Seminar on Science and Technology and It's Role for National Development

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Science, Technology and Society

- Prof. Dr. Dayananda Bajracharya*

Science is, in a very fundamental sense, the process of seeking truth. It is a common heritage of mankind. People of all nations have contributed to its development. Openness, universality, honesty, quality and respect for evidence are important values of scientific enterprise. It is one of the most remarkable human achievements.

Advances in Science and Technology

In the last century many advances were made in science and technology that will have lasting impact on humanity. Among others, the 20th century will best be remembered as the century in which the atom was split, a relation between matter and energy was revealed, man defied gravity and landed on the moon, silicon turned into computing power, the Internet was created, antibiotic was discovered, DNA was spliced and manipulated, test tube babies were born, sheep named Dolly was cloned and human genome was decoded. While advances in physical sciences changed our view about the genesis of universe, advances made in biological sciences changed our view about our-selves, our relation with the universe and our place in creation. In the first half of 20th century physicists were revered and feared for what atom could do to the society. Today, such ambivalent feelings are held towards biologist for what DNA could do.

Growing Pace of Science and Technology

Scientific knowledge is growing at an unprecedented speed. More new information has been generated in the last 30 years than in the previous 5000 years. Scientific knowledge now doubles every 3-4 years. Similarly, technology is also growing at a galloping pace. In the 19th century it used to take over 50 years for the scientific discoveries to result in new technologies. In the second half of 20th century, it was reduced to less than 20 years. Today, the transition from science to technological innovation takes only 5-10 years. With such explosion in knowledge, the world economies in 21st century will increasingly become 'knowledge-based', with value-added coming more from knowledge than materials.

Impact of Science and Technology

Advances in scientific knowledge have led to great benefits to humankind. Life expectancy has increased strikingly. Cures have been discovered for many diseases. Antibiotics alone have saved more human lives than were killed by all the century's wars combined. Agricultural output has increased significantly and helped fight hunger. The use of new energy resources has freed humankind from arduous labor. A number of industrial products and processes have made life more comfortable. Due to progress in transportation and communication, millions of human beings cross national borders every day and hundreds of millions of written, visual and sound message are exchanged instantaneously all around the world. There are billions of pages of information in World Wide Web. With the click of a mouse, individuals around the world can access to them. However, despite many positive achievements in using science for human benefit, indiscriminate use of scientific advances has at the same time contributed to the production of weapons of mass destruction, adverse climate change and environmental degradation. There are still no cures for many diseases such as HIV/AIDS and severe acute respiratory syndrome (SARS). Hunger and poverty still exist in significant parts of the world. Existing science and technology structure is worsening the divide between rich and poor nations. New advances in biological sciences, such as cloning, stem cell research and genetic engineering, are confronting our society with more and more complex ethical and moral questions.

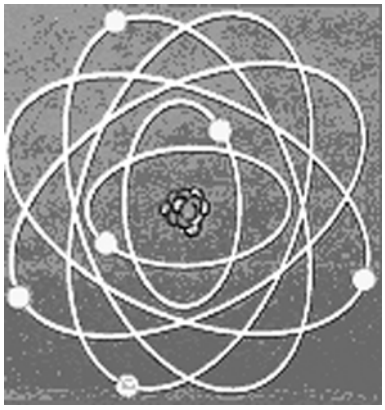
Science, Technology and Development

Science serves as an engine for economic development of a nation. There is a growing consensus among planners and economists that at least half, if not more, of economic growth of countries is directly attributable to science. In a globalizing knowledge- driven world of 21st century this contribution can only become higher. It is well recognized now that there is a distinct relation between the scientific capability and economic well-being of a nation. For example, science-rich nations of the north with only 20% of world population possess 80% of world's wealth whereas science-poor nations of the south with nearly 80% world population possess only about 20% of world's wealth. Poorest fifth of world's nations hold only 1.4% of world riches whereas some 358 billionaires from rich countries have wealth equal to the combined income of nearly 2.2 billion people from poor nations. Nearly 4.3 billion people from 140 states still live in abject poverty. Nearly one billion people have no access to safe drinking water and basic sanitation. According to the late Abdus Salam, a Nobel Laureate, the widening economic gap between rich and poor nations is basically due to a gap in their scientific capability.

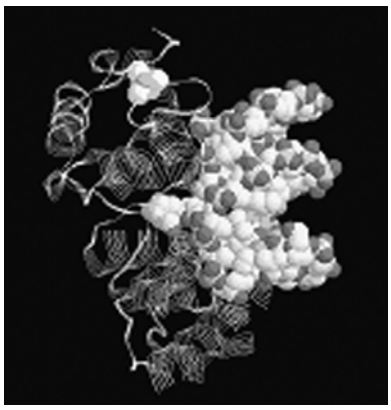
Do Poor Nations Need Science?

* Vice-Chancellor, Royal Nepal Academy for Science & Technology.

Many people in developing nations believe that science is a luxury for poor nations. But it is necessary to understand that science cannot be imported as commodities from foreign producers and that every nation needs to develop its own scientific capability. To judiciously assess the risks and opportunities of emerging technologies, developing nations need more, not less, science than the developed nations. Nobel Laureates from developing countries have always stressed on the importance of science in the development of poor nations. According to the late C. V. Raman, the first Asian to receive Nobel Prize in science, there is only one solution to economic problems of poor nations. That is science, more science and still more science. Similarly, Abdus Salam had always advocated that the key to economic progress in the developing countries is first to build and then sustain scientific capability. There is no short cut to it. No doubt, science alone cannot develop a nation but no nation can develop without science. There is not a single nation which has come out of underdevelopment without putting big emphasis on investing in science and technology. All nations, including poor nations, will continue to face challenges that require sound scientific knowledge and technology for their resolution. In the 21st century the success of all countries and societies around the world increasingly depend on their capacity to generate and access science, technology and innovation. Enhancing scientific capacity in poor nations is, therefore, truly a necessity not a luxury.



Till 1950s an Atom was a ***Symbol of Science***



Since 1960s a DNA Molecule became a ***New Symbol of Science***

Science, Technology and Future

During the 21st century human society faces the daunting task of forging a new relationship with the natural world. This new relationship is defined by the concept of 'sustainability' that implies meeting current human needs while preserving the environment and natural resources needed by future generation. Sustainable development is one of the greatest challenges humanity has ever faced. The world's population, which stands at about 6 billion at present, is expected to reach nearly 9 billion by 2050. About 80% of this population will live in developing countries. This population growth will result in enormous demand for more food, shelter, health care, safe drinking water, energy and material. It will also lead to further loss of biodiversity and environmental degradation. These are all areas that are central to sustainable development and also where science and technology has much to offer. This is the reason why science and technology is being increasingly recognized as the foundation for sustainable development and the best hope for a better human future. Unless problems related to these issues of sustainable development are properly addressed, intense competition for human needs could lead to national, regional and international conflicts and threaten world peace. Scientists, however, believe that such a dismal forecast need not come to pass. Effective application of current and new scientific knowledge, if supported by political will, appropriate socio-economic policies and international cooperation, can produce substantial progress towards a sustainable human future.

Role of Science and Technology in Poverty Reduction

- Dr. Shankar Sharma*

Scientific and technological development presents tremendous opportunities for economic growth, poverty reduction, and human development. Technology not only helps in doing old things in better ways but also demonstrates new ways of doing previously unimagined things, the technological development - industrial revolution, green revolution, advancement in health sciences, improvement in transport technology, the fusion of information and communication technology, progress in knowledge and education - has broken the bounds of cost, time, distance and capability of doing things. These developments have helped to increase production and productivity of the economy dramatically. However, the dissemination and utilization of technological development have been uneven and the benefits of these developments have been distributed to the poorer countries, poorly.

Nepal, in a limited way is trying to develop, import and disseminate technology focusing more on poverty reduction. As agriculture plays a prominent role in reducing poverty, the focus of agricultural development has been on the development and utilization of improved seed, better irrigation facilities and enhanced soil fertility, as guided by the Agricultural Perspective Plan. To make research and dissemination complementary to each other, the government, among other components, has also initiated agricultural research and development fund to be used by the farmers according to their needs and demand.

Nepal has adopted liberal and market oriented policy in importing goods and service and attracting foreign investment to make the economy competitive and effective. The policy has provided the opportunity for importing, developing and using new technology by allowing the imports of capital goods and facilitating transfer of technology in an easier manner in the country. In addition, increasing ODA has helped to bring and adopt newer technology in Nepal.

In a similar manner, Nepal has give emphasis on health, especially to improve overall health of the population and increase longevity by adopting and disseminating new technologies. Increased focus on education is expected to improve the absorbing capacity of the people.

One of the problems of technology transfer is the inappropriateness of technology. Technology does not become useful and sustainable if it is not appropriate. However, if the technology is simple, labour intensive, applicable to small productive units, carries smaller risk, and suits the country conditions the technology will be more sustainable. In this context, Nepal's effort to expand bio-gas, micro-hydro and indigenous medicine (aurbed) is commendable.

Technological progress should not be confined to the industrial and mechanical arts. It should also include improvements in economic organization-perhaps a reform of marketing arrangements, or better incentives for extension workers or better management of the economy. Furthermore it covers improvements in skill, resulting from formal training or from 'learning by doing'. These types of changes can also lower average cost sometimes substantially and improves the effectiveness of the program dramatically.

Keeping in view some of these issues, HMG has prepared and implemented highly focused and prioritized plan (or poverty reduction strategy) supported by monitoring framework and medium term expenditure framework. Sectoral business plans are also being prepared and significant progress has also been made in implementing decentralized delivery-involving local bodies, private sector, NGOs and CBOs and local communities, in implementing and managing service delivery functions. Overall improvement in the management of the economy combined with the emphasis on technological adoption, development and dissemination are expected to help expedite the poverty alleviation program of the country. The overall paper can be summarized in the following heads:

* Vice-Chairman, National Planning Commission.

How Technology can Help Poverty Alleviation

- Economic Growth
- Advancement of Medicine
- Agriculture Growth
- Education/Knowledge Technology

Technology and Economic Growth

- Transport and Communication
- Industrial Revolution
- Green Revolution
- Information Technology
- Educational Advancement

Medical Advancement

- Antibiotics and Vaccines
- Oral Rehydration
- HIV/AIDS
- Other Innovations and Development

Industrial Revolution (only examples)

- Steam Engine
- Computer Chips
- Energy Technologies
- Industrial equipment and Technologies

Green Revolution

- High Yield Varieties
- Fertilizer Use
- Investment in Irrigation and Infrastructure
- Pesticides

Knowledge and Information Technology

- Human Skills
- R & D Expenditures
- Increased Number of Scientist and Engineers
- Advancement in ICT

Human Deprivation in Nepal

- Poverty Incidence (app. 30% or 7 million)
- Child Mortality Rate 91 (per '000)
- Adult Literacy 49.2%
- Agriculture still Subsistence

Technological Development Efforts for Poverty Alleviation in Nepal

- Facilitation of Transfer of Technology
- Demand Led R and D
- Promotion and Dev. Of Appropriate Technology
- Education
- Other Interventions

Facilitation of Transfer of Technology

- Conducive Environment for Trade and Investment
- Development Assistance
- Deregulation
- Government Support for Adoption

Trade, Investment, and Deregulation

- Tariff Reduction from 32% to 14% in 10 years time
- Open Investment Policy
- Licensing System Removed

ODA and Government's Support in Adoption of Technology

- ODA Increasing
- Facilities Improved for Adoption of New Technology
- Deregulation Expedited
- Demand led Research

Appropriate Technology

- Appropriate Energy Technology (120, 000 hhls/year)
- Efforts for increased Indigenous Medical Technology
- Conservation of Bio-diversity

Improving Technological Absorbing Capacity

- Increased Focus in Education
- Emphasis on Medical and Engineering Education
- Development of Different Scientific Labs and Facilities in the Government

Comments on the paper entitled "Role of Science and Technology in Poverty Reduction"

- Dr. Binayak Bhadra*

The basic ideas of the power-point presentation are indeed very sound and agreeable, specially as they relate to Science and Technology Policy. So my comments are simply going to elaborate S&T Policy themes. The promotion, development (R&D), adoption and transfer of technology are an important consideration. But perhaps it needs to be examined in the context of the demand side and resources available. Thus, a **development strategy based on hydro-power** may be quite relevant for our consideration.

The strategy for industrialization through hydro-power development, in the medium term, is likely to be dominated by three broad thrusts towards integration, which are listed below:

- **Rural Electrification Initiative**
- **Electric Transportation Systems**
- **Energy Intensive Industries**

In addition, as already noted, integration of hydro energy with the development process, also requires a balance between centralised and decentralised hydroelectricity development. The grid electricity or hydro-energy can form a strong base for the national development in Nepal. Hydro-electricity may be utilised in Industry to enhance her comparative advantage in exports, and hydro-electricity can be used in transportation, to reduce the imports of fossil fuels and also to reduce environmental pollution from internal combustion engines used in vehicles. In agriculture and agro-industrial activities, the integration can take the form of hydro-electricity use in lift irrigation, food processing, refrigeration, canning and a host of other manufacturing and processing activities.

Rural Electrification Initiative

One important consideration is related to the strategies of rural industries development and off-farm employment generation. The core of such a strategy will be that of the agricultural diversification and specialization, which leads to demand for irrigation and transportation services. The opportunities for agriculture based rural industries also expand with agricultural diversification. The provision of motive powers in these services and industries create demand for hydro power. However, as has already been pointed out, the expansion of transport, communication and marketing infrastructures (warehouses, storage facilities) is a highly complementary intervention on the part of the community, and local government.

The viabilities of rural industries and employment generation are not always guaranteed if local consumption and demand alone are considered. It has been pointed out else where, that existence of transport and marketing facilities often times play a critical role in making a success of these enterprises (Bhadra, 1995).

In this context, let us look at the possibilities in the context of rural electricity provisions, as an element of rural industrialization. The case studies of turbine mills and micro hydro installations indicate that, often times, hard nosed economic analysis has been replaced by excessive enthusiasm on the part of both entrepreneurs and credit institutions (RECOS, 1993). Such unchecked enthusiasm of course ultimately leads to unnecessary pessimism about the finance/economics of small hydro technology, and probably does more harm in the longer term. It may be noted that sound project formulation demands creativity on the part of the entrepreneurs and financiers alike, in identifying the initiatives needed on both supply and the demand side.

A diverse set of end-uses needs to be designed, such that the small hydro scheme becomes viable, in economic and financial terms. It should be noted that for a given level of initial outlay/investment in small hydro scheme, the cost-price of a unit of energy, (i.e. Rs./KWH) is inversely proportional to the load-factor or capacity utilization. In the short run with excess capacity therefore, the more energy is used, the cheaper its sales-price, is likely to be (primarily because the unutilized capacity has already been paid for). Thus, in managing the supply and demand for electricity, a good degree of flexibility remains in promoting use of electricity in non-lighting applications. Thus a multi-pronged approach will be necessary: R&D in various sectors of end-uses, enterprise promotions through easy credit and effective marketing, and skill and human resources development. Following are some examples, which may have to be made more elaborate and specific, for implementation.

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* Former Member, National Planning Commission.

Cottage Industries

Role of rural electrification in enhancing cottage industries can not be over emphasized. For example, it is clear that hand looms are no longer competitive with respect to machine made imported textiles, although mechanized looms probably are still competitive. So in envisaging a textile industry in rural areas, it would be important to take this into consideration, and see if small hydro/ rural electrification can contribute the rural industrialization process. Similarly food processing, metal working, dying, paper-making, saw milling and wood furniture making, electrical, electronic and a host of other industrial processes are possible candidates to be integrated with small hydro development.

Rural Transportation and Communication

The small hydel development can very well complement the development of electric road transportation, such as trolley buses, or electric rope-way transportation. The later is more attractive for areas where roads are either uneconomical or undesirable (as in trekking and recreational areas). The load factor improvements can reduce the selling price of small hydro electricity. Communication sector also benefits from small hydro.

Irrigation through Renewable Energy (hydro electricity, biogas and wind)

Use of electrically pumped irrigation during the day and during the night, during the off-peak times is beneficial, specially in the context of cash crop development through provision of irrigation water (e.g. sprinkler for cardamom growing in Ilam). The cost advantages are high, for already electrified areas, specially if one compares electric pump with the diesel/ kerosene type of installation. In remote areas, in the hills with large porter transportation, small hydro are quite cost effective compared to diesel/kerosene pump sets in terms of operation and maintenance costs and also in terms of the initial outlays. Similar systems can be based on biogas and wind in suitable areas.

Lighting and Space Heating

The lighting demand, in the absence of other industrial and agricultural loads, results in very low load-factor. This means that lighting electricity is rather expensive, on its own. The end-use diversification can reduce this imputed cost of lighting electricity. It should be noted that, compact florescent light bulbs are more cost effective in the longer run, although their initial outlay are comparatively high. In remote and inaccessible areas, the cost of fossil fuels are quite high, due to porterage, and under those circumstances small hydro and even photo voltaic are comparatively cheaper. Space heating may also be feasible if the load-factor is low.

Cooking from Hydro Electricity

The use of electricity for cooking, although very attractive from the fuelwood saving and environmental perspective, becomes a problem if the cooking time coincides with peak demand during evening. A recent seminar held on rural electric cooking highlighted the technical viabilities of using thermal storage to reduce the wattage requirements per household for cooking (ITDG, 1994). Similar storage technology using hydrogen, based on electrolysis of water, although proposed, has not yet been tried in Nepal (Bockris and Veziroglu, 1991).

The technology consists of the use of aluminum containers, cast iron or stone pebbles in insulated containers, to store and extract heat energy. Electricity at low wattage, is used to heat the vessel, cast iron or stone pebbles, and is stored as heat. This heat can be used for slow cooking, as in the case of Bijuli Dekchi, which operating at about 80% efficiency, has been demonstrated to be feasible in Ghandrung, Salleri and Andhi Khola areas (ITDG, 1994). This type of slow cookers does not permit the frying of foods, the traditional cooking style, and thus may have limited popularity.

The heat stored in the Pebble Bed Storage Cooker is used for cooking with the help of a fan blower, which takes the high temperature heat through the media of air to the cooking vessel for normal or fast cooking, and permits frying of foods. Although more expensive initially, this type of pebble bed cooker may become more popular, due to high cooking temperature and speed.

The social acceptance has been proven for these electric cooking technologies under a subsidy, although, it is clear that if the subsidized cost is higher than that of fuelwood then users will most likely revert back to using traditional fuelwood chulo. However, when opportunity cost of labour is high, say due to agricultural diversification, electric cooking may be acceptable without subsidy.

Electric Transportation Systems

Another example is the use of ropeways and trolley buses in local transport, to provide the necessary link to the markets for the inter-regional and local trade. In general, hydro-electricity may also be integrated with transportation sector, through electric battery vehicles, ropeways, trolley buses, trams, and electric trains. This will reduce the dependence on imported oil, and reduce the

transportation costs considerably. The implication to the urban environment will be great, particularly, where there is severe congestion and over-crowding. The use of public transportation in urban areas such as, Kathmandu, can dramatically improve the city environment.

The most important physical characteristics of the hill and the mountain regions is inaccessibility, as it results from the rugged terrain and the complex river system. Thus inaccessibility results in lower productivity in agriculture, because of inputs constraints, which when coupled with population pressures leads to unsustainability. Therefore, priorities given to the development of hill and mountain roads is obvious, although the capital investments required for the roads are very high. The infrastructure development imperatives for attainment of sustainable mountain agriculture has already been indicated elsewhere (B. Bajracharya,1992). The transport infrastructure opens up the area for transfer of modern technology (HYVs), new market openings, new opportunities for capital formations and human resource development.

Given the large investments and high repair and maintenance costs associated with roads transportation, and also the incidence of environmental problems associated with roads construction techniques presently prevalent in the country, it appears that alternative modes of transportation are more effective in terms of initial investment and maintenance. For example, it is noted that, roads have to, more or less, follow the contour lines between two towns in the hills. The length of the roads is about 8 or 9 times longer than a ropeway line between the two points separated by a fair distance. The advantage of the ropeway is that it can be powered by hydroelectricity, which is abundant in the hills and the mountains.

The hydel development can very well complement the development of electric road transportation, such as trolley buses, electric trains, and electric rope-way transportation. The later is more attractive for areas where roads are either uneconomical or undesirable (as in trekking and recreational areas). Thus there are a number of areas such as ropeways, electric trams and trolley buses, battery operated vehicles, electric batteries and a host of related technologies (such as tunnelling and manufacturing of rock blasting materials) which may be beneficially transferred to Nepal. There has yet to be a clear analysis of technology transfer policy in this area, although it may be added that savings in terms of the foreign exchange of imported petroleum fuels (which will be replaced by electricity based transportation) alone would make it worthwhile for Nepal. Some research and development is also warranted in this area, particularly as it relates to down scaling of certain technologies, such as ropeways and tunnels, and of adapting modern technologies of manufacturing explosives for tunnelling.

Use of electrically pump for transportation of water (irrigation) during the day and during the night during the off-peak times are beneficial, specially in the context of cash crop development through provision of irrigation water (e.g. sprinkler for cardamom growing in Ilam). The cost advantages are high, for already electrified areas, specially if one compares electric pump with the diesel/ kerosene type of installation. In remote areas, in the hills with large porter transportation, small and medium hydro are quite cost effective compared to diesel/kerosene pump sets in terms of operation and maintenance costs and also in terms of the initial outlays.

Energy Intensive Industries

The possibility exists to manufacture and export energy intensive goods, such as special steels, aluminum, calcium carbide, and a number of chemicals, such as, sodium hydroxide and sodium carbonate. The value additions from hydro-electricity in these industries far exceed the cost of electricity, so that these industries are highly profitable. More importantly, this allows Nepal to fully capture, the potential comparative advantage of cheap hydro-electricity, through value addition in industrial activities within the country. Needless to say, the multiplier effects will promote industrial growth as well as growth of other sectors, such as service sectors. This allows Nepal to move away from the situation of singular dependence on India for exports of hydropower. It should be clear that, export of "raw electricity" means that Nepal is exporting her "comparative advantage" to India; the multiplier effects also go to her, with no means to capture them again.

The energy intensive industry technologies such as those used in manufacture of high energy compounds (e.g. calcium carbide), high energy and high purity metals (e.g. aluminum, copper, zinc, magnesium, titanium) and alloys (alloy steels, electrically produced), fertilizers, paper and pulp are candidates for development and technology transfer. There should be a deliberate policy to promote these, and electricity supply to these industries should be at cost, so as to exploit the comparative advantage, Nepal has.

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Highlights on Science and Technology and Its Role in Today's World

- Prof. Dr. Pramod Kumar Jha*

Science and Technology evolved with evolution of human civilization. Man marched through the Stone Age to bronze, to iron and to information and technology age. Today, he has emerged as a mighty species because he developed science and technology.

The industrial setting started after 1850. The simple appearing technologies today were the seeds of industrial revolution. For example: The Singer Sewing Machine became available in 1851, the bicycle without ball bearings started in 1877 and pneumatic tyres in 1888; Benz motorized tricycle run at 7 miles / h in 1978; Light weight high speed petrol engine was invented in 1885, etc. Today, we talk about human cloning, new sources of energy, life at other planets, biotechnology to increase productivity and control diseases.

There are five major driving spheres that play major roles is designing the present and future of all countries.

(i) Political sphere (to look for peaceful solution to conflicts).
(ii) International sphere (globalization of national economies).
(iii) Technological sphere (emergence of hi-tech information, communication, materials, biotechnology).
(iv) Environmental sphere (global change seems to threaten the system).
(v) Strategic sphere.

Out of these five spheres, technological sphere has emerged as a very strong factor influencing all other spheres.

Success Stories of Countries through Science and Technology

Today, the world is categorized as developed and developing countries. The major basis of this categorization is economy and base of science and technology. One can see a strong correlation between use of S & T and economy of the country, and all developed countries have strong base of S & Tit is now evident that the countries that adopted strong S & T policies developed faster. A few examples are as follows:

- Peter was born in 1672 in a royal Tsars family in Russia, and throned at the age of 10. He made several celebrated pilgrimages to Western Europe. Seeing the effect of technology while there, he was convinced that this would make a positive impact on the lives of his people at home. Making a determined effort, he sent several of his countrymen to Western Europe to study and acquire skills. He also brought experts from Western Europe and ensured that these helped to diffuse the technology in Russia. So great on impact did technology bring into the lives of the people that he earned the veritable title of Peter the Great. He transformed Russia within a couple of decades (Roberts 1990). It is said that developing countries need many people like Peter the Great.

  Today, Japan is a super economy power. After the second world war, Japan vigorously set policies and programme to import, acquire and promote manufacturing technologies for the improvement of the economy (Jain 1994).Accordingly, it is said that between 1956 and 1978 Japan spent about US $ 9 billion to arduously acquire technologies from the USA that cost a staggering US $ 1 trillion to develop (Abiodun 1994).

India set a clear science policy within the first decade after independence in 1947, and offered a good condition service to scientists, honored position, and also associated indigenous scientists with formulation of national policies. India has already attained food sufficiency and became industrial power with impressive manufacturing abilities ranging from computers to satellites and rockets.

Brazil is another economy that has benefited enormously from the fruits of its science and technology efforts. The country has acquired high tech manufacturing capabilities in air craft and other areas, while it is also building its capacity in new and emerging technologies, including biotechnology, space technology, computer manufacturing. Indeed, in the manufacturing of certain type of military helicopters, Brazil also tops the world.

China has also made a tremendous progress in science and technology and developed capabilities today of manufacturing satellites, electronic equipments, laser and optic technologies, etc. Most of there technologies have been imported from the west, then modified, internalized and adapted to blend with the indigenous knowledge.

* Head, Central Department of Botany, Tribhuvan University, Kirtipur.

Upto the end of 19th century the countries now regarded as developing market economy countries accounted for about one percent of world's industrial output. By the end of the twentieth century there was a sharp change in the distribution of world industrial output, and developing countries now share more than twenty percent.

The world Bank estimates that seven of the ten largest economies in the world by the year 2020 will be in Asia: China, Japan, India, Indonesia, South Korea, Taiwan and Thailand. Few decades back these countries were known to have poor policies, low discipline, high level of corruption, and with its people disregard wealth and material concepts. These Asian countries have done miracles with the help of science and technology.

Views of the West on S&T

While the developing economies have worked hard to acquire the technological advances of the west with varying degree of success, countries of the west have continued to work with rigor in the pursuit of scientific excellence .And frontiers of knowledge have continued to advance. Today, technological innovations double every 18 years (Moore's law).

The west is proud of its S&T success, and rightly. So a British national clearly echos this with the remarks: Engineers are our life blood. Every one knows that we are an industrial country. Our wealth is based on adding value to our raw materials. It is clear that S&T is a number one priority in the industrially developed countries.

S & T Indicators:

The most relevant indicators of S & T capabilities are:

(i) Per capita Gross Domestic Product.
(ii) Exports of manufactured products.
(iii) Percentage of Gross National Product to R & D.
(iv) Scientists and engineers engaged in R & D.
(v) R & D personnel in higher education.
(vi) Third level (Tertiary level) S & T students.
(vii) Potential number of scientists and engineers.
(viii) R & D personnel in industry as a percentage of total R & D personnel.
(ix) Number of patents and inventions.
(x) Number of scientific publications.

Based on the above indicators, developing counties are categorized under three major groups. (UNESCO 1992)

Group A: Countries with no or very poor S & T base :

Very low income per person,
A share of less than 0.3% of GNP devoted to R & D,
Less than 200 third level students per 100,000 inhabitants
Less than 20,000 potential scientists and engineers,
Less than 100 R & D scientists, engineers / million populations,
In many cases information on S & T is lacking.

Group B: Countries with Fundamental Elements of S & T base.

Income between US $ 200 and 900/person.

Devote more than 0.4% of their GNP to R & D.

Between 20,000 and 80,000 potential scientists and engineers.

Between 100 and 250 R & D scientists and engineers /million .

Between 200 and 900 third level students/100000 inhabitants.

Group C: Countries with an established S & T base.

Already acquired a relatively significant S & T base.

Above the group B indicators.

Group D: The Industrialized countries with strong S & T base:

Nepal falls under the group A.

India and China falls in group C. China and India are sometimes unclassifiable and call for a special group.

Role of S & T in Today's World

Science and Technology have played an instrumental role in improving the living condition in almost all countries, but the benefits have not been harvested maximum by all the countries. It is true that S & T are making our lives healthier, easier and more comfortable. In the last five decades tremendous development occurred in almost all fields of life, health, education, communication, energy, agriculture, industry, etc. (Table 1).The global economic output increased 17 fold in 20th century, and almost eight fold in the last five decades. Life expectancy has increased, literacy and education level has increased, agriculture production and productivity increased, and miracles happened in communication and transportation sectors, Today, one in 30 people in the world have access to internet. In spite of all these achievements, the world is still not free from hunger, disease, pollution, illiteracy and poverty. Still 20% of world's population is hungry and malnourished and lack access to clean water, decent house and health care. 1.3 billion People are still illiterate, and 1.5 billion people have a very 1ow per capita income of no more than $ 1 per day. The gap between rich and poor has widened in the last few decades. According to WHO, each year, at least 10 million of the desperately poor die prematurely of malnutrition increased susceptibility to infectious diseases, drinking water.

Government can make an impressive change in the twenty first century with the help of S & T. Science and Technology obviously cannot solve all problems, but can play a decisive role in extending the range of options. The health and relevance of the S & T base turn out to be especially important.

Governments of seven largest economy of west spend a large proportion of R & D budget for military (36%), and insignificant in agriculture (3%), social development (1%) and environmental protection (1%).Increase in R & D budget in agriculture, social and environment sectors can minimize the problems significantly in the twenty first century.

Table 1. Changes in different sectors during 1950-2000

Indicators	1950	2000
Agriculture		
Grain harvest (mill ton)	631	>1900
Fertilizer Use (mill ton)	14	143
Export of pesticides (bill $)	< 1.0	>12.0
Energy		
Coal consumption (mill ton oe)	1043	2146
Oil	436	3200
Natural Gas	187	2301
Nuclear Power (gigawatt)	<1.0	345
Wind energy (mw)	<10 (1980)	13040
Production		
World Paper Production (mill ton)	77(1961)	294
World Paper Production (kg/person)	25	50
World automobile Fleet (million)	5.3	540
World bicycle production (mill/yr)	8	39
Telephone lines (mill)	89(1960)	>1000
Economy		
Gross World Production (total trillion $)	6.3	40.5
Gross World Production (Per Person $)	2525	6757

Source: WWI 2000, 2002.

S & T in Nepal:

Nepal is a developing country endowed with natural resources but could not get much success in harnessing benefits of natural resources as well as S & T. Human Development Report (2004) places Nepal in the Medium Human Development category (140th position out of 177 countries) (Nepal was in the low human development group in the last years). Most of the indicators reveal poor condition (e.g. GDP $ 230/person in Nepal, for developing countries $ 1264, $ 516 for South Asia, and for low human development countries $ 322; life expectancy Nepal 59.6 yr, developing countries 64.6 yr, developed countries 77.4 yr; public expenditure on education in 1999-2001 was 3.4% of GDP, many countries spend more than 5 %).

Nepal falls under the S&T Group A, having poor S & T base. Country spends 0.3 % of GNP for R&D, and major population of S&T personnel are neither happy with the existing scenario nor contributing to their capacity. As a result, country could not harness the benefit of S & T to the desired level. There are several reasons for poor performance. A few are as follows:

- S & T personnel and infrastructure inadequate outside Kathmandu valley.
- While developing economies have thirty scientists or engineers to every 10,000 people, Nepal has less than 5 scientists or engineers.
- The major issue for Nepal is not merely to train the S & T personnel, but to use them effectively and keep them in the country. The challenge is to maintain/develop their motivation to work for the nation.
- Transfer of technology was either inadequate or improperly done.
- Nepal has not pursued a determined path to harness the benefits of S & T for uplifting the quality of life of her people.
- Nepal's people have a general lack of appreciation of the contribution that S & T can make to economic development.
- Many of the scientists and engineers we now have in Nepal have their talents barely recognized properly by Nepal's leaders and society.

Table 2. S & T scenario of Nepal (Annual enrolment in Nepalese Institutes)

S&T		1997-98	98-99	99-00	00-01	01-02	02-03
Engi.	B.E	216	312	360	412	404	
	M.E	37	60	43	67	106	

Agriculture B.Sc. (Ag)			116		136	150	135		100
	M.Sc. (Ag)		19		40	40	39		47
Medicine (MBBS)		96		155	167	178		182	
	(PG)		70		66	73	72		115
Forestry (B.Sc)			60		61	10	59		58
	(M.Sc)							14	
Science & Tech (B.Sc)			1700		2568	1624	1905		1889
	(M.Sc.)		863		1077	697	690		702
Total	(Bachelor)		2196						2633
	(Masters)	1026						984	
Total	(B+M)		3222				3617		

Policy challenges:

- Realize a need of change at all levels.
- Invest adequately in S & T sector.
- Strengthening strong education system.
- Providing internet access to S & T Institutions and personnel.
- Develop capacity to adapt existing technology.
- Develop sectoral strategies and implement effectively.
- Give continuity to the S & T processes.
- In order to utilize S & T to achieve economic development, Nepal needs to emphasize on science education. In faces the above challenges, the government has a great role to play.

We still have a long way to go. The present seminar is thus a wake up call to all of us.

Comments on the paper entitled "Highlights on Science and Technology and Its Role in Today's World"

- Prof. Dr. M.B. Gyawali*

Let me start by appreciating the endeavor of Ministry of Science and Technology for organizing such a important Seminar on "Science and Technology and It's Role for National Development" and congratulating Professor P.K. Jha for his thoughtful and lucid presentation of "Highlights of Science and Technology and It's Role in Today's World".

Chemistry Nobel Prize winner Ahmed H. Zewail lis four factors for unsatisfactory pace of progress his developing countries- (a) high rate of illiteracy reflecting the failure of education system and subsequently resulting in alarming increase in unemployment, (b) limited use of human resources largely due to hierarchical dominance, strong seniority system and centralization of power all cumulatively suppressing collective human thought and stifling human potentials, (c) the mix-up of state laws and religious beliefs causing confusion and chaos through the misuse of religion's fundamental message about the ethical, moral and human ingredients of life, and (d) lack of coherent vision for science and technology. Let us try to see what type of vision we have in the field of science and technology. It would be fair to say that modern science entered in our country with the introduction of Intermediate Science Education in Tri-Chandra College in 1919. Since then, a number of scientific institutions have been established. They include Research Centre for Applied Science and Technology (1977), National Council for Science and Technology (1977, now dismantled), Royal Nepal Academy of Science and Technology (1982) and Ministry of Science and Technology (1995). We have Tribhuvan University, Kathmandu University, Purbanchal University, Pokhara University, B.P. Koirala Institute of Health Science and National Academy of Medial Science delivering higher education in the area of science and technology. Several government laboratories and departments such as National Agricultural Research Centre, Department of Forest Survey and Research, Department of Irrigation, Department of Hydrology and Meteorology, Department of Plant Resources, Department of Geology and Mines, Department of Soil Conservation, National Bureau of Standard and Metrology, Food Research Lab, Department of Wild Life Conservation, Department of Drug Administration etc. have come into existence. Several policies and acts related to science and technology such as the Five Year Plan (starting from 1956), Industrial Enterprise Ace and Industrial Policy (1992), Foreign Investment and Technology Transfer Act (1992), National Science and Technology Policy (1989), Information Technology Policy (2000), National Biotechnology Policy (forthcoming) and others have also been put forward. Against this background, we have to ask what is the state of science and technology in our country.

Needless to state that a nation's development and prosperity are judged to a large extent by the status of science and technology of that country. A scientifically unsophisticated society means virtually underdevelopment in all sectors. This is evident from the fact that the countries that invest substantially in research and development activities such as Japan (3.12% of GDP), USA (2.65% of GDP) and others are in the highest echelon of development whereas country such as Nepal that invests just 0.34% of GDP remains in the lowest ladder of development. Therefore the lawmakers are well advised to increase R/D share of budget pie if Nepal is to progress fast.

Teaching institutes play a key role in producing well qualified manpower in S/T sectors. What is the state of our teaching, learning and research activities of our university? There are some good points. Our graduates are internationally sellable in reputed foreign universities and research institutions which show that we are doing alright in basic teaching. Some of our faculty members are doing a good piece of research work as evidenced by their publications in journals of international repute. Talking of Tribhuvan University, research infrastructure of central departments of profusely upgraded, thanks to World Bank assistance despite this, several issues can be raised. Our Ph.D. program is very weak, without a sound Ph.D. program research cannot be sustained in the country. Furthermore, programs designed to enhance teacher's ability, motivation and confidence seem to be lacking. Although a few scholarships for Ph.D. program are available for teachers, it is still a far cry for most of our teachers. A few of our young teachers are talented and fortunate enough to go to abroad for higher studies. But chances of their return and serve the country after completion of their studies are becoming more and slimmer. They feel that they cannot quench the thirst of doing innovative research in their country due to lack of research environment. Some complain that their expertise and skill are not recognized in there country. Brain drain has become a real problem. The other side of the coin is equally interesting. Young people who have

* Executive Director, Research Centre for Applied Science & Technology.

done Ph.D. and excelled in research do not get job or become part timer for a long period of time. We lack administrative mechanism to retain good people.

Motivation runs very low among scientists. Budget for scientific organizations is being irrationally cut down. Social prestige and fringe benefit from scientific work are not comparable to the bureaucrats and bankers. Scientists are therefore lured into executive posts. Inadequacy of promotion mechanism in R and D sectors needs special mention. Scientists are frustrated by the lack of career development mechanism. An old study has shown that in a government lab, a scientist gets promotion in 14 years of service. Job description of scientists is also some time faulty. What purpose will be served by transferring a scientist who has worked years on medicinal plants to supervise the work related to mines and geology?

One another point I would like to raise over here is that there appears to be minimum involvement of business community and entrepreneurs in R and D activities. Whatever R and D work we have done in the lab has not come out of the lab. Scientists lack entrepreneurial skill. Business communities do not have dialogue with scientists. What can be done in such situation? One approach will be to establish technology incubates. The incubator will have a technological laboratory acting as a source of innovations, investment fund for seed capital and incubating facility located next to the laboratory. The IT Park in Banepa is expected to play the role of some sort of incubator.

Our economist friends usually remind us that in the sixties, Nepal and South Korea were almost in the same level of development. Where has Korea reached today? My Korean friends have time and again stated that among others, two things really stand out as the major factors in Korea's success story - heavy emphasis on S/T and quality educations. Our policy makers would be well advised to look into the Korean model. These are some of my feelings. I know very well that I have not touched upon many relevant issues. Nevertheless, I would like to thank the august audience in this hall for their patient listening.

Role of the Ministry of Science and Technology with other Ministries and Its Line Agencies

- Dr. Shom Pudasani

Introduction

Humanity has made a tremendous advancement in the field of sciences and technologies in the twentieth century and the progress is likely to be even more spectacular in the twenty first century. Many countries, particularly those in Western Europe and North America and Japan, were able to take full advantages of the modern scientific and technological innovations earlier on and rapidly develop their nations and enhance the standard of living and quality of lives of their peoples. By now many other countries in Asia Pacific, Latin America and Eastern Europe have also made significant headways in the field of poverty reduction and socio-economic progress through the development, adaptation and utilization of modern and indigenous technologies. Our two big and friendly neighbors, China and India, are also rapidly progressing in the field of socio-economic development through the utilization of appropriate modern and indigenous technologies as well as impressive development in trade and commerce. A bunch of the so called Least Developed countries such as Nepal is still in a high poverty and low development trap and they will have to take due advantage of scientific and technological innovations to jump out of the trap and make necessary progress in socio-economic development and poverty reduction without further delay.

While the level and quality of technological development, adaptation and utilization is rather meager, Nepal has made some efforts to upgrade it in various sectors by research, adaptation and transfer from outside with a limited success. However, what ever has been achieved is grossly inadequate and represents only a very small tip of the gigantic scientific and technological iceberg and a lot needs to be done in a much faster pace if we are to alleviate poverty and raise quality of life of the people, particularly those belonging to disadvantaged groups and backward regions.

In view of the need, Nepal has established institutions such as the Royal Nepal Academy for Science and Technology (RONAST), the National Agricultural Research Council (NARC), the High Level Commission for Information Technology (HLCIT), the Alternative Energy Promotion Center (AEPC). In addition, the Government of Nepal also constituted the Ministry of Science and Technology (MOST) in 1996 (BS 2053) to effectively deal with issues and institutions concerned with science and technology. The key objective of this paper is to highlight the roles MOST may play to develop and promote science and technology together with other line Ministries and their agencies. The objectives set by the Tenth Plan and the mandates of MOST constitute the basis for delineating the role of the Ministry.

National Development Objectives

The ongoing Tenth Development Plan (2002-2007) emphasizes on the need to achieve GDP growth of 7 percent during the plan period and the "following consecutive two plans in order to reduce the number of people living below poverty line to 10 percent by 2017" from over 38 percent in 2004. Given that the rate of growth of GDP was 3.6 percent against the target rate of 6 percent during the Ninth Development Plan, it is stressed that a significant increase in productivity and productive capacity will have to be attained to ensure that the targeted rate of GDP growth is achieved in the Tenth Plan and beyond. The four key strategies of the plan emphasizes on (1) a high, sustainable and broader economic growth with focus on agriculture, forestry, industry and water resources; (2) social sector and infrastructure development with due focus on education, health and drinking water; (3) targeted programs to empower and enhance "the welfare of vulnerable, disadvantaged and exploited groups" and (4) good governance " to produce result-oriented and effective management of service delivery and implementation of projects/ programs ". The Tenth Plan stresses that the " use of science and technology should focus on fulfilling basic needs, alleviating poverty, promoting income generating activities, generating employment opportunities and conserving natural resources and environment and maximizing their utilization".

The Tenth Plan enlists six strategies for science, technology and alternative energy chapter as follows:

- *Ensuring maximum utilization of available resources and means in the science and technology sector and to arrange additional infrastructures and institutions as per the need.*
- *Developing and adopting appropriate technology through the mobilization of private sector in the development of science and technology and import of appropriate technology.*
- *Developing of mechanism to conduct research and development activities in a competitive manner among individuals, communities and institutions engaged in science and technology.*

- *Contributing in the socio-economic development of people through the development of knowledge and skills in the science and technology sector and sustainable use of natural resources and means.*
- *Encouraging universities, concerned institutions and individuals in scientific researches and generating high-skill scientists by giving special priority to science and technology in the higher-level education.*
- *Expanding and developing water and metrological services.*

Nevertheless, it may not be out of the context to note here that the ongoing almost 10 years old conflict initiated by the Maoist in 1996 is the biggest threat to peace, security and development and it is important that our development initiatives addresses the root causes of the conflict. It is now well accepted that inequalities coupled with poverty are at the very root of the conflict. The Poverty Reduction Strategy (PRS) adopted by Nepal "identifies social exclusion as one of the fundamental development challenges" and absolute number of poor has increased since mid-1980 and income distribution have become unequal in the country (World Bank). Also, poverty incidence in remote districts of Far Western and Mid-western is as high as 70 percent while it is 55 percent in the mountains, 44 percent in rural areas and 25 percent in urban areas. The inequalities are long standing and are economic, social as well as political. Women, Dalits, Janajatis and those living in backward areas; particularly remote districts in the far western and Midwestern development regions, have suffered the most from inequalities and lack of opportunities. Bad governance; including widespread corruption and nepotism, largely subsistent economy and slow growth, poor resource base, illiteracy, poor health, poor infrastructures and inaccessibility, superstitions and harmful cultural traditions have been among the critical constraints to overcoming the problems of poverty and inequalities. All the development efforts, including science and technologies, will have to be directed to effectively address the root causes.

Mandate of MOST

The Ministry was created in 1996 (BS 2053) with the following three objectives (MOST):

- *Contribute to the national poverty alleviation efforts by identifying and developing new technologies through promotion and development of research activities.*
- *Develop and promote indigenous technologies.*
- *Encourage intellectuals engaged in science and technologies by creating appropriate opportunities for them.*

The programs to be handled by the Ministry were listed as follows:

- *formulation and implementation of policy, plan and program*
- *recording, analysis and research progress*
- *alternative energy development*
- *contact and collaboration with universities*
- *production, supply and management of scientific materials*
- *survey and data collection of modern technologies*
- *national, regional and international conferences, seminars and meetings*
- *bilateral and multilateral agreements and understandings*
- *contact with international institutions*
- *serve as contact Ministry for RONAST and HLCIT*

The following institutions are directly under the jurisdiction of the Ministry:

- *National Information Technology Center (NITC)*
- *Alternative Energy Promotion Center*
- *Water and Weather Science Department*
- *National Forensic Science Laboratory*
- *B.P.Koirala Memorial Planetarium, Observatory and Science Museum Development Committee*

The Ministry has two divisions under it: (1) Planning, Evaluation an Administration Division and (2) Science and Information Technology Promotion Division. A total of 57 staff works in the Ministry and the total number of staff under the Ministry and agencies under it is 287.

List of Tasks and Role

Concerning its role the Tenth Plan states "with the objectives of helping people to uplift their socio-economic condition, the Ministry of Science and Technology will play a role of promoter and facilitator, and will provide necessary guidelines to ensure qualitative development of research institutions. It will also extend cooperation to various institutions involved in research and

development activities, like universities, council and academies. It will help coordinate between national and international institutions, enhancing institutional capacity and effective mobilization of resources".

In view of the review of the Tenth Plan and the mandate of MOST, a broad range of tasks and roles to be played by the Ministry emerges, which is listed as follows:

1. Awareness creation, information and communication
2. Motivation, promotion and facilitation
3. Technical assistance, issuance of guidelines, backstopping and feedback
4. Human resources and institutional development
5. Coordination and collaboration
6. Strategy and plan development
7. Promotion of regional and international cooperation and understanding
8. Bilateral and multilateral agreements to enhance scientific and technological innovations
9. Updating National Science and Technology Policy
10. Expanding utilization of information technology(IT) to schools, VDCs and general public
11. Improving and expanding the utilization of indigenous technology
12. Updating laws concerning IT and other technology
13. Promoting e-governance, e-education and e-commerce
14. Mobilizing and supporting the private sector for scientific and technological development, promotion and utilization
15. Protecting intellectual property rights
16. Minimizing brain drain by arranging attractive programs, facilities, incentives and environment to retain and use scientists and intellectuals within the country
17. Develop and promote appropriate technologies to reduce the burden and drudgery of rural folks and women's household chores
18. Integrating appropriate science and technology education in school and higher level education
19. Promoting alternative energy technologies such as biogas, water mills, improved ovens, wind energy, solar electricity
20. Managing transfer of appropriate technologies to the country
21. Supporting research and institutional development; including biotechnology and genetic engineering
22. Establishment of Biotechnology Research Centre
23. Establishment of Rural Energy Fund
24. Supporting the establishment of National Space Center and upgrading of National Forensic Laboratory
25. Support to the establishment of IT Parks and information highways.

Broad Roles

Given the mandate, its limited capacity and existence of a number of institutions dealing with scientific and technological concerns in both the public and the private sectors; the MoST will have to prioritize and specify its roles based on its comparative advantages and national development priorities. It is suggested that the Ministry might wish to concentrate on the following four roles, which are presented only in nutshells and will have to be elaborated and worked out in detail once the roles are agreed by the concerned authorities in principle.

1. Vision Building and Policy Leadership:

One of the most critical roles for the Ministry to play would be to map out a longer term vision or strategy in scientific and technological development, adaptation, transfer and utilization that could guide government agencies, NGOs, private sector and educational institutions to enable Nepal achieve the millennium development goals (MDGs) by 2015 as set by the UN member states in 2000 or help Nepal reduce poverty to 10 percent by 2017 as stated under the Tenth Plan or development of even a longer and more realistic "Science and Technology Vision 2025" to achieve developmental and Scientific and technological goals decided in consultation with all stakeholders. The Vision could clearly suggest a broad range of research activities to be conducted by various institutions, development of IT Parks, IT based industries, export of IT based goods and services, computerization of local and national government agencies, establishment of planetarium and space center, role of private sector in R and D etc. Also, in close collaboration with the National Planning Commission (NPC) and other relevant partners, the MoST will have significant roles to play to formulate effective short and medium term policies to support timely implementation of the Vision and provide necessary policy leadership to all the stakeholders.

2. Coordination and Collaboration:

In the absence of systematic and effective coordination, the scientific and technological work conducted by Line Ministries and other agencies is hampered due to duplications, omissions and neglect. The MOST could shoulder the coordination responsibility so far as research, scientific and technological components are concerned. For the purpose, "A High-Level National Science and Technological Council" and "A Coordination Committee" as proposed under the Tenth Plan could be established under the leadership of the Ministry. The High-Level Commission for Information Technology (HLCIT) established with a broad mandate "to provide strategic policy direction and support to the government" in Information and Communication Technologies (ICTs) could be considered for integration into the MoST for better policy coordination and cost effectiveness. RONAST and the Ministry need to review their programs, roles and responsibilities to enhance coordination and effectiveness. Concerning coordination with other Line Ministries, it should first focus on the Ministries and agencies identified as most crucial for achieving poverty reduction and other important goals stated in the Tenth Plan. Based on the criteria, agriculture, education, health, water resources, local development and environment sectors might turn out to be priority agencies for MOST to initiate coordination.

The Ministry should strengthen its collaboration with regional and international organizations. The role will include signing understandings and agreements with regional and international organizations concerning science and technology and organizing conferences, seminars and meetings. In addition, transfer of technology from other countries to Nepal and exports of scientific and technological materials and services; including IT, might be important aspects of collaboration with other nations. MOST should also collaborate with Line Ministries, Universities, NGOs and private sector on important scientific and technological initiatives; particularly on those initiatives in which the other national institutions may have comparative advantages.

3. Information, Facilitation and Promotion:

The Ministry, particularly the Science and Technology Information Center will have to be adequately pro-active in providing information on appropriate indigenous and modern technologies to all the relevant stakeholders. Provision of guidelines and information on the type of useful R & D that could be undertaken and information on funding sources and markets would be very helpful. This will include responses and feedbacks on queries and concerns they may wish to clarify time to time. In addition, the Ministry will have to earnestly promote suitable technologies and facilitate their adoption by creating conducive environment and arranging proper incentives. Information on how to network and exchange experiences among like minded national and international institutions would be valuable. Tax breaks, lower import duties, fair and transparent laws, rules and regulations will be critical for the purposes. The Ministry may have to establish a proper data bank and documentation center to ensure effective information and promotion functions.

4. Human Resource and Institutional Development Support:

Availability of quality human resource and functioning institutions are critical ingredients for successful development and utilization of science and technology to meet the national development goals and enhancing the quality of life and standard of living of the Nepalese people. The Ministry will have to review and assess human resources and institutions currently available and support Line Ministries, Universities, NGOs and private sector to bridge any gaps between availability and the identified needs. It needs to play important role to ensure to the maximum possible extent that scientists and relevant intellectuals are properly employed and receive due incentives and recognition so that large scale brain drain and their genuine frustrations can

be minimized. The Ministry may be able to carryout only a small fraction of human resource development by itself. Thus, it will have to play a supportive role in encouraging and facilitating the human resource development initiatives of universities, line agencies, private sector and other relevant institutions to meet the increasing and changing human resource needs in the country.

Some Issues:

The Ministry of Science and Technology is relatively new and has limited capacity and resources to effectively handle a vast field such as science and technology. Consequently, it must be strengthened by following a two prong strategy. First of all, its organizational structure, quality and number of manpower, and capacity must be assed and necessary improvements must be undertaken. Establishment of a sound Science and Technology Division with adequate number and type of professional manpower will be critical for effective implementation of the four roles explained above. Secondly, it mandate; including the specific scientific and technological areas for which it is directly responsible and for which it is expected to play coordinating and collaborating roles should be clarified so that it does not over stretch itself and unnecessarily step on the toes of others. Coordination of activities of other line agencies by a sectoral Ministry such as MOST is likely to meet resistance from the others and thus would require due sensitivity on the part of MOST and its ability to be beneficial to them in terms of technical, financial or other assistances.

It is already the time for Nepal to start making serious and maximum efforts to benefit from information revolutions by expanding the use of information technology up to VDCs and creating an appropriate environment for exports of IT based materials and services. We may be able to learn and benefit from the experiences of India and others in developing IT sector in Nepal as we now have a critical minimum mass of computer savvy population in the country. A broad based computer education and expansion of internet could play a critical role in enhancing communication and information accessibility in a difficult terrain of the country. Nepal is believed to have over 100,000 computers already in use and interest in computer and IT technology is expanding rapidly among young, educated and school/ college going population as well as general public. MOST should take a lead in encouraging individuals and institutions to expand the use and export of IT technology with the involvement of all the relevant stakeholders, including the private sector.

Our government offices are now beginning to have computers but they are inadequate on the one hand and either unutilized or used only for typing on the other. MOST in collaboration with private sector may move forward the idea of e-governance, in which computers are increasingly used to deliver information and services in a transparent and efficient manner. Some agencies are moving in this direction. One hears of citizenship certificates in some locations being processed by computers or bank statements delivered by computers or hospitalization records maintained by computers. These are encouraging attempts but needs systematic and dedicated efforts of agencies like MOST to strongly push the process forward if e-governance is to make any significant impact in the near future. The process of e-governance could be effectively initiated in urban areas such as Kathmandu valley, where electricity and other basic facilities are already available, and then gradually expanded to rest of the country.

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Comments on the paper entitled "Role of the Ministry of Science and Technology with Other Ministries and Its Line Agencies"

- Mohan Bahadur Karki*

The paper entitled "Role of the Ministry of Science & Technology with other Ministries and its line Agencies" by Dr. Shom Pudasaini is indeed a very good attempt.

* Secretary, Ministry of Health.

The introductory chapter gives a brief description of the history of Science & Technology in Nepal, comparing it with other countries. Also highlighted in the paper is why Nepal is still a least developed country and how S&T can contribute for national development steps. Establishment of certain scientific institution including MOST as the Apex Body is considered as positive. An overview of the National Development objectives including the 10th Plan has been presented well, making special correction of the GDP scenario. Also broad mandated of MOST is listed vis-à-vis the programmes. What MOST has to focus at is mentioned under broad roles. These are very valid points. The chapter under "some issues" shows how experienced and knowledgeable the author is. Suggestions provided seem to be most practical including immediate attention.

Following additions & comments may be given some thought:

- As weak state of S&T in Nepal is attributed to weak professional organization, these need to be strengthened for confidence building & confronting challenges.
- Scant-realization among the decision-makers & planners that science can be applied for the development & for the survival of human being is another reason for the weak state of S&T in Nepal.
- Another reason for the weak state of S&T in Nepal could be due to the lack of national "think-tank" to undertake policy research & develop strategy etc. in the field of S&T.
- An aware, transparent & accountable administration is a prerequisite for the development of not only S&T but also other sectors in Nepal.
- The wrong thing to do would be to cut back on technology development, cut back on investment in R&D. The right thing to do would be to move ahead and realize that technological development in Nepal is very slow. If we slow down, we will be left behind, we are still far behind.
- There is a need for innovative and flexible administrative system involving financing, staffing, legal sanction & government clearance. For boosting S&T, the bureaucracy has to be S&T friendly.
- The media's role in understanding & supporting S&T is very important. But mostly they have been publishing more spectacular matters only.
- The MOST need to be an Apex Body in the field of S&T.

General Report

The seminar which was held on 23rd Poush, 2061 at Kathmandu was attended by 103 participants including scientists, technologists, and educationists. The seminar was declared open by the Rt. Hon'ble Prime Minister Mr. Sher Bahadur Deuba.

Delivering her welcome address & highlights of the seminar, Hon'ble State Minister Mrs. Pratibha Rana, MOST, said that this seminar is a first attempt by MOST and is very encourageable by the participation of people of diverse field. She agreed that voices of scientist should be heard and emphasized that all think tanks including scientists and politicians should work together for national development. She further added that present seminar is a mile stone in that regard. She also mentioned the need of gender equity in the field of Science and Technology.

High ranking officials of Institutions affiliated & working under the MOST presented there activities & achievements briefly; among them were Dr. Dinesh Bhuju of RONAST, Mr. Atma Ram Ghimire of HLCIT, Dr. Madan Lal Shrestha of DHM, Dr. Madan Bdr. Basnyat of AEPC, Mr. Mahesh Singh Kathayat of NITC, Mr. Sanat Kumar Sharma of BPKMPOSMDB and Mr. Jeevan Prasad Risal of Forensic Lab.

After distributing the prizes, Rt. Hon'ble Prime Minister Mr. Sher Bahadur Deuba expressed, in his inaugural address, his thanks to the organizers for providing opportunity to address the seminar. He noted that the spheres of science and technology are very vast and multi-dimensional, and emphasized that the fruitful co-ordination among concerned institutions and organizations is all more essential while formulating programs and activities. He added that the major functions of Ministry of Science and Technology is importantly related with education, agriculture, information, internal affairs, health, environment and Tourism and appropriate co-ordination system along these ministries is essentially important to save time and avoid duplication. He also urged to the participants to look into shortcomings observed in the past and provide implementable suggestions for policy reformation and institutional promotion.

Expressing his vote of thanks, Dr. Swoyambhu Man Amatya, Secretary of MOST said that MOST is quite aware of the urgent need to develop national scientific and technological capabilities in accordance with the development targets of the country.

Chairman of the Seminar Hon'ble Minister Mr. Balaram Ghartimagar, MOST, remarked that the messages conveyed today in this seminar might be forgotten after the end of the seminar; so attempt should be made to implement the recommendations obtained in the seminar. He asked all the academics and intellectuals to work for the development of Science and Technology in Nepal. He requested for some concrete proposals for this.

Presenting his paper on "Science & Technology" Dr. Dayananda Bajracharya, Vice Chancellor of RONAST, explained the major break through in Science and Technology. He compared science with a two edged sword and said science could be blessing as well as curse depending on its use. He highlighted the need of judicious application of science and technology. He highlighted the digital divide in Science and Technology between developed and under developed countries. Dr. Bajracharya emphasized that Science and Technology cannot be imputed as a commodity but every nation should develop its own Science and Technology. He highlighted the role of development in Science and Technology for economic development of the nation.

Dr. Shankar Sharma, Hon'ble Vice-Chairman of National Planning Commission, presenting his paper "Role of Science & Technology in Poverty Reduction", stated with explaining how technology helped in economic growth (e.g. Industrial revolution, green revolution, medical advancement, etc). He explained the human deprivation in Nepal and highlighted the technology development effort for poverty alleviation in Nepal. He emphasized facilitation of transfer of technology, demand led R&D, appropriate technology, education (higher) etc. He underlined the need of conductive environment for trade and investment, development assistance, government support for new technology. Dr. Sharma highlighted some recent trends related to the improvement of technological absorbing capacity in Nepal. He also mentioned increased focus in education (higher vs. primary) and significant increase in the production of doctors and engineers in the country. Dr. Sharma mentioned that development of several labs and establishment of MOST is a significant steps.

Commenting on the paper entitled "Role of Science & Technology in Poverty Reduction"; Dr. Binayak Bhadra congratulated Dr. S. Sharma for the excellent presentation especially for highlighting what role science and technology can play in poverty reduction. The most important comment made by Dr. Bhadra was that, it is necessary to consider the demand side and the resources (endowments) for the promotion of Science and Technology. He explained the endowments, hydro- electricity, scenic beauty, biodiversity and human resources.

Presenting the paper entitled "Highlights on Science & Technology and It's Role in Today's World" Prof. Dr. Promod Kumar Jha highlighted the success stories of Russia, India, and China in economic development with strong policies in Science and Technology. He also explained how Science and Technology has changed agriculture, energy production and economic sectors of the world in last 50 years. He pointed out that, based on science and technology category, Nepal stands in group A, i.e. group with least Science and Technology development. He emphasized that it is due to less expenditure in Research and Development, lack of infrastructures and expertise. He concluded that for development of Science and Technology there should be up to the level investment in Science & Technology, strong education system and continuation of research projects.

Commenting on the paper entitled "Highlights on Science & Technology and It's Role in Today's World" Prof. Dr. M.B. Gyawali highlighted that slow pace of progress in developing countries is due to under investment in Science and Technology. He also pointed out that there is not only economic divide between developed and developing countries but there are also dividing in Science and Technology. He emphasizes that there should be public understanding of Science and Technology, Entrepreneurship development and should cultivate trust in Science and Technology. He pointed out that research work in Ph.D. and Master's programs is weak in Nepal's Universities which should be improved. Finally, he concluded with what is lacking to link Science and Society in Nepal and recommended to establish National Science and Technology Foundation for fund mobilization in Science and Technology.

Dr. Shom Pudasaini presented the paper entitled "Role of MOST with other Ministries and line Agencies". He started with noting some important aspects of 10the five years plan e.g. GDP growth, poverty reduction and highlighted need to address root cause of conflict (i.e. inequalities, poverty, unemployment). He elaborated 10th five years plan and its relationship with MOST's mandate. Dr. Pudasaini elaborated to great depth broad roles of MOST and emphasized the need to map out "Science and Technology Vision 2025". Further Dr. Pudasaini listed 25 specific roles and tasks of MOST. Among all coordination and collaboration by MOST was greatly emphasized.

Commenting on the paper "Role of MOST with other Ministries and line Agencies", Mr. Mohan Bahadur Karki, Secretary of Ministry of Health thanked Dr. Pudasaini for interesting presentation with practical issues. He highlighted important points of the presentation.

Recommendations

The seminar on "Science and Technology and It's Role for National Development" which was organized by the Ministry of Science & Technology on Paush 23, 2061, brought together a number of prominent scientists, technologist, policy makers, planners and administrators to discuss the issues involved in the field. There were 103 participants from various organizations including government organizations, non-government organizations, Tribhuvan University, Kathmandu University and Royal Nepal Academy of Science & Technology.

The seminar was declared open by the Rt. Hon'ble Prime Minister Mr. Sher Bahadur Deuba. The seminar was concluded with remarks by Hon'ble State Minister Mrs. Pratibha Rana.

After intensive deliberation, the participants agreed to make the following recommendations.

1. MOST as the national S&T policy making body should be strengthened in such a way that its effectiveness is enhanced in every sector of economy.
2. S&T should be included in national education, economy, financial, industrial, agricultural, social, fiscal and other basic national policy and in the related high-level government decision.
3. There is a need to set up separate and specific, legal, administrative, fiscal and institutional machinery required to carry out the process of scientific & technological development.
4. The primary asset for further development and growth, in any country, is the level of education and training of its general population and of its professional and workers, in all spheres of activity. So efforts to raise this level to the maximum should be the highest priority for the government.
5. Government's priorities should include the drawing up and implement of a national plan for the training and employment of scientific staffs at all levels based on real requirements of the country on the continuous basis, at home and abroad, so that the research capability of the scientists and technologists is continuously developed & harnessed.
6. There is a strong need to determine scientific & technological research priorities that are related to national development objectives, emphasis should be laid on goal-oriented research.
7. The total R&D expenditure should reach a minimum level of one percent of GNP by 2006.
8. There is a strong need to establish national laboratory of high quality.
9. Government should take a concrete responsibility in publicizing scientific and technological knowledge through dissemination programmes aimed at the population at large; for this all available means of communication like radio, television, popular magazines and exhibitions should be used.
10. There is a need to strengthen the capacity of scientific & technological research institutions and units for generation, adaptation & assimilation of scientific and technological knowledge, and for the transfer of knowledge to the production sector.
11. There is a need to study the role of new technologies like micro-electronics, bio-technology, information technologies in the development and the impact of their application or the development.
12. There should be a commitment to ensure adequate scale of investment in R&D for the absorption, adoption and wherever possible, improvement & generation of new technologies.
13. Fullest support should be given to the development of indigenous technology to achieve technological self-reliance and reduce the dependence on foreign inputs, particularly in critical & vulnerable areas and in high value-added items in which the domestic base is strong.
14. There is a need to develop a scientific & technological plan on the basis of prospective projection of national needs 10 to 20 years from now & this plan should be subjected to political decision makers at the highest level.
15. Government should evaluate instruments for the implementation of policy and spell out the detail guidelines for ministries and agencies of government as well as for industries & entrepreneurs.

16. Government should consider development strategy based on hydro-power, specially energy initiative industry technologies.
17. S&T should be integrated in the sector of agriculture, medicine, industries, etc. in such a way that it would play a vital role in poverty alleviation.
18. Emphasis should be laid on goal-oriented research so that it will be helpful for poverty reduction.
19. Our directives should clearly define systems of the choice of technology, taking into consideration economic, social and cultural factors along with technical consideration.
20. Emphasis should be laid for the promotion & use of information technology.
21. The science & technology plan should be properly integrated within the national development plans.
22. Taking into consideration, the establishment of MOST, roles, functions and activities of various S&T related organizations should be redefined.
23. MOST should take the coordination responsibility for the research & development activities conducted in various ministries and organizations.
24. MOST should strengthen its collaboration with regional & international organizations.
25. MOST should push the process forward the e-governance to make a significant input in the days to come.

Inaugural Programs

Seminar on
Science and Technology and It's Role for National Development

Venue: Hotel Yak and Yeti

10:15	:	Welcome Address and Highlights of the seminar	:	**Mrs. Prativa Rana,** ***Hon'ble State Minister,*** Ministry of Science and Technology
10:20	:	Inauguration	:	Chief Guest ***Rt. Hon'ble Prime Minister*** **Mr. Sher Bahadur Deuba**
10:25-10:55	:	Brief Presentation:		
10:25	:	RONAST	:	Dr. Dinesh Bhuju, Academician
10:30	:	HLCIT	:	Mr. Atma Ram Ghimire, Member- Secretary
10:35	:	AEPC	:	Dr. Madam Bahadur Basnyat, Executive Director
10:40	:	DHM	:	Dr. Madan Lal Shrestha, Director General
10:45	:	NITC	:	Mr. Mahesh Singh Kathayat, Executive Director
10:50	:	B.P.K.M. Planetarium, Observatory & Science Museum Development Board	:	Mr. Sanat Kumar Sharma, Co-Executive Director
10:55	:	Forensic Lab	:	Mr. Jivan Prasad Rijal, Executive Director
11:00	:	Prize Distribution and address	:	Chief Guest ***Rt. Hon'ble Prime Minister*** **Mr. Sher Bhadur Deuba**
11:10	:	Vote of thanks	:	**Dr. Swoyambhu Man Amatya**, *Secretary*, Ministry of Science and Technology
11:15	:	Remarks and Closing of Inaugural Session	:	Chairman ***Hon'ble Minister*** **Mr. Balaram Ghartimagar**, Ministry of Science and Technology

Seminar on
Science and Technology and It's Role for National Development
(Technical Session)

First Session

(23rd Poush, 2061)

Chair Person: ***Hon'ble Minister*** **Mr. Balaram Ghartimagar**

12:10	:	Science, Technology and Society	:	Presented by Prof. Dr. Dayananda Bajracharya
12:10-12:30	:	Role of Science and Technology in Poverty Reduction	:	Presented by Dr. Shankar Sharma
12:30-12:40	:	Comments	:	By Dr. Binayak Bhadra
12:40-13:00	:	General Discussion		
13:00-13:05	:	Chairman's Comments		
13:05-14:00	:	Lunch Break		

Second Session

(23rd Poush, 2061)

Chair Person: ***Hon'ble State Minister*** **Mrs. Prativa Rana**

14:00-14:20	:	Highlights on Science and Technology and Its Role in Today's World	:	Presented by Prof. Dr. Pramod Kumar Jha
14:20-14:30	:	Comments	:	By Prof. Dr. M.B. Gyawali
14:30-15:00	:	General Discussion		
15:00-15:05	:	Chairman's Remarks		

Third Session

(23rd Poush, 2061)

Chair Person: **Dr. Swoyambhu Man Amatya,** Secretary, MOST

15:10-15:30	:	Role of MOST with other Ministries and It's Line Agency	:	Presented by Dr. Shom Pudasani
15:30-15:40	:	Comments	:	By Mohan Bahadur Karki
15:40-16:00	:	General Discussion		
16:00-16:10	:	Chair Person's Concluding Remarks & Closing of the Seminar		
16:10	:	High Tea		

विज्ञान तथा प्रविधि मन्त्रालयका माननीय राज्यमन्त्री श्रीमती प्रतिभा राणाज्यूद्वारा प्रस्तुत स्वागत मन्तव्य तथा गोष्ठीको औचित्यमाथि प्रकाश

समारोहका सभापति माननीय विज्ञान तथा प्रविधि मन्त्रीज्यू, प्रमुख अतिथी सम्माननीय प्रधानमन्त्रीज्यू, माननीय मन्त्रीज्यूहरू, संवैधानिक अङ्गका प्रमुख तथा सदस्यज्यूहरू, रुडकका अध्यक्ष आरजु राणा देउवाज्यू, राष्ट्रिय मानव अधिकार आयोगका माननीयअध्यक्ष तथा सदस्यज्यूहरू, माननीय उपाध्यक्ष तथा सदस्यज्यूहरू राष्ट्रिय योजना आयोग, श्री ५ को सरकारका मुख्य सचिव तथा सचिवज्यूहरू, महामहीम राजदूत महोदयहरू, वैज्ञानिक विशेषज्ञज्यूहरू, मित्रराष्ट्र तथा गैरसरकारी सङ्घसंस्थाका प्रतिनिधिज्यूहरू, सञ्चारकर्मी साथीहरू, उपस्थित भद्र महिला तथा सज्जनवृन्द,

विज्ञान तथा प्रविधि मन्त्रालयले आयोजना गरेको "राष्ट्र विकासमा विज्ञान तथा प्रविधिको भूमिका" बारेको एक दिने राष्ट्रिय सम्मेलनमा सम्माननीय प्रधानमन्त्रीज्यूले प्रमुख आतिथ्य स्वीकार गरी हाम्रो मनोबल बढाइदिनु भएकोमा सम्माननीय प्रधानमन्त्रीज्यूमा मन्त्रालय र आफ्नो तर्फबाट हार्दिक स्वागत गर्दछु । यसैगरी हाम्रो निमन्त्रणा स्वीकार गरी पाल्नु हुने माननीय मन्त्रीज्यूहरू, संवैधानिक अंगका प्रमुखहरू, महामहिम राजदूतज्यूहरू, तथा सम्पूर्ण अतिथीज्यूहरूलाई पनि हार्दिक स्वागत गर्दछु ।

विज्ञान तथा प्रविधि क्षेत्रको विकासका लागि प्रशस्त ठाउँ रहेतापनि केही वर्ष अघिदेखि नै प्रयास नभएका होइनन् । स्थापना कालदेखि नै विज्ञान तथा प्रविधिको माध्यमद्वारा नेपालको द्रुत गतिमा विकास गराउने उद्देश्य रहेको हो । तर मेरो विचारमा यसले जनमानसमा खासै प्रभाव स्थापित गर्न सकेको छैन । त्यसैले हामीले यस किसिमको एक दिवशीय सम्मेलन आयोजना गरेका छौं । हामीलाई पूर्ण विश्वास छ केहीसम्म भएपनि हाम्रो उद्देश्य परिपूर्ति हुनेछ ।

विज्ञान तथा प्रविधि क्षेत्रको विकासको लागि श्री ५ को सरकारले अनवरत रूपमा प्रयास गर्दै आएको छ । ई.सं. १९८० देखि नै राष्ट्रिय योजना आयोगले यसलाई पाँच वर्षीय योजनामा समावेश गर्दै आएको छ । विज्ञान तथा प्रविधिको महत्व बुझ्ने दूरदर्शी सम्माननीय प्रधानमन्त्रीज्यूकै कार्यकालमा २०५३ सालमा यस मन्त्रालयको स्थापना भएको हो ।

नौ वर्षअघि स्थापना गरिएको यस मन्त्रालयको कार्यक्षेत्र र सम्बन्ध निकै व्यापक र महत्वपूर्ण रहेको छ । २१ औं शताब्दीको चिनारी विज्ञान तथा प्रविधिले महत्वपूर्ण बनाएको सर्वविदितै छ । विकासको मेरुदण्ड बनेको यस क्षेत्रले आर्थिक तथा सामाजिक क्षेत्रमा ठूलो सफलता पाएको कुरा विकसित देश र विकासोन्मुख राष्ट्रहरूले यथार्थमा परिणत गरेर देखाइसकेका छन् ।

यही सन्दर्भमा नेपालले पनि यसको भूमिकालाई महत्वपूर्ण बनाई यस क्षेत्रलाई अगाडि बढाउने प्रयास गरी आएको छ । २० वर्ष अगाडि स्थापना भएको नेपाल राजकीय विज्ञान तथा प्रविधि प्रज्ञा प्रतिष्ठान, धेरै जिल्लाहरूमा कार्यक्रम फैलिएको वैकल्पिक ऊर्जा प्रबर्द्धन केन्द्र, स्वयम् सम्माननीय प्रधानमन्त्रीज्यूले परिकल्पना गर्नुभएको सूचना प्रविधि उच्चस्तरीय आयोग, मौसमको भविष्यवाणी, हिमताल तथा हिमनदीहरूको अध्ययन अनुसन्धान गर्दै विष्फोटन हुनबाट जोगाउने कार्य गर्दै आएको "जलवायु विज्ञान विभाग" तथा नेपालमा पहिलोपल्ट न्याय सम्पादन गर्न ज्यादै महत्वपूर्ण हुने DNA संयन्त्र जडान गरिएको राष्ट्रिय विधि विज्ञान प्रयोगशाला र वी.पी. कोइराला मेमोरियल प्लानेटेरियम तथा अब्जरभेटरी र विज्ञान सङ्ग्रहालय विकास समिति यस मन्त्रालयसँग सम्बन्धित छन् । श्री ५ को सरकारको सबै विभाग र मन्त्रालयलाई निःशुल्क इन्टरनेट सेवा, मन्त्रालयको सूचना प्रविधि केन्द्रले पुऱ्याउँदै आएको छ । Gender Divide नहोस् भनी यस मन्त्रालयको Gender Focal Point ले वैज्ञानिक विशेषज्ञ महिलाहरूको बारे सम्मान स्वरूप Directory प्रकाशन गर्ने कार्य अगाडि बढाइएको छ । साथै पहिलोपल्ट विभिन्न मन्त्रालय र विभागमा कार्यरत महिला कर्मचारीलाई दक्ष बनाउने सोच सहित कम्प्युटर तालिम संचालित गरिएका छन् ।

हाम्रो देश नेपालको भू-बनोटको स्थिति विकासका पूर्वाधारहरूको कमी, आर्थिक अभाव तथा साक्षरताको हिसाबले निकै पछि परेको परिप्रेक्ष्यमा सबैभन्दा छिटो, सरल र खासै ठूला-ठूला पूर्वाधारहरूको जरुरत नभएको सूचना प्रविधि क्षेत्रले विशेष ग्राह्यता पाएमा हामीले विकासको बाटो चाँडै नै ठम्याउन सक्ने छौं भन्नुमा अत्युक्ति हुने छैन । हाम्रो छिमेकी राष्ट्रहरूले यही माध्यमद्वारा State to State, गाउँ-गाउँ, जिल्ला-जिल्लासम्म द्रुत गतिमा विकासको पूर्वाधार खडा गरिरहेको यहाँहरू सबैमा विदितै छ । सहर र गाउँ, शिक्षित र अशिक्षित, गरीब र धनी सबैलाई समेट्ने गरी नयाँ प्रविधि अपनाइरहेका छन् । यही महत्वलाई मध्यनजर गर्दै गत ९ वर्षदेखि नेपालमा पनि विज्ञान तथा प्रविधिको प्रारूप खडा गर्न, व्यवस्थित गर्न तथा व्यापक बनाउनका लागि विभिन्न योजना तथा कार्यक्रम संचालन भएका छन् । समयको माग अनुसार यसमा हामीले हालको अवस्थामा गर्नुपर्ने कार्यहरू धेरै छन् । जैविक विविधता, प्राकृतिक सौन्दर्यता, ऊर्जाको व्यापकता, उर्बरा माटो र राम्रो मौसमले भरिपूर्ण यस राष्ट्रमा विज्ञान र प्रविधिको उपयोग गरी विकासको मुहान खोल्न अति नै आवश्यक भएको छ । हाम्रो कार्यशैलीमा नयाँ प्रविधि र ज्ञानले मान्यता स्थापना गर्नुपरेको छ । हाम्रो उद्देश्य प्राप्ति गर्नका लागि यही क्षेत्रमा दक्ष, लगनशील र अनुभवी विशेषज्ञको संलग्नता गराउन नितान्त आवश्यक भएको छ ।

छिमेकी राष्ट्रहरू र अन्य राष्ट्रहरूमा बजेटको ग्राह्यता, निजी क्षेत्रको संलग्नता, यस क्षेत्रलाई आकर्षक बनाउने नीति र तरीकाहरू अपनाइएका छन् । विदेशी लगानीकर्तालाई समेत विशेष आकर्षण गरिएको छ । यही सन्दर्भमा मेरो डेलिगेसन सहितको भारत (चेन्नाई) को भ्रमणले पनि हामीलाई केही ज्ञान हासिल गर्ने मौका प्रदान गरेको थियो । सूचना प्रविधि कसरी जनस्तरसम्म पुऱ्याउने, IT Park कसरी संचालन गर्ने, विदेशी तथा स्वदेशी

लगानीकर्तालाई कसरी आकर्षण गर्ने भन्ने कुरा बुझ्ने मौका पायौँ । हामीले हासिल गरेको ज्ञानलाई यथार्थमा परिणत होस् भन्ने मान्यता स्वरूप विज्ञान प्रविधि नीति २०६१ ल्याउने तरखरमा छौँ ।

अध्यादेश मार्फत् हालसालै विद्युतीय कारोबार ऐन, २०६१ आएको छ । जैविक प्रविधि नीति तथा E Governance नीति नियमको तर्जुमा हुँदै छन् । नेपाली लिपीमा कम्प्युटर सेवा, सवारी चालक अनुमतिपत्र, राहदानी, नागरिकता आदि अनुमतिपत्र व्यवस्था कम्प्युटरबाटै प्रदान गर्ने कार्य सुरु गरिएको छ ।

बजेटको अभावले गर्दा यथेष्ट जग्गा हामीसँग हुँदाहुँदै पनि वी.पी. कोइराला प्लानेटेरियम भवन निर्माण हुन सकेको छैन । तथापि टेलिस्कोपको व्यवस्था मिलाई तारामण्डल र सौर्यमण्डल अध्ययन अनुसन्धानको क्रमलाई यसै आर्थिक वर्षदेखि अगाडि बढाइएको छ ।

वैकल्पिक ऊर्जा प्रबर्द्धन केन्द्रको सेवा लक्षित समूहसम्म पुऱ्याउनु पर्छ भन्ने मान्यता सहित यसको गठन आदेश संशोधन गरी विकेन्द्रकरणको व्यवस्था मिलाइएको छ । मौसम तथा वातावरण सूचना संकलन गर्न भारतसँग INSAT को सम्झौता भएको छ ।

नेपाली वैज्ञानिकहरूको योगदान राष्ट्रलाई आवश्यक छ भन्ने महसुस गरी रोनाष्टले वैज्ञानिकहरूलाई प्रोत्साहन स्वरूप प्रतिभा पुरस्कारको व्यवस्था गरेको छ ।

बेरोजगारीको समस्याले गर्दा लाखौँको संख्यामा हाम्रा युवा शक्तिहरू पलायत भइरहेका छन् । नयाँ पुस्ताहरूका युवा शक्ति नै भएनन् भने हामीले राष्ट्र निर्माण कसरी गर्ने भन्ने प्रश्न खडा भएको छ । प्रत्यक्ष रूपमा विज्ञान तथा प्रविधिको विकासले दक्ष तथा अन्य युवायुवतीहरूलाई हजारौँको संख्यामा रोजगारी प्रदान गर्ने भएकोले यस क्षेत्रको विकास र विस्तारको लागि विशेष सहयोग प्रदान हुनेछ भन्ने विश्वास राख्दछौँ ।

अहिलेका असहज परिस्थितिमा हाम्रा विकास कार्यक्रमहरूमा बाधा अड्चन आएका छन् । गाउँ-गाउँ र जिल्ला-जिल्लामा चाहेर पनि सुचारु रूपले विकास कार्यक्रम संचालन गर्न कठिनाई छ । तर यस क्षेत्रको माध्यमद्वारा विकास कार्यक्रमका लागि सहर वा सदरमुकामहरूबाटै गर्न सकिने जस्तो हामीलाई लागेको छ । अब हामी तयारी अवस्थामा छौँ । विज्ञान तथा प्रविधि मन्त्रालयको सूचना, शिक्षा, स्वास्थ्य, वातावरण, जलस्रोत, रक्षा, कृषि, पर्यटन उद्योग, न्याय तथा कानुन जस्ता सम्पूर्ण मन्त्रालयसँग सम्बन्ध रहेको हुँदा अझ राम्रो समझदारी र समन्वय होस् भन्ने उद्देश्य राखी यस किसिमको सम्मेलन आयोजना गरिएको हो । हामीलाई विश्वास छ यसले समन्वयात्मक विकासको योजना र लहर ल्याउने छ ।

विज्ञान तथा प्रविधि मन्त्रालयलाई श्री ५ को सरकार तथा अन्तर्राष्ट्रिय सङ्घसंस्थाहरू र दातृ राष्ट्रहरूले दिएको सहयोगको लागि आभार व्यक्त गर्न चाहन्छु ।

अन्तमा, प्रमुख अतिथी सम्माननीय प्रधानमन्त्रीज्यू तथा आमन्त्रित सम्पूर्ण अतिथी महानुभावहरूलाई पुनः हार्दिक स्वागत गर्दछु ।

धन्यवाद ।

प्रमुख अतिथी सम्माननीय प्रधानमन्त्री श्री शेरबहादुर देउवाज्यूद्वारा
अभिव्यक्त समुद्घाटन भाषण

समारोहका सभापतिज्यू, उपस्थित महिला तथा सज्जनवृन्द ।

आजको युग विज्ञान तथा प्रविधिको युग हो र विकासका धेरैजसो अवधारणाहरू विज्ञान र प्रविधिमा आधारित हुन्छन् ।

हाम्रो मुलुकमा विज्ञान र प्रविधिको क्षेत्रमा थुप्रै कार्यहरू गर्न सक्ने सम्भावना रहेको छ । प्रकृतिले हामीलाई थुप्रै अवसरहरू प्रदान गरेको छ । तर हाम्रो जस्ता भू-बनोट भएको ठाउँमा विकासका चुनौतीहरू पनि नभएका होइनन् । तर चुनौतीहरू अवसरमा परिणत गर्नु पर्दछ भन्ने मेरो मान्यता छ ।

विज्ञान र प्रविधिको क्षेत्रमा पनि उक्त कुरा लागू हुन्छ । भर्खरै मैले विज्ञान तथा प्रविधि मन्त्रालयद्वारा सम्पादित कामहरूको संक्षिप्त विवरण हेर्ें । विभिन्न चुनौतीहरूका बाबजुद पनि मन्त्रालयले सम्पादन गरेका कार्यहरूको सराहना गर्नै पर्दछ ।

उपयुक्त प्रविधिको विकास बिस्तार गरी गाउँघरसम्म पुऱ्याउन सक्नु आजको आवश्यकता हो । उपयुक्त प्रविधिको माध्यमले सम्पूर्ण नेपालीको सामाजिक तथा आर्थिक जीवन पद्धति र शैलीमा सुधार हुनुपर्दछ भन्ने मेरो मान्यता रहिआएको छ र विज्ञान तथा प्रविधि मन्त्रालय त्यसतर्फ अग्रसर हुनेछ ।

विज्ञान र प्रविधिको क्षेत्र व्यापाक र बहुआयामिक भएको परिप्रेक्ष्यमा यो क्षेत्रसँग सम्बन्धित निकायहरूको भूमिका अत्यन्तै गहन रहेको हुनाले बृहत र वाञ्छित प्रतिफल पाउनको लागि कार्यक्रम तर्जुमा गर्ने बखतमा नै अझै राम्रो समन्वय हुनुपर्ने देख्दछु ।

हाम्रो मुलुकको विकासमा थुप्रै अन्तर्राष्ट्रिय, सरकारी एवम् गैरसरकारी सङ्घसंस्थाको सहभागिता रहिआएको छ । म ती सबै सङ्घसंस्थाहरूलाई धन्यवाद दिन चाहन्छु र विज्ञान तथा प्रविधिको माध्यमबाट मुलुकमा उपलब्ध सीमित स्रोतहरूको सदुपयोग गर्ने क्रममा हामीलाई हाम्रा स्वदेशी तथा विदेशी सङ्घसंस्थाहरूको सदासयता विगतमा झैं निरन्तर रहिरहने अपेक्षा गरेको छु ।

विज्ञान तथा प्रविधि मन्त्रालयको गतिविधिलाई प्रधानमन्त्रीको साथै रोनाष्टको कुलपति र सूचना प्रविधि उच्चस्तरीय आयोगको अध्यक्षको नाताले मैले पनि नजिकबाट अध्ययन र अनुसन्धान गर्ने गरेको छु ।

विज्ञान र प्रविधि क्षेत्रबाटै २१ औं शताब्दीतिर आएर विकासोन्मुख राष्ट्रहरूले समेत विकासतर्फ ठूलो उपलब्धी हासिल गर्न सकेको यथार्थलाई मध्यनजर गरेर मैले पनि आई.टी. पार्कको स्थापना तथा विकास हुनु पर्दछ भनी यसको स्थापना र विकास गर्न केही योगदान गर्ने अवसर पाए तर अब यसले कति सङ्ख्यामा रोजगारी उपलब्ध गराउने, व्यापार, व्यवसाय र आर्थिक विकासमा बिस्तार गर्न सक्ने हो भन्ने कुरामा म सदा मननशील र चिन्तनशील रहन्छु । मलाई पूर्ण विश्वास छ हामी सबैले लगनशील भई अगाडि बढ्न अठोटका साथ सही मानेमा शहरदेखि गाउँसम्मका जनता र समुदायको जीवन पद्धति विकास गर्न सहयोग गर्नेछ । गरीब र धनीको खाडललाई कम गर्नेछ । विकासका लागि चाहिने सहयोग र नीति निर्माणमा ग्राहयताको साथ पुर्नविचार गरी अझ बढी सहयोग हुने कुरा विश्वास दिलाउन चाहन्छु ।

विज्ञान तथा प्रविधि मन्त्रालयको कामको सम्बन्ध शिक्षा, कृषि, सूचना, गृह, स्वास्थ्य, वातावरण, पर्यटन आदिसँग पनि सम्बन्धित हुने गर्दछ त्यसैले कार्यक्रम संचालन गर्ने सन्दर्भमा राम्रो समन्वय स्थापना गर्नु महत्वपूर्ण हुन्छ । सतर्कतापूर्वक कार्यक्रम संचालन नभएमा Overlap भई समय, परिश्रम र लगानी खेर पनि जान सक्दछ ।

नीति निर्माण गर्ने समयमै स्पष्ट हुनु पर्दछ भन्ने मेरो मान्यता छ । विज्ञान प्रविधि क्षेत्रको मन्त्रालय भएको हुनाले नीति निर्माण, अनुसन्धान, नयाँ आविष्कार आदिमा यसले अगुवाका भूमिका निर्माण गर्न उपयुक्त हुनेछ ।

अरुले ५ वर्षको समयमा हासिल गरेको कुरा अब हामीले १, २ वर्षभित्रै गर्न सक्नु परेको छ । यो क्षेत्रको माध्यमबाट विकासको गति द्रुत हुन सक्दछ, रोजगारी र आर्थिक अवस्थामा सकारात्मक प्रभाव पर्ने छन् भन्ने तथ्य हामी सामु छ ।

यस क्षेत्रमा लगानी गर्नका लागि स्वदेशी, गैरआवासीय तथा विदेशी लगानीकर्तालाई आकर्षण गर्न सक्ने क्षेत्र पनि हो । विज्ञान तथा प्रविधि क्षेत्र मार्फत् हालको असहज अवस्थामा पनि एक सीमित जिल्ला वा क्षेत्रबाट पनि विकासको मार्ग प्रशस्त गर्न सक्ने क्षेत्र हो ।

विज्ञान तथा प्रविधि मन्त्रालयको रोनाष्ट मार्फत् थालनी गरिएको प्रतिभा पुरस्कारले पनि केही हदसम्म भएपनि वैज्ञानिक विशेषज्ञको मनोबल बढाउने छ । पुरस्कृत व्यक्तिहरूलाई बधाई दिन चाहन्छु ।

परिपक्व र युवा विज्ञ, विशेषज्ञ र बौद्धिक सबै वर्गको प्रयासमा यो मन्त्रालयले आफ्नो पकड र स्थान मजबुत गर्ने नै छ । यसमा मेरो पनि मार्गदर्शन हुने विश्वास दिलाउँछु ।

राजनैतिक कटिबद्धता, सुझबुझ भएमा राष्ट्रले द्रुत गतिमा विकासको मार्ग समेट्न सक्दछ । तर यसमा सबै समूह, क्षेत्र र वर्गको सहयोग राष्ट्रिय रूपमा नै अनिवार्य हुन्छ ।

विज्ञान तथा प्रविधि क्षेत्रको विकाससँगै केही समस्या पनि देखिएका छन् । त्यसैले हामीले Cyber Law बनाउन सतर्कता अपनाउनु अनिवार्य हुन आउँछ । मलाई विश्वास छ यस मन्त्रालयले यसतर्फ ध्यान पुऱ्याउने नै छ । हालसालै विद्युतीय कारोबार अध्यादेश पास भएको छ । वैकल्पिक ऊर्जाको अझ विकास होस् भनी गठन आदेश सम्बोधन गरिएको छ । अन्य नीतिहरू पनि अध्ययन गरी अगाडि बढाइनेछ । नीति निर्माण वा संशोधन गरेर भए पनि यस क्षेत्रलाई अगाडि बढाउन हामी खुला छौं । नीति निर्माणमा मात्र सीमित नरही तपाईहरूले आफ्नो कार्यक्षेत्र व्यापक बनाई सम्पूर्ण जनताको जीवनमा राम्रो प्रभाव पुऱ्याउन पर्ने challenge पनि आएको छ । कार्यक्रमको प्रभावकारिता नै नीति निर्माणको परिणाम हो । मलाई विश्वास छ, यसमा तपाईहरूले सफलता हासिल गर्नु हुने नै छ ।

विज्ञान तथा प्रविधि मन्त्रालयले हामी सबैलाई विस्तृत जानकारी प्रदान गर्ने गरी यस सम्मेलन गरेकोमा धन्यवाद र तपाईहरूलाई अझ प्रगति गर्नु हुनेछ भन्ने विश्वास राख्दछु ।

PowerPoint को presentation र सम्मेलनको आयोजना मार्फत् तपाईहरूले गर्नु भएको कामको मूल्याङ्कन केही हदसम्म गर्न मौका पाएकोमा हर्ष व्यक्त गर्दछु ।

अन्त्यमा, उपस्थित माननीय मन्त्रीज्यूहरू, वैदेशिक कुटनीतिज्ञज्यूहरू लगायत सबै महानुभावहरूलाई हार्दिक धन्यवाद दिन चाहन्छु ।

धन्यवाद ।

विज्ञान तथा प्रविधि मन्त्रालयका सचिव श्री स्वयम्भूमान अमात्यज्यूद्वारा अभिव्यक्त मन्तव्य

यस समारोहका सभापति माननीय विज्ञान तथा प्रविधि मन्त्रीज्यू, प्रमुख अतिथी सम्माननीय प्रधानमन्त्रीज्यू, माननीय मन्त्रीज्यूहरू, संवैधानिक अङ्गका प्रमुख एवम् सदस्यज्यूहरू, श्रीमान् मुख्य सचिवज्यू, सचिवज्यूहरू, महामहिम राजदूतज्यूहरू, सञ्चारकर्मी साथीहरू एवम् महिला तथा सज्जनवृन्द ।

आजको एक्काइसौँ शताब्दीमा विज्ञान तथा प्रविधिको महत्व कति छ भन्ने बारे यहाँ उपस्थित वैज्ञानिक एवम् प्राविधिकज्यूहरूको माझ मैले भनिरहनु पर्ला जस्तो लाग्दैन ।

विज्ञान तथा प्रविधिको विकास नै एउटा राष्ट्रको विकास एवम् समृद्धिको परिसूचक हो जस्तो मलाई लाग्दछ । हामीले विज्ञान एवम् सूचना प्रविधिको विकास एवम् विस्तारलाई समुचित रूपमा व्यवहारमा ल्याउन सकेमा हाम्रो जस्तो भू-परिवेष्ठित राष्ट्र पनि तीव्रतम् रूपमा विकासको पथमा अग्रगामी हुन सक्दछ ।

विज्ञान तथा प्रविधिबाट प्राप्त सार्थक प्रतिफललाई जबसम्म जनस्तरसम्म पुऱ्याइदैन तबसम्म राष्ट्र विकासले मूर्तरूप लिन सक्दैन भन्ने तथ्यहरूलाई हृदयङ्गम गर्दै हामीले विज्ञान तथा प्रविधि क्षेत्रमा लिएको दीर्घकालिन अवधारणा अनुरूप कार्यान्वयनको तहमा रहेको विज्ञान तथा प्रविधि नीति, सूचना प्रविधि नीति, विद्युतीय कारोबार अध्यादेश आदिको माध्यमबाट यस क्षेत्रलाई विकास र विस्तार गर्न लागिपरेका छौँ । उपलब्ध स्रोत र साधनको परिधिभित्र रहेर मन्त्रालयले ग्रामीण भेगसम्म ऊर्जा पुऱ्याउने उद्देश्यले वैकल्पिक ऊर्जाको प्रवर्द्धन क्षेत्रमा कार्य गर्दै आएको छ भने राष्ट्रिय/अन्तर्राष्ट्रिय हवाई सेवालाई अत्यावश्यक पर्ने मौसम सम्बन्धी सूचनाहरू पनि निरन्तर रूपमा सम्बन्धित निकायहरूलाई प्रदान गर्दै आइरहेको कुरा म निवेदन गर्न चाहन्छु ।

जनस्तरसम्म सूचनाको पहुँच होस् र यसबाट ग्रामिण भेगका जनताहरू प्रत्यक्ष रूपमा लाभान्वित होउन् भन्ने उद्देश्यले Tele Centre हरूको स्थापना, विधिविज्ञानसँग सम्बन्धी कार्यहरू, ब्रह्माण्डको अध्ययन/अनुसन्धान गरी तत्विषयमा सेवाग्रहीहरूलाई जानकारी उपलब्ध गराउँदै आएको पनि म यहाँ निवेदन गर्न चाहन्छु ।

यसका अतिरिक्त हामीले हाम्रा मित्रराष्ट्रहरूसँग पनि विज्ञान तथा प्रविधिको क्षेत्रमा आपसी सहयोग अभिवृद्धि गर्ने कार्यमा सहकार्य गर्दै आइरहेका छौँ ।

विज्ञान तथा प्रविधि मन्त्रालय र अन्तर्गतका निकायहरूले आफूले सम्पन्न गरेका मुख्य-मुख्य कार्यको संक्षिप्त विवरण यस गरीमामय सभामा भर्खर प्रस्तुत भैसकेको छ, यसबाट पनि विज्ञान र प्रविधिको महत्व र मन्त्रालयको भूमिका अझ बढी स्पष्ट भएको मैले महसुस गरेको छु ।

अत्यधिक कार्य व्यस्तताका बावजुद पनि आफ्नो अमूल्य समय दिई यस समारोहमा समुपस्थित भएर हामीहरूलाई मार्गदर्शन प्रदान गरी हौसला बढाइदिनु भएकोमा सम्माननीय प्रधानमन्त्रीज्यूलाई विज्ञान तथा प्रविधि मन्त्रालय तथा म स्वयम्को तर्फबाट हार्दिक आभार प्रकट गर्न चाहन्छु । सम्माननीय प्रधानमन्त्रीज्यूको यस गरिमामय समुपस्थितिले हामी विज्ञान तथा प्रविधिको क्षेत्रमा कार्यरत सबैलाई थप ऊर्जा प्राप्त भएको छ ।

साथै आजको यस कार्यक्रममा कार्यपत्र तयार गरी हामीलाई सहयोग पुऱ्याउनु हुने राष्ट्रिय योजना आयोगका उपाध्यक्ष डा. शङ्कर शर्माज्यू, त्रिभुवन विश्वविद्यालयका प्रा.डा. प्रमोद कुमार झाज्यू, डा. सोम पूडासैनीज्यू एवम् कार्यपत्रका टिप्पणीकारहरू डा. विनायक भट्टराज्यू, डा. मोहनविक्रम ज्ञवालीज्यू र स्वास्थ्य मन्त्रालयका सचिव श्री मोहन बहादुर कार्कीज्यूलाई हार्दिक धन्यवाद दिन चाहन्छु ।

त्यसैगरी माननीय मन्त्रीज्यू, राज्यमन्त्रीज्यू, श्रीमान् मुख्य सचिवज्यू, सचिवज्यूहरू, महामहिम राजदूतज्यूहरूले हाम्रो आतिथ्य स्वीकार गरी यस समारोहमा समुपस्थित भई हामीलाई थप हौसला प्रदान गर्नुभएको छ । उहाँहरू सबैलाई हार्दिक धन्यवाद दिन चाहन्छु ।

विज्ञान तथा प्रविधि मन्त्रालयको यस सम्मेलनमा हाम्रो निमन्त्रणा स्वीकार गरी पाल्नु भएका सम्पूर्ण उपस्थित अतिथीहरूप्रति पनि मन्त्रालयको तर्फबाट धन्यवाद दिन चाहन्छु ।

अन्तमा, यो कार्यक्रमलाई मूर्तरूप दिने काममा प्रत्यक्ष/अप्रत्यक्ष रूपमा संलग्न सबै व्यक्तित्वहरूलाई पनि म हार्दिक धन्यवाद दिन चाहन्छु ।

धन्यवाद ।

विज्ञान तथा प्रविधि मन्त्री श्री बालाराम घर्तीमगरज्यूद्वारा अभिव्यक्त मन्तव्य

सम्माननीय प्रधानमन्त्रीज्यू, माननीय मन्त्रीज्यूहरू, संवैधानिक निकायका प्रमुख तथा सदस्यहरू, राजदूत महोदयहरू, श्री ५ को सरकारका सचिवहरू, पत्रकार बन्धुहरू, भद्र महिला तथा सज्जनवृन्द ।

आजको युग सूचना प्रविधिको युग हो र विज्ञान प्रविधिको युग हो । विकसित देश र विकासोन्मुख देशको तात्विक फरक भन्नु नै विकसित देशमा विज्ञान र प्रविधिको समुचित विकास भै त्यसको प्रतिफल सबै तहमा पुग्नु हो भने विकासोन्मुख राष्ट्रहरूमा त्यसको न्यून प्रयोग हुनु र विकसित प्रविधिहरू पनि आम जनताहरूसम्म नपुग्नु हो ।

हाम्रो देशमा पनि प्रविधिहरूको विकास/विस्तार नभएका होइनन् । सही सूचना सेवाग्रहीहरूमाझ समयमा नै पुऱ्याउने उद्देश्यले अधिराज्यका विभिन्न गा.वि.स., उपमहानगरपालिकाहरूमा टेलिसेन्टरको स्थापना गर्ने प्रयास भैरहेको छ ।

राष्ट्रिय तथा अन्तर्राष्ट्रियस्तरमा चाहिने उपयुक्त मौसम सम्बन्धी सूचना यस मन्त्रालय अन्तर्गत जल तथा मौसम विज्ञान विभागले भूउपग्रह मार्फत् उपलब्ध गराउँदै बाढी भविष्यवाणी जस्ता अति महत्वपूर्ण जानकारी पनि दिँदै आएको छ । च्छो रोल्पा जस्ता हिमताल विस्फोट हुन नदिने कार्यक्रममा पनि हामी अगाडि बढेका छौं । विभिन्न किसिमका अपराधहरूको सही पहिचान गरी न्याय सम्पादनमा मद्दत गर्नुको साथै जैविक प्रविधि, रेडिएसन म्यापिङ आदि कार्यहरू मन्त्रालयबाट भैआएको म स्मरण गराउन चाहन्छु । सेवाग्रहीलाई छिटोछरितो र पारदर्शी ढङ्गले सेवा प्रदान गर्ने सिलसिलामा सूचना प्रविधि उच्चस्तरीय आयोग, सूचना तथा सञ्चार मन्त्रालयको संयुक्त प्रयासमा मन्त्रालयबाट विद्युतीय कारोबार ऐन, ०६१ जारी भैसकेको छ र आउँदा दिनहरूमा विद्युतीय कारोबारद्वारा सेवाग्रहीहरूलाई दिने सुविधामा सुधार हुने अपेक्षा गरेको छु र यसले गर्दा नेपाललाई अन्य देशहरूसँग सम्बन्ध सम्पर्क राखन महत्वपूर्ण भूमिका रहेको छ ।

हाम्रो जस्तो भू-बनोट भएको देशमा विद्युतशक्तिको प्रचुर सम्भाव्यता भए तापनि सबै ठाउँमा राष्ट्रिय विद्युत प्रणाली पुग्न नसकेको परिप्रेक्ष्यमा सौर्य तथा अन्य वैकल्पिक उपायद्वारा गाउँघरमा ऊर्जा शक्ति पुऱ्याउन लागिपरेका छौं । यसै सन्दर्भमा वाञ्छित मात्रामा सम्पादित कार्यहरूको प्रतिफल सेवाग्रहीहरूलाई पुऱ्याउनु र भविष्यमा गरिनेअन्य कामहरूको लागि यस मन्त्रालयमा विविध विधाका अत्यन्त महत्वपूर्ण काम गर्नुपर्ने आवश्यकता पनि मैले महसुस गरेको छु । विज्ञान तथा प्रविधिको क्षेत्रमा सघाइरहने हाम्रा विदेशी मित्रराष्ट्रहरू एवम् प्रतिनिधिहरूमा म हार्दिक आभार प्रकट गर्न चाहन्छु ।

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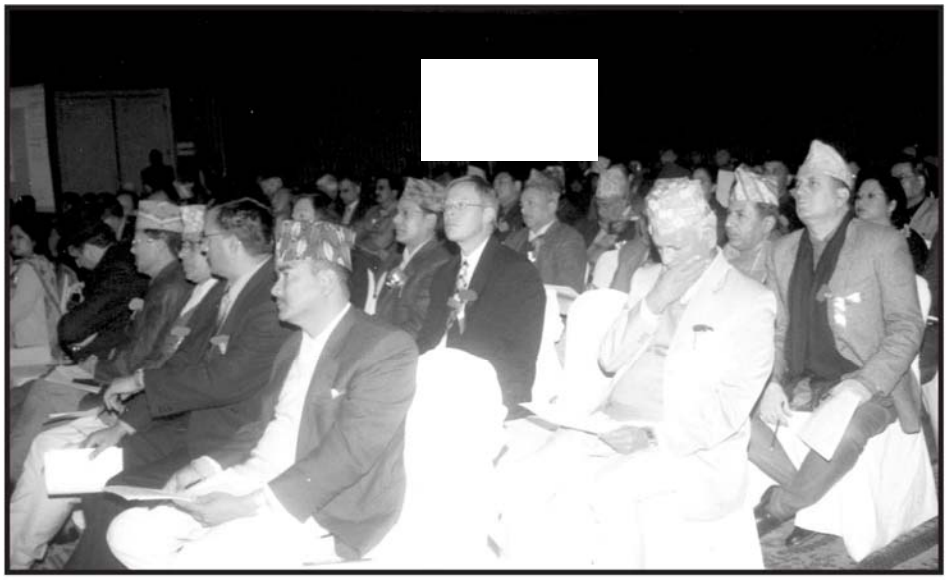
धन्यवाद ।

List of Participants

S.N.	Name	Organization
1	Adarsha P. Pokhrel	Free Lance Consultant
2	Akkal Man Nakarmi	
3	Andila Dangol	RONAST
4	Archana Shrestha	DHM
5	Arjun Kumar Thapa	NITC
6	Arun B. Shrestha	DHM
7	Arzu R. Deuba	SAMANA-A
8	Ashok Koirala	Sc. Dean Office
9	B.K. Vaidya	DHM
10	Bimal Shah	NITC
11	Bishnu Maskey	SID
12	Bishnu Narayan Gurung	DHM
13	Chitra Malla	MOST
14	Dayananda Bajracharya	RONAST
15	Devendra L. Shrestha	Action Aid Nepal
16	Dinesh K. Jha	NAFOL
17	Dr. Ashok Bajracharya	RONAST
18	Dr. Chiranjibi Regmi	RONAST
19	Dr. Dinesh Bhuju	RONAST
20	Dr. Govind Nepal	AEPC/MOST
21	Dr. M. Ranjit	RONAST
22	Dr. Som Pudasaini	
23	Durga Khadiwada	NPCS
24	Ganesh Bahadur Maharjan	MOST
25	Girendra Pd. Pokhrel	MOST
26	H.N. Bhattarai	UGC
27	Hira Lal Shrestha	FCGO
28	Hirdaya R. Shakya	NAFOL
29	Ishwar Shrestha	CEDPA/N
30	Jagan Nath Shrestha	Center for Energy Studies/IOE
31	Jagat K. Bhusal	DHM
32	K.B. Malla	RONAST
33	K.B. Thapa	T.U.
34	K.M. Bhuta	
35	K.N. Shrestha	DHM
36	K.P. Budhathoki	DHM
37	K.P. Sharma	RONAST
38	Kailash Man Pradhan	Embassy of Japan
39	Keshari Bajracharya	DHM
40	Keshari Bajracharya	DHM
41	Keshari Manandhar	Women in S&T
42	Keshari P. Pokharel	NVC/N
43	KP Sharma	DHM
44	Krishna B. Manandhar	DHM
45	Kumar Rajbhandari	DHM
46	L. Shakya	RONAST
47	L.C. Shrestha	RONAST
48	Lok Hari Pandey	MOST
49	M. Rajbahak	DHM
50	Madan B. Basnyat	AEPC
51	Madan Lal Shrestha	DHM
52	Mahendra Thapa	NAFOL
53	Mahesh S. Kathayat	NITC
54	Mohan B. Gewali	RECAST, TU
55	Mohan Man Sainju	PAF
56	Mr. Mohan B. Karki	Ministry of Health
57	Mukti Khanal	MOST
58	Mukund P. Acharya	MOIC
59	N.H. Rajbhandari	DHM
60	Naindra Upadhaya	MOICS
61	O.R. Bajracharya	DHM
62	P.K. Jha	T.U.
63	P.P. Oli	H.C. EG & LRM
64	Pancha R. Shakya	DHM
65	Parbati Pudasaini	RONAST
66	Pradeep B Shah	DHM
67	Prakash Thapa	NITC
68	Prem Nidhi Gyawali	Annapurna Development Bank
69	Purushottam Ghimire	MOST
70	Priya Giri	RONAST
71	Prof. Govind P. Sharma	T.U.
72	Prof. Karan B. Shah	Natural History Museum
73	Rajendra Adhikari	AEPC
74	Rajendra Manandhar	MOST
75	Rajendra Shrestha	DHM
76	Rajesh Paudyal	PMO, HPC
77	Ram Badan Pradhan	Women in S&T
78	Ram Prasad Dhital	AEPC
79	Ramesh Balayar	Embassy of Israel
80	Ramesh M. Singh	RONAST
81	Ranjan Shrestha	EU
82	Rom Kant Pandey	MOST
83	S.L. Maleku	MOST
84	S.P. Prajapati	DHM
85	Saloni Singh	Didi Bahini
86	Saroj Raj Shahi	BPKMPOSMDB
87	Shasi Hamal	RONAST
88	Shishir Raj Kolachhepati	RONAST
89	Shreekar Pradhan	CES/IOE/TU
90	Shreeshar Pd. Pokharel	MWCSW
91	Shriharsh Koirala	BPKMPOSMDB
92	Shudha Shrestha	RONAST
93	Sita Ram Timsina	MOST
94	Sudeep Dagi	NITC
95	Sunil Poudel	NITC
96	Suresh R. Sharma	K.U.
97	Sushila Regmi	MOST
98	T.M. Bajracharya	Election Commission
99	Takeshi Osaka	Embassy of Japan
100	Tulasi Sitaula	CIAA
101	Usha Joshi	DHM
102	Vijaya Babu Khatri	Kantipur
103	Willem Boers	SNV

A Glimpse of the Seminar



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