

## Introductory remarks at the International Conference on Global Change

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Professor Riazuddin, Dr. Ishfaq Ahmad, Distinguished Delegates, and Ladies and Gentlemen:

The local organizers generously gave me free reign by assigning the title “General Talk”, so I shall follow their dictum for the next ten or so minutes.

During cold-war days, the threat of a possible nuclear end to our planet was a great preoccupation in international forums. While nuclear proliferation is still a worry, perhaps of greater concern in our era is that of global change and the ability of the human species to adapt itself to it. It is in recognition of the importance and relevance of this topic that this international conference is being organized as a joint effort between the new National Centre for Physics here, in Islamabad, and the ICTP, in Trieste. I wish to make a few remarks to put the meeting in context.

No one disputes today that the earth is becoming warmer on the average, that its biodiversity is dwindling, and that the strain placed on the earth’s resources is constantly on the rise. There are differences of opinion as to whether such

changes are unique in earth's history. There are differences of opinion on whether the humans are the cause of global warming and on what, if anything, ought to be done to reverse the trend. I don't wish to enter these arguments here. However, one thing is obvious: there has never been a time in human history when the potential damage of global changes on humans is as catastrophic as now. An earthquake that might have killed one hundred people a century ago can now kill, at the same place, 100,000 of us. A tsunami that might have killed two hundred people a century ago can now kill 200,000 people. This is clearly because of the increase in population, and the tendency of the population to concentrate in certain regions of the world, especially its urban centers and coastal regions. So, to be mindful of these disasters and to do something constructive about them is our duty to ourselves, our generation, our children, our race and posterity itself. Many thoughtful people have warned us that the dangers are imminent and urgent, not lurking to appear a few generations hence.

If we accept that the dangers of global change, whether man-made or natural, have far-reaching consequences today than ever before, we should ask if we can do anything about them. The most important need is no doubt for a sociological rethinking of our values and life styles. In meeting this challenge, the burden on developing countries will be disproportionately larger. In particular, the developing world cannot follow the same pattern of development as the industrialized countries once did. For instance, if the rest of the world aspires for each family to own an automobile and use it routinely, there just aren't

enough resources anywhere to support this aspiration. It will add two to three times as many automobiles as now, ushering unmitigated disaster in greenhouse emissions. So, people who are seeking development now ought to be thinking of new paradigms. In our march forward, each part of the world has to play its constructive role.

There are things that we, as scientists, can do. We can make the needed measurements and generate a base of facts, develop reliable mathematical modeling for assessing global changes and their consequences, while being aware of their power and limitations, improve our ability to predict natural disasters, develop in each country a core capacity to understand the consequences of global change, advice our governments and societies appropriately, and so forth. This is not enough but is within our competence.

As I said a minute ago, the most important change in outlook that ought to occur to avoid catastrophes of global change is sociological. At the minimum, these sociological can be ushered only through a concerted effort between physical scientists, on the one hand, and social scientists, on the other. We cannot any longer ignore the question of how our knowledge of the physical world can be used for the benefit of our societies. As you know well, a sentiment of anti-science has been on the slow rise, and this sentiment has no doubt arisen, in part, because science has not shown enough concern for problems of our societies. In particular, the problems that will spring on us because of global change need scientific solutions. But let's not imagine, even for a moment, that they can be applied without paying

attention to social diversity and the propensity of human societies to develop rich differences.

If the relevance of our knowledge lies in its collaborative interdisciplinarity, extending even beyond the traditional domain of physical sciences, it is clear that interdisciplinary centers are essential to promote the view and make a success of it. It is my hope that the Centre for Global Change, created in Islamabad under the stewardship of Dr. Isfaq Ahmad, will pay attention to this interdisciplinarity. One might think that Pakistan is not large enough to be a big player on issues of global change: the changes that can befall us are sensitive to small perturbations, and can be triggered by any one of the many actions of even small nations.

I should now say what our Centre in Trieste has been doing in this direction. As you know well, our Centre was created by Professor Abdus Salam to support scientists from developing countries. It enables them to run high-class research activities in their own countries through periodic visits to our Centre, through nurturing connections and networks with international scientific communities, through participation in conferences and workshops in all branches of physical sciences, through the creation of opportunities for scientists to take a break from their taxing duties at home so they can immerse themselves in science for a time. The Centre has had an excellent tradition of doing just that, and many researchers from Pakistan have visited the Centre and known its work first-hand. In its early days, the Centre focused on High Energy Physics but has lately branched off

in other directions such as condensed matter physics, mathematics, applied physics including medical physics and renewable energies, and so forth.

Of particular interest to our meeting here is the recent creation at our Centre of a new Section on Earth Physics, with focus on topics such as computational earth system modeling, natural and anthropogenic climate change, climate impact on societies and ecosystems, land-atmosphere coupling, ocean-air and ocean-land interactions, the structure and dynamics of the interior earth, earthquake prediction and seismic risk. We are attempting to expand its scope to aspects such as environmental deterioration, depletion of petroleum energy and other natural resources, responses to natural disasters such as earthquakes and man-made accidents, climate changes and their effects on agriculture, ecology, new diseases, storminess, cyclones and floods. We organize many workshops and programs on such topics, not only at ICTP but also elsewhere. I regard the present conference as an illustration of the types of activities we have been conducting outside ICTP in collaboration with like-minded institutions. We have high hopes for the future of the Earth System Physics Section and its relevance to problems that determine our destiny, transcending national interests. It is my expectation that our cooperation between the Centre for Global Change and the National Centre for Physics will continue unabated, and, together---and with the involvement of scientists like yourself and many others---we shall be able to play a part in charting a sensible path for the future of our planet.

Thank you for your attention.