Status of Science and Technology in Nepal

By

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Nepal at a Glance

Area:	147181sq. Km
Population:	25.6 million
GDP per capita:	US$ 240
Telephone per 100 inhabitants:	1.26
Internet users per 10,000 inhabitants:	25.43
PC per 100 inhabitants:	0.34
Physicians per 10,000 inhabitants:	4
Life expectancy:	59 years
Threshold income for poverty line:	US$ 7.52 per month
Population below poverty line:	around 40% of total
R/D expenditure as % of GDP	0.3
R/D expenditure per capita (US $)	0.7

A Short History of Science

- Modern science entered into the kingdom with the introduction of Intermediate science education in Tri-Chandra college in 1919

Since then Institutions / Policy / Laws

- Bachelor of Science: Tri-Chandra College, 1948
- Master of Science: Tribhuvan University, 1965
- Institutes of Medicine, Engineering, Forestry, Agriculture, Tribhuvan University, 1973
- The Sixth Five Year Plan (1980-1985) link S/T activities with economic development

Since then Institutions / Policy / Laws Contd…

- National Council of Science and Technology (NCST), 1976 (now dismantled)
- Research Centre for Applied Science and Technology (RECAST), 1977
- Royal Nepal Academy of Science and Technology (RONAST), 1982
- Ministry of Science and Technology, 1995

- **Educational Sectors**
  - Kathmandu University
  - Purbanchal University
  - Pokhara University
  - B.P. Koirala Institute of Health Science
  - National Academy of Medical Sciences, Bir Hospital

Government Sectors

- National Agriculture Research Centre, 1991
- Department of Forest Survey and Research, 1963
- Department of Irrigation, Hydrology and Meteorology, 1967
- Department of Plant Resources, 1957
- Department of Geology and Mines, 1958
- Department of Soil Conservation, 1974
- National Bureau of Standard and Metrology, 1976
- Food Research Lab, 1973
- Department of Wild Life Conservation
- Department of Drug Administration, 1976

The Following Policies and Acts are Put Forward by HMG in the National Development

- Five Year Plans (starting from 1956)
- Industrial Enterprise Act and Industrial Policy, 1992
- Foreign Investment and Technology Transfer Act, 1992
- National science and Technology Policy, 1989
- National Policy on Technical Education and Vocational Education, 1999
- Forestry Act
- Agriculture Act
- Information Technology Policy, 2002
- Science and Technology Policy, 2005
- National Biotechnology Policy (Forthcoming)

Nation's Present-day Commitment

The present Constitution of Nepal has categorically spelled out the essence of S/T Policy 'For the total development of the country the state will pursue the policy of giving priority to the development of science and technology as well as focus on the development of local technology.'

Furthermore, the Tenth Five Year Plan (2002-2007) promulgated with core objective of poverty alleviation envisages the following strategy in S/T sectors:

1. To mobilize natural resources and infrastructure to the fullest extent and to establish new structures/institutions in the field of S/T when needed
2. To transfer, adapt and utilize foreign technologies as per national need involving private sectors as well.
3. To establish a working system of competitiveness in R/D activities among scientists, scientific communities and scientific institutions
4. To support economic and social development of common people by sustainable use of resources through development of knowledge and skill in the field of S/T
5. To encourage universities, research institutes and scientists to become more involved in research activities and to produce high class manpower in S/T by providing S/T special place in university curriculum

Burning Issues

A large number of S/T institutions, National policy and Acts.

Some following questions require answer.

- Why are our institutions not working in the manner they should ?
- Why are not fruits of our S/T activities reaching to the common people?
- What is the standard of our science education?
- For whom do we make science policies and are we even eager to know that how they are implemented?
- What quality of science we have in our lab?
- Why can not we translate whatever R/D we have done into commercial products?
- What roles are expected from scientists, science teachers, policy makers, law makers and decision makers?

Science/Technology Policies

RONAST in 1989 put forward the first ever National Science and Technology Policy.

The policy emphasized on:

- Proper resource utilization and development
- Technology transfer
- Quality manpower development and
- Promotion, extension and participation in S/T development

Science/Technology Policies Contd…

- Good S/T policy
- Question is in last fifteen years how the policy was implemented
- Who will do what is not specified
- Since 1989, things have changed
- S/T policy - 2005 has already been launched

Science/Technology Policies Contd…

- Go to S/T strategies mentioned in the Tenth Five Year Plan
- Implementing agencies need to be identified
- A nation's development and prosperity to a large extent are judged by the status of S/T of that country
- A scientifically unsophisticated society means less economic development in all sectors
- Japan (3.12% of GDP), USA (2.65% of GDP) spend on R/D and are in the highest echelon of development
- Nepal (0.34% of GDP) remains in lowest ladder of development
- Lawmakers are well advised to increase R/D share of budget pie if Nepal is to progress fast

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Science/Technology Policies Contd…

- We lack an institution to fund research organizations and research projects
- Some sort of National Science Foundation
- Formulates what type of research the country needs in line with national S/T policy
- Sets priority in research
- Identifies the relevant institutions
- Advertise for the submission of research proposals
- Monitors the research
- Makes funds available for research
- Foundation extends hands to government, business communities and private endowments to generate resources for doing useful research

Science and Technology Policy 2005

Objectives

- To enhance national capability by developing and utilizing knowledge, skill and competence in the field of Science and Technology
- To contribute in the reduction of poverty by improving economic and social condition of the people at large through sustainable use of natural resources and means and conservation of the environment
- To take the nation in competitive advantage by utmost development of Science and Technology

It focuses on:

- Infrastructure development
- Human resource development
- R & D

Vision:

To build the country as a developed, dynamic and prosperous state by raising the living standards through the appropriate development and use of science and technology.

MISSING POINTS

- INSTITUTIONS ARE NOT IDENTIFIED
- SILENT ON EXENDITURE ON R and D (atleast 1% of GDP)
- NOT MUCH ABOUT YOUNG SCIENTISTS
- COORDINATION OF SCIENCE RELATED ORGANIZATIONS
- NATIONAL INNOVATION SYSTEM
  - institutions that contribute to the creation, diffusion and use of new economically useful knowledge and the linkages and synergies between the institutions
  - institutes include universities, research centres, Government , financial and industrial houses and involves technical, commercial, legal, developmental, social , financial, and regulatory mechanisms
  - R and D, developments of products, commercialisation andmarketing, to spur innovation
  - this network is the foundation of NATIONAL INNOVATION SYSTEM

Science/Technology Organizations

Two General Comments

- Nepali S/T institutions have minimum or no coordination with other organizations.

- Organizations lack clear-cut mission and objectives so that works and activities are duplicated withstanding resource constraints

Science/Technology Organizations Contd..

- Teaching institutions play key role in producing well qualified manpower
- Some good news: our graduates are internationally sellable
- Some faculty members doing good piece of research work published in journal of international repute
- Research infrastructure of Tribhuvan University profusely upgraded, thanks to a World Bank assistance
- Ph. D. programme is weak. Without a sound Ph.D program, research can not be sustained

Science/Technology Organizations Contd..

- Programs designed to enhance teacher's ability, motivation and confidence lacking
- A few Ph. D.scholarships for teachers are available.
- Some talented teachers go abroad for Ph. D., but chances of return and serve the country are becoming more and more slim
- They can not quench the thirst of doing innovative research due to lack of research infrastructure
- Some complain that their expertise and skill are not recognized in their country

Science/Technology Organizations Contd..

- Brain drain is a big problem
- The other side of the coin is equally interesting. We lack administrative mechanism to retain good People.
- In the academic research front, faculty member are doing research on their own initiatives and for their pleasure and satisfaction
- The point to stress is research has not become integral part of academic life
- University must be made hob of research activities
- Importance of University research

Science and Society

Scientific culture

- Openness
- Devotion to the scientific work
- Transparency in their work
- Sharing of knowledge and expertise with others
- Nonhierarchical system of working

Science and Society

- In addition to enrichment of state of knowledge, fruits of R & D should also reach common people
- Technology as knowledge of how to fulfill human purposes in a specifiable and reproducible way

- **Component of Technology Development and Transfer**
  - The hardware (equipment) development
  - The means of producing, distributing, installing, maintaining and repairing the equipment
  - The ongoing social preparation and end-use training required for the equipment to be used effectively
  - Institutions and mechanism for financing end-users, distributors, local manufacturers and others

Science and Society Contd…

- Unless these factors are taken care of, technology transfer will not be successful
- Some successes: Rural Technology, RETs

- **Suffers from**
  - Limited application
  - Usually supply side technology
  - Inadequate awareness and training program
  - Incoherent subsidy and other policies

There appears to be minimum involvement of business community and entrepreneurs in R and D activities

- Scientists lack entrepreneurial skill
- Business community does not dialogue with scientists
- What can be done in such situation?
- Solution: Technology Incubators?

The incubator concept may have the following elements:

- A technological laboratory acting as a source of innovations
- Investment funds for seed capital and
- An incubator facility located next to the laboratory

The IT park at Banepa may also act as some sort of incubator

What Needs to be Done

- As outlined in the Tenth Five Year Plan, it is extremely important that its S/T activities be directed towards poverty reduction. In order to channelize R/D activities in line with national policies, Nepal Science and Technology Foundation must be created for attracting and disseminating funds for doing S/T activities. National Research Laboratories on different area of S/T should gradually be established.

- Science education needs qualitative improvement. Ph.D. and Master programs should be strengthened. Special and intensive science education should be started in schools selected on the basis of school's capability and performance. In order to utilize young scientists in creative activities and also to prevent brain drain, a scheme of pool scientists in which they work in assigned S/T organizations for a fixed period of time during which they are expected to find tenured position of their choice, needs to be established.

What Needs to be Done Contd…

- One irony is that scientific organizations possess expensive instruments and equipments that are not used, underused or out of order for small reason. A inventory of such instruments should be made and maximum utilization of such instruments should be ensured. We would think that Ministry of Science and Technology should take lead on this.

- A mechanism of involving business people and entrepreneurs in supporting R/D activities should be established. Business incubators need to be established in order to convert R/D inventions into commercial products. Indigenous technologies need to be strengthened and modified, if necessary, to meet the country's demands. Imported technologies should be made country suitable through adaptive research.

What Needs to be Done Contd…

- In view of globalization and Nepal's entry in WTO, effective mechanism needs to be developed to safeguard traditional knowledge, skill, problem solving ability and biodiversity and IPR. At the same time, area of our competitive advantages need to be identified and priority for R/D activities in such area should be ensured.


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Thank You!