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Directorate-General for Research
Directorate L – Science, economy and society
Unit L.2 – Research in the economic, social sciences and humanities – Prospective

Contact: Domenico Rossetti di Valdalbero

European Commission
Bureau SDME 07/34
B-1049 Brussels
Tel. (32-2) 29-62811
Fax (32-2) 29-79608
E-mail: domenico.rossetti-di-valdalbero@ec.europa.eu

People, the economy and our planet

Sustainable development insights from socio-economic sciences and humanities

A socio-economic perspective from the conference
Sustainable development:
A challenge for European research
Brussels, 26-28 May 2009

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Foreword

Sustainable development is a human construction sometimes considered as an oxymoron – a figure of speech by which an expression produces a seemingly self-contradictory effect. Since its large public launching in the middle of the eighties by the 'Brundtland Report' and the Rio Earth Summit in 1992, step by step, sustainable development has passed from a conceptual idea to an operational reality.

At European level, the sustainable development strategy, the energy and climate change package, and the procedure of 'impact assessment'

for any major EU legislation or programmes are good examples of how sustainable development has been integrated into the daily EU policy-making.

In the research field, sustainable development has been subject to scientific, technological and, more and more, socio-economic studies. Sustainability hinges on whether one can find a new model of development that marries economic, social and environmental objectives or, in the words of Commissioner Potočník: reconciles profit, people and planet.

European research on its own will not make the world more sustainable, but it is without any doubt a central part of any answer. In fact, research deals with long-term issues and with the need to support a knowledge-based society. In addition, through international collaboration, European research can project its sustainability goals onto the rest of the world in a positive and participatory way.

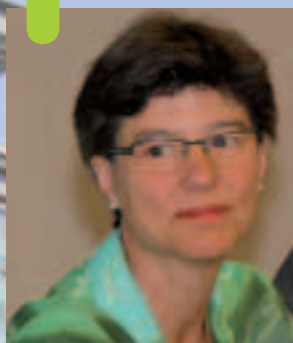
More public and private Education, Research and Innovation investments should allow a more rapid transformation from a resources-based economy into a knowledge-based society. That is the core premise underlying the European Research Area. A society that derives more wealth creation and prosperity from knowledge will be a more sustainable one, because it will be able to do more with less.

To achieve this ambitious target, scientific, technological and socio-economic research is needed. This publication draws upon presentations and discussion from the conference on 'Sustainable development: A challenge for European research' that was held in Brussels in May 2009.

This paper focuses on the role of socio-economic sciences and humanities within the European research effort directed at sustainable development. It follows and takes stock of recent reflections in this field like the European Commission Conference 'Towards a post-carbon society' of 2007 and the EU French Presidency Conference on 'Humanity and society faced with Climate Change: an agenda for Europe' of 2008.

A handwritten signature in black ink, appearing to read 'JMB', with a long horizontal stroke extending to the right.

Jean-Michel Baer
Director



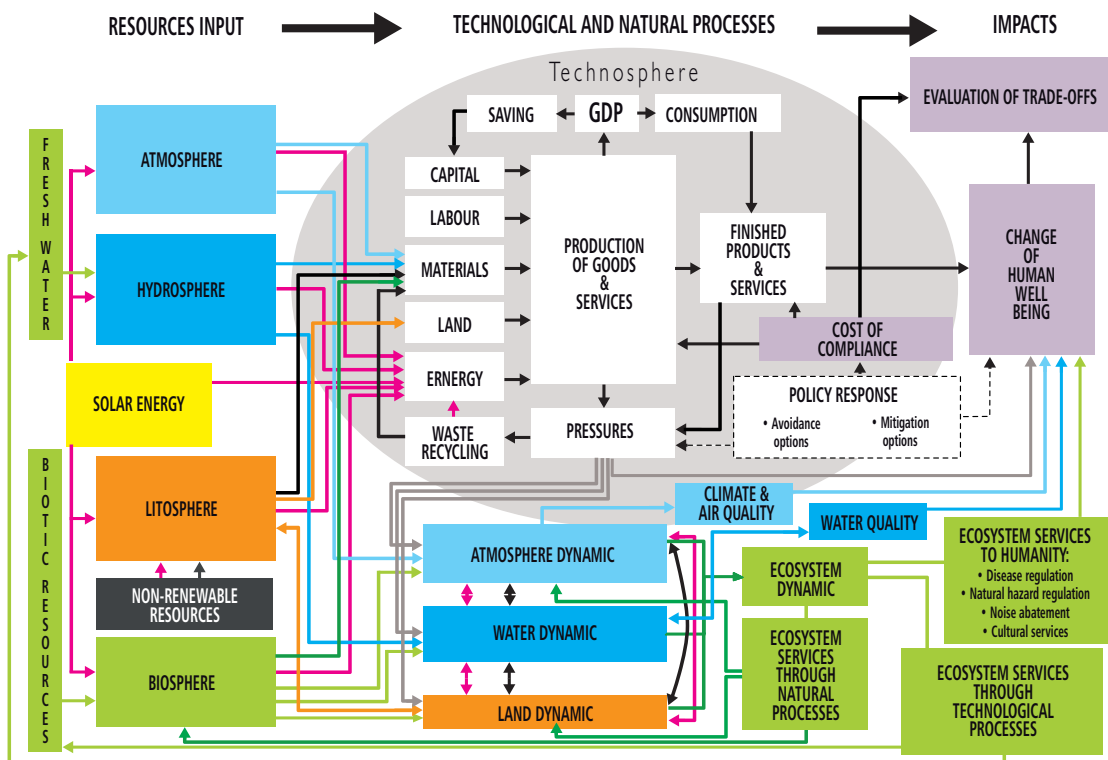
The role of Socio-economic Sciences and Humanities

The behaviour of the complex systems that are under stress is governed by natural sciences and the practical solutions to redress the abuse of these systems will need support from innovation across a wide range of technological areas. But natural sciences and technology are not enough to achieve sustainable development. To create sustainable development will require an unprecedented integration of research and practice across disciplines and new modes of scientific and political discourse including socio-economic sciences and humanities.

An important part of the EU research effort in this regard is channelled through the Socio-economic Sciences and Humanities (SSH) theme of the 7th Framework Programme. This programme aims to support policy-relevance, pluri-disciplinary collaborative research; it has a budget of € 623 million to disburse over the period 2007-2013. Among the major challenges related to the political priorities of the European Union that it seeks to address are:

- Growth, employment, competitiveness, knowledge society;
- Combining economic, social and environmental objectives: energy, agriculture, rural and urban issues;
- Major trends in society: demography, quality of life, cultural interactions;

Representation of a complex socio-ecological system



Source: C. Sessa, 2009

- Global interactions and interdependence; conflicts and peace;
- Participation, democracy, governance; European diversities and commonalities.

The question of development of new scientific and socio-economic indicators as well as foresight and forward looking activities are horizontal activities that can also cover some above-mentioned activities.

Sustainable development is primarily covered within the second of these activities ('Combining economic, social and environmental objectives'), but it is imperative to note that all the other priorities of the programme tie in one way or another into this concept¹. The demographic trends in society – aging, smaller family units, urbanisation – have immediate consequences for the nature of sustainable development and the changes that will be needed to cope.

Climate change and resource depletion are two important parts of the sustainable development, but they will also have a direct bearing on global interactions, interdependence, conflicts and peace. Many conflicts are resource based; climate change will bring big shifts in settlement patterns and huge fluxes of populations.

Development of new and more appropriate forms of governance at local, national and international levels is a key to the institutional dimension of any successful adaptation. The knowledge society is a certain component of the technical dimension of adaptation.

To identify the nature of desirable growth and its relationship to sustainable development is a critical part of helping change our values to bring us into a stable relationship with the natural world. So, each of these challenges is an essential part of studies of sustainable development.

The scope of the issue and the interactions of all these factors were richly demonstrated in the conference.

Arising from this set of societal challenges, a list of research priorities for socio-economic sciences and humanities research in sustainable development was proposed in the introduction to the Session on *Global changes: economics, employment, behaviour and territorial dynamics*:

- Conditions for transition;
- Measuring the economic impact;
- Changes in behaviour;
- New forms of governance;
- New geopolitical relationships;
- Changing land use;
- Resource conflicts.

This problem-oriented taxonomy will be the basis for this review. We shall reflect in turn on how the proceedings contributed to our understanding of each of these priorities, although inevitably the precision of this exercise is compromised by the interdependence of all these elements. Finally we will attempt to make a synthesis and an appreciation of the whole.

1. Several European research initiatives have been funded in this field by the 'Socio-economic Sciences and Humanities' (SSH) theme of the seventh European research framework programme (FP7) like the PACT and GILDED projects. See: http://ec.europa.eu/research/social-sciences/pdf/sustainable-development-and-territorial-dynamics_en.pdf

Conditions for transition

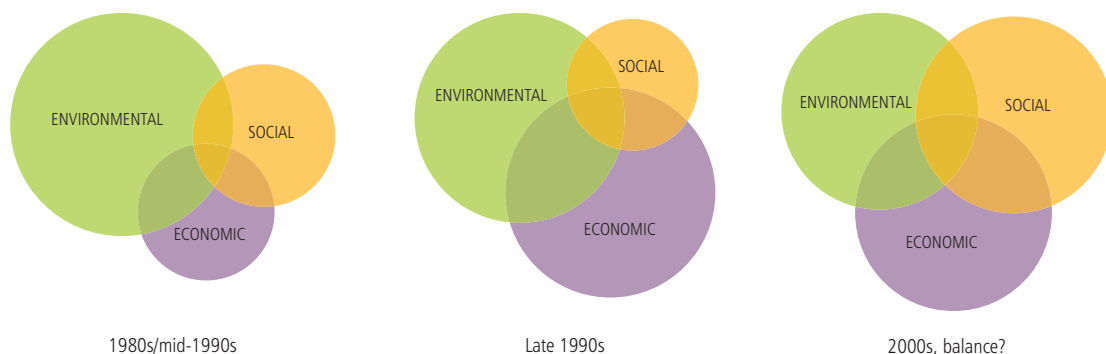
Achieving a transition towards sustainable development is one of the most important challenges to modern society. Finding solutions requires not only a shift in technology, but also a shift in behaviour and a transition to a decision-making process where choices for action are made differently. An important part of the contribution of socio-economic sciences and humanities research is to identify the economic, political and social conditions for the socio-ecological transition of our current model of production and consumption, including the role of education and training².

Proper research, properly used, is itself a precondition for successful transition. Both research practice and content have to be closely scrutinised to improve their contribution to sustainable development. This means developing wise indicators of impact of the research activities, and promoting a more intimate

engagement of researchers with the users of research, including policy-makers and stakeholders within business and civil society³. The scientific communities cannot work in isolation from the society. Examples of the involvement of stakeholders in implementing research and/or defining research agendas were cited in the Session on 'Research for sustainable development: who is accountable?' as well as examples of projects driven by alliances of NGOs and corporate actors.

Research and education are linked. Unless sustainable development is prominent in higher education then there will be diminished interest and capability among graduates to engage in research. Surveys suggest that sustainable development is generally better anchored in the vocational curricula than in universities. If society urgently needs graduates who can think in a more integrated way and who are familiar with the principles of sustainable development then there is merit in ensuring that the educational system supports their formation and encourages the multi-disciplinary approach vital to the topic⁴.

Relative importance of the sustainability components over the last twenty years



Source: A. Colantonio, 2009

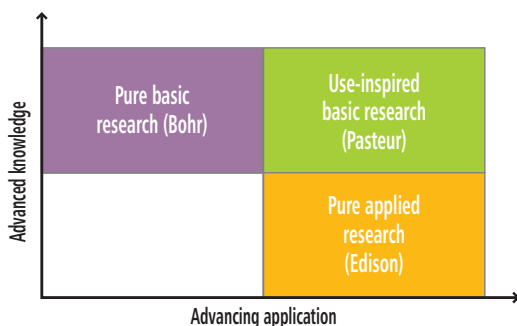
2. Baer, J-M., Session 13: Socio-Economic Sciences and Humanities (SSH) in FP7.

3. Esterle, L., Session 1: How can the contribution of research to sustainable development be measured?

4. de Wit, B., Session 7: Sustainable development, research, innovation and higher education in the Netherlands.

Technical research and innovation are also linked. Understanding the relation between them is crucial if research is to be converted to solutions for sustainable development. Good innovation policies require effective articulation between innovators and users through coordination, engagement, capacity building and incentives for users to participate⁵. Socio-economic sciences and humanities research is needed to understand how to use innovation to move to more sustainable modes of development, how to avoid lock-in to dominant socio-technical regimes and to define appropriate infrastructures and regulatory frameworks.

Advancing knowledge and/or advancing application



Source: L. Georghiou and J.C. Harper, 2009

Innovation generates property rights, which are often seen as fundamental to the knowledge economy. The origins and justification of such rights are sometimes challenged. It may be argued that sustainable development depends less on a decoupling between physical environmental impact and a knowledge

economy, than on a decoupling between macro-economic growth and the perceived dependency of business on intellectual monopoly to generate profits. The model of the knowledge economy in common thinking leads to an undervaluation of the environment, which is composed largely of public goods, and an overvaluation of ideas, which are often in private monopoly ownership. The consequent economic distortions and excessive use of environmental assets are devastating for global sustainability. The availability of knowledge at prices based on individual 'willingness to pay' would increase welfare compared to present reality where consumers face intellectual monopoly prices in pharmaceuticals, educational materials, financial instruments, agricultural inputs, computer software and even entertainment⁶. Such radical change would involve new forms of governance for knowledge and reward for innovators. Socio-economic sciences and humanities research would be critical to the search for these new arrangements.

Although its limitations are widely accepted, there is still a pervasive model of science as an isolated and deterministic system providing value-free 'truths' upon which policy-makers may draw as they see fit. It is generally acknowledged that we need to move beyond this and to provide for continuous exchange and co-evolution of scientific and policy knowledge in support of sustainability. Science should extend its engagement to stimulate willingness to act and to support policy amongst the public and stakeholders and to ensure rapid uptake of research results by stakeholders. The aims are to facilitate timely translation of research into policy advice and to ensure research addresses the matters and policies of concern to society. Such mechanisms need to be flexible and

5. Georghiou, L. and Harper, J.C., Session 1: Implementing research for sustainable development.

6. Bucio, A., Session 19: The 'knowledge ecology' we need: Are the core assumptions of the knowledge economy sustainable?

to be present on many scales; they are relevant at all stages of the policy cycle including early warning, issue identification, policy design, implementation, assessment, review⁷.

Sustainability research should engage with societal stakeholders from design to the implementation of results. Investment in people and institutional capabilities is the essential condition to use knowledge in all spheres of human activity to create sustainable societies and meaningful lives in the future. This stronger engagement of researchers with society will help detect what are the factors that support the implementation of research results and innovations in practice, and what are the factors that impede it⁸.

This knowledge must then be integrated into research policy and planning. An obstacle to this process is that academic scientists are still reluctant to get involved in policy advice and to engage the society at large, unlike the industry or NGOs. They feel that they are being asked questions that they are not yet able to answer and for which they don't have sufficient means to conduct a proper investigation.

Mechanisms to involve scientists more effectively need to be developed. Scenarios offer one way by which scientists and policy-makers can jointly test ideas about possible futures and the probable results of specific actions and particular frameworks of governance. They can also be used as a means of improving public and stakeholder participation. If these groups are involved in the formulation and evaluation of scenarios, they can provide insights not readily available for policy-makers, as well as increasing the level of social learning⁹.

It is not only researchers who are learning these lessons. Industry has also seen that it has to make this connection. Customers are looking increasingly not for answers to specific technical problems, but for coherent and sustainable approaches to generic problems and large scale issues. Successfully to meet these expectations means developing approaches where policy-makers, citizens and technicians work together. Industry has to learn to face the problem of reconciling starkly opposing views of stakeholders and becomes a catalyst in this process¹⁰.

7. Van den Hove, S., Environmental research: Necessary, not sufficient, and somewhat different...

8. Georghiou, L. and Harper, J.C., Session 1: Implementing research for sustainable development.

9. Gooch, G. and Allan, A., Session 4: The policy-science interface in sustainable water management: Creating scenarios together with stakeholders.

10. Dutang, M., Session 22: A gram of prevention is worth a kilo of cure: Environmental research is a good investment.



Measuring the economic impact

Three aspects of the economic impact received attention. The classical concern that an emphasis on sustainable development could reduce jobs and growth was evoked. Prominent also was a discussion of how economic welfare might better be measured.

A crucial aspect of any politically acceptable transition to a sustainable path of development is that there should be jobs for people. Most analysis suggests that unemployment is not an inevitable consequence of any specific set of social values, but depends essentially on how the economy is managed.

Most available studies indicate that a green economy is consistent with high employment. More important than small possible shifts in total employment as a consequence of a transition to sustainable development is that underneath the total there will be immense shifts in employment between sectors and

in the type of skills required. It will be necessary to find a just transition for workers in declining sectors and to be sure that the new skills are available. This will be an important need for retraining and help with relocation¹¹. It is not clear that these implications and needs have been adequately researched.

Arguments were advanced that even if jobs should be destroyed it is a necessary cost to avoid far larger costs of climate change. On a more optimistic note, it is also possible to suggest that the massive transition in terms of deployment of new technology and the upgrading of existing facilities of all types will create sustained economic growth.

Sustainability and the profit motive can coexist. Corporate awareness of the opportunities is in many ways well developed, but still needs further work to ensure that it feeds into all commercial practice in big and small institutions. Session 3 of the conference (Cash and Theory) dealt with the integration of sustainability issues in economic activities and touched upon the conditions required to promote these ideas

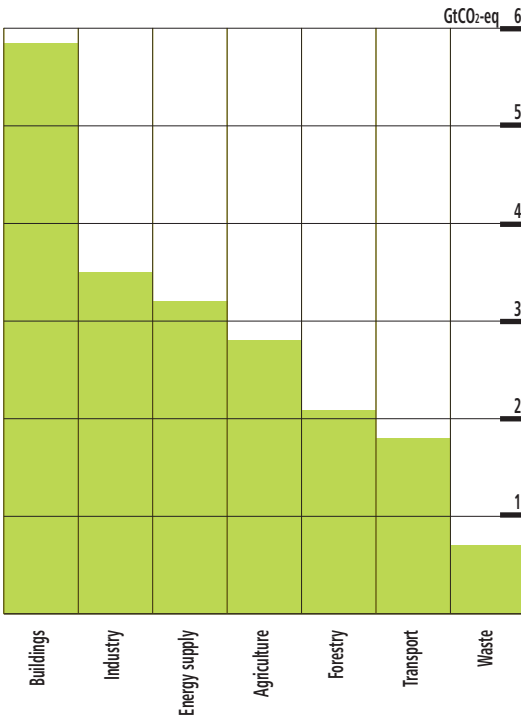
EU27 environment related jobs

Organic farming, sustainable forestry, renewable energy, water supply and environment-related tourism in the EU	8.7 million of jobs 6 % of total jobs in the EU
Scenario substitution (10 %) <ul style="list-style-type: none">• Agricultural production, more organic• Transport, more biofuels• Electricity generation, more renewables• Energy efficiency, manufacturing sector	Job creation 44 000 140 000 58 000 227 000

Source: D. Kucera, 2009, ILO

11. Kucera, D., Session 13: Green Economy and Green Jobs: Myth or Reality?

Global economic mitigation potential for different sectors at carbon prices lower than 50 US\$/tCO₂-eq



Source: IPCC, WG III, 2007

in small businesses¹². The environmental impact of production and consumption and the social character of sustainability (worker conditions, industry location, involvement of local communities and municipalities) are seamlessly linked. To make economic activity more sustainable, it is necessary to improve knowledge and raise awareness of the possibilities. Case studies and learning from good practice are useful tools for this purpose.

Municipalities can catalyse the creation of these conditions. Some success was reported from a German scheme of Public-Private-Partnership (PPP) that supports local authorities and companies to secure the sustainable economic development of a region. Municipalities and local companies work together to improve economic efficiency and the local environment by using integrated environmental technologies¹³.

The usual measure of economic (and indeed political) success is GDP, but it was never intended that it should be used as an indicator of long-term social welfare. It was designed essentially as a useful aggregate indicator for short-term economic management. The need to go beyond GDP was recognised. The need may not be for the derivation of new indicators, but more for the incorporation of a wide range of indicators into the practical design of policies and better techniques of multi-criteria analysis.

A function of research in socio-economic sciences and humanities is to broaden the languages of valuation of both social and environmental systems and assets in a way which can be policy relevant. This need to revise ideas about how to measure economic value appeared at the conference in many guises. Processes for economic valuation of ecological services are weak. More work is needed to provide robust methodologies as is research into schemes of governance of common properties. Case studies of Italian forests reveal the significant value of ecosystems services such as the carbon sequestration and recreational value. The identification of economic values related to the services offered by local social-ecological systems provides a sound analytical basis to provide a reward for the external use of these resources, and

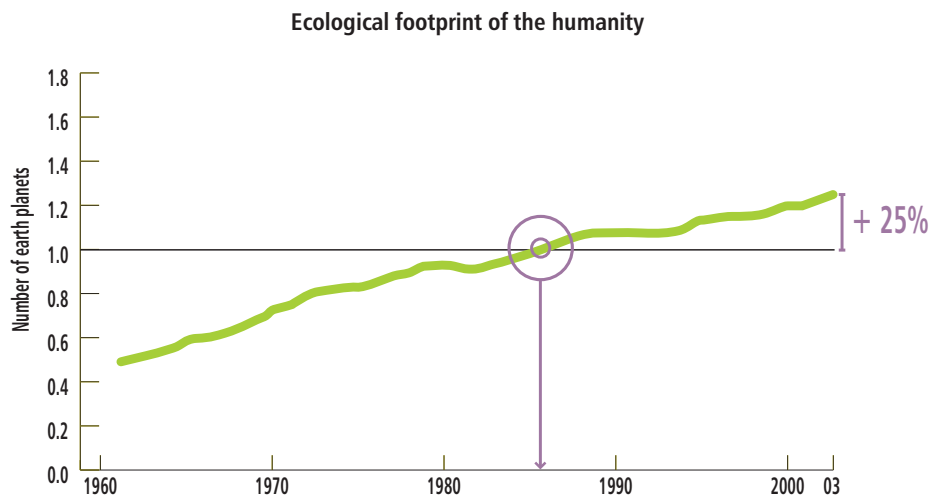
12. Haskins C., Session 3: Using the concept of sustainable development to encourage corporate responsibility in small enterprises.

13. Balcázar, N. and Wolsing, D., Sustainable ecological and economical success in Germany.

therefore a mechanism to fund policy for revitalising the rural areas¹⁴.

There are some grounds for believing that the emphasis on measuring less tangible aspects of social sustainability will strengthen as society becomes more affluent and more aware. It is important that this new focus is not pursued at the expense of traditional measures of social sustainability, such as equity and poverty. Progress toward sustainability is increasingly being appraised by amalgamating assessment

techniques developed for impacts on environment, health and society into an independent form of assessment rooted in the philosophical and methodological framework provided by sustainability. The earlier forms of impact assessment were not designed to address the complexity inherent to concept of sustainability and consequently it is not evident how they can or should be integrated. Research is needed to focus on unravelling the links between social sustainability assessment methods, policies and indicators and also to understand the subsequent processes, by which



Source: G. Deschutter, 2009, WWF

14. Gretter, A., Session 19: Beyond commons: New perspectives and roles for common properties: Some case studies in Italy and England.

innovative ideas and theories are integrated in EU sustainable development policies and legislation ¹⁵.

Decision-making must deal not only with contradictions between economic and environmental values, but also among environmental values. Management of climate change has potential to clash with nature conservation targets and related commitments in the EU. Attaining the targets within these two domains

may create new conflicts, as demands to create large-scale infrastructures on renewable energies encroach on sensitive conservation areas. Several options are possible to deal with such conflicts. Most likely, such conflicts will create the conditions for new technological solutions, with less impacts on biodiversity as well as new innovative regulatory frameworks that may be able to integrate both goals and means of both domains ¹⁶.

Social sustainability key themes and domains

Traditional	Emerging
<ul style="list-style-type: none">• Basic needs, including housing• Education and skills• Equity• Employment• Human rights• Poverty• Social justice	<ul style="list-style-type: none">• Demographic change (ageing and international migration)• Empowerment, participation and access• Identity, sense of place and culture• Health and safety• Social mixing and cohesion• Social capital• Well being, happiness and quality of life

Source: A. Colantonio, 2009

15. Colantonio, A., Session 7: Social sustainability: Linking research to policy and practice.
16. Jackson, A., Session 19: An impending clash between biodiversity and climate change policies in Europe: Insurmountable problems or challenges and opportunities?

Changes in behaviour

It is apparent that current life styles in industrialised countries are not sustainable on a worldwide scale. Changes in the place of technology in society and the social choices of technology are unavoidable in the next decades, and this in turn will change the way people live. To be sustainable, life styles have to turn towards low resource use. Examples were plentiful, including the key resources of energy and water, but also in the adaptation of industrial processes and choice of consumer goods.

Long-term energy scenarios show that current life styles in industrialised countries are not sustainable on a worldwide scale. Existing technologies can in the short-run substantially reduce energy consumption and greenhouse gas emissions, but technologies alone cannot bring about the needed energy revolution. They have to be accompanied by policy measures and behavioural changes. Changes in the energy technology paradigm are unavoidable in the next decades. To be sustainable, life styles will have to adapt to low energy use. Renewable energy then becomes more appealing, because the higher costs generally associated with renewable energy are less significant if smaller quantities are used.

Long-term behavioural changes to adapt to low energy use are conditioned by several important social factors. Life styles are stable within an age class, but change from a generation to the next. Change tends to be slow and must start at school. In most industrialised countries population is aging and retired people life styles will dominate; this trend will extend in due course to developing countries. Household size is decreasing; there are more single and two person households that imply more energy use. Economic growth and rising income increase

the value of time, so people substitute equipment and energy for their time. Research shows that less time is used for providing food now than was in the past, but much more energy. Similarly energy replaces time in transport, so that people move faster and further, within a constant time budget. Across the world people take a similar time to travel to work, but rich people go further and faster¹⁷.

Low energy life styles are feasible; it is a matter of social choices. Technology is important, but individual preferences and social choices are dominant. Individual values, representations and preferences are strongly determined by the cultural heritage and the social context, mainly through school and education. A big effort in socio-economic sciences and humanities research is needed to understand the processes and to modify choices towards sustainability.

Some hope came from a political science analysis of the political factors underlying the different carbon emissions and different carbon emission trajectories of different countries. All other things being equal, democracies tend to show lower levels of per capita carbon emissions. This may be related to the known correlation between authoritarian regimes and price subsidies. The effect of democratic levels is only significant in non-OECD countries, suggesting perhaps that there is a democratic threshold: past which diminishing returns set in. Since political systems over the past half century have tended to democracy this is a cause for optimism¹⁸. A possible explanation is that authoritarian governments are obliged to bribe the polity with populist policies in exchange for a lack of social freedom, whereas in democracies a better balance between leaders and electorate permits long-term painful policies to be adopted. The issue requires more research.

17. Chateau, B., Session 13: Long-term scenarios – Towards sustainable or unsustainable social behaviours?

18. Fuchs, D. et al., Session 15: Does politics impact carbon emissions?

There are many challenges ahead for sustainable urban water management; the city of the future needs to be able to cope with climate change, population growth and scarcity of resources. Technologies for more effective use of water exist and are being researched. Much of the research is technical, but the social implications are considerable. Three behavioural shifts will help make use of water a lot more sustainable. Waste water must cease to be seen as a waste; it is a resource to be used for growing flowers, feed for fish, algae for biofuels or for anaerobic production of biogas. We need 'fit for purpose' water: potable water for drinking and cooking, rainwater for laundry and toilet flushing, grey water for flushing and gardening, black water for anaerobic treatment. Water must be kept local to ensure higher flexibility and better participation.

Constructed treatment wetlands offer one option for the treatment of domestic wastewater, permitting nutrient reuse in urban agriculture, creating green spaces in the city and contributing to habitats for wild life. Stakeholder involvement during the planning and operation is crucial if the general public and local government is to recognise these ancillary benefits¹⁹. The use of artificial groundwater recharge techniques in some circumstances to cope with aquifer exploitation or depletion is another example where technology can be used to reduce conflict between stakeholders over diminishing water resources²⁰. The social dimensions of such techniques are again critical.

Our choice of industrial processes must also change. There is a strong differentiation across industry in their capacity to adjust. Traditional heavy industries such as cement, pulp and paper, metallurgy have significantly reduced their environmental footprint and the potential of current optimization path is now almost fully exploited. Research support for sustainability needs to focus on product development and innovation, supported by basic research to strengthen fundamental understanding²¹. Moving in this direction requires not only change in the behaviour of industry but also in the behaviour of consumers as expressed through the value and the preferences they give to (more) sustainable products and services. There is a role here again for socio-economic sciences and humanities research in making that connection.

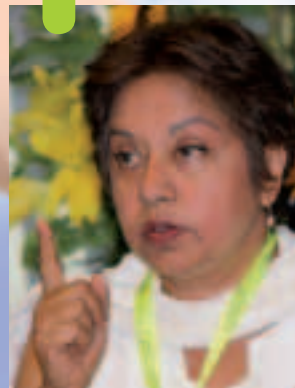
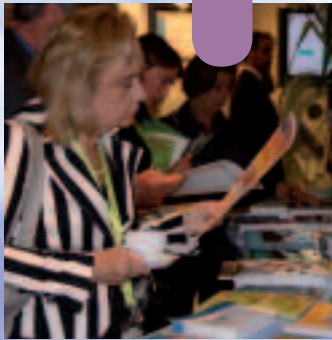
In other industries there is more obvious scope for the redesign of products, but uncertainty as to what is really sustainable. We need tools to identify whether change in consumer behaviour is for the better. Research can improve definitions of sustainability through more sophisticated and better adapted indicators that provide to customers reliable and comparable measures that take in account all phases of the product lifecycle and allow designers to take into account sustainability from the beginning of the design process²².

19. Rousseau, D., et al., Session 8: Constructed treatment wetlands contributing to the paradigm shift in sustainable urban water management.

20. Miracapillo, C., Session 8: Use of artificial groundwater recharge techniques: a task in case of aquifer exploitation or depletion.

21. Dienemann, W., Session 5: Research and technological development in the cement and concrete industry.

22. Taisch, M., Session 5: R&D in sustainable manufacturing.



New forms of governance

Reform of governance was evoked across the full spectrum of issues. Defining new forms of governance in business, cities and regions is necessary to allow expression of new values and new forms of decision-making. Examples were provided from management of land, water, materials, but also in the definition of research and the access to knowledge.

The need for new governance is especially clear for common resources with many stakeholders. On common land, ecological functions have often been conserved because governance procedures that require a large consensus impede the introduction of large changes with unpredictable consequences. The declining economic relevance of traditional productivity has weakened the role of common property management. New models and forms of governance should provide new needs for ecosystem services for a wider range of beneficiaries. This will require a participative process to research needs and mechanisms and to identify future policies²³.

For urban planning and sustainable cities the engagement of citizens in local governance and decision-making processes through the use of collaborative techniques is essential. City governance linking all levels of urban society has to be established if sustainable development is to be achieved. Improved governance should not address only climate change adaptation measures, but also have a critical role to play in ensuring social equity and resource sustainability.

Social trends (like ageing, urban growth, city life styles) demand a new contract between rural and urban areas and functions and that we do not yet know what form that contract should take. Cities will demand new services of the countryside (e.g. flood mitigation and prevention). New opportunities (e.g. agri-tourism) will be created for rural areas by the shift to the cities. The social trends also increase the vulnerability of the population to interruptions in or break-down of food provisioning, and increase their potential exposure to pandemic diseases that may propagate quickly wherever people are concentrated, especially as populations are also highly mobile at a range of geographic scales²⁴.

The degree to which sustainable use of water can be achieved depends on financial, human resource and infrastructure capacity; it is also critically reliant on the existence of a broader governance framework that supports the rights of access to justice, information and participation in decision-making. Given the indivisibility of river basins, this must be established across the basin. The governance framework must also permit the incorporation of stakeholder views and research into policy development. If sustainable use of water resources is to be achieved, it is imperative that it takes account of the experience of stakeholders and relevant actor networks, along with the best relevant research from the natural and socio-economic sciences and humanities. The governance framework will establish the formal mechanisms through which this knowledge feeds into the policy development process in as transparent and accountable a way as possible²⁵.

23. Gretter, A., Session 19: Beyond commons: New perspectives and roles for common properties: Some case studies in Italy and England.

24. Brunori, G., Session 10: SCAR 2nd Foresight exercise.

25. Gooch, G. and Allan, A., Session 4: The policy-science interface in sustainable water management: Creating scenarios together with stakeholders.

Transition management has been used as a new and appropriate form of governance for materials management in Flanders. Transition management is a stakeholder-oriented and participatory process that attempts to influence the direction of a transition towards a more sustainable state. It starts from a long-term vision, then experiments in niches to prepare bigger interventions and to build new coalitions between actors. The government facilitates, but does not dictate. Options are kept open, to manage risks²⁶.

Effective incorporation of research in more plural governance is a key to the improvement of local governance. A French initiative (Liteau) was designed to enable better environmental management in the coastal zone. Coastal systems offer a good example of the need to innovate for sustainability. They are complex by nature, with many different competing social interests for a limited resource and their maintenance depends on relationships that we do not understand scientifically. It must therefore be a matter of social debate to decide what we do today for tomorrow. Liteau created new relationships between research actors and knowledge users and demonstrated mechanisms for integrating diverse perspectives into socially-determined questions. Scientists helped keep targets realistic²⁷.

It is encouraging that newly groups of actors are emerging in the field of science and innovation such as, for example, the involvement of patient organisations and the elderly in the development of new technologies for health and social care knowledge production – often called the third sector of knowledge production. The social practices of human decision-making – among public agencies, citizens and consumers, and technical experts – and, in particular, the systematic processes for producing, assessing, and applying knowledge and ideas in decision-making, whose transformation will be required to meet the challenge of sustainability²⁸.

Governance also applies to knowledge. It may be desirable to change the governance so that society does not hugely overvalue human innovation over natural resources and in the process corrupt and destroy the environment. What apparently needs to happen is not a major decoupling between physical environmental impact and weightless, disengaged profitable ‘ideas’ but a major decoupling between macroeconomic growth and the perceived dependency of business on intellectual monopoly to generate profits²⁹.

26. Van Acker, K., Session 15: A transition towards sustainable materials management in Flanders.

27. Lafon, X., et al., Session 16: Sustainable development of seas and coastal zones, LITEAU. 1998-2008 and forward.

28. Pauwels, E., The value of science and technology studies to sustainability research in Europe.

29. Bucio, A., Session 19: The ‘knowledge ecology’ we need: Are the core assumptions of the knowledge economy sustainable?



New geopolitical relationships

Interdependence between different regions is growing through trade, human mobility, scientific and cultural exchange, human security concerns, disease, ecosystems functions of major biomes, ocean and atmospheric exchange. The European Union has engaged in international scientific cooperation for the past 25 years; initially priority was given to developing human capital and to building institutional capacity in food, agriculture and health. Subsequently, the scope of cooperation has been enlarged to cover broader sustainable development, the sustainable management of natural resources, energy and socio-economic research.

One-dimensional technical solutions, useful though they are, are not enough to create globally sustainable societies. Health often depends on access to food, clean water, land, other resources and education and access to information. Likewise necessary agriculture research e.g. for African conditions needs to be complemented by work on wider ecosystems, land tenure, demography, economics, gender, access to markets and credit and institutional and regulatory frameworks. The need for socio-economic sciences and humanities research to understand the relationship between these issues is evident.

A cooperation project between Brazil and Europe to protect and restore degraded Amazonian forest back in the 1960s has not only addressed ecological research, but also incorporated social and commercial initiatives to improve the livelihood of the community. The aim was to promote, through forest restoration and the creation of incentives for sustainable land use activities the development of an attractive environment for private investors in a planned and integrated manner, generating economic and social results and environmental conservation in rural areas. The initial cooperation project generated larger-scale international follow-up activities that now inform policy formulation and implementation³⁰.

A presentation on universal health care in India firmly underlined the importance of social and economic development within sustainable development. Health care exhibits acute disparities between urban and rural communities as a consequence of underinvestment in health care, personnel and equipment, migration of qualified personnel, ageing populations, social discrimination and neglected diseases. The path to a better system involves not only actions directly linked to health provision, but also the empowerment of women, programmes to reduce social exclusion and to provide benefits for landless labour. It means expanding water supply, better education, eradication of poverty and improvement of the quality of life. Socio-economic sciences and humanities research is

30. Scheunemann, I., Session 11: Enhancing global sustainability through global cooperation.

needed to analyze the political context of decision-making and the obstacles to health, empowerment and social inclusion. Research should address socio-economic and technical constraints to overcoming maternal and child mortality, context-specific solutions to prevent and mitigate infectious diseases or pandemics, innovative combinations of advanced scientific and local knowledge for empowerment and integrated solutions to health, food and environmental dimensions of sustainable societies. Such an integrated vision entails investment in knowledge, recognition of legitimacy of demands of currently marginalised groups and emphasis on transforming knowledge into action³¹.

The Session 11 on International Cooperation proposed guidelines for research that echo in many respects the conclusions of several sessions. Emphasis should be placed on interdisciplinary research to find better trade-offs between social, economic and environmental stakeholders. Research policy should foster better understanding of key concepts across disciplinary boundaries and there needs to be more systematic development of social and communication skills among participants in research.

31. Nayar, K. R., Session 11: Health for all: A public health framework for sustainable solutions.

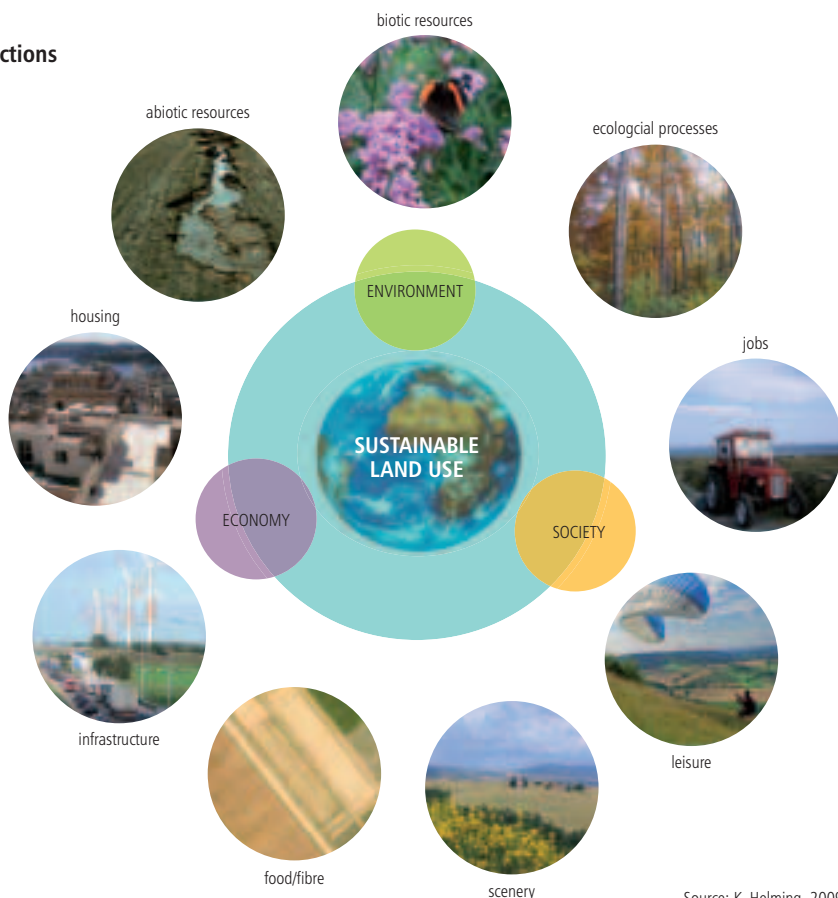
Changing land use

Europe is already one of the world's most urbanised areas; since the 1950's, European cities have expanded an average 78%, while population has grown 33%. Probably around 70% of Europeans now live in cities and in urban agglomerations. But population and urbanisation are growing fast throughout the world and by 2030, 90% of the urban population will be in developing countries.

The concept of urban sustainability must be framed in environmental, social, cultural and economic dimensions; it faces the need to reconcile conflicting

actors and antagonistic stakeholders. Holistic approaches to territorial cohesion are needed. Promoting sustainability in cities must be seen as a 'quality step' balancing good land use, territorial planning, development policy, design and life style. This implies more effective involvement of citizens in decision-making and new modes of governance to inform and involve all citizens. In turn, improved governance of resources in the urban environment should be seamless with improved social equity. Socio-economic sciences and humanities provides a bridge between natural science and its equitable application to the real concerns of people³².

Land use functions



Source: K. Helming, 2009

32. Dely, K., Session 2: Sustainable cities: From an oxymoron to a target.

The technical nature of the cities that we need for sustainable development remains elusive. Daring architectural solutions were described including off shore islands and huge residential areas with built in surfaces for urban agriculture. In Europe urban sprawl continues to spread into the countryside; the process tends to be irreversible, and if it continues uncontrolled will damage valuable agricultural land ecosystems and the critical services they provide. Compact cities also impact the environment; they can lead to higher vulnerability to the impacts of climate change, through exposure to flooding and heat island effects.

A mean way might be the development of 'compact green cities', where sprawl is contained but where connected green urban areas are incorporated and provide recreation space, increased rainfall infiltration capacity, cycling and walking paths and urban gardens. Heat islands are diminished and loss of biodiversity reduced³³. Alternatively, there is even the possibility that maligned social preferences like urban sprawl could be legitimised by clever combination with technical advance; in this case by building solar panels into the fabric of the housing and using electric cars³⁴.

The conference revealed agreement on many weaknesses of approach; urban research and policy are still highly sectoral and not adapted to handle the complexity of urban sustainability. Multi-disciplinary and multi-sectoral approaches still need to be promoted. There is a need for more creative management of the cultural heritage of cities. The benefits of a better engagement of citizens in local governance and decision-making were accepted, as well as the need to raise awareness amongst civil society.

The unique path towards sustainable cities was not found. Research is needed to better understand the social, cultural and economic drivers of urbanisation; to help design new and better trends for urban development; to devise methods to strengthen the role of local governments and to foster greater engagement of civil society.

The biggest use of land is for agriculture. A growing population needs more food; more intensive agricultural practice implies often higher environmental impacts and suggests an emerging conflict between food security and the environment. World average land productivity growth has slowed in recent years and world average population growth exceeds productivity growth. The area of the best cultivated land is diminishing due to lack of water, desertification and urbanization. Some new land is available for cultivation, but it is essential also to achieve high productivity from existing land³⁵.

Conventional agriculture has been successful in increasing productivity, but at an environmental cost. In the light of expected climate change plus the pressures on natural and other resources we need to rethink the way we produce, process, retail and purchase food. In order to make progress on a sustainable development path innovative research is essential to meet the challenge of growing more food on limited land for a still growing global population, with less energy and other scarce inputs while improving ecosystems resilience capacity and exploring all possibilities to adapt to and to control climate change³⁶.

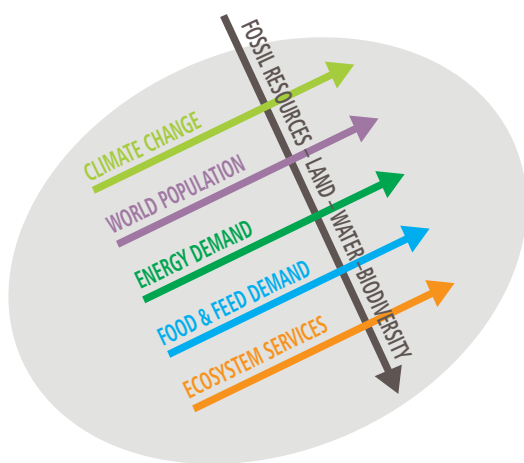
33. Nilsson, K., Session 2: Compact green cities.

34. Chateau, B., Session 13: Long-term scenarios – Towards sustainable or unsustainable social behaviours?

35. Biroli, C. P. and Buckwell, A., The nature and scale of public goods delivered by EU land managers.

36. Svedin, U. and Ritter, W., Session 10: Comments from the SCAR – Working Group on the 2nd Foresight Report.

Resources pressures and interconnection between complex systems



Source: U. Svedin and W. Ritter, 2009

There is room for debate on what exactly constitutes intensification of agriculture. Organic systems are already at high environmental performance and provide more nutritious food, but the yields are lower than for conventional practice. It is worth exploring whether organic farming can be intensified in a different and more acceptable manner that intensifies production, but maintains the benefits in biodiversity, landscape, energy and water use, climate change mitigation. Eco-functional intensification claims to provide a more efficient use of natural resources and processes, improved nutrient recycling techniques, and innovative agro-ecological methods for enhancing the diversity and the health of soils, crops and livestock. It builds on the knowledge of all stakeholders and uses information and decision-making tools along with new research knowledge in the biological and ecological sciences. Eco-functional

intensification is characterized by cooperation and synergy between different components of agro-eco systems and food systems, with the aim of enhancing the productivity and stability of the agro-ecosystems, and the health of all components³⁷. Such an approach emphasises once more the recurring theme of socio-economic sciences and humanities as a bridge between natural science and policy.

Properly developed tools to understand the relationship between policy reforms and change in land use and then to assess the consequences and to design responses are vital to the capacity to understand and manage policies that bear on sustainable development. There is as yet little agreement as to how to model this chain of consequences and what the eventual meaning might be for policy. Liberal and interventionist thoughts still contend.

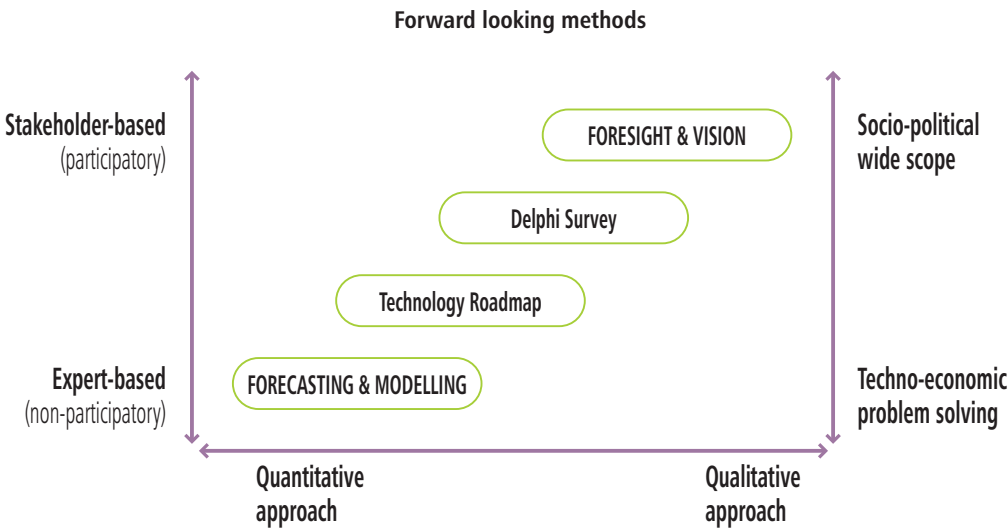
A detailed analysis of the reform of the Common Agriculture Policy was performed within the FP6 project called SENSOR; a large set of indicators of the consequences to 2025 was estimated at national and regional level, including prices, income, employment and environmental impacts and risks. These were then condensed into a set of aggregate indicators to inform policy. The study concluded that reform of the CAP would have only a small effect on agricultural production and a small decrease in arable land in marginal areas, but a substantial effect on prices that would fall by 8-9%; the overall economic effects would be positive; GDP might rise by 0.5-2.5%. Overall employment would increase, but there would be problems in agricultural areas. For the environment there would be some costs and some benefits, but probably some spots of serious degradation³⁸.

37. Micheloni, C., Session 5: Management of agro-ecology for eco-functional intensive systems.

38. Helming, K., Land use: Territorial diversity and emerging conflicts.

In the interventionist paradigm, it is necessary to engage in proactive agricultural policy to ensure the simultaneous achievement of both food and environmental security. Such policy should aim to ensure there is a profitable farming industry, maintain production capacity and protect the best agricultural land; it should also seek to reduce the environmental impacts by active, appropriately-scaled set of environmental policy measures to deliver public goods from land management³⁹.

These contrasting positions may not be irreconcilable, but there are tensions; there is still much research that needs to be done to find persuasive means of policy assessment and foresight, both for EU Member States and for the EU as a whole⁴⁰.



Source: D. Rossetti, 2009

39. Biroli, C. P., Nature and scale of public goods – How?

40. Valette P., Rossetti D., The socio-economic sciences research for sustainable development.



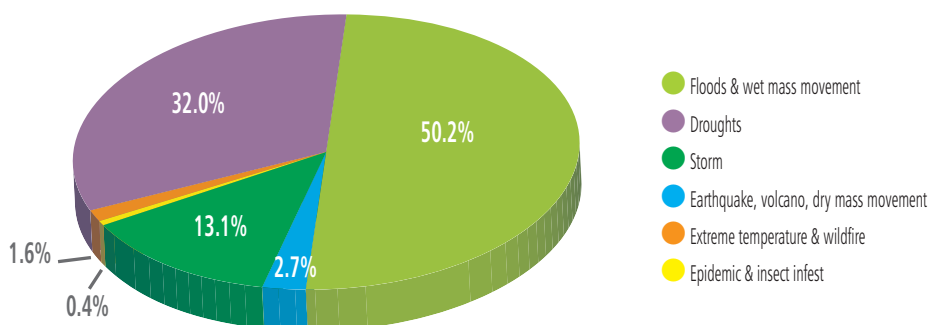
Resource conflicts

Most civil conflicts are in poor countries and are closely linked to inequality and resource problems. Resource importing countries are often directly involved in such conflicts. Sometime conflicts are successfully localised, but sometimes they spread and the consequences can extend far beyond the borders of the country affected.

As income rises, so the risk of armed conflict falls. Poor countries lack the means to address grievances and resolve disputes. The security forces, although capable of immense damage to civilian populations are often too weak to deter or crush armed forces. Conflict is often associated with other consequent disasters; most people in civil conflicts do not die from weapons, but from hunger and disease.

Civil conflicts cause the mass movement of people. International borders have become more difficult to cross in recent years; displaced people tend to be driven into frontier areas and form densely packed communities with no resources. Such displaced persons have fewer rights than refugees (in 2008, there were about 1 million new refugees from which 80% were hosted in developing countries). Apart from the moral iniquity, these displaced populations present severe problems for the rest of the world. They exacerbate environmental degradation; they are often unemployed, disenfranchised and are fertile ground for terrorism. There is an important role for socio-economic sciences and humanities in helping understand the origins of conflict, helping design processes to address grievances and helping stabilise post-conflict countries⁴¹.

Worldwide percentage victims per disaster type (1960-2008)

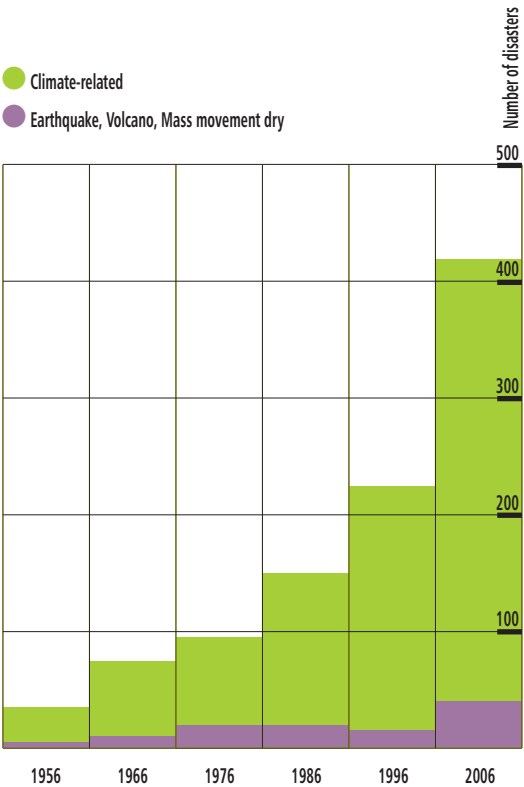


Source: D. Guha-Sapir, 2009 and EM-DAT – ORFA/CRED International Disaster Database

41. Guha-Sapir, D., Disasters and conflicts: Challenges for sustainable development.

In principle, consumers in rich countries should also pay the external and indirect costs of resource extraction. A case study of gold-mining in Kyrgyz showed that these externalities are often difficult to estimate and need to be studied further⁴².

Climate-related disasters compared to geophysical disasters



Source: D. Guha-Sapir, 2009 and EM-DAT – ORFA/CRED International Disaster Database

42. Kronenberg, J., Session 20: All that glitters is not gold: Opportunity costs of gold mining.

Appreciation

The richness and scope of the material defies simple synthesis, but some impressions emerge.

An important conclusion is that the debate largely confirmed the appropriateness and relevance of the goals for SSH and the research priorities in particular. The only substantial issue raised concerned process rather than content. A recurring theme of the conference was the need for interdisciplinary research and the perceived insufficiency of present mechanisms to promote it. We are almost unable to integrate research between social and natural sciences. The two disciplines ask different questions, on different scales with different methods. Funding structures so far have neglected to extract the opportunities interdisciplinary research offers in developing innovative fields of research. Interdisciplinary research to date has no appointed advocate and therefore no stake in everyday business of EU research policy. In order to overcome this structural deficit appropriate policy measures have to be developed and implemented.

Suggestions for reform included ⁴³:

- Each Directorate should have a person responsible for research for sustainable development, who should be members of a cross-cutting working group to develop a joint interdisciplinary research programme for sustainable development;
- Discourse arenas on the European level for the further development and specification of interdisciplinary research approaches, methods and institutions, e.g. summer schools and workshops on interdisciplinary research;
- Compiling quality criteria for interdisciplinary research on the European level;
- Appointment of a strong advocate for interdisciplinary research for sustainable development within the European research administration: a European Research Platform for Sustainable Development could be established.

Several leitmotifs were detectable. The nexus of knowledge, integration and governance was frequently explored.

43. Jahn, T., et al., Session 7: Understanding social-ecological systems: frontier research for sustainable development. Implications for European research policy.

Integration was sought among disciplines and of science and of scientists into social and political decision-making. Certainly a flawless integration of social and natural sciences has yet to be achieved. The bringing together of quantitative and qualitative discourses is hard, but it must be achieved. A part of the reason why scientists are diffident about engaging with policy-makers may be that in the initial formulation of research scientists are concerned with fitting problems into scientific disciplines. Policy-makers and managers, on the other hand, need answers to immediate problems and the relationship between these two modes of thought is often weak. Dialogue can be achieved; the conference showed several examples of successful processes on which progress can be built.

Knowledge must lie at the heart of our response to sustainable development. The 'knowledge-based' society is the key tool. But there is much knowledge that we do not use and much that is not used as much as it should be. Socio-economic sciences and humanities can help us discover where knowledge lies, how to access and use it. It can also help to mobilise knowledge more effectively for the welfare of all.

Deployment of research and knowledge to solve problems across the full range of scales and issues and to reconcile conflicting needs and rights depends on governance. Mechanisms of governance should be flexible and adaptable, informed by local knowledge and designed to avoid the trap of 'Panacea Thinking' which sometimes weakens environmental policy⁴⁴.

44. Ostrom, E., Avoiding the trap of panacea thinking.

Acknowledgements

This publication contains the socio-economic results of a major European conference entitled 'Sustainable development: A challenge for European research'. This conference held in Brussels at the European Commission on 26-28 May 2009 attracted more than 1 000 stakeholders from the academic and research community, from governmental and non governmental organisations, from the public and the private sectors.

All the speakers quoted in this publication have to be thanked for the quality of their speeches and presentations. The slides can be found on: http://ec.europa.eu/research/sd/conference/2009/index_en.cfm?pg=home

In particular, we show regards for the speakers of the session 'Global changes – Economics, employment, behaviour and territorial dynamics': Bertrand Chateau from ENERDATA, David Kucera from the International Labour Organisation, Katharina Helming from the Leibniz Centre for Agricultural Landscape Research (ZALF) and Debarati Guha-Sapir from the School of Public Health of the Université catholique de Louvain (UCL).

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At the European level, the sustainable development strategy, the energy and climate change package, and the procedure of 'impact assessment' of major EU initiatives are good examples of the integration of sustainable development into the daily life of the European Union. Sustainable development has passed from a conceptual idea to an operational reality.

Sustainable development has been subject to scientific, technological and, more and more, socio-economic research and studies. Sustainability hinges on whether one can find a new model of development that reconciles profit, people and the planet. Here, EU research deals with long-term issues and with the need to support a post-carbon and knowledge-based society.

This publication draws upon presentations and discussion at the 'Sustainable development: A challenge for European research' conference that was held in Brussels in May 2009. It focuses on the role of the Socio-economic Sciences and Humanities within European research and which is directed at creating more wealth while consuming fewer resources.

