



# Leaders Preserving Our Future

Pace and Priorities  
on Climate Change

**Insights Paper**  
November 2010

# Executive Summary

**This Insights Paper has been designed to accompany the World Preservation Foundation's (WPF) campaign on getting the domestic and international political communities to recalibrate their priorities on climate change. We have drawn extensively on established scientific studies to deliver a report which calls for greater focus to be placed on tackling shorter-lived climate forcers such as methane, black carbon and ozone emissions.**

Whilst acknowledging the important role of carbon dioxide (CO<sub>2</sub>) emissions in global warming, the WPF has arrived at the conclusion, informed by leading scientists, that tackling shorter-term climate forcers is indispensable to mitigating the threat of imminent climate tipping-points which could soon be breached as a result of human activity.

The report proceeds by addressing the environmental damage of these forcers, in relation to carbon dioxide, and then explores the important role of food production and the livestock sector in emitting such substances. It concludes by providing recommendations and discussing potential areas for government action which could both help make farming more environmentally-friendly and stimulate more sustainable modes of living on our planet.

The report's key points are as follows:

### **The importance of short-term climate forcers versus carbon dioxide emissions**

We discuss the way in which reducing carbon dioxide emissions has become the dominant political discussion on climate change abatement and the extent to which shorter-lived climate forcers like methane have been marginalised even though they have a much greater capacity to trap heat (this despite being less voluminous in the atmosphere).

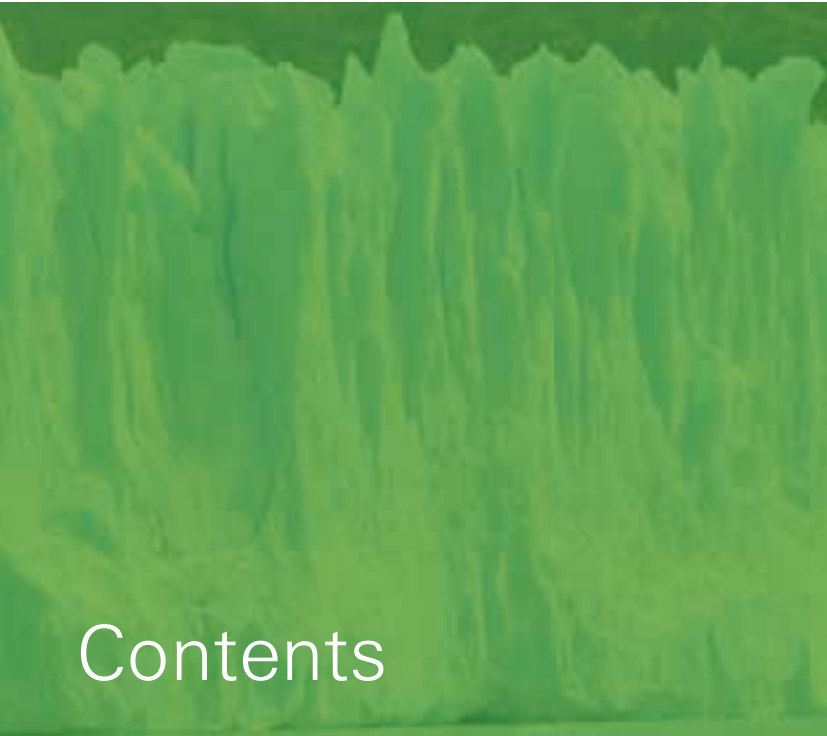
We also set out the need for nearer-term solutions to global warming, citing various reports which predict imminent climate tipping-points catastrophic to our ecosystems and which engender the need for action which will rapidly cool our planet now. Reducing those short-term forcers which are at the same time more intense in their global warming effect and more easily and swiftly eradicable is presented as the best strategy going forward.

### **Food production, farming and the environment: the environmental impact of the livestock industry**

We discuss the role of livestock farming and food production in contributing to the emission of methane, ozone, black carbon and nitrous oxide, as well their wider environmental impacts. We also consider the Committee on Climate Change's assertion concerning the UK's poor record in making farming more environmentally friendly.

### **Recommendations for change: more environmentally-friendly farming and living practices**

We provide recommendations for the way in which the UK government can assist in working with farmers, industry and consumers to encourage sustainable farming methods and healthier life-choices in line with recommendations to shift diets away from animal-based proteins towards plant-based foods capable of alleviating pressures on the environment.



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## Introduction

**The global warming debate is pre-occupied by talk of curbing carbon dioxide emissions and international negotiations which stall on the reductions being made by individual countries concerning the burning of fossil fuels.**

Yet, cutting carbon dioxide, by drives to increase our green economy and de-carbonise sectors in transport and power, simply does not take account of one compelling fact – it remains in the atmosphere for at least a hundred years and plans to lessen its abundance now do not match the more urgent timeframe in which we must bring the global temperature down.

Fortunately, there is an alternative solution. There are short-term climate forcers which, though less abundant in the atmosphere than carbon dioxide, have a disproportionately high effect in heating the planet. Methane, for example, has a much greater propensity to trap heat whilst also enjoying a lower half-life than carbon dioxide. If we could prioritise its reduction globally, rather than focusing solely on carbon dioxide, we could achieve quick gains in cooling the planet now (leaving carbon abatement strategies to fulfil their longer time-frame objectives).

Livestock raising (and the dietary patterns that drive it) is the one area immediately presenting itself as the significant realm in which action can be taken – a sector which, according to fresh studies, contributes over half of all human caused greenhouse gas emissions (GHGs) and for which there are viable alternatives and remedies.<sup>1</sup>

Reliance on livestock farming is also the primary cause behind global biodiversity loss and deforestation in the Amazon and South East Asian tropical rainforests and the production of livestock feed is also responsible for emitting other harmful greenhouse gases such as nitrous oxide found in fertilisers.

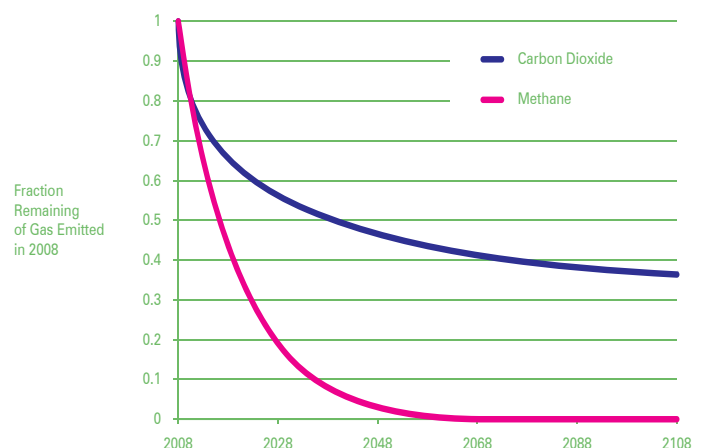
Decreasing our reliance on meat provides more than just significant environmental gains however. It also has enormous value in terms of its health benefits, given the nutritional strengths of plant-based foods.

Governments must play their part in this process and, as we set out in this Insights Paper, the compelling environmental and health arguments of our message should help resolve some of the global problems our politicians are currently grappling with.

What's more, the failure to act in this sphere will engender negative rather than neutral effects in terms of livestock farming's role in global warming. We are presently on course to double our global meat production by 2050, the ramifications of which would be to increasingly emit those very substances which have a disproportionately high immediate impact in warming a planet we have already said we are committed to cooling.

### Natural CO<sub>2</sub> and CH<sub>4</sub> Depletion – 100 years

Methane (CH<sub>4</sub>) vs CO<sub>2</sub> Depletion (from 2008) – showing the extent to which methane dissipates more quickly<sup>2</sup>



## The importance of reducing shorter-lived climate forcers

**The narrative on climate change and human-caused global warming is not new – world leaders have long debated the need for greater environmental stewardship of our planet and the Kyoto Protocol (1997) represents the most ambitious international attempt, so far, to bring greenhouse gas emissions under control.**

However, the political consensus, at both the domestic and international level, is out of touch with emerging scientific realities which call for both nearer-term solutions to climate change (and criticise the array of overly long target dates for reducing emissions) and a change of tack on the actual warming agents which are being targeted for reduction from our atmosphere. Studies such as *Improved Attribution of Climate Forcing to Emissions*, written by climatologists Drew Shindell, Greg Faluvegi, Dorothy M. Koch, Gavin A. Schmidt, Nadine Unger and Susanne E. Bauer, have found that the interaction of different greenhouse gases to aerosols in the atmosphere alters their relative importance in the process of global warming.<sup>3</sup>

Specifically, the Shindell study found that methane, which comprises approximately 8 per cent of the total greenhouse gases in the atmosphere, is affected by its interaction with aerosols to such an extent that it rises to being 28 times stronger than carbon over the course of a century, in terms of its effect in the global warming process.



Furthermore, the relative potency of methane to carbon dioxide increases over diminishing time-spans, trapping around 72 times more heat over 20 years and 100 times more heat over 5 years.

Moreover, the fact that methane breaks down in the atmosphere much more quickly than carbon dioxide (roughly 12 years compared to carbon dioxide having a half-life of at least a hundred years) compounds the issue to show that prioritising its reduction over carbon dioxide, in the short-term, would yield far more effective results in physically halting global temperature increases in our lifetimes.

This is not to say that carbon dioxide emissions are unimportant. A systematic cut in carbon dioxide emissions is also vital. But, with organisations such as the United Nations Environment Programme saying that there is “alarming evidence” that we are “within a few years” of crossing climate tipping-points with catastrophic ecological impacts, it seems that urgent action must be taken to cool the planet now and that a different course must be pursued.<sup>4</sup>

The UN is not in isolation in calling for more urgent reductions to global emissions and challenging the status-quo. The World Wide Fund for Nature (WWF) International has recently stated that by 2020, global emissions are on track to be 30 percent above levels believed to be needed to keep global average temperature increases to under 2C relative to pre-industrial levels.<sup>5</sup>

### The importance of reducing shorter-lived climate forcers 3



In light of this evidence, we favour the immediate adoption of a short-term approach for reducing livestock farming in parallel with continuing efforts to reduce net carbon dioxide emissions from sectors such as electric power which, though important, will yield slower-acting, long-term gains.

We must not forget the role of other short-lived climate forcers beyond methane either – though they can similarly be tackled by concerted action taken to reduce livestock farming.

Black carbon and ozone are similarly potent in global warming, dissipating far more quickly than carbon dioxide, in providing yet further examples of where quick gains can be made in the fight against climate change.

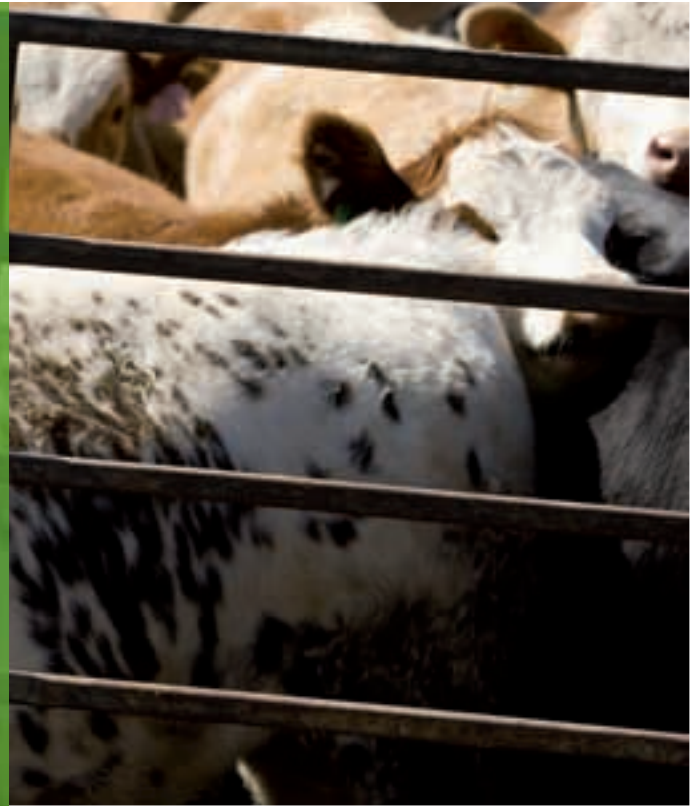
Black carbon, also known as soot, is actually a particle which is created through the incomplete combustion of fossil fuels, biofuels and biomass, including the slash and burn agriculture associated with cattle grazing and growing soy for livestock in the Amazon. Dr. Shindell estimates it is responsible for around 45 percent of the warming in the Arctic. Brazilian researchers led by Dr. Heitor Evangelista have found black carbon in the most rapidly-warming areas of Antarctica, where around 50 percent is related to biomass burning in the Amazon, and 40 percent to the livestock industry.<sup>7</sup>

Tropospheric ozone is the third most-prevalent greenhouse gas after carbon dioxide and methane, and it dissipates out of the atmosphere in only 22 days. It is created through the chemical reaction of various precursors, including nitrogen oxides, carbon monoxide, methane, and non-methane volatile organic compounds (NMVOC), meaning a reduction in any of these precursors should simultaneously create a rapid planetary cooling effect. In other words, reducing methane has the added benefit of tackling this forcer too.

**“The global livestock sector is in fact responsible for at least 51-per cent of human-caused GHGs”**

‘Livestock and Climate Change’,  
Robert Goodland and Jeff Anhang (2009)

# Food production, farming and the environment: The environmental impact of the livestock industry



**The United Nations' famous report, *Livestock's Long Shadow*, argues that livestock farming is among the "top two or three most significant contributors to the most serious environmental problems, at every scale from local to global".**

The UNFAO attributes 18 per cent of total global greenhouse gas emissions to the sector (37 per cent of which are from methane) and pits it as being more polluting than the entirety of our international transport network.<sup>8</sup>

While this figure was intentionally and necessarily conservative at the time, we now believe it to be significantly out of step with current research.

A 2009 report from the Worldwatch Institute, written by former World Bank analysts Robert Goodland and Jeff Anhang, argues that *Livestock's Long Shadow* underestimates the emissions attributable to livestock by discounting, among other considerations, respiration from domesticated animals, the full environmental impact of using the land to rear livestock and the extra emissions resulting from the production and distribution of animal by-products.

The report shows that the sector is in fact responsible for at least 51% of human-caused GHGs.

Were a 25 % reduction in livestock products worldwide to be achieved between now and 2017, the report says, a minimum 12.5 % reduction in global anthropogenic GHGs emissions could be made.<sup>9</sup>

Moreover, diminishing our consumption of meat, and correspondingly reducing livestock farming, faces fewer technological and economic (animal farming contributes less than 2% of global GDP) obstacles than development and implementation of low-carbon technologies in power and transport. We also believe it faces fewer behavioural obstacles than changes targeted at transportation and power use.

Beyond the compelling scientific reasons, political considerations argue for a change in strategic approach to tackling climate change. International negotiations focussed mainly on limiting fossil fuel burning have failed dismally. Indeed, since the Kyoto Protocol was agreed in 1997, GHG emissions have only increased.

## Farming and land use

Whether used for grazing animals or cultivation of feed crops which livestock get fed on, land being used today for farming purposes is land that has been cleared of its original forest or perennial vegetation, sacrificing much of its capacity to sequester carbon as biomass or in the soil.

Not only would the reduction of livestock farming reduce methane emissions, it would free up extensive areas for reforestation, immediate capture and long-term sequestration of carbon dioxide and restoration of natural habitats which will encourage biodiversity.

Moreover, crop plants require only a small fraction of the acreage that animal farming requires to yield equivalent protein as calories for human consumption; only a small fraction of the land recovered from livestock farming and feed-crop cultivation would need to be devoted to cultivating crops for human consumption.<sup>10</sup>

The point then, say Goodland and Anhang, is that we should promote the best possible nutritional efficiency of the land, both to improve our environmental prospects and deal with concerns around the global food supply.

For example, the current annual worldwide production of corn, wheat, rice and soybeans, alone, if used to feed humans rather than livestock, would provide more protein and calories than are consumed annually by the world's population – a fairly compelling argument for stimulating dietary change.<sup>11</sup>

## Additional impacts of livestock farming

### Water scarcity and global water supplies

Agriculture is the largest human use of water as well as being a wasteful user of that resource.

With scientists projecting an increased threat of water shortages, on the back of a growing global population, the Stockholm International Water Institute (SIWI), has said that “improvements of water productivity, and agricultural productivity in general, are...urgent and necessary”.

Its report, *Saving Water: From Field to Fork – Curbing Losses and Wastage in the Food Chain*, says “meat and dairy production is more water-intensive than crop production” and presents a change in dietary patterns as a viable antidote to the problem.

### Biodiversity loss

The world also faces a major crisis in biodiversity loss and the associated damage which could be done to ecosystems and wildlife.

A report by the Netherlands Environmental Assessment Agency, *Exploring Structural Changes in Production and Consumption to Reduce Biodiversity Loss*, has also presented changing diets as a way of tackling biodiversity loss.

Reducing meat consumption in developed countries, it says, would help precipitate the redistribution of global agricultural land and restore natural habitats and forest areas.

## 4 Food production, farming and the environment

Other studies have shown the positive economic benefits derived from reallocating land to more sustainable farming methods, given the manner in which better land management could help reduce the costs of climate change mitigation methods.

*Climate Benefits of Changing Diet*, for example, published in *Climatic Change* 2009, argues that a global transition to low-meat diets would significantly reduce the costs of meeting a stabilization of greenhouse gas concentrations at 450 ppm CO<sub>2</sub>-eq, perhaps by as much as 80 per cent.<sup>12</sup>

### Farming and nitrous oxide

It is crucial to guard against the impression that we are equating the environmental damage of livestock farming purely with methane emissions.

Methane emissions are important but livestock farming brings an even bigger global warming impact to bear when considering the full ramifications not only of keeping livestock but of producing its feed and treating waste.

Take livestock feed production, for example, which often involves the application of nitrogen-based fertilisers to agricultural soils. The impact to the soil, in subsequently releasing nitrous oxide to the atmosphere, has a devastating impact on our planet – nitrous oxide is responsible for around 6% of the heating effect of greenhouse gases in the atmosphere.

## The health benefits of plant-based diets

Beyond yielding significant environmental benefits, a plant-based diet has also been strongly linked to reductions in the risk of heart disease, diabetes, cancers and obesity.

Research such as the China Study, compiled in 2005 by nutritionist Dr T Colin Campbell Ph.D., compared the lifestyles of people in China and came back with “more than 8000 statistically significant associations between various dietary factors and disease”.

The research project comprised a 20-year partnership of Cornell University, Oxford University, and the Chinese Academy of Preventive Medicine.

Reducing global livestock numbers then, and concurrently the processes which support the sector, will have positive effects in other areas of climate change mitigation.<sup>13</sup>

### The UK livestock industry

The last UK government, for its part, set out a target for reducing the greenhouse gas intensity of agriculture in England by making a 3 million tonne saving by 2020. This was confirmed as part of its overall emissions reduction plan, stated in *The UK Low Carbon Transition Plan* white paper of 2009, and reflected its acknowledgement, in the Climate Change Act (2008), that gases other than carbon dioxide needed to be significantly reduced as part of legally-enshrined moves to lower emissions.

This report fully recognises that methane emissions in the UK fell by 53% between 1990 and 2006, and cites the acknowledgment by the Committee on Climate Change (CCC) that this was largely down to falling livestock numbers but also “some evidence of improved efficiencies within the livestock sector”.<sup>14</sup>

However, the CCC also says that both the Low Carbon Transition Plan and Industry GHG Action Plan (a joint taskforce made up of agriculture industry groups) are too “conservative” in their targets of a 3m tonne reduction and that more ambitious (and sustainable) emissions reductions could be made concerning the livestock industry.<sup>15</sup>

That attempts to make livestock farming more sustainable in this country have been inadequate is, some might say, lamentable. More important however is that, on the basis of the Goodland/Anhang projection that livestock is responsible for 51% of human-caused emissions, then, to quote those authors, “mitigation measures no longer suffice, and broadly avoiding emissions attributable to livestock becomes critical”.<sup>16</sup>

Rather than making livestock farming more sustainable, we should be moving to incentivise people away from meat-based diets altogether and help farmers and the agricultural economy begin the inevitable transition from livestock farming to sustainable alternative crops.

This echoes the sentiments of Dr Rajendra Pachauri, IPCC chairman, who believes the most effective short-term solution to climate change would be to systematically reduce global livestock numbers and to promote the transition to more sustainable, plant-based diets.<sup>17</sup>

“A major shift toward plant-based diets is imperative if we are to have even a chance of preventing catastrophe according to top climate leaders... In terms of immediacy of action... reducing meat consumption clearly is the most attractive opportunity.”

Dr. Rajendra Pachauri, Chair of the Intergovernmental Panel on Climate Change

## Recommendations for change: more environmentally-friendly farming and living practices

**Our principal purpose is to collate and disseminate scientific evidence on the damage being done to the planet by global warming and the best possible solutions to tackle it. Our current understanding is that the present political narrative consuming decision-makers fails to take sufficient account of either short-lived climate forcers or the near-term solutions required to mitigating climate change quickly.**

Moreover, we believe the global livestock sector to be a pivotal industry in this argument – a sector which contributes as many as half of human-caused GHGs and which must be more urgently addressed.

Thereafter, our role is to bring together key thinkers and decision-makers and to generate discussion on the best course of action for securing change.

We accept that the global livestock industry is not going to disappear overnight and acknowledge the various interests into preserving the sector. However, we also support the position advocated by the Worldwatch Institute that a 25 per cent reduction in global livestock numbers should be achieved by 2017, matched by a commensurate increase in the appetite for plant-based diets to substitute for eating less meat.

We recognise the complex mix of domestic and international issues at play, and the extent to which discouraging UK farmers from livestock could lead to increasing foreign imports, driven by consumer demand, and resulting in a supply chain which is even more environmentally damaging.



However, we believe there are tangible steps which the UK government can take to precipitate change and demonstrate leadership on this issue of grave importance; action which will help incentivise the food industry to change, which will increasingly support farmers into growing more environmentally-friendly produce and which will educate the public about the need for different and more sustainable consumer habits.

### **Included among our calls to action to the UK government are:**

- To promote a new nationwide public awareness campaign jointly funded between the Department of Health and Department for Environment, Food and Rural Affairs which educates consumers about the health and environmental benefits of increasingly plant-based diets and incentivises lesser demand for meat
- Assist farmers in transitioning to support more environmentally-friendly and healthier plant-based diets by shifting subsidies away from supporting production of animal products to supporting more plant-based foods
- Use the government's own muscle, as a public sector customer of the private food industry, to procure plant-based and analog products for the country's schools, hospitals and prisons. Mandated action in this area may be necessary to ensure compliance

- Work with the food industry to better market substitutes to meat and dairy produce – encouraging supermarkets to display products side-by-side with meat and dairy alternatives and mandating labelling that extols benefits of plant-based foods<sup>18</sup>
- Investigate ways to incentivise food retailers to develop and sell meat and dairy analogs via subsidies<sup>19</sup>
- Support, as a “Green” investment, research and development aimed at mass-marketable, inexpensive, nutritious plant-based substitutes for unprocessed meat and milk in the general food production chain, which would appeal to consumers and food producers for their taste and low cost rather than “environmental friendliness” or “conscience friendliness”.

### International farming industry

Roughly 70 per cent of the world’s meat is produced in developing countries and livestock farming provides livelihoods for roughly a billion people.

Moreover, it acts a sponge for the world’s poor (around 36 per cent of the total number of poor in the world are engaged in livestock farming) given its lack of extensive capital requirements.<sup>20</sup>

It is beholden upon us then, and the UK government, to investigate ways in which international agreement can be struck up and aid re-allocated to increasingly support farmers’ transferral to arable farming and the production of non-meat alternatives for which we envisage demand to go up.

This is no easy feat. Nevertheless, the UK government can use its extensive international reach, expressed in its membership of the EU, role in the Common Agricultural Policy (CAP) and participation in other international bodies, to press the cause for a reappraisal of the industry globally.

At the very least, it can begin by divesting itself from the support of subsidies, sustained through frameworks such as the CAP, which support the most environmentally damaging methods of farming such as large-scale intensive practices.

### Internationally, the UK government should:

- As an urgent priority work through the framework of the Common Agricultural Policy to remove subsidies which unfairly privilege and sustain intensive farming
- Desist from financially supporting intensive livestock production globally, through bodies such as the World Bank and the European Bank of Reconstruction and Development<sup>21</sup>
- Help investigate political solutions to the international reallocation of land to more human-nutritious farming and a fiscal and financial regime which dissuades inefficient food production

# About the World Preservation Foundation

**Founded by Sam Rogers, the World Preservation Foundation is an international non-governmental organisation whose mission it is to assimilate, document and present scientific data relating to climate change; including deforestation, disease, drought and global hunger.**

We aim to stimulate debate on the best ways to tackle environmental threats and to serve as an information hub for governments, media and other concerned parties interested in the struggle against global warming.



[www.worldpreservationfoundation.org](http://www.worldpreservationfoundation.org)

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