

Science in Emergent Countries: India, a case study

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India: a paradigm for unity in diversity

- Diversity of culture: ethnic, economic, educational and work-ethic-related
- 'The Elephant, the Tiger and the Cellphone'
- One India from many Indias!
- Plurality of coexisting cultures good and bad for emergence
- Science is only a part of this larger culture, so necessarily has same plus points and pitfalls!

Emergence: from what, and towards what?

- *An ancient culture: makes for educational richness (known to the world through the talent we export to it) as well as feudalism and hierarchy in the face of our many inequities*
- *Traditionally (at least in the post-modern era) the way has been for home-grown talent to flee our shores (eg membership of expat associations!)*
- *Now, with economic emergence, science is looking at the example of industry – not only is home-grown talent staying/returning, but it's encouraging foreigners to come and work here for Indian industries!*
- *Many young scientists now choose to return; but is the culture of science really changing? Can we emerge from feudal beginnings close to privilege and a few power centres, to let the **invisible** (politically disconnected) scientist emerge?*
- *This issue – more than improved finances – will determine if the talented among them stay on. (many examples of even mid-career scientists who've returned to the west).*

Diversity of paradigms I

- *Paradigm a) - The creative exploitation and encouragement of diversity*
 - *The Dept of Science and Technology countrywide initiative in the cognitive sciences - mathematicians, physicists, clinicians, psychologists, linguistics experts are part.*
 - *New initiatives to encourage women scientists by DST being attempted*

- *Paradigm b) - The ultimately unproductive negation of diversity*
 - *Many institutions where diversity - of research, of personality, of background - frowned upon, their bearers isolated/harassed.*
 - (" it's no good hiring girls, all they do is prepare to get married", "when women give talks, men don't listen - all they need is to look good", " This scientist is doing research in this new field, typically dilettantish...").*
 - *Suitably hushed up gender harassment, penalisation of whistle-blowers ('the victims usually ask for it').*

Diversity of paradigms I I

- Paradigm a) : Dream campuses exist (eg 25,000 trees, architecture by Charles Correa, ensuite offices with beautiful naturescapes), make scientists feel **visible** and valued, that 'they too have a right to aesthetic surroundings'
- Paradigm b): In many institutes, hugely unsanitary conditions: air and noise pollution, lack of basic hygiene ... Gross violation of health and safety, never mind aesthetics. Makes scientists feel **invisible**, undeserving...

Diversity of paradigms III

- *Paradigm a): At some institutes, all faculty members are pushed to go to international conferences, where they arrive in a team.*
- *Offer free access to their library and other facilities to any institution in India*

- *Paradigm b): Many institutes would rather order duplicate copies of journals than allow sister institutes to share facilities.*
- *Foreign collaborations often frowned upon (major prize withdrawn from recipient after someone contested it on grounds of his foreign collaborations; "Ivy leagues are for one's youth, in one's maturity one should stop looking for **white** skin"; "of course it's easy for this scientist to publish in good journals, he had training at a foreign institute, didn't he?").*
- *Money for international travel very hard to come by even in institutes with huge funding....very inequitable distribution*

Diversity of paradigms I V

- *Paradigm a) - Many institutions known for their lively faculty meetings, where hiring, pay, research, are freely discussed. In best traditions of Indian democracy. Scientists in such institutes feel proud of their identity, their **visibility**, their ability to make a difference*
- *Paradigm b) - Many, (especially 'autonomous') institutes have completely autocratic system of governance ('one steps out of India's democracy as one enters this place'). Growth of nepotism, sycophancy, enhancement of feudalism. Feelings of **invisibility** and frustration can result, especially among the productive.*

Diversity of paradigms V

- *Paradigm a) - India's space program, based on team work, has flourished, despite late start, and occasional presence of sanctions.*
- *Paradigm b) - Hierarchical nature of many institutions inhibits, and often prohibits real team work. Major impacts, involving such collective efforts are absent in many areas. The culture of individuals in many institutions based upon their own talent or initiative (institutions frequently known outside only because of a couple of people).*

Diversity of paradigms VI

- *Paradigm a) – In a few selected institutions, equitable international collaborations between India and other countries. Flow of postdocs and students follows direction of knowledge; is bilateral, and both sides are equal partners.*
- *Paradigm b) – Effective 'call centres' operated when slave labour provided on relatively low Indian salaries for number-crunching. Unfortunately, this paradigm often preferred, as it gives science managers more control of overall resources; as a result individual initiatives at international collaboration often hindered.*

How can invisible scientists be made more visible?

- ✓ *Science is part of culture; include in larger society, give prominence to scientists in general culture (cf treatment of artists, writers, cineastes, businessmen), both in terms of recognition and rewards (scientists are allowed not to be ascetic!)*
- ✓ *Divide financial resources more equitably (ie let more institutes have good computer facilities, instead of e.g. five star hotels for few), and keep tight check on how money is spent.*
- ✓ *Encourage dialogue – plurality of culture, diversity of backgrounds are a strength, not a weakness in the globalised world!*
- ✓ *Move from a top-down to a peer-to-peer system, both within country and also in the context of external collaborations and travel grants (many scientists even from well-funded institutes still cannot afford to come to this APS meeting!!)*
- ✓ ***MOST IMPORTANTLY:** learn from industry, the vehicle of India's emergence. After all they work with same raw material to produce very different results!! (set up joint institutes, involve them in governance, create high-productivity, high-reward culture).*