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OPINION

## **Enable and Manifest Scientific Temper in Tangible Development-oriented Outcomes: Go Beyond Rhetoric**

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### **ABSTRACT**

Three facets of scientific temper are highlighted with respect to the scale and nature of impacts that can be expected through their expression in real-life contexts. These are aligned with a call to prioritize efforts targeting correlates of sustainable development and quality of life to enable and enhance scientific temper with the centrality of common good. Importantly, these could be useful entry points for larger scale sensitization because the benefits of well-informed action will be evident and mutually reinforce transformations. Some simple citizen-centred participatory models are also suggested to help realize the goals of infusing scientific temper.

**KEYWORDS:** Scientific temper, Development, Enabling circumstances.

### **Introduction**

There is a need for timely consolidation of thinking on the dynamics of scientific temper, central to the success of inclusive and robust systems of governance. This perspective duly recognizes the importance of imbibing and practicing principles of scientific temper by individuals in the society as part of the continuum of collective action. The other part of the continuum is signified by institutionalisation of action with implications for collective good at the national level. A logical extension of this continuum is collective action at the global level especially for judicious management of global commons with implications for sustainable development.

Timely and topically relevant knowledge consolidation will be valuable to re-ignite and sustain interests through insights communicated in the future too to construct correlates of scientific temper that should pervade the development and implementation of multiple and mutually reinforcing management interventions to tackle contingencies on several fronts. A historic perspective by Mahanti (2013) and propensities to foster scientific temper (Hester Du Plessis, 2013; Fujun, 2013 and Prathap, 2013) are cases in point.

India is launching several missions through her 12<sup>th</sup> Five-Year Plan. The approaches, output and outcome of these missions are designed to optimize synergies and impacts across sectors (Mane, 2012 and Sankar, 2012). Statements of intent to foster scientific temper are also embedded in the plans of action to strengthen science and technology learning and output/outcomes in the States of Kerala, Odisha and Rajasthan to mention a few. Efforts to design institutional mechanisms that adapt to emerging challenges and sustain delivery of services and impacts can derive significant benefits.

### **Emerging correlates and horizons of insights on preventive management**

Our understanding of individual and synergistic impacts of perturbations at the local, national, regional and global levels appears to be growing along with our abilities to apportion liabilities on natural and artificially induced variations. Economic downturn and environmental externalities are only two of the predominant challenges that directly influence quality of life. Political and geographic boundaries appear to blur in today's world and cross-cutting impacts are felt with equal vehemence around the globe. This spatial and temporal juxtaposition is probably at its highest at present times. Preventive management strategies and timeliness of locally adapted action is critical. This is with special reference to such immediately relevant parameters as livelihood, health and nutrition security and environmental management.

A clear understanding of alternatives and mainstreaming that improve the quality of life can be expected to trigger greater

interest in imbibing the values of scientific temper. The scale of impacts on preparedness to imbibe principles and practice of scientific temper with such real-life connects and the manner they will be perceived may be far greater than the abysmally slow and minutely incremental impacts at the individual level. This framework however does not overlook or undermine the importance of enabling rational thinking and the felt need to embed abilities to evolve continually in the psyche of individuals and the collective impact of rational individuals and communities through a predominantly bottom-up approach.

**Prioritize development-centred thrust areas through a common good perspective, going beyond the focus on individuals**

Deliberations on the substance and manifestation of scientific temper should, on a priority basis, go beyond the rhetoric of changing mindsets at the individual level to such tangible macro level impacts relevant to improving the quality of life. This calls for value-added capacity building of institutions and institutional mechanisms to not only imbibe but also practice the principles of equity and justice expected to emanate from a diligent application of related principles of scientific temper. Capacity building of these stakeholders is as important as the often laid stress on the ‘common people’/‘masses’ and calls for mutually complementing top-down and bottom-up approaches. We may otherwise compound the risk of over preparing some stakeholder groups that in turn will find others underprepared and unresponsive to the calls for concerted action.

Importantly, it is not as if the countries are only waiting to be transformed. India’s resilience is guided by the collective wisdom inherent in her people. This is also true of countries with comparable circumstances of development. This inherent ability has to be taken into account while designing strategies to foster scientific temper. Such attempts should not merely proselytize and appear to be condescending, but be guided by credible processes and individuals who actually demonstrate scientific temper. Historically engrained perceptions, predominant influences, reticence and priorities may influence responses to calls for action. Pre-conceived notions about the preparedness of

stakeholders to respond could also influence the framework of investigations regarding the levels and manifestations of scientific temper. Nanda, 2004 and Narlikar, 2009 provide useful syntheses of these aspects.

### **Manifestations of scientific temper and scales**

Three important facets of scientific temper are evident through the narratives in the references cited and the framework presented. These are:

1. A focus on mindsets, beliefs, and superstitions calling for rational thinking to overcome fears and related inhibitions. This framework implies a clear divide between people with rational mindsets and those without. This apparent polarization could also be based on speculations regarding circumstances that determine practice of rationality and the nature of rationality exhibited. Often the former appear to argue for a systemic change in outlook to life. While this is an imperative, it can also be argued that such transformations may be achieved only over significantly long periods of time and have to be guided by thinking that is well informed.

Sustained access to information that is consistent, low on rhetoric and not condescending has to be delivered by individuals and institutions perceived as credible to sustain such transitions. It would suffice at this juncture to indicate that the rudiments and the growing scale of such influences are evident in some places in India. These have to however be suitably adapted and up-scaled all across the country duly considering system-specific socio-economic and cultural parameters.

2. The second facet pertains to pursuit of science by individuals through a formal/informal academic or research engagement. Convictions that emerge out of such pursuits in the true spirit of science will reflect values directly relevant for harmony in the society, through real-life actions or influences exerted by such individuals pursuing this path. Some such important values are confidence in the universal applicability of

one's stand/stance based on facts, up-front stating of the limits and limitations of knowledge systems they stand for, and wisdom to recognize the dynamic and continually evolving spread and depth of knowledge through other's pursuits.

It is logical to expect that minds steeped in such values will provide leadership for just action with implications for inclusive growth. In this context it is equally important to ask if recipients of such wisdom (say, institutions responsible for governance) are equally well entrenched in corresponding values of common good. This is an important aspect of 'enabling circumstances' directly relevant for citizens and collective action. The minds of citizens are probably dominated by such looming considerations as economic well being, livelihoods and political stability. These thrust areas provide valuable windows of opportunity to infuse values stated above and help secure the twin benefits of knowledge and economic gains and can serve as useful starting points for holistic transformations.

3. The third important facet is accordingly about applying preventive management strategies, remediation and strategically important enablers to sustain transitions. Stakeholders have to be assisted with appropriate information in a timely manner aligned with enabling circumstances including easy access to alternatives and capacities to use them successfully.

### **Lessons from the development and implementation of the Montreal Protocol**

A typical case in point with special reference to the third facet is collective action at the global and national levels to protect the ozone layer. This has all the ingredients of intrigue, quantifiable evidences and willingness to change. Enabling circumstances characterized by regulations, fiscal and non-fiscal measures to mainstream alternatives and capacity building to use them successfully were established. Institutional mechanisms that ensured periodic and comprehensive communication between

stakeholders, penalties and rewards complemented these. Country plans were developed to minimize economic dislocation and obsolescence costs, with the support of a robust financial mechanism especially for the benefit of developing economies. While these were implemented for nearly fifteen years since the adoption of the Montreal Protocol, mid-course corrections regarding the phase-out of initially proposed alternatives had to be ensured.

It was important to also leapfrog across a continuum of alternatives to tackle challenges due to the global warming potential of alternatives. The larger imperative was to prevent backsliding with respect to the initial gains achieved through the phase-out of ozone-depleting substances. Consumers too are rewarded with vouchers for their efforts in safe disposal of ozone-depleting substances. Plans to phase out alternatives implicated in global warming are also progressing well. Scientific evidences regarding depletion and recovery corroborate preventive measures. Mindsets to use alternatives are established on the basis of evidences on market gains and energy efficiency gains.

### **Some low-hanging fruits and opportunities for action to mainstream scientific temper**

The moot question is whether it is possible to employ these strategies with equal success to tackle other environmental externalities? Agreements amongst countries on financial mechanisms for mitigation and adaptation in response to climate change are yet to become consistent, despite growing evidences of impacts at the local level. This is despite significant advocacy for preventive and precautionary approaches. Scientific temper that should guide action for collective good is conspicuous by its absence, despite cases of success in a sporadic manner.

Such issues at the local level too as solid waste management, sanitation and pollution control do not seem to respond readily and adequately to calls for action. The encouraging fact is the tenacity of purpose to tackle these, evident through the rejuvenated missions of the Government of India. Information dissemination for the benefit of stakeholders through extension

services are planned in the case of several sectors with well-defined timelines and networks of institutions. It will be useful to assist these missions with focused forerunners to improve preparedness of stakeholders to receive information that will follow through the missions. The single most important advantage of this forerunner approach will be a comprehensive understanding of the specific information needs that can guide the development of suitably adapted communication strategies. Forerunners can also help reach the unreached. The importance of enabling circumstances however cannot be overemphasized.

Local participatory models may also help stakeholders engage in well-informed collective action. For instance (even at the cost of sounding too simplistic!!), it will be useful to inspire children in schools in particular to participate in such important tasks as traffic management and preventing people from littering the roads. These are simple tasks but are founded on sound principles of science with enormous implications for cleanliness in public spaces and related positive spinoffs. Formal arrangements can be established with schools to involve children and their participation can be suitably acknowledged and rewarded. This action orientation will help them imbibe values that may be sustained through their lifetimes. Citizens of all age groups above these may then be enthused to volunteer support and in the process create a cascade of participation. We are too familiar with the chaos even in the case of these two commonly encountered challenges that prevail despite large-scale communication interventions. It is therefore essential to go beyond fancy messaging to actual hands-on demonstration of values.

Students at all levels of learning including higher education and research should be oriented to principles of science and scientific thinking, wherein such aspects as open-endedness of insights, heuristics, emerging frontiers of knowledge based on newer and better application of tools/techniques and limits and limitations of systems of investigations and insights are suitably highlighted. It is equally important to infuse such human values as respect for knowledge systems and the spread and depth of knowledge consolidation that does not necessarily reveal the founding principles, precautionary principles and common good.

A typical case in point, for instance, can be hands-on learning about astronomy and astrophysics. These are stepping stones to the larger niche of rational thinking.

These mechanisms of technical assistance can at best only serve as starting points or augments for transformations in individuals. Larger scale and consistent transitions have to emerge from within the individuals based on the manner in which these principles are imbibed. These have to also be evident through values of common good, without which the process of communication will remain only an art of discourse.

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