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# Dynamic Asia in the New Millenium

- Asia emerged as the most influential global player
- President Jacques Chirac – observed 21st Centrury Belongs to Asia – When French voted against complete EU integration last year
- Began with dynamic Japan during 1960s –80s
- Propelled by 'East Asian Miracle' in the 1990s
- Since 2000 – China and India holding the fort…
- Unesco Survey covered and is concerned with developing Asia

# Developing Asia – Unesco Survey

| Tier One | Tier Two | Tier Three |
|---|---|---|
| Singapore<br>SKorea | Thailand<br>Malaysia<br>Philippines | Bangladesh, Sri Lanka, Nepal, Pakistan, Indonesia, Vietnam, |

# Developing Asia – Unesco Survey

- Very strong link between science, technology and economic growth/development in Tier 1 countries
- This link is rather quite Weak to Very Poor in tier 2 and tier 3 countries resp.
- Relative stagnation of R&D budget and growth over the decade (tier 1 exception)
- This is indicated by following S&T Indicators

# Developing Asia: S&T Indicators 2000-2005

| | GERD/ GDP% | S&T Pub. 2005 | Researc/ Million | Patents |
|---|---|---|---|---|
| Tier 1 Sin/korea | 1.5 to 2.80 | 5400 to 14500 | 4745 to 2900 | 600 to 5400 |
| Tier 2 Pi.Th.Ma | 0.1 to 0.70 | 500 to 2500 | 150 to 400 | 10 to 75 |
| Tier 3 Others | 0.03 (B) to 0.24 (P) | 250 to 1100 (P) | 50 (B) to 450 (In) | 0 to 9 -ve |

# STD - Landscape: Focus on Tier 2&3 Developing Asia

- Big gap between theory and practice of S&T Policy institutional framework
- Organisational structures for S&T policy created but remain isolated from other institutions
- Lack of political/state support for S&T and higher education
- Existing support to S&T & R&D is not critical
- Brain drain is a major problem in most countries
- Many countries are engulfed in political uncertainty and internal disturbances

# STD landscape: HRD & HEIs

- Indonesia, Malaysia, Philippines and Thailand exhibited good progress in tertiary workers between 1990 and 2000 with 5 to 12% increase on an average for 10yrs
- 235k to 735k Indo; Mal 210 to 418k; 3.5to5.6 mil Phil; 1.0 to 3.1 mil Thai for instance.
- Similar is the case with Science and Engineering graduates
- Other Asian countries in the survey did not exhibit similar trends
- Rather there has been relative stagnation in HRD with the exception of Pakistan.

# STD landscape (focus on Tier 2&3)

- Initial S&T institutionalisation has not led to creation of science communities at the national level (Malaysia exception)
- Many countries lack intellectual climate, science journals and societies
- Grass root innovations and small technologies neglected at the cost of high technology policy discourse

| Country | Agricul. GDP/Lab force% | Industry GDP/Lab force% | Services GDP/Lab force% |
|---|---|---|---|
| Bang | 20/63 | 28/11 | 52/26 |
| Indon | 13/43 | 47/18 | 40/38 |
| Nepal | 38/76 | 20/6 | 42/18 |
| Pak | 20/42 | 27/20 | 53/38 |
| Philipp | 14/36 | 31/15 | 54/49 |
| Sri Lan | 16/34 | 27/25 | 56/40 |
| Thailand | 11/50 | 44/14 | 45/37 |
| Vietnam | 20/57 | 42/37 | 38/6 |

# Why Science Communities and Oriented basic research capacity essential?

- Most of the countries are still agriculture based economies with good proportion dependent on it
- Biological sciences, agriculture and health needs demands local capacities in S&T
- These capacities are linked to oriented basic research and endogenous capacities
- Tech.Transfer is costly in post-wto regimes
- Science commuities – Univ – specialist groups/labs linked & have to evolve locally

# Challenges - 1

- Tier 1 countries Singapore/Korea difficult to serve as relevant 'models' for Tier 2& 3 countries except for Malaysia and a portion of manufacturing sector
- Need a different model of S&T capacity via science communities to innovation (China/India/Singapore)
- For this - drive towards professionalisation is very important (Singapore example)
- Human resources development is essential

# Challenges 2

- Strategy for SMEs and industrial cluster based innovation
- Some lessons of learning on clustering from Taiwan, China and India
- Transitional technologies and innovation to manage the transition from agriculture to industry/service oriented knowledge economies
- Need a new innovation perspectives for agro-industrial develpment

# Challenges 3

- Third set of challenges relate to the impact of new technologies such as ICT, biotechnology etc
- S&T capacities here are also linked to development of universities and science communities
- Ph.D training and Professional 'sandwich' programmes with reputed universities in different countries (Singapore and Thailand good example)

# Concluding Remarks - 1

- S&T policy mechanisms are grossly under developed and utilised by most countries. S.Korea, Singapore and Malaysia are good examples to emulate.
- Oriented basic research and developing science communities is not luxury but essential factor of S&T based development
- Arresting brain drain depends on the extent to which local/national science institutions promoted and intellectual climate is created
- Unfortunately there are no short cuts to this state mediated S&T based development – clear from Singapore and S Korea and other big countries like India and China
- Universities and HEIs will play a key role in future S&T based development – calls for 'neighbourhood effect of HEIs'.

# Remarks 2

- East Asian 'dragon model' has very limited relevance for rest of developing Asia which are agiculture based economies
- Clustering and cluster innovation systems with regional/rural economies provide new window of opportunities
- Need public-private partnerships in technology parks, incubation and entrepreneurial schemes
- Role of industrial schools and polytechnics for skills training have a crucial role to play
- Our survey research did not focus on gender, science and technology issues. This calls for further research focus.
- Need for detailed case studies approach to identify lessons of learning from established bench marks