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The return of blood diamonds?

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+ SPORT AND ENVIRONMENT SPECIAL

The return of blood diamonds

Our disturbing and timely news report, 'Export of Zimbabwean diamonds threatens ethical jewellery trade' highlights a number of issues that should be of concern to us all.

It should be deeply troubling that diamonds, so closely associated with love and marriage, have once again been linked to gross human rights abuses in a country producing the luxury stones. This time it's Zimbabwe, and the abuses are serious - including allegations of rape, child labour, and mass killings in the Marange diamond fields situated near the Mozambique border.

This isn't supposed to happen anymore: following the global outcry after the hidden cost of 'blood diamonds' was first revealed more than a decade ago, much has been done at every level - from extraction through to manufacture and retail - by industry, governments, civil society and the jewellery sector itself to try and clean up the stones' tarnished image.

A dedicated body, known as the Kimberley Process (KP), was created to govern the diamond sector and ensure it remained free of abuses within its (notoriously complex) supply chain. But the body is now at war with itself over controversial plans to allow the export and sale of Zimbabwean diamonds onto the global marketplace. As well as undermining the credibility of the KP itself, the sale of diamonds from the Marange region will destroy consumers ability to make ethical choices when purchasing their jewellery.

If consumers feel there's no longer a viable, ethical, option available, what are they going to do? Give that diamond ring a miss? Or buy a standard stone and hope they're engagement is not tarnished by killings, rape or child labour?

Andrew Wasley, Editor

How the boom in climbing, biking and sailing is costing the earth

Isabella Kaminski reports on how habitat damage, waste, nanotechnology and persistent organic pollutants are increasingly linked to our favourite outdoor pursuits

Outdoor sports are increasingly being linked to environmental problems

Whether for health, love of nature or just for a serious adrenaline rush, millions of us regularly take part in outdoor sports such as climbing, biking or sailing. Although true aficionados are out in all weathers, braving the rain and snow, Britain's lush rolling hills and temperamental waters are most enticing at this time of year.

According to the Outdoor Industries Association, 43 per cent of the UK population takes part

in outdoor activities at least once a month, with 35 million people hiking every year in the National Parks alone. But growing evidence suggests that these relatively green activities, powered by human muscle, wind or water, have hidden environmental costs.

David Cole, a research geographer at the Aldo Leopold Wilderness Research Institute based in the US state of Montana, says the impact of outdoor sports is typically very intense but highly localised: 'The general populace is probably largely unaware that their activities, when multiplied by the effects of everyone else out there, can have a significant effect. But I think it is widely recognised that these sports are not completely eco-friendly.'

The cumulative effect of thousands of hikers or cyclists using the same trail, for example, can cause serious erosion, inhibit the growth of plants and disrupt animal nesting and hunting sites, while watersports can disrupt aquatic life, including birds, fish and cetaceans such as dolphins, and destroy their habitats by eroding banks and depositing soil in the water. Camping muddies the issue further by adding fire risk and the disposal of rubbish and human waste to the list of potential problems.

Outdoor organisations have generally been good at minimising these effects – Surfers Against Sewage in the UK, for example, runs a strong marine litter campaign – and the 'leave no trace' ethos (although it is belied by the infamous mountain of rubbish deposited by hikers on Everest) still holds strong but it can be difficult to maintain. Many sports inevitably leave subtle remains that can have a large cumulative effect: rubber worn from bicycle tyres or shoe soles, plastic fragments from broken surfboards and shavings from boat hulls are difficult to avoid and can persist in natural ecosystems for years.

Biodegradability and durability

Even before they reach this stage, the materials and processes used to make this specialist equipment are difficult to assess, because the outdoors market has become a jungle of obfuscating brand names and baffling technical specs. Safety is not an area for compromise – you certainly wouldn't trust your weight to a recycled carabiner or risk using a second-hand crash helmet – but when it comes to generalised products, such as tops, jackets and boots, there is always a trade-off between biodegradability and durability.

> The general populace is probably largely unaware that their activities, when multiplied by the effects of everyone else out there, can have a significant effect

Outdoor gear needs to be waterproof, breathable, hardwearing and/or light, but not many natural materials can stand up to these rigorous demands. As a result, the market for outdoor clothing and equipment is dominated by synthetics such as polyethylene (used in everything from netting to canoes), carbon fibre (fishing rods and high-end bike frames) and nylon (waterproofs). Many of these materials are not biodegradable and until recently there has been no systematic way of assessing how they are manufactured.

Neoprene is a good example. Wetsuits keep surfers warm even in unforgiving British seas but the neoprene they are made from is derived from either petroleum or limestone, neither of which are squeaky clean, and as with many synthetic materials, most of it is made using a toxic chemical process. While no miracle alternative has yet been invented, greener versions are starting to appear. Sports specialist Patagonia, for example, recently introduced a wetsuit with a lining of merino wool instead of laminate. But neoprene is not made to last, and once it has torn it is difficult, and not usually cost-efficient, to repair.

Gore Tex, on the other hand, is now ubiquitous in outdoor coats and shoes, and is incredibly durable. It is popular because it is both waterproof and breathable, due to its membrane design which has thousands of tiny pores. But Gore Tex is made out of PTFE (polytetrafluoroethylene, the same ingredient as in Teflon), which is a persistent organic pollutant. Gore Tex argues that it is environmentally friendly because it has a long lifespan, but there are durable alternatives – albeit with a compromise.

Nanotechnology

Leather walking boots can last a lifetime if looked after properly but come loaded with animals welfare concerns. On the other hand, some vegan boots use synthetic linings that contain silver nanotechnology. Smart Silver, a brand name for nanotechnology using silver, is increasingly being used for outdoor fabrics in products such as baselayers and footwear. When water comes into contact with these tiny silver particles, they release silver ions which prevent the growth of microbes (both

bacteria and fungi), so the clothing smells less and does not degrade as quickly.

Smart Silver maintains that it is environmentally friendly, but Friends of the Earth recently released a report raising concerns about such forms of nanotechnology and called for them to be banned until more research has been done.

In terms of clothing, there seems to be general agreement among manufacturers that recycled and recyclable polyester is the way to go. 'Cotton is not good for outdoor or high-impact activities so that's where synthetics are better in terms of, for example, moisture management,' says Isabelle Susini, environmental manager of Patagonia Europe. 'Our main goal is to make our products as durable as possible.'

Patagonia, which was founded by a man frustrated by climbers leaving bolts in rock faces, addresses the problem of degradability by inviting customers to send back their worn out clothing for recycling or repurposing. In the US, about 45 tonnes of clothing has been returned and upcycled into products such as fly fishing bags, while any materials that can't yet be recycled or repurposed are stored until a solution is found.

Expectations

But Ernie Capbert, marketing director of Cornish independent surf brand Finisterre, argues that many outdoor companies make products with higher specifications than are really necessary. 'When was the last time you went camping at minus 15?' he asks me. 'Most people will never be in an environment or situation, such as sleet or snow, where these benefits would play a role. I have to be comfortable and warm but other things don't matter so much.'

Capbert argues that customers want to know exactly what's in the products they buy and transparency should be key. But while outdoor enthusiasts are often interested in in technical minutiae of their specialist equipment, there has been a distinct lack of focus on the supply chain of these products.

According to Nick Brown, managing director of Páramo, which has won ethical awards for its outdoor clothing, this is simply a matter of scale. 'The industry provides goods and services to people who have an emotional relationship with the outdoors. Many companies, like ours, were started by people passionate about the outdoors who weren't satisfied with what there was to offer.

'Now you have a new layer within the industry which is the realisation by more conventional businesses that there is money to be made here and they have a more aggressive approach. It has driven down quality and made it more disposable, yes, and it's had a tremendous price pressure which has forced cheaper manufacturing with less questions asked. On the other hand as those large companies get above the parapet they are getting more concerned about their image.'

Pile it high, sell it cheap

Many established outdoor brands have been subsumed into conglomerates working on the 'pile it high, sell it cheap' model boosted by the increasing popularity of staycations and summer festivals. The traditional wax jacket is a good example: it is still one of the best and more sustainable options for rainy, cold UK weather, and can last for years if looked after, but it has a dated reputation and few major retailers stock it.

Brown admits that the outdoor industry, like mainstream clothing, has succumbed to the pressure of fashion. Páramo's response has been to turn this into a business opportunity by selling its customers repair services and care products.

An 'Eco-Index' recently developed by the US Outdoor Industry Association together with the European Outdoor Group is starting to make an impression on the industry. The index measures chemistry and toxics, waste, end of life, packaging and facilities of products in the outdoor industry, as well as labour and social responsibility issues.

However, there is little that can be done on an industry level to tackle the elephant in this massive room. Before you can actually climb a mountain, paddle a river or catch a wave you have to get there and for most of us that means racking up considerable petrol miles, with rear carriers and roofracks carrying bikes, surfboards or boats increasing fuel consumption by to 30 per cent.

Some activities, such as hiking, lend themselves to using public transport but for those carrying lots of specialist kit or travelling to remote locations a car is usually the only realistic option. While a UK-based trip is usually a more environmentally friendly option than a flight abroad, sports fans can try to plan local trips or, if travelling over longer distances, look to stay for a few nights. Joining a specialist club and buddying up to share lifts is another good way to lower your carbon footprint.

We all have a vested interested in looking after the environment but outdoor enthusiasts often see the effects of neglect first hand, so there's a strong incentive to keep these spaces green – in every sense of the word – as possible.

Sustainability and football: why the beautiful game is getting a green makeover

Ruth Styles reports on the efforts some football clubs are making to turn the sport into an eco-friendly one, although there's still plenty to do

With everything from sex scandals to corruption allegations, the last six months haven't been kind to the national game. Scandalous behaviour and Sepp Blatter aside, football remains one of the most lucrative – and most watched – games on the planet. But popularity has come with a price and it's the environment that's paying it. When the new season kicks off next weekend, some 700,000 fans will make the trip to one of the UK's 40,000 clubs where they'll watch a game played on emerald-green grass maintained using gallons of water, fertiliser and pesticides under floodlights in a power-hungry glass and steel stadium. Many will also head to one of the stadium's cafes for a half time burger or pie, most of which will be mass produced. When they leave, it's likely to be by car, or if it's a long distance away game, by plane. With everything from food to transport included, the average Premier League football match creates an estimated 820 tonnes of carbon. That's an awful lot of pie and chips.

For a sport widely seen as caring about little that goes on outside of the game, the last five years have seen a quiet revolution with everything from footballer's lifestyles to watering the training pitches coming under increasing scrutiny from green groups. To its credit, football has begun to rise to the challenge with clubs making credible efforts to reduce their environmental impact. One of the pioneers is Forest Green Rovers, which is owned by Ecotricity founder, Dale Vince. 'I play football every week and Forest Green Rovers were on the verge of bankruptcy,' says Vince by way of explanation for his foray into football. ''They have 100 years of history and are a big local employer but it was also a great opportunity to take the environmental message to a wider audience.' And that, in a nutshell, is exactly why green groups are so keen to get involved in football. With a global audience of 1.15 billion tuning into matches every week, there's no better way to get the message across than to encourage a little greenery in the sport – and that's exactly what Vince is planning via his foundation, Sustainability in Sport.

With everything from food to transport included, the average Premier League football match creates an estimated 820 tonnes of carbon

Renewable energy

Formally launched at Neville's Old Trafford testimonial match in May, Sustainability in Sport was founded by Gary Neville and Dale Vince with the aim of making all sport – not just football – more eco-friendly. First on the list was the testimonial match itself, which was powered by renewable energy from Ecotricity's 52 wind turbines. But the duo have bigger aims in mind over and above fuelling a single football match, with plans in the pipeline that include working with commercial organisations to raise funds for the installation of renewable energy technology and low-impact infrastructure at grassroots clubs, and persuading clubs at all levels to rethink the ways in which they source and use power. And it's not just power they have in their sights either. Sustainability in Sport also encourages the use of low-carbon transport, rainwater harvesting systems and solar panelling, all intended to reduce football's carbon footprint. What's more, they also plan to use it as a vehicle for spreading the green message to a wider audience, with Neville commenting that: 'Sport is such a powerful [vehicle for change]. If Manchester United want to get a message across in something, they will do, they have that power, and so do the Premier League.'

But while Vince and Neville are championing the cause of all things green, what about the clubs themselves? Here too, there are some encouraging signs. 'Football clubs are expensive to run and often lose money,' says Bristol City's CSR director, Pete Smith. 'Reducing our utility bills [by using less power] is important to make us more sustainable financially. Secondly we take a huge amount of pride in our community work and social responsibility is important to us. Football clubs are not normal businesses driven solely by profit; we are part of the fabric of Bristol and the South West. We may not be able to save the world on our own but we are determined to do out bit.' 'Doing their bit' Bristol City style means a new stadium heated by a biomass boiler, rainwater harvesting facilities and eight acres of wetland habitat making up part of the grounds.

Other, bigger clubs are playing their part too with Chelsea's CSR director, Simon Taylor, taking

home first prize at the People and Environment [PEA] Awards in the Sustainability in Sport category. How did he do it? By kicking off a wave of initiatives covering everything from a grass roof for the training ground to using rainwater on the pitches. 'We're setting an example that other clubs could and should follow, with many initiatives which include harvesting rainwater for reuse on the pitch,' he commented. 'We have a major Premier League club and sports brand giving a leadership signal that others will follow.' Arsenal too have introduced a wealth of green initiatives including recycling all paper, cardboard and printer cartridges at their training ground, introducing greener LED floodlights at the Emirates Stadium and encouraging all members of staff to use public transport. While you aren't too likely to bump into Robin van Persie on the tube, some of his colleagues, Neville included, are doing their bit to introduce a bit of greenery to their daily lives.

Zero carbon

His zero carbon eco-mansion might have been the subject of much mockery from certain sections of the press who likened it to the set of the Tellietubbies children's TV show, but Gary Neville is one of a growing number of footballers putting their money where their mouth is on green issues. Likewise, while Neville's club colleague Rio Ferdinand might seem like no ones idea of a green guru; the Manchester United defender recently had an 'energy fitness audit' at his home and is now planning to build a carbon neutral residence in Surrey for his retirement. 'It's about the future,' he said in an interview with the Guardian. 'Natural disasters, sea levels, ice melting, fires... people have to understand that's down to humans. Governments need to let the public know how we can become energy self-sufficient.' Footballers might seem unlikely role models at times but according to Vince and Smith, that's exactly what they are. 'Our strength is that we can get messages over to our fans and especially children,' says Smith. 'Football clubs and players can act as role models for such projects and boost awareness relatively easily.'

In the meantime, the mantle of role model has fallen to Vince's club Forest Green Rovers who are taking sustainability to levels not seen elsewhere in the game, with even the pitch going organic. 'We're seeking the Soil Association stamp of approval for that,' enthuses Vince, 'and we're also looking at installing a borehole for spring water. We already have a drain to collect the run-off from the pitch, so we'll be able to use a mixture of recycled water, rainwater and springwater on it.' And that's not all. The club are also working on installing LED floodlights and are hoping to get planning permission for ground-mounted solar panels, which will be put where the fans can see them, because as Vince puts it: 'we want fans to get up close and personal with them.' Vince has even changed the menu, dispensing with the usual pies and chips and replacing them with something considerably healthier. 'The stuff we used to feed people was so grim,' he remembers. 'We're working towards making all the food local and organic and towards a Soil Association Gold Standard.' We've done away with mass produced food to show that sport really can be greener.'

Messaging

Between Ferrari-driving players and ridiculously high power use, football as a whole still has a long way to go but the signs are good. The 2010 World Cup created a whopping 2.8 million tonnes of carbon, the equivalent of making 20 cheeseburgers for every single person in the UK. But while the antics of players and the undoubtedly high environmental impact of match days will continue to raise eyebrows, there's no denying that football can be a real force for environmental good – not just in terms of what it does for itself, but in terms of getting the message across to billions of fans. 'I think sport can have a big role [in promoting a greener lifestyle] but in truth, professional sport probably hasn't done enough to date,' says Smith. 'Professional sport often concentrates on issues around health and education but there is unquestionably a growing awareness of the environment.' 'I think using football to get the message out there is really important,' comments Vince. 'Football fans are an attentive audience who love their clubs. If those clubs can say they've got solar panels, don't use red meat in menus and so on, it gives [those things] credibility. Forest Green Rovers fans are already getting involved.' And that, in a nutshell, is why efforts to green the beautiful game need to be taken seriously.

Export of Zimbabwean diamonds threatens ethical jewellery trade

With the Kimberley Process in a state of paralysis over Zimbabwean diamonds, consumers can no longer be sure they're buying ethical jewels. **Rosie Spinks** reports

Diamonds mined in eastern Zimbabwe's Marange diamond fields have come into question for potential human rights abuses. (Image courtesy of Global Witness)

The dusty veld on Zimbabwe's eastern border with Mozambique is home to the Marange diamond fields; an area with rich alluvial deposits that have an estimated worth of up to US $800 billion and could be viable for the next 80 years.

However the extraction of diamonds from these fields – and their subsequent release into the global market - has put the ethical diamond trade in jeopardy due to allegations of serious human rights abuses connected to the region's diamond industry.

'At this point, the consumer has no idea what they're getting at jewellery stores,' says Annie Dunnebacke of Global Witness, a UK-based NGO. 'And retailers have no way of telling consumers if a diamond has been produced without human rights abuses.'

'At this point, the consumer has no idea what they're getting at jewellery stores'

In 2002, the Kimberley Process Certification Scheme (KPCS) was created to prevent the sale of 'blood diamonds', or stones used by rebel groups to fund civil wars, such as those in Sierra Leone and Angola.

Diamonds from Zimbabwe's Marange region have been questioned ever since President Robert Mugabe's forces took over mining operations there in 2008 as part of his attempt to nationalise the industry. Since then, numerous reports of human rights abuses—including rape, child labour, and mass killings—have emerged.

This month BBC Panorama aired an in-depth investigation into the scale and scope of these alleged crimes, and assessed whether or not Mugabe will ever be held accountable.

The controversy over Marange diamonds reached a peak on June 23, when the civil society branch of the KPCS walked out in protest at the body's official meeting being held in Kinshasa, Democratic Republic of Congo (DRC).

The dozen African and international groups that comprise the KP civil society coalition, which includes Global Witness, clashed with KP Chairman Mathieu Yamba of the DRC. Yamba broke with the KP's consensus-based decision making procedure by unilaterally stating that Zimbabwe could start exporting rough stones from Marange without having to prove their compliance with KP regulations first.

'The case in Zimbabwe highlights the extent to which the KP isn't able to [control] the members who don't uphold the minimum standards to accountability,' said Dunnebacke. She confirmed that Global Witness, which was instrumental in founding the KPCS, is currently 'reconsidering future participation' with the scheme.

Conservative MP Henry Bellingham, the UK Foreign Office Minister to Africa, said the UK is committed to ending the trade of conflict diamonds. Bellingham believes that Yamba's recent decision cannot be considered valid.

'Despite the statement released by the Chair of the KP in June, it is clear that KP members did not reach a consensus to resume exports of diamonds from Marange,' Bellingham told the Ecologist. 'Any agreement must ensure Zimbabwe complies with its KP obligations, and must be robust enough to ensure that the KP remains a credible and effective mechanism.'

Bellingham's disapproval of Yamba's unilateral action was echoed by other national governments including the US State department, which issued a statement saying it was 'deeply disappointed' by the non-consensus based decision.

The World Diamond Council, the group formed to represent the interests of the diamond industry in KPCS decisions, said in a press release that traders in the industry should avoid Marange diamonds for the time being. `The WDC urges all members of the trade to deal only in rough diamonds that are accompanied by KP certificates that comply with the consensus decisions of the Kimberley Process.'

Defining conflict diamonds

It has widely been quoted that less than one per cent of the diamonds on the world market are blood diamonds. However, Dunnebacke states this figure only applies when the narrow definition of a blood diamond is used, which only includes stones that rebel groups use to fund civil wars. In Zimbabwe, it is the legitimate (if controversial) government, not rebels, that is reportedly profiting from diamonds mined in inhumane conditions. In addition, Mugabe's officials are failing to account for the proceeds from these stones in a transparent manner.

Farai Maguwu is a Zimbabwean diamond activist who was jailed and then released last year

for allegedly 'publishing and communicating false information' related to human rights abuses at the mines. He said that if the KP is concerned with human rights, it must broaden its definition to include situations like the one in Zimbabwe.

'In terms of ending rebel related conflicts the KP achieved its goal 100 per cent,' Maguwu told the Ecologist. 'But in terms of protecting people from diamond related violence, the KP has failed to find an answer, especially where it pertains to Zimbabwe. It's not about the identity of the perpetrator, whether it be government or rebel group that matters, it is all about protecting people.'

Maguwu is not optimistic when it comes to the prospect of average Zimbabweans benefiting from the vast mineral wealth that is found in their nation. 'You have a situation where the Finance Minster says he is not receiving proceeds from diamond sales and then a quasi state institution [is] paying salaries for state employees using proceeds from diamond sales,' Maguwu said. 'Unfortunately diamonds are non-renewable and that day may never come when we [Zimbabweans] shall all say, "behold what our diamonds have done for us."'

Zimbabwe as a symptom

However dire, the situation in Zimbabwe is only part of the larger challenge the KPCS faces at present. There are major underlying problems within the certification scheme as a whole that must be addressed, according to Dunnebacke. She cited administrative problems, including a lack of funding and a permanent secretariat, as well as issues caused by a consensus being required for every decision that's made.

> 'Diamonds are an expression of love, not hatred or pain'

The KPCS has a three-pronged structure: the civil society coalition, participating governments (of both producer and consumer nations), and industry representatives. Dunnebacke said that both government and industry have to make major changes if the KPCS is going to move forward as an effective regulator.

'We need to face the facts now and see that government have failed in their responsibility to see that the KP is effective and industry has totally failed in their responsibility to see that there's any supply train traceability,' Dunnebacke said. 'Its basic stuff - find out who your suppliers are, who their suppliers are, and then demand documentary evidence for that.'

In Zimbabwe's case, several possibilities remain. In the wake of Yamba's decision, it's possible that Marange diamonds are being exported with KP certification attached. In addition, smuggled Marange diamonds could have already left Zimbabwe and been on the market prior to June's meeting.

For these and other reasons, Dunnebacke says, there is currently no guarantee of a 'conflict-free' diamond on the market. 'It's not something the consumer wants to hear,' Dunnebacke said. 'But the fact is unless you're buying from certain companies that have a "mine to market" certification scheme or from retailers that only buy from a certain mine, there's no way of knowing.'

Maguwu says that it's sad that something as precious as a diamond can result in such suffering and wants to see it change. 'Diamonds are an expression of love, not hatred or pain,' he said. 'This love must flow from the place of origin, from that remote village, through the whole production chain, right up to the consumer.'

Himalayan glaciers are 'not just melting, they are dying'

Many glaciers are melting away at a rapid rate. This could have serious consequences for half a billion people who depend on the 'eternal snows' to water their crops and for drinking. But as **Jonathan Mitchell** reports from Nepal, not everyone appears concerned

If the world's glaciers melt millions of people could be affected. Photo: Jonathan Mitchell

Perhaps it is not a place that many climate sceptics visit. Though standing on Gokyo Peak, the view before you is spectacular and according to glaciologists - quite worrying. For the giant 22km long Ngozumpa Galcier that dominates the Gokyo valley in the Everest Himalaya is dead, glaciologists claim.

For Jason Gulley, a Karst Hydrogeologist at the Department of Geological Sciences at the University of Florida, their demise is certain. 'The debris-covered areas of the glaciers [in the Mount Everest region] are dead and no longer flowing,' he says. In effect this means the glacier has stopped grinding its way innorexably through the Gokyo valley as it should and is now in a state of terminal decline. This is largely due to high CO2 emissions in our atmosphere which have resulted in rising temperatures across the world and partially due to brown haze air pollution.

The same is true of many of the great glaciers of the Great Himalayan Range - which stretches from northeastern India some 2,500 km across to the border with Pakistan and Afghanistan.

While it is true that there is no evidence to suggest all these glaciers will have melted by 2035 - as the scientists who wrote in their UN International Panel on Climate Change (IPCC) report were widely vilified for - the science clearly shows that most of the southern facing glaciers are in deep trouble and melting at a rapid rate. This is likely to have serious consequences for half a billion people who depend on the 'eternal snows' to water their crops and provide water for their lives.

The effects of glaciers melting could be catastrophic for countless people

'This is a phenomenal melt rate,' says Joseph Gergan, a geologist at the Wadia Institute of Himalayan Geology (WIHG) at Dehra Dun in India. Indeed, many smaller glaciers have already disappeared.

While a lot of emphasis is put upon the demise of the great glaciers like the Ngozumpa, the 'water towers of Asia' (as the Himalayas are sometimes referred to) are also made up of thousands of smaller glaciers on less grand peaks.

The ice has gone

High up in the Everest Himalaya, several mountains have lost their glaciers entirely. In Namche Bazaar, at 3,440 metres in altitude, elderly Sherpas will tell you they used to use the ice on the mountains surrounding the town to figure out when to sow and reap their potato crops. They'll also tell you it is not possible to do that any more. A quick look at Mount Nup La and over at Mount Thamserku - two peaks which dominate the horseshoe-shaped town quickly reveal no glacier at all on the former and very little ice left on the latter.

Higher up in the Nangpa valley and elsewhere in the region, it is apparent the landscape itself is changing due to the melting ice and snows. In Langmoche for instance, a summer yak pasture at 4,200 metres, the valley is under threat from a glacial lake which has formed in the last two decades underneath the two glaciers at the top of the valley.

In 1985, this lake - known as Dig Tsho - caused a mini tsunami after a large chunk of ice fell off the glacier above it into the lake. The resulting damage was estimated at US$5 million and radically altered the valley's landscape and destroyed the best part of two villages, Langmoche and Kamthuwa, further down the valley.

Trekking up the valley, it is apparent that much of the pasture has been eroded away and one village was completely relocated. Erosion is also widespread in the Nangpa valley of which the Langmoche river is a tributary, the main trail up the valley having be re-routed several times in recent years.

Now there are over 22 such lakes throughout Nepal, with more being

Regions downstream of the shrinking glaciers could suffer from increasing drought

reported every year. As these 'dead' glaciers began to thaw more rapidly and the lakes form at the terminus of these glaciers, they become a threat to communities downstream.

The statistics on this are quite clear evidence - and a better indicator than the length of the glacier - as to the rate of melting.

One glacier that has been of particular interest is the Imja Glacier, at an altitude of 5010 metres, nestled in front of the Lhotse Massif right underneath Mount Everest's southern face and its large glacial lake. In the 1960s, this lake was 48,811 square metres. By 2007, it was 945,662 square metres, according to data in a scientific paper by Samjwal Ratna Bajracharya of the International Centre for Integrated Mountain Development (ICIMOD).

According to Jason Gulley, many of the Everest region's large glaciers will eventually follow suit. 'The debris-cover insulates the glacier ice underneath and the melt is faster in the areas with thin debris. This means the glaciers are melting and thinning faster in the bare ice regions close to the upglacier edge... and slowest at the terminus,' he says. 'Debris cover' is a term used by glaciologists to describe the lower part of the glacier - which is always covered with a blanket of rocks and stones which roll down from the mountains. Only the upper reaches of a mountain glacier are bare ice.

Terminal decline

These different rates of melting, he says, allow the large lakes to form at the end of the glacier - a sign they are in terminal decline and no longer active. 'The lakes on the Ngozumpa will soon grow together and form a large lake like the Imja and the Khumbu Glacier is pretty close to forming lakes like on the Ngozumpa,' he adds.

Indeed, the Khumbu Glacier which stretches out from the southern ice fall of Mount Everest is already littered with small lakes and on its upper reaches the area where the British 1953 Everest expedition established their base camp has now dropped by 40 metres.

High up on the famous peak itself, the reports are also worrying. 'We saw mosquitoes in Namche Bazaar (altitude 3440m) for the first time in 2008 and we also saw a house fly at Everest Base Camp (altitude

5360m) - which is unheard of,' says Apa Sherpa of his 2008 and 2009 expeditions to climb Mount Everest, of which he is the world record holder, having climbed the mountain over 21 times.

More worrying than the ever-present danger of GLOF events is the broader consequences downstream on the Indo-Gangectic plains of southern Nepal and India, plus Bangladesh and Pakistan. As these glaciers recede, the water they abundantly supply reduces and most of the region is semi-arid - depending heavily on the constant flow of glacial water to feed it's rivers and of course, the annual monsoon rains.

Alarm bells are already ringing for many. There have been some highly unusual discharges of water along some rivers, such as the Kosi Flood in 2008 - which displaced 25,000 people in southern Nepal and more recently the massive floods along the Indus in Pakistan.

According to figures from ICIMOD, currently over 112,000 square km of the Great Himalayan Range and the inner Asian ranges is covered in ice and snow and estimate this frozen water resource serves some 1.3 billion people in the downstream basins of the ten large Asian rivers that originate there.

In the Himalayas, there are several rivers which have their source high up in the mountains, the River Ganges being the most famous. Running roughly in an east-south-east direction, the river crosses the fertile plains of northern India - which receives very little rainfall outside of the monsoon months (which roughly correspond to summer in the west). Its tributaries are numerous and most of the rivers in the Nepal Himalaya contribute to the Ganges.

Much of the region is semi arid

Water shortages

Scientific analysis of the Ganges basin by academics working with ICIMOD both in China and Nepal suggest that a complex situation is highly likely where water demand increases, glacial ice volume declines and river water runoff declines to less than 1/8 of what it has been in recent years.

The same paper says that currently 9.1 per cent of the water in the Ganges is from glacial melts and that the flow from the Himalayan glaciers will be approximately 170 per cent of its original flow by 2070 and then an 18 per cent drop in the river's annual runoff.

'With time, however, as glaciers completely disappear or approach new equilibria, long-term effects will be increasing water shortages and limited supplies for downstream communities, particularly during the dry season,' the paper says.

'The rivers most likely to experience the greatest loss in water availability due to melting glaciers are the Indus, Tarim, Yangtze, Brahmaputra, and Amu Darya,' they add.

> 'As per the finding, average pace of retreat is 3.75 per cent a year so at this pace, it would take 400 years to melt all the glaciers in the Himalayan region'

Increasingly then, the spectre of drought casts a dark shadow across many areas of south Asia, threatening everything from food security to the delicate geopolitics of the region. Despite this, many in the west and also many in India deny there is any link in the demise of these great Himalayan glaciers and anything to do with man-made climate change.

One of the chief naysayers, say critics, is India's own environment minister - Jairam Ramesh. 'As per the finding, average pace of retreat is 3.75 per cent a year so at this pace, it would take 400 years to melt

all the glaciers in the Himalayan region,' Mr Ramesh told a audience at the Indian Space Application Centre (SAC) of the Indian Space And Research Organisation (IRSO), in Ahmedabad in early June 2011, according to a report in the Hindustan Times.

Much of his verbal output is less-than scientific, his critics say, and he tends to evolve certain facts into lightweight arguments that uphold his belief that nothing is wrong in the Himalayas. This view is echoed by some western commentators and scientists.

Recently he was quoting from an Indian SAC report which claims to be... 'the largest study ever conducted on glaciers in the world. Total 2,190 glaciers were studied for the span of 15 years by the scientists of SAC, a unit of ISRO,' Mr Ramesh said, according to the Hindustan Times.

The report found that 75 per cent glaciers are 'retreating', 8 per cent are 'advancing' and the remaining 17 per cent are 'stable' in the Himalayan region, according to the Hindustan Times.

Are these statistics meaningless though? An 'advancing' glacier is not necessarily getting bigger, it could just be falling apart and extending its debris further out into the valley. It is possible that certain glaciers, due to local conditions and the dynamics of the peaks around them, could grow slightly, though to use this as an argument that glaciers are not on the whole in decline in the region is questionable.

Dubious science

Terming a glacier stable in terms of its length is fallacious, as glaciers melt mostly in a vertical - rather than horizontal manner. As the melting continues, it will usually form into a lake at the terminus of the glacier. This is due to the build-up of debris which is released by the melting ice above, which tends to form a natural dyke of moraine sand and rocks - as has been pointed out in dozens of scientific papers on the subject.

> 'Western scientists have less of a scientific agenda and more of political agenda'

Mr Ramesh's scientific evidence is unreliable at best then, according to some commentators. He also does not touch upon the fate of thousands of smaller glaciers - many of which have now disappeared.

While the IPCC and in particular, its head, Dr Rajendra Pachauri, was brutally attacked in many newspapers throughout 2010 for one misguided sentence which said the glaciers could disappear by 2035 - which was originally an estimate by an Indian glaciologist called Syed Hasnain - few appear to have bothered to take Mr Ramesh to task on what are some quite blatant unscientific porkies.

'Western scientists have less of a scientific agenda and more of a political agenda,' Mr Ramesh was quoted as saying in the Hindustan Times. However, some say his own agenda is political and has little to do with any concrete science.

Much the same can be said for commentators in Europe and the Americas and many other places who have all been very quick to condemn climate change and the panel of highly-respected scientists who are the authors of the UN IPCC reports, without actually checking if what they are saying has any scientific basis - which often their arguments lack.

Meanwhile, high up on Gokyo peak, as the trekkers gasp at the innate splendour of the 360 degree panorama of some of the world's highest mountains around them, few realise the extent of the demise of these great mountain glaciers and the consequences for those hundreds of millions who live in the shadow of the Great Himalayan Range.

The big divide:

is ideology holding back greens from embracing nuclear power?

Once united in opposition, the environmental movement is now divided on nuclear power. **Matilda Lee** reports on why some greens say that anti-nuclear is just sentimentalism

The UK is pursuing a policy of new nuclear builds

They may have gone from dark green to glow-in-the-dark, but the environmentalists behind a series of well-publicised defections to the pro-nuclear camp have done more than just change their colours. They are forming a growing divide on an issue long central to the green cause.

Since the early days of the modern environmental movement, nuclear power has been considered dangerous, expensive as well as unnecessary- with most major green NGOs running long-standing and influential anti-nuclear campaigns, from Greenpeace and Friends of the Earth down to the single-issue Campaign for Nuclear Disarmament.

But now many of those same people- from Executive Director or Greenpeace UK, Stephen Tindale, to Guardian writer George Monbiot and activists and writers Mark Lynas and Stewart Brand among others- are arguing that nuclear, far from being ghastly, is green.

Whether grudgingly or wholeheartedly, they have turned the tables on this most green of green creeds. If we are really going to combat climate change, and at the same time fill the energy gap and meet national and European emissions targets, the argument goes, then nuclear power in the UK is inevitable, and yes, vital.

It is a debate being played out publicly - in the media and within green circles. Now that the UK government has revived its nuclear power programme - easing planning restrictions, identifying sites, even offering what has been described as under-handed subsidies despite a campaign pledge not to do so - is it conceivable that the green movement, which once vilified the technology, will be its champions?

Sentimentalism vs. science?

Mark Lynas, a campaigner who once espoused strong anti-nuclear beliefs, now suggests in his book The God Species that anti-nuclear campaigners have, 'unwittingly helped release tens of billions of tonnes of carbon dioxide into the atmosphere,' in stopping planned nuclear plants that were replaced by coal over the last four decades.

Writer George Monbiot, now strongly in favour of nuclear, says the anti-nuclear stance is, 'an irrational and outdated prejudice'.

Based on the prospect of uncontrolled climate change, it is 'incorrect' for greens to be anti-nuclear

They charge that greens have got it wrong on the science. By not thoroughly considering new evidence, they claim, greens are fixated on an ideological anti-nuclear stance that doesn't stack up when challenged with new facts.

Ex-Greenpeace director Stephen Tindale says he changed his mind on nuclear power due to two things. 'The first was that it is not ideal but better than coal and because we are going to need a lot more electricity which we won't be able to provide using renewables and energy efficiency - we are going to need nuclear'.

He believes greens have a legitimate concern with nuclear weapons proliferation, but that, based on the prospect of uncontrolled climate change, it is 'incorrect' for greens to be anti-nuclear. 'The risks of not using nuclear are much greater than the risks of using nuclear'.

Pro-nuclear arguments centre on it being far better than dirty coal, more reliable and economically viable than renewables and what's more, the waste issue isn't the problem greens have portrayed it as - technology and time will solve it.

Kate Hudson, chair of the Campaign for Nuclear Disarmament, whose been campaigning on the issue since the 1970s, begs to differ. 'They are very much mistaken, I'm not sure what new figures they have seen which would lead them to change their minds. All the new evidence, including much research taken place in Germany that underpinned its recent decision to dispense with nuclear, shows that, in economic terms, it is absolutely viable to press ahead with renewables'.

But is this a case of confirmation bias - dismissing evidence when it doesn't fit a certain belief system? 'We are not ideologically opposed to nuclear power if it was completely clean and safe and met people's needs in a way that it was cheaper or competitive with other technologies. We are against it because there are so many non, or lower, risk options instead'.

Green group dynamics

How significant and widespread is the newfound pro nuclear stance? And are the traditionally anti-nuclear big green NGOs taking any stock of new, or younger members who may be more favourable towards nuclear power?

Craig Bennett, Friends of the Earth's director of policy and campaigns, says FOE hasn't specifically surveyed its members on the nuclear issue. 'There is a lot of two-way communication with

our members. Some ask why we aren't doing more to campaign against nuclear. I think the vast majority are quite clear in being against new nuclear build. But we haven't done a systematic survey of our 100,000 financial supporters. What we have done is a public opinion poll, and quite a high percentage of people, would broadly prefer energy efficiency and renewables'.

He says that FOE haven't had a staff member entirely focused on nuclear in the last 10 years. 'Do we rule out academic research into nuclear? No. We are always open to new ideas and research - and have indicated that we support research into [fourth-generation] thorium reactors. The concern is that governments leap on that as a silver bullet and public sector money gets poured into it.'

While FOE seems to have changed its stance, backing off campaigning against nuclear, and instead focused on campaigning for a massive increase in renewables and energy efficiency, Bennett says FOE still considers new nuclear build a threat.

Greenpeace's chief scientist Doug Parr says the group's continued anti nuclear position stems from a set of historic positions and end points it aims to reach. 'We did change position on nuclear in the UK around 2002 with British Energy's power stations. We advocated phase out in an orderly manner, because immediate shut down would result in an unreasonable level of societal disruption.'

Shouldn't Greenpeace accept the idea that nuclear power is an essential technology to stop climate change? 'Of course there is a case to answer that nuclear is a solution to climate change. Almost certainly it is low carbon, but not everything can be reduced to carbon. You can get a good carbon balance by cutting old growth forests and replacing them with plantations. On a broader sustainability level, is it a good idea? Looking at the evidence, we can do without it'.

Jim Jepps spokesman for the UK Green Party says, 'there shouldn't be any heresies' but raised questions about the availability of uranium supplies and the time scale for fourth generation nuclear reactors.

Politics at the heart of nuclear

If ideology isn't at the heart of the UK greens anti-nuclear stance, and green groups seem to be increasingly open to the idea of technological developments to overcome issues such as radioactive waste, then perhaps the greatest frustration is that new nuclear build is the result of a lack of political will.

Doug Parr says nuclear has been particularly corrosive in UK politics. 'It's been an ideological fixation of government, resulting in policies and action that fail to invest time, energy and money into renewables and energy efficiency. Why have greens come out in favour of nuclear? Because they feel nothing else is working. I empathise with that frustration, but there are a number of key considerations: the threat of nuclear proliferation and whether nuclear and renewables can live side by side.'

It is this incompatibility of nuclear and renewables both vying for attention within a small political bandwidth that is such a huge concern. 'Politicians only have so much time to push something through,' says Doug Parr. 'Nuclear faces a whole range of things that need to be dealt with - public opposition, only a certain number of sites, planning and public inquiry. Renewables equally face barriers - building technical skills, planning and consistency of support. It's crunch time.' Parr believes there are practical, political and technical reasons why nuclear and renewables are incompatible.

'It is quite ironic that Lynas accuses us of being ideological. In fact, we are pragmatic, we need a more decentralised energy system, and nuclear can not do that. It has consistently over promised and under delivered. We can not risk it not delivering now when it hasn't in the last 50 years,' says Craig Bennett.

What about nuclear in the short-term, as a 'bridge' to a renewable-based energy system? Energy policy expert Bridget Woodman, of the University of Exeter, disagrees. 'It can't happen. With nuclear it takes ten years to build and 60 to operate. That's 70 years. I don't see it as a bridging option. If we decide now to go down the nuclear route, we are locked in for 70 years.'

But we seem to be on track for doing just that. 'The government's new set of policies are explicitly designed to enable new nuclear build and even more possibly designed to make EdF very happy. One of the key issues on nuclear power stations is that they are costly to build, meaning you need to reduce uncertainty in the market. That is exactly what the government has done,' she says.

The defiant NO on the nuclear issue has been muted and is now a cacophony of voices - some yes, some maybe, some not sure. Risky and expensive, yes. But nuclear has won over many of its fiercest critics.