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## FEATURE ARTICLES

# Shape up for Sustainability: the professional approach

*A summary of the PP4SD seminar and workshop, 1 May 2002*

### About the conference

Shape up for Sustainability was a seminar and workshop taking an inter-professional approach to learning for Sustainable Development. It was held at the Institution of Civil Engineers at One Great George Street, London on 1 May 2002. It was organised by the Professional Practice for Sustainable Development (PP4SD) project management group, sponsored by the Environment Agency and hosted by the Institution of Civil Engineers. About 50 participants representing business and industry, the professions and the public sector attended.

The main purposes of the day were to:

- learn how professional organisations are working together to integrate sustainable development principles into professional development;
- learn about the Foundation Course in Sustainable Development developed by PP4SD;
- review case studies of sustainable development practice;
- identify common success factors for professional development in sustainable development;
- exchange information, ideas and experiences with other professionals and members of the Government's Sustainable Development Education Panel;
- make recommendations for future inter-professional learning events.

The following is an edited version of the inputs, discussions and conclusions. For a full record of the meeting contact the Institution of Environmental Sciences, 01778 394846.

### Introduction

Annie Hall chaired the morning session and welcomed participants.

The Environment Agency has been involved with PP4SD project since its inception, co-hosting an initial seminar for professional bodies with the

Council for Environmental Education in March 1999. PP4SD developed from this. Working with 13 professional bodies, PP4SD is developing:

- an understanding of sustainability (in its Framework for Sustainability) against which tools and materials can be tested to ensure they are consistent with the overall objectives;
- tools to support sustainable development including two booklets and the Foundation Course;
- approaches such as Systems Thinking, cross-professional dialogue and learning and the use of case studies to help professionals integrate sustainable development into their working practices.

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The Environment Agency is very enthusiastic about growing business awareness and actions. They are of benefit to people, the economy and the environment – and make the job as regulator so much easier!

#### *Message from the Minister*

The Rt Hon Michael Meacher MP, Minister for the Environment at DEFRA: 'I am sure that the recent award through DEFRA's Environmental Action Fund will help you to move this work forward and support professions developing and accrediting the skills that this country and its industry need to fulfil their roles in making sustainable development happen. Professional institutes have a particularly important role to play in the developing sustainable development agenda in the workplace. I wish you a very successful day.'

#### *Education for Sustainable Development Peter Martin*

Peter pointed out that the 1960s were a turning point for our thinking about the environment. Although the new 'caring' ideal lost out to competitive consumerism in the 1980s, it did not go away and led directly to the first Earth Summit in Rio de Janeiro in 1992. The UN conference on Environment and Development has become a regular event, the next one taking place in Johannesburg in 2002.

The environmental movement began with an eco-centred approach that many world leaders considered an obstacle to economic growth. Indira Ghandi spoke for many when she said that her priorities were poverty eradication and economic development. If tigers were lost in her drive to achieve these goals, then that was an unfortunate price that had to be paid.

The environmental movement changed as their traditional solutions to environmental problems were evidently failing. At the Earth Summit in 1992 solutions for global problems were to be based on the complex interaction of economy, society and environment.

In the UK the period since 1992 has seen progress in sustainable development thinking and gradually this is being translated into policies and actions in national and local government, NGOs and business and industry. The importance of education in building a sustainable society has also been recognised by its addition to the school curriculum and the setting up of the Government's Sustainable Development Education Panel.

To make sustainable development sustainable it must be owned by all elements of society. Education or life long learning is fundamental to this. WWF is concurrently running a programme of capacity building that takes advantage of the push-pull dynamic between civil society, business and government. There are two key elements: firstly to increase the capacity of civil society to make informed decisions about their roles in both creating unsustainability and creating sustainability and secondly building the professional capacity.

Three main change agents are targeted. Formal education, local and regional governance and business. PP4SD is all about supporting interprofessional learning amongst these agents.

#### *Professionals and sustainability: communities of practice*

*Professor Stephen Martin*

Stephen noted a change towards environment consciousness from the 1970s onwards. It has become embodied in the concept of sustainable development. The term has spawned a huge number of definitions that can lead to communication problems. However finding definitions should not deflect us from the real issues that need to be addressed.

Environmental campaigners were one of the earliest drivers for this change, but the other has been the incontrovertible evidence that a degrading environment is impinging on other policy areas.

Professionals are increasingly coming under fire from the public and governments. This is putting pressure on professional institutions and the 5.5 million people who call themselves professionals. There is a growing demand for greater professional transparency in such areas as ethics, environmental and social performance and other societal priorities. In response professional institutions are placing a growing emphasis on occupational standards, competency and codes of conduct as well as the professional development needed to implement them.

The real question for today's seminar is how can the professional institutions help their members, offer guidance, training and above all direction, in this complex field?

The approach to sustainability needs to be different from the traditional forms of education and training we got used to in schools, colleges and universities. The emphasis needs to be more on learning, dialogue, inquiry, participation and partnership as part of an on-going process. Learning about sustainability is not time-bound.

Continuing Professional Development (CPD) has become part of the debate. A survey of professional associations conducted by the Professional Associations Research Network (PARN) found that of the 162 respondents, 62 per cent had developed a CPD policy and programme. However, there appears to be a wide variation in the level of participation in CPD across professional bodies. A key finding of the research was the difficulty of finding appropriate CPD related to reassuring clients and the public that professionals remain competent throughout their working lives. The research concludes that the practice of CPD should not consist of a series of updating or knowledge acquiring events but a continuous process of learning through reflection on practice. This can be defined as an act of participation in a complex social learning system. When we join an association we want to learn and align our experience with the competence defined by the association. Later, when we are thoroughly competent in our own eyes and those of our peers, we can have an experience that opens our eyes to a new way of looking at the world that does not fit with our home community. We need to communicate this experience to our community, reflect on it and perhaps change how our community defines competence.

If professional associations are to become effective

Communities of Practice, they must do three things:

- keep learning at the centre of their purpose;
- maintain a sense of community and mutual engagement over time;
- be aware of the community's own state of development and move forward.

These three dimensions work together. Without the learning energy the community becomes stagnant, without strong relationships of belonging it is torn apart and without the ability to reflect, it becomes hostage to its own history.

There is no doubt that sustainability in all its dimensions will increasingly impinge on the decisions and actions that professionals take in the communities of practice in which they operate.

### Case studies

The case studies were introduced by Peter Price-Thomas, Senior Adviser, the Natural Step. The Natural Step is working with many companies to help them develop sustainable development policies and practices based on the Natural Step approach.

Andy Wales, Sustainability Director Europe and Asia Pacific for Interface Inc talked about how sustainability had enabled this flooring and furniture fabric company to 'do well by doing good'. The chairman and founder of the company, Ray Anderson, considered that most current business practice was unacceptable: 'in the future people like us will go to prison'. The company has identified seven steps to sustainability:

- eliminate waste;
- benign emissions;
- renewable energy;
- resource efficient transportation;
- closing the loop;
- energising people;
- redesign commerce.

Essential to achieving sustainability in the company are education and training for the workforce and Interface has set up the QUEST programme using the system ideas from the Natural Step.

The Carillion experience was presented by Professor Quentin Leiper, Director for Engineering and the Environment. The company is a 'construction to services' organisation that was demerged from Tarmac in 1999. He described how the company had changed from being reactive to proactive and how being sustainable was enabling them to:

- identify their social and environmental impacts;
- reduce cost, raw materials and waste, resulting in savings;
- reduce risk and minimise the risk of prosecution;
- improve relationships with customers;
- improve relationships with the community;
- create more effective supply chain management;
- achieve greater employee motivation.

Change takes place because of people and critical to achieving the changes were leadership and ownership of the ideas and the actions. Education and training programmes were introduced for all people at all stages of the planning and implementation processes. This has included:

- induction courses – offices, sites, suppliers;
- bespoke courses in 'Learning Works';
- Spectrum, Enviro, Intranet and Internet;
- sustainability reporting;
- involvement – with Business in the Community, communities, universities and schools, the Wildlife Trusts, WWF, Forum for the Future and The Natural Step;
- stakeholder communications – government, investors, shareholders, NGOs, suppliers, customers.

Dr John Blewitt, School of Lifelong Education and Development, University of Bradford, described how the Yorkshire and Humberside Region had developed its sustainable development education strategy for 2000-10. A forum was established in 1997 with representatives from schools, colleges and universities, NGOs, the voluntary sector, local authorities, health bodies, QUANGOs, businesses and charities.

The Sustainable Development Education Strategy forms part of the Region's Sustainable Development Strategy – Aim number 3 Education and training opportunities which build the skills and capacity of the population. It has six objectives with actions associated with each:

1. To develop the sustainable development competence of the existing workforce.
2. To promote the region's commitment to sustainable development.
3. To develop the sustainable development competence of the region's future workforce.
4. To develop the sustainable development competence of all the region's citizens.
5. To establish a community based volunteer programme to improve the quality of life in the region.
6. To promote the sustainable management and use of the education community's physical, cultural and environmental assets.

Peter Savidge, Director of the Pershore Group of Colleges described Project Carrot, an education project involving the Group, Advantage West Midlands and the Bulmer Foundation. The aims of the project are:

- To create Europe's leading centre for sustainable land management and agriculture.
- To develop a vibrant social context within which to strengthen the links between human nature, human health and the health of the land and the natural world.
- To make economically sustainable and socially and environmentally regenerative agriculture a defining feature of Herefordshire as a model region for Europe.

The college needed a fresh approach to offset the declining demand nationally for traditional land based subjects. Sustainable development was seen as an opportunity and it has generated an enthusiastic response from staff, local business and the community alike.

The key steps to achieving this are an innovative curriculum with the associated needs of staff training, managing the estate sustainably to set a good example, engaging local communities and developing partnerships.

A start has been made and change is evident. The farm is now run organically, in-service training is being provided, audits of the estate have been done and objectives and targets set. There is a long way still to go, but we are certain that engaging people in an educational

process so that they are better able to participate in responsible decision making is an important element of sustainable development strategies.

### *The professional response*

*Mark Whitby*

Providing Continuing Professional Development (CPD) and the right sort of CPD is obviously a major part of the professional body's role in supporting its members. It is also crucial if the professions are to fulfil their wider duty to society. We must not provide CPD from within our professional bunkers. Civil engineers are typically part of a whole range of overlapping communities and work side by side with other professions.

I have been using my Presidency at ICE to develop a Sustainability Alliance with RIBA, CIBSE and now IEE, IMechE, IChemE and RICS. A key task will be to develop and co-ordinate our CPD programmes to ensure we are providing the interdisciplinary training that built environment professionals need to take a genuinely holistic view of their projects.

I am also ensuring that there is a top down commitment from within the Institution. Our next Council meeting will be considering a proposal to make Sustainable Development a core requirement of civil engineers education and training leading up to chartered status.

Last week we also launched Society and Sustainability and Civil Engineering, a sector sustainability strategy for the profession and industry, developed with our partners in trade and research associations. It puts forward a model of sustainable development as one of continuous improvement and learning from each other. In addition the implementation plan includes rolling out the lessons of PP4SD and the Foundation Course itself to the profession.

Our strength lies in our membership and local associations, where the majority of CPD is provided. If the aims of PP4SD are to be realised the project managers and the participating organisations must take this on board. ICE's representative on the PP4SD steering group is Mark Broadhurst who as well as being active in his own local association in Devon and Cornwall is Chairman of the South West Environment Group. Mark is to shortly begin offering the PP4SD Foundation Course in the South West in conjunction with IMechE and hopefully other professions.

### *Group sessions*

The afternoon session was chaired by Alasdair Stark

Groups were asked to use information from the morning session and their own knowledge and experience to

- prepare a list of learning critical success factors for implementing sustainable development;
- prepare a list of recommended actions for integrating these CSFs into professional practice. Actions should relate to the three spheres in which people operate in their working environment:
  - i) working to agreed professional standards and procedures
  - ii) working to corporate standards and procedures, and

- iii) working as an individual with a personal set of values and standards.

### *Learning critical success factors*

The following list is an edited version of what were considered critical success factors:

- Full organisational commitment.
- Good examples should be set.
- It is part of a long-term process, not a short-term project.
- It needs to be of a high quality and professional.
- Relevant to the audience and the situation so the target groups can buy in and develop ownership of the ideas and actions. To be relevant it needs to be part of the 'day job' and people must understand the impacts of their work.
- People need to know what the vision is and see where they are in the process.
- Learning needs to be transformative and lead to cultural changes, not just a knowledge thing. It should help people develop different perspectives and ways of thinking and challenge existing values, attitudes and behaviour.
- Learning must encourage 'joined up thinking'.
- Learning needs to be participatory and encourage various forms of leadership.
- Learning should empower people to participate and be active in finding solutions.
- In an organisation, everyone needs to be involved and the learning needs to be relevant to them.
- People need space and time to discuss with colleagues and friends, reflect and internalise the learning.
- The organisation must be committed to sustainable development.
- Learning goals and targets should be set.
- Learning must be credible, e.g. using case studies or other evidence and be of a high status.
- Learning opportunities must be accessible, e.g. e-learning networks.
- Incentives are needed.
- There should be feedback to show how effective the learning has been in helping to meet sustainable development objectives. Show the benefits.

### **Recommended actions**

- Identify an initiator, and champions.
- Audit of the baseline – the whole picture and flow diagram.
- Prepare the business case to help convince people.
- Targets require skill development.
- Build into business strategies and structures.
- Build SD learning into appraisals and reward with bonuses.
- Create or use measures/indicators e.g. quality.
- Develop better links between professional institutions and the related industries.
- Better links between professional institutions.
- Gaining knowledge to use for change.
- Make SD a significant part of the professional exams.
- Compulsory, monitored CPD with personal plans and guidance and compilation of a learning log.
- Prepare codes of practice.

- Enable multidisciplinary and cross professional learning.
- Availability of suitable resources to support learning.
- Effective communication.
- 'Walking the talk', getting involved, being proactive.
- Dissemination.
- Influencing others, spreading the message, offering support.
- Set up an award scheme.

### *Moving forward* *John Baines*

Sustainable development is a learning process through which we plan to achieve sustainability. Both sustainable development and sustainability are dynamic concepts and will remain so as long as there is change or the possibility of change. One way educators have responded to learning for change is by promoting action research, a form of self monitoring evaluation that encourages people to use the lessons learned in their actions. Frameworks such as those provided by PP4SD and the Natural Step help us identify sustainable development actions and assess their effectiveness. They are useful tools. The case studies have shown there many models from which we can learn, but from the group sessions we have identified some common critical success factors.

We have learned that we cannot think and act in compartments any more. The phrase that crops up again and again is systems thinking – joined up thinking. If we are to do this successfully as professionals we will need to learn from each other and develop solutions that are shared.

### *The Foundation Course in sustainable development* *Jimmy Brannigan*

The Foundation Course has been written by Jimmy Brannigan and Stephen Martin and edited by John Baines. The content and structure of the course closely follows the recommendations of the participating professional institutions who developed the ideas at a series of workshops. The course aims to provide participants with the tools necessary to engage in the process of integrating sustainable development principles into professional practice. It provides a framework for a structured dialogue with participants. The course was thoroughly tested with a variety of professional audiences before being printed in its current format. Two types of course are available. The first is a 'Train the Trainer' course lasting a day and a half. The second course is aimed at professionals who are interested in getting started with sustainable development.

The manual is on sale from the Institution of Environmental Sciences, PO Box 16, Bourne PE10 9FB.

### *Biographies*

**John Baines** is a Vice-President of the Institution of Environmental Sciences and Director of the PP4SD Project.

**Dr John Blewitt** has been instrumental in producing the regional Sustainable Development Education Strategy for Yorkshire and the Humber. He is a member of the Yorkshire and Humber Education for Sustainability Management Group and a member of the region's

Sustainability Commission.

**Jimmy Brannigan** is National Education Development Manager at the Environment Agency.

**Duncan Eggar** developed a sustainable development strategy for the international aviation fuels marketing business of BP and is currently seconded to the UK Sustainable Development Commission.

**Annie Hall** is Head of Education at the Environment Agency and a member of the Government's Sustainable Development Education Panel.

**Professor Quentin Leiper** is Director for Engineering and the Environment at Carillion plc, where he is responsible for developing and implementing the Carillion sustainability programme in a £2 billion 'construction to services' company.

**Peter Martin** is Head of Education at WWF-UK and a member of the Government's Sustainable Development Education Panel.

**Peter Price-Thomas** is Senior Advisor for The Natural Step in UK.

**Professor Stephen Martin** is an independent consultant in sustainable development and vice-chair of the Institution of Environmental Sciences. He designs organisational change programmes in sustainability for businesses and educational institutions.

**Peter Savidge** is a Director of Pershore Group of Colleges and involved in the management of a major project to create a leading centre for sustainable agriculture and land management at the Holme Lacy campus in Herefordshire.

**Alasdair Stark** is Business and Industry Training Manager at WWF-UK.

**Andy Wales** is Sustainability Director Europe and Asia Pacific for Interface Inc. His role is to challenge and support Interface EAP as it develops towards sustainability becoming business as usual.

**Mark Whitby** is President of the Institution of Civil Engineers and is committed to developing institutional involvement in sustainability, urban design and education for engineering. He is a founding Partner/Director of Whitby Bird and Partners. 

## SUSTAINABILITY

Want to learn more about the most significant issue for the professions in the 21st century?

The Institution of Environmental Sciences is running a series of participative, solutions-based workshops entitled

### *PROFESSIONAL PRACTICE AND SUSTAINABILITY.*

The events will be facilitated by practitioners and experts from the Environment Agency, NGOs, and the professions. All participants will receive a copy of the recently published training manual – *Professional Practice For Sustainable Development* – on which the workshop is based.

The next two workshops will be held at Holme Lacy College, Hereford, on 3-4 September and 1-2 October 2002. We would like to hear from all interested parties, whether companies, individual members or non-members of the IES.

For further information and costs contact

The Institution of Environmental Sciences  
on 01778-394846 or email: [ies-uk@breathemail.net](mailto:ies-uk@breathemail.net)

# Non-food crops

*The initiative of government and industry*

*Rob Margetts CBE*

## *Introduction*

As Chairman of the Government-Industry Forum on non-food uses of crops my task is to look for ways and means to re-connect agriculture and industry. The application of agriculture to industry arises from crops grown specifically for non-food uses and from co-products of food crops.

The industrial world is used to synthetic materials with their advantages of scale, consistency and reliability of supply. The Common Agricultural Policy is not sufficiently geared towards innovative applications and in some instances hinders development of non-food uses of crops. And, here at home, we need to put in place concerted leadership and co-ordination between industry, DTI and DEFRA.

There is poor technology transfer to the market so to end-users the functionalities of crop-based products are not evident. Clearly this has to be a market-driven activity. But where the market lacks maturity or critical mass it requires help with co-ordination, strategic thinking and with targeted initiatives.

## *Sustainable development*

As well as being a new income opportunity for farmers, non-food uses of crops have the potential to contribute to sustainable development, contributing to the UK's objectives in substituting fossil carbon and mineral feedstocks with renewable resources. I want to see the potential of UK agriculture realised to deliver tangible economic, social and environmental goods through non-food uses of crops.

The Forum has agreed a set of sustainable development indicators which will be used to assess specific recommendations.

The Forum owes its existence to the House of Lords Select Committee on Science and Technology which reported on non-food crops two years ago. Its terms of reference are to provide strategic advice to Government and industry on the development of all agricultural products of plant and animal origin produced or processed in the UK, with the exception of solid biofuel crops as these have established support mechanisms.

GM technology has the potential to produce crops with new or enhanced properties but on the whole, and for the present, significant progress can be made using conventional agriculture and plant breeding technology.

## *Forum – membership*

The industry members of the Forum are drawn from industrial users of crop-based raw materials and from farming, plant science and environmental experts. The size of the Forum has been kept deliberately small and external members selected from particular backgrounds, mainly beyond the agricultural sphere. This is because, for industrial crops, the main question marks appear to lie outside agriculture.

## *Forum – case studies*

As part of its core working method the Forum is carrying out detailed case studies on areas where it is felt there is under-exploitation of economic potential and opportunity for non-food uses of crops. The challenges to be met cannot be tackled generically but instead need to be looked at on a case by case basis.

Our case studies range from high volume – low value, to low volume – high value markets, covering energy crops, fibres, oilseeds, carbohydrates, speciality products, co-products and animal products. These applications all present opportunities for wealth creation and quality-of-life improvements – for example, by replacing mineral feedstocks and synthetic fibres in bulk commodity markets, by adding value to secondary products in new markets, by consolidating niche markets.

Agronomic advantages dictate that the programme is focused on wheat, oats, rape, potato, forestry and sheep where our climate and soils can deliver relative advantage.

A key part of the work is to identify the economic, technical and regulatory constraints which are holding back commercial development, and to identify the three or four actions required to make a difference.

## *Winds of change*

Advances in scientific knowledge and greater environmental awareness are helping to change perceptions about non-food uses of crops. The political landscape too is changing.

The CAP is evolving second pillar policies to provide greater rewards to farmers for delivering public environmental and rural enterprise benefits. Here there is a case for establishing non-food uses of crops as a legitimate and integral second pillar policy.

Sustainable development is higher on corporate and Governmental agendas and there are opportunities to be seized. For example, we have had the Treasury's Green Fuels Challenge. More recently the Performance and Innovation Unit produced a report on 'resource productivity' to underpin Government work and policy on sustainable development. Non-food uses of crops are part of resource productivity and I welcome the report's emphasis on targeted support for resource productive innovation.

The Natural Environment Research Council, which I also chair, is committing resources to the area of sustainable energy from biomass and the evaluation of a large scale increase in the cultivation of crops for non-food use in terms of the rural economy and ecology.

Several other Research Councils are already involved with Government in supporting LINK programmes which are relevant to non-food uses of crops. Such programmes help to bring together the world of industry and science and this is clearly important if the UK is to make the most of its industrial and scientific excellence.

Other supporting initiatives will be required. For example, the Forum is encouraging DEFRA and DTI

to set up a scheme for demonstration projects to kick-start uptake by industry of crop-based raw materials. It is clear to those at the sharp end that 'green is not enough'. Crop-based raw materials must demonstrate comparable technical performance to prove that the technology works and reassure industry that problems associated with scale-up can be overcome.

Another scheme being considered is support for market introduction by drawing up technical specifications for end products and carrying out economic studies of supply chain dynamics.

Another likely development is the establishment of an independent centre of knowledge, technology and intellectual property to serve the sector for non-food uses of crops. I am pleased that DEFRA, DTI and various industry bodies are actively looking into the establishment of this centre of excellence in the context of a possible Faraday Partnership. This will integrate different capabilities and services, and help co-ordination within the sector.

### *How we can all help*

It is important that this debate should cause us all to ask how we can help given the respective places that we occupy, in the worlds of science, industry or politics. We must all help to raise awareness of non-food uses of crops and their benefits, using the influence that you have in your own fields.

A valid question seems to be: where are the entrepreneurs? We need more of them because the connection between agriculture and industry is simply not there.

The CAP is not as supportive as it could be, and in some cases exerts a negative influence. The CAP has traditionally been a mechanism to support existing industries rather than stimulate the development of new ones. Two examples: first the CAP supports the production of long fibre flax for traditional linen applications to a greater extent than it does short fibre flax for new industrial markets. In doing so it disadvantages and therefore stifles a clear new industrial opportunity. Second, potato starch manufacturers are given additional support within the EU through the payment of a fixed premium per tonne of starch produced. The UK does not share in

this scheme because it was not a historical producer of such starch when the scheme was established. As a consequence, the new commercial opportunity to use potato starch to make biodegradable plastics is not being exploited to the full by UK producers.

Successive CAP reform has moved support for different crops towards alignment with that available for cereals. This is a good thing as it aligns the CAP closer to the world market but it has meant a lower subsidy for industrial crops such as linseed, flax and hemp.

### *End-of-Life Vehicle Directive*

The Forum's case study on the use of hemp fibres in automotive applications has highlighted the importance of the Directive on end-of-life vehicles. This Directive puts the emphasis on the use of materials which can be recycled but gives no incentive for the use of renewable materials. This is an issue which is exercising the European car industry, and progress here could provide quite a boost to the hemp fibre industry.

### *Packaging Waste Directive*

Similarly the Forum's case study on biopackaging (starch based plastics) has highlighted the importance of the Directive on packaging waste. A key issue is how this can accommodate biodegradable plastics, which clearly warrant different treatment under the Directive and its recycling/recovery obligations, from non-degradable petrochemical based plastics. Here too there could be a way of boosting a promising industrial application for an agricultural crop.

### *Conclusion*

I have covered a number of potential commercial developments for non-food uses of crops. The Forum is in the business of picking winners and identifying the barriers that need to be removed to make progress. I believe the time is right to drive this forward – it is right for the future of UK farming, for sustainability and for rural jobs. We need to make progress and we need to do it now. 🌳

■ *Reprinted from Science in Parliament, Vol 59 No 1, Spring 2002 with the kind permission of the publishers.*

## The role of renewable raw materials in the European Climate Change Programme

*Dr Joachim Ehrenberg, European Commission*

The European Climate Change Programme was set up to produce a list of actions and prioritise them on the basis of criteria such as their potential to reduce greenhouse gas emissions. Within this programme a Working Group on Renewable Raw Materials was formed. Renewable raw materials in this context are defined as 'products derived from the agricultural and forestry sectors and being used for other purposes than nutrition'.

Due to the fact that they contain no fossil 'carbon',

renewable raw materials are potential contributors to reducing 'fossil' greenhouse gas emissions.

A number of areas where a wider introduction of renewable raw materials can contribute to reduced EU emissions of greenhouse gases were identified for their potential to be evaluated and their cost implications to be assessed. The suggested areas suitable for policy measures aimed at promoting the use of renewable raw materials were polymers, lubricants, solvents and surfactants.

### *Market prospects for renewable raw materials*

In order to assess the current and future economic importance an overview of the current and expected future market development was made. Estimates for the future are based on scenarios that are considered to be technically and economically feasible.

Rough estimates on the possible substitution potentials in some applications indicated the following results:

- **Polymers:** Starch-based polymers probably offer the most promising use of renewable raw materials (RRM) in terms of production volumes. However, they are also the least developed application. RRM based polymers currently account for less than 0.1 per cent of the polymer market. The potential market share in 2010 could be several per cent.
- **Lubricants:** Currently only about 2 per cent of the EU lubricant market is based on RRM. In 2010 between 30 and 40 per cent might be possible.
- **Surfactants:** Here the RRM market share is already high (more than 50 per cent). However an increase to over 60 per cent appears possible.
- **Solvents:** Currently only about 1.5 per cent are based on RRM. Potentially almost a factor of 10 more is feasible.

### *The greenhouse gas reduction potential*

For identifying the possible benefits, in terms of total energy and CO<sub>2</sub> reduction, it is necessary to take a holistic approach. This covers all steps, from the raw material to the manufacturing of the end product, the use and the waste phase (cradle-to-grave approach). The energy input required for forestry and agriculture (including fertiliser use and crop protection), for transportation and chemical processing also has to be considered.

The figures on CO<sub>2</sub> savings are therefore based as far as possible on life cycle assessment studies. Estimates on the total greenhouse gas savings potential have been made by including projections of the market development until 2010, either in the absence (business as usual) or in the presence of policies and measures that would promote a wider use of RRM.

In this context it is important to distinguish between two types of GHG emission savings:

Potential primary savings are defined here as the direct emission reduction (predominantly CO<sub>2</sub>) during the entire lifecycle, but excluding savings in the use phase.

Potential secondary savings are defined as emission reductions during this use phase. They are related to the performance of RRM-based products. For example, the superior performance of some lubricants based on RRM enable fuel savings in cars.

The total primary savings of GHG emissions in 1998 amounted to 1.7 Mt CO<sub>2</sub> equivalents (relative to no use of RRMs). On top of these savings, RRMs are estimated to avoid in the future additionally 3.8 Mt CO<sub>2</sub> equivalent without specific policies and measures and 8.2 Mt CO<sub>2</sub> equivalent with them.

The primary savings amount to approximately 1 to 2.5 per cent (without/with special policies and measures) of the total CO<sub>2</sub> reductions (336 Mt CO<sub>2</sub> equivalent) needed to comply with Kyoto. This means that

in the short term the increased use of RRM offers only a limited emission reduction potential.

Secondary savings have the potential of being considerably larger (by an order of magnitude) than the primary savings. Examples are the use of starch as filler for car tyres and some vegetable based motor oils (reduced friction). In the long term and by making use of biotechnology much larger reductions of CO<sub>2</sub> emissions might be achieved by producing bulk chemicals from biomass feedstock.

### *Relevant Community policies and measures*

Through its different research programmes the Commission has in the past actively participated in developing uses for renewable raw materials. From 1986 to 1998, the European Commission supported through its agricultural research programmes ECLAIR, AIR and FAIR around 120 research projects dealing with both renewable energies and renewable raw materials. In addition, projects on renewable raw materials were also funded in the industrial Community Programmes such as BRITE-EURAM.

Also, in the Fifth Framework Programme (from 1998 to 2002) the Commission continued to fund research on renewable raw materials in its programmes 'Quality of Life and Management of Living Resources' and 'Competitive and Sustainable Growth'.

More specifically the ECCP working group suggested some policy measures to facilitate a wider introduction in general of renewable raw materials in European manufacturing industry, for example:

1. For security of sufficient and stable supply an innovative inclusion of RRM requirements in the future development of CAP (Common Agricultural Policy) would be needed, with particular attention to enlargement.
2. Improving the scope for application as well as technical and economic performance could be achieved by better promoting basic research on RRM and by providing for better application of biotechnology. Supporting applied research, demonstration projects, and market development are other issues of priority.
3. Removal of barriers inherent in the chemical registration (EINECS/ELINCS) is essential by adapting EINECS/ELINCS system to account for RRM specifics, but also by adapting the new chemical policy to the same effect.
4. Facilitating commercialisation and creating economies of scale for renewable products could be performed through European or international standards and by public procurement favouring products partly or fully based on renewable raw materials. In addition, emerging industries based on RRM would need better access to venture capital.
5. Providing for a coherent approach and political attention in the short, medium and long term would be possible by creating a European Commission inter-service task force on RRM. This could result in a technology roadmap for RRM, including developing, monitoring and benchmarking of progress. Making bio-degradability and non-toxicity more relevant to the consumers would also enhance market oppor-

tunities. During the period of the ECCP no good estimates of the costs of measures were possible. This needs to be assessed in more detail in the follow-up to the ECCP. Depending on the case, the changeover to more use of RRM could result in financial savings for the end users of these products, but also in higher costs caused by changes to more expensive production processes and increased raw material prices. Increased market volumes would help to mitigate any cost increases.

### *Conclusions and follow-up of the ECCP*

The ECCP is a launch pad for the overall strategy on climate change and not a final step. The ECCP has created a forum also for RRM to be discussed not only in terms of environmental benefits but also in terms of advantages for industry and consumers alike. The European Commission and DG ENTERPRISE have responded to this.

Work in the context of the ECCP has shown that RRM can be an important subject for industry, although its direct contribution to the reduction of greenhouse gases is somewhat muted.

Although RRM is not explicitly included in the new Commission's Communication to Council and

Parliament as an area where measures against climate change would have to be pursued during the next two years, DG ENTERPRISE has continued to work with the WG RRM. This work goes beyond the aspects of climate change. Together with ERRMA we are currently drafting a synthesis report on the current and future role of RRM in industry.

The purpose of this report will be to make DG ENTERPRISE more aware of the economic potential that a more widespread use of RRM would bring about and to identify problems and possible solutions for a better promotion of this kind of industry.

The report should be ready early next year and could form the basis for further actions.<sup>1</sup> 

**Note:** *The views expressed in this article are only those of the author and can under no circumstances be understood as an official position of the European Commission.*

■ *Reprinted from Science in Parliament Vol 59 No 1 Spring 2002 with the kind permission of the publishers.*

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<sup>1</sup> *The report was published in March 2002 as an internal report of DG ENTERPRISE and is available by making contact with the following e-mail address: joachim.ehrenberg@cec.eu.int*

## The Urban Exposure Project

Guy Coulson AMIEnvSc

### *Abstract*

The Aerosol Science Group at the University of Essex is involved with an EU funded project to produce a state of the art, user-friendly management decision software tool for administrators to help them quantify and deal with the real health risks associated with pollution in urban environments. The project, entitled Urban Exposure, will run for three years and will quantify the relationship between outdoor pollution measurements and actual exposure suffered by people in urban indoor environments. The resulting product will be extensively field tested in two European urban centres before being made available to administrators.

Airborne pollutants are recognised as a major cause of health problems in Europe. Most adverse health effects come from pollutants in the form of airborne particulate matter or aerosols. However the health risks from these aerosol pollutants are poorly understood. Legislation has been made at various levels to attempt to control the risks but is often based upon available technology i.e. what it is possible to measure conveniently rather than what is most damaging and difficult to implement because of a lack of information on best practice.

Various regulations and guidelines have been published attempting to limit human exposure to potentially harmful particulates (The Air Quality Framework Directive 96/62/EC and World Health Organisation 2000 Air Quality Guidelines for Europe, 2nd edition). These standards are based upon exposure to pollutants measured outdoors. The problem is that in urban environments, most people spend most of their time indoors – at home or at work. This raises two questions:

- How do particulate concentrations from sources outside translate into concentrations inside a building?
- What sources of particulates are there inside a building and what concentrations of these are there in indoor air?

Both of these questions are followed by questions on how the measured concentration translates into exposure; what this means, in terms of the risk of adverse health effects to real people and how should governments – local, regional and national – manage these risks?

The first two questions are currently being addressed by an EU funded project called 'Urban Aerosol' (EU contract number EVK4-CT-2000-00018), which is being carried out by a consortium of European universities and research institutes including the Aerosol Science Group at the University of Essex. Urban Aerosol aims to measure and characterise the concentration and chemical composition of aerosols in indoor and outdoor urban locations across the EU.

The subsequent questions about exposure, risk and management will be addressed in a new project due to begin at the end of 2002. A new consortium has been formed consisting of members of the Urban Aerosol project with the addition of toxicologists, epidemiologists and a public health authority to undertake this project, which will be called 'Urban Exposure'.

The aim of the project, which will last three years, is to build upon the data gathered in the Urban Aerosol project to investigate the toxicological and epidemiological effects of indoor and outdoor pollution in urban environments. In addition to particulate pollution, a study will also be made of the effects of by products of drinking water disinfection. These data will be used to develop and

implement integrated modelling tools for calculating exposure through inhalation and through dermal adsorption for compounds relevant to air pollution.

Internal doses of particulate matter and gaseous pollutants will be estimated using a new model for inhalation, which will be based on a mechanistic description of particle dynamics in the human respiratory tract. The inhalation dosimetry component to be used in combination with the proposed micro-environmental model for particulate matter and gaseous pollutants will provide a new and integrated exposure and dosimetry assessment approach for human receptors indoors. Realistic development of dosimetry modeling for the human inhalation exposure to air pollutants is an important step for understanding the complete exposure-dose-response relationship. Determination of the particle deposition efficiency at different parts of the human respiratory tract will provide information and characterization for the first step of the relationship between exposure to particulate matter and toxicological response in human subjects.

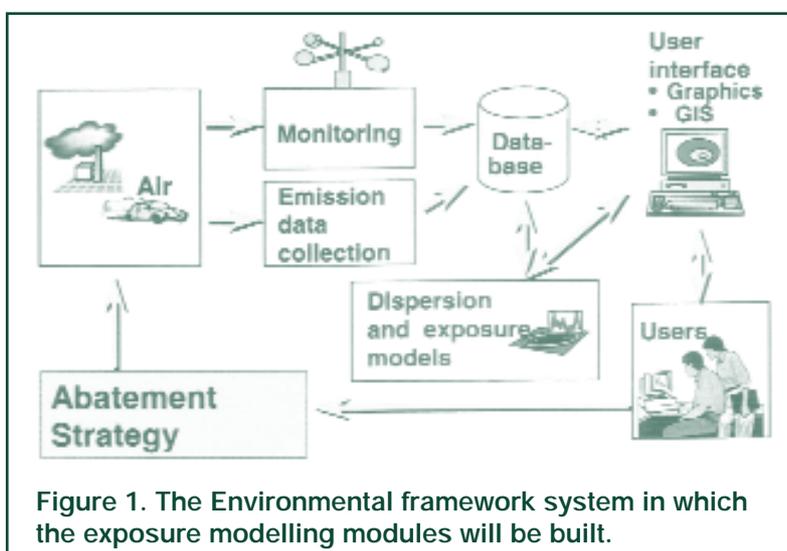
Therefore, integration with dosimetry modeling will provide useful information in linking exposure to internal dose and human health, and furthermore will determine variability in dosage associated with (a) different components of the particulate matter and (b) different physiological attributes of individuals. In this dosimetry model the Aerosol General Dynamic Equation is solved numerically during inhalation using a discrete-nodal point method for describing the particle size distribution. This model incorporates explicitly the mechanisms of nucleation, condensation, coagulation, convection and deposition of gases and particles, as well as a module for considering gas phase reactions. The model predicts the evolution of the size distribution and composition of inhaled particles and their deposition characteristics for each generation of the human airways. The model has modular structure and the user has the flexibility to include or exclude specific physical processes in a particular simulation.

Urban dwellers are exposed to a multitude of air pollutants of many origins. Some of the pollutants that are present in the air can have important routes of exposure other than inhalation. Examples of pollutants where it is necessary to consider multiple pathway exposures are heavy metals (e.g. lead), or some organic compounds (e.g. polychlorinated biphenyls, dibenzodioxins and dibenzofurans). Chloroform, which is a water disinfectant by-product present in municipal tap water and in swimming pools, is one such compound having multiple pathways. Previous epidemiological studies of the indoor environment have considered only tap water as a chloroform source. Another important source of chloroform is the ocean. One of the main objectives of the proposed project is to develop a more sophisticated approach for the estimation of dermal uptake by extending

what are known as Lumped Parameter Models (LPM) through the use of a distributed parameter skin compartment in order to deal with spatial variability. The proposed Distributed Parameter Model (DPM) will account for accumulation in the skin's barrier layer, the stratum corneum, based on the intrinsic properties of this tissue and on fundamental equations of transport phenomena. The DPM will be parameterised for chloroform, and will be compared with two LPM models in which the skin is represented by one and two compartments. The three models will be identical in all respects except from the representation of the skin and the processes associated with dermal absorption.

The modelling framework is intended to be modular and very flexible to offer the possibility of evaluating a variety of exposure scenarios. Figure 1 below depicts the environmental framework within which the exposure modelling modules will be built. The final result will be a European exposure database available on a public access website and management decision software tools to enable local authorities to assess the risk presented by measured air pollution levels and act accordingly. The tools will have a Geographical Information System (GIS) type interface, which is essentially a map from which spatial distributions of pollution sources, monitoring stations, measurement, model results and other geographically linked information can be presented. Two local authorities in urban locations in the EU have volunteered to act as guinea pigs to test the 'product' in the last year of the project. The management decision software tool will then be disseminated by arranging demonstrations to interested parties in Europe.

The reasons behind the project – apart from scientific curiosity – lie in EU regulations and goals. The Treaty of Amsterdam (EU Art. 136) sets out objectives for social policy in the EU, which include both improved living and working conditions. Articles 35 and 37 of the EU provide for a high level of human health protection and protection and improvement of the environment. In addition, one of the priorities set in DG Environment 'Clean Air for Europe' is to address problems associated with particulate matter. There are also provisions for the provision of safe drinking water:



however there are concerns regarding the by-products of the disinfection process.

In order to help in achieving these goals, information concerning concentration and chemical characteristics of particulate matter and gaseous pollutants in urban areas and in indoor air will be used to assess actual human exposure characteristics. The aim is to quantify the correlation between the complex system of human indoor exposure and outdoor monitoring measurements. This will enable governments to quantify risks and hence costs associated with urban air pollution and ultimately to produce abatement strategies.

The end product of this project – the management decision software tool – will take into account exposure in the outdoor and indoor environment. The main emphasis will be on inhalation of particulate matter but it will also be calibrated for inhalation and dermal adsorption of chloroform as an indicator of drinking water disinfection by-products. The tools will be validated in two in-depth case studies in Oslo and Katowice.

In order to have any value for decision making, tools available to administrators must be easy to use. To achieve this the aim is to integrate any tools developed into the existing AirQUIS air quality management system (AQMS). This system has been successfully implemented in several European cities (including

Stockholm and Bucharest) after selection in open competition. It has also been used in several urban areas in Asia in development projects funded by NORAD and the World Bank. The project is dedicated to serve the real needs of end users through a combination of scientific excellence and emphasis on user friendliness. To help achieve this a User Panel will be enlisted consisting of nine representatives from ministry or local government across the EU, including Essex County Council in the UK. The user panel will advise on policy relevance and general direction of the project and individual case studies. It will also help in the dissemination of information at the end of the project and make suggestions for further research, development and implementation at a local level.

Along with the final ‘product’ information from the project will be disseminated through the usual channels of peer-reviewed articles and conferences

We expect two detailed case studies and four smaller ‘demonstration’ studies to be completed by mid 2005. The database website should be online and the management software available as a stand-alone product by the end of that year. 

■ *If you have any questions about the project please contact Guy Coulson or Ian Colbeck at the University of Essex, Department of Biological Science, Colchester CO4 3SQ.*

## Project Carrot: an exercise in sustainability farming

### *The concept*

Project Carrot is establishing a unique European centre for sustainable land-use and sustainable agriculture. The Centre will be based at Holme Lacy College (part of the Pershore Group of Colleges) in Herefordshire and will link the health of the land to the health of its people and develop new enterprises for the regeneration of farming and rural life. It will be a specialist resource for research and development, and a flagship project for the nation.

### *The background*

Project Carrot is a partnership between the farming, business and education sectors which have come together because of the crisis in farming and its impact on rural communities. The project confronts the dangers of intensive practices to land, air, water, animal and human health. It seeks to transform people’s attitudes and behaviour in favour of sustainable land management. Project Carrot’s organic approach to sustainability recognises the need to embrace all farming systems to deliver a sustainable future.

### *Why Holme Lacy?*

Holme Lacy sits in the organic heartland of Britain with a very high concentration of organic farmers and food producers within striking distance. The estate has the climate, soil and topography to research, develop,

demonstrate and teach a wide range of agricultural and forestry enterprises. An historically important deer-park bordering the River Wye gives access to the cultural and recreational value of one of the great parklands of England. The farm has a range of buildings suitable for development to house food, health and tourism ventures which will aid the wider regeneration of Herefordshire.

### *Who is behind Project Carrot?*

The Bulmer Foundation, a new sustainability charity formed by the Bulmer family and HP Bulmer plc, is the driver and innovator, conceiving ideas and bringing them to fruition.

The Pershore Group of Colleges, of which Holme Lacy is a part, develops and delivers education and training packages from the ideas conceived and created by the Foundation. The Holme Lacy campus is the home for Project Carrot involving the whole of its 600-acre farm and woodland estate.

Advantage West Midlands is the Regional Development Agency which is supporting the development of Project Carrot.

A group of volunteers, individual and corporate, give their time and experience to deliver a Project that is richer and more vibrant for their vision and passion.

All parties are committed to developing and delivering a project of high quality.

## Objectives

■ *To establish Europe's most innovative and effective curriculum for sustainable land-management.*

Following key recruitments and staff development, Project Carrot is delivering new short courses in organic and extensive farm management including an introduction to organics for food retailers and new 'fun' courses such as bacon and sausage making. It is developing, in conjunction with other European colleges, internationally accredited organic courses at craft and management levels, to be delivered from 2002. It is developing a range of leadership courses for agricultural entrepreneurs of the future and is aiming to host relevant degree and post-graduate courses within the next three to five years.

■ *To site the project on a profitable organic farm, woodland and landscape.*

The 600-acre Holme Lacy estate went into organic conversion in July 2001 and is establishing profitable tourism, food, woodland, energy and waste initiatives alongside its role as an exemplary organic farm and educational resource for students and researchers. A pedigree breeding herd of 44 Hereford cows has been introduced and will calve in summer 2002. Other new agricultural enterprises will be introduced as the mixed rotation progresses and important processes such as on-farm composting will extend students' skills and experience. The historic and cultural value of the ancient deer-park will be enhanced and the biodiversity of the site improved through more sustainable landscape management, including the preservation of important veteran trees and the restoration of medieval fishponds.

■ *To redevelop the college campus and farm buildings according to best practice for sustainability.*

The campus will be almost totally rebuilt using the best ecological design and locally sourced materials. Designed as a series of courtyards for learning, study and recreation, the campus will be light, healthy and spiritually uplifting. New halls of residence will allow people from the UK and overseas to access Carrot courses and new recreation and sports facilities will invigorate the social life of students, visitors and villagers. The Holme Lacy campus and estate aim to be carbon neutral and renewable heat and energy technologies will provide for college, farm, organic enterprises and the neighbouring Holme Lacy House hotel. Water and waste systems will be linked to the farm's composting and irrigation systems to maximise the value of waste by its use as a raw material.

■ *To establish organic food processing operations and other imaginative commercial and visitor programmes on-site.*

Redundant farm buildings, including a listed dovecote, will be renovated to become an organic enterprise zone, turning the produce of the farm, woodland and surrounding farms into hams, pies, cheese, bread, etc. The development will include production and administrative facilities, a shop, café and consumer centre allowing people to learn about food from field to fork and to consume and purchase organic and local products.

■ *To establish progressive and successful health and community programmes on-site.*

Project Carrot will create a health and wellbeing centre on-site to teach people, including all students, how to cook and how to benefit physically and psychologically from positive interaction with the natural world. The centre will promote health through food choice and preparation and teach how to get the best value through local and seasonal produce. Carrot will also work with other charities and community groups to offer a site and support for their health projects. The Project's revision of education will focus not only on content but on the process of learning to increase wellbeing through attention to the health of body, mind and spirit of students, staff and visitors.

■ *To establish sustainable land management design, research and advisory services.*

Working with leading international organisations Project Carrot has commissioned ground breaking research into the ecological impact of agriculture, the environmental footprint of Herefordshire and a sustainability audit of the Holme Lacy site from which to measure progress. Project Carrot will continue to seek solutions to current problems and future threats and will develop a sustainable land-use model which will be replicable elsewhere in the UK and Europe. It will establish education programmes and advisory services that provide new solutions at the point of need and that help to move agriculture and people towards a healthier and wealthier future.

## Who needs Project Carrot?

Everyone can benefit from Project Carrot: people of all ages, of all abilities and from all walks of life.

Conventional farmers who need help developing production and business systems that are reliable, profitable and good for the environment.

Organic farmers, food processors and woodland owners who need skilled people to strengthen and develop their businesses need access to top advisors and the opportunity to get hands-on with leading-edge research and innovative technologies.

The entrepreneurs and the workforce of the future, who wish to live and work in a thriving countryside that provides for them financially, physically, socially and spiritually.

Individuals and families, currently living an urban life, who wish to experience the best of the countryside or who are looking for new land-based lives after successful first careers.

People who want to find physical and psychological rejuvenation through positive contact with land, plants, animals, food and people, in other words, a real health service for the community.

People who want to learn about cooking real food.

The staff of government agencies, local authorities, agriculture and forestry organisations who need information on the advances in sustainable land management policies, techniques and markets for their own effectiveness and professional development.

Organic food, drink, woodland, health and tourism innovators looking for production and administrative facilities, routes to market and a presence in this high-profile, media, visitor and consumer destination centre. 🌳

# Salary survey 2002 by Environment Business

Dr R.A. Fuller FIEEnvSc

In our March/April edition I featured the environmental careers survey carried out by ENDS Environmental Consultancy. This has been closely followed by a survey of salaries in the UK environmental sector carried out by Environment Business Magazine. This reaches similar conclusions to those in the ENDS survey i.e. that salary levels are on the whole improving though environmental employment still pays less than jobs in other scientific and engineering disciplines.

The survey contains a range of statistical information and analysis and some significant extracts are included below. In the full report there is information on gender differentials, sector differentials and the effect of qualifications and professional membership.

## The survey results

The highest average salaries in the environment sector are those paid to directors and partners in environmental consultancies (£41,750), senior environmental managers in industry (£38,580) and professors or senior lecturers (£33,438). In the next strata, senior officers involved in monitoring and technical activities do well with an average of £32,386, while senior consultants earn an average of £29,650. Middle managers working on environmental management in industry receive £29,040 on average.

However, these salaries are lower compared to those of management in industry in general – it seems that the environmental sector is not particularly well-paid.

According to the National Management Salary Survey 2001, published by Remuneration Economics and the Institute of Management, the average basic annual salary of a director (other than a CEO) in UK organisations is £97,507, while a senior manager earns an average of £56,475. A middle manager is paid an average of £32,464, while an assistant manager receives £28,000. These sums are considerably higher than those earned in the environmental sector.

According to the Environment Business Magazine survey, only 21 per

cent of respondents earn more than £35K, while 21 per cent earn less than £20K. The majority of job titles (58 per cent) earn between £20K and £35K. The lowest paid jobs are those of those of junior officers in regulation and policy, including local government, who earn an average of £16,786, assistant officers in monitoring and technical areas (£17,813) and scientists/engineers (£19,514).

## Increasing wages

However, wage levels do appear to be improving. Nick Eva, manager of recruitment consultants Evergreen Resources, comments that salaries in the environment sector have always been low. 'When I started five years ago, graduates were getting £10-12K and although they are now getting £15-20K, it has been a gradual rather than a huge increase,' he says.

Paul Seeley, director of Eden Recruitment, agrees that compared with

a lawyer or accountant, an environmental professional is not well paid. But, he says: 'An environmental consultant or environmental engineer, not including ecologists who are paid very little indeed, is probably being paid better than a civil engineer with the same experience. It's not a particularly low-paid industry, unless you compare it to sectors like banking. Compared to other areas of science and engineering, it's not badly paid at all.'

The discrepancy in wage levels in relation to other sectors is changing, says Paul Gosling, environment divisional manager of recruitment consultants Allen & York. He says he has seen an improvement over the last three to four years. 'Wage levels are catching up with industry in general and getting very close now,' he says.

The change is being driven by three factors:

- the best people in consultancy are see-

## ANNUAL SALARY BY JOB TITLE

ANNUAL SALARY £K	<15	15-20	21-25	26-30	31-40	41-50	50+
TITLE	3%	18%	23%	22%	21%	9%	4%
Director	-	-	-	15%	30%	37%	19%
Senior consultant	-	-	28%	35%	26%	12%	-
Consultant	5%	55%	25%	13%	3%	-	-
Senior manager	-	-	8%	16%	41%	18%	18%
Middle manager	-	10%	26%	32%	19%	10%	2%
Assistant manager	13%	35%	39%	9%	4%	-	-
Senior/Principal officer	-	3%	16%	26%	45%	8%	3%
Mid-level officer	3%	25%	44%	25%	3%	-	-
Junior officer	14%	86%	-	-	-	-	-
Senior officer	-	9%	9%	27%	36%	18%	-
Technical officer	-	50%	33%	-	17%	-	-
Assistant officer	25%	50%	25%	-	-	-	-
Senior scientist/Engineer	7%	13%	20%	20%	33%	-	7%
Scientist/Engineer	17%	44%	28%	6%	6%	-	-
Senior/Principal officer	-	50%	50%	-	-	-	-
Professor/Senior lecturer	-	-	-	-	100%	-	-
Lecturer	-	50%	-	50%	-	-	-
Research officer	20%	20%	-	20%	40%	-	-
Other	-	47%	27%	20%	-	7%	-

ing that they can get 20% more for doing a similar job in industry, so consultancies have had to match salaries and benefits;

- management consultancies are entering the industry and are driving up salaries; and
- there is a shortage of good quality technically and commercially aware individuals.

All salaries are of course influenced by the location of the job, the size and type of organisation, and the experience and seniority of the job-holder. Much also depends on whether the job the person is doing is purely technical, or involves an element of business development, in which case they will be better remunerated.

Directors/partners include principals and owners of businesses. All figures include part-time and self-employed people, who may work fewer hours than full-time members of staff.

Low sample figures were obtained for junior officers, technical officers, professors, lecturers and research officers, and should be treated with caution.

The full survey report was issued as a supplement with the June 2002 issue of Environment Business Magazine.

## Forthcoming events

### 17 September DNAPL Risk, Remediation and Research

Lakeside Centre, Aston University, Birmingham £75  
CL:AIRE Conference looking at contaminated land and dense non-aqueous phase liquids, their assessment and remediation. Details: CL:AIRE 7th Floor, 1 Great Cumberland Place, London W1H 7AL; 020 7723 0806; email enquiries@claire.co.uk

### 23-26 September Management Skill For Countryside, Tourism & Heritage Staff

Plas Tan Y Bwlch, Wales £690  
Short course to promote development in management for countryside managers. Details: The Director, Plas Tan y Bwlch, Maentwrog, Blaenau Ffestiniog, Gwynedd, LL41 3YU; 01766 590324; email: plas@eryri-npa.gov.uk

### 24-26 September Waste 2002 – Intergrated Waste Management and Pollution Control, Research, Policy and Practice

Stratford upon Avon.  
The second in a series of international bi-annual conferences on the management and regulation of controlled wastes. Details: Conference Office; 02476 412170; email: info@waste2002.com

7-9 October  
**Environmental Protection 2002**  
NSCA Annual Conference and Exhibition, Glasgow £247-377  
Annual conference including sustainable urban management, energy and climate change, industry and environment, transport and air quality. Details: NSCA, 44 Grand Parade, Brighton, BN2 9QA; 01273 878770 email admin@nsca.org.uk

30 October - 1 November  
**Oceans of Change**  
A three day international conference at the National Maritime Museum, London. For further information contact Janet Norton, Research Administration, National Maritime Museum; 020 8312 6716; Fax: 020 8312 6521; e-mail: research@nmm.ac.uk

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# Environmental Education for Sustainable Development

*Russian-British Conference held at Lomonosov Moscow State University  
Faculty of Geography 27-29 June 2002*

Forty delegates from Russia and Britain met in June in Moscow to share ideas and good practice in education for sustainable development. The conference was hosted by the Faculty of Geography at Moscow State University (MSU), one of the largest communities of geographers and environmental scientists in the world. It comprises over 700 faculty, 1,000 undergraduate students and 150 post-graduates, based in 14 departments.

The two-day conference was jointly organised by the Learning and Teaching Support Network – National Subject Centre for Geography, Earth and Environmental Sciences (LTSN-GEES), University of Plymouth and the Faculty of Geography, MSU.

Key themes included progress on greening the HE curriculum, curriculum innovation, indicators of sustainable development, roles of NGOs in environmental education, outdoor education for sustainability, radio ecology and sustainability and the professions.

Senior civil servants and members of the State Duma provided an insight into Russian policy on sustainable development. Important policy areas include enhancing human capital through education and training, while sustaining the huge areas of natural capital within the Russian Federation. They stressed that regional differences will require different approaches, including different legal and

political structures. Delegates were also informed of some of the significant challenges facing Russia, including over 61,000 radioactive contaminated sites, many of which are close to cities.

The British delegation included presentations on outdoor education and the role of NGOs. Professor Martin Haig from Oxford Brookes University argued that NGOs were lead agencies for change in the UK HE curriculum. Professor David Eastwood from the University of Ulster spoke about an innovative web-based virtual MSc in Education for Sustainable Development which he and his staff have pioneered.

Professor Stephen Martin, vice-chair of the Institution for Environmental Sciences, spoke about the role of professionals and education for sustainable development, and introduced the foundation course – Professional Practice for Sustainable Development (PP4SD). There was a great deal of interest in how universities here and in Russia might introduce such programmes into industry and commerce.

Other contributions came from Professor Shirley Ali Khan on ESD developments in higher education in the UK and from Professor Bill Scott and Dr Steve Gough on Unesco initiatives in higher education and Professor Peter Higgins on the key role of outdoor education and education for sustainable development.

Professor Brian Chalkley, Director of the LTSN-GEES Network at the University of Plymouth, in summarising what further action was needed to strengthen education for sustainable development in universities, suggested that action was needed at five levels:

- a stronger emphasis within environmental sciences programmes;
- new degree programmes;
- greater emphasis on greening other disciplines;
- greater emphasis on greening universities as institutions;
- closer links with the professions.

## Moving? Changing jobs?

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## New members

The IES is pleased to welcome the following to membership of the Institution:

Ms J. Allan	Air Outcomes Team Leader, SEPA	Mr Ian Marr	Assistant Environment Protection Officer, SEPA
Mr K.L. Beaton	Environment Protection Officer, SEPA	Miss H.G. Moat	Information & Communications Officer Staffordshire University
Mr J.C. Burns	Hydrology Unit Manager, SEPA	Mrs J. Moore	Environment Protection Officer, SEPA
Mr J. Calow	Environmental Consultant Middlemarch Environmental Ltd	Dr S.M. Struthers	Director, Environmental Engineer Skapa Mining Services Ltd
Mr T.E. Cavallo	Graduate, University of Sunderland	Mr P. Wend Hansen	Assistant Environmental Manager Bovis Lend Lease Ltd
Ms K. Foster	Student, Open University	Mr T.G. Williamson	Policy Officer National Society for Clean Air
Mr J.A. Hepburn	Environment Protection Officer, SEPA	Miss S.E. Woodward	Analytical Chemist City Analytical Services
Mrs C.V. Jamieson	Assistant Chemist, SEPA		
Mr G.S. Kinsella	Hydrometric Officer, Environment Agency		
Mr S. McIntyre	Plant Manager, Wastewater Treatment Works, United Utilities		
Ms L. McSherry	Assistant Chemist, SEPA		

### Diary dates for 2002

9 Sep	GP Committee	13.00
6 Nov	Education Committee	10.30
6 Nov	Council	13.30
2 Dec	GP Committee	13.00

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- From waste to woods: trees on landfill and their place in landscape
- Enhanced landfill strategy
- Waste minimisation: the long term benefits
- European study on EISs of installations for the treatment and disposal of toxic and dangerous waste
- Mercury fall-out from crematoria

#### Education and training

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