

Statement by the World Federation of Engineering Organisations on Environment and Development

1. Introduction

The evidence of change and deterioration in the global environment is inescapable. It is acknowledged by authorities that the need for action is urgent, that new policies must be developed, and that such policies should be implemented by about the year 2030.

Because present global problems are so related to the selection and use of technology, the engineering profession carries a large responsibility to contribute to the creation of new policies. Engineers have the potential and the duty to be a major influence in the achievement of the primary goals of the future; a sustainable habitat for all life, and one that continues to allow humankind to achieve its potential and to enjoy the process of living.

The Report of the World Commission on Environment and Development (WCED) has defined 'sustainable development' as that which 'meets the needs of the present without compromising the ability of future generations to meet their own needs'. The WCED states that sustainable development requires the 'reorientation of technology — the key link between humans and nature — and the management of risk' for the fulfilment of the following strategic imperatives:

- (i) Reviving growth
- (ii) Changing the quality of growth
- (iii) Meeting essential human needs — food, energy, health
- (iv) Conserving and enhancing the resource base.

Reorientation of technology must go hand in hand with the merging of environmental concerns and economics in decision making. For the engineering profession to realise its contributory potential within the short time frame required for the development and implementation of policy, it will be necessary for governments to establish suitable policy frameworks.

2. Actions by Government to facilitate the engineer's role

For engineers and other professionals to have a basis for implementing sustain-

This is an abridged version of a statement adopted by the recent WFEO general assembly in Tanzania for submission to the UNCED conference on Environment and Development, scheduled for 1-12 June 1992, in Rio de Janeiro, Brazil.

able development, governments should establish sustainability as an overall national strategy and include sustainability in all sectorial policies and in budgets and investment decisions. Long-term multifaceted policies covering population, resources, energy and industry are required.

The development and implementation of such a policy direction will need directorates at a high level, with access to cabinets and departments, and with the power to initiate sound policies and plans as well as to monitor their implementation for conformity with sustainable strategy. Engineering expertise within such directorates will be needed to provide the technological input into sustainability issues. Development of sectorial policies should place obligations on producers and consumers to face the full social costs of their decisions — through pricing policy, property rights and economic instruments.

The four key target areas where action is required by Governments to facilitate the engineer's role are:

- (i) National strategies and policy development as above
- (ii) Education of the public generally and of engineers in particular
- (iii) Research and development of sustainable technologies
- (iv) Ethical standards and commitments

3. The role of the engineering profession

Within the development of their own profession, engineers need to ensure that professional education, engineering practice, and environmental competence fully address the demands of the new situation.

There is a need to provide sufficient content in engineering education to ensure that graduates have a mature understanding of environmental values and an ability to identify, manage and incorporate these aspects into development projects. Curricula should include courses in ethics, sustainability, ecology, systems of nature, and the impact of individual choices on nature and people.

Special training for sustainability is required in a number of disciplines, including engineering, at the professional and technician levels. At the professional level of associated disciplines specialists in ecology, resource management and the law are needed. At the technician level, in addition to sound technological training, the main requirement is the development of a good understanding of ecological relationships and sustainable use, to enable technicians to achieve improved practices, in their work with professional associates and with the community.

Universities, consultants and research institutions have a major role and should be fully involved in the learning process. Adequate funding should be provided to support this work.

Technology transfer is a powerful means of education in less developed countries and should be a priority in all funding programmes. This can be achieved through:

- Using each engineering project in developing countries as a means of transferring technology
- Creating a worldwide network utilising the knowledge and experience of late career or retired engineers to act as advisors to environmental agencies, engineering firms and other organisations on sustainable development issues
- Establishing Regional Development Centres coordinating teams of consulting engineers, international leaders, local university personnel and volunteers, to educate engineers within developing countries
- Provision of funding for regional technological networks and Non Gov-

ernment Organisations (NGO's) to undertake specific projects, workshops and training programmes on the environment and sustainable development.

4. Research and Development of Sustainable Technologies

4.1 Research and development must encompass more than pure science and technology, and include political implementation, economic and commercial values and public perceptions. One of the keys to successful sustainability will be interdisciplinary collaboration, particularly with respect to politics, economics, education, and natural science.

4.2 The developing technologies must focus on use of renewable resources as a key element of sustainability and on use of non-renewable resources in a manner which allows timely transfer to an equivalent sustainable technology.

4.3 Goals will be reached by a broad strategy of research and development involving commitment to the six R's:

- Reduce consumption of resources and production of wastes by the study of systems and the use of incentives and regulation
- Replace — unsustainable activities with sustainable — polluting activities with clean processes — inefficient processes with more efficient
- Re-use and recycle products to conserve resources
- Renewable resource use adoption wherever practicable
- Restructure institutions (government and NGO's) to incorporate commitment to sustainability philosophy
- Restore land, water, air and ecosystems.

4.4 Research into sustainable technologies should focus particularly on:

- Data bases of natural resources and phenomena including items such as climate change and sea level rise
- Biophysical limits within which sustainable management of resources can be put into practice
- Data bases of waste products that may be reusable
- Closed loop systems that combine renewable resources with re-use and recycling of products and restoration of the environment
- Consolidating proven technology by rationalising designs and standardising manufacture
- Demonstrating the commercial value of sustainable technology
- Depletion strategies for use of finite

nonrenewable resources and their sustainable replacements.

4.5 Funding for research and development of data bases and sustainable technologies should be increased with due allowance for longer term needs in preference to short term expediency or commercial gain.

4.6 Results of research and development should be communicated expeditiously for the common good between disciplines, Government and NGO's and internationally. Funding for such should be made available.

5. Ethical Standards and Commitments

5.1 The absence of an adequate ethic of sustainability is the major factor responsible for the failure to meet basic needs; for growing inequities and loss of opportunity in the use of and enjoyment of nature; for loss of diversity and integrity of cultures and ecosystems and for the destruction of the capacity of the biosphere to support future generations.

5.2 In recent years a number of organisations that have taken initiatives towards a strong commitment to ethics have appeared throughout the world. These organisations should be brought together in a coalition at international level to promote a world ethic of sustainability.

5.3 The coalition would stimulate joint activity between scientific, technological, legal and religious organisations in development, adoption and promotion of the world ethic.

5.4 Sustainability calls for fundamental changes in personal conduct. People behave unsustainably because they perceive that the benefits they gain from doing so will outweigh the costs they have to bear.

5.5 Sustainability will become a shared goal and common practice when our ethical horizons embrace all generations of people and all created beings.

6. Recommendations

6.1 That governments be encouraged to adopt sustainability in all sectorial policies and in budgets and investment decisions.

6.2 That governments create mechanisms for the initiation and coordination of action for sustainability and fully involve professional engineering expertise in strategic planning and policy development.

6.3 That education on the issues involved in sustainability be given the

highest priority. This applies not only to the public in general to heighten consciousness of the critical importance of sustainability, but also to the engineers, technologists and scientists who will be involved in promoting, planning and implementing development in the future, to provide the skills to develop and implement sustainable technologies.

6.4 That mechanisms and funding be provided internationally and regionally to ensure that sustainable technology transfer takes place in the most effective way.

6.5 That the critical importance of research and development in identifying new sustainable technologies be acknowledged and appropriate coordination and financial support be provided nationally, regionally and internationally to make the most effective use of expertise and skills of consultants, research institutes, universities and NGO's in developing solutions to sustainability problems.

6.6 That the need for cooperation between NGO's generally and conservation and development NGO's in particular be acknowledged and appropriate funding support be provided to international and regional networks to foster this cooperation.

6.7 That the critical need for a World Ethic on Sustainability be acknowledged and mechanisms be set in place to develop, adopt and promote such a world ethic. □