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Environmental Justice: Inequality and Gender

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A CRACK IN THE GLASS CEILING?

PROFESSOR CAROLYN ROBERTS examines the persistent gender bias in environmental sciences today

8th March 2011 will mark the centenary of the establishment of International Women's Day, a time at which the contributions of women to human society are to be celebrated. But despite this notable event, investigation of the role of women in almost any area of contemporary life demonstrates the persistence of gender bias. The growing cadre of high profile individuals includes icons of the environmental movement such as Joy Adamson (naturalist, conservationist and raiser of lion cubs); Rachel Carson (researcher and author of the influential 1962 text, 'Silent Spring'); and Akpezi Ogbuigwe (Head of Environmental Education and Training, United Nations Environment Programme); and in the UK Sara Parkin, (joint founder Director of the Forum for the Future), Judy Ling Wong (Director of the Black Environment Network) and Caroline Lucas, (first Green Party MP in the UK), but women generally maintain relatively low profiles. In 2008 for example, they made up only 23.7% of all Board Members of Science, Engineering and Technology (SET) public bodies in the UK, a decline of 2.0% since 2006 (Figures from Dr Pat Morton, Sheffield Hallam University). Progress in bringing women into leadership and decision-making positions around the world remains far too slow, according to the United Nations Commission on the Status of Women, in March 2010.

In the business sector, the latest analyses show that women make up only about 12% of Management Board membership in the top 300 European companies. The position is marginally better in the United States, where women hold about 15% of the Board seats of Fortune 500 companies. In Australia it is worse, with women directors filling only some 9% of corporate Board seats, whilst in Asia the figure is a pitiful 1.8%. Women are far more likely to be serving coffee to the Board members, or indeed tending to the growing beans whilst living in conditions of poverty and deprivation, than exercising the responsibilities of power. They are disproportionately excluded from the decision-making that affects everyone's lives, and their absence not only prevents individual ambitions from being fulfilled, but also reduces the chances of society unlocking the human potential to move towards a more sustainable future. Sustainable development necessitates harnessing the talents of the many, not the few, as many of the papers in this edition highlight.

The position of women in industry has barely shifted in recent years, except in countries such as Norway, where 2003 legislation has precipitated a more equitable share of the action. Spain and the Netherlands have passed similar laws, and France has started down this route too. In the UK, Prime Minister Gordon Brown noted in Spring 2009 that it was 'unacceptable that there were UK firms without any female Board representatives', but the latest indications are that the current UK government will not be following its European neighbours in setting mandatory targets. Big players such as the Confederation of British Industry, under their President Helen Alexander, are exploring this issue, and Lord Davies has been commissioned to report to government in February 2011, but the expectation is that he will recommend that UK listed companies should set voluntary targets for the number of women in their boardrooms, and that failure to meet them would not incur penalties. The targets would reflect a company's existing number of female employees, and the requirement would be added to the UK's Corporate Governance Code. A similar voluntary

approach would be taken for measuring and publishing gender-related pay information.

In the meantime, a recent report by Cranfield University School of Management, published in December 2010, found that the number of female directors at the UK's leading firms had been almost stagnant for the third year running, with 12.5% women on Financial Times Stock Exchange 100 Boards, compared with 12.2% in 2009 and 12% in 2008. Of these, the companies operating in areas of science, engineering and technology (the SET sector) in which many of the Institution of Environmental Sciences' Members work, typically have even lower percentages of women Board members - about 10.8% in 2009 - and over 28% of these companies had no women Board members at all (Sealy, Vinnicombe and Doldor, 2009). The equivalent figure for non-science-based companies was 19%. At the highest level, only one Chief Executive Officer of a science-based FTSE 100 company was female.

In UK Higher Education, the gender balance of leadership looks a little more promising. Women now make up more than half of UK university graduates, and although in 1995 only five UK Vice Chancellors were women, five years later there were twelve in this influential group, and by 2009 some 31 women were in charge of the 152 institutions, a fifth of all the Vice Chancellors (Times Higher Education Supplement, April 2010). Lower down the university pecking order, the average academic salary gap for lecturers is narrowing too, from a 16% gap in 2007/8, to 14% in 2008/9; the gap for senior professorial staff is apparently closing more quickly. The suggestion here has been that the reduction reflects women picking up increasingly senior roles, but it is a complex picture; women Vice Chancellors were still paid significantly less than the men in 2009.

Information regarding the detailed position of women in the environmental professions is less easy to acquire, but the indications are that the position may be shifting, albeit slowly. The proportion of women science professionals has now reached about 39%, although the numbers in technologist level posts hovers around 12 or 13%. For most science, engineering and technology occupations a higher percentage of the female workforce has a degree than the male workforce. Sometimes the difference between the two percentages is large; for science and engineering technicians the difference is 15.3 percentage points, and for scientific researchers 7.5%; women evidently need to be significantly better qualified to secure equivalent positions, but they are making progress (Kirkup, G., Zalevski, A., Maruyama, T. and Batool, I. (2010). Women and men in science, engineering and technology: the UK statistics guide 2010. Bradford: the UKRC).

For the environmental professions narrowly defined, we can only speculate. Higher Education Statistics Agency statistics suggest that the proportion of women studying undergraduate or postgraduate courses in environmental and related sciences in 2008-9, was some 46% (HESA Ltd, 2010 Table 2e). This is the starting point for most environmental careers today. The gender balance for Institution of Environmental Sciences student members is also close to fifty-fifty, but the proportion of women Members falls in more senior posts and roles (see Figure 1); for full Members and Fellows of the Institution, who must demonstrate several years experience in senior roles, it drops to between a third and a quarter. Women make up about a third of the Institution's 'Chartered Environmentalists', rather more than their Membership proportion would imply, and it remains to be seen how many will take up the new opportunity of Chartered Scientist. Surprisingly, no Honorary Fellowship has ever been awarded to a woman, perhaps something that the Institution should consider. The aspirations of women in environmental domains cannot be questioned, and amongst the environmental professional bodies more widely, the Institution of Environmental Science's female Members are also playing a leading role. Alongside the Institute of Ecology and Environmental Management, and the Institute of Environmental Management and Assessment, our own Institution is in the vanguard in terms of the proportion of its women members who have achieved chartered status (see Figure 2), demonstrating their commitment to professionalism.
What of service to the Institution of Environmental Sciences? Although women have participated in small numbers on Council almost since its establishment in 1971, their numbers have rarely exceeded three. The Institution's 1975 minutes record the contributions of Miss B.P.R. Ward, Principal of Crewe

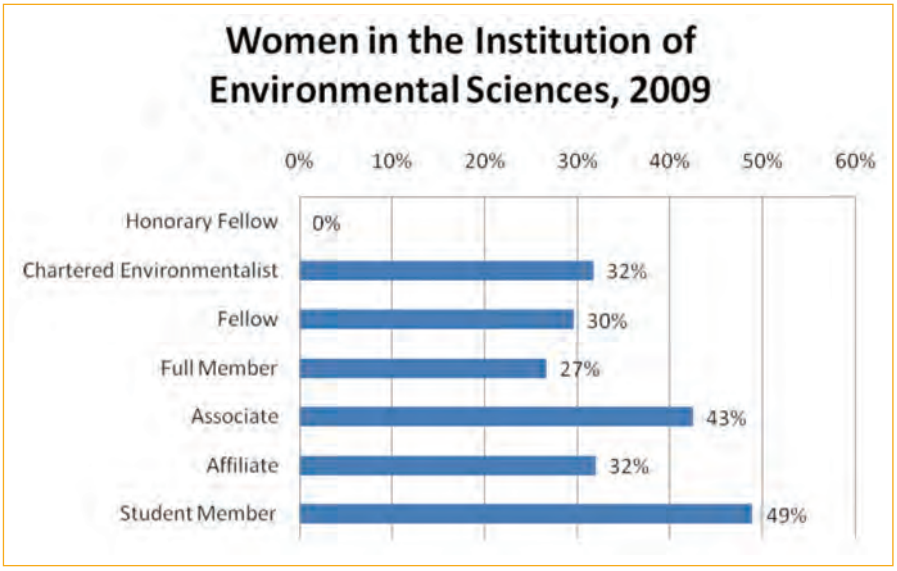

Figure 1

and Alsager College of Education. The College was already offering a pioneering course in environmental studies for serving teachers at that point, with its remit to 'impart an informed concern for the environment' to schoolchildren reflecting the Institution's own objectives. By January 1976, Miss Ward had been joined by Dr. Lindsey Marsh, Senior Lecturer in South London College, and Professor Elizabeth Perrott, Director of the International Micro-Teaching Unit at Lancaster University. Both subsequently chaired Institutional subcommittees, especially those focussing on education. In January 1977, Mrs Sonia Withers (Loughborough University of Technology) joined Council; she was a frequent writer in the International Journal of Environmental Studies, and contributed to the Institution's leadership for several years. An early 'industrial member' of Council was Miss D Bruce, an Environmental Conservation Officer with the Central Electricity Generating Board. But the proportion of women on Council has remained disappointingly low until the present day, where there are still only three women (18%) amongst the seventeen members, and we should as an Institution be concerned about this situation. A more explicit commitment to achieving diversity and equality from our own professional body would be a good beginning.

More and more research could be done to pinpoint the relative position of women in different areas of life, and to provide further reasons why society would be enhanced if their talents were utilised effectively. Equity is, after all, one of the fundamental tenets of sustainability. But as many of the articles in this edition of the Journal demonstrate, we probably already know enough already. Just as for other dimensions of inequality such as ethnicity or sexual orientation, the long term solution to the lack of women in leadership roles in the environmental professions is a cultural one, both within their workplaces and in the wider world. The stereotypes of gender roles that perpetuate inequalities between men and women are unlikely to be shattered by single individuals or in the short term. It is a synergistic change, too - as women continue slowly to break through into senior positions where they can effect organisational change and become critical actors, it is more likely that shifts in the perceptions of women at work will occur. Assisted perhaps by organisations such as Women into Science and Technology (WISE) operating in schools and Higher Education, and 'Women in Cleantech and Green Industry' within the environmental professions, the stereotypes of women as 'supporters', who inevitably populate the less well-regarded, more 'people centred', human resources and administrative roles, will be challenged. The Americans have been more successful than other nations at this, with a range of organisations supporting women environmental scientists, such as the 'Association for Women Geoscientists', the 'Society of Women Environmental Professionals of Greater Philadelphia', and the 'Women's Environmental Council'. Perhaps the run up to International Women's Day is a critical moment, where the opportunity for women to gain access to powerful organisations in the UK and beyond can be seized, transformational change in te progression towards a more sustainable future prompted, and where both women and men will gain?

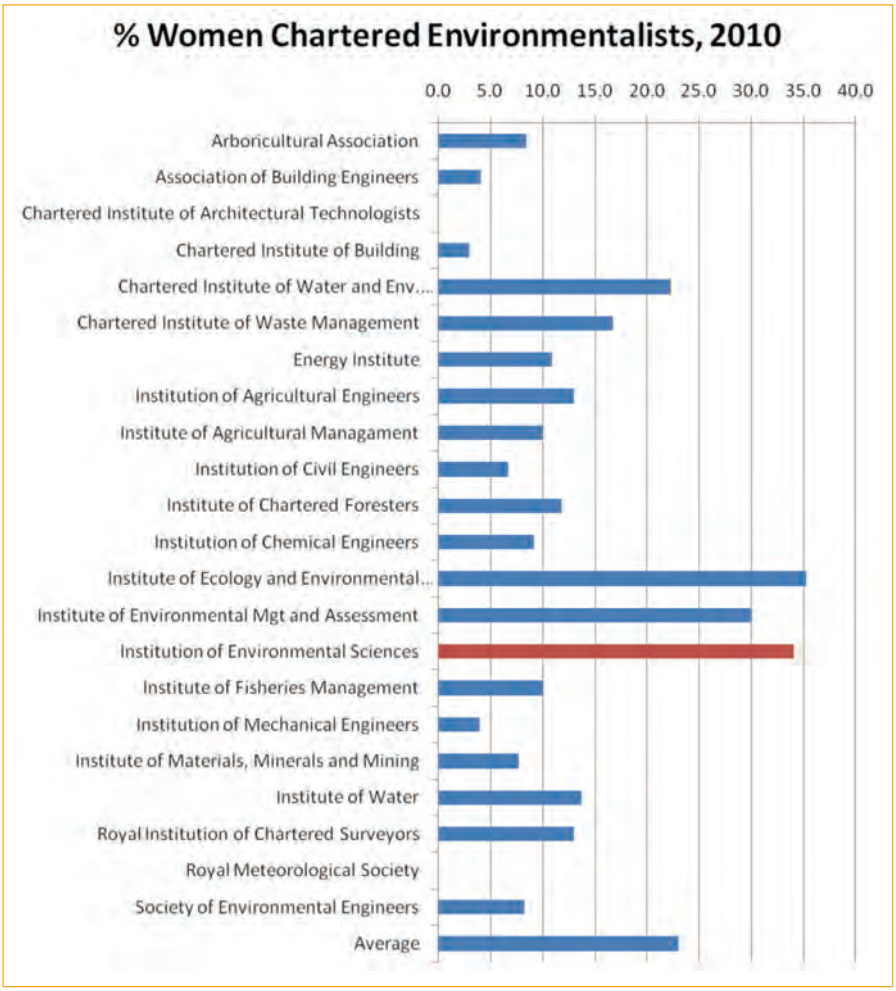

Figure 2

• *Professor Carolyn Roberts, FRGS, FIEnvSc, FCIWEM, CEnv, CWEM, SFHEA*
Vice President of the Institution of Environmental Sciences

SHARING THE COMMUNAL WELL

DR MARK EVERARD considers the past and future of shared resources worldwide

Sharing of a communal well, spring or other important natural resource, such as grazing or fertile parcels of cropland, is a common feature of tribal life throughout much of the developing world. Whether in rural India, China or Africa, elaborate if unwritten protocols, traditions and beliefs characterise and bind local communities whose continued well-being depends very directly on the co-operative sharing of these fundamental environmental resources.

A brief history of sharing

It would be naive in the extreme to believe that there was a bygone 'golden age' of equitable resource sharing in the developed world, although we of course rose from tribal roots and many common stewardship systems from our more remote past do mirror the tribal systems described above. Famously, the 'enclosures' (or inclosures) that took place roughly between 1760 and 1820 marked a time when much of the open lands of England and variously across Europe were 'enclosed', with traditional rights of use revoked as title deeds passed to private owners. This was a time of great social revolution with land often seized with violence, at once creating a poor underclass as well as spurring a mass migration of the rural population to the booming cities and their burgeoning factories. Yet, even prior to the enclosures, there had been a very considerable asymmetry of power and rights relating to exploitation of these purportedly common land, water and other natural resources, particularly under the medieval feudal system that saw land rights granted in exchange for military (knight) services.

Notwithstanding these changes in ownership and exploitation, certain communal rights have been cemented since at least Roman times. It was the Roman emperor Justinian I during his reign as Eastern Roman (Byzantine) Emperor from 527 to 565 who instituted Justinian law in what is now the UK. This still underlies much of contemporary riparian common law across Europe, North America, Australasia and a wide range of other nations, particularly including former British colonies. In principle, rights under Justinian law allow riparian owners to make reasonable use of water adjacent to their property whilst protecting the rights of other riparian owners both across the watercourse and downstream. Whilst the details of riparian rights differ between countries, variously covering flows and flooding, fisheries, nature conservation, pollution, sedimentation and a range of other concerns, case law built up over centuries based on the simple principle of not impinging on others' rights has produced an adaptive system which is backed up by statutory legislation.

These swings between common and private rights have been played out across much of the world and throughout human history. Perhaps the most infamous recent privatisation of rights was that which caused such a degree of international outrage under the apartheid regime in South Africa, under which land, water and other critical resources were progressively brought under the control of the ruling white minority. This is exemplified under the Irrigation Act of 1912 in which it was specified that water constituted the sole property of the owner of the land (and the most productive land was almost invariably white-owned) on which it rose: "He can do whatsoever he pleases with it and neither the owners of lower-lying land nor even the public can claim to be entitled to make any use at all of that water".

Whilst it is right to denounce such patently prejudicial policies, we should not too readily assume that our own inherited rights and traditions are pure. For example, although the authority of the British Empire may be largely a thing of the past, and generally titular where it persists, the industrial power which propelled it forwards to seize resources and cheap labour across the globe is prospering today.

The Mvoti River at Ezaqayeni village, South Africa, which is shared for water extraction, bathing, laundry and many other uses by village residents, farmers, and industry.

Much of the workings of the current capitalist model (an ideology more pervasive than any religious or political creed) are founded on economic, resource use and other models established in the early part of the European Industrial Revolution.

As the rest of the world has industrialised, we have seen a progressive globalisation that, for all its much-proclaimed promise of prosperity for all, tends to depend for its competitive success on materials and labour procured at the lowest possible cost. Neither the rights of people forming the grassroots of supply chains feeding this model, often remote and in countries lacking protective legislation equivalent to that of emancipated peoples of the western world, nor sustainable resource extraction and processing can be safely assumed. Indeed, the cheap products that cram our high streets and shopping websites have their own ethical and environmental footprints, much of which remains invisible to us as we strive to make ends meet within the market economy that substantially shapes our worldview and expectations.

Sometimes, we see the raw edges of our consumptive habits rather closer at hand. For example, periodic 'bun fights' under the EU Common Fisheries Policy or wider international fishery agreements under the aegis of the 1982 UN Convention on the Law of the Sea tend to follow a depressingly familiar script; national ministers arguing for a larger quota than their neighbours of stocks that robust scientific opinion assures us are already harvested beyond 'safe' limits at considerable peril to the long-term stock viability. This, as if the multiple and enduring human hardship, community breakdown and continuing misery resulting from the well-signalled but largely ignored catastrophic collapse of Newfoundland's Grand Banks fishery, formerly the world's richest cod fishery but now bereft of fish in economically viable numbers, were a mere winter's tale to scare the children.

The tales of land ownership, controls on forest and mined resources including petrochemicals, and rights to water, food, biofuels and other natural assets are no more glorious than that of international fisheries. Furthermore, as exemplified under apartheid but reflected in many other guises across the globe, inequities in power and wealth are most often affected through controls on critical natural resources. After all, in an arid land, access to water is more important than access to oil or gold, and money is of little use if one can not graze one's cattle to support one's family nor purchase food from neighbours equally dependent upon a common that has been grazed bare.

The future of the commons

The metaphor of the common well or of common land is one with particular resonance for those concerned about the integrity of the ecosystems essential to supporting our future. It no doubt chimes with some ancestral cooperative behaviours evolved to ensure the sustainability of critical natural resources and the livelihoods of all dependent upon them. It is, however, perhaps more consciously recognised in the metaphor of 'the tragedy of the commons', which was ushered into popular environmental discourse by Garrett Hardin in 1968 (Hardin, 1968). In essence, 'the tragedy of the commons' refers to the tendency for common resources to be degraded due to competitive advantages accruing to individuals from over-exploiting communal resources, taking more of the pie before their neighbours beat them to it, with the costs borne communally. Sadly, the metaphor is played out with great regularity in terms of the competitive destruction of many global fisheries, and in asymmetries in access to key resources and emissions of climate change and other wastes into the global commons of atmospheric, water and soil systems. Arguably, future generations are the greatest losers in this annexation of common resources for immediate gain. Aong with the wealth we have both generated and squandered, they will inherit a legacy of depleted biodiversity, contaminated environmental media and suppressed ecosystem services. Unless our trajectory of development changes fundamentally and rapidly, this will ensure them more impoverished prospects than those enjoyed by today's stewards of the Earth.

> *'Inequities in power and wealth are most often affected through controls on critical natural resources.'*

Fortunately, and contrary to many who believe that private ownership is the only way to escape it, 'the tragedy of the commons' is far from an inevitability. This is verified not only by the myriad tribal protocols that have sustained some common resources over millennia – grazing practices by the Maasai in East Africa, forest-dwelling terrace farmers in India's Western Ghats, commoners' councils governing rights in the few remaining British commons, and so forth – but also by the host of statutory, common law and other prescriptions that have been instituted to safeguard resources recognised as both important and vulnerable. Effective governance, be that formal or traditional, is the guardian angel of common resources understood to be essential to the continued wellbeing of those who share them.

Returning to South Africa, the far-sighted leadership of the first democratic government elected in the aftermath of apartheid saw the nation's natural resources as fundamental to the journey to equity, sustainability and economic efficiency that underpinned the new constitution. From the installation of this government in 1994, patient and painstaking engagement and consensus processes were undertaken to hear the voices of all in that new society, many of which had been silenced or unheard for literally centuries, to establish a novel basis for governing the sharing of land and water. Notwithstanding practical difficulties that still thwart its full implementation, South Africa's National Water Act of 1998 remains a beacon of hope in terms of its recognition of the need to share the fundamental common resource of water, sweeping away all prior rights to water and establishing instead the fundamental principle that water is a national resource owned by the people of South Africa and held in

custodianship by the state. The sharing of water, and the institutions to be developed to achieve it, form the very cornerstones upon which the driving principles of equity, sustainability and efficiency will be made real.

Herein therefore lies the key principle. We refer often to the pressing environmental crises with which we have to grapple. Yet they are not environmental crises at all, for Gaian theory tells us that the Earth's ecosystems will adapt in one shape or another. The framing question is whether we intend to be part of that future, and to be living fulfilled lives. Sustainability is, in its essence, about sharing common resources such that they can continue to support our needs indefinitely. Is it impossible to separate equity from sustainability, which is certainly an 'inconvenient truth' for the privileged minority of us planetary folks who have benefited from a history of disproportionate resource use?

As the UN's authoritative Millennium Ecosystem Assessment (MA) (Millenium Ecosystem Assessment, 2005) revealed with frightening clarity, the major ecosystem types of this planet constitute planetary-scale commons that bind and support us all. Yet the MA also shows us that all are in decline, some of them steeply so, which paints a far from rosy prognosis for the future wellbeing and security of humanity. It is not all 'doom and gloom' of course, which would anyhow be a disempowering message. Advancing ecosystem services as an effective tool for not only assessing our environmental impacts, including their consequences for others who share these common life support systems, the MA also expands on how this tool can help us develop a wider vision that enables us to change our habits and practices to ensure less unintended degradation of critical ecosystems and the more equal sharing of environmental 'goods' and 'bads'.

We are, of course, embarked on this journey through many single-disciplinary and localised agreements, including various EU environmental Directives such as the Water Framework Directive, national policies such as the US Clean Air Act, trans-national agreements such as those relating to trans-boundary rivers, practical tools such as Integrated Water Resource Management, and international agreements such as the Convention on International Trade in Endangered Species of Wild Fauna and Flora, the 1997 Kyoto Protocol and the Ramsar Convention (for the protection of wetlands). The real challenge now is to break out of sectoral and geographical parochialism and recognise the full scale of our influences on the wider ecosystems of which they are part, and the impacts that our lifestyles and habits thereby inflict upon communities from local to global scale, now and into the future. It is by such ecosystem-centred thinking that we can best recognise and address the massive equity issues that underlie the sustainability challenges we face today.

Conclusion

In returning to the metaphor of the 'communal well', we have to recognise that these commons extend from the village to the catchment, the nation to the continent, across the oceans and atmosphere, and include the whole biosphere and all who share it including future generations. Tools are now available which may make tractable the consideration of these scales of space and, critically, time in day-to-day decision-making. All we need now is the courage and humility to apply them in recognition that equity and sustainability are, ultimately, inseparable within our planetary 'common'.

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References

Hardin, G., 1968. The Tragedy of the Commons. Science, 162(3859), 1243-1248.

Millennium Ecosystem Assessment, 2005. Ecosystems and Human Well-Being: Current State and Trends. Island Press, Washington, DC.

OPINION: SOCIAL INEQUALITY AND ENVIRONMENTAL JUSTICE

An unequal society is a more unjust society, according to DANNY DORLING

Within recent years awareness has been growing of the interconnectedness of social justice and the environment. This has resulted in the concept of environmental justice, the idea that all people have the right to a healthy environment and that poorer groups should not bear a disproportionate burden of those environmental policies that are enacted. Tradable carbon quotas impose just such a burden. Coupled with high social inequalities and widespread financial debt, tradable carbon quotas force the poor, and especially women, to give up their rights to resources to the rich, as the rich can buy these quotas. Giving up such rights has mischievously been described as somehow being of benefit to poorer groups: they can supposedly 'cash-in' on their environmental allocation, but such cashing in is merely the legitimisation of existing inequalities and results in affluent people coming to believe that they have the right to pollute more because they have paid for that right. Paying to 'carbon offset' you air travel is a similar self-deceit.

Inequality and Pollution

In Britain the poorest fifth of households live disproportionately in areas which produce the least pollution, including pollution from car exhausts, and yet they are also that group who will inhale the most of these pollutants from the exhaust fumes of the more affluent, those who drive past their homes on the way to the office. This relationship holds when poverty, pollution and emission statistics for all of the country's 10,000+ wards were examined and this made me realise that in seeking what might appear to be the most efficient short term economic solutions, we can both cause the greatest long term environmental harm and exacerbate social injustice in the process (Mitchell & Dorling, 2003).

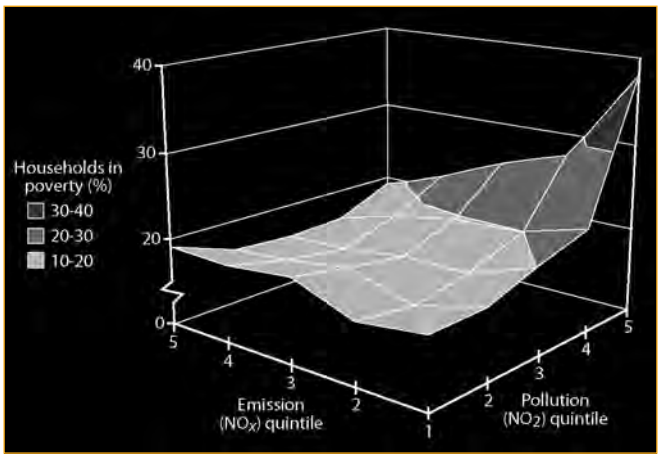


Figure 1: Poverty rate of wards by quintiles of emission and pollution of NOx (Source: Dorling, 2010)

Worldwide, inequality between those who most pollute and those who suffer pollution the most is far greater than within any one country. Imagine if the world were a city. In that planetary version the rich billion live upwind and on the hill. The world's most affluent one billion people either directly pollute or buy goods that disproportionately pollute the other six billion's air, water, land and foodstuffs. For the Worldmapper project, with a group of colleagues, I collected information on who polluted the most worldwide. The results shocked us (Dorling et al., 2007), and made me wonder what lay behind the disparities in levels of pollution per capita within affluent countries. These are countries which otherwise have very similar mean average income per person.

The 25 richest countries of the world those countries in which, for the first time in our generation, there are now more than enough resources for all to live a good life. In all those affluent countries there is no longer any material need for people to go without, as there was just a generation ago in, say, Britain, where most people could not afford to heat their homes to a level the majority would consider adequate today. We are now in an era where, within these affluent countries, and for the first time in human history, it is the poor who grow fatter than the rich. These 25 are the countries which now have enough to go round (they are similar to those chosen by Wilkinson and Pickett, 2010).

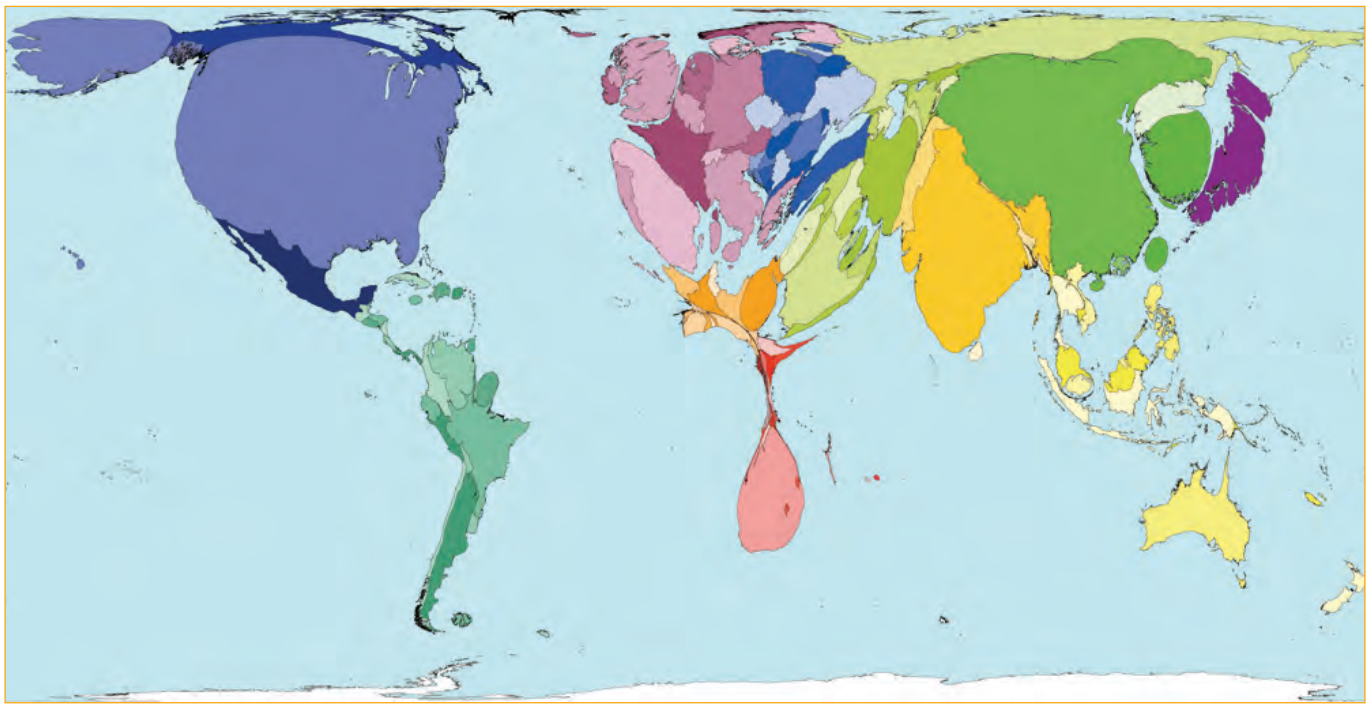


Figure 2: Worldwide distribution of pollution of Nitrogen Oxides (NOx) for all countries. Area is proportionate to pollution (Source: www.worldmapper.org, data for 2002).

In all these affluent countries there are however inequalities, and in those where inequalities are the greatest it is now becoming evident that people, on average, pollute much more. The initial indications of this came in a series of recent papers on biodiversity which found that in affluent countries with high income inequalities there was a consequential faster loss of species and habitats occurring (see Mikkelson et al., 2007; Holland et al., 2009; and Butchart et al., 2010). Earlier Liu et al. (2003) had shown how environmental damage per person tended to be greater in affluent countries with smaller household sizes. When combined with these later studies, this demonstrated the same to be true in more socially inequitable countries where free markets are more likely to be allowed to ride rough-shod over other concerns. It became clear that countries of great social inequalities made up of small nuclear family units have the potential to cause great environmental harm through more excessive consumption per person.

Consumption and Pollution

In the last year I have been comparing levels of consumption and pollution between the world's richest nations and the results have shocked me. The affluent country with the lowest income inequalities between households is Japan. The richest tenth there receive 4.5 times more per year in income than the poorest tenth according to the latest statistics from the UN Development Programme (Dorling, 2010). In Japan, according to the Food and Agriculture Organisation, people on average each consume 44 kilograms of meat and fish per year (all remaining statistical sources are given in Dorling, 2011). In the UK the richest tenth of households receive 14 times the income of the poorest tenth each year and everyone consumes an average of 77 kilograms of meat and fish a year. In the United States the richest tenth receive 16 times the income of the poorest tenth and some 118 kilograms of meat is consumed by every man, women and child each year (by rich and poor and all others combined).

Why, in the United States, where so many millions of people live in poverty and thirty million receive food stamps, are such huge quantities of meat consumed? It is not the affluent consuming all that meat. Everyone, on average, eats more in the USA than the UK. All social groups on average eat more meat in the UK than in Japan. Poorer people partly get into debt to eat so much meat (it is cheaper and

healthier not to). What happens in unequal affluent countries is that everyone increases their consumption to try to better mimic those just 'above' them, even in cases such as consuming excessive meat that is individually harmful, let alone more environmental destructive in aggregate (Frank, 2007).

There are exceptions to all the generalisations I am about to make about the behaviour of people in the rich world. For example, the Danes consume even more meat per head than the Americans, but the rarity of the exceptions and their cultural specificity with national stereotypes, makes the overall realisation even more telling that in general our animal carcass consumption and consequent pollution is three times higher where social inequalities are higher. The pollution is from animal slurry, methane, pesticides put on crops that the animals eat and fertilisers used as well as growth hormones given to animals before slaughter.

The same pattern is found when we look at domestic water consumption. In Norway, a relatively equitable country where the best-off tenth receive 'just' six times more than the poorest tenth a year, some 4.0 cubic metres of water is consumed by each resident each year. In France, where the income inequality ratio is 9 to 1, it is 5.1 cubic metres per year; while in Portugal, with a 15 to 1 ratio, it is 6.2 cubic metres per year. In the United States 6.8 cubic metres per person per year is consumed in contrast to Japan where consumption is 3.2 cubic metres per person per year. Profligacy in water use is not a function of climate or a cultural phenomenon; it is fundamentally a function of profligacy in general, which appears to be best predicted by higher income inequality. Everybody uses more water where people live more unequal lives. Egalitarian societies are better conserving societies.

Where high income inequalities are tolerated, selfish behaviour in other ways is more acceptable. The country which is the exception to the rule amongst the richest 25 by water use is the UK, where we each only consume 3.4 cubic metres despite living in a very unequal society. I hope that there is not a cultural stereotype that the British choose to wash less than other nations (but those others are too polite to tell us!); perhaps we still have a lingering memory of war-time restrictions of not filling the bath up above the line you had to draw in it? Inequality explains a lot, but not everything.

It is not just in food and water consumption that we behave in more selfish ways in more selfish countries. When it comes to civilian flights there are 27 aircraft departures per 1000 people per year into the skies of the United States, 15 per thousand into United Kingdom airspace, and 5 per thousand from Japan. From much smaller islands however there are more flights regardless of economic inequality, and places like New Zealand are the great exceptions here that show how it is not always inequality which drives high levels of air fuel pollution, but also isolation.

> *'in seeking what might appear to be the most efficient short term economic solutions, we can both cause the greatest long term environmental harm and exacerbate social injustice in the process'*

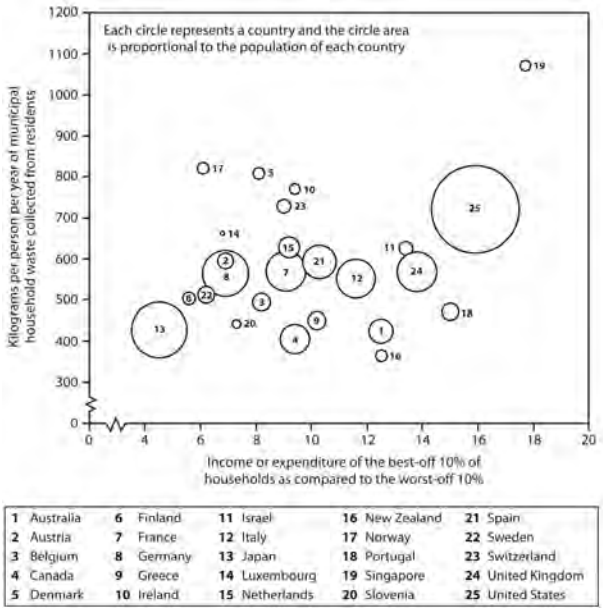
Again the exceptions help prove the general rule. Those countries that pollute the skies the most often have the least need for such frequent are travel. But it is in affluent countries where income and wealth inequalities are high, like the United States, where people appear to find it far harder to organise to build an efficient national rail system. Compare kilometres of train tracks per person in the USA to those in economically far more equitable affluent countries, like Japan. Then extrapolate further. When it comes to military flights and pollution in general from a wider range of sources than just civilian air travel the disparities between the behaviour deemed to be acceptable in different countries is even starker.

Other than in fuel use, our consumption can be well measured, in aggregate, through the weight of what we throw away. We tend to throw away or eat almost everything we buy, other than jewellery. We do this in a very short space of time (and jewellery tends not to weigh very much). If we did not throw away, or eat, most of what we purchase our homes would soon fill up. By weight the greatest average consumption amongst household in the rich world is in Singapore which also has the greatest income inequality ratio. There the richest tenth earn almost 18 times more than the poorest tenth a year.

In Singapore, household waste averages 1072 kg per person per year. In Switzerland, where the inequality ratio is 9 to 1, waste is 728 kg per person per year. In Sweden, where the inequality ratio is 6 to 1, waste averages 513 kg. Reduce inequality three fold and average consumption by weight halves. The graph below shows that there is great variation around the line just described. If however all the States of the United States could be shown separately on this graph, and the provinces of Japan, regions of Britain, and the länder, of Germany, dividing all these large countries into smaller circles, the pattern would become clearer again:

In an attempt to combine individual consumption of goods, food, meat, water, fuel and all the other aspects of our lives which influence our environmental impact, the World Wide Fund for Nature (and many other organisations) have produced estimates of the overall ecological footprints of people in each nation of the world. These too follow the same pattern when the affluent 25 countries are considered. Some 4.3 Planets would be required were everyone to behave like the citizens of the USA do (with their 16:1 income inequality ratio between extreme decile groups); some 3.5 planets would be needed if we all behaved like Australians (with a 13:1 ratio); 2.9 planets if we were all like the Irish (with their 9:1 inequality ratio); 2.4 planets if all like the Finns (with their 6:1 ratio), or 2.2 if like the Japan (with that 4.5:1 ratio). Still too many.

All these levels of consumption are too high and, of course, income inequalities are not the only determinant of polluting behaviour, but there is no affluent unequal country in which on aggregate people consume and pollute less, despite such countries containing so many poor citizens. Perhaps it is because countries like the USA, the UK, Portugal and Singapore contain so many poorer people that eve-



'Where high income inequalities are tolerated, selfish behaviour in other ways is more acceptable'

Figure 3: Residential Waste thrown away by weight verses income inequality in rich nations. Note these are the most affluent countries with 1 million people (Source: Dorling, 2011)

rybody in such places is a little less concerned with everyone else, including with their common environments?

> *Environmental justice requires social justice and social justice cannot be achieved without greater equality of income and wealth*

Conclusion

Within each country who gets to consume and pollute the most is again very unevenly distributed. Men tend to pollute more. Men drive more and fly more often, children pollute the least and are most affected by pollution in the long run, not least because their lungs are smaller and they breathe in at car exhaust pipe level. In unequal countries excessive consumption offers an escape from everyday realities and is lauded by governments to help 'keep the economy going'. The worse pollution of all in such countries is the pollution of our minds from such banal thinking and the spreading of that mental pollution worldwide from the most aggressively free-market of such unequal countries. There is nothing truly free about such behaviour.

To consume less and pollute less we each need to begin to lead lives based on a more equitable distribution of resources. In an age of austerity the belts of those with most need to be tightened the most. That is when we come to see that we need not eat so much meat, need not waste so much water, need not travel so frequently and far, need not buy so many things we really do not need - all if we really do want to tread lightly upon the earth and have a smaller footprint. It is far easier to tread lightly when others are not thundering around you. Environmental justice requires social justice and social justice cannot be achieved without greater equality of income and wealth. All this has only recently become evident. Maintaining high economic inequality will speed up enhanced global warming.

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References

Butchart, S. H. M., Walpole, M., Collen, B., et al., 2010. "Global Biodiversity: Indicators of Recent Declines." Science, 328(5982), 1164-1168.

Dorling, D., Barford, A., & Wheeler, B., 2007. Health impacts of an environmental disaster: a polemic. Environmental Research Letters, 2(045007), 11pp. doi:10.1088/1748-9326/2/4/045007 (www.worldmapper.org)

Dorling, D., 2010. Injustice, Why social inequalities persist. Bristol; Policy Press.

Dorling, D., 2011. See presentations given to the Royal Geographical Society in May 2010 and on 'The economics of social inequality and the natural environment' in November 2010 archived here: http://sasi.group.shef.ac.uk/presentations/

Frank, R. H., 2007. Falling Behind: How rising inequality harms the middle class. Berkeley: University of California Press

Holland, T. G., Peterson, G. D., & Gonzalez, A., 2009. A Cross-National Analysis of How Economic Inequality Predicts Biodiversity Loss. Conservation Biology 23(5), 1304-1313.

Liu, J., Daily, G. C., Ehrlich, P. R., et al., 2003. Effects of household dynamics on resource consumption and biodiversity. Nature 421, 530-533.

Mikkelson, G. M., Gonzalez, A. & Peterson, G. D., 2007. Economic Inequality Predicts Biodiversity Loss. PLoS ONE 2(5), e444. doi:10.1371/journal.pone.0000444.

Mitchell, G., & Dorling, D., 2003. An environmental justice analysis of British air quality. Environment and Planning A, 35, 909-929.

Wilkinson, R., & Pickett, K., 2010. The Spirit Level: Why equality is better for everyone. London: Penguin.

www.worldmapper.org, 2010.

GENDER EQUITY IN AGRICULTURAL DEVELOPMENT IN SUB-SAHARAN AFRICA

There are numerous challenges to agriculture in Sub-Saharan countries. ARUNDHATI INAMDAR WILLETTS considers the unintended consequences of agricultural research on local communities, in particular women

The development agenda in almost all Sub-Saharan countries focuses on the need to reduce poverty. Given that between 70 and 80% of the population in these countries live in rural areas and that (predominantly rain-fed) agriculture is the main means of livelihood, the proposed approach to achieving this goal is through agricultural-led development, with the intention of ultimately leading to food security.

Among the drivers supporting agricultural development is agricultural research. Consequently numerous national institutions, as well as international and local non-governmental organisations (NGOs), are involved in various types of agricultural and biotechnological research (occasionally involving genetic modification). Their work is often targeted at rural small-holder subsistence farmers, the majority of whom are women. Indeed, the United Nations Food and Agricultural Organisation statistics indicate that about 45% of the economically active population involved in agriculture in Africa is female, and that the contribution by women to food crop production is substantial, ranging for example between 70% and 80% in Malawi, the Sudan, Uganda and the Democratic Republic of Congo (Africa Recovery, 1997; FAO, 2010; World Bank, 2009). Women are also extensively involved in the production of cash crops.

Women in the rural areas of Sub-Saharan Africa are therefore essentially the providers of food for their families and play a critical role in food production. They are responsible for subsistence farming activities and provide the bulk of the labour required for the day-to-day management of farms including planting, sowing, weeding, and harvesting, as well as for processing or cooking agricultural produce. They must therefore interact very closely with the natural environment.

Challenges to agriculture

Throughout Sub-Saharan Africa, however, exponential population growth (and the resultant pressure on land) has triggered environmental degradation through deforestation, overuse and/or pollution of water resources, soil erosion and loss of biodiversity. As a result, the size of land holdings belonging to individual households have substantially decreased, and in the quest to produce food for subsistence, unsuitable (often marginal) land is cleared for agriculture. This results in degradation of soil, and then decreased fertility and productivity. Wetlands have been also drained to gain additional land for cultivation, leading to the loss of critical dry season water sources. This makes it increasingly difficult for rural women to feed their families.

Agricultural development faces a number of challenges in most African countries, as with other less-developed countries in the world. Much of Africa is classified as semi-arid or arid; rainfall is therefore often erratic, making water a major limiting factor affecting farming. Pestilence is rife, with vast

tracts of farmland periodically affected by plagues of locusts or army worms. Agricultural research programmes aim to improve crop yields, enhance the nutritional value of crops, improve resistance to drought and pestilence, reduce dependence on inputs such as fertilizers, shorten crop cycles, and improve the adaptability of crops to different types of soil characteristics. Other research focuses on improving livestock health, and increasing milk yields.

The unintended impacts of agricultural research

While the overall intentions of such programmes are (directly or indirectly) to better the livelihoods of the rural poor, including women, there are several practical and cultural aspects that are often overlooked in the bid to advance agricultural innovation (PharmEng Technology Inc, 2006). For example, by having shorter crop cycles, particularly for dryland crops, farmers would be able to produce at least two crops during the short rainy season. Often however these fast-growing crops require more water, whilst traditional varieties – such as the sorghum grown in Turkana in northern Kenya – although much slower to ripen, need smaller quantities of this precious resource. There are additional issues related to increased production: farmers may have to hire more labour to be able to harvest the crops and must therefore have access to cash; they would need more facilities for storage; and they would need access to adequate and reliable transport to take their produce to markets (this being a significant constraint for agricultural production in Africa).

Maize meal is the staple starch throughout much of Sub-Saharan Africa, and is prepared by mixing it with water and boiling it until it forms a soft dough. This preparation is variously called ugali, nsima or mealie pap. Improved varieties of maize and other food crops may taste strange, may not have the same doughy consistency, or may differ in colour, and therefore may not be palatable or appealing, particularly to rural folk. These new varieties may take longer to cook, requiring more water and energy; remembering that in rural Africa, women are responsible for the collection of water and firewood, this puts an additional burden on their already heavy workload.

New crop varieties may also require more tending, weeding or pruning, again having implications on women's work load and time availability. They may introduce new planting techniques, require different means of land preparation and different agricultural inputs, all of which rural farmers may be unfamiliar with. The farmers would therefore have to depend on agricultural extension workers to help them to understand planting and harvesting techniques. Extension workers are however often under-resourced and are not able to reach farmers in more remote areas, so farmers would have to travel to markets or trading centres to access any extension services. Women farmers in particular would be unable to access extension services, due to other household chores that demand their time and energy, or cultural restrictions. Women typically have lower education and literacy levels than men, and this would restrict their ability to gain skills in new agricultural practices.

The introduction of technologies may reduce or make redundant both men's and women's roles, and restrict their participation in farming activities. For example, some genetically modified (GM) crop varieties contain the "terminator gene" which was developed as a means to prevent the spread of GM plants and cross-contamination of natural varieties. This has however meant that farmers are no longer able to keep some of the harvested seed for sowing in the following seasons, and must instead buy new seed from the agricultural inputs store, usually

involving time-consuming travel as well as additional expense. The mechanisation of agricultural activities (such as tilling), which were normally undertaken by men meant that men then took over activities that were traditionally the responsibility of women, such as sowing. Similarly, milling of grain was traditionally done manually by women, but now mechanised mills are operated by men. While this may be seen as a benefit for women in that it reduces their workload, there are social elements associated with activities like milling and sowing, which are then disrupted or require adjustment.

> *'Rather than assisting rural women in achieving food security, agricultural development and research products may instead perpetuate gender inequality'*

Despite being the main producers of food crops and the custodians of environmental and agricultural resources, women are generally at a disadvantage in terms of land ownership and land rights. Throughout much of Africa, land laws and customary laws are patriarchal, and thus men control women's access to land by women and the activities conducted there. Agricultural research technologies sometimes require ownership of land as an entry point for access (for example for field trials where farmers are paid for their participation). In such cases, women are automatically excluded. Banks are reluctant to provide them with loans as they own no land as collateral. Where women do own land, this tends to be marginal land with low agricultural potential.

Conclusion

Apart from restricted access to land, women seldom have access to earnings from farm produce. When food crops become cash crops as a result of higher yields and improved nutritional value, income earned from these crops as well as any decisions relating to their production are dictated by men.

Over the past two decades, the above-mentioned concerns have been well documented. It would therefore appear that rather than assisting rural women in achieving food security, and thereby contributing to the alleviation of poverty, agricultural (particularly biotechnological) development and research products may instead perpetuate gender inequality. As a result of increasing empowerment among women and a growing recognition of the role of women in agricultural development and environmental resource management, various initiatives are however being undertaken to address these concerns. These include the promotion of education among girls and women to increase literacy levels, conducting extensive consultation with women farmers to set research agendas, establishing research priorities linked to women's needs and requirements, as well as assessing the potential impacts of agricultural programmes on the environment, livelihoods, the role of women, and the impacts on their families. It is hoped, therefore, that the lot of women farmers in the rural areas of Africa will substantially improve in the near future.

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References

Africa Recovery, 1997. Women Farmers, the "invisible" producers. Africa Recovery, 11(2). www.un.org/ecosocdev/geninfo/afrec/vol11no2/women.htm

FAO, 2010. Women, agriculture and rural developments: a synthesis report of the Africa Region. www.fao.org/gender/landrights/report/

PharmEng Technology Inc., 2006; Strategic Environmental Assessment Report for Biosciences eastern and central Africa (BecA), Volume 2; ILRI/BecA.

World Bank, 2009. 2009 World Development Indicators Database. http://data.worldbank.org/indicator

JUSTICE AND THE FAIR DISTRIBUTION OF WATER RESOURCES

SUE CAVILL outlines the central role of women in water management, and the importance of considering this when distributing this resource

"For the conservation of water and equitable access to water, we need to recognise water as a commons"

Vandana Shiva, Water activist (Shiva, 2010)

Women and Water

Women and girls generally have the primary responsibility for collecting water for drinking, cooking, washing, and hygiene for the household, as well as managing water for raising livestock, irrigation and home-based industries. Whilst the importance of involving both women and men in the provision, management and safeguarding of water has been fairly well-documented - and international treaties explicitly recognise the central role of women in water resource management - there has not been sufficient progress on gender equality in relation to water resources.

Why it matters

Gender equality in relation to water resources means girls and women having the same rights and opportunities to access and use water as boys and men, addressing the causes as well as the consequences of inequality. Despite evidence to show that investing in women makes societies more prosperous, women and girls remain worse off, they are paid less, receive worse health care and less schooling, suffer more violence and have less control over the decisions that affect them. It is increasingly clear that those Millennium Development Goals (MDGs) which are most off-track (for example MDG 7 to halve, by 2015, the proportion of people without sustainable access to safe drinking water and basic sanitation) are those most closely dependent on improvements in women's rights. Empowering girls and women as actors and agents of lasting change has multiplier effects for achieving all of the MDGs.

Water Supply

In 2008 it was estimated that 900 million people worldwide lacked access to an improved drinking water supply. Women and girls bear the main burden from poor service. They are the ones who usually collect water in more than 70% of households where water is not available on the premises. For 18% of households in sub-Saharan Africa, this is more than a 30 minute round trip.

In urban areas, women and girls may spend hours queuing for intermittent water supplies. In rural areas, walking long distances to fetch water can expose women and girls to harassment or sexual assault, especially in areas of conflict; there are many accounts of women and girls being attacked when searching for water in refugee camps. If men are responsible for distributing water for drinking or agriculture, women may be vulnerable to sexual exploitation, harassment or abuse.

Water carrying and other domestic responsibilities are widely recognised barriers to girls attending schools. Almost two thirds of the 750 million illiterate people in the developing world are women. Investing in girls' primary and post-primary education can improve a country's productivity; increase girls' chances of employment and entrepreneurship; decrease fertility; improve maternal health; and ultimately increase the chances of economic growth.

Water and livelihoods

In Sub-Saharan Africa and South Asia the agricultural sector makes up more than 60 per cent of all female employment. In South East Asia it is women who provide 90% of the labour for rice cultivation and in Sub-Saharan Africa women produce up to 80% of basic foodstuffs, but under customary law in much of the region, permanent land – and thus water - rights are typically held by male household heads.

In urban and peri-urban areas women use water for informal occupations – such as working as washer and laundry women, growing vegetables or the production of snacks and fast food or the brewing of

beer for sale. Water supply programmes in low-income areas have created a number of water- and sanitation-related occupations for women such as acting as vendors at water kiosks, supervisors or cleaners for public toilets, coordinators of micro-credit entities set up to help women install and pay for improved water supply. Some projects also promote women's involvement in construction work traditionally done by men, such as masons of pit latrine slabs.

The benefits of better access to productive uses of water - home gardens, livestock, small-scale enterprises - include higher female earnings and bargaining power, livelihoods diversification, food security and nutrition, health, greater investment in children's education (especially increased female schooling), and social equity and empowerment, which all lead to economic growth in the long term.

'Capture of water resources by the rich and powerful to the detriment of the poor is the norm rather than the exception in developing countries'

Water security

Water security is the availability of an acceptable quantity and quality of water for health, livelihoods, ecosystems and production, coupled with an acceptable level of water-related risks to people, environments and economies. The 2006 Human Development Report estimated that around 300 million people lived in areas of water scarcity and a further 700 million people in 43 countries lived in areas of water stress (UNDP, 2006).

It is estimated that by 2025, almost two thirds of the world's population are likely to experience some kind of water stress, and for one billion of them the shortage will be severe and socially disruptive (WEDO 2003: 61). Water scarcity - the length of time it takes women to collect water and/or if no water is available in the household - has led to increased domestic violence. For instance there are reports from the Kamuli District in south-eastern Uganda that husbands have become suspicious of their wives taking so much time to fetch the water, accusing them of adultery (Ivanova, 2009).

Women, water and a changing climate

The importance of women and access to water resources takes on a new significance in the context of climate change. A changing climate may lead to rising sea levels, droughts, heatwaves, floods, and crop failure, all of which will affect the highest impact on the poorest people. For instance, women are many times more likely than men to die in floods; in Asian countries this may reflect the type of clothing worn by women but also that women spend more of their time in the vicinity of their homes, or that for cultural reasons they do not learn how to swim (Röhr, 2005). Women may be more likely to be undernourished and less resilient to the aftermath of flooding - for example in Bangladesh women were more calorie deficient than men and did not recover as well from the adverse health effects of floods (Osman-Elasha, 2010), floods also increase women's domestic burden (Cannon, 2002).

Social Justice

On July 28th 2010, the United Nations recently recognised water as a human right (UN, 2010), making it the state's obligation to realise this right for everybody, without discrimination. Where states fail to carry out this duty, it possible for ordinary people and their associations to hold them accountable for it. With respect to water, social justice requires the fair distribution of supply and access to the resource. If people's expectations are violated, public action may result; people asserting their rights as citizens to have a voice, and also to have adequate supplies of water.

The size and frequency of water protests appears to be increasing: in Egypt 600 people staged a sit-down protest outside the Irrigation Ministry in Cairo in July 2010 to protest about the lack of wa-

ter for their land. Also this year, more than 1,000 protesters from indigenous groups in Ecuador held a series of protests to challenge a water reform bill they say would limit their access to water sources in favour of mining companies and agribusiness. In Mumbai, over 100 women from the Shivaji Nagar slum staged a rasta roko – which means "obstruct the road" in Hindi and is a common form of protest in India - to protest against acute water shortages, bringing traffic to a halt. In the Ukraine, a group of students in Kiev donned bikinis to wash their laundry in a city fountain to protest against the summer shut down of hot water supplies. In Cameroon and Mexico women have protested about attempts to charge for water. A notable aspect of protests about water is the central role played by women, intended both to pursue "strategic gender interests" (transforming gender relations) and "practical gender interests", the practical issue at hand (lack of water) that happens to affect women unequally.

Conclusion

Experience shows that enabling women to access water for a variety of essential uses ranging from drinking, hygiene and sanitation to food production, watering livestock and income generation has a number of benefits including: more income, diversified livelihoods, better health, food security and nutrition, time savings, and social empowerment. However for these benefits to be realised, planners must pay greater attention to the following questions:

1. Who has the information?

The interests of poor and excluded people can be a low priority, however with increased access to information, citizens (such as low-income women) can influence policy development and prioritisation of investments for water resources.

2. Who makes the decisions?

The 2006 Human Development Report (UNDP, 2006) argues that the roots of the crisis in water can be traced to poverty, inequality and unequal power relationships as well as poor water management. Women are often left out of the decision-making processes such as choosing development priorities at community level or designing water and sanitation programmes. The result is that either that improving water is not prioritised and/or programmes do not properly meet the needs of those who are meant to benefit.

3. Who gets the benefits?

Capture of water resources by the rich and powerful to the detriment of the poor is the norm rather than the exception in developing countries. Paying attention to the voice of women, organising community-level associations and improving accountability around water allocation can improve access to water.

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References

Cannon, T., 2002. Gender and Climate Hazards in Bangladesh. Gender & Development, 10(2), 45-50.

Ivanova, N., 2009. Water Shortages Trigger Domestic Violence in Uganda. Circle of Blue: WaterNews. www.circleofblue.org/waternews/2009/world/water-shortages-trigger-domestic-violence-in-uganda/

Osman-Elasha, B., 2010 Women...In The Shadow of Climate Change. UN Chronicle. www.un.org/wcm/content/site/chronicle/cache/bypass/lang/en/home/archive/Issues2009/pid/5080;jsessionid=D0EF5C218DCA5F1F82342144B6EEFB86?ctnscroll_articleContainerList=1_0&ctnlistpagination_articleContainerList=true

Röhr, U., 2005. Gender and Climate Change - a Forgotten Issue?, in Tiempo: Climate Change Newsletter, UEA, SEI and IIED. www.tiempocyberclimate.org/newswatch/comment050711.htm

UN, 2010. General Assembly Adapots Resolution Recognising Access to Clean Water, Sanitation as a Human Right. www.un.org/News/Press/docs/2010/ga10967.doc.htm

UNDP, 2006. Human Development Report 2006: Beyond scarcity: Power, poverty and the global water crisis. New York.

ACCESS TO JUSTICE

The right to access to information is currently insufficiently exercised in the European Union, according to

ANAÏS BERTHIER

Access to environmental justice is a broad concept encompassing among other things the idea of justice for the environment. Yet the environment cannot defend itself alone and needs others to give it a voice, notably by challenging public authorities' decisions through the courts. As the vast majority of laws that apply in European Union (EU) Member States in environmental matters are adopted by EU institutions, it is crucial that the public has the right to contest these decisions in the European courts. There is however strong resistance from the EU institutions to see this right becoming reality. Environmental justice is also about being able to access information that is necessary to assess whether decisions adopted by EU institutions are legally and scientifically sound. Individuals and, interestingly, non-governmental organisations (NGOs) can challenge decisions of EU institutions to unduly withhold documents.

No environmental justice at EU level yet

The jurisprudence (the theory and philosophy of law) of the European Courts has blocked all access to justice for individuals and NGOs in environmental matters. The relevant provisions for access to justice can be found in the Treaty establishing the European Community (EC Treaty) (Article 230(4)), now replaced by the Treaty on the Functioning of the European Union (TFEU) (Article 263). The current interpretation of this by the courts is narrow; individuals and NGOs have in every case[1] been refused the right (called standing) to challenge EU institutions' decisions in the European Courts. The practical consequence is that EU public authority decisions that have an adverse impact on the environment are immune from public scrutiny by the EU Courts (see Crossen & Niessen, 2007; Cygan, 2003; Granger, 2003; Jack, 2004; Pallemaerts, 2009; Rodenhoff, 2002). Environmental NGOs are not deemed to have a sufficient interest, or in EU law terminology to be "individually concerned", by EU decisions impacting biodiversity, the climate, marine conservation or authorising the sale of hazardous pesticides and are thus not allowed to challenge these crucial decisions. This explains in part the underuse of the law by the NGO community in Europe in order to obtain changes in key environmental decisions.

The EU did however ratify the Aarhus Convention[2] (the Convention), which provides the public with the right to have access to information and justice and to participate in decision-making in environmental matters[3]. The Convention is, thus, an integral part of the EU legal order, making it binding on EU institutions including the Court of Justice of the EU. It is also settled case law that international agreements concluded by the EU prevail over secondary EU legislation[4]. The persistence of the Courts in barring all access to justice for members of the public is thus in clear violation of the Convention. Regulation 1367/2006 (the Aarhus Regulation) has been adopted to apply the provisions of the Convention to EU institutions and bodies. It is however still unclear whether the regulation will effectively provide NGOs with the right to contest EU institutions' decisions before the courts (Crossen & Niessen, 2007; Pallemaerts, 2009).

The Response by ClientEarth

To tackle this situation ClientEarth, an organisation of environmental lawyers, has made a complaint[5] to the Aarhus Convention Compliance Committee (ACCC) against the EU. Communications against the UK and Germany have also been made as there are serious obstacles to access to the courts in environmental matters in these two countries. The EU is represented by the European Commission which chose as a defence to limit itself to support the overly restrictive interpretation of the courts, deny-

ing any problem of lack of democratic rights or of compliance with the access to justice provisions of the Convention despite the fact that no NGO has ever had access to the Court of Justice of the EU in environmental matters.

The cases against the EU and Germany have not yet been decided, but the case against the UK has lead to final recommendations from the ACCC published in October 2010[6]. ClientEarth was particularly successful in this case, as the ACCC found the UK to be in breach of rules against prohibitive costs and in requirements of fairness relating to rules on time limits for bringing cases.

> *'Access to environmental information is crucial for the public to be able to understand the considerations underlying the laws and decisions taken at EU level'*

One of the main arguments made in the cases brought by environmental NGOs in the past is that in order for the European courts' case law to change and provide NGOs standing to sue, the EC Treaty would need to be changed. The Lisbon Treaty came into force in December 2009 and has amended the EC Treaty; an additional right has been inserted providing that natural or legal persons can challenge "...a regulatory act which is of direct concern to them and does not entail implementing measures", withdrawing the need to show "individual concern". Whether this amendment will however affect change is an open question. It is not at all clear what a regulatory act is, what type of decisions it will be possible to challenge or whether NGOs will be considered to be "directly concerned" by a decision of an EU institution impacting on the environment. In practice, the removal of the 'individual concern' test will make a difference only if it is not replaced with a more stringent test for "direct concern". That concept has never been interpreted by the European courts in cases brought by environmental NGOs. There is now a unique opportunity for the courts to relax their standing rules, to provide NGOs with access to justice and to bring the EU into compliance with the Convention. In the meantime, NGOs and individuals may strive to foster environmental justice by challenging refusals from EU institutions to disclose strategic environmental information.

Access to the European Courts against refusal of access to environmental information

The right to access to information is an important milestone of the concept of environmental justice. Access to environmental information is crucial for the public to be able to understand the considerations underlying the laws and decisions taken at EU level. It is also a precondition to the exercise of the public's right to participate in decision-making relating to environmental matters. The right is very closely linked to the right of access to justice, as decisions of EU institutions to withhold requested documents (whether they relate to environmental information or any other type of information) may be challenged before the European courts by the person who made the request. It is therefore the only situation where individuals and NGOs have automatic standing before the European Courts.

There are two main EU instruments regulating access to environmental information. The Transparency Regulation[7] regarding public access to European Parliament, Council and Commission documents is the main regulation governing public access to documents held by EU institutions. At the same time, the Aarhus Regulation contains specific provisions on environmental information. They are thus complementary measures.

Interestingly, the right provided under both regulations is very broad. The definition of a document under the Transparency Regulation includes "any content whatever its medium (written on paper or stored in electronic form or as a sound, visual or audiovisual recording) concerning a matter relating to the policies, activities and decisions falling within the institution's sphere of responsibility".

No category of document is excluded a priori from the right of access.

The definition of environmental information under the Aarhus Regulation encompasses everything related to the environment including measures, policies, and cost-benefits analyses. Importantly, commercial confidentiality exclusions from the duty to supply information do not apply to information relating to emissions into the environment.

There is however still a need to clarify what "information relating to emissions" means. The court's interpretation of this provision of the Aarhus Regulation has already been requested. In a case brought by environmental NGOs, one of the Advocate Generals has considered that studies on pesticide residues on lettuces and trial reports were information relating to emissions into the environment and therefore had to be publicly disclosed[8]. This case shows the usefulness of cases brought by NGOs. If the court follows the opinion of the Advocate General it will clarify provisions of existing environmental law and broaden the scope of the right of the public to have access to environmental information. Judicial precedents are essential to change the attitude of the institutions.

A pattern of behaviour that needs to be changed

Despite the fact that the new Lisbon Treaty stresses the need for transparency and for more open decision-making[9] and although the European Court has repeatedly stressed that the right to information aims to give the widest possible access (with any exception from this rule to be interpreted narrowly[10]), there is a general pattern of behaviour within the EU institutions that needs to be changed. Access to strategic documents including scientific studies, legal opinions or conformity-checking studies ordered by the Commission to check whether Member States have transposed environmental directives is systematically denied without any sound reasons. These refusals prevent the public at large from genuinely participating in the decision-making process of the EU institutions which impact our everyday life and the environment we live in. The institutions withhold requested documents illegally by extending delays to reply when no exceptional circumstances allow them to do so, by failing to provide detailed reasons and by systematically failing to weigh the different interests at stake and to assess whether there is an overriding public interest in disclosure as required by the Transparency and Aarhus Regulations.

> *'NGOs and individuals may strive to foster environmental justice by challenging refusals from EU institutions to disclose strategic environmental information'*

The role of civil society

The right to challenge, in the EU courts, decisions of EU institutions when they refuse NGOs access to environmental information is an important one. Unfortunately, despite the fact that transparency underlies all other areas of work of environmental NGOs, this right is underused by the NGO community. It is exactly in this context that ClientEarth has recently brought two cases before the General Court.

The first case is against the EC for withholding documents related to the impacts of European Union biofuel targets. The documents requested would provide information necessary for meaningful public participation. The fact that they have not been released has effectively prevented the public from engaging in an important decision-making process. The other case is against the Council of the EU for withholding a legal opinion from its legal service on the admissibility of the amendments proposed by the European Parliament to the Commission's proposal to review the Transparency Regulation. The disclosure of the requested document would allow the public to understand the reasons why the Council considers the majority of the amendments

proposed by the Parliament, which aim at widening the scope of the right of access, as inadmissible. It would also foster a sound discussion between the Council and the Parliament on the future of the regulation. This would fulfil one of the aims of the Transparency Regulation: to increase openness to enable citizens to participate more closely in the decision-making process and guarantee that the administration enjoys greater legitimacy and is more effective and more accountable to the citizen in a democratic system.

Conclusion

The European courts have not had the opportunity to hand down a judgement under the Aarhus Regulation and the TFEU yet. There is therefore still doubt as to whether they will overturn the jurisprudence they have been reasserting for almost the last fifty years[11] and whether they will decide to provide the NGO community with the right to challenge EU institutions' decisions in environmental matters.

Environmental justice is however also about transparency and therefore civil society actors have an important role to play in consistently exercising their rights to access documents to promote better institutional behaviour. Engagement of the NGO community in strategic litigation would foster more transparency in the proceedings of the EU institutions. It would also contribute to creating a legal culture within this community and increase the use of the law as a key tool to campaign and influence the decision-making process at EU level. In addition, it would help to educate the EU institutions themselves and encourage them to effectively and conscientiously weigh the different interests at stake when taking decisions and hopefully lean in favour of the protection of our environment.

[1] *See for example Case C-321/95 P, Stichting Greenpeace Council and Others v the Commission [1998] ECR I-1651; T-37/04, Regiao autonoma dos Açores v Council [2008] ECR II-2153; C-355/08P, WWF-UK v Council of the European Union [2008] ECR I-73.*

[2] *Convention on Access to Information, Public Participation in Decision Making and Access to Justice in Environmental Matters, 25 June 1998, see Article 9 paragraph 3.*

[3] *Council Decision 2005/370/EC of February 17th 2005.*

[4] *Case-61/94, Commission v Germany, [1996] REC I-3989, paragraph 52; Case C-341/95 Safety-Hitech [1998] ECR I-4355, para 20; case C-286/02, Bellio F. LLi, [2004] REC I-3465, Paragraph 33; case C-344/05, IATA and ELFAA, [2006] REC I-403, paragraph 35.*

[5] The formal word for a complaint before the compliance Committee is a communication. See http://www.unece.org/env/pp/compliance/Compliance%20Committee/32TableEC.htm for the complaint and related documents.

[6] http://www.unece.org/env/pp/compliance/Compliance%20Committee/33TableUK.htm

[7] Regulation (EC) 1049/2001 (the Transparency Regulation) of the European Parliament and of the Council of 30 May 2001 regarding public access to European Parliament, Council and Commission documents.

[8] C-266/09, Opinion of Advocate General Kokott, 23 September 2010.

[9] Article 1 of the Treaty on the European Union.

[10] Case C-266/05 P, Sison v Council [2007] ECR I-4, paragraph 61; Case T-20/99 Denkavit Nederland v Commission [2000] ECR II-3011; paragraph 45 Case T-188/98 Kuijer v Council [2000] ECR II-1959, paragraph 38; Case T-2/03 Verein für Konsumenteninformation v Commission [2005] ECR II-0000, 'VKI,' paragraphs 69 and 72.

[11] Since the Plauman case: Case 25/62, Plaumann & Co v Commission [1963].

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References

Crossen, T., & Niessen, V., 2007. NGO Standing in the European Court of Justice – Does the Aarhus Regulation open the Door? RECIEL 16(3), 332-340.

Cygan, A., 2003. Protecting the interests of civil society in Community Decision-making –the limits of Article 230EC. International & Comparative Law Quarterly, 52(4), 995-1012.

Granger, M-P., 2003. Towards a liberalization of standing conditions for individuals seeking judicial review of Community acts: Jego-Quéré et Cie SA v Commisison and Union Pequenos Agricultores v Council. The Modern Law Review, 66, 124-138.

Jack, B., 2004. Locus Standi and the European Court of Justice: a Faint Light on the Horizon? Environmental Law Review, 6(4), 266-273.

Pallemaerts, M., 2009. Compliance by the European Community with its Obligations on Access to Justice as a Party to the Aarhus Convention. Report by the Institute for European Environmental Policy for WWF-UK.

Rodenhoff, V., 2002. The Aarhus Convention and its implications for the 'Institutions' of the European Community. RECIEL 11(3), 343-357.

THE FUTURE OF CLEANTECH: PROMOTING WOMEN'S PARTICIPATION

CATHERINE BOWERS outlines how women have not been sufficiently represented in environmental sciences to date

When women are disproportionately affected by environmental change, why is it that men are disproportionately responsible for the decisions which shape global responses? Access to, and participation in, both the debate and its solutions are at the root of why 'Women in Cleantech' was formed.

All over the world, women have long been involved at grassroots level initiating campaigns across a wide spectrum of environmental issues: against the effects of industrialisation on clean water supplies in the Aral Sea, in the Mediterranean, across the Ukraine and in rural Bangladesh; against the socially-damaging activities of mining and hydroelectric companies in Nitassinan, Canada; in the Bolivian 'water wars' which saw a million people mobilised on the streets of Cochabamba. Within communities, the voice is powerful; outside communities it fights to be heard, in the developed as much as the developing world.

Agenda 21, the Rio Declaration on Environment and Development, was adopted by more than 178 Governments at the United Nations' Conference on Environment and Development (UNCED) held in Rio de Janeiro in 1992 (Agenda 21, 1992). Its principles were then strongly reaffirmed at the World Summit on Sustainable Development (WSSD) at Johannesburg in 2002. This summit unequivocally positioned 'broad participation and inclusiveness' as key to the success of sustainable development. These principles were outlined in detail in Chapter 24 of the Agenda which clearly states that:

"Each body of the United Nations system should review the number of women in senior policy-level and decision-making posts and, where appropriate, adopt programmes to increase that number, in accordance with Economic and Social Council resolution 199/17 on the improvement of the status of women in the Secretariat" ***(Agenda 21, 1992)***.

It is safe to say, however, that this aspiration, in the UK at least, has seen little result. The most recent 'Democracy Statistics for Female ministers by Country' as published by the Inter-Parliamentary Union in 2001 puts the UK in 57th position with only 14.3% of its ministerial positions held by women (IPU, 2001). Despite the per cent of women MPs having increased from under 10% in 1992 to approximately 22% in 2010, analysis of the current Coalition Government shows almost no improvement in female representation: women holding ministerial responsibility now stand at just over 17%, a less than 3% increase in 10 years (Parliament, 2010).

These poor levels of participation are repeated in bodies with particular interest in the environmental sphere, both at Select Committee level and at the Department for Energy and Climate Change (DECC). Out of the 11 serving members on the Energy and Climate Change Select Committee, currently only two are women (Parliament, 2010). At DECC, although the Permanent Secretary is female, its Secretary of State, two serving government ministers and Parliamentary Under-Secretary and all five of its Director Generals are male. In fact, of the 90 Senior Team posts listed in its organisational chart, only 23 of these are held by women with only 4 out of 21 at CEO or Director level (DECC, 2010).

This is a representational imbalance that needs to be addressed at every level where decisions are made which affect our industrial future, starting in schools with the take-up of key subjects and continuing through higher education and into employment. The concern over the entry of girls into STEM (Science, technology, Engineering and Maths) subjects is an ongoing one which has been aired in a number of forums. In 2002, the Greenfield Report on Women in STEM stated that *"the under-representation*

of women in science, engineering and technology threatens, above all, our global competitiveness. It is an issue for society, for organisations (as strategy and policy-setting agents), for employers and the individual" (Greenfield et al., 2002).

Following the Greenfield Report and its very key concern that the increasing number of female students participating in STEM at school was not translating into increased numbers in the relevant workforce, a "Strategy for Women in SET" was launched in 2003. This had a number of strategic targets, from providing a resource centre with dedicated funds to using governmental machinery to ensure good SET management within departments. Many of these targets have been recorded as met.

In addition, many positive initiatives have developed around this strategy. The Smallpiece Trust, for example, is an educational charity running STEM activities works in partnership with STEMNET (The Science, Technology, Engineering and Maths Network) and the WISE (Women into Science and Engineering) Campaign to boost the prospects of students in England, particularly females who are currently underrepresented within STEM careers. Courses are run which, although not exclusively for women, deliberately target them: a Low Carbon Energy Challenge (previously run as Sustainable Energy Challenge) at Newcastle University and a Low Carbon Energy course with EDF Energy at Exeter University are currently on offer. The Smallpiece Trust has also run an Energy Challenge course at The Robert Gordon University in Aberdeen which focused on wind, tidal and wave energy. Petra Hancock, the course administrator for the Trust told Women in Cleantech that *"we aim to raise the awareness and profile of STEM subjects, specifically engineering, to young female students which in turn will hopefully lead to them realising it is not just a male environment and ultimately encourage them into choosing and studying related subjects, followed by university studies or apprenticeships in these areas."*

Despite initiatives like these however, women remain under-represented across STEM (with the exception of entrepreneurs). Little progress has been made in terms of employee numbers, across both the academic and business sectors: in 2007 only 18.5% of employees in the STEM sector were female, almost no increase over the 2002 figure of 18.1% (Harding, 2009). This is despite an increase of 8.4% in the number of girls taking STEM 'A' levels since 2004. Take-up therefore appears to be increasing at school-level but not translating into the workforce. The issue, in fact, appears to be one of very high levels of attrition for girls between the stages of engagement with STEM: some 76% of women with SET training are not working in the sector, compared to 51% of men (Harding, 2009). This, combined with a lower level of entrants available in the first place, leads to ongoing under-representation both within the sector and, therefore, within the wider debate and the decision-making process.

WOMEN IN CLEANTECH

It is the opinion of Delta Economics, authors of an Evidence Paper on Women's Enterprise, that this situation has largely come about because of social factors: success within this sector can sometimes be perceived as depending upon accepting and dealing with a very masculine environment rather than having the ability to challenge it; the gendered nature of this masculine culture seems to be self-perpetuating, with women dropping out as they progress further up the ladder being a common pattern; although women are often entrepreneurs, there has been criticism of the amount of dedicated information and funding available; finally, there is often an image problem in this sector, where becoming an engineer, for example, can be rejected by girls as being both hard to do and hard to be (Harding, 2009).

So what is the solution? Clearly work to promote the take-up of STEM with school-age students needs to continue and the work of organisations like the Smallpiece Trust must be publicised and celebrated. Gemma Murphy, Head of Marketing and

Development within the Trust, reported a teacher's comments from a recent STEM day which made very positive reading:

"I would like to give you an update on the response by the pupils to the autumn Smallpiece STEM Day. Just after Christmas, the school had its options evening where the pupils made their choices of subjects to take in Key Stage 4. I am sure that the STEM Day was still in their minds. In normal years we just have enough pupils to run one Engineering group of 17. But not this year. In fact we are this year running two groups of 22 students and have had to turn pupils away. But the very interesting thing is the number of girls that have opted to take Engineering some who are among the high flyers in the school. This I can only put down to the STEM Day."

This approach alone, however, is clearly not enough. Delta Economics focus their proposed solutions around the need to promote female STEM entrepreneurship among students, supported by dedicated funding for women's STEM businesses. Mentoring and negotiation skills, recognised as keys to executive development, should be taught in schools.

What is clear is that tackling gender-based inequality needs to be addressed by a wide-ranging programme of strategies which must form an essential part of the ongoing development and shaping of this industry to a point where representation is equal. Effective participation in any industry requires an understanding of the sector and its different areas of opportunity: the pathways in, the experiences of those involved, the skills needed to progress and the challenges presented. Cleantech is no different. Whether it is raising finance, contributing to the Board, setting policy, finding a career path or acquiring skills, the sharing of ideas, experiences and best practices within a like-minded community can be invaluable.

At 'Women in Cleantech', we recognise that this is a critical time in the industry's evolution when funding, policy and development needs all the focus, collaboration and energy that a variety of different voices can provide. We also recognise that collaborative working, a key strength of many female executives, will be the key to the Cleantech businesses of the future; the traditional, more transactional, way of conducting business is changing. In this way, we hope to move Chapter 24 of Article 21 from a byword to a reality.

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References

Agenda 21, 1992. Agenda 21: The United Nations Programme of Action From Rio. Available online at: www.un.org/esa/dsd/agenda21/

DECC, 2010. Department of Energy & Climate Change Organisation Chart. www.decc.gov.uk/assets/decc/About%20us/1_20100622105016_e_@@_deccorganogram.pdf

Greenfield, S., Peters, J., Lane, N., Rees, T., and Samuels, G., 2002. SET Fair: A Report on Women in Science, Engineering and Technology for the Secretary of State in Trade and Industry. London, Department for Trade and Industry.

Harding, R., 2009. National Policy Centre for Women's Enterprise Evidence Paper: Women's Enterprise and SET. Delta Economics.

IPU, 2001. Correspondence on women in government at the ministerial level. March. Geneva

Parliament, 2010. www.parliament.uk

SUSTAINABILITY SENSE: LINKING PERSONAL, PROFESSIONAL AND ORGANISATIONAL VALUES

Appropriate education and training are required to tackle the complex issues of environmental justice, argues

JOHN BAINES

The journey towards sustainability is mired in complexity and beset by 'wicked problems'. A problem is wicked because the whole topic is complex and resists understanding and resolution. Justice itself is a concept of moral rightness; a concept that is evolving at different rates and in different directions depending on the groups and individuals involved. How should individuals and organisations respond to the realisation that the people most at risk from anthropogenic climate change, loss of biodiversity or habitat destruction are those that are least able to buy their way out of the resulting problems? Furthermore, they are usually the ones who have benefited least from the economic development. Is this a matter for human concern, or should the evolutionary principle 'survival of the fittest' be allowed to determine the future? For anyone interested in sustainability, it certainly is of concern.

Achieving environmental justice for all is complex because it requires developing solutions that take account of so many variables, including varied beliefs, values and emotions. These have a strong effect on personal and organisational patterns of behaviour. 'Sustainability Sense: Linking personal and organisational values' was an event organised by Professional Practice for Sustainable Development (PP4SD) and the Institution of Environmental Sciences with support from the David Tyler Trust. PP4SD has adopted a cross-professional, multi-disciplinary approach to sustainability, recognising that the successful resolution of complex sustainability issues requires cooperation between professionals and a broad range of skills. The purpose of this event was to explore how values and emotions could be engaged to support action for sustainability at personal and organisational levels. What follows is based on the report.

The cultural dimension

Resolving wicked problems usually involves changing or modifying the behaviour of groups of people within an organisation and this is often incorporated into the concept of 'cultural change'. At such times clashes of cultures can arise. Understanding organisational cultures can be elusive, so a number of tools have been created to assist the process.

The cultural web model developed by Johnson and Scholes (1992) is helpful in identifying some of the characteristics of organisational culture (see Figure 1). The diagram resembles the petals of a flower, with the centre dominated by an organisation's culture. These are considered to be, ''The emergent result of the continuing negotiations (and conversations) about values, meanings and proprieties between the members of the organisation and with its environment'. UNESCO (1997) wrote, 'Our Culture includes our system of beliefs, values, attitudes, customs and institutions. It shapes our gender, race, and other social relations, and affects the way we perceive ourselves and the world and how we interact with other people and the rest of nature'.

Figure 1: The cultural web (Johnson & Scoles)

The six petals are the manifestations of culture which result from the organisation's values. Hence, the rituals and routines refer to the daily actions of people that signal acceptable behaviour and this in turn determines what is expected to happen in any given situation as well as what is valued by managers. Most change programmes concentrate on the petals, so for example they try to affect change by looking at structures, systems and processes. Experience shows that these approaches do not lead to sustained change because they are dealing with the cultural manifestations rather than the culture on which they are based.

An understanding of the way cultures develop begins to offer ways of approaching the wicked problem of working towards environmental justice within organisations. However, cultures are in a constant state of flux, so it makes sense to focus any approach to environmental justice on facilitating changes to culture and not structures, systems and processes.

Utilising personal values

If culture is the manifestation of the sum of the beliefs, values, attitudes and behaviour of a group, then cultural changes will follow personal changes. Personal behavioural change is advocated by organisations and governments as a means of achieving sustainability, an aspiration that encompasses an ideal of environmental justice. Bringing about appropriate behavioural changes has proved challenging. Raising levels of awareness, knowledge, skills and guilt do not seem to improve environmental behaviours fast enough to match the problems. Paul Murray has developed a training approach known as Personal Education for Sustainable Development (PESD) that focuses on values and makes use of some of the Neuro-linguistic Programming techniques.

Values are significant because they influence human behaviour. Values describe what is important to a person. If we can live our values then it is more likely that we will feel right in what we do, thus enhancing our personal well-being and sense of integrity. Not being able to live our values can have the opposite affect. Collectively, these values influence the roles of technology, governments, businesses, institutions and communities.

Figure 2

The PESD approach to sustainability training attempts to give personal meaning to sustainable development. It is a stepped process starting with 'making meaning' and moving on through 'making connections', 'cultivating motivation', 'feeling empowered', 'becoming equipped' to finally 'behaving sustainably within and without work'. It works with people's values, attitudes and beliefs, recognising they are linked. Attitudes describe a predisposition to behave or respond to specific situations in a manner that is based on feelings and judgements. Beliefs are mental models that we make to help us understand our inner and outer worlds. Holding empowering beliefs, pro-sustainability values and pro-sustainability attitudes together can result in pro-sustainability actions. These in turn can feed back to influence beliefs, values and attitudes creating a positive feedback loop.

Identifying and questioning values in a training situation can help cultivate positive attitudes and intentions, for example facilitating participants to:

- Cultivate positive intentions.
- Cultivate positive attitudes such as care/ compassion, openness and respect.

- Remember/remind themselves of their core values and to notice whether their actions are in tune with them.
- Explore their values more deeply and to reinforce their core values through conscious practise and questioning the impact of their own and others' actions.

Values are just one of the influences on our behaviour. Other influences may work for or against living our values. For example, most people learn to reconcile some conflicts between personal and organisational values, attitudes and behaviour.

Utilising our emotions

There are hardly any world problems that cannot be traced to human agency and could not be overcome by appropriate changes in human behaviour. The root causes even of physical and ecological problems are the inner constraints on our vision and values. We suffer from a serious case of 'culture lag' (Laszlo, 1989).

Paul Maiteny holds that going even deeper into our psyche can help people make appropriate responses to concerns such as environmental justice. Whereas personal and corporate values and attitudes are sometimes explored in relation to issues, personal emotions are less so. Paul considers that people need first to learn about themselves by exploring how they respond emotionally to issues. He aims to engage with people's own thoughts and feelings, responses and choices, and dilemmas. For example, how do you respond emotionally to the following newspaper headlines?

- Italian 'green' mayor killed in suspected Camorra murder (September 2010)
- New wave of coal-fired plants in US (September 2010)
- China aims to increase hydropower by 50% by 2015 (September 2010)
- Congolese chimpanzees face new 'wave of killing' for bush meat (September 2010)
- Endangered sea turtles released in Thailand (August 2010)

When Paul carried out a similar exercise at this event, participants responded with a variety of emotions including frustration, anger, astonishment and impotence. They also noted the lack of positive news stories, further reinforcing feelings of hopelessness.

It is somewhat depressing to note that environmental headlines today are little different from 30 years ago suggesting that the messages did not resonate emotionally and meaningfully with readers, or at least if they did, not sufficiently to lead to significant changes in behaviour. This raises a fear that we might just be in another round of concern that may not bring about significant change. It is us that need to change, but changes to our world view are slow, and alternatives are not as well presented as the advertising for continuing business as usual.

Patterns of human behaviour are embedded in our psyche. They are patterns that have served humans well in the past, but may not be appropriate for the future. Humans appear more concerned with their own individual survival rather than the survival of the systems on which they depend. Humans are programmed to manage and resolve individual, often short term crises with the consequence that the longer term multi-dimensional crises that seem to be heading towards collective catastrophe are given a low priority. It appears that humans are slow to accept that they need to change the way they interpret and respond to the world around them. Using emotional responses to issues like environmental justice is a further way towards re-evaluating personal values, interests and priorities.

Application to education and training

PP4SD seeks to apply such insights to sustainability through continuing professional development (CPD) programmes. Many existing CPD programmes provided by professional bodies, colleges or private training organisations are primarily technical aiming to improve awareness and competencies. Examples are those that focus on compliance to legislation, the development of carbon markets,

environmental management or nature conservation. Such programmes lend themselves to straightforward assessment by the providers and participants, but are the programmes too focused on dealing with symptoms of lack of sustainability rather than the root causes? They may provide technical solutions that can ameliorate problems, but not necessarily change the 'culture' that give rise to the problems.

As stated at the start, PP4SD has adopted a multidisciplinary approach to sustainability, recognising that the successful resolution of complex sustainability issues requires cooperation between professionals and a broad range of skills. PP4SD focuses on systems thinking, or 'joined up thinking' and tries to provide participants with the knowledge and skills to at least start applying the principle at a basic level. The Sustainability Sense workshop has shown that PP4SD and other organisations need to go further: to engage with participants at a deeper level by additionally exploring values, attitudes, beliefs and emotional responses.

Such programmes present challenges as conflicts and contradictions surface. While one individual or organisation may place a high value on economic growth, another may place a high value on sustaining biodiversity. What is good for one country's national interest may not be good for another's. There can also be tensions caused by differences between personal, societal, professional and institutional values. Trainers will need to be sensitive to these differences and an individual's response in these situations, and use differences constructively in a values-based approach. We can learn a lot from those facilitators trained in the process of environmental conflict resolution.

Conclusion

Achieving greater environmental justice is unlikely without appropriate education and training. Those responsible for developing and providing training will need to reassess their programmes to take account of the findings of this and other events. For their part, the participants of Sustainability Sense agreed to start by:

1) Identifying the values at the heart of environmental professionalism.
   a) Create criteria against which to validate sustainability CPD.
   b) Provide a model of what a sustainable profession might look like.
2) Research and advise on pedagogical approaches that address sustainability emotions, values, attitudes and behaviour.
3) Develop education and training mechanisms for supporting professionals in integrating sustainability into their professional practice.
4) Research and advise on the compatibility of company/business values with sustainability values.

Given the interconnectedness of the concepts of sustainability and environmental justice, these discussions should influence thinking when approaching either issue.

• *John Baines is the Senior Vice President of the IES and the Chair of PP4SD. PP4SD is a partnership project dedicated to promoting sustainable practice among professionals, through developing and disseminating continuing professional development materials and events. The report 'Sustainability Sense: Linking personal and organisational values' is from an event held on 23 February 2010. The report can be downloaded from the PP4SD website: www.pp4sd.org.uk.*

References

Johnson and Scholes 1992. The Cultural web

Laszlo, E., 1989. The Inner Limits of Mankind: Heretical Reflections on Today's Values, Culture and Politics. Elsevier Science & Technology

Murray P., to be published in 2011, The Sustainable Self

UNESCO, 1997. Educating for a Sustainable Future: A Transdisciplinary Vision for Concerted Action.

OPINION: CLIMATE JUSTICE WITHOUT VENGEANCE

AUBREY MEYER argues that climate justice relies on a global framework of contraction and convergence

Contraction and Convergence (C&C) is a proposed model for reducing greenhouse gas (GHG) emissions and thus mitigate anthropogenic climate change. C&C is a measurement framework for a range of scenarios or 'emissions-futures' that assumes and so measures compliance safe and stable atmospheric GHG concentrations. Thus C&C calculates and projects a range of emissions-contraction-scenarios where we avoid dangerous rates of global climate change.

The development of C&C

The objective of the United Nations Framework Convention on Climate Change (UNFCCC), agreed internationally at the Rio in 1992, is to secure safe and stable GHG concentration in the global atmosphere. Its principles are precaution and equity. In response to this, the Global Commons Institute (GCI) introduced the C&C calculating model to the negotiations at the UNFCCC one year after these formally commenced in 1995 (GCI, 2010c).

Measured in tonnes of carbon per unit-time, but counted subject to the overall emissions limit that achieves UNFCCC-compliance, C&C assumes the rationale of globally equal emissions-entitlements per capita, saying that (not the monetary unit) is the unit of measurement of C&C. The reason that C&C assumes equal entitlements, subject to the concentration limit, is simply to avoid what are the insoluble measurement problems that follow from assuming globally unequal entitlements, not-to-mention the insoluble political problems that follow from attempting to defend them.

During preparations for the Second Assessment Report (SAR) of the Intergovernmental Panel on Climate Change (IPCC) between 1993 and 1995, economists were invited to participate. They conducted a 'Global Cost/Benefit Analysis' (GCBA) of climate change, posing the question of whether the benefits of avoiding climate change were greater than the costs of so doing. During this exercise they produced a procedure where the monetary unit was the relevant and indeed the dominant measurement unit. Using this, they quantified and valued all assets at risk of damage due to climate changes as proportional to the income of the owners of these assets. This included the 'statistical lives' that would be lost due to the growing impacts of climate change. When they summed the inventories of the marginal costs and benefits, their results demonstrated firstly that on average, 15 poor people equalled one rich person and secondly that it would be cheaper to adapt to climate change than to prevent it.

Anticipating this result, in 1994 GCI submitted a report to the IPCC entitled "the Economics of Genocide", disputing the GCBA suggestions seeking a global consensus for a methodology that demonstrated it was cheaper not to prevent the deaths of people and the other problems arising from dangerously changing rates of global climate on a progressively warming planet. After a memorable political row, GCBA was rejected.

Central to the protection of the economy is the necessity of preventing dangerous rates of climate change. To comply with the UNFCC's objectives, GCI argued that the relevant unit of measurement was global emissions 'entitlements' in a structure of Contraction and Convergence, measured in tonnes of carbon per unit time, not money. To comply with UNFCCC goals, the unit for measuring GHG emissions 'needs to know where it is going'. Money cannot therefore be the unit of measurement because it cannot do this, beyond being linked to an exponentially and indefinitely rising

curve of 'economic growth' with 'expansion and divergence', thus decreasing the potential for UNFCCC-compliance.

The precautionary principle requires that we solve the emissions problem faster than we are creating it. This means getting C&C politically agreed, organised and implemented at rates that 'do-enough-soon-enough' to avoid dangerous rates of climate change. Doing 'too-little-too-late' simply says we will all succumb sooner or later, just as though we had done nothing at all. Indeed, in the absence of being led by a substantial full-term C&C agreement that prevents climate change, the question arises as to why implement any framework, as just to make attempts on the margins means all we possibly achieve is simply a slightly slower rate of failure.

The role C&C in addressing inequalities

The UNFCCC also recognizes the equity principle which requires us to recognise that the majority of the expanded and accumulated emissions that have triggered anthropogenic climate change so far have originated from developed countries. As these emissions have been increasingly closely correlated with economic growth, an increasing asymmetry of global wealth has developed since fossil fuel burning began with the industrial revolution in the 19th Century. Currently as a general rule, emissions per capita are highest where incomes are highest and lowest where incomes are lowest. C&C seeks to correct this. Indeed, the primary purpose of the C&C model is to articulate, integrate and structure the two interdependent resource considerations that in combination are indispensible for calculating the globalisation needed for UNFCCC-compliance:

1. Taking into account the loss of 'sink-efficiency', C&C shows how future global carbon GHG emissions:concentrations trajectories for UNFCCC-compliance can be calculated as emissions-contraction (GCI, 2010e).

2. Recognising the reality of worsening international discord over the past very unequal causation of 'anthropogenic climate change' and the future opportunity cost to the countries that did not cause it, C&C shows how the sharing of the 'contraction-event' can be negotiated in a rational procedure of constitutionally sharing the entitlements that are subject to that global limit, as entitlement-convergence on the global per capita average arising under contraction, at a rate to be decided.

The first is the prerequisite for achieving the objective of the UNFCCC and any sustainable future global economy. At the same time, agreement on the second is necessary for achieving the former, and this needs now to become less rhetorical than it has been the case so far if we are to succeed. We must now collectively forgo the distraction of the 'blame-based-politics' and endless 'possibilities' in favour of a transparent and rational procedure. Since 1995 disputes about money and blame have clouded the negotiations at the UNFCCC.

C&C provides a rational global structure for resolving this: as the rate of global emissions contraction must be established for UNFCCC-compliance and possibly accelerated for reasons of urgency, the rate of convergence on the per capita average negotiated must be accelerated relative to contraction for reasons of equity. Since UNFCCC negotiations have required that a global market which trades emissions entitlements must develop, a C&C-based pre-distribution of emissions entitlements can resolve this dispute. Those countries with per capita emissions below the global average have a surplus. Those countries with per capita emissions that are above average have an immediate shortage. The former, lacking purchasing power, are poor. The latter, not lacking purchasing power, are rich. Negotiating the rate of convergence is what Ross Garnaut calls, "the main

equity lever" in this aspect of the deal (Garnaut, 2008). The earlier the convergence, the greater the redress for the historical asymmetry and future opportunity cost.

To end conditions of global 'apartheid' in 'globalization', it is necessary to recognize that sustainable development can no longer be separate development. C&C addresses this by merging equity and efficiency, dealing with poverty and climate change in the same mechanism. Emulating Mandela's vision for ending 'apartheid' in South Africa, GCI says that C&C predicates survival on 'Climate Justice without Vengeance'.

> *'emissions per capita are highest where incomes are highest and lowest where incomes are lowest'*

Conclusion

In 2004, nine years after the negotiations at the UNFCCC began the UNFCCC Executive acknowledged that, "achieving the objective of the UNFCCC inevitably requires 'Contraction and Convergence'". C&C is now the most widely cited model in the literature around climate-policy (GCI, 2010a). There are more extreme proposals that claim to make up for an alleged 'lack of sufficient fairness' in the C&C proposal by requiring instant convergence or demanding 'negative emissions-entitlements' for developed countries (GCI, 2010d). C&C sits between those proposals and those on the other hand which claim that 'justice' has nothing to do with it and even those which still insist that there is not even a problem.

The UK Climate Act is based on moderate rates of C&C and though the world came closer to winning the struggle for the global understanding and acceptance of this principled structure at COP15 in Copenhagen in 2009, those governments that introduced it failed to explain their reasoning and were prescriptive on the rates of C&C that must be established and so the attempt did not succeed (GCI, 2010b).

C&C is a global negotiating framework that enables both sides to come together and settle their 'differentiated responsibilities' in the same structure. The struggle to explain and to establish this has however not yet been completed. C&C conforms to the requirements of the UNFCCC and to secure UNFCCC-compliance it must succeed for, as the Archbishop of Canterbury said in 2004, "anyone who thinks that C&C is 'utopian' simply hasn't looked honestly at the alternatives."

• *Aubrey Meyer co-founded the Global Commons Institute (GCI) in 1990 and a programme to counter the threat of climate change based on the founding premise of 'Equity and Survival'. Since then he has devised and run the campaign for 'Contraction and Convergence'.*

References

Garnaut, R., 2008. Garnaut Climate Change Review. WHH Publishing: Australia. Pp. 537.

GCI, 2010a. An International Conceptual Framework for Preventing Dangerous Climate Change. www.gci.org.uk/Briefings/C&C29sept_.pdf

GCI, 2010b. C&C...is "Climate Justice without Vengeance". www.gci.org.uk/public/COP_15_C&C.swf

GCI, 2010c. Contraction & Convergence GCI Briefing. www.gci.org.uk/briefings

GCI, 2010d. Endorsements. www.gci.org.uk/endorsements.html

GCI, 2010e. Sources and Sinks: UK Climate Act. www.gci.org.uk/animations/Sources_and_Sinks_UK_Climate_Act.swf

Key Clauses in the United Nations Framework Convention on Climate Change

Parties to the UNFCCC acknowledge that, ”change in the Earth’s climate and its adverse effects are a common concern of humankind.”

They are concerned that, *“human activities have been substantially increasing the atmospheric concentrations of greenhouse gases, that these increases enhance the natural greenhouse effect, and that this will result on average in an additional warming of the Earth’s surface and atmosphere and may adversely affect natural ecosystems and humankind.*” (Preamble)

The Convention’s objective is, *“to achieve . . . stabilisation of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system.*” (Article 2) In other words, greenhouse emissions have to contract globally.

Its principle of ‘Global Equity’ says, *“Parties should protect the climate system for the benefit of present and future generations of humankind, on the basis of equity.*” *(Article 3.1) They note that, “the largest share of historical and current global emissions of greenhouse gases has originated in developed countries and that per capita emissions in developing countries are still relatively low.*” (Preamble)

They therefore conclude that, *“in accordance with their common but differentiated responsibilities and respective capabilities the developed country Parties must take the lead in combating climate change and the adverse effects thereof”* (Article 3.1) while, “the share of global emissions originating in developing countries will grow to meet their social and development needs.” (Article 3.3) In short, the Convention covers Convergence in a system of emissions allocation.

Its ‘Precautionary Principle’ says, *“Parties should take precautionary measures to anticipate, prevent or minimise the causes of climate change and mitigate its adverse effects. Where there are threats of serious or irreversible damage, lack of full scientific certainty should not be used as a reason for postponing such measures’.*” (Article 3.3)

On achieving ‘global efficiency’ it says, *“taking into account that policies and measures to deal with climate change should be cost-effective so as to ensure global benefits at lowest possible cost.*” (Article 3.3) *“In the past, cost-effective measures have been used to target pollutants, notably CFCs, in the form of trading via markets under a global maximum limit or ‘cap’.”*

A framework based on precaution and equity was therefore established, with efficiency introduced in a subsidiary role purely to assist it.

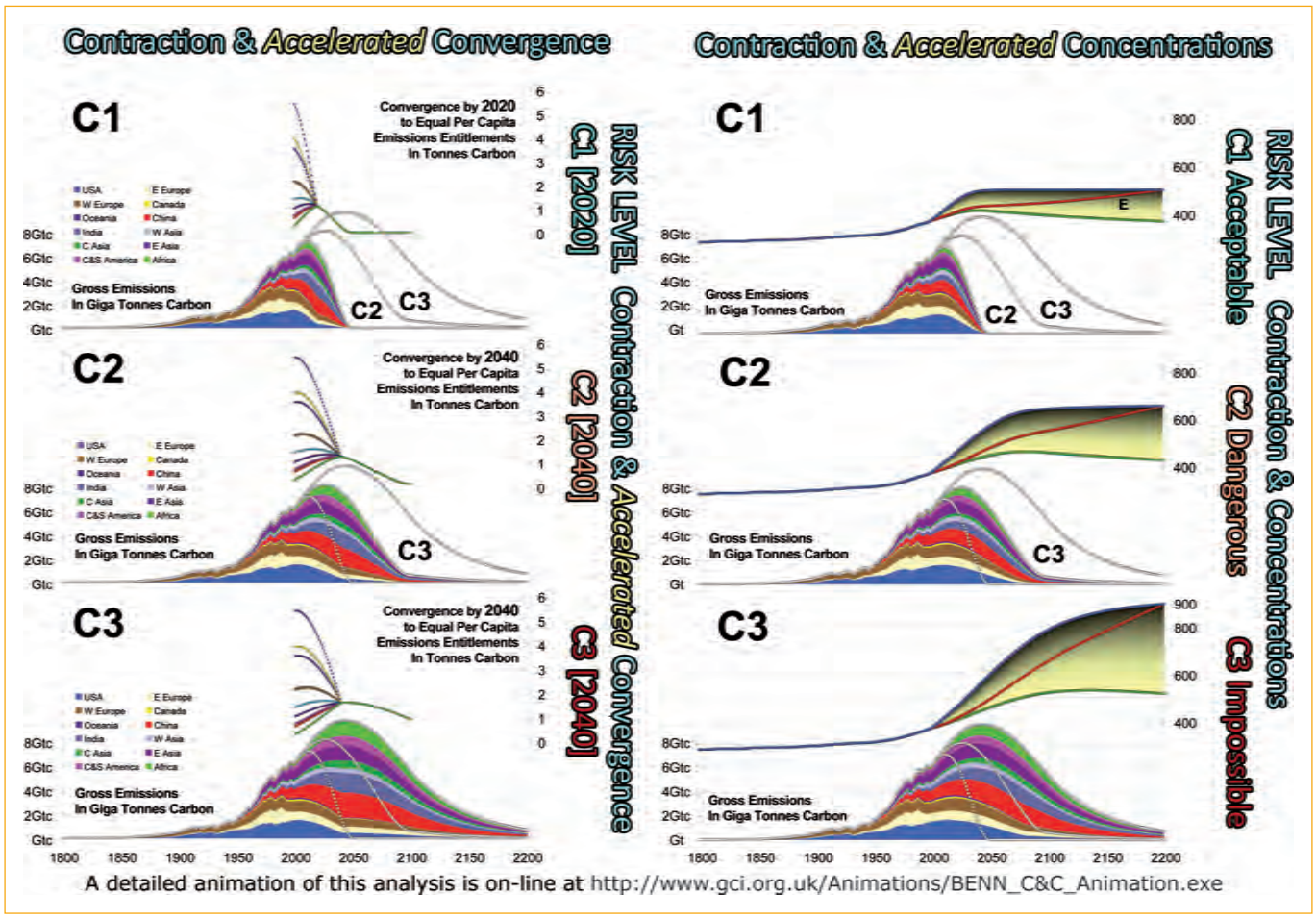

Figure 1: Charting the UNFCCC Objective & Principles

Column 1 analyses what rate of contraction achieves a rate of atmosphere GHG accumulations that is still UNFCCC-compliant. Column 2 asks what rate of convergence on the global per capita can be agreed and integrated with the contraction rate needed for UNFCCC-compliance. The left side of each graph shows expanding CO2 emissions measured in billions of tonnes of carbon between 1800 - 2000 and rising concentration of atmospheric CO2 as parts per million by volume [ppmv] between 1800-2000.

Each Row has a different level of Risk projected across the four columns as C1-Acceptable, C2-Dangerous and C3-Impossible:

- C1 bottom row Acceptable risk: global GHG emissions contraction complete by 2050 so concentrations end up around 400-450 ppmv with damages potentially still under control

- C2 middle row Dangerous risk: global GHG emissions contraction complete by 2100 so concentrations keep going up through 550-750 ppmv with the illusion of progress maintained, while damages are in fact continuing to rise faster than growth.

- C3 top row impossible risk: global GHG emissions contraction complete by 2200 so concentrations keep going up through 550-950 ppmv while the illusion of progress is being destroyed, rising damages costs are destroying the benefits of growth very quickly and all efforts at mitigating emissions become futile.

CASE STUDY: GENDER EQUALITY IN MALTA

DR MARK C. MIFSUD proposes potential methods for tackling gender inequality in NGOs in Malta

Introduction

The objective of Agenda 21 is to guarantee a future that is economically, socially and ecologically sustainable. Chapter 24 of Agenda 21, produced at the 1992 United Nations Summit Meeting in Rio de Janeiro, was entitled 'Global Action for Women towards Sustainable and Equitable Development'. It outlined strategies to achieve the full and equal participation of women in order to bring about sustainable development. It is policy and management oriented and contains over one hundred specific recommendations and references to strengthen the role of women in sustainable development. It particularly focuses on the elimination of obstacles to women's equal participation in decision-making activities.

The three key areas of sustainable development: economic growth and equity; conserving natural resources and the environment; and social development and their balance cannot be achieved without solving prevailing problems of gender inequality and inequity. The involvement of woman in making decisions that will affect their own future is of vital importance regarding sustainability (World Summit on Sustainable Development, 2002).

Several plans of action and conventions have endorsed the equal and beneficial integration of woman in all development activities, including the Nairobi Forward Looking Strategies for Woman that emphasises the role of woman in national and international ecosystem management and control of environmental degradation. Other conventions such as the Convention on the Elimination of all Forms of Discrimination have been adopted to eliminate gender based discrimination and ensure equal access to resources.

Legislation regarding gender equality and equity in Malta was long overdue, and in 2002 the 'Act to Promote Equality between Men and Women' was drafted. The legislation is limited in scope, appearing to address mostly gender issues in employment or training. Provision should be made for other issues, such as social security, non-occupational healthcare, the participation of men and women in decision-making, and the role of woman in sustainable development.

Establishing a Working Definition of Gender and Gender Equality

Gender refers to socially constructed differences and relations between men and women that vary by situation and context. It does not refer to the biological differences between women and men. Achieving equality does not mean that men and women are the same; it means that one's rights or opportunities do not depend on being female or male. Gender equality requires understanding that every policy, program or project affects men and women differently, and therefore equality can only be achieved through partnerships between men and women.

Legal Framework

The rights of women are an integral and indivisible part of all human rights and fundamental freedoms. The Maltese Legislation guarantees the right to equality in the law and equal benefit of the law without discrimination on a number of grounds including gender. Malta has ratified all the major international human rights treaties, including the Universal Declaration of Human Rights and the International Covenant on Economic, Social and Cultural Rights. Malta is also committed to the consensus reached at the various UN conferences such as the Cairo Conference on Population and Development, and most recently the Fourth United Nations World Conference on Women in Beijing.

The Maltese welfare state is nowadays seeing a shift from the single breadwinner model in the case of the older population, to the dual breadwinner model

adopted by the vast majority of under-forties. This shift is being made possible by programs of parental leave to encourage mothers to remain in gainful employment. Families typically have two children, though the fertility rate is steadily decreasing. Apart from circumstances directly related to childbirth, married women are now covered by the same labour, tax and social security legislation as men.

Theoretical Framework

In the Maltese islands, there are a large number of local environmental problems including the high population density (more than 1200 persons/square kilometre), untreated sewage disposal, unregulated solid waste disposal, a very high rate of childhood asthma and a high level of lead content in the blood.

Women are influenced by these problems, including the effects of pollution on their health. Environmental problems in Malta need to be tackled, regardless of gender differences. Most policy decision-makers are men however, and non-governmental organisations (NGOs) rarely have women in positions to make decisions. Agenda 21 advocates that governments should review policies and establish plans to increase the proportion of woman involved as decision-makers in the implementation of policies and programmes for sustainable development. We need to recognise that gender inequality is not only present in developing countries but is also present in developed countries like the Maltese islands:

"In industrial countries unemployment is higher among woman than men, and women constitute three fourths of the unpaid family workers...no society treats its women as well as its men" (UNDP, 1997).

Environmental leaders need to understand that there will only be environmental equality when there is human equality (Agyeman, 2000). One method for attaining this is to make the environmental content and process gender sensitive. Environmental education must not only consider the environmental problems but should also be concerned for educating towards a socially and environmentally just world (Dichiro, 1987). Environmental issues which are better seen through a 'gender sensitive lens' (Peterson, 1993) such as the use and disposal of sanitary wear, the diversity of food species in fields and gardens (Rea, 1995) and family planning and child health (Graham-Brown, 1991) are sometimes not given due importance by male environmental leaders.

Women play an important role in promoting sustainable development through their concern for the quality and sustainability of life for present and future generations. Environmental education and participation is crucial in achieving this and NGOs are in an ideal position for this task.

Nature Trust: A Short History

Nature Trust Malta (NTM) was officially launched by the President of the Republic on Friday 8 January 1999 following the merger between the Society for the Study and Conservation of Nature, Arbor and Verde. Marine Life Care Group joined along in 2001. The mission statement is as follows:

"Committed to the conservation of Maltese nature by promoting environmental awareness, managing areas of natural and scientific interest, and lobbying for effective environmental legislation."

NTM has worked over the years lobbying for the legal protection of various plant and animal species in Malta, particularly seeking to protect numerous endemic species from extinction. The organisation is also very active in environmental education.

Nature Trust is one of the largest environmental organisations on the Maltese islands with a membership of over 2500. Membership covers all sectors of profession and employment. There are no obstacles to membership due to sex, race or religious beliefs. The current membership profile is made up of:

- Adults (over 18): 1,500
- Youths (12 to 18 years of age): 600
- Children (under 12): 400

(Source: examination of Nature Trust Organisation records and two structured interviews with Nature Trust President (Attard, V.) and the Nature Trust Education Officer (Bonello, A.))

There is a relative balance between male (57%) and female (43%) members of Nature Trust, however males do constitute a slightly higher membership. The Nature Trust Council consists of eleven members, and is "responsible for the policy-making of the NGO together with the taking of major decisions dealing with the Administration of Nature Trust" (Attard, V., Nature Trust President). Although the ratio of females to males on the council (45% to 55%) does not seem to show any particular inequality between sexes, this is mainly due to chance rather than the statute, as there is no reference to a stipulated minimum number of females or males on council.

Recommendations

Reviewing the role and function of NTM suggested the following actions:

a. The drafting of a new statute that includes a gender-sensitive perspective

The importance of gender equality should be clearly stated as a basic principle of sustainable development. At the same time, active measures should be taken to ensure gender balances in the Nature Trust organisation especially with regards to senior council member positions.

b. Training of members

Training in gender equality is not sufficient at present. NTM should ensure that council members especially those in management positions attend training on gender-equality. NTM should lobby so that gender studies becomes a required component of teachers' education. This would assist the promotion of gender-sensitive education considerably.

c. Establishment of a clear policy for promoting gender-equal education

NTM lacks a policy for promoting gender-equal education. The courses organised by the Nature Trust for individual teachers should enable them to lead in the development of a gender-sensitive education system, and the commitment of schools as a whole to gender-equal education. Another useful tool would be the production of gender-equal textbooks, written from the standpoint of the gender equality.

e. Women's participation in decision-making processes

A good percentage of woman participate in the decision-making process of the society, however they should be much more aware of gender equality issues. Half the members of all boards of NTM should be women who are aware of such issues and a sufficient number of both men and women should follow a continuous training programme with regards to human rights and gender equality. Nature Trust should be a place for developing sensitivity to environmental responsibility and gender equality.

f. New role models for youth female members

Male and female NTM leaders who are role models to young members are not equal in numbers or status, especially regarding media appearances. The NGO should strive to divide airtime equally between the sexes to promote appropriate role models for gender equality among women and men.

'Achieving equality does not mean that men and women are the same; it means that one's rights or opportunities do not depend on being female or male'

Conclusion

The Nature Trust has a number of strengths in the area of gender equality, in particular that its membership is nearly equally divided between the genders, females are represented in senior positions of the Trust, and participation in training courses is high from both males and females.

There are however a number of weaknesses that prevail. There are currently no gender-related policies, which can lead easily to inequalities as there are no reference criteria or evaluation guidelines. The implementation of a new statute, including a gender-sensitive perspective, is proposed as a means of rectifying this. Such a statute should establish a clear policy for promoting gender-equal education. Training for council members regarding gender issues may be of benefit, enabling them to review the work of the NTM, such as publications intended for schoolchildren, from a gender perspective. It is predominantly men who get media appearances, which may result in a false impression that environmental leaders are mostly male. Increasing the exposure of female environmental leaders would correct this imbalance. There is still much to achieve in the area of gender inequality but a start has been made in the right direction.

References

Agyeman, J., 2000. Address to Equity and Environment Conference, 8/11/2000. Southbank University/Royal Geographic Institute/Institute of British Geographers.

Dichiro, G., 1987. Environmental Education and the question of Gender, a feminist critique in Rowbottom l. (ed), Environmental Education, practice and possibility, Geelon: Deakin University Press.

Graham-Brown, S., 1991. Marginal Groups and Education, Chapter 5 in Education in the developing world: Conflict and Crisis, pp 50-63. Longman Group UK Ltd.

Peterson, V.S., & Runyan, A.S., 1993 Global Gender Issues. First Edition. Westview Press: Boulder, Colorado.

Rea, V., 1995. Gender, A vital issue in Biodiversity, extract from Appropriate technology, pp. 8–9. IT Publications Ltd.

UNDP, 1997. Human Development Report, New York: Oxford University Press.

WOMEN IN CAMPAIGNING: THE NFWI PERSPECTIVE

Women have for decades played a key role in campaigning for environmental justice, according to

RUTH BOND

A great deal has been written about women as agents of change, particularly in relation to the environment. For the National Federation of Women's Institutes (the WI) this concept is a strong one, and one that resonates widely with our 207,000 members who, in all of their diversity, make up the largest women's organisation in the UK. The WI has an ambitious agenda and a far reaching vision. We play a unique role in providing women with educational opportunities and the chance to build new skills, as well as the opening to influence local, national and world issues affecting the social, economic and environmental life of families and communities.

Since its inception in 1915 the WI has campaigned on a wide range of issues that matter to women and their communities. Our environmental work dates back to 1927 when we began lobbying decision-makers about pollution in the seas. More recently our resolutions have ranged from ending human trafficking and violence against women, to obesity and children's diets; and from reducing waste to conserving our planet's resources.

Underpinning our work on climate change is the ambition to build a well-informed and pro-active society, taking responsibility for our impact on the planet. Climate change remains an area in which women are uniquely placed to make a difference; as consumers, educators and of course change agents. In all areas the disproportionate effect on women and their ability to bring about necessary changes have been the essence of the NFWI's example. In an arena when all too often women have been shut out of the debate, especially on an international level, the organisation has been tackling major strategic challenges as they arise, recognising that all women have a role to play and setting about those small individual lifestyle changes that can make significant differences.

The starting point for the issue of environmental is the home; day-to-day decisions taken in this sphere, whether as householders, carers, wives, mothers, and consumers about any number of issues from feeding the family, to clothing them, to keeping the house warm, have an effect far beyond the reach of our individual households and communities. In the UK women are responsible for around £400 million of domestic expenditure each week (Visa, 2007). This tremendous spending power presents a real opportunity to make the best possible consumer choices for the environment.

Food choices create links with processors in other countries, and impact on farmers closer to home too. Transport miles contribute to climate change and intensive agriculture has led to environmental degradation. The huge threat we all face from climate change means that the day to day decisions made in the home and supermarket are more important than ever. It is these seemingly small, personal decisions which the WI has helped members to build upon to make a big difference nationally and demonstrate that individuals can have a huge collective impact.

The WI's history of work on the environment and climate change has led with action on the ground, mobilising a level of interest that both inspires individuals and gives politicians the mandate they need to bring about broad-reaching national action. Members have led as environmental ambassadors and change agents in their own communities.

Such practical initiatives include 90@90, a three year project which launched in 2005 to celebrate and consolidate 90 years of the WI. Members took part in many practical projects, engaging with their communities to show just how sustainable lifestyles can be achieved and environmental impact lessened. Members formed 'Eco Teams' to examine the amount of energy used, the many different types of rubbish that could be disposed of in an environmentally friendly way; they looked at water savings and travel as well as shopping and food over a four month period at the end of which they monitored the savings both in energy and in monetary terms. Groups were trained to go out into their communities and achieve tangible savings in energy usage, waste and transport. They then passed their knowledge and working methods onto other similar groups, creating a cascade effect which in all saw 7,000 people take part in the project. The programme resulted in groups cutting their water and energy consumption as well as cutting their waste by a quarter.

The WI Carbon Challenge placed the organisation in the forefront of greener living with 12,000 participants pledging to cut their carbon footprint by 20% over the course of the project. The savings achieved were equivalent to filling the Royal Albert Hall 108 times with carbon dioxide (CO2).

'Climate change remains an area in which women are uniquely placed to make a difference; as consumers, educators and of course change agents'

The Albert Hall also came into the equation when calculating how many plastic bags are used and discarded in a day – with London alone producing enough waste to fill the venue each hour. The recycling of plastic bags and packaging was a major campaign undertaken by thousands of members who monitored recycling facilities at the request of local authorities, and lobbied retailers and manufacturers to lessen and discard unnecessary packaging on products that clearly needed none. From the 15 billion bags used in 2007, this work set the scene for the beginnings of the retreat of the polythene tide.

The emerging gases from landfill sites credited with adding CO2 to the atmosphere could be less if packaging and food waste were not produced in the first instance. To this end members became Love Food Champions as part of the national Love Food Hate Waste campaign to raise awareness of the economic and environmental impact of food waste. During the six-month campaign individuals halved the quantity of food wasted in their homes and learned tips for planning meals and preparing dishes from left-over foods. New skills of food management and cooking were learned with some groups celebrating their achievements with a 'leftovers banquet'.

Underpinning all the campaigns has been the desire to halt climate change or, at least, to alert the WI membership and their wider communities to the necessity to take action. This is not only for the benefit of their families now and in the future but also in recognition of their sisters across the planet and across those seas that previous WI members had worried about.

As well as the education element to facilitate behaviour change, and the actual 'doing,' public awareness raising has also been key. In May 2009 the WI launched "If we can do it so can you" to promote awareness of the issues surrounding women and climate change. This initiative succeeded, finally, in putting the issue on the political agenda. Prior to the Copenhagen summit in 2009 members participated in the high profile 'Wave' marches and as Chair of the WI I had the opportu-

WI members at The Wave protest calling for action on climate change

nity to present thousands of the lobby postcards to Ed Milliband, then the Secretary of State for Environment and Climate Change. On these postcards members had written their comments about their fears and hopes around climate change and the impact on their families, pledging their support for the issue of gender to be set out as an integral part of the United Nations Framework Convention on Climate Change talks.

As a founding member of Stop Climate Chaos, the WI supported successful efforts to increase Britain's carbon reduction target from 60% to 80% by 2050. One of only two women on that Board, the WI was always in favour of doing something to back up talk and intention; while an important part of the political process it is important not to lose sight of the major lifestyle changes needed on a large scale in the UK. This focus on awareness changing continued with "A World Without Jam", an award winning short film created by the WI in 2008 to show the bleak future of our world unless everyone, collectively and individually, takes action to tackle the problem of climate change.

'Women and Environmental Change: Women Changing the World' is the WI's current rallying call to its members to take hands-on action within their communities and inspire others to do the same. This campaign has seen members protecting local woodlands and planting trees in community areas, carrying out water and air quality surveys as part of a national research programme, as well as lobbying local councils to take strong action on climate change and focusing on eating seasonal food and passing on the word to local cafés and restaurants.

For 95 years the WI has been broadening the horizons of its members in many areas. Most recently, this focus has been directed on the recognition of climate change as a major threat to development. As part of the 'Women Reaching Women' project, (funded by the Department for International Development and run jointly with Oxfam UK and the Everyone Foundation) the WI has provided educational opportunities for members and oth-

Launch of the 10:10 campaign

ers to learn more about the issues of development, poverty and climate change and the disproportionate impact of these on women and girls in the developing world. The project's sole aim has been to empower women to take action in support off development efforts by understanding the role individuals can play, thereby supporting people to make choices with the knowledge of how their actions can impact the world around them.

We might live in different cultures but the same issues affect women across the globe – and so often women are not represented when it comes to the practical ways of tackling shortages, excesses and anomalies on the planet – the biggest one of all being climate change, or more accurately, the changed climate. Discovering more about the challenges facing women in some of the most vulnerable parts of the world, as well as the response of women in other nations, has led WI members to understand both the vulnerability and the potential of women all over the world. Education amongst the membership, who in turn, pass information on to their own communities has ensured that awareness of these issues has deepened and increased.

For so many years leadership on these issues has been lacking. Without this, it is down to individuals to demonstrate the desire and determination to change the way they live. Through making comprehensive changes, women can make a real difference and working collectively, have a direct impact upon climate change and upon the environment in which we all live and strive to thrive.

- *Ruth began her working life in journalism and joined Barton WI in 1976 and is a past WI President. In Cambridge Federation she is a WI Adviser and was previously Chairman of the Public Affairs committee and Federation Chairman for 4 years. Ruth has been an NFWI Trustee since 2003 and was elected as Chair in June 2009.*

GENDER EQUALITY IN THE ENVIRONMENTAL SCIENCES

Following a survey of IES members, JULIA HEATON examines the gender equality in the workplace in environmental sciences

Justice in environmental sciences covers a wealth of topics, including that of equality in the workplace. The Institution of Environmental Sciences (IES), as part of its concern for supporting its members throughout their careers and its desire to promote good professional practice, undertook an employment survey of its members. One of the aims of this survey was to build a picture of the demographic of the profession of environmental sciences, identifying potential gender differences in the sector.

The survey enabled the IES to consider the uptake of membership opportunities and services by men and women. 397 IES members completed the survey, of which 111 were women. The majority respondents were Full Members of the IES (80 women and 224 men), whilst only 15 were Fellows (four of which were women). Whilst a similar per cent of male and female respondents were Fellows, proportionately more women were Associate Members (24%), compared to men (17%). The opposite was true for Full Membership (72% versus 78%). Regarding Chartership, 33% of respondents were already Chartered Environmentalists (CEnvs), with marginally more women than men taking up the opportunity to become chartered (35% of CEnvs were female whilst 31% were male).

Gender equality in the workplace remains a source of debate, with proponents on different sides of the argument. Within IES membership, the majority of respondents (224 men and 70 women) were employed on full-time permanent contracts. Proportionately more women were employed on full-time (fixed term/temporary) contracts or part-time, whilst more men were self-employed than women. *(see Figure 1)*

For both men and women, the two primary employment sectors were consultancy (146 men and 58 women) and government (55 men and 27 women). Following these, women were more likely to be found in academia, whilst men dominated industry. The third sector was the least represented by IES membership regardless of gender (seven respondents in total).

Disparity between men and women in employment is often thought to centre on salary and responsibility within the job. The majority of male respondents earn within the salary band £30,000-£34,999; equal numbers of women were earning in this salary band and between £35,000 and £39,999. The gender difference in earnings therefore appears not to be in the average salary, but in the range of salaries earned. Women were more likely to be earning at the lower end of the spectrum, with the highest earnings for female respondents being between £70,000 and £74,999. *(see Figure 2)*

Male respondents were earning over the full range of salary bands. Considering position gained within organisations, more male and female respondents were "Project/Middle Managers" than any other position. Female respondents were more likely to occupy "Graduate/Trainee", "Specialist/Technician" or "Officer" positions (see Figure 3). When asked whether they received a bonus in 2009, 34.6% of female respondents did, compared with 40.4% of male respondents.

With the coalition government considering implementing shared parental leave in 2011, the IES asked its members about their previous use of parental leave and the impact of doing so on their career. Maternity leave had been taken by 29.7% of female respondents, whilst 23.4% of male respondents have exercised their right to paternity leave. On returning to work, all male respondents returned to

the same salary position in the organisation. Only one of the 64 men felt that their employer was not supportive of them taking paternity leave, though another respondent commented that their employer "was not 100% supportive – more grudgingly so". Regarding their maternity leave, 12 of the 33 women did not return to the same salary and position in their organisation. Of these 12, two were made redundant due to taking maternity leave; one could not return to the same position due to "child care issues"; four returned part-time; one returned to less responsibility in her job whilst one returned to a job with greater responsibility. Two women felt that their employers were not supportive of them taking maternity leave.

Surveying IES members will enable us to better understand demographic of our membership, helping IES to identify areas of inequality which need to be highlighted and hopefully addressed. This article provides just a snapshot of the sector, but one which seems to indicate that women are still under-represented at the top levels of responsibility in employment (or if they do reach those levels, may be comparatively underpaid). In a bid to promote justice in all areas within environmental sciences, it is the aim and hope of the IES that a greater understanding of current pitfalls will educate and motivate us to promote a level playing field for all environmental professionals. A full report on the survey will be published through the IES website in January.

• *Julia Heaton is the Project Officer at the Institution of Environmental Sciences.*

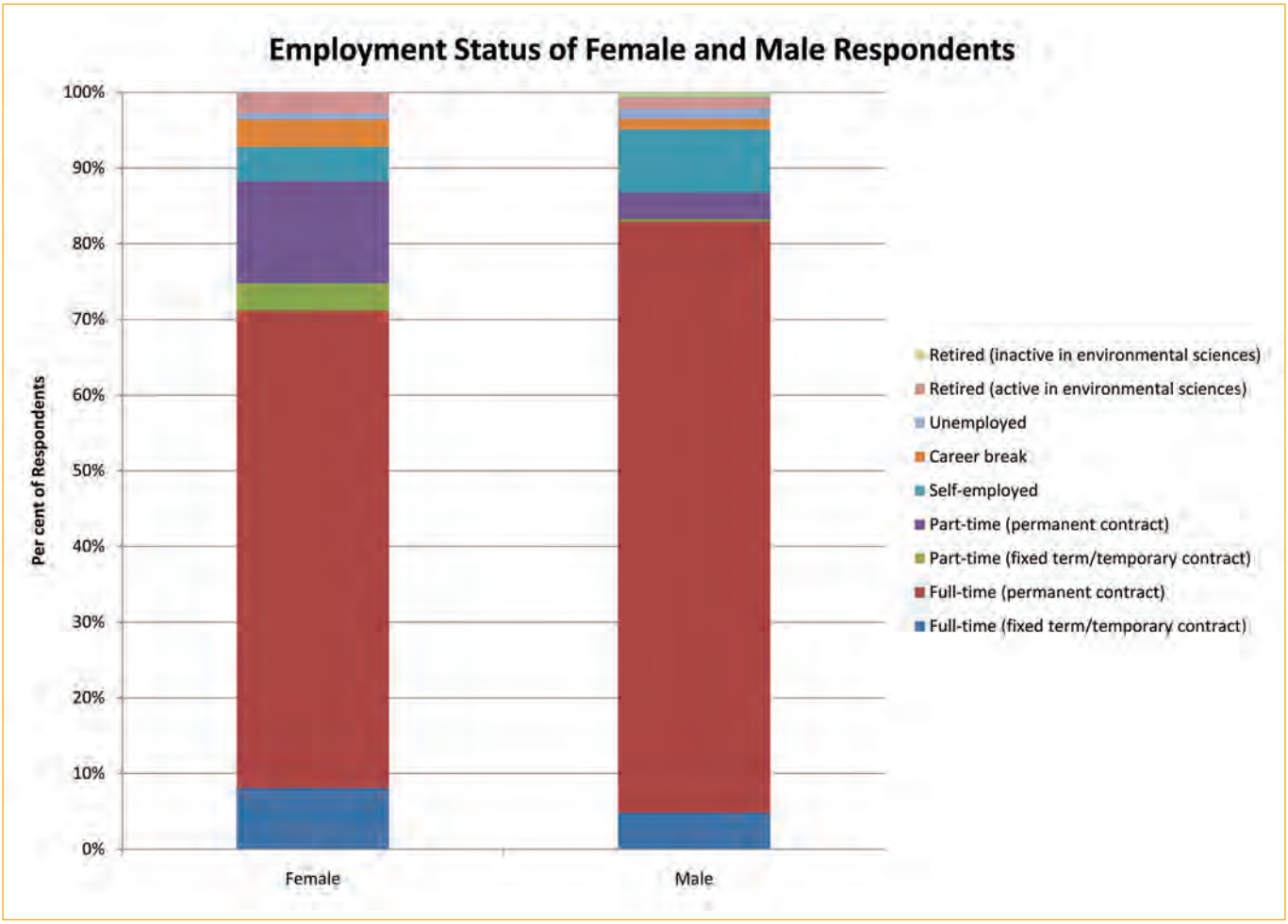

Figure 1

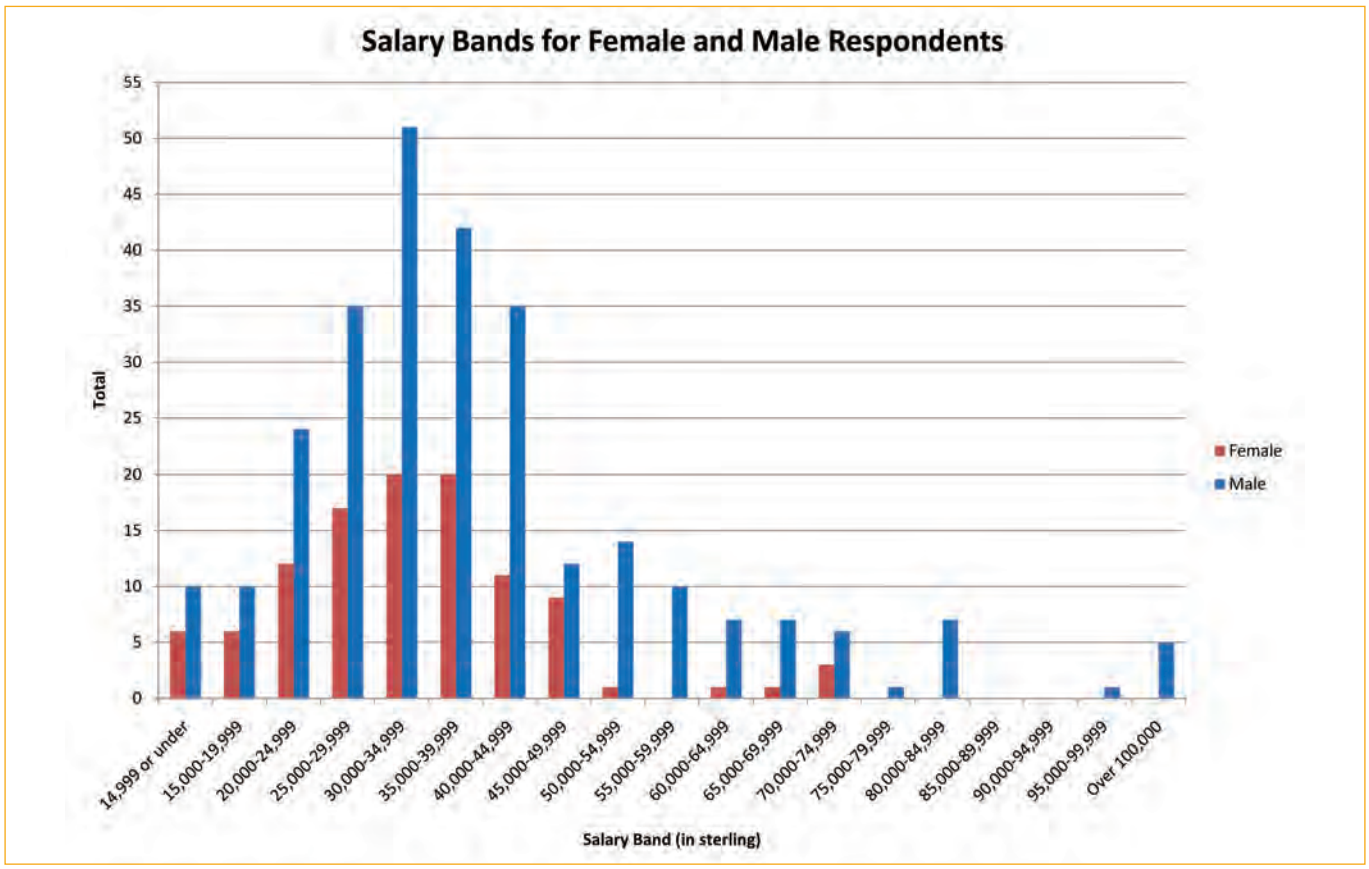

Figure 2

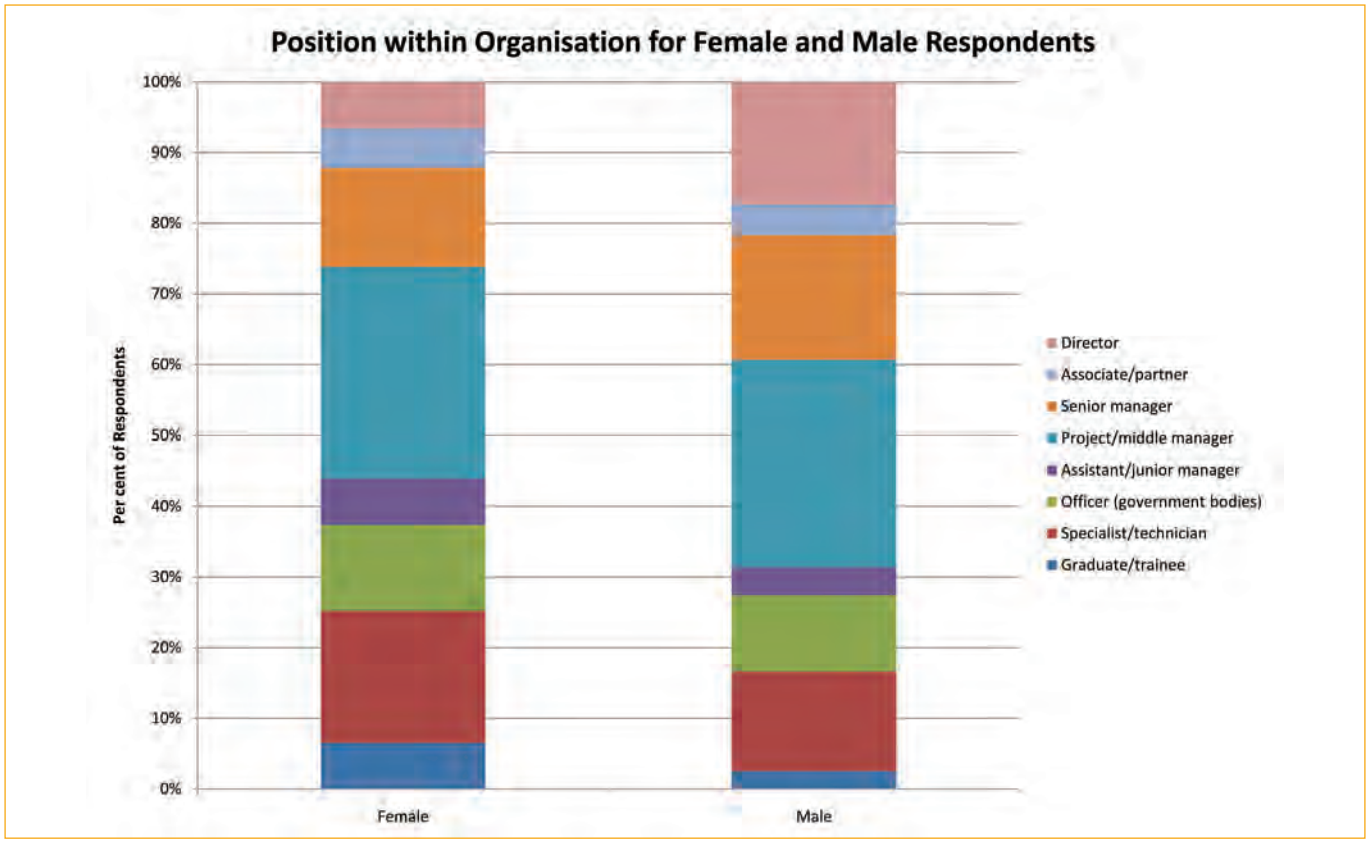

Figure 3

IES: NEW MEMBERS AND RE-GRADES

Name	Occupation	Grade
Ashley Adkin	Library Assistant	A
Ndifreke Akpatang	Trainee Engineer	A
Gavin Allsopp	Senior Environmental Engineer	M
Helen ApSimon	Professor of Air Pollution Studies	M
Alyson Bacon	Environmental Scientist	A
Alageswaren Balsamy Radiar	Graduate	A
Appadoure Basile	Graduate	A
John Boddy	Senior Project Consultant	M
Victoria Brooks	PhD Student	A
Anthony Brooks	Coastal Scientist	M
Deborah Brown	Environmental Engineer	M
Gayle Burgess	Programme Director	M
Ruth Chambers	Environmental Consultant	M
Ellen Copeland	Graduate	A
Erwan Corfa	Air Quality Senior Consultant	M
Nicholas Davies	Senior Analytical Chemist	A
Sarah-Jane Davies	Lecturer	M
Mofoluso Fagbeja	Senior Scientific Officer	M
Bhooshan Garge	Student	Af
Emmanuel Gault	Highway Engineer	Af
Thomas Goatly	Graduate Consultant	A
Luis Gonzalez Lopez Arriba	Graduate	A
Aine Gormley	Postdoctoral Research Fellows	M
Michelle Gosling	Graduate	A
Joanne Green	Senior Air Quality Consultant	M
Nicholas Hawkins	Managing Director	M
Anne-Marie Hindley	Air Quality Consultant	M
Katie Hole	Principal Consultant	M
Graham Horton	Environment Manager	A
Ali Hussan	Food Industry Professional	Af
Kamaljeet Jabbal	Property Directorate (Energy)	M
Stephen Kalule	Director	M
Tsun Kam	Assistant Consultant	A
Jason Kanellis	Geo-environmental Engineer	A
Elizabeth Kelly	Science Intern	A
Aida Khalil	Environmental Consultant	M

Name	Occupation	Grade
Prashant Kumar	Lecturer	M
Joanne Kwan	Project Manager	M
Weng Lai	Student	Af
Robert Latimer	Principal Environmental Consultant	M
Olanrewaju Lawal	Lecturer in Environmental Management	M
Penelope Longstaff	Senior Environmental Scientist	M
Stepehen Marr	Group Environmental Manager	M
Hayley Marston	Site Supervisor	A
Rebecca McCollom	Environmental Scientist	A
Roslyn McIntosh	Contaminated Land Officer	M
Ciara McKay	Water Laboratory Technician	A
James Monahan	Ecological Design Consultant	M
Brigid Murray	Secondary Education Adviser	M
William of Shropshire Esq	Environmental Management Consultant	A
Nicola Owen	Environment & Waste Policy Executive	A
Guido Pellizzaro	Air Quality Consultant	A
Simon Pike	Environmental Scientist	M
Ben Potts	Staff Environmental Scientist	M
Michael Proffitt	Energy Efficiency & Carbon Reduction Officer	M
Emily Reynolds	Graduate	A
Rachel Saville	Environmental Scientist	M
Abdulmutallib Shagari	Operator - Waste Water Treatment	A
Adam Shelton	Environmental Consultant	A
Scott Smith	Environmental Consultant	M
Angela Spinks	Assistant Air Quality Consultant	A
Andrew Stewart	Student	Af
Delyth Toghill	Principal Environmental Consultant	M
Mary Treneer	Streetscene Area Manager	A
Debbie Walker	Associate	M
Peter Walsh	Principal Air Quality Scientist	M
Simon Weller	Regional Environmental Advisor	M
Timothy Wilkes	Regional Environmental Manager	M
Anna-Yolande Wood	Project Assistant	A
Wendy Woodland	Senior Lecturer	M
Karen Young	Principal Environmental Scientist	M

KEY: F = Fellow, M = Member, A = Associate, Af = Affiliate