments, however, the donor does not pick each	GCF seeks to have an impact within eight mitigation and adaptation results areas. We are also committed to achieving a balance between funding for mitigation and adaptation initiatives.
The ImpactAssets Donor Advised Fund	<b>Targeted Impact</b>	<a href="#">URL</a>	ImpactAssets	donor advised fund for impact investors	Y	This option allows donors to invest in social/environmental thematic focused funds (i.e. in water, farmland, etc).	Investments target into low-income community investing and initiatives that empower women on a worldwide scale. Ideal for donors seeking direct impact in these specific areas.
The ImpactAssets Donor Advised Fund	<b>Direct Impact</b>	<a href="#">URL</a>	ImpactAssets	donor advised fund for impact investors	Y	This allows donors to curate investments in the areas that mean the most the them, which is similar to what we want to do for	Investments enable direct investment into mission driven companies/impact investing, more broadly (specific to private debt, private equity and venture capital). Ideal for those seeking direct impact in environmental & social impact more broadly.
The ImpactAssets Donor Advised Fund	<b>Customized Impact</b>	<a href="#">URL</a>	ImpactAssets	donor advised fund for impact investors	Y	Could be a helpful way to frame the initial impact decision i.e. what kind of impact does the HNWI want to make. This should	Investments curated to the specific needs of the donor. ImpactAssets enables donors to choose investments outside of their platform. Donors must self-identify, perform due diligence and agree on an investment structure with the organization a donor wishes to
Merrill Lynch	<b>ABCs &amp; Measurement Themes</b>	<a href="#">URL</a>	Merrill Lynch	Asset Manager	Y	Gives investors a clear understanding of the emissions impact their investment could have	Investors choose between avoid (screening), benefit (support environmental initiatives) and contribution (create a measurable impact) based on investors risk tolerances, time horizons, and preferences through actionable planning and objective advice.
Goal is to be widely used	<b>Emissions Reduction Potential (ERP)</b>	<a href="#">URL</a>	Prime (additional development partners – Greenometry, Rho	Public Charity / Venture Capital	Y	Although 3D is compiling their portfolio of startups proportional to emission source, an investing framework in line could be a	The CRANE tool assess the emissions reduction potential of climate technologies. Inputs include: geography, range of years, market penetration, figures of merit. Outputs include: annual ERP, cumulative ERP, market penetration, key calculation factors, and a heat map
Third Derivative	<b>Emissions source</b>	<a href="#">URL</a>	Third Derivative	climatch tech accelerator	Y	SGDs broadly could be a good place to start the Capshift framework and drill down into what HNWI prioritize	3D's cohort of startups represent the world's major GHG-emitting sectors of the economy. They have thoughtfully curated the sector breakdown diversity to similarly reflect global sources of GHG emissions.
Wetherby Asset Management	<b>SDGs</b>	<a href="#">URL</a>	United Nations	Asset Manager	Y	Funds Elemental Exceleator. Posts thought leadership articles for environmental justice.	Wetherby's impact objectives are mapped to the United Nations' 17 Sustainable Development Goals (SDGs). They aim to integrate impact – broadly and deeply – without compromising any other objectives.
Emerson Collective	<b>Climate x Justice</b>	<a href="#">URL</a>	Emerson Collective	Philanthrocapitalism	Y	Initiative started based on the innovative finance framework in row 26. The 'action item' from the report linked above.	Social change org that uses philanthropy, impact investing, advocacy, and community engagement as tools to spur change in the United States and abroad
Rockefeller Foundation	<b>Zero Gap</b>	<a href="#">URL</a>	Rockefeller Foundation	Impact Investor	Y	Not only is this example the closest thing I have found to what we are working towards but it's also a very well-done	Aim is to invest in new financing products and solutions to catalyze new capital to help meet the SDGs. Focuses on scaling high-innovation financial mechanisms such as new securitizations, insurance products, and fund strategies to unlock new and additional
Blackrock	<b>Blackrock Thematic Investing Tool</b>	<a href="#">URL</a>	Blackrock	Asset Manager	Y		Blackrock has 5 megatrends (one of which is climate change and resource scarcity) that connect to both funds and indices organized around particular investment themes (see categories for more detail).

Asset Manager	<b>Offense, Defense, and Engagement</b>	<a href="#">URL</a>	Wellington Management	Asset Manager	Y	This is an easy framework to remember but it isn't obvious what each part means. Noteworthy partnership with WCRC.	<a href="#">Partnered with Woodwell Climate Research Center</a> to study and manage risks in capital markets. Have integrated climate change risk management into the investment process through "defense, offense, and engagement" (see right)
Asset Manager	<b>Risk Categories (Adaptation)</b>	<a href="#">URL</a>	Wellington Management	Asset Manager	Y	Risk focus could resonate with investors who want to help people most in need. Geography focus. Noteworthy partnership	<a href="#">Partnered with Woodwell Climate Research Center</a> to study and manage risks in capital markets. Have placed risks on map that investors can use. They make sure 50% of a portfolio will benefit from helping adapt to one or more of these risks. They call this
Widely used	<b>Values-Aligned Investing</b>	<a href="#">URL</a>	Confluence Philanthropy	Think Tank	Y	Impact investing & mission-related investing are unhelpful. All investments have impact, (+) or (-). Not all people have	Confluence has decided to step back from the use of the terms Mission-Related Investing and Impact Investing [because those terms are inaccurate and have baggage]. Instead [they] describe our 'style' of investing as values-aligned investing.
Goldman Sachs	<b>Climate transition, Inclusive growth &amp; Environmental</b>	<a href="#">URL</a>	Goldman Sachs	Investment Bank and Asset Manager	Y	Climate transition areas of focus offer a narrowed down scope of areas for HNWI to potentially invest	Sustainable Finance: Sustainability is a firmwide mandate with a focus on two interconnected themes: climate transition & inclusive growth (see categories for breakdown).
Investment Management Community	<b>ABCs &amp; Dimensions of Impact</b>	<a href="#">URL</a>	Impact Management Project	Forum; Practitioner Community of over 2,000 organisations;	Y	Could be a helpful way to frame the initial impact decision i.e. what kind of impact does the HNWI want to make. More built	Provides framework for why and how investors manage impact.
Veris Wealth Partners	<b>Thematic Impact (4 themes)</b>	<a href="#">URL</a>	Veris Wealth Partners	Asset Manager	Y	Narrows down scope to 4 major themes for HNWI to focus on	Veris focuses on 4 key themes (see categories). No full framework for their chosen themes/sub-themes. However, they have a framework (research brief) for regenerative ag/forestry and its connection to climate change. Has a separate asset mapping matrix with
Rockefeller Foundation	<b>Innovative Finance</b>	<a href="#">URL</a>	Rockefeller Foundation	Foundation / Philanthropy	Y	Using philanthropic capital with higher risk tolerance to meet funding gap for SDGs	Using philanthropic risk capital to develop the next generation of innovative finance solutions that are needed to close the gap between global development's funding needs and the resources that are currently available.
Foundations / Asset Managers	<b>Responsible Investing Framework</b>	<a href="#">URL</a>	McKnight Foundation	Foundation / Philanthropy	Y	Focused on the investors responsibilities in deciding where to invest, and how to act once invested.	Four point strategy addressing the role an investor should play when making impact investments. The investor should consider their impact as a (1) customer of financial services, (2) shareholder, (3) market participant, and (4) owner of assets
Foundations / Asset Managers	<b>Climate Initiative Strategy</b>	<a href="#">URL</a>	Hewlett Foundation	Foundation / Philanthropy	Y	Comprehensive overview of the opportunities divided by region and pool of capital (i.e. asset class)	Framework to mobilize a significant increase in the flow of capital for climate-friendly activities, aiming to reduce GHG reductions and keep global temperature increase well below 2°C. Strategy is segmented by pool of capital and regions.
Institutional Investors / Private Sector Generally	<b>GIIN Climate Investing Track</b>	<a href="#">URL</a>	GIIN	"Nonprofit dedicated to increasing the scale and	Y	<a href="#">Provides justification for mapping to the SDGs (with data points) as well as a profile of impact investors who have done</a>	GIIN has a "Climate Investing Track" that is probably a step or two away from being a framework but, more importantly, they have a variety of reports/resources linking impact investing and the SDGs
Financial Advisors and investors	<b>Climate Change Fossil Fuel Aware Investing Primer</b>	<a href="#">URL</a>	Morgan Stanley	Asset Manager / Financial Advisor	Y	Roadmap for climate change investing as it relates to fossil fuels	Climate Change and Fossil Fuel Aware Investing: outlines risk, opportunities and a roadmap for investors. Includes scope, risks, opportunities across asset classes and potential returns. MS also has a tool for investors to rank 100 different impact categories. They don't appear to use or offer any form of framework. They build custom portfolios around specific social goals that their clients have so there's not a lot of transparency into the themes they use
Flat World Partners					TBD		
MIINT					TBD		MIINT doesn't really appear to have any theme for framework info available
CERES					TBD		Ceres appears to be mostly ESG related
GIIN					TBD		GIIN has a "climate investing track" but there's very limited information online you have to reach out to membership to hear more
Goal is to be widely used - investors, grantors, entrepreneur &	<b>GHG emissions</b>	<a href="#">URL</a>	Prime	Public Charity / Venture Capital	N	Investors might care more about how their capital will have impact, not how much the tech emits (unless the technology is off-	PRIME uses a Carbon Estimation Tool specific for CCU (carbon capture, utilization, and sequestration) technologies and carbon removal solutions
The ImpactAssets Donor Advised Fund	<b>Ease of Investment</b>	<a href="#">URL</a>	ImpactAssets	donor advised fund for impact investors	N	Public equity heavy focus	Investments are mapped by grant-making time horizon, risk appetite, and liquidity profiles. ImpactAssets assures that fund managers are addressing social and environmental issues across asset classes. Ideal for investors seeking "turn-key" portfolio.
The ImpactAssets Donor Advised Fund	<b>Screened Impact</b>	<a href="#">URL</a>	ImpactAssets	donor advised fund for impact investors	N	Public equity heavy focus	Investments are screened by ImpactAssets and investors can build their own mutual fund of ETF portfolio. Ideal for those seeking to build portfolio from existing mutual funds/ETFs.
New York State	<b>Public v. Private Sector Projects</b>	<a href="#">URL</a>	New York Green Bank	State sponsored financial entity	N	Methods for investing public capital in clean energy. Not relevance to our goal of attracting more investment capital. Don't consider this to be super relevant considering most of CapShift's portfolio will consist of "contribution" investments	(1) Leverage private sector capital to support and expand clean energy financing markets; (2) Animating and growing capital markets reducing the need for government support; (3) motivating faster and more extensive deployment of clean energy assets.
No clear user	<b>Asset Allocation Strategy</b>	<a href="#">URL</a>	<a href="#">Y. Choi</a>	Think Tank	N	Investment stage is potentially a framework axis that would appeal to investors	This breaks out impact investing strategies into divestment, alignment, and contribution.
Widely used	<b>Financial Supply Chain Framework</b>	<a href="#">URL</a>	Calvert Impact Capital	Non-profit investment firm	N	Mostly for ESG ratings so not particularly relevant	A theme that categorizes investment based on stage - simple but worthwhile to include
MSCI	<b>ESG Ratings Key Issue Framework</b>	<a href="#">URL</a>	MSCI	Investment Decision support tools	N	MSCI Offers a framework for categorizing key issues that serve as inputs for their ESG ratings process. Issues fall under 4 environmental pillars: climate change, natural capital, Pollution and waste, environmental opportunities. I would argue that there are other	



Widely used	<b>Geography-Specific Climate Risks</b>	<a href="#">URL</a> NYT	Media	N	Too specific to easily be widely appealing; better as categories. See Wellington Management for more geography-related.	NYT breaks out material climate risks by country. Investors might want to invest in solutions to risks that are most relevant to their country (or geography).
Widely used	<b>Climate Solutions</b>	<a href="#">URL</a> Drawdown	Think Tank	N	Too specific to easily be widely appealing; better as categories	Drawdown have analyzed and prioritized solutions that need to be implemented to hit 1.5F and 2F targets.
Widely used	<b>Food Waste Climate Solutions</b>	<a href="#">URL</a> ReFED	Think Tank	N	Too specific to easily be widely appealing; better as categories	ReFED have analyzed and provided roadmap of solutions that need to be implemented reduce food loss and waste (FLW) by 50% by 2030 in accordance with SDGs.
Institutional Investors / Private Sector Generally	<b>Mitigation vs. Adaptation</b>	<a href="#">URL</a> Green Climate Fund	Fund	N	Created as catalytic funding. This is an easy framework to remember but too generic to be interesting.	Mission: hit Paris goals thru fund's 50:50 balance in mitigation, adaptation ("themes"). Private Sector Facility (PSF) to fund and mobilize private sector actors, including institutional investors, and leverage GCF's funds to encourage corp. investment. Set up by
Investors	<b>Sectors</b>	<a href="#">URL</a> Transition Pathway Initiative	Think Tank	N	<a href="#">Developed with investors</a> in mind, though not our target users. Too specific to easily be widely appealing; better as categories.	The TPI was developed with investors in mind. Until its launch, it had not been clear what the transition to a low carbon economy looked like for individual companies and sectors, raising many important practical questions for investors. Built with Grantham. LSE, PRI,
Wealth Owners	<b>Sustainable Investor Path (SIP) Wheel</b>	<a href="#">URL</a> CREO Syndicate + Cambridge Associates	Platform	N	CREO leverage partnerships like CapShift. Not useful to attract investment. Helpful to understand the investor journey.	The SIP Wheel outlines the wealth owner journey to sustainable investments. CREO is a 501(c)3 and CapShift competitor platform. Family offices focus. CREO educate investors on clean, renewable, and environmental opportunities (CREO), help them collaborate,
Financial Institutions	<b>Renewables, Efficiency, Buildings</b>	<a href="#">URL</a> Deutsche Bank	Financial Institution	N	Helpful that it's mapped to ICMA Green Bond Principles and SDGs, but too narrow for use as intro framework for our	Green Financing Framework is method for issuance of 'use-of-proceeds'-based Green Financing Instruments. Aligned with ICMA Green Bond Principles (GBP). Reflects SDGs, European Union Green Bond Standard (EU GBS), European taxonomy for sustainable
Widely used	<b>ESG</b>	<a href="#">URL</a> Deutsche Bank / Deutsche Asset Management	Asset Manager	N	<a href="#">No climate investment framework / strategy outlined on their website beyond basic ESG</a> , "Environment" subcategories	DB's response to stakeholders requesting more transparency around corporate activities and making decisions based on a broader variety of information. This includes identifying additional opportunities and risks from corporate behaviors related to ESG.
Institutional Investors / Private Sector Generally	<b>Countries</b>	<a href="#">URL</a> Green Climate Fund	Fund	N	Too specific to easily be widely appealing; better as categories. See Wellington Management for more geography-related.	The following developing countries have designated a National Designated Authority or Focal Point, paving the way towards unlocking GCF resources for climate solutions. The Fund pays particular attention to the needs of societies that are highly vulnerable to the
Institutional Investors / Private Sector Generally	<b>Public v. Private Sector Projects</b>	<a href="#">URL</a> Green Climate Fund	Fund	N	Easy framework to remember but overly generic as a framework.	A defining feature of GCF in the world of climate finance is its unique ability to tap both public and private finance flows, seeking to engage across sectors to unlock high impact and paradigm shifting climate investments. GCF is able to offer and combine a full range of
n/a	n/a	<a href="#">URL</a> Deutsche Bank / Deutsche Wealth Management	Wealth Manager	N	<a href="#">No climate investment framework / strategy outlined on their website beyond basic ESG</a> .	n/a
Apollo			Apollo	N		Apollo launched an impact fund with areas of focus based on SDGs and where they already have industry connections (i.e. education). This \$1B fund is currently fundraising and will invest in private debt and equity.
Institutional Investors / Private Sector Generally	<b>PRI (Principles for Responsible Investing)</b>	<a href="#">URL</a> PRI	Principles for Responsible Investment is a	M	Better categorization of themes than some other frameworks but I believe TONIC's SDG Impact Themes Framing or the	PRI released an impact investing market map which includes 6 environmental themes, sub-themes, and business types. Appears to be geared more towards institutional investors

## Appendix C. Fast Facts Sets B & C

We can stop climate change if we invest correctly.

**INVESTMENT: Any way you slice it, climate change requires massive financial investment.**

Estimates of the investment required to keep warming below 2°C range from \$1.6 trillion to \$3.8 trillion annually through 2050 for energy systems investment alone ([CPI](#)). Other estimates indicate the cost of adaptation in developing countries could rise to between \$280 and \$500 billion per year by 2050 ([UNEP](#)).

**GAP: We are not investing enough to stop climate change.**

Investment in climate change adaptation and mitigation must triple to reach the bare minimum of \$1.6 trillion needed annually. Actual investment flows into climate technologies and solutions are steadily increasing, but estimated to be at most \$580 billion as of 2018. ([Hewlett](#), [CPI](#)).

**ALLOCATION: Too much money is going to energy, at the expense of other major solutions.**

Today, private finance accounts for around half of climate finance. The vast majority (85%) of investment flowed to renewable energy, another 14% to low-carbon transport, leaving less than 1% for all other subsectors. Public and private actors must coordinate to rapidly scale up investment in all solutions, not just renewable energy generation ([CPI](#)).

**CATALYTIC: Patient capital is needed to catalyze transformational solutions.**

To keep warming below 2°C requires continued investment in nascent climate solutions, which is simply not happening in the current market ([Prime](#)). Venture capital (VC) investors typically fill this gap, however, nearly all (87%) of VC cleantech investments went to late-stage projects in 2016 ([Hewlett](#)). This creates a need for patient capital with high risk tolerance and long investment horizons.

**ACTION: Philanthropic donors are critical to finding solutions.**

Most donors have inter-generational timelines, high risk tolerance, and an existing passion for optimizing social outcomes rather than financial gain. This creates a source of risk-tolerant capital needed to develop new solutions and scale existing ones, and makes philanthropic intervention a crucial tool in the fight against climate change. ([Prime](#))

Here's what we can accomplish if we get this right.

**PROTECTING HOMES: Preventing sea level rise and drought means halting mass displacement.**

Climate change is projected to create more than 140 million climate refugees by 2050 ([BOA](#)). Immediate cuts to emissions along with mitigation and adaptation efforts would reduce the total number of people threatened by annual flooding and permanent inundation at the end of the century by 20 million ([Climate Central](#)).

**SECURING LIVELIHOODS: Climate change puts millions of jobs at risk, but also creates millions of new opportunities.**

If left unchecked, climate change is projected to lead to a loss of 80 million jobs by 2030 ([ILO](#)). However, an effective transition towards green growth will lead to new opportunities for workers and net job creation through a substantial reallocation of labor towards mitigation and adaptation efforts ([ILO](#)). In fact, employment growth in the renewable energy sector alone could create up to 20 million new jobs by 2030 ([OECD](#)).

**PRESERVING EQUALITY: Overexposure of the poor means they have the most to lose, and the most to gain from climate action.**

The poor are the most susceptible to climate change, though they contribute to it least - studies show that global warming has already decreased the wealth per person in the world's poorest countries by 17-30% ([Stanford](#)). But this susceptibility works both ways: 90% of the global population will experience reduced economic damages at 1.5°C (compared to 2.0°C), with poorer countries benefiting most ([Nature](#)).

**FOOD AND WATER SECURITY: Climate change and population growth will strain our food systems, but adaptation is within reach.**

If greenhouse gas emissions continue on their current trajectory, yields could fall by 35 percent by 2100, while global demand for food could nearly double by 2050 ([Columbia University](#)). Nonetheless, adaptation to the level that fully mitigates climate-related losses in food availability is possible, and financial costs of food system adaptation are relatively low. Estimated global costs of agricultural adaptation to 2050 are in the order of \$7 billion per year ([University of Copenhagen](#)).

**ECONOMIC IMPACT: Effective mitigation and adaptation means trillions in savings for the global economy.**

Climate change costs 1.6% of US GDP today and that number is expected to double by 2030 ([BOA](#)). But significant economic opportunity still exists. Keeping global warming to 1.5°C, as opposed to 2.0°C, could save more than twenty trillion dollars around the world by the end of the century ([Nature](#)).

## Appendix D. Agrifood Primer Landscape Assessment

Please proceed to following page.

## AGRIFOOD INVESTING PRIMER LANDSCAPE ASSESSMENT

2021.11.1

### Erb Team Focus Areas

User	Title	URL	Author	Author_Role	Description - Objective	Bricks	Intended Use of Brick
Investors interested in sustainable food and ag investing across all different asset classes	Impact Investing In Sustainable Food an Agriculture Across Asset Classes	<a href="https://www.wocan.org/sites/default/files/Investing-in-">https://www.wocan.org/sites/default/files/Investing-in-</a>	Croatian Institute	Nonprofit focused on building social equity and ecological resilience through leveraging donors and nonprofits about	Generally this is more about activating the whole portfolio and focusing a lot on asset classes but has a couple interesting tidbits.	1) Have IDed 5 different "impact areas" within the space that investors currently pursue. 2) They have an ESG sustainable investing themes venn diagram 3) breaks out opportunities by asset class	Use the impact areas to bucket problems/solutions. Use the venn diagram to help inform problem area overlap
Philanthropy/Impact Investing	Investing to Strengthen the Good Food Supply Chain	<a href="https://drive.google.com/file/d/1-">https://drive.google.com/file/d/1-</a>	Arabella Advisors	advises left-leaning donors and nonprofits about		1) Good Food System requires culture, infrastructure & policy 2) ID'ed Sustainable Ag; Sustainable Seafood; Healthy	Use for problems/solutions and potentially investment ideas
Policy Makers & Investors	The right to food and responsible investment in agriculture and	<a href="https://drive.google.com/file/d/1-">https://drive.google.com/file/d/1-</a>	FAO of the UN	it's the UN		1) Direct linkages between responsible investment in agriculture and the realization of the right to food 2) Lays out some principles to ensure responsible	Themes to keep in mind when considering the people side
Private Capital Owners	Unlocking Investments in Regenerative Agriculture	<a href="https://static1.squarespace.com/">https://static1.squarespace.com/</a>	CREO Syndicate	CREO is a 501(c)3 and CapShift competitor platform.	Regenerative ag focus. Starts with scene-setting definition and importance of regen ag as we do.	1) Five investment categories outlined, plus investment opportunities (i.e., funds and companies) in those categories	See point (5) especially. General awareness. Compare to what we do to avoid duplication.
Institutional Investors	Investing in the agriculture value chain	<a href="https://www.nuveen.com/en-">https://www.nuveen.com/en-</a>	NUVEEN	Asset manager and wholly owned subsidiary of	Value chain description and builds the case for investing in this space	1) Outlines why agrifood investments are attractive 2) Another good agriculture value chain diagram	Value chain diagram as example for us. Consider including a section on why agrifood attractive space.
Private Capital Owners	Real Assets Primer (2015)	<a href="http://www.sonencapital.com/wp2">http://www.sonencapital.com/wp2</a>	Sonen Capital		Impact investing-focused piece with subsection on agrifood	1) Highlights stability provided by real asset investments 2) Interesting viz on p.12 covering drivers of returns in farmland	Consider adding piece on stability from real assets in agrifood
Impact Investors	What Drives Impact Investing in the Food and Agriculture Sector?	<a href="https://www.bridgespan.org/insights/">https://www.bridgespan.org/insights/</a>	Bridgespan		Importantly hig	- Highlights potential misalignment between motivators (e.g., increasing smallholder farmer market access could increase GHGs)	
Private Capital Owners	Private Capital Solutions for a Sustainable Food System in the US	<a href="https://www.fiduciarytrust.com/c">https://www.fiduciarytrust.com/c</a>	Fiduciary Trust International/Gratitude Railroad		Heavily weighted towards a focus on land-based ag (specifically regenerative) but still useful report for generating ideas on	1) Good data points on the harmful effects of the food system 2) Also has some solutions mapped to problem areas	1) Comb for harmful effects to add to our problem matrix
Impact Investors	Understanding Impact Performance: Agriculture Investments	<a href="https://theqiin.org/assets/UnderstandingInvestments">https://theqiin.org/assets/UnderstandingInvestments</a>	GIIN	GIIN envisions a world where all investments take	This report is more about what impact investing is happening in agrifood – less about motivating people to invest in	1) Impact framework (for CapShift generally? Does Jordana know about this?) 2) Ties to motivators and ag sectors pp.28-29	
Wide Spread	Investing in Regenerative Agriculture across Asset Classes	<a href="https://croataninstitute.org/soilwe">https://croataninstitute.org/soilwe</a>	Croatian Institute		[not vetting this one deeply as we've already dug into regen ag]		
Wide Spread	So, You're Thinking of Investing in Regenerative Food Systems...	<a href="https://conservationfinance.net/">https://conservationfinance.net/</a>	CONSERVATION FINANCE NETWORK		[just a recap of the Croatian Inst. regen ag piece, with examples]		
Wide Spread	INVESTING TO SCALE REGENERATIVE AGRICULTURE: A PATHWAY	<a href="https://cornerstonecapital.com/investing-to-scale-regenerative-agriculture-a-pathway">https://cornerstonecapital.com/investing-to-scale-regenerative-agriculture-a-pathway</a>	Cornerstone Capital Group		[not vetting this one-hour video deeply as we've already dug into regen ag]		
Wide Spread	Transforming Food Systems The Power of Integrating Grant and Investment Capital	<a href="https://swiftfoundation.org/wp-">https://swiftfoundation.org/wp-</a>	Swift Foundation		References Croatan and SSIR risky capital bit from first primer	1) They use photos and names of actual people helped	
Impact Investing	Cultivating Change: Why Agriculture Needs Impact Capital	<a href="http://maximpactblog.com/cultiva">http://maximpactblog.com/cultiva</a>	MAXIMPACT	Consulting group	Overview of recent investment into agriculture, discussion of why that investment didn't reach the right places,	Really good framing of why the recent investment in ag didn't reach those who really need it, the smallholders (see the tapping potential of the ppor smallholder section)	Points to \$450b in capital needed to help smallholders connect with global market place which brings all
All Investors - Institutional, Foundations, Governments, NGO's, etc.	Principles for Responsible Investment in Agriculture and Food Systems	<a href="https://www.wfao.org/3/au866e/au">https://www.wfao.org/3/au866e/au</a>	Committee on World Food Security	FAO subgroup	(1) Addresses the core elements of what makes investment in agriculture and food systems responsible, identify key	Sort of reads like SDG's, principles that could be helpful for aligning impact but a little high level.	I did like this quote - " Financial institutions are encouraged to develop innovative financial
Private Capital Owners	Sustainable Investment in Land, Agriculture, and Food Systems	<a href="https://ccsl.columbia.edu/content/">https://ccsl.columbia.edu/content/</a>	Columbia Center on Sustainable Investment	Think tank	Collection of links related to investing in land, ag & food systems. Many are just trying to sell you on there trainings /	Most useful links: (1) <a href="#">Food sector and sustainable development goals</a> , (2) <a href="#">Innovative Financing Solutions for Community Support in the Context of Land Investments</a>	(1) Frames sustain. ag around SDG's which people love, note larger report is in development. (2)
Impact Investing	Investing in Sustainable Agriculture	<a href="https://waiterschindler.com/sustai">https://waiterschindler.com/sustai</a>	Walter Schindler	Thought Leader	Introduction to sustainable agriculture and landscape of investing in future sustainable ag developments	Bullets in the Global Capital Investment Allocation section and Product, Projects & benchmarks sections (last 2 sections)	Useful if we decide to frame around asset class/risk tolerance/time horizon/check size david mentioned
Governments, private capital owners	Responsible Agricultural Investment: Knowledge into Action Series	<a href="https://www.worldbank.org/en/to">https://www.worldbank.org/en/to</a>	World Bank	International Bank	Provides evidence-based advice on the implementation of responsible agricultural investment	Links to a ton of evidence based research on specific topics related to responsible ag investing (monitoring investments, water management, empowering women, etc.)	This will be a good place to go to pull out data and research related to specific topics
All Investors - Institutional, Foundations, Governments, NGO's, etc.	Responsible Agricultural Investment	<a href="https://agrifood.net/committee-on-">https://agrifood.net/committee-on-</a>	UN Committee on World Food Security	FAO subgroup	Links to drafts of RAI - seems like an outdated version of the Principles for Investment... in row 22	"The private sector is already the biggest engine of poverty reduction and economic growth in the developing world. On average, business provides 60% of GDP, 80%	Stat may come in handy
Wide Spread	The Global Syndemic of Obesity, Undernutrition, and Climate Change: The Lancet	<a href="https://www.thelancet.com/com">https://www.thelancet.com/com</a>	The Lancet			<a href="https://www.thelancet.com/journals/lancet/article/PIIS0140-6736(2018)2932822-8/fulltext">https://www.thelancet.com/journals/lancet/article/PIIS0140-6736(2018)2932822-8/fulltext</a>	
Super High Net Worth Individuals, Foundations	Investing to Strengthen the Good Food Supply Chain	<a href="https://www.arabellaadvisors.co">https://www.arabellaadvisors.co</a>	Arabella	Advisor	Article highlights opportunities across 5 areas of the 'good food' supply chain	The five investment opportunities, so pages 2-7	This is basically a food focused version of how we could present our findings

Super High Net Worth Individuals, Foundations	<b>Good Food</b>	<a href="https://www.arabellaadvisors.co">https://www.arabellaadvisors.co</a>	Arabella	Advisor	<a href="#">Overview of Arabella's food focused project. Appears to be aimed at connecting our target audience with impact investments</a>	Framing of the problem is done in a very accessible way	In case we want to use it as an idea for some language
Super High Net Worth Individuals, Foundations	<b>Good Food For All</b>	<a href="https://www.arabellaadvisors.co">https://www.arabellaadvisors.co</a>	Arabella	Advisor	An Assessment of Food System Efforts in the Chesapeake Bay Watershed	Setup for each problem: Intro, Current Strategies and Initiatives, Challenges and Gaps	Hyper local example of a way we could structure our report
Super High Net Worth Individuals, Foundations	<b>Funding the Foodshed</b>	<a href="https://www.arabellaadvisors.co">https://www.arabellaadvisors.co</a>	Arabella	Advisor	Assessment of Funding Levels, Priorities and Opportunities in the Chesapeake region	Figure 1 - What size annual food funding portfolios do regional funders have Figure 5 - What strategy are food funders using	Could adapt this to show the investors what investment level is necessary for each solution we
Everyone	<b>Investing in Alternative Protein</b>	<a href="https://gfi.org/investment/">https://gfi.org/investment/</a>	Good Food Institute	Think Tank / Incubator	Overview of the alternative protein landscape	Investment summary, State of Industry reports, Market assessment for plant based food (see 'Plant based retail market' link)	Lots of good data here specifically focused on investing in plant based food
HNWI / Family Offices	<b>Understanding Impact Investing for Families</b>	<a href="https://clearingcustody.fidelity.co">https://clearingcustody.fidelity.co</a>	The Impact	Nonprofit	Basic overview but includes different asset classes families can invest in with a few food/ag call outs	Example food/ag investments across asset classes	In case we want to use for our examples
HNWI / Family Offices	<b>Impact Investing: Mapping Families' Interests &amp; Activities in 2020</b>	<a href="https://uploads-ssl.webflow.com/swiftfoundation.org/wp-">https://uploads-ssl.webflow.com/swiftfoundation.org/wp-</a>	The Impact	Nonprofit	Calls out families impact investment trends for investment interest and gaps	"The most significant areas of unmet investor interest are Base of the Pyramid Services, Water Investments, and Agriculture and Food". Investors are looking for more	Proof that in 2020, impact investors cared about food & ag but either had knowledge gaps or lack of
Foundations	<b>Investing in Food Systems: Gaps in Capital, Analysis and Leadership</b>	<a href="https://uploads-ssl.webflow.com/swiftfoundation.org/wp-">https://uploads-ssl.webflow.com/swiftfoundation.org/wp-</a>	The Swift Foundation	Nonprofit	Primer/motivator to get foundations to invest in food & ag	Current investment supports industrial farms	Farmer livelihood