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EVENT: KEY NOTE - ON SCIENCE AND NATIONAL DEVELOPMENT AT THE
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TIME:

(Delivered by The Honourable Datuk Sulaiman
Daud, Minister of Education)
Yang Mulia Pengerusi Majlis;
Dif-Dif Kehormat;
Tuan-tuan dan Puan-puan yang dihormati sekalian.

Saya mengucapkan ribuan terima kasih kepada pihak
penganjur di atas penghormatan yang diberikan kepada saya
untuk memberi ucapan dan juga membuka Forum Sains Kebangsaan
ini. Walau bagaimanapun, oleh sebab saya terpaksa berlepas
ke luar negeri pagi ini, saya meminta maaf kerana tidak
dapat hadir bersama di majlis ini. Saya mengucapkan terima
kasih kepada Yang Berhormat Datuk Dr. Sulaiman Daud, Menteri
Pelajaran kerana sudi menyampaikan ucapan ini bagi pihak
diri saya.

Saya mengambil peluang ini mengucapkan setinggi-tinggi
tahniah kepada Universiti Pertanian Malaysia di atas
usaha-usaha menganjurkan Forum ini, dan saya berharap Forum
ini akan berjaya melahirkan perakuan-perakuan yang konkrit
dan praktikal selaras dengan tema dan tujuannya.

Ladies and Gentlemen,
INTRODUCTION

Man is God's special creation. While science may
regard him as one of the categories of animals, his ability
to reason differentiates him from the others. He has all
the animal instincts, but he is more mobile and able to
control his environment and destiny.

ability to choose, between good and bad, to differentiate
what is moral and immoral. He has the choice of what he
should be, and become.

3. From history we see this progress though it may not be
linear. Today, we are at another stage of progress. The
achievements made within this last few centuries has been
unprecedented. Discoveries, inventions and innovation in
the fields of science of technology have changed almost
everything and we are on the threshold of an age of
excellence.

Ladies and Gentlemen,
MAN, HUMANITY AND DEVELOPMENT

4. Given man's ability to make choices to serve his general good, the question is whether he is fulfilling the future. It is for this that he is gifted with the ability to reason, not just to seek knowledge and truth but with the knowledge to be of service to humanity.

- materially and spiritually - a better quality of life and living. Development is, therefore, an environment that enables individuals to have a truly meaningful existence as human beings in the context of the whole scheme of existence, and therefore, a process for achieving this higher state of well-being. It is a totality and a balanced progress within a normative framework, at the core of which is humanity.

6. National development is a major preoccupation of modern states. It is an instinctive response to man's quest for better existence. National development is the process of achieving a better state of well being given a certain set of norms and values of what is good and desirable.

7. The concept of development and national development has gone through a process of change and adaptation itself. While initially it's emphasis was more on material economic progress, today, more and more it is seen as a total upliftment and balanced progress. Today, development is no longer accepted as a cultural-bound western-biased phenomenon, but as a contrived phenomenon with importance placed to its particular context. Its material and physical components are regarded only as a dimension and more as a means for realising a greater, fuller and meaningful human existence materially and spiritually.

soft and hard sciences. Unfortunately modern day branches of knowledge, developed more or less independently of each other. The people of various disciplines, again as a modern day phenomenon of knowledge explosion and obsessions with protecting the legitimacy and mystique of one's field, do not necessarily share a common philosophy about the place of science and development. It is indeed, infortunate, that philosophy which has been the apex of, and an integrative point of pre-modern knowledge is no longer performing that role.

9. Thus today many people are still arguing about exclusive good of man; its abuse allows the evolution of a culture that is contrary to the higher ideals and basic norms of humanity. Moral decadence, brutality and social upheavals, militancy and oppression are manifestations of some dysfunctional effects of science on modern day generation. Not that science is bad, but some people who apply it lacks humanity at heart. If there is misuse or abuse, it is the society, and more specifically the

individuals in the society. We should not place the blame on science. The pursuit of science must go on, and even at a greater pace but serious considerations must be given to enable science to be utilized for the greater good of men and humanity. It is an area within the realm of conscience. in our times, today. Yet, the paradox is that we also claim that we have the potentials of producing enough food for the whole world population, and to raise the standard of living of the whole human race to a level unknown before.

11. Today, vast sums of funds are being used for military purposes and human sufferings are made to support the war industry. And again vast sums are spent to maintain international outfits whose preoccupation is empty rhetorics. Big nations may be able to indulge in these luxury but not the smaller nations. We are still far from meeting the challenge facing humanity. To optimise the application of knowledge, science and technology for the betterment of mankind, is a challenge facing us, the present generation.

Ladies and Gentlemen,
SCIENCE AND NATIONAL DEVELOPMENT: THE MALAYSIAN CASE

12. Malaysia is most fortunate. Though events in our history have posed us with many problems, we have the necessary ingredients to make Malaysia a case of success in national development. Given abundant natural resources, what we need now is a motivated and hard working society with high moral values and discipline, and the proper application of science and technology to serve our needs and aspirations for greater achievements.

13. In our case, science and technology, and indeed the whole spectrum of knowledge must be developed and utilized as a tool for fulfilling our aspirations towards peace, prosperity, unity and justice for all Malaysians.

14. In its widest sense, science is the systematic method of describing and controlling the material world and is based on the study of natural laws of the Universe. The development of scientific laws, theories and principles over the last 6,000 years are a result of man's enquiring mind in his search for knowledge and truth. Science does not create but discover what exists.

15. We in Malaysia, view knowledge and science as the pre requisite, of all human endeavours. In accordance with the teaching of Islam we believe that it is our duty to create and develop a conducive environment for the promotion of knowledge and sciences which in essence are efforts in confirming divine truth. Our Prophet Muhammad s.a.w. said "The quest for knowledge is obligatory on every Muslim".

16. Science does not just serve human curiosity but more importantly it is to serve his needs. We cannot deny that

the world is shaped by technology and that the successful application of science have resulted in technological breakthrough as well as in the production of trained and competent manpower for national development. Science is "know-why" while technology is "know-how". In other words, science produces knowledge while technology helps in the production of wealth. Science without the by-play of technology becomes sterile, and technology without science becomes moribund.

17. Let us take a lesson from history. The golden age of Islamic civilization was the period of high achievement in various sciences. This has triggered the Renaissance in Europe and led the West on a new road to scientific development and glory. Science in the Islamic world became neglected and eventually led to the decline of the Islamic civilization as a pacesetter in world affairs.

18. Today nations, including Malaysia, look forward to science and technology for salvaging stagnant economies and in overcoming misery and poverty. However, in order to ensure a healthy development there must be a balance both in the development and application of hard and softsciences. This is necessary if we are to ensure a balanced development and reduce the unintended consequences and undesirable effects of development.

19. Science and technology is a powerful instrument of social change; its effects on modernization is not merely through improved technology but also through changing the lives of individuals and of societies and nations.

20. Some generalisations have been made on the reasons why developing nations show little progress towards achieving greater prosperity. Firstly, it is the lack of adequate resources especially skilled manpower and advanced technical know-how. Secondly, the failure to recognize the important given to arms build up than to scientific and social development, and fourthly, there is a lack of sincere co-operation from advanced nations which are still holding fast to the theory of scarcity and are reluctant to see the developing economies as equal competitors and partners in international affairs.

21. Such generalisations may not be wholly applicable to Malaysia, but being a developing nation there are much to be done to take us through the take-off stage.

22. On achieving independence we embarked on programmes in nation building and socio-economic development. "Rome was not built in a day," but we do not have all the time in the world either. So we strive and made use of the resources and capabilities that we had. Now, through this cumulative process, we are on a stronger foundation for greater achievements.

23. Where, before, we had no university, we now have five

universities and numerous technical institutions. Education in the sciences has been encouraged and given higher priority over the general education in the arts. We established research institutions in agriculture, forestry, medical sciences, industry and even on the application of nuclear materials. A National Council for Scientific Research and Development, a consultative body to advise the Government on scientific and technical matters and to ensure that research activities are geared towards national development needs and goals was established in 1975.

24. Education is important. Every year thousands graduated from universities and colleges in our country as well as from colleges and universities overseas, and many are being trained in science and technological fields. We are aware that the development of our human resources is equally as important as the development of natural resources. Without indigenous science and technology, the resources of a nation cannot be fully exploited for our development.

25. With our efforts we have progressed in a number of fields. In terms of research on the production of rubber from *Hevea* plants we are ahead of other nations; our work on

tropical diseases are commendable, and our approach to land settlement is an example for many developing countries. We cannot be contented with our achievement but, on the other hand, we have to address ourselves to the challenges ahead of us in entering the new decade.

26. Whether there is any need for extensive education in science and technology for Malaysia is no longer a question. The task before us is to ensure that our educational development and our research are constantly geared towards our specific cultural, socio-economic and political milieu. Do science curricula in our schools and universities contain the elements that are needed. What are the necessary adaptation to required. These are basic questions which are pertinent to our aim in fostering a dynamic scientific community.

27. The greatest challenge in science education is the process of instilling the right attitudes to learning and conducting our work. Attitude is a product of environment. The attitude towards work and production of technological goods shown by the Japanese differ greatly with that of the western nations such as Britain or the U.S.A. and this factor explains partly for the advancement in high technology attained by the former. On the other hand, the attitude towards enquiry and towards seeking new knowledge, has put Britain and U.S.A. ahead of others in terms of innovations and invention. Similarly, the Germans have excelled themselves in chemistry because the Germans in general are thorough in their analysis, classification and construction of systems. It is therefore essential for us in Malaysia to develop and incorporate into our culture the

kind of attitudes that can make science and technology the basis of our development.

Ladies and Gentlemen,

APPLICATION OF SCIENCE AND TECHNOLOGY

28. What we want in Malaysia, at this point in time, is a greater, more aggressive, and appropriate utilisation and application of science and technology for our development in the various fields. Our economic growth requires the concurrent development of agriculture and industry whose symbiotic relationship should be maximally nurtured and developed together. Whereas agricultural technology must necessarily be adapted to the specific environment or ecological circumstances and the local farming system, industrial technology and techniques, if needed, can usually be transplanted without major modifications. Nevertheless in both cases, given the specific needs and the particularity of a given situation, supporting institutions will be required to help select or generate the most appropriate technology and to adapt it to suit the local needs and conditions. Therefore, the improvement of indigenous technology and adaptation of imported technology, deserve close attention. In this regard we need a sensitive scientific and research community.

29. In our effort to enhance improved technology, expenditure alone may not serve our goals. There must, at the same time, be a right attitude to see to a balanced development of a continuous innovation chain linking scientific research, market research, development design, production, and market acceptance. Experience elsewhere has indicated the need to keep basic and applied research in proportion to development and design, and to other scientific and technological activities. A proper and systematic co-ordination of science, technology and production is a must. And since linkages between government, production and research are important, and that their effectiveness may be more decisive than the actual physical form of the overall organisation, then a well formulated strategy and plan with the necessary co-ordinative mechanism is a prerequisite and necessities a centralised function, at the national level where decision can be made in relation to national goals and priorities.

30. In the process of utilizing science and technology for development, we must make the best use of our national scientific and technological potential, in a two-way interaction with economic and social planning. We need to strengthen the supporting service activities, and raising the general level of productive competence. We need to make the best use of imported technology while at the same time generate appropriate indigenous ones. This requires attention both to the mechanism for the transfer of technology, and to the propagating of our own scientific and technological competence. In other words, we need a

balanced distribution of scientific and technological personnel besides an adequate supply of managerial and entrepreneurial talents.

Ladies and Gentlemen,
EDUCATION

31. Since the impact of industrialization through science and technology, industrializing countries have been facing the problem of striking a balance between adopting western technology and maintaining traditional values. The adoption of new technology and along with it alien negative norms is not what we want. There is this twin problem of preserving positive traditional values on the one hand, and changing attitudes and values to suit the demands of modern technology on the other. We must be sensitive to this and our education, formal and informal, has an important role to play to see to it that our people can sieve through what is necessary and appropriate.

32. The teaching of science must take a new orientation. The overall objective of the new approach in science teaching is to foster a living science, as a dynamic force for societal improvement. Our efforts must be geared towards the creation of a scientific mind. So far, science teaching has remained in its traditional form where sciences are taught for science sake, without showing much of its usefulness and practicality in everyday life. In the classrooms, scientific laws are learnt, not discovered; hypothesis are not tested but taught. Such a curriculum does little to develop an attitude for a critical enquiry, adaptability and objective understanding. Thus the ability to critically observe, analyse and conclude on everyday phenomena has remained to be the exclusive realm of scientists alone. The general public continues to be passive consumers of scientific facts, discoveries and inventions. In fact, there is a tendency for some people to look upon science as something mysterious and complicated. As such scientific discoveries and inventions are not analytically viewed as an ordinary achievements of mankind.

33. The make up of a scientific mind begins from young, and there must be continuous follow through. Given the present situation the task again falls on the scientific community to assist in making science education more interesting and applicable to the daily lives of the different level of our people. Science must be made to serve and not as a plaything of exclusive few who are scientists. We must strive to see to the birth of Malaysians who not only specialize in various fields but both having and able to utilize the tools and instruments of science and the humanities as a way of life.

34. The question of social-technical balance in development is an important dimension. In striving for a balanced development of scientific and humanistic knowledge there is a need to incorporate within the social dimension moral and

religious elements. As a matter of fact we have made a good start in this respect through the restructuring of the primary school syllabus where a more scientific and natural approach to the study of nature and society is complemented by the inculcation of religious and moral values. We will continue to strengthen this base at the secondary and tertiary levels so that increased technical learning at these level would not result in the production of scientists who are not socio-culturally sensitive.

35 In working towards the above objectives, our scientists themselves have a big role. They should organize themselves into some kind of a national society which will serve as a forum for exchanging ideas on matters relating to science and development. Many models are available but one which suit our own need and special socio-political situation will need to be evolved.

Ladies and Gentlemen,
RESEARCH AND DEVELOPMENT

36. I have been stressing the fact that advancement in science and technology is important in national development. At the core of it is research and development (R&D). This colitical of research and development underscored by the quite well defined. However, in third world countries this component has been lacking, be it in terms of funding, organization or the establishment of priorities. For example, research expenditure for most third world countries have been less than the UNESCO recommended ratio of 1% of GNP. In the case of Malaysia, public expenditure on research was only 0.63% for 1980 and 0.64% for 1981.

37. Among the logical reasons cited for inadequate research funding are the huge capital outlay involved in R & D as well as the the long span of time necessary before benefits can be reaped and this is especially so in the case of basic research. Greater commitment will have to be given if we are to see the support role of science and research come to reality. While the public sector role is critical no less important is the share of the private sector. No less also is the critical role of research entities to organize institutions and research threats as a prove of their capability and sense of commitment. We must now concentrate to set our priorities in the light of our long term objectives. Basic and applied research are complementary and mutually reinforcing. The product of basic research must not be merely imported but instead basic research must be undertaken locally for the upgrading and adaptation of information for advanced applied research as well as the exploration of new frontiers. In the case of Japan there is no denying that a great investment has been put into the establishment of infrastructure for basic research as far back as 1930's. The present advanced stage of Japanese science and technology can be attributed to this investment. Presently Japan has one of the most elaborate mechanism for science policy organisation in the public sector as well as

the most comprehensive network of basic and applied scientific research institutions in both the public and

38. Research and development also require manpower planning and development so as to ensure adequate supply of manpower necessary to carry out research and utilize the benefits of research. Manpower policy must be tailored to cater for the needed development. The task of performing intensive formal as well as in-service training functions should be jointly provided by the public and private sectors, and it is hoped that this can be made possible in the future. In Japan, private corporations have enormous training facilities including enrollment into company-owned technical schools, colleges as well as two year training apprenticeship for newly hired engineers. This is possible partly due to the life-time employment system whereby investment on training of personnel is not wasted due to high turnover of employees.

39. From the experiences of our six national plans we should be in a better positions to devise a national manpower development plan that incorporates not only the necessary training of manpower in critical areas of science and technology, but also the contribution of the private sector in the training as well as the forecasting of future manpower to meet required target.

40. Co-operation between the private sector and the public sector is still the essence. This no less fit our concept of Malaysia Incorporated. The private sector will have to shoulder some of the responsibilities in R & D as well as manpower planning and development. On the other hand, the bureaucracy has to fully appreciate the nature of research and its benefits to national advancement. It is in this light that leadership in research organizations should be headed by competent managers who can organize efficient research and appreciate the needs and aspirations of scientists. At the same time, to ensure maximum productivity of research sufficient motivation must be devised in terms of status, incentives and rewards. Only then can support, funding and utilization of research be given its proper place be it in terms of basic or applied research, between agriculture and industry and even between foreign and local expertise.

Ladies and Gentlemen,

CONCLUSION

41. Through all these planned efforts we are hopeful the role and forces of science in our national development.

42. With these words, I now have the pleasure of of declaring this Forum officially opened.

Thank you.