

## Science Policy and the Development Plan

This paper tries to elaborate on the science policies as they should be devised by policy makers and applied by researchers to address the most significant problems on which research must be conducted. It is argued that in the current situation researchers of the developing world should research on the issues that policy makers are faced with. Lastly, the major challenge of developing countries is that they do have scientists but they usually spend their time researching on issues that have already been resolved or that are not done at the right time and place.

Developing an effective and practical science policy calls for enough information from the status of science and science policy in the world, and the awareness of development and expansion of science in different countries, especially in the developed world.

Necessarily, science policies in different parts of the world should be different since the countries do not have similar situations. Underdeveloped countries have some problems in determining the facilities and conditions. Meanwhile, they have to adopt their plans to the scientific developments in the developed countries.

The science is not something that we can import as a package and take advantage of its benefits, rather it is like a tree that should be planted in a suitable soil and taken care of so that it can establish its roots in the soil and grow its leaves and branches and to fruit. Sometimes governments can allocate more financial resources to this demanding act but for planning and implementation of a science policy other conditions are required as well, and in the absence of these conditions, allocating the funds would be sometimes useless. However, it is possible to plan a scientific policy appropriate for a certain area of thinking.

Briefly, the following should be considered in planning a scientific policy:

Spiritual and moral possibilities 1)

Political and cultural possibilities 2)

Financial, administrative, organizational and technical possibilities and 3)  
manpower.

In our country, some measures have been taken to reform the system of administrative organizations and science and research institutions. Furthermore, through the Five-year Development Plan, that has begun this year, the share of the costs incurred in research programs from Gross National Production, has continuously increased, and this share will soar to 1% in public sector and to 0.5% in private sector by the end of the Plan. The government is also committed to spend 15% of these credits for fundamental research and research programs pertaining to the production of modern technologies. If the conditions already mentioned exist, spending credits leads to the flourishing of research.

### Scientific Policy for Research Development

Countries in general and developing countries in particular should devise a plan for developing science and technology, because in the present changing world, one can not follow a vague way by chance. As some post modernist thinkers believe, modern science and reason have lost its spontaneous expansion strength. Although establishing a scientific policy is a challenging task, developing countries should undertake this task to get rid of the current dilemma. -

When it is said that establishing science policy is not an easy task, it does not necessarily mean that we can do nothing about it, rather it is a hint to the people who do not take it seriously. At first glance my view may seem discouraging,- but I do not believe in following what Sisyphus in Greek mythology had done; taking a stone to the mountain top again and again after it rolled down.

The people of developing countries are not like Sisyphus. They somehow know that they should carry a big stone to the mountain top but they are not aware of the difficulty of this task, and even when they struggle to carry up the stone for a while in vain, they are not aware of the importance of their task. When Sisyphus's stone

rolled down the mountain he came down while being quiet and sad and began its task again. He carried up the stone with extraordinary determination. His pain was the pain of someone whose destiny was an aimless and absurd effort, but the pain of the developing world is that it does not know clearly how to carry up the stone. We should discover the way and know how to proceed along it. This process should be organized by planning. Such organization did not exist until the beginning of the 20th century and Russia's Revolution in 1917. Making use, or better to say, abuse of science and technology in the two world wars and particularly in Hiroshima and Nakazaki atomic bombardment motivated the project of "Science for Peace and Life". After the World War II, when most colonies gained political independence, there has been a recognition that real independence is due to science and research. At that time, acquiring science and devising research system did not seem difficult. Yet, after more than 100 years of fruitless search for science and technology some countries have not realized that the creation of science and research is not an easy job. Since we have seen that talented persons become scientists by working hard, we have taken it for granted, and have supposed that the mission of science would simply be accomplished by training a number of people as scientists. Obviously, science and research are taught and expanded in research centers and at universities, but the tree of science will not live, grow and fruit unless the soil, air and water are available.

It is not enough for the gardener to think about healthy tree; rather he should plant it in a suitable place and be concerned about its growing conditions. What are the preconditions for developing the tree of science, and how are these brought forth? If we do not have a clear answer to this question, we will not be able to devise science and technology policy. We often take such questions as boring and irrelevant, and do not think of them. Instead, we think of temporary and transient measures that although not irrelevant, they will be useful if the principal conditions exist. It is clear that the establishment and expansion of science and research centers, as well as increasing the research budget are the preconditions for foundation and development of science. Training meticulous researchers and providing for their subsistence is necessary for flourishing research. The governments are supposed to manage these affairs, yet it is unclear for researchers how to do these measures. What should the subject of research be? In recent years, it has been noticed that every country has its own possibilities and issues, some of which are more important than the others. Therefore, different organizations are established for specifying important plans and proposing them to researchers. The profile of these organizations is not usually brilliant even though their managers and leaders are among the best scientists. In a sense, it is both easy and difficult to specify the more important and critical problems for research. These managers usually fail to see the difficulties. The problems, which were traditionally popular among scientists, are confirmed and necessities are forgotten. Education planning in developing countries is devised by following the example of a typical developed nation. Every effort is also made to have a comparable curriculum as well as the

same student/teacher ratio with a developed country but this process often stops as it encounters social and cultural problems and obstacles. Determination and recognition of the important problems of research in developing countries are difficult in some aspects: First, the system of society, relations, agriculture, industry and technology have not revolutionized to the extent that they would be adopted for conducting new research. Second, the scientists could not easily apply their knowledge for solving the scientific problems of the society. Because despite what is commonly believed, science does not have steps and stages, rather in every phase of expansion and development other phases are put aside and new projects replace old ones. Most scientists of developing countries can research on knowledge frontiers but these researches are useless for the technology of the country. Third, in current situation that science has turned into a commodity, most researches, that are suitable for developing countries have already been conducted. Such researches are at best a practice of research but all these and other reasons that are mentioned in justifying the stagnation of science and research, are a subdivision of a basic need. It is believed that science has a marginal place in the developing world. The truth is that the developing world is devoid of unity, rather it is like a mosaic whose components are arranged by chance or desire and sometimes, a scattered and incongruent composition has been made. Much is said about science in developing countries but science is really a psychological need for developing societies, not the need for the application of science and benefiting from its factual advantages. In other words the structure of the society and economy and policy of the developing society is less coordinated with science and research, and in running affairs usually the need for it is not felt. It is true that in these countries, the government covers almost all the expenses for research and governments' budgets for research is not sufficient, as a result of which, the share of research of such budget is low. I do not mean that merely the government should function as employer and ordering agent and consumer of research. This situation is not acceptable at all but the fact is that government is the biggest ordering agent and consumer of research. Even in the developed countries, military centers cover a great portion of research budget and are persistent customers of research institutions. In some developing countries there is more need for doing research since the military industries are more developed. You should pay attention that the tree of science has fruited and everyone stares at it in a way that no one thinks about the basis and root and stability of the tree, but in the developing world the plant of science is in the vase and instead of planting it in a suitable soil, they use it in the parties for decoration. It means that people consider science as an important matter but it is a luxury and has not an important dignity in life and system of society. In such a situation, where is the place of science policy?

If countries and governments really want to compose an effective, practical and successful policy, they should consider the moral, cultural, historical and material situation necessary for development and progress.

In 1963, when the first conference on the application of science and technology for less developed regions was held in Geneva, there was the belief that science can be exported to everywhere, and if governments allocate enough resources, science and research will flourish. Forty years have past since that time but the achievements were not as much as expected. We can not say that nothing has been learnt in these years, though we have not reached a clear result yet. This is a difficult lesson and one should be an alert to learn from it. To develop a science and technology policy in every country there should be some people who know the history and background of modern science, and its present situation in the developed world, and should realize the situation in which science can grow or can not. They must be able to study and explore the extent of ability of every country in creating situations for acquiring science and its development. I do not like the term of naturalizing science because science is refractory and universal, but undoubtedly, science is a historical and chronological matter, and if it does not strike root in a suitable soil, it can not last. We can send people to the best universities and train scholars, and even we can establish scientific and research centers for these scientists and employ them in these centers. However, if the research subjects are not set forth and areas of research are not specified and the research is not useful for the country, scientists will become frustrated and research centers will be involved with the administrative and bureaucratic formalities.

## Conclusions

Science policy can be followed only if it is developed on the basis of the following:

Knowledge of the general conditions of modern science development and its 1-trend to the present time, and the place and status of science in the modern world.

Knowledge of the abilities of the society for absorbing science. 2-

Knowledge of the extent and kind of society's need to science. 3-

Knowledge of relation between research and development, and that research is 4- not isolated from technology and since in developing countries, science and technology are not usually at the same level, this difference of level may unjustify the scientific research, and change it to a luxury.

In brief, the big problem of developing countries is that they mostly have scientists but the problems set forth in their system of society, policy and technology are either already solved or they think of them as being solved. It is because that they believe that the countries should follow the West European or North American approaches. However, it seems that this approach is futile and such countries should find their own way to the future. In fact, developing countries have peculiar problems. These problems are unprecedented and do not belong to our own age in which we have been turned into consumers and have seized to develop and cope with the West.

These problems should be explored and set forth and this will be realized by philosophy and human sciences. For this reason, despite what has been thought of during the past hundred years, turning to human sciences, and especially researching on the situation of creation and development of science, is one of the developing world's priorities. However, now the globalization of economy, production and investment do not leave a room for developing countries and if this globalization takes place by departing from thinking and ignoring the future, the world of tomorrow will not be better than what it is now. We can hope for an improvement in the situation unless we are concerned about future and think about what has happened to us during the past hundred years and by calculating the possibilities enter the scene. Our future path will be paved by considering and thinking about our strengths and shortcomings, and it is by thinking that we can succeed.

Since research is the building block for the production of sciences, it is necessary to emphasize on research activities. The points that should be in mind while making research policies include:

Expectations from research and its impacts on development. 1-

Research has a critical role in decision making and preparation of a system

mapping to specify the priorities, or at least adopting research policies with politicians and decision makers' measures. Furthermore, decision makers should have access to clear and comprehensible research findings that are accompanied by sophisticated and-specialized detailed information.

Who sets forth research questions and who conducts the research? 2-

It is of prime significance to designate research questions by users and to allocate credit for especial researches for the person who finds answers to research questions. It is equally important to make a compromise between researchers' views and those of decision makers by considering the limitations, pressures and biases. On the other hand the cooperation and active participation within and among research institutes, and also coordination among research findings in similar researches is noteworthy.

Research applications in decision makings. 3-

The most significant points to be considered in this relation are: establishing continuous communication structures between research and decision making institutions. This is apart from designating research priorities, setting forth research questions and research recommendations, adapting research planning timetable and decision making to provide the required answers at the right time, considering cultural background in the application of researcher.

Increase the share of research from Gross National Production (GNP). The 4-  
percentage

of allocation from GNP from the government budget or from the income of private  
sector

organizations devoted to research in the developing countries as compared with

developed countries is not noticeable. It should be noted that GNP of developing

countries is much lower than that of developed nations, and the percentage of  
allocation

from the GNP is also lower than the corresponding figure in developing countries.