Science and social responsibility

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The ethical implications of scientific progress concern everyone

Today there is a certain degree of disillusionment about science, especially in the industrially developed countries. Science and scientific progress are indeed raising urgent questions, for example in the field of genetics. Who should determine the priorities and choices of science and technologies and on the basis of which social goals? How can we define democratically the risks which can be considered as "acceptable"? What is the level of responsibility and solidarity which can be expected from individuals and groups in relation to both present and future generations?

The answers to these questions go beyond the narrow confines of professional practice and national borders. In a multipolar world characterized by an unprecedented splintering of perceptions, it is more than ever necessary to strive for the emergence of values which will make our common existence technologically, ecologically and socially viable.

Such ethical reflection calls for a free and open exchange of experience and ideas among decision-makers, specialists and representatives of the civil society, in all its diversity, in order to identify the issues, set points of reference and advocate a range of forward-looking alternatives.

The development of science must henceforth be examined in a new framework. At the end of the twentieth century, the "battlefield" has become primarily one of economic warfare, and economies are increasingly being dominated by scientific knowledge, technologies and information. What has to be done is to develop new forms of knowledge and share them. Sharing knowledge goes together with sharing responsibilities. Science needs to be perceived as a liberating force.

At the same time, we cannot overlook the gap between the state of science in the developed and developing countries. Some of the devel-

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This model at a research centre in Faridpur (Bangladesh) is used to study flood patterns. The results will be helpful in designing and building flood-control barrages.

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Digital composite image showing a biochemist using a virtual reality system to investigate molecular interactions.

oping countries are facing crucial choices. Should the State devote its resources to science or should it tackle more urgent problems such as access to drinking water, for example? It should be recalled that industrial research is non-existent in the developing countries and that some of them do not allocate even one per cent of their gross national product (GNP) to science. For example, there is no research centre for industrial chemistry in any developing country. Meanwhile, the industrially developed countries seem to be suffering the consequences of the lack of flexibility that characterizes their unwieldy research institutions. It is as if the ability of science to create wealth were a burden on its own organization. These cumbersome and administration-oriented structures are discouraging investment by the industrial sector.

This is why there is a need to work out new strategies of scientific development. It is necessary to establish flexible structures of international co-operation and to turn science into an "international undertaking", for example through partnership programmes and by tightening the links between research work in all countries through conferences, publications, networks, the use of new information and communication technologies.

It can be seen today that there is a profound failure of understanding between laboratory science and the general public. This failure often stems from a lack of knowledge and is based on mistrust and fear: research workers sometimes have a dehumanizing and reductionist view of the public and, at the same time, the public is becoming increasingly wary of science. ▶

Scarcity of resources forces some developing countries to make the painful choice between investing in research and tackling more pressing problems. Right, a genetics-microbiology laboratory in Harare (Zimbabwe).

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The public increasingly expects that major engineering works, in particular those involving technological hazards, should be preceded by comprehensive, stringent and independent technology assessment studies. These studies should take into account unavoidable technological risks, which cannot be altogether eliminated but must be reduced to a minimum, and should also address the question of hazard management. Their results should be made public in accessible form.

Transparency, truth and trust

The three Ts in this exercise are: transparency, truth and trust. Of course, transparency is time-consuming, but it is an essential ingredient of trust. This is also the case of truth. Misinformation or half-truths fuel rumours, induce fears and discredit those responsible for public information.

Accumulated experience illustrates that information provided in an impartial way is generally rewarded by responsible behaviour by the population concerned. This is particularly true in the case of the prevention and management of natural disasters, where UNESCO has acquired some expertise.

Surveys show that this is also true in the medical field, in particular in genetics. In fact, such a trustful relationship can stimulate the creativity of a population in response to a new and unexpected situation. Of course, a number of international guidelines and directives adopted by intergovernmental bodies, addressing these issues, exist; for instance in experimentation on human subjects or clinical trials, not to mention national Parliamentary legislation.

The safety issue is closely linked to the principle of precaution. (See article page 23.) More specifically, there is a felt need for education and information of the public at large, starting with the populations directly concerned. Mechanisms that guarantee the informed participation of the public should be devised. To be effective, these mechanisms must rely on the local authorities and involve leading figures of the civil society, as well as associations, consumer groups and other non-governmental organizations which have a key role to play in this area provided they are involved from the inception of the project.

Public debate can only enhance a democratic process very much needed in this area. The road lies before us, and if there is still a long way to go, we know the indispensable provisions needed for the journey. One such provision is a strategy of communication, in order to ascertain comprehensive information and a sense of solidarity.

Appropriate communication can only be based on accurate information, including that concerning uncertainties when these exist. Nevertheless, it would be illusory to think that irrationality can be completely eliminated; it can only be reduced. As a matter of fact, irrationality, nurtured by ill-understanding, can

Training farmers in Togo.

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be built into a rational argument. This is an element which has often been overlooked.

The most topical example of the need for ethical safeguards in regard to scientific progress lies in the field of genetics. This example reminds us of the ambiguity of science, which is one of the most powerful ingredients of societies. Today we can no longer close our eyes to the ethical issues implicit in science. It is no longer possible to envisage an ethical neutrality of knowledge that would be independent of its subsequent applications. Thus, the General Conference of UNESCO, on 11 November 1997, adopted a Universal Declaration on the Human Genome and Human Rights. This Universal Declaration provides a consistent and comprehensive set of ethical principles which should guide both research and applications of research findings in biology and medicine. (See page 34.)

We also need to be able to think out the conditions of ethical control over discovery. Scientific institutions have a responsibility with regard to the environment of research workers and must ensure that research is governed not solely by the lure of gain but also by the desire to protect life and cater to the welfare of human beings.

Finally, science can no longer be regarded as the repository of truth. Science does not state mere certainties. It constantly challenges itself. It is in the balance between doubt and certainty that the ethics of science places its role.

Scientific knowledge no longer depends on the genius of human beings, it calls for gigantic resources, both human and technological. Hence scientists themselves recognize the importance of the social acceptability of their undertakings. The level of acceptability relies heavily upon a balance of measured risks and unwarranted risks. And present societies have a clear perception of the need to establish priorities, even when the alternatives are not always clearly defined.

This situation places new responsibilities upon the scientist, the engineer, private and public decision-makers (in particular in the industrial sector) and the citizen. These responsibilities can only be assumed through discussion and the construction of common values. ■

NASA scientists set up equipment to measure gases that will be given off during the burning of a deforested area in the Amazon (Brazil).

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