

Three BBC articles

Nature's sting: The real cost of damaging Planet Earth

Nature's law: Business will pay the costs of depleting natural resources

Nature's gift: The economic benefits of preserving the natural world

11 October 2010 Last updated at 23:08 GMT

Nature's sting: The real cost of damaging Planet Earth

By Richard Anderson Business reporter, BBC News



The global cost of replacing insect pollination is around \$190bn every year. You don't have to be an environmentalist to care about protecting the Earth's wildlife.

Just ask a Chinese fruit farmer who now has to pay people to pollinate apple trees because there are no longer enough bees to do the job for free.

And it's not just the number of bees that is dwindling rapidly - as a direct result of human activity, species are becoming extinct at a rate 1,000 times greater than the natural average.

The Earth's natural environment is also suffering.

In the past few decades alone, 20% of the oceans' coral reefs have been destroyed, with a further 20% badly degraded or under serious threat of collapse, while tropical forests equivalent in size to the UK are cut down every two years.

These statistics, and the many more just like them, impact on everyone, for the very simple reason that we will all end up footing the bill.

Costing nature

For the first time in history, we can now begin to quantify just how expensive degradation of nature really is.

Drivers of biodiversity loss

- Land use change - for example cutting down forests that provide essential water regulation, flood protection and carbon storage, to make way for agriculture
- Over exploitation - for example over-fishing or intensive farming that leads to soil degradation
- Invasive species - for example the introduction of non-indigenous species that crowd out endemic insect populations
- Climate change - for example rising temperatures that cause more extreme weather conditions.

A recent, two-year study for the United Nations Environment Programme, entitled The Economics of Ecosystems and Biodiversity (Teeb), put the damage done to the natural world by human activity in 2008 at between \$2tn (£1.3tn) and \$4.5tn.

At the lower estimate, that is roughly equivalent to the entire annual economic output of the UK or Italy.

A second study, for the UN-backed Principles for Responsible Investment (PRI), puts the cost considerably higher. Taking what research lead Dr Richard Mattison calls a more "hard-nosed, economic approach", corporate environmental research group Trucost estimates the figure at \$6.6tn, or 11% of global economic output.

This, says Trucost, compares with a \$5.4tn fall in the value of pension funds in developed countries caused by the global financial crisis in 2007 and 2008.

Of course these figures are just estimates - there is no exact science to measuring humans' impact on the natural world - but they show that the risks to the global economy of large-scale environmental destruction are huge.

Natural services

The reason the world is waking up to the real cost of the degradation of the Earth's wildlife and resources - commonly referred to as biodiversity loss - is because, until now, no one has had to pay for it.

"It's pretty terrifying. Nobody in business thinks that at some point this is not going to hurt us"

Gavin Neath Unilever

Businesses and individuals have largely operated on the basis that the natural resources and services that the planet provides are infinite.

But of course they are not. And only when the value of protecting them, and in some cases replacing them, is calculated, does their vital role in the global economy become clear.

Some are obvious, for example the clean and accessible water that is needed to grow crops to eat, and the fish that provide one-sixth of the protein consumed by the human population.

But others are less so, for example the mangrove swamps and coral reefs that provide natural barriers against storms that devastate coastal regions; the vast array of plant species that provide

pharmaceutical companies with endless genetic resources used for life-saving drugs; and the insects that provide essential pollination for growing around 70% of the world's most productive crops.

Bee collapse

It is a hugely complex process, but an economic value can be placed on these resources and services.

In the US in 2007, for example, the cost to farmers of a collapse in the number of bees was \$15bn, according to the US Department of Agriculture, contributing to a global cost of pollination services of \$190bn, according to Teeb.



Deforestation increases the risk of flooding in surrounding areas

As Paven Sukhdev, a career banker and team leader of Teeb, says: "Bees don't send invoices".

Research by consultancy group PricewaterhouseCoopers also suggests the economic losses caused by the introduction of non-indigenous, agricultural pests in Australia, Brazil, India, South Africa, the US and the UK are more than \$100bn a year.

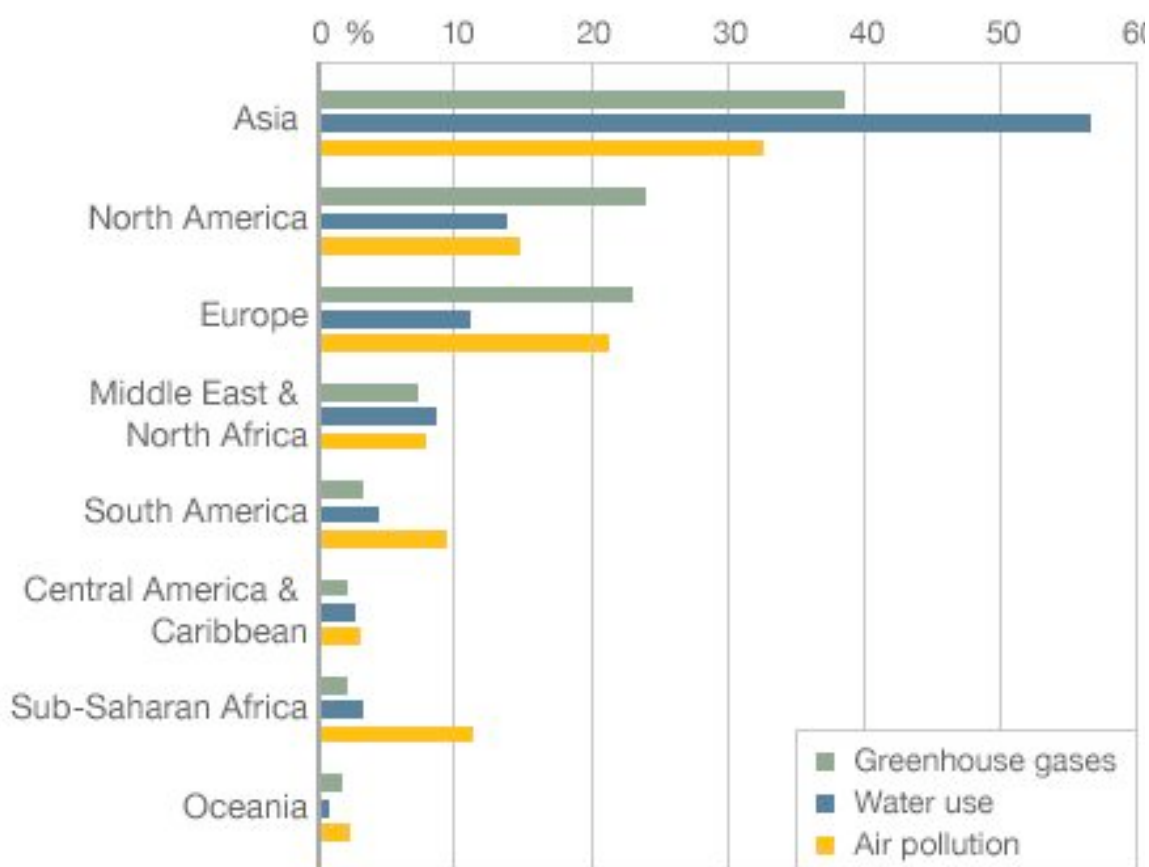
In 1998, flash flooding in the Yangtze River in China killed more than 4,000 people, displaced millions more and caused damage estimated at \$30bn. The Chinese government established that extensive logging in the region over the previous 50 years had removed the trees that provided essential protection from floods. It promptly banned logging.

Indeed the Centre for International Forestry Research has estimated that, in the 50 years prior to the ban, deforestation cost the Chinese economy around \$12bn a year.

Business costs

The impact of biodiversity loss is felt hardest by the world's poor. The livelihood and employment of hundreds of millions of people depend upon the world's natural resources, whether it be fish to eat or sell, fertile soil for farming or trees for fuel, construction and flood control, to name just three.

Geographical breakdown of the costs of damage to the natural world



Source: Trucost, WRI

As Mr Sukhdev explains: "Biodiversity is valuable for everyone, but it is an absolute necessity for the poor".

For example, Teeb has calculated that the Earth's natural resources and the services they provide contribute 75% of the total economic output of Indonesia, and almost half of India's output.

But it's not only the poor who suffer.

Businesses will increasingly be hit as they start paying for their part in biodiversity loss.

Not only will they have to pay to protect or replace services that nature has historically provided for free, but they will be forced to pay by regulatory instruments such as pollution taxes, like carbon credits and landfill taxes that already exist, and higher insurance premiums.



Increased flooding is partly due to land conversion by humans

Then there is the cost of paying for the increased number of natural disasters, resulting in part from more extreme weather conditions caused by rising temperatures due to greenhouse gases, and even reputational damage among consumers that are becoming increasingly sensitive to environmental issues.

Trucost and PRI have estimated the cost of environmental damage caused by the world's largest 3,000 companies in 2008 at \$2.15tn.

That equates to around one-third of their combined profits.

Again, these figures are only estimates, but the scale of the costs that will have to be paid by companies for their damage to the environment cannot be ignored.

As Gavin Neath, senior vice president of sustainability at consumer goods giant Unilever, says: "It's pretty terrifying. Nobody in business thinks that at some point this is not going to hurt us".

Pension values

And higher costs for business mean higher prices for consumers.

Only this summer, massive floods in Pakistan and China forced the global cotton price to 15-year highs, pushing up the costs of clothes, with retailers such as Primark, Next and H&M all warning of higher prices to come.

Drought and wildfires in Russia also sent wheat prices rocketing, sending global food prices sharply higher.

But consumers won't just be hit by rising prices. As Trucost's research shows, earnings and profits of the world's largest companies will come under increasing pressure, undermining share price growth.

And it is precisely these companies that pension funds invest in.

Pension values, therefore, are likely to suffer, reducing retirement incomes for all.

The cost of the current, rapid rate of degradation of the earth's natural resources will, then, be borne by everyone, environmentalist or not.

20 October 2010 Last updated at 23:02 GMT

Nature's law: Business will pay the costs of

depleting natural resources

By Richard Anderson Business reporter, BBC News



Fishermen are suffering from overfishing and quotas to protect fish. The natural world supports the livelihoods of hundreds of millions of people the world over.

It also provides the foundations upon which all the world's major corporate enterprises are built.

For it is not just farmers, fishermen, tour operators and the like that are dependent on nature.

Miners, energy providers, food and clothes retailers - you name it, most companies rely to varying degrees on natural resources.

The majority of businesses, for example, would struggle to survive without clean and accessible water.

[The rapid degradation of the natural world by humans, therefore, has a very real and detrimental impact](#) on the ability of people to support themselves and their families, and hits the bottom line of businesses in every sector of the economy.

Fish quotas

Few industries have been hit harder than fishing.

In many areas of the world, fish stocks have fallen by more than 90% since the onset of commercial fishing. Not only does overfishing threaten a vital food source, but it threatens the livelihoods of millions of fishermen.

For some, there simply aren't enough fish left to catch, while for others the quotas and restrictions on time at sea designed to prevent the total collapse of fish stocks are hitting incomes hard.

John Kirkwood has spent his entire working life as a fisherman in the village of Pittenweem, Fife, on the east coast of Scotland.

He left school in 1974 and went straight into a summer job fishing, "and just ended up staying

at sea".



Mr Kirkwood is retiring early after seeing his income hit by quotas and restrictions on time at sea

"I bought my first boat for £460,000 in 1986, which was a big gamble for me, and have been a skipper ever since, fishing white fish such as cod and haddock," says Mr Kirkwood.

"We made a good living back then," he says of himself and his six crew. "There were no restrictions and no quotas."

But in the mid-1990s, the European Union began introducing regulations to protect rapidly-dwindling fish stocks.

"The cuts became deeper every year, so we just weren't able to buy enough," Mr Kirkwood says.

"We were better off than many others, but the quotas have put a lot of boats out of business.

"There was a big decommissioning in 2001 and 2003, which cut the Scottish fleet by more than a half."

And nowhere has the impact of quotas and restrictions on days at sea been felt more deeply than on the northern banks of the Firth of Forth.

"There used to be 20 large vessels fishing white fish, but we are the last. When we go, there will be no big boats fishing out of Fife," Mr Kirkwood says.



The Ocean Triumph 11 is the last big fishing boat still in operation in Fife
And it won't be long before they are all gone.

"The income we get now is the same as it was in 1998 - our earnings have stood still for the past 12 years.

"So I am retiring at 53, a good two or three years before I had intended to."

And it's not just overfishing that affects stocks - pollution can have a more sudden and devastating impact on freshwater fish.

For example, river pollution caused by rapidly expanding oil palm plantations and extensive logging in the Kinabatangan floodplain in Malaysia have caused the local fisheries to collapse, with local fishermen losing their major source of income.

"We used to visit Keeper Reef, 38 nautical miles from Townsville, but this has been severely impacted by coral bleaching"

Paul Crocombe Adrenalin Dive

Ski resorts

Another sector that has been hit by damage to the natural world - often referred to as biodiversity loss - is tourism.

For example, lions across Africa have disappeared from 80% of their former habitat, hitting game reserves and associated businesses.

Rising temperatures caused in part by greenhouse gases have also seen glaciers and snow coverage shrinking, hitting winter sports resorts that are seeing ski seasons cut short.

Rising sea temperatures and water levels are also affecting coastal regions and small islands such as the Maldives, and particularly those businesses dependent on coral reefs, 20% of which have disappeared in the past few decades alone.

Disappearing corals

Adrenalin Dive, based in Townsville in Queensland, Australia, is being squeezed on many sides.

Paul Crocombe set up the business in 1987, running trips for tourists to the Great Barrier Reef.



Dive operator Paul Crocombe needs to buy a new boat to visit pristine corals further from the coast

"We used to visit Keeper Reef, 38 nautical miles from Townsville, but this has been severely impacted by coral bleaching and by Crown-of-thorns starfish that eat up the reefs," Mr Crocombe explains.

"This has affected a lot of reefs - Flinders Reef was exceptional but now suffers severely from bleaching due to the higher water temperatures.

"At first the corals get brighter and more colourful as they give off algae, but once all the algae

is gone, the corals go white and then die."

The problem is compounded by the Crown-of-thorns starfish, which tend to prey on stressed reefs.

"Now we have to go to Wheeler Reef, which is about as quarter as far again, which adds travel time and fuel costs," Mr Crocombe says.

This, he estimates, requires an extra 30,000 litres of fuel a year, costing the business 42,000 Australian dollars (\$41,000; £26,000).



Dive operators have been hit by the destruction of coral reefs
The extra time taken on the trip also puts some potential customers off.

"People say they don't want to go that far so we need a faster, more modern boat to keep the time, and our fuel costs, down.

"If we don't change boats, then our business becomes marginal," explains Mr Crocombe.

He already employs fewer full-time staff, and is now relying on the banks to provide funds for the new craft.

"We are chasing finance now but a new boat costs A\$3m, while a second-hand boat costs A \$1.2m.

"I think that eventually we will get it, somehow."

Water costs

But it is not just small businesses that are hit directly by biodiversity loss.

The cost of environmental damage by water use 2008



Total \$366,555m

Figures represent the damage done by the world's 3,000 largest public companies

Source: Trucost/PRI

A recent study by the UN-backed Principles for Responsible Investment (PRI), conducted with corporate environmental research group Trucost, estimated the cost of environmental damage caused by the world's largest 3,000 companies in 2008 at \$2.15tn, the equivalent of one-third of their combined profits.

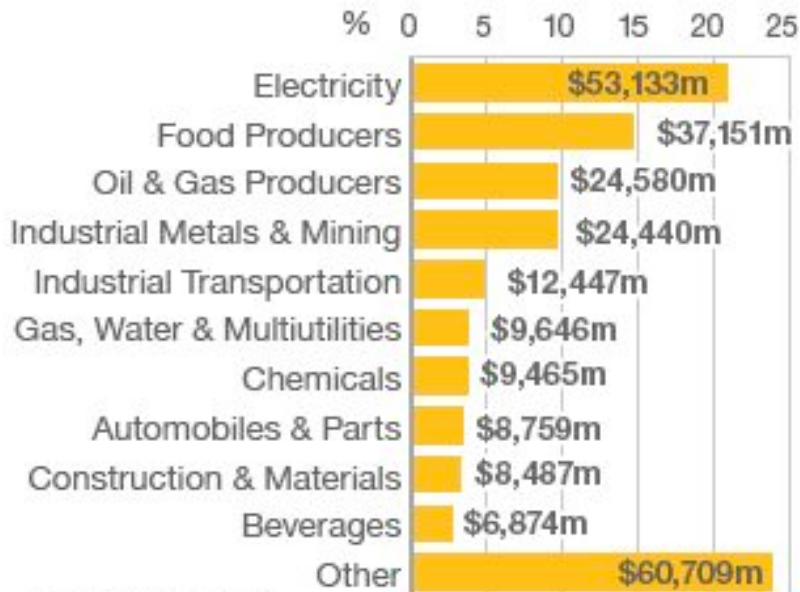
Increasingly these costs - what economists call externalities - will become internalised.

Consumer products giant Unilever, for example, has been forced to take action to secure the water supply to its tea plantations in Kenya's Rift Valley.

"The local population has chopped down large sections of the Mau Forest, which directly impacts on our ability to catch water," explains Gavin Neath, Unilever's senior vice president of sustainability.

To compensate, the company has spent about £300,000 over the past 10 years on planting more than one million indigenous trees in the forest. It has also spent a similar sum on safeguarding forestry and biodiversity in Tanzania.

The cost of environmental damage by air pollution 2008



Total \$255,691m

Figures represent the damage done by the world's 3,000 largest public companies

Source: Trucost/PRI

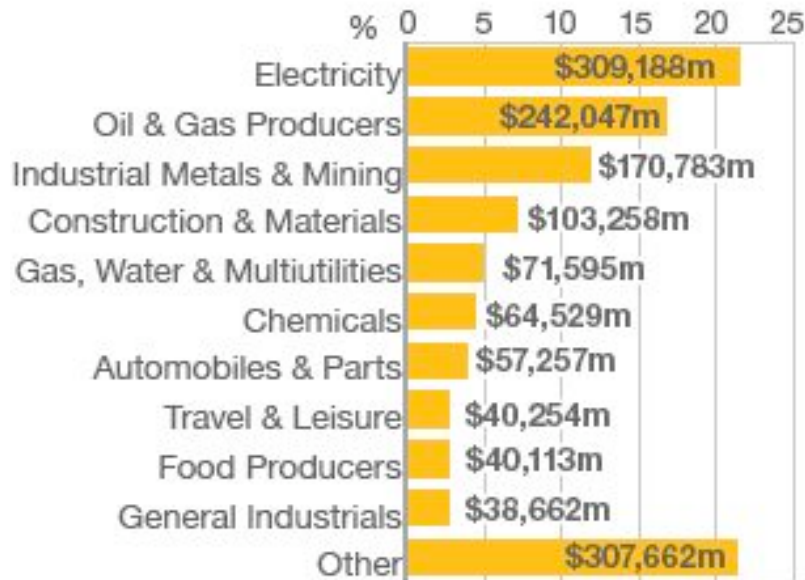
Changing rain patterns in California, Spain and Greece are also raising issues over tomato production, just another one of the "serious issues" that could hit the company in the next 10 years, Mr Neath says.

Europe's largest carmaker Volkswagen has also committed to investing \$430,000 (£270,000) in re-planting forests and digging rain water pits to secure the water supply to its factory in the Mexican town of Puebla, while brewer SABMiller has paid farmers in Bogota, Colombia, \$150,000 to replant trees for the same reason.

The world's largest steel producer, ArcelorMittal, has invested almost \$2.1m since 2006 on protecting what is, after iron and coal, the most important component in making steel, by restoring the ecosystems surrounding the Great Lakes in North America that supply water to nine facilities.

Coffee giant Starbucks has also committed millions of dollars to protect the water supply and to ensure natural shade cover to its coffee plantations in Mexico and Indonesia.

The cost of environmental damage by greenhouse gases 2008



Total \$1,444,864m

Figures represent the damage done by the world's 3,000 largest public companies

Source: Trucost/PRI

Rising costs

More and more major corporations are waking up to the fact that they have to pay to protect or replace the earth's natural resources and services that have, until now, been seen as free.

Many will be forced to do so by increased regulation, just like fishing quotas and pollution taxes, such as carbon credits, that already exist.

And these costs are not peripheral.

According to Trucost and PRI, environmental costs amounted to more than half the combined earnings of about 2,500 major listed companies in developed and emerging markets across the world in 2008.

And as resources come under greater pressure, as they inevitably will, so the bill will continue to rise.

Big business will be forced to adapt, but many smaller businesses and individuals will not have that luxury.

This is the second in a series of three articles on the economic cost of human activity on the natural world.

24 October 2010 Last updated at 18:12 GMT

Nature's gift: The economic benefits of preserving the natural world

By Richard Anderson Business reporter, BBC News



Forests and the insects that live in them provide huge economic benefits. Slowing down the destruction of the Earth's natural resources is essential if the global economy, and the businesses that drive it, are to prosper long term.

[The current rate of destruction is estimated to cost the world trillions of dollars every year](#), and the damage will only get worse unless wide-ranging measures are taken to stop it.

The reason is simple - population growth is the main driver behind those factors that are causing biodiversity loss.

There are currently about 6.7 billion people living on Earth, and this number is projected to grow to 9.2 billion by 2050 - that's roughly the population of the UK being added to the planet every year.

This means we'll need 70% more food, according to the United Nations (UN), just one of the many additional pressures on Earth's finite resources.

If left unchecked, these pressures will lead to the ever-faster destruction of nature, which could cost the world \$28.6tn (£18.2tn), or 18% of global economic output, by 2050, according to the UN-backed Principles of Responsible Investment and corporate environmental research group Trucost.

That's about twice the current output of the US, the world's biggest economy.

Valuing nature
So what can be done?

A vital step has already been taken - for the first time in history, we now have at least a rough idea of the economic cost of depleting the earth's natural resources.



The economic value of mangroves is often greater than the shrimp farms that replace them. This not only means that governments, businesses and consumers can understand the gravity of the problem, but it also means the value of nature can be factored into business decisions.

As Will Evison, environmental economist at PricewaterhouseCoopers (PwC), says: "No-one is saying we should just stop converting pristine land, just that the value of the environment is recognised".

For example, a study on the conversion of mangroves to commercial shrimp farms in southern Thailand estimated the net economic returns at \$1,122 per hectare a year.

The conclusion, at least for the shrimp farmer, is clear - there is an economic benefit of converting the mangroves.

But once the wider costs of the conversion - what economists call externalities - are taken into account, a very different conclusion is reached.

"Directors' bonuses don't have to be included [in company accounts] from a pure profit and loss point of view, but they are. Environmental externalities should be the same"

Pavan Sukhdev Teeb

The economic benefits from the mangroves of collecting wood, providing nurseries for offshore fisheries and protection against storms total \$10,821 a hectare, far outweighing the benefits of converting them into a shrimp farm.

Damage limitation

There are a number of initiatives, some already introduced and some in the pipeline, that are specifically designed to ensure that the economic value of nature is recognised.

One example is reduced emissions from deforestation and forest degradation, or REDD, under which forest owners are paid not to cut down trees. A number of governments across the world have committed hundreds of millions of dollars to these projects.

Another is habitat banking, the market for which currently stands at around \$3bn in the US, where companies that degrade natural areas are forced to restore nature elsewhere.

Trade in forest conservation obligations in Brazil and ground-water salinity credits in Australia have also proved successful.

Alongside these schemes and those like them, there are various compensation arrangements that make those causing environmental damage pay for it, just like carbon credits that currently exist.

Exemptions from these various taxes, charges and fees, as well as subsidies, are also used to encourage environmentally responsible behaviour.

There is also growing pressure for companies to begin incorporating the costs of the damage that they do to the Earth's natural resources into their profit and loss accounts.



Governments have committed hundreds of millions of dollars to preserving rainforests. Only by incorporating these costs into their accounts, many argue, will companies be forced to reduce their impact on the natural world.

"Directors' bonuses don't have to be included [in company accounts] from a pure profit and loss point of view, but they are. Environmental externalities should be the same," says Pavan Sukhdev, a career banker and team leader of the United Nations' The Economics of Ecosystems and Biodiversity (TEEB) study.

"This is not a straightforward process and needs standard methodologies accepted by everyone, but it could be achieved within 10 years."

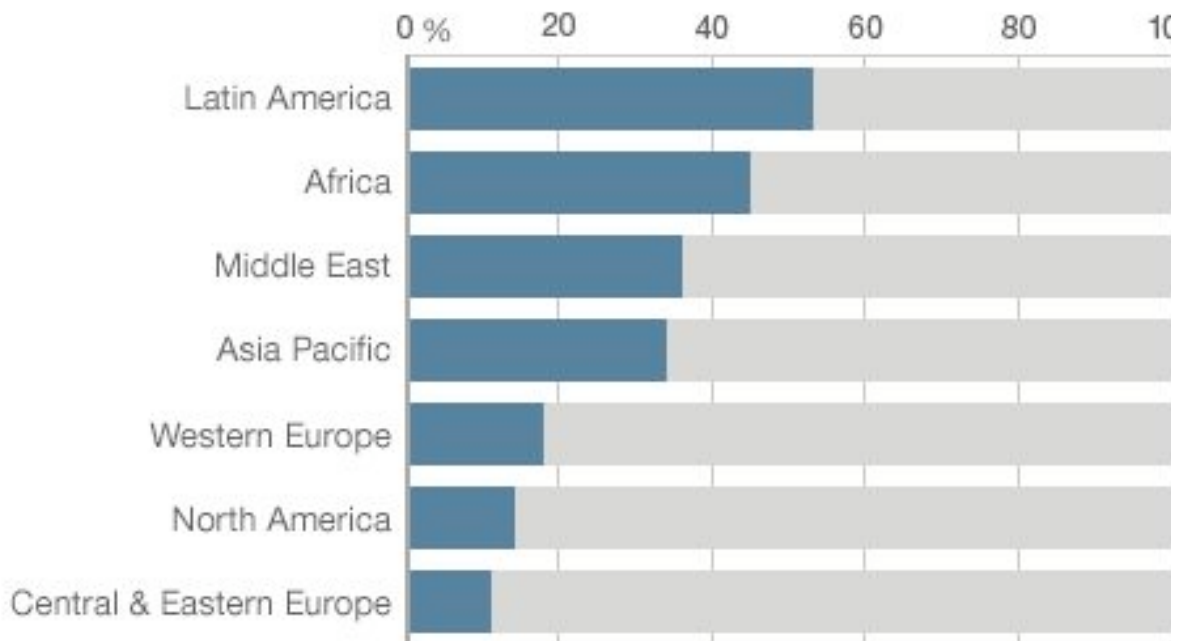
The next step would be to incorporate environmental assets into national accounts.

Protecting assets

But many companies already do acknowledge the costs of biodiversity loss.

A survey conducted by PwC earlier this year found that 27% of chief executives were either "extremely" or "somewhat" concerned about biodiversity loss, but there was a large disparity between those operating in developed economies and those in emerging markets.

Percentage of global chief executives concerned about biodiversity loss



Source: PricewaterhouseCoopers

[Indeed many multinational companies have made significant investments](#) in protecting the natural resources upon which their success depends.

These include investments to mitigate the impact of tighter regulation, such as shipping giant Swire's decision to buy up swathes of rainforest to offset the possible introduction of pollution taxes in the shipping industry.

Indeed those companies that are well prepared for more stringent regulation, and have made the necessary investment in protecting the natural assets that serve them, will gain an important competitive advantage.

But it's not just a question of risk mitigation - there are also opportunities for companies that act in an environmentally responsible manner.

Brewing giant SABMiller has made considerable investments in reforestation in Columbia and South Africa, as well as setting stringent targets for reducing water consumption - commitments, it says, that helped the company secure licences to brew in Australia, "because the authorities trust that we will be water efficient", says Andy Wales, the brewer's global head of sustainable development.

Contrast this with mining group Vedanta, which has been denied permission both to expand its aluminium operations and to mine bauxite in India after campaigners claimed the company had ignored the needs of indigenous peoples.

Consumer attitudes

Companies also recognise that they need to react to increasing customer awareness of

environmental issues.

For example, another survey conducted by PwC in May found that more than half of UK consumers were willing to pay between 10% and 25% more for goods up to £100 to account for their impact on the natural world.



More companies are investing in sustainable practices to meet consumer demand. Such changing consumer attitudes mean that more and more companies are investing in reducing their impact on nature.

For example, the world's biggest retailer Walmart has introduced sustainability criteria as part of its official product sourcing process.

Coffee giant Starbucks has also invested millions of dollars in protecting natural resources because "we know maintaining biodiversity makes a difference to our coffee drinkers" according to Tim McCoy, the company's head of communications.

Natura, the Brazilian cosmetics group with a turnover of \$2.4bn, has committed to sourcing products sustainably from natural sources in order to appeal to consumers, while French energy group GDF Suez has invested in conserving biodiversity on its landfill sites purely as part of its "reputational risk management".

Google Maps has even launched a service that allows users to track changes in forest cover across the world.

Sub head

Not everything some companies say about their environmental commitments can be believed, but the fact that they are saying it at all is what's important, says Mr Sukhdev.

"Once you get away from denial, you pass through a phase of understanding and then one of empty rhetoric before you arrive at action. The stage of empty rhetoric is part of the process."

And those companies that do take action will win out in the long run.

The costs of failing to protect the Earth's natural resources and the services they provide, and the price of failing to grasp the opportunities that investing in nature present, are simply too great for those that do not.