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WORKING PAPER

Sustainable behavior in climate pledges: An analysis of top emitters' strategies

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CONTENTS

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HIGHLIGHTS

- This paper is the first to analyze if and how countries are using their nationally determined contributions (NDCs) to shift citizens toward more pro-climate behavior changes.
- We find that only three of the most impactful behavior changes (of nine identified) are consistently included in NDCs by at least half of the 20 highest-emitting countries: encouraging electric or hybrid vehicle purchases, increasing public transport use, and reducing household energy use by insulating homes or switching to energy-efficient appliances.
- Decreasing air travel and adopting sustainable diets are impactful climate actions overlooked in NDCs, with no countries addressing air travel and only one country mentioning sustainable dietary changes. In terms of specific behavior change tools or strategies, NDCs most frequently mention changing the decision-making context by improving infrastructure or service provision. These are impactful changes, but more extensive use could be made of additional behavior change tools such as incentives and enhanced or personalized information provision (e.g., eco-labels), or multiple tools in combination.
- To support pro-climate behavior change, countries should increase their focus on air travel and food-related behavioral changes and leverage a wider range of behavior change tools in their NDCs.

EXECUTIVE SUMMARY

Context

In 2015, 196 countries signed the Paris Agreement, pledging to reduce greenhouse gas (GHG) emissions and prevent the worst impacts of climate change. Meeting this goal requires decreasing emissions by 43 percent by 2030. To realize this drastic reduction, each nation must submit NDCs, outlining their plans to cut emissions and adapt to climate change. NDCs explain how targets will be achieved and how progress will be monitored. Every five years, countries are required to review and submit more ambitious commitments to accelerate GHG emissions reductions.

Currently, NDC commitments fall short of achieving emissions reduction targets. The 2022 Intergovernmental Panel on Climate Change (IPCC) report indicates that, even if all current climate pledges are successfully implemented, the planet will fall short of Paris Agreement goals and is likely to reach between 2.4 and 2.8 degrees Celsius of warming by the end of this century (IPCC 2022).

In 2022, the IPCC emphasized an urgent need for greater consideration of pro-climate behavior change, estimating that comprehensive behavior changes could decrease GHG emissions by a further 40–70 percent by 2050 compared with current climate policies (IPCC 2022, 2023). However, changes must happen rapidly and at scale to realize these benefits.

Through the NDC process, member states can lay out policies that support sustainable behavior change (e.g., building electric vehicle charging infrastructure or providing subsidies for household renewable energy). Our analysis finds that some countries are indeed using the NDCs as a tool to support pro-climate behaviors. Specifically, three behaviors are consistently addressed by at least half of the countries in our sample: encouraging electric or hybrid vehicles, increasing public transport use to replace gasoline or diesel car usage, and reducing household energy use by insulating homes or switching to energy-efficient appliances. But we also find that many countries are not yet using NDCs to support behavioral shifts.

About this working paper

This working paper provides the first analysis exploring how countries are considering behavior change within their NDCs. We first outline nine of the most impactful behavior changes, or "Priority Practices," based on the research literature. These are behavior changes with the greatest potential to decrease GHG emissions within the food, mobility, and energy sectors. Next, we evaluate how countries' NDCs outline concrete actions to shift these behaviors.

We categorize existing actions into three broad groups according to the type of behavior change tool used: enhanced and personalized information; incentives (e.g., monetary or nonmonetary rewards); and improving the decision-making context (e.g., changing how choices are presented, removing barriers to desired behaviors, or altering the physical or built environment that surrounds an individual).

This paper is relevant to national governments, policymakers, academics, and nongovernmental organizations (NGOs) that are working to increase the ambition of NDCs, as well as those working to promote effective behavioral climate policies.

Key findings

We find that only three Priority Practices (of nine identified) are consistently included in at least half of the 20 highest-emitting countries' NDCs. These are in the mobility and energy sectors. They include encouraging electric or hybrid vehicle purchases, increasing the use of public transport to replace travel using gasoline or diesel vehicles, and reducing household energy use by insulating homes or switching to energy-efficient appliances. See Figure ES-1 for a country-by-country breakdown of policies, plans, actions, and targets in relation to each Priority Practice.

Figure ES-1 | **Comparison of key pro-climate behaviors (priority practices) in NDCs of the top 20 high-emitting countries**

	MOBILITY				FOOD		ENERGY			COUNTRY SCORE (%)
	Air transport	Road transport								
	Reduce air travel by increasing telecommunication or video-conferencing practices	Increase electric or hybrid vehicle use to replace journeys taken using gasoline or diesel cars	Expand use of mass transit, including public transport and car-pooling services	Replace journeys using gasoline or diesel vehicles with active mobility	Consume diets with reduced animal-based protein	Reduce consumer food loss and waste	Increase installation of residential rooftop solar	Replace stoves that require fossil fuels with clean stoves	Reduce household energy use by insulating homes or switching to energy-efficient appliances	
China	■				■					78
Mexico	■				■	c				67
United Kingdom	■		b	b		d	f	■		67

Figure ES-1 | **Comparison of key pro-climate behaviors (priority practices) in NDCs of the top 20 high-emitting countries, continued**

	MOBILITY				FOOD		ENERGY			COUNTRY SCORE (%)
	Air transport	Road transport								
	Reduce air travel by increasing tele-communication or video-conferencing practices	Increase electric or hybrid vehicle use to replace journeys taken using gasoline or diesel cars	Expand use of mass transit, including public transport and car-pooling services	Replace journeys using gasoline or diesel vehicles with active mobility	Consume diets with reduced animal-based protein	Reduce consumer food loss and waste	Increase installation of residential rooftop solar	Replace stoves that require fossil fuels with clean stoves	Reduce household energy use by insulating homes or switching to energy-efficient appliances	
Vietnam	■			■	■	d				56
United States	■				■		■			56
Indonesia	■		■	■	■	d				44
Canada	■				■	c	■	■		44
Turkey	■			■	■		■	■		44
South Korea	■			■	■	d		■		44
India	■			■	■	■	■			44
South Africa	■			■	■	■		■	g	33
Pakistan	■			■	■	■	■	■		33
Japan	■	a		■	■	e	■	■	■	22
Thailand	■			■	■	d	■	■	■	22
Saudi Arabia	■	■		■	■	■	■	■		22
Australia	■		■	■	■	■		■	■	22
Brazil	■	■		■	■	■	■	■	■	11
EU	■		■	■	■	■	■	■	■	11
Russia	■	■	■	■	■	■	■	■	■	0
Iran	■	■	■	■	■	■	■	■	■	0
% of countries with a policy	0	80	75	25	0	10	35	30	60	

Notes: a) Japan's NDC highlights promotion of next-generation automobiles, which are assumed to be EVs.

b) The UK NDC highlights the commitment to implement a sustainable travel hierarchy, where people make travel choices that minimize the long-term impacts on the climate; this ranks walking, cycling, public transport use.

c) Canada and Mexico have NDC entries relating to improved food waste management (but not reduction measures).

d) Vietman, UK, Indonesia, South Korea, Thailand, have policies that highlight the reduction in waste, but do not mention food waste specifically.

e) Does reference the 'Strategy for sustainable food systems' that highlight food loss and waste prevention.

f) The UK NDC states incentivizing small-scale low-carbon generation (which is assumed to be solar).

g) South Africa's NDC does have reference to increased provision of energy efficient lighting.

Source: WRI authors.

We find that the Priority Practices included in NDCs do not always align with the emissions reduction potential of candidate behavior changes. For example, while changing food-related behaviors can yield some of the highest GHG emissions reductions (including policies to reduce consumer food waste and support the adoption of sustainable diets), these changes are considered least frequently in NDCs.

NDCs most commonly promote behavior change by improving infrastructure and services—which can be powerful—but countries are not leveraging other tools like incentives or personalized information provision. For example, many countries plan to install electric vehicle charging stations to encourage adoption, but fewer mention providing tax breaks for purchasing electric cars. Only two of the nations included in our analysis mention using a combination of all three tools to shift behavior toward increased electric or hybrid vehicle use (e.g., building charging infrastructure and offering incentives on electric and hybrid vehicles and developing energy-efficient certification of vehicles to inform consumers about fuel efficiency).

Recommendations

To support pro-climate behavior change at scale, future NDCs should include detailed and well-funded policies that focus on country-specific, demand-side GHG emissions reductions. In particular, future NDCs should include behavioral policies that promote sustainable dietary shifts and reduce consumer food waste, since consumer behaviors within the food sector are currently the least frequently considered of all Priority Practices.

Countries should use the full range of behavioral tools available. Prior research indicates that providing incentives and employing multiple tools in combination can be very effective, yet these are currently underused in NDCs.

Because the relevance and impact of behavioral shifts are subject to regional and socioeconomic variation, it will be important for leaders who want to drive sustainable behavior change to consider their country- and population-specific cultural practices and emissions profiles when considering which behavioral tools to implement.

More broadly, to accurately evaluate how countries are using NDCs to encourage sustainable behavior change, we recommend continued monitoring to understand actions that are underway and their eventual impacts on GHG emissions. Monitoring could be incorporated into the United Nations' global stocktake and undertaken by NGOs and research institutions.

INTRODUCTION

Human behavior change is critical to solving the climate crisis.

The Intergovernmental Panel on Climate Change (IPCC) 2022 Working Group III report emphasizes that comprehensive policies, infrastructure, and technology could help citizens change their behaviors, reducing greenhouse gas (GHG) emissions by an additional 40–70 percent by 2050 compared with current climate policies (IPCC 2022). However, to realize these benefits, these behavior changes must occur quickly and at scale. Nationally determined contributions (NDCs) provide a unique opportunity to achieve this scale.

As of 2024, 196 countries and member states had signed the Paris Agreement—a legally binding treaty to reduce GHG emissions to limit global temperature rise ideally to 1.5 degrees Celsius (°C), or well below 2°C, of warming. As part of this agreement, each signatory country must submit an NDC. As the agreement describes, each Party shall "prepare, communicate and maintain successive nationally determined contributions (NDCs) that it intends to achieve" (UNFCCC 2020).

NDC documents summarize efforts by each country to reduce its national emissions and adapt to the impacts of climate change. NDCs, therefore, act as a bridge linking global commitments to reduce GHG emissions with more detailed national plans (Den Elzen et al. 2019; Fransen et al. 2022). The United Nations Framework Convention on Climate Change (UNFCCC) clearly states that NDCs "are at the heart of the Paris Agreement and the achievement of its long-term goals" (UNFCCC 2020).

Participating nations must update their NDCs every five years, with the next update expected in 2025. Yet, the gap between current NDC commitments and what's needed to meet the Paris Agreement's temperature goals has been highlighted as an area of concern. Even if all current pledges are met, the 2022 IPCC report warns that warming could still reach 2.4–2.8°C by the end of this century (Londakova et al. 2021; IPCC 2022).

Given the potential of policies that change demand-side behaviors at scale, it is possible that integrating behavior change into NDCs would help us move toward a 1.5°C future. While some countries may have already introduced various behavior change policies that are not explicitly mentioned in their NDCs, our current analysis specifically highlights the opportunity to use NDCs as a platform for making commitments to support crucial pro-climate behavior shifts.

Including behavior change commitments in NDCs can help ensure that these efforts are well-integrated with other mitigation strategies, provide a framework for public accountability, and encourage international collaboration as countries can more easily identify opportunities for collective action and examples of international best practices to emulate.

Upstream versus downstream approaches to behavior change

Historically, behavior change efforts have focused on addressing individual behaviors such as encouraging people to bike instead of drive. These efforts can be conceived of as "downstream" approaches as they directly target individual agency and choice. They often take the form of educational initiatives such as popular media campaigns (Marteau 2023; Londakova et al. 2021); examples include in-store messages and consumer education campaigns to encourage people to buy more sustainable products (e.g., upcycled clothing, LED bulbs). However, downstream approaches do not change the behavior of earlier supply chain actors.

While it's important to target and motivate people to modify their own actions, relying solely on individual agency overlooks the important influence of the surrounding environment and institutional actors on human behavior. Behavioral science research has repeatedly demonstrated that our actions are largely driven by quick, unconscious, and intuitive modes of thinking that are automatically influenced by the context or situation in which a decision is made (Kahneman 2011). As a result, we must pay attention to both individual actors and the situation in which the individual is acting, which includes "upstream" influences from governments, institutions, and industry.

This paper defines "upstream interventions" as behavior change approaches that target the systems that govern the surrounding environment. Upstream interventions almost always involve industry or government actors leveraging their power to shape the broader system and influence practices throughout the supply chain. Examples of upstream interventions include changing policy to incentivize a particular course of action (e.g., providing subsidies) or developing supportive infrastructure to increase the ease and convenience of a certain behavior.

The upstream-versus-downstream distinction illustrates the diverse and layered drivers of behavior and highlights the need to use a range of behavior change tools to encourage action. As such, policymaking should aim to consider both the context that makes it possible, convenient, and low cost for people to make pro-climate choices and the approaches that are effective at increasing awareness, knowledge, and personal motivations to change (Whitmarsh et al. 2021; Chater and Loewenstein 2022). This paper takes into account how NDCs encourage both up- and downstream behavior changes.

Behavior change tools

This working paper considers a range of behavior change tools. Informed by the IPCC's 2022 Working Group III report, we present three streamlined categories of tools (from the IPCC's original eight).[1] These tools are described in Table 1 along with illustrative examples of how they might work in practice. Depending on how these tools are implemented, they may exert either an upstream or downstream influence, as follows:

- **Providing enhanced or personalized information**, which involves supplying individuals with information that is intuitive and easy to access (e.g., eco-labels); giving reminders and/or feedback that makes behavior observable (e.g., smart meters that tell you how much energy you are using); and communicating a norm (e.g., utility bills that compare your energy consumption to that of your neighbors).
- **Incentivizing and disincentivizing**, which involves leveraging monetary and/or nonmonetary rewards to make pro-climate behavior more attractive. These interventions might include subsidizing low-emission technologies or making less sustainable options less attractive through increased taxation. Nonmonetary incentives might include offering preferred parking spaces for bikes or electric vehicles (EVs).
- **Improving the decision-making context**, which involves promoting a behavior by changing how choices are presented (choice architecture) or altering the physical or built environment in which decisions are made (choice infrastructure). Improving the decision-making context includes the following: setting defaults (e.g., setting all government buildings to low energy temperatures); obtaining commitments (e.g., government leaders publicly committing to engaging in pro-climate behaviors); making behaviors easier (e.g., integrating a city's bike share scheme to work seamlessly with the bus and rail system or expanding protected bike lanes to make cycling more convenient and appealing).

While regulations typically fall outside of the traditional definition of a "nudge," this paper looks beyond nudges to all policies and practices that influence end-use behavior. Therefore, "improving the decision-making context" also includes regulations that restrict or ban businesses from offering certain options before they reach the consumer, such as preventing the sale of gasoline and diesel vehicles.

Table 1 | **Behavior change tools and illustrative downstream versus upstream examples**

BEHAVIOR CHANGE TOOL	DOWNSTREAM INTERVENTION EXAMPLES	UPSTREAM INTERVENTION EXAMPLES
Providing enhanced or personalized information	Public awareness campaigns promoting meatless Mondays in schools and hospitals	Policies that require products to include carbon-footprint labels
Incentivizing and disincentivizing	Loyalty programs rewarding purchases of sustainable products	Congestion pricing to disincentivize car use; subsidies to incentivize purchases of energy-efficient appliances or renewable-energy installations
Improving the decision-making context	Placing meat alternatives in eye-catching areas; providing designated/priority parking spaces for car-sharing schemes or hybrid/electric vehicles	Urban planning that prioritizes walkable areas and public transportation

Source: WRI authors.

ABOUT THIS WORKING PAPER

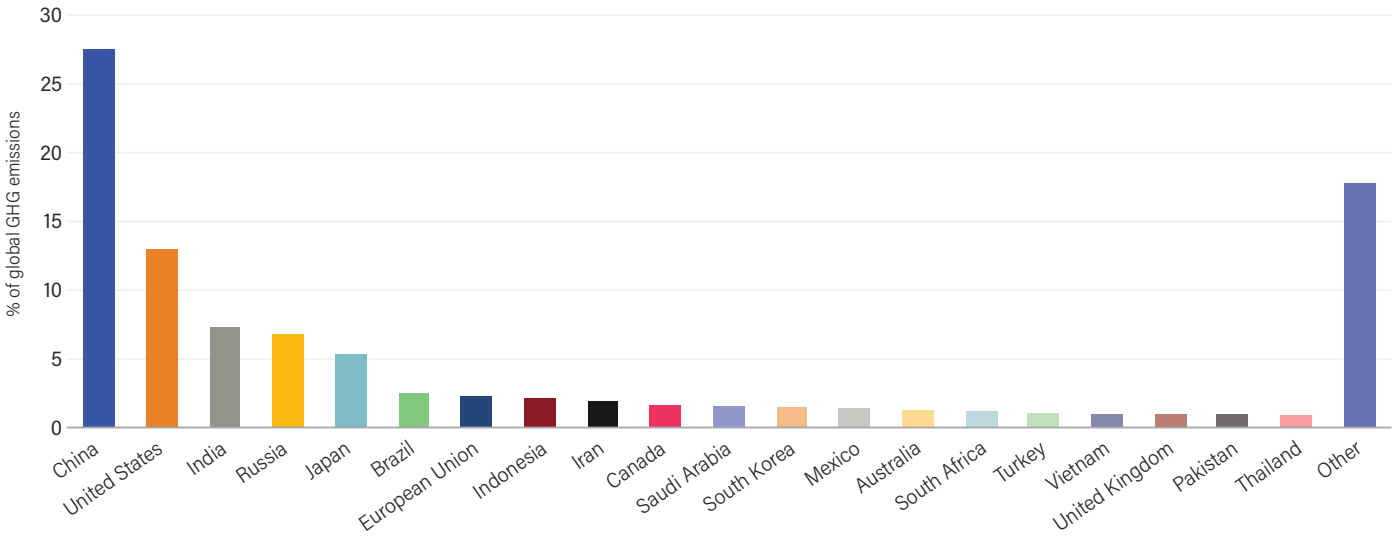
This working paper explores the extent to which those nations that are responsible for the majority of the world's GHG emissions are supporting sustainable behaviors via their nationally determined contributions.

Our analysis focuses on the top 20 highest-emitting countries in 2019 (see Figure 1), which collectively represent 82 percent of global GHG emissions. Three countries—China, the United States, and India—account for nearly half of this total (47 percent).

Identifying "Priority Practices"

In 2019, the energy (i.e., electricity and heat),[2] transport, and agriculture sectors accounted for 60 percent of global GHG emissions, with electricity and heat generation responsible for 31.8 percent, transport for 17 percent, and agriculture for 11.6 percent of global emissions (Climate Watch 2022). Focusing specifically on the future potential of demand-side mitigation strategies,[3] researchers have estimated that potential emissions reductions within these sectors are significant.

Figure 1 | **Top 20 highest-emitting countries ranked in order of gross GHG emissions released in 2019**



Notes: These estimates include the greenhouse gases covered under the Kyoto Protocol (methane, carbon dioxide, nitrous oxide, and fluorinated gases). The 27 member states of the European Union have been considered collectively. Emissions represent total emissions excluding land use, land-use change, and forestry. GHG = greenhouse gas.

Source: Climate Watch n.d. For further details on the data sources and methodologies used by Climate Watch to collate these estimates, see Climate Watch, "Climate Watch Country Greenhouse Gas Emissions Data Method Note," World Resources Institute, last updated May 13, 2022, https://wri-sites.s3.us-east-1.amazonaws.com/climatewatch.org/www.climatewatch.org/climate-watch/wri_metadata/CW_GHG_Method_Note.pdf.

For example, by 2050, demand-side mitigation strategies within the transport sector have been estimated to reduce emissions by a possible 62 percent, saving 5.8 gigatonnes of carbon dioxide equivalent ($GtCO_2e$). For the food sector, mitigation solutions could provide further GHG reductions of 41 percent (6.5 $GtCO_2e$), and within the building sector they could reduce emissions by up to 78 percent (6.8 $GtCO_2e$) (Creutzig et al. 2022). Leveraging behavioral changes in these sectors will be critical for reaching collective emissions reduction targets.

To identify demand-side mitigation solutions with the greatest potential, we leverage on Project Drawdown's analysis (Hawken 2017), which presents a full range of mitigation solutions that have been assessed according to their emissions reduction potential if scaled by 2050. We have selected the solutions that focus on behavior change and fall within the top-emitting sectors.[4]

We refer to these solutions as "Priority Practices," which we describe below and outline in Table 2 along with illustrative examples of behavioral policies.

Food

To lower emissions from the food sector, shifting to diets with less animal-based protein and reducing consumer food waste are critical. Behavioral policies that help drive these shifts might include mandatory eco-labels on food packaging to inform consumers about the climate impact of their purchases, and initiatives to help families better plan their shopping to reduce over-purchasing of food that will subsequently go to waste.

Mobility

Increased use of public transport and greater active mobility, like cycling or walking, to reduce private car use are important for reducing GHG emissions within the mobility sector. Behavioral policies that could drive these shifts include introducing discounted bus and rail cards or supporting active mobility by developing infrastructure, like bike lanes, wider sidewalks, or green and well-lit walkways, or redirecting traffic away from routes that are popular with pedestrians and cyclists. When private vehicle use is unavoidable, increased use of electric or hybrid vehicles, instead of those powered by gasoline or diesel, is recommended. This shift can be supported through tax breaks and incentives on electric and hybrid cars as well as policies that ban the sale of new gasoline or diesel vehicles.

Energy

Within the energy sector, Priority Practices include helping consumers reduce household energy use by insulating homes and switching to energy-efficient appliances (e.g., heat pumps or smart thermostats), as well as shifting to home solar. Effective policies to change these behaviors might include government subsidies to reduce the initial cost to the consumer of installing solar panels, eco-labels on appliances to help consumers easily identify the most efficient products, and green loans to help homeowners invest in home insulation.

See Table 2 for further details.

Table 2 | **Priority Practices and corresponding illustrative NDC policies**

SECTOR	PRIORITY PRACTICES	ILLUSTRATIVE NDC POLICY
Food	Reduce consumer food waste	Launching national campaigns to help people better plan their shopping to reduce over-purchasing
	Consume diets with more plant-based protein (e.g., lentils, peas, beans, soy) and less animal-based protein (e.g., meat, dairy)	Incorporating sustainability considerations into national dietary guidelines to increase consumption of plant-based foods Adding eco-labels to food products to clarify their climate impacts and encourage more informed decision-making
Mobility	Increase use of electric or hybrid vehicles to replace journeys taken using gasoline or diesel cars	Allowing electric vehicles to use bus lanes or other vehicle lanes that have restricted access
	Increase use of mass transit through the following: 1. Use of public transport, such as metro, rail, tram, and bus, to replace journeys using private transportation 2. Car-pooling services to replace single-occupancy car use	Providing discounted bus and rail cards to incentivize uptake of public transport

Table 2 | **Priority Practices and corresponding illustrative NDC policies, continued**

SECTOR	PRIORITY PRACTICES	ILLUSTRATIVE NDC POLICY
Mobility, continued	Replace journeys using gasoline or diesel vehicles with active mobility options, such as walking or cycling	Developing infrastructure to support active mobility, such as by creating bike lanes and wider sidewalks, or redirecting traffic away from routes popular with pedestrians and cyclists
	Reduce air travel by increasing telecommunication or video-conferencing practices	Introducing workplace policies in government agencies that encourage teleworking or discourage business flying
Energy	Reduce use of stoves that require fossil fuels and biofuels by replacing them with clean cookstoves	Establishing community health worker visits to introduce clean cookstoves along with subsidized clean stoves
	Reduce household energy use by insulating homes and switching to energy-efficient appliances such as heat pumps and smart thermostats	Adding energy-efficient labelling to appliances to inform consumer choice
	Increase installation of residential solar panels to reduce energy use generated from fossil fuels	Introducing payment schemes whereby households are compensated for surplus electricity generated from residential solar panels fed back into the national grid

Source: WRI authors.

Regional and income variations

It's important to note that regional and national emissions differ due to country-level variations in climate, infrastructure, income, and socioeconomic factors. Consequently, the extent to which our proposed Priority Practices reduce GHG emissions will vary significantly across countries. For instance, transitioning from a meat-based to a more plant-based diet will yield greater emissions reductions in countries with high meat consumption (e.g., Spain or the United States) compared with countries with lower meat consumption (e.g., India).

Moreover, within-country variation will also influence the impact of behavioral shifts on GHG emissions. In India, for example, the richest 5 percent of the population consumes 7.8 times more calories from animal protein than the poorest 5 percent (Sharma et al. 2020). When making policy decisions concerning behavior changes, it is essential to consider these country- and population-specific cultural practices and differences in emissions profiles.

APPROACH AND METHODOLOGY

Scope

Our analysis focuses on the 20 highest-emitting countries (Figure 1).[5] To determine emissions levels, countries are ranked according to their total annual GHG emissions reported in 2019, based on estimates from Climate Watch.[6] While other more recent estimates are available, we chose to use these estimates as they are comprehensive and incorporate different GHG gases and sectors.

This paper considers NDCs that were submitted up until September 2022. The NDCs included are updated first for countries whose first NDC contained a time frame up to 2032 and second NDCs for countries whose first NDC contained a time frame up to 2025.

NDC mitigation measures

To quantify the extent to which NDCs incorporate each Priority Practice, we extracted and coded NDC content. Our extraction process was based on data collected by Climate Watch, a data platform that has been used by previous World Resources Institute (WRI) reports to monitor the progress of NDC submissions (Fransen et al. 2022). Climate Watch categorizes sector-specific mitigation commitments cited in NDCs using a methodology adapted from the World Bank's NDC platform, which rates mitigation measures as falling under a specific sector or subsector, and as including sectoral plans, targets, policies, and actions.[7]

We filtered the NDC content according to sectors and subsectors that were relevant to each Priority Practice (listed in Table A-1, Appendix A). For instance, to address the behavior of "reducing use of fossil fuel stoves and replacing them with clean cookstoves," we focused on the energy sector, and further narrowed this down to specific subsectors: "demand-side efficiency," "clean cooking and heating—cleaner household

fuels," and "clean cooking and heating—efficient cookstoves." This ensured we weren't reviewing irrelevant information on, say, industrial energy usage.

Next, we reviewed the extracted text for each entry to determine if it related to a Priority Practice (e.g., to ensure the text was referring to the adoption of clean cookstoves and not simply discussing clean cooking broadly). Finally, to ensure the extraction process was thorough, we performed an additional keyword search within the Climate Watch NDC Explorer (see Table B-1, Appendix B).

Rating criteria

Criterion 1: Presence of an appropriate policy, action, plan, or target

To determine whether each individual country has a policy, action, plan, or target in place within its NDC that relates to the Priority Practices, we coded the extracted text based on existing categorizations by Climate Watch using the following rating system:

0 : No mention of a policy, action, plan, or target that relates to the Priority Practices

1 : The NDC mentions a Priority Practice in an action, policy, target, or plan, as defined below:

Action: The intention to implement specific means of achieving GHG reductions, such as projects or narrowly defined measures

Policy: A policy that is already in effect—policies, typically national legislation or high-level strategy documents, are larger in scale than projects

Plans: Broader than a specific policy or project, a plan could be a general intention to "improve efficiency" or "develop renewable energy"

Targets: The intention to achieve a specific result—e.g., to reduce GHG emissions to a specific level (a GHG target) or increase renewable energy to a specific level (a non-GHG target), typically by a certain date

It is important to emphasize that our analysis focuses on identifying whether actions, policies, plans, or targets are specifically mentioned within the NDCs. Our analysis does not, therefore, reflect the comprehensive presence or absence of such measures in a given country especially when they are not explicitly referenced in that country's NDC.

In our analysis, we included both upstream and downstream policies relating to Priority Practices. For upstream behaviors, we excluded those that do not influence individuals or households. This means that we included upstream behaviors relating to how businesses label products or services as these improve information provision for consumer decision-making. In addition, we included regulations that ban industry from selling a particular product, as these remove undesirable options from consumer choice altogether.

NDC entries that relate to shifting government procurement toward pro-climate products and services are outside the scope of our analysis. In addition, measures that target industry workers (who are not directly related to end-use service provision) are also out of the scope.

To calculate the total score for each country, we summed the scores across all nine Priority Practices and expressed the result as a percentage of the maximum possible score, which would be achieved if the country's NDC included policies supporting every Priority Practice.

Criterion 2: Assessment of behavior change tools

For our second rating criterion, we assessed the type of behavior change tool used:

- Providing enhanced or personalized information
- Incentivizing and disincentivizing
- Improving the decision-making context

Please refer to section "Behavior change tools" for a detailed description of each tool.

RESULTS AND ANALYSIS

Global analysis

Overall, we find that only a few of the world's highest-emitting nations are using their NDCs to support impactful, pro-climate behavior changes. Of the nine Priority Practices identified, only three are consistently addressed by at least half of these countries: encouraging electric or hybrid vehicles; increasing the use of public transport to replace gasoline or diesel car usage; and reducing household energy use by insulating homes or switching to energy-efficient appliances.

Two Priority Practices were particularly poorly addressed. Specifically, reducing business air travel through teleworking practices did not appear in the NDC of any country considered in our analysis, while promoting more sustainable diets was included in only 1 of the 20 highest-emitting countries' NDCs. Lack of inclusion represents a missed opportunity, although we do also recognize that some Priority Practices

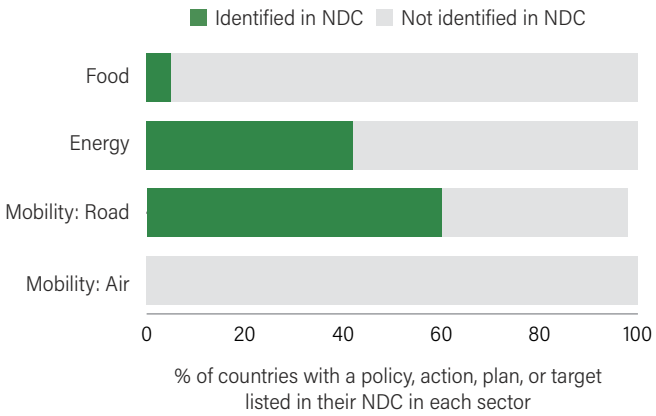
may not be relevant to all country contexts and that NDCs may not be the ideal instrument for outlining policies to address specific behavior changes.

Figure 1 shows a country-by-country breakdown of actions, policies, plans, or targets in relation to each Priority Practice. Figure 2 shows the extent to which each of the top 20 emitting countries includes Priority Practices in their NDCs.

Sectoral analysis

Overall, we find that Priority Practices are referenced most frequently in NDCs in relation to mobility and least frequently for food (see Figure 3). This suggests a missed opportunity, as dietary shifts can yield substantial emissions reductions.[8]

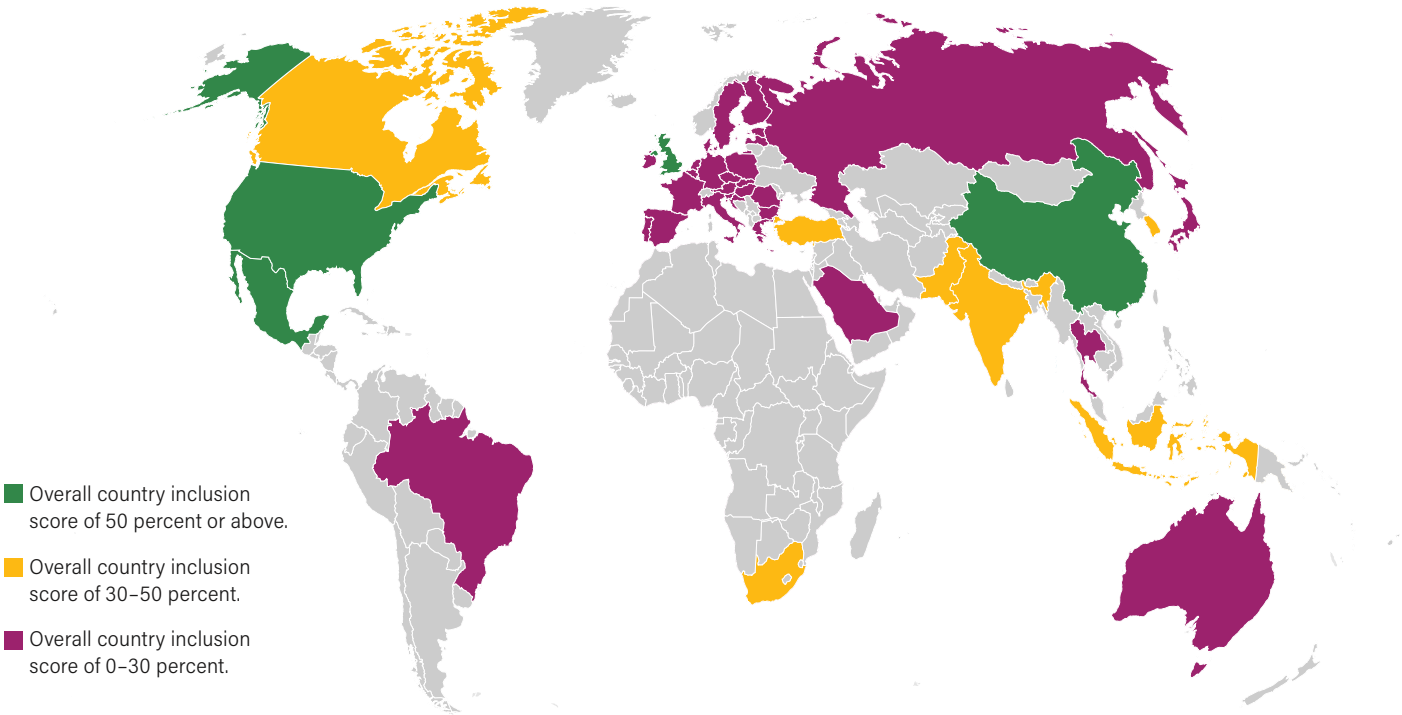
Figure 3 | **Percentage of the top 20 highest-emitting countries with NDCs that address Priority Practices by sector**



Notes: Estimates for the food sector were averaged across the Priority Practices of reducing consumer food loss and shifting to more plant-based diets. Estimates for the energy sector were averaged across the Priority Practices of expanding use of clean cookstoves, increasing installation of residential solar, and insulating homes and switching to energy-efficient appliances. Estimates for the mobility (road) sector were averaged across the Priority Practices of increasing mass transit use, activity mobility, and electric/hybrid vehicle use. NDC = nationally determined contribution.

Source: WRI authors.

Figure 2 | **Overall inclusion rates of Priority Practices in the NDCs of the 20 highest-emitting nations**



Notes: We calculated the overall country score by summing the presence of an appropriate policy across each of the nine identified Priority Practices and expressing this as a percentage of the maximum possible score that would be achieved if the country's nationally determined contribution (NDC) included policies supporting every Priority Practice.

Source: WRI authors.

Food sector

Priority Practices within the food sector are the least included of all sectors in the NDCs (see Figure 4).

A mitigation policy, action, plan, or target related to promoting more sustainable diets appeared in only 1 of the 20 highest-emitting countries' NDCs. This was the United Kingdom (UK), which states, "The UK is committed to delivering a sustainable food system, ensuring that everyone has access to nutritious and healthier food" (UKG 2022).

Similarly, a policy, action, plan, or target to reduce consumer food waste was mentioned in the NDCs of only two countries, China and Turkey. China's "empty plate" campaign aims to reduce food waste by drawing the public's attention to food security in the context of climate change. Turkey's NDC states that effective control of GHG emissions from agriculture has improved, and reducing food loss and waste is of critical importance.

Energy sector

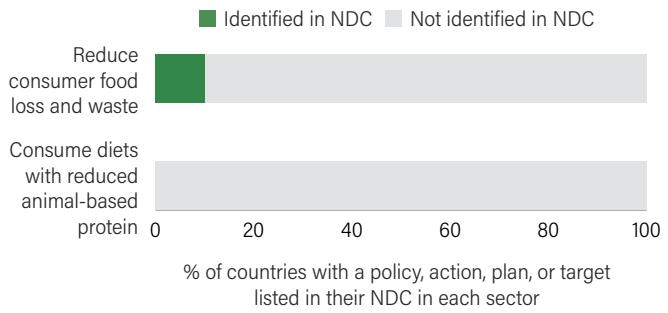
On average, NDCs address Priority Practices in the energy sector more consistently than in the food sector (see Figure 5).

Increasing household energy efficiency via energy-efficient appliances or improved insulation measures are the most frequently mentioned Priority Practices in the energy sector. These are noted in 12 out of 20 of the highest-emitting countries' NDCs. For example, Canada outlines its Greener Homes Grant initiative, which provides financial provisions for households wanting to retrofit homes. Saudi Arabia focuses on improving the efficiency of home appliances and air-conditioning units.

Policies that promote household renewable energy generation are listed in the NDCs of 8 of the 20 countries that we analyzed. For example, Indonesia outlines a commitment to develop solar rooftops in the residential sector.

Shifting households to clean cookstoves is included in six NDCs. For example, Vietnam has a commitment to increase the use of cleaner fuel for household cooking in rural areas.

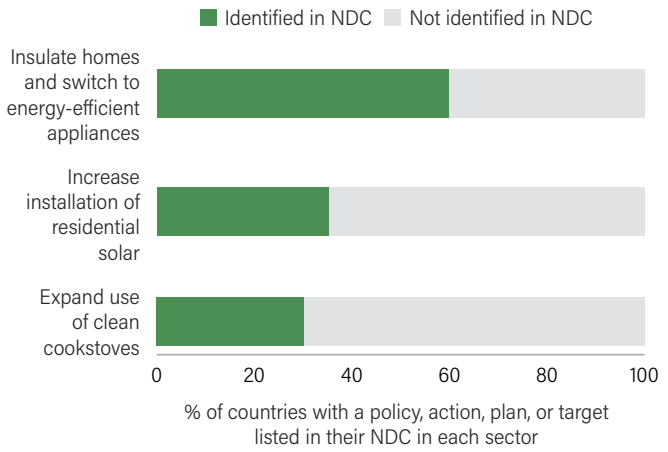
Figure 4 | **Percentage of the top 20 highest-emitting countries with NDCs that address Priority Practices in the food sector**



Note: NDC = nationally determined contribution.

Source: WRI authors.

Figure 5 | **Percentage of the top 20 highest-emitting countries with NDCs that address Priority Practices in the energy sector**



Note: NDC = nationally determined contribution.

Source: WRI authors.

Mobility sector

NDCs most consistently address Priority Practices within the mobility sector (see Figure 6). Sixteen of the 20 countries have entries that relate to increasing the use of EVs. For example, Pakistan's NDC outlines a target to ensure that all vehicle sales are electric by 2030 by establishing a recharging network and tax exemptions for hybrid and electric vehicles.

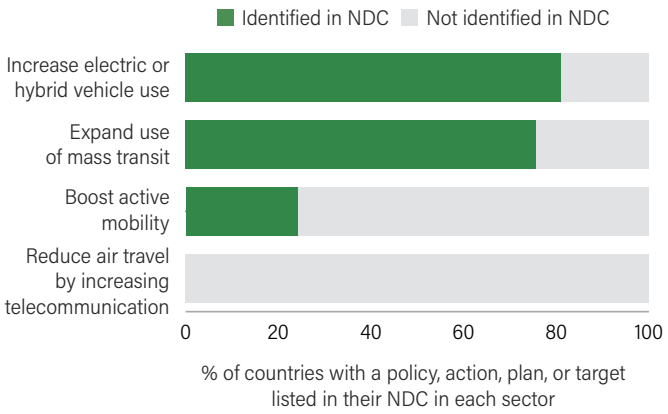
Fifteen countries have entries that relate to increasing the use of mass transit or car-pooling services. Japan's NDC highlights the country's focus on promoting public transport, including a modal shift to rail and improving national railway networks.

Entries that relate to increasing active mobility feature in five NDCs. For example, the United States has a commitment to invest in a wide array of transportation modes to facilitate greater choice for travelers, including developing cycling and pedestrian infrastructure.

Despite consistent coverage of entries relating to mobility shifts on land, behavior changes related to aviation are lacking. Reducing the number of business flights by replacing them with telecommunication[9] did not feature in any of the 20 NDCs.

The lack of focus on business travel in NDCs has two probable causes; first, business travel is not widespread in all high-emitting countries. A future analysis that looks at the highest-emitting countries on a per capita basis (rather than the nation as a whole) might find a stronger focus on business travel. Second, NDCs concentrate on areas under direct government control, like product labelling or renewable energy subsidies. Directly influencing business travel behavior is not commonly within government control, although

Figure 6 | **Percentage of the top 20 highest-emitting countries with NDCs that address Priority Practices in the mobility sector**



Notes: NDC = nationally determined contribution.

Source: WRI authors.

France's 2023 ban on short-haul flights (business and leisure) is one notable exception that provides an early policy example for other nations to emulate (de Bortoli 2024).

4.3 Behavioral tool analysis

The depth and scope of reporting within NDCs varies considerably across countries; some countries briefly mention a policy area, while others state in far more detail the tool or instrument through which the Priority Practice is encouraged.

We analyzed the type of behavioral tools that countries are integrating into NDCs based on available information. Overall, improving the decision-making context was the most frequently referenced behavioral tool in the NDCs. See Figure 7 for more detail.

Figure 7 | **Types of behavior change tools to encourage each Priority Practice listed in NDCs**

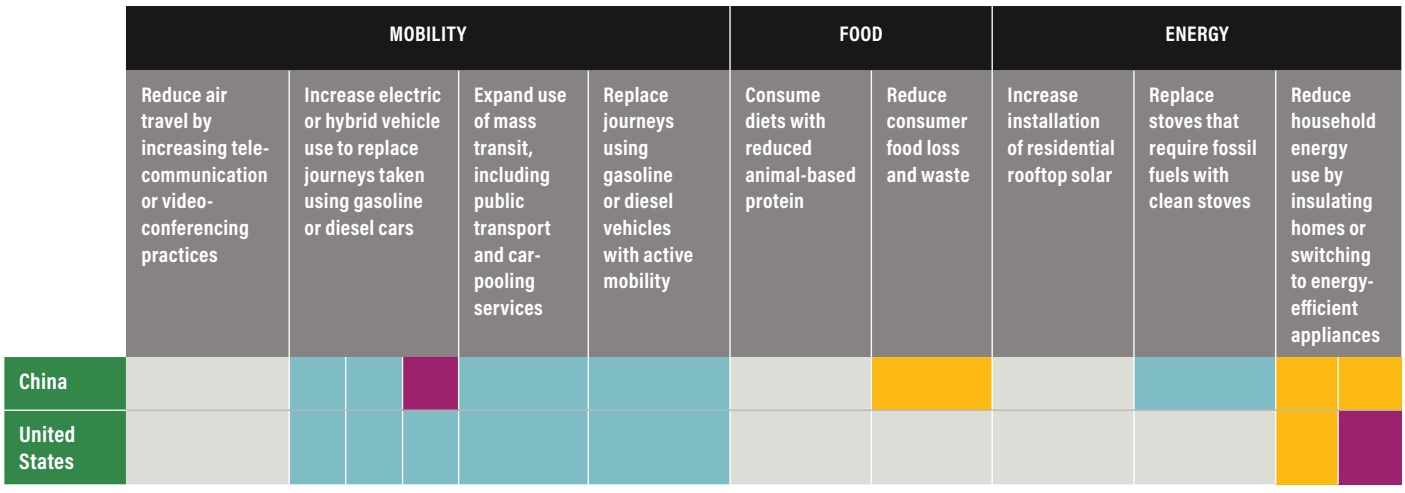
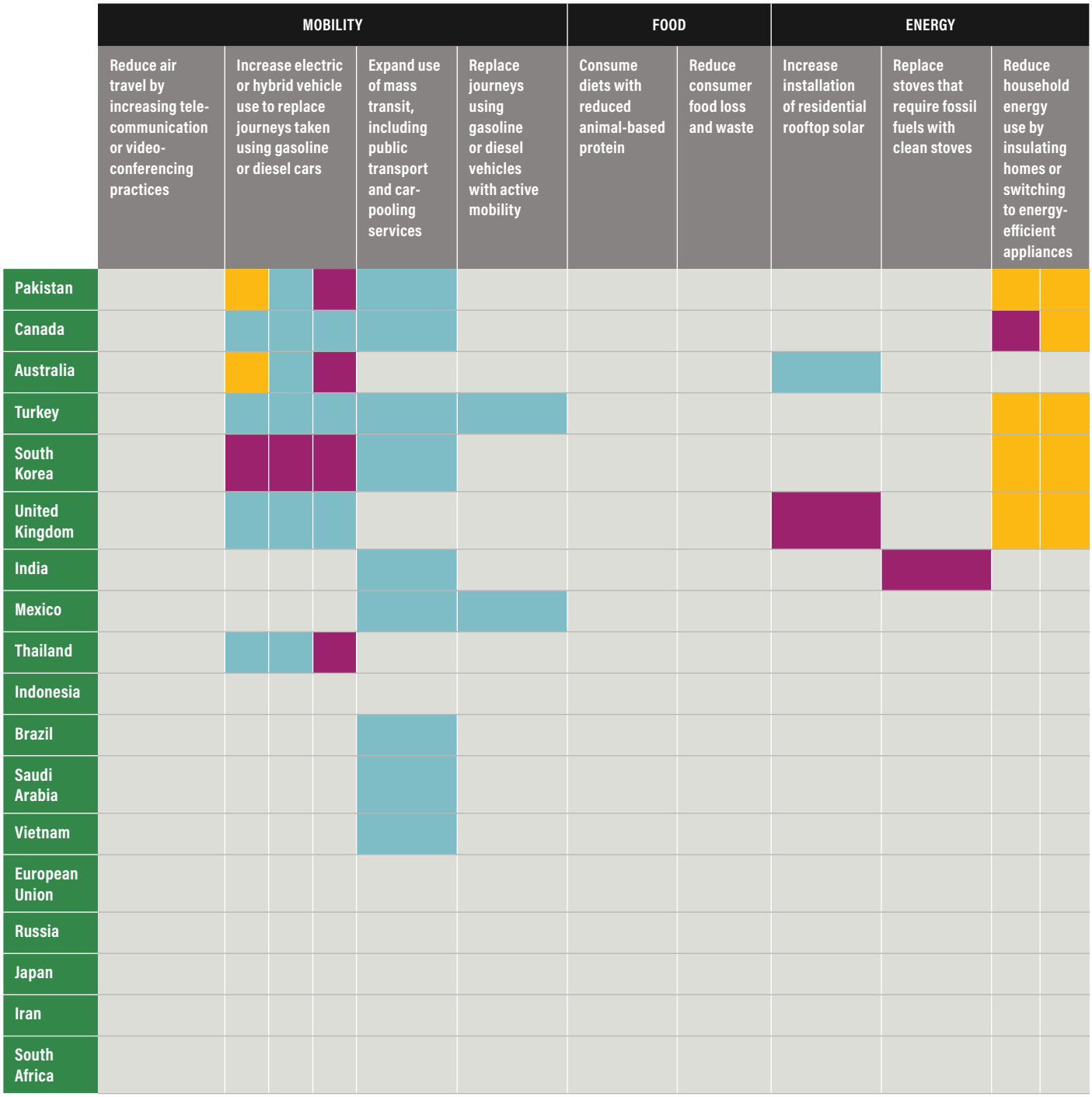


Figure 7 | **Types of behavior change tools to encourage each Priority Practice listed in NDCs, continued**



Notes: = inform; = incentive; = improve the context of the decision; = not enough available information. We ordered countries according to how consistently they describe behavior change, from most (at the top) to least. NDC = nationally determined contribution.

While the UK's NDC mentions sustainable consumption in agriculture, it does not refer to a specific behavioral tool and therefore is not represented in the food-sector columns in this table.

Improving the decision-making context

Changing the decision-making context was the most commonly used behavior change tool in the NDCs we analyzed. For example, in the energy sector, China's rooftop solar initiative creates an enabling environment for cleaner home cooking, and Australia's community batteries and solar banks policy improves the context for small-scale electricity generation.

In the mobility sector, countries focus on creating an enabling environment for EVs through battery charging infrastructure, investing in public transport, and promoting active mobility through bicycle lanes and pedestrian walkways. For example, Brazil, South Korea, and Pakistan all aim to expand or improve their public transport infrastructure to enhance the quality and convenience of mass transit, making it an easier, more attractive choice. The UK commits to ending the sale of gasoline and diesel vehicles, making EVs the default choice.

Interestingly, changing the decision-making context was the only behavior change tool included in the NDCs to promote shifts to mass transit and active mobility, underlining space for future NDCs to use additional tools in this critical area.

Incentives and disincentives

Countries are also using incentives and disincentives in their NDCs. In the energy sector, the UK's Renewable Heat Incentive scheme encourages small-scale solar generation by allowing residential solar units to feed surplus energy back into the grid and provides ongoing payments to participating households. India's "direct benefit transfer" scheme incentivizes consumers to choose cleaner fuel by automatically transferring subsidies into their bank accounts. In the mobility sector, the second-most-common tool to encourage a shift to electric or hybrid vehicles is providing incentives to reduce initial and ongoing operating costs for consumers.

Enhanced or personalized information

Providing enhanced or personalized information is the least common tool mentioned in the NDCs. In the energy sector, five countries introduce energy standard labelling for buildings and appliances to support consumer decision-making. In the mobility sector, Australia has established a real-world emission testing program to help consumers identify efficient vehicles more easily. The food sector has only one example, with China's policy to reduce consumer food waste via a national "empty plate" educational campaign.

Shifting behavior toward increased electric or hybrid vehicle use was the only behavior where any nations (Pakistan and Australia) mentioned using a combination of all three tools in their NDCs (e.g., building charging infrastructure and offering incentives on electric and hybrid vehicles and developing energy-efficient certification of vehicles to inform consumers about fuel efficiency).

LIMITATIONS

Limited scope

To focus on areas with the greatest potential for reducing emissions, this working paper considers the NDCs of only the top 20 highest-emitting countries. However, an analysis including all nations would yield a more comprehensive understanding of how the world is incorporating behavioral changes into their NDCs. Several lower-emitting nations have already included substantial behavioral policies. For instance, a recent analysis from WRI indicates that 55 NDCs, including those of Bangladesh, Malawi, Singapore, and others, already promote shifting from private vehicles to public transport (Kustar et al. 2022). In the food sector, Argentina and the Democratic Republic of the Congo have nominal mentions of transitioning their populations toward healthy, sustainable diets in their NDCs (FLUC 2022). Further exploration of behavioral policies in all nations' NDCs is a promising area for future research and would also help us understand equity in the distribution of these policies.

Data availability

Because we constrained our analysis to information listed in NDC documents, we did not capture actions that might be discussed in other materials or as part of other policy processes. As a result, this working paper may underrepresent actions being taken at the national level and may provide a conservative view of current efforts.

Global averages

We identified Priority Practices based on their average potential impact. However, the actual impact will vary across regions, depending on current behavioral patterns, population size, and regional differences in baseline GHG emissions. Future research should conduct more targeted and nuanced analyses to identify the most critical domestic behavioral shifts based on national emissions profiles and align these with existing NDC commitments.

Underlying causes of country-level differences

It was beyond the scope of our research to identify and analyze reasons for variation in countries' NDCs. For example, China leads in our analysis of countries' behavioral policies. Is this because of strong leadership at the national level, less

cultural resistance to behavioral policies, or a sense of urgency caused by local pollution levels? Such theories are speculative but represent a ripe area for future study.

Additional research needs

Considerations of equity and just transitions are crucial in developing effective behavioral policies. Future work should include these aspects when rating the behavior changes cited in NDC policies. Although beyond this paper's scope, future research should also examine how behavioral shifts impact both emissions and human well-being (for a detailed analysis of how just transitions have been incorporated into existing NDCs, see Fransen et al. [2022]).

Future research should investigate the cost-effectiveness of policies targeting the high-impact behavior changes that we have identified. Comparative analysis will help policymakers prioritize interventions that maximize GHG emissions reductions per investment while considering potential co-benefits, such as equity, well-being, and economic gains.

SUMMARY AND RECOMMENDATIONS

Overall, our analysis shows that some of the 20 highest-emitting countries are using their NDCs to drive key behavior changes in the energy, transport, and food sectors, but there is an opportunity to do more.

While eight of nine identified Priority Practices have been included in countries' NDCs to some extent, most have not been recognized within specific NDC commitments. Only three behaviors have been consistently included in NDCs by at least half of the highest-emitting countries: encouraging electric or hybrid vehicle purchase; increasing public transport use; and reducing household energy use by insulating homes or switching to energy-efficient appliances.

Electric or hybrid vehicle use is addressed frequently within the NDCs that we analyzed. However, even if all new vehicles sold were electric from now onward, it would still take well over a decade for EVs to replace all existing gasoline and diesel vehicles (Carlier 2021, 2022). Beyond electric cars, an immediate reduction in the number of miles travelled in private gasoline and diesel cars is also needed by increasing the use of mass transit and active mobility (Hill et al. 2019). Yet only 25 percent of the 20 highest-emitting countries have behavior change policies that encourage a shift toward active mobility.

Behavior changes within the food sector—notably, shifting diets away from animal-based proteins and reducing consumer food waste—are some of the most impactful solutions (Clark et al. 2020; Hawken 2017), yet these have been least consistently addressed within NDCs. As we have noted, the relative impact of shifting diets will depend on each country's baseline characteristics, but even so, only 1 of the 20 highest-emitting countries has so far included a policy addressing sustainable dietary shifts.

This mismatch between current policies and potential impacts within the food sector has started to be addressed following the 28th Conference of the Parties to the UNFCCC in the United Arab Emirates in 2023, where 159 countries (including 16 of the top 20 highest emitters) signed a Declaration on Sustainable Agriculture, Resilient Food Systems, and Climate Action. Within this, animal-based protein reduction is not specifically mentioned as a goal, but emphasis is placed on more sustainable consumption patterns (including intake of sustainable aquatic foods), in addition to a focus on reducing consumer food waste. Several national governments—including 1 of the top 20 highest-emitting countries, South Korea—have also already published national plans to encourage the adoption of plant-based diets. These publications provide road maps for dietary transitions that other nations can review and emulate, including as part of their NDCs.

We also find that countries are using behavior change tools to drive behavioral shifts, most notably by altering the decision-making context. This can be a powerful way to change behavior, but there is an opportunity to make behavior change easier and more likely by bringing more tools to the table. For instance, within the mobility sector, many countries focus primarily on improving infrastructure, such as building EV charging stations or expanding public transportation. While this is important, countries must also start to consider using additional tools, like tax incentives on electric and hybrid cars. Indeed, using a basket of tools may yield greater impact.

Recommendations

The recommendations below suggest ways that countries can strengthen their NDCs by introducing policies to shift to pro-climate behaviors. While some recommendations are universally applicable, others require careful adaptation based on context-specific factors.

Our analysis shows great variation in how Priority Practices have been reported within the NDCs, indicating that there is space for more extensive and consistent behavioral policy considerations. Ideally, policies should contain funding allocations and targets so that implementation can be measured. It is also important that behavioral policies are evidence based and supported by relevant research to indicate effectiveness when implemented at the national level (Hallsworth 2023). Some of the 20 highest-emitting countries have behavioral science units they could draw on for support, in addition to extensive bodies of country-specific literature

exploring the effectiveness of behavior change interventions and their relevance to national and international policy (Ategeka et al. 2022).[10]

Countries may be addressing priority practices through alternative mechanisms, which is important. But incorporating behavioral policies into NDCs, alongside existing efforts like national policies and industry regulations, can bolster climate action, ensuring a comprehensive, multifaceted approach that leverages the power of international commitments to drive change at all levels.

NDCs should consider both upstream and downstream behavioral policies to target the varied factors that influence people's choices and actions (Creutzig et al. 2022; Londakova et al. 2021; Chater and Loewenstein 2022). Policies should focus upstream on the context that makes it possible, convenient, and low cost for all citizens to shift to Priority Practices and downstream to increase awareness, knowledge, and personal motivations for change (Whitmarsh et al. 2021).

NDCs can increase their focus on encouraging dietary shifts and reducing consumer food waste. As we have noted, research indicates that shifting food behaviors could make a significant difference. Countries should assess their unique baseline conditions to determine if they are well-positioned for high-impact results in this area. If the potential for impact is high, robust policies targeting food behavior change should be a central focus within their NDCs.

In terms of reducing consumer food waste, higher-income countries could enact policies enabling smaller or customized portions when aligned with recommended serving sizes for nutritional health, particularly for energy-dense foods. Policymakers could also work with the industry to optimize "sell-by" labeling (Reynolds et al. 2019; Schanes et al. 2018). Campaigns to raise public awareness and interventions to optimize shopping, meal planning, and food preparation behaviors could further reduce over-purchasing. For lower-income countries, interventions might focus on improving home food storage practices and enabling access to appropriate storage facilities, including refrigeration, to maximize product life (Hanson et al. 2019; Simões et al. 2022).

In terms of shifting diets toward less animal-based protein, NDCs might aim to limit high-emissions food within their purview—for example, by decreasing the availability of animal-based products in public sector organizations, such as hospitals, schools, and prisons.

Countries should monitor how NDCs are tackling behavior change. To encourage more leaders to include behavioral support in their NDCs, it would be beneficial to monitor and showcase how countries are currently integrating behavior change policies into their climate commitments. This effort would align with and build upon existing United Nations (UN) guidance on leveraging behavioral insights, such as the "Secretary-General's Guidance Note on Behavioral Science" (UN 2023) and the United Nations Behavioral Science Report (UNIN 2021). Incorporating an assessment of behavior change policies into the UN's global stocktake process could be a particularly effective way of promoting their adoption and implementation.

New NDCs addressing behavior change should be adopted in line with a set of relevant guiding principles. We propose the following as countries move toward crafting improved NDCs that focus on Priority Practices:

- Identify the most important sources of their demand-side emissions and, from there, which Priority Practices to focus on to address them.
- Consider the multiple drivers of behavior and types of interventions that address these drivers. For example, consider all three behavioral tools—incentivizing or disincentivizing a course of action, providing enhanced or personalized information, and improving the context of the decision.
- Identify key actors (e.g., farmers, distributors, food industry providers, and consumers in the food sector) and consider policies and actions that target each of them.
- Consider both upstream and downstream policies and programs. Do not put undue burden on individuals to create change without ensuring that key behavioral shifts are available, accessible, and affordable.
- Track the implementation, progress, and impact of behavioral policies to isolate highly effective approaches and enable countries to learn from the successes of others.

CONCLUSION

Our findings reveal that some of the world's top greenhouse gas emitters are leveraging their nationally determined contributions to encourage meaningful, pro-climate behavior shifts. But we also find significant room for improvement.

As countries revisit their current NDCs and begin to craft new commitments, we hope leaders will focus on relevant, high-impact Priority Practices; use a range of behavioral tools; and consider the often-overlooked potential of dietary shifts and food waste reduction.

While some countries are using their NDCs to support critical behavioral shifts, there is room for growth and with that, the potential to steer the world toward a more resilient and sustainable future.

APPENDIX A. CLIMATE WATCH SECTORS AND SUBSECTORS CONSIDERED IN ANALYSIS

Table A1 | **Climate Watch sectors and subsectors considered in analysis**

SECTOR	SUBSECTOR
Agriculture	Agriculture: General
	Climate smart agriculture
	Livestock
Buildings	Buildings: General
Energy	Clean cooking and heating
	Clean cooking and heating: Cleaner household fuels
	Clean cooking and heating: Efficient cookstoves
	Demand-side efficiency
	Demand-side efficiency: Appliances
	Demand-side efficiency: Buildings
	Demand-side efficiency: Cities
	Demand-side efficiency: Industries
	Demand-side efficiency: Tourism
	Energy: General
	Energy efficiency
	Renewable energy
	Renewable energy: Off-grid
	Renewable energy: Solar, off-grid
Transport	Aviation
	Nonmotorized transport
	Public transport
	Rail
	Road sector
	Suburban rail
	Transit-oriented development
	Transport: General
	Transportation infrastructure
	Urban transport
	Vehicle fleet
Waste	Recycle, reuse, reduce
	Solid waste
	Waste: General

Source: WRI authors.

APPENDIX B. KEYWORD SEARCH TERMS

Table A2 | **Keyword search terms**

AREA	KEYWORD SEARCH TERMS
General behavioral policies	Behavior/behaviour, citizen, household, lifestyle, consumer, residential, demand, choice(s)
General policy instruments	Awareness, education, campaign, tax, taxation, congestion charge, incentive, attitude, recommendation
Sector: Food	Diet, meat, food, vegetarian, vegan, plant-based, protein, food loss, food waste
Sector: Transport	Bicycle, bike, pedestrian, passenger, car-pooling, car-sharing, automobiles, rail, bus, electric + vehicles, home work/home working, teleworking/telework/remote work/aviation/air travel
Sector: Energy	Appliance, lighting, refrigerator, labelling, heat pump, boiler, cooking, retrofit + residential, solar + residential, renewable + residential

Note: The tool we used to search nationally determined contributions can be accessed on the Climate Watch website: https://www.climatewatchdata.org/ndcs-explore.

Source: WRI authors.

GLOSSARY

behavior(s)
An action or set of actions carried out by an individual, directed by choices, attitudes, and the surrounding environmental and social context.

behavior change tools
Initiatives designed to modify a behavior or pattern of behaviors. We have categorized these into three groups that use similar psychological processes to shift behavior: incentivizing, informing, and improving the decision-making context.

climate change mitigation
In climate policy, mitigation measures are technologies, processes, or practices that contribute to mitigation, such as renewable energy technologies, waste minimization processes, and public transport commuting practices.

demand-side mitigation
A set of approaches that aims to reduce greenhouse gas emissions by decreasing the demand for goods and services that generate emissions, in contrast to supply-side solutions, which aim to reduce emissions by changing how energy and goods are produced. Demand-side mitigation can target individual behaviors or broader population-level consumption patterns.

downstream behavior change
Measures that promote behavior change by directly targeting an individual's choices and actions.

mobility
The ability of a person to move or be moved; transportation describes the act of moving a good or person. Mobility considers access to modes of transport so that places, goods, and services can be reached, and therefore focuses on people as well as infrastructure.

nationally determined contribution
A summary of a country's efforts to reduce its national emissions and adapt to the impacts of climate change. These are submitted every five years to the United Nations Framework Convention on Climate Change.

nudge
A type of intervention that alters the context in which a choice is made, known as the "choice environment" or "choice architecture," to promote a particular behavior while maintaining an individual's freedom of choice, such as moving plant-based foods to more visible positions in supermarkets to increase sales of these products. A tax, subsidy, mandate, or ban is not a nudge.

priority practice(s)
An action or set of actions required to achieve the greatest lowering of GHG emissions.

upstream behavior change
Measures that promote behavior change by modifying the surrounding system or context in which an individual makes choices and acts.

ENDNOTES

1. See IPCC (2022, 549). The complete list of eight tools includes the following: set the proper defaults, reach out during transitions, provide timely feedback and reminders, make information intuitive and easy to access, make behavior observable and provide recognition, communicate a norm, reframe consequences, and obtain a commitment. We add to this list incentives and disincentives, and ease.

2. This refers to carbon dioxide, methane, and nitrous oxide emissions from the main activity producers of electricity and heat, including electricity plants, combined heat and power plants, and heat plants.

3. We use the IPCC definition of demand-side mitigation as a set of approaches that aims to reduce GHG emissions by reducing the demand for the goods and services that generate them.

4. To be included in the Project Drawdown solution set, "technologies and practices must meet the following criteria: be currently available, growing in scale, financially viable, and able to reduce greenhouse gas concentrations in Earth's atmosphere. They also must have a net positive impact, and there must be sufficient data available to assess their potential." Further details can be found on the Project Drawdown website: https://drawdown.org/solutions/methods.

5. Using per capita emissions would also be a reasonable way to select our sample, but total emissions reflect the scale of impact on the global climate. Nations with large emissions have the greatest potential to drive change, and arguably, bear the greatest responsibility to act, particularly among the high-consuming segments of their populations.

6. Climate Watch is an online platform designed to empower policymakers, researchers, media, and other stakeholders with the open climate data, visualizations, and resources they need to gather insights on national and global progress on climate change. For more, see the Climate Watch website: https://www.climatewatchdata.org/.

7. Please note that in December 2023, Climate Watch updated its methodology for coding sectoral mitigation. It no longer uses the methodology from the World Bank's NDC platform and has introduced an updated list of subsectors. It also no longer makes the distinction between plans and actions, instead classifying entries as measures, targets, or policies.

8. We took the emissions reduction potential estimates from Project Drawdown's analysis of the amount of carbon dioxide equivalent that can be reduced/sequestered from 2020 to 2050 for each demand-side solution. The estimates are an average of the modelling based on 2°C and 1.5°C warming scenarios. For more, see "Table of Solutions" on the Project Drawdown website: https://drawdown.org/solutions/table-of-solutions.

9. Following the ranking in Project Drawdown, this analysis looks at business travel rather than air travel broadly.

10. For a list of these behavioral science units, see "Map of Behavioral Science Teams" on Behavioral Teams* website: https://www.behavioralteams.com/team-map/.

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ABOUT WRI

World Resources Institute is a global research organization that turns big ideas into action at the nexus of environment, economic opportunity, and human well-being.

Our challenge

Natural resources are at the foundation of economic opportunity and human well-being. But today, we are depleting Earth's resources at rates that are not sustainable, endangering economies and people's lives. People depend on clean water, fertile land, healthy forests, and a stable climate. Livable cities and clean energy are essential for a sustainable planet. We must address these urgent, global challenges this decade.

Our vision

We envision an equitable and prosperous planet driven by the wise management of natural resources. We aspire to create a world where the actions of government, business, and communities combine to eliminate poverty and sustain the natural environment for all people.

Our approach

COUNT IT

We start with data. We conduct independent research and draw on the latest technology to develop new insights and recommendations. Our rigorous analysis identifies risks, unveils opportunities, and informs smart strategies. We focus our efforts on influential and emerging economies where the future of sustainability will be determined.

CHANGE IT

We use our research to influence government policies, business strategies, and civil society action. We test projects with communities, companies, and government agencies to build a strong evidence base. Then, we work with partners to deliver change on the ground that alleviates poverty and strengthens society. We hold ourselves accountable to ensure our outcomes will be bold and enduring.

SCALE IT

We don't think small. Once tested, we work with partners to adopt and expand our efforts regionally and globally. We engage with decision-makers to carry out our ideas and elevate our impact. We measure success through government and business actions that improve people's lives and sustain a healthy environment.