

The Synthetic Biology Community in Pakistan

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Pakistan

- Population: 212 million
- Largely an Agriculture Economy
 - 21% of GDP
 - 45% of labour workforce
 - 29.4 million tonnes of milk produced

Our work so far



Institute of
Integrative
Biosciences



SynBio in Pakistan

- Grassroots story sparked mainly by iGEM, the International Genetically Engineered Machines competition
- Ripples already created by iGEM Alumni
 - Community Labs
 - Startups
 - Open Agriculture
 - Open Hardware
 - BioArt
 - ELSI



SynBio in Pakistan

- 'Multiple nuclei' of communities
 - BioE
 - IGEM
 - Startup Weekend
 - The 'Undivided': bioart community
 - Precision Medicine Lab
 - Outreach activities
 - Seminar series
 - Training series

Peshawar's Bio Ecosystem

20+
BioArt

12
IGEM16

60+
PIs/APs

13
IGEM17

73
LabSkills

170+
BioE

210+
BYLC

95+
Startup
Weekend
SynBio

3 large private hospitals
1 large public hospital + others
60+ smaller clinics
30+ pharma units
10,000 OPDs+

4000+
biotech grads in KP

SynBio in Pakistan

- Strong student outreach
 - 18000+ public/private, rural/urban, boys and girls,
 - All four provinces
 - 200+ events
 - 60+ schools
 - 10+ science fairs
 - National STEM School
 - All print, media and social media outlets



SynBio in Pakistan

- A rejuvenated National Institute of Health in Pakistan
 - A very active Pakistan Biological Safety Association with international partnerships in place, especially the US NIH's Fogarty Centre.



SynBio in Pakistan

- Inter-disciplinarity is inevitable, but culturally very difficult.
 - Barriers in curriculum and pedagogy at universities
 - Barriers in research collaborations
 - Barriers in research funding

Challenges and Opportunities

Implications of Carlson curves

Increase in performance

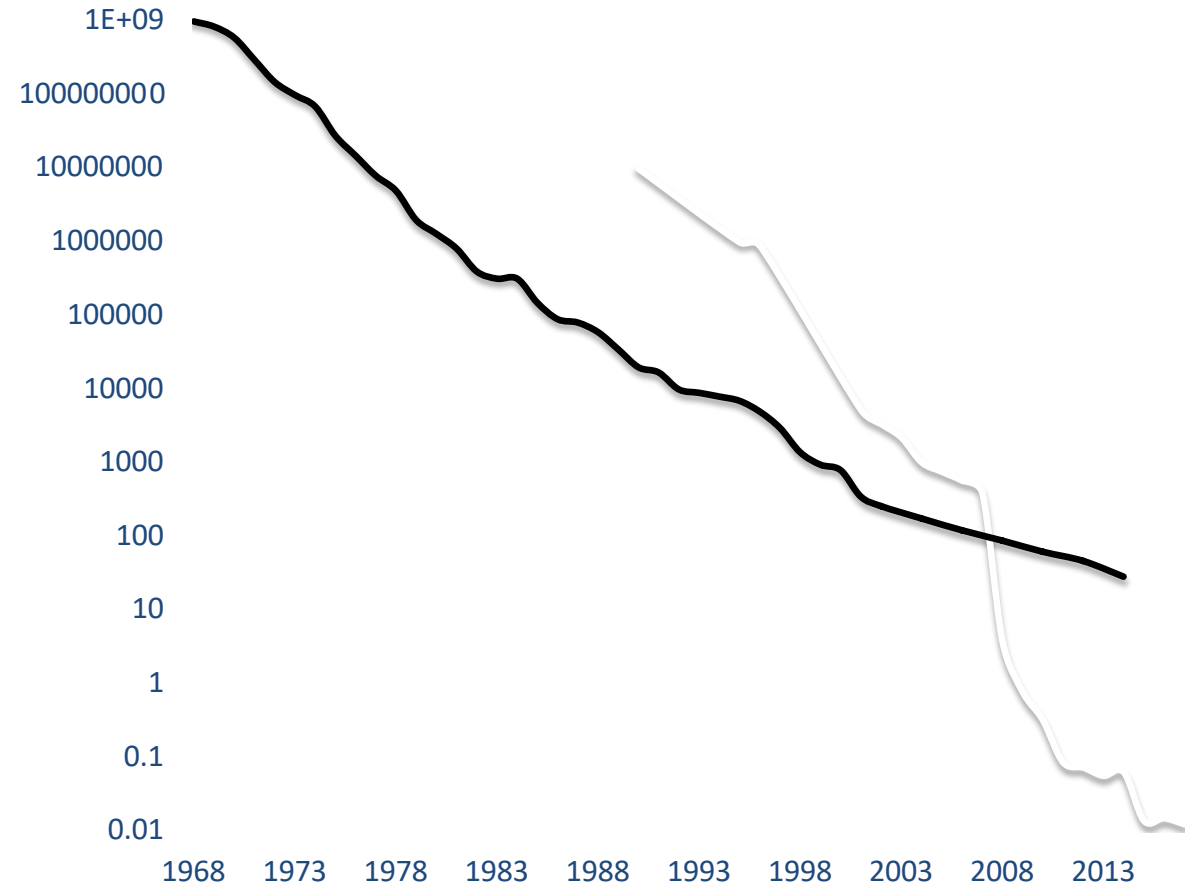
= Drop in costs

= Democratization (Biology's PC moment)

= More innovation

= More regulation? Different across regions?

= Access and Benefit Sharing?



Challenges and Opportunities

- Discourse on Responsible Research
 - Not there in the curriculum
 - Can PBSA be leveraged?
 - Can the national Higher Education Commission (HEC) be supported to support this and also ELSI research?

Challenges and Opportunities

- Capacity in the Public Sector
 - The S&T infrastructure within the government needs a lot more specialists.
 - Currently, in the current economic climate, not a priority area for the government.

Challenges and Opportunities

- 64% of the country falls in the youth, 70%+ in KP.
 - Can we engage the youth upfront and help with exciting research directions?
 - Can we invest in young researchers, through formal channels: startups, graduate scholarships, etc?

Challenges and Opportunities

- Leveraging non-curricular science
 - Can Outreach be used as a vehicle to promote RR?
 - Can IGEM be used as a vehicle to promote RR?

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