

Ethics in Indian Science and Technology Policy and Issues in Access, Equity and Inclusion

Amit Kumar

Broader Context

- While the role of Science and Technology and Innovation (STI) in national development is well recognized, what constitutes ethics in Science and Technology (S&T) and Innovation policy is a matter of debate.
- Instead of taking a traditional approach we have approached the question of ethics through Access, Inclusion and Equity (AIE). This assumes great importance for a country like India, where 'access' itself is a larger issue which arouses intense and passionate debates, for instance, on questions related to intellectual property rights. The wider inequality within the country and across various regions raises the debate on inclusion and equity.

Focus

- The idea of ethics in this respect is also significant since technology and gender divide are pre-dominantly evident across the board. In the context the endeavor is to contribute to measuring AIE as an outcome of policies including S&T policies and as a norm in STI policy frameworks.
- In giving importance to AIE it is not to be assumed that values like autonomy are irrelevant. Rather, AIE is more relevant in the Indian context than abstract values like autonomy, freedom and human dignity.
- However, in measuring AIE through indicators is a challenging task given the methodological issues, data availability and other issues in developing indicators.

- In this regard it is worth pointing out that inclusive growth and social inclusion are now part of the development economics literature and economists are developing indicators to measure them.
- The 12th five year plan focuses on inclusive growth and states that “our focus should not be just on GDP growth itself, but on achieving a growth process that is as inclusive as possible” and rightly accepts that “strong inclusive growth is the only scenario that will meet the aspiration of the people”. This reflection indicates that the planners are aware of the need to move beyond growth in GDP growth and promote inclusive growth.

Access, Inclusion and

- Access and equity are linked with inclusion. Access to benefits of advances in S&T and deriving the benefits of technological advances is important. Access is often studied in terms of access of certain groups/classes to technologies and/or access to services and goods like drugs and how race, gender affect access to technologies particularly the digital technologies and related services, and/or participation in science.
- While inclusion has been discussed in the context of exclusion and on the inclusiveness of technology or policy it has been linked with social inclusion/exclusion.

Equity

- Equity is a contested term but iniquitous distribution of benefits of advances of S&T and/or bearing the disadvantages from developments in S&T without deriving any benefits indicates that S&T policies can exacerbate persisting inequalities in the society and there by contribute to widening disparities or worsening of the condition.
- Hence, AIE could be considered as ethical principles that would help in assessing impacts of S&T policies and their outcomes.

STI Policy and AIE

- S&T policies should ensure that policy design or institutional frameworks do not reduce access, result in more exclusion and more iniquitous distribution of benefits.
- The key question is how to ensure that S&T policy addresses these issues and contributes to equitable and sustainable development..
- Distributional inequities can occur on account of inequalities in the distribution. According to UNCTAD, *“In a highly unequal society, STI is often an elite activity, serving a few people and industries. In inclusive development, STI is no longer restricted to laboratories and frontier technologies, but contributes to solving day to day challenges”*

- In the recent years scholars have used ideas of Amartya Sen and John Rawls to address distributive justice implications of innovations in life sciences and for developing normative theory of information society. AIE is closely related to distributive justice.
- In India, there are several initiatives undertaken by various agencies, institutions, civil society organisations and individuals, working in the area of science and technology for improving access and inclusion. The various Five Year Plan documents and S&T policies have repeatedly emphasized on ensuring that benefits of S&T reach the masses i.e. access, equity and inclusion.

Indian Science and Technology Policies and Issues of Access, Equity and Inclusion

Indian Science and Technology Policies and AIE

- Scientific Policy Resolution 1958: *“it is only through the scientific approach and method and the use of scientific knowledge that reasonable material and cultural amenities and services can be provided for every member of the community”*
- Technology Policy Statement 1983: *“the use and development of technology must relate to the people’s aspirations. Our own immediate needs in India are the attainment of technological self-reliance, a swift and tangible improvement in the conditions of the weakest sections of the population and the speedy development of backward regions”*

- Science and Technology Policy 2003:
 - *“Special emphasis will be placed on equity in development, so that the benefits of technological growth reach the majority of the population, particularly the disadvantaged sections, leading to an improved quality of life for every citizen of the country”;*
 - *“One of the important objective is to ensure food, agricultural, nutritional, environmental, water, health and energy security of the people on a sustainable basis.”*

Science, Technology and Innovation Policy 2013

- *“a strong and visible Science, Research and Innovation System for High-Technology-led path for India (SRISHTI) as the goal of the new STI Policy” and ‘science, technology and innovation for the people’ as the new paradigm of the Indian STI (science, technology, innovation) enterprise.”*
- *“Innovation for inclusive growth implies ensuring access, availability and affordability of solutions to as large a population as possible.”;*
- *“People and decision makers must be made aware of the implications of emerging technologies, including their ethical, social and economic dimensions”;*
- *“the guiding vision of aspiring Indian STI enterprise is to accelerate the pace of discovery and delivery of science-led solutions for faster, sustainable and inclusive growth.”*

Measuring AIE

- At the quantitative level, three indices using Principal Component Analysis (PCA) were constructed where weights in each index are the variances of successive principal components. PCA is a multivariate statistical approach that uses orthogonal transformation to convert a set of correlated variables into set of uncorrelated variables called principal components.

Science and Technology Index

- Number of recognized general educational institutes- arts, commerce and science.
- Number of recognized professional educational institutes- polytechnic, agriculture, medicine, veterinary, engineering, architecture and vocational.
- Number of enrolment/scholars from general educational institutes- arts, commerce and science.
- Number of enrolments/scholars from professional educational institutes- polytechnic, agriculture, medicine, veterinary, engineering, architecture and vocational.
- Patent application by states.
- Telephone exchange lines.

Socio-Economic Index

- Death Rate
- Birth Rate
- Infant Mortality Rate
- Number of population below poverty line

Index for Basic Needs

- Power- per capita electricity consumption.
- Urbanization- total number of registered motor vehicles, total road length.
- Health- number of hospitals and dispensaries, number of beds.
- Access to Drinking water- percentage of households with safe drinking water.
- Education- Schools for general education (primary, secondary, and high secondary), literacy rate.

Concluding remarks

- New methodologies and models have to be developed, particularly in case of emerging technologies. There are several efforts to link these indicators with socio-economic indicators for instance, bibliometric-databases are used for correlation analysis along with R&D expenditure and Gross National Product (GNP). As pointed out elsewhere in this paper the challenge is two fold – one is to revise and improve the current indicators and the other is to develop indicators that could measure AIE and open up space for policy interventions. DST can form a working group to study these.

- The OECD has made an effort to harmonise initiatives by some member countries like Canada, New Zealand, France, Germany and Australia. The OECD Biotechnology Statistics, an initiative of OECD and its Working Party of National Experts of Science and Technology Indicators (NESTI) has come up with various surveys since 2006 and the latest one is out in 2011. They have launched national surveys to assess the status of biotechnology and its contribution in their economies.

- AIE research should become part of S&T policy process and major technology initiatives and policy proposals should allot 3% to 5% of the proposed budgets to such research. In case of Mission mode programs like Nano-mission AIE research should be initiated in the beginning itself. The Ethical, Legal and Social Issues (ELSI) research should be undertaken on a broad scale involving institutions outside ministries and departments and should involve institutions that represent stakeholders.

- India should propose a network of institutions in developing nations working on AIE issues and S&T policy issues and this can be integrated with multilateral S&T collaboration framework. This will enable developing a ‘Southern’ approach in AIE issues and will strengthen the capacity in S&T policy making in developing nations. As new issues like big data, technological convergence demand more studies on STS issues within India there is an urgent need to build capacity in doing AIE and STS research.

Thank you!
Have a nice day!