

Regional Knowledge and Practice

Linking Higher Education with new Job Definitions and Development Outcomes

A Proposal for Centrally Funded Institutions
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1. Background.

There are *two key issues of human resources development*, which this proposal addresses. These are:

(HR1) the creation of sufficiently trained human resource, researchers and knowledge in key development areas.

(HR2) to show and create avenues and gainful opportunities for our youth

Our proposal links the two by creating jobs and knowledge in the development sectors through its professionalization.

The two key development areas are:

(D1) provision and improvements in basic services such as drinking water, cooking energy and public transport.

(D2) knowledge support to medium, small, rural and household enterprises.

Both of the above are extremely important to move our people out of poverty and to improve social security. This will reduce the dependence on agriculture, strengthen industry and balance the role of the service sector in our economy. This has been recognized by many national leaders, including Dr. Ambedkar, as early as in 1917.

However, on both the fronts, i.e., the provision of basic engineering or socio-economic services such as drinking water or public transport, or in the capabilities of our manufacturing sector, esp. small and medium sectors, India has performed badly. ***New engineering and new knowledge and practice is required in both these areas. For this, new ways of professional engagement between higher education institutions, regional development agencies and society need to be established.***

An important part of the reason for our development deficit, is our outdated curricula, much research of little utility and very little engagement of institutions with problems of the neighborhood. For example, the curricula for civil or mechanical engineering in Mandi, Himachal Pradesh is the same as in Mumbai. Or for that matter, Sociology in Delhi or Hyderabad. It was in this connection that on August 22, 2014, at the Hon. President's Conference with all IIT Directors, our Hon. Prime Minister, Shri Narendra Modi, observed that “***Science is universal, but Technology must be local***”.

Existing programs such as IMPRINT or GIAN tackle the high-end research requirements. However, it is not clear how much applicable knowledge will get generated and how will it be broad-based across the nation's institutions and eventually transferred to regional implementation agencies.

Key Objective: To prepare institutions into becoming regional knowledge resources.

This will need institutions to develop the capability to work on regional problems in developmental sectors. Our proposal indicates a route to achieve this by a migration to a curricula and research culture of excellence in regional relevance. This will be achieved while maintaining their current strengths, including their autonomy, and causing as few disruptions as possible.

The proposal will also address another important problem:

(HR3) What is the role of Centrally Funded Institutions in strengthening higher education at all levels?

2. Proposal for centrally funded institutions (IITs, NITs, JNU, CUs, DU, IISERs and others):

The proposal consists of 3 parallel steps A-C to be achieved in 5 years.

Step A. Regional Knowledge and Practice (RKP). Each *department* within these institutions should undertake the following:

(i) **Identify.** In consultation with the state government, identify 2-3 regional knowledge and practice (RKP) sectors (i.e., sectors of regional interest and in the development area) of their choice to develop as potential research and teaching areas.

(ii) **Reform.** Develop suitable academic courses and formal avenues for projects for students and researchers. *Develop interdisciplinary methods and linkages within and across departments to address the specificities of the chosen sector.*

(iii) **Engage.** Address community, regional and state demands in the same area and deliver solutions through such projects. This may include case-studies, analyses, designs, assessments, evaluations and policy studies.

(iv) **Consolidate.** Generate new knowledge and extend this to regional agencies. Extend course-work, methods, case-studies and research frameworks to regional colleges.

The objectives will need sustained efforts over a span of 3-5 years so that a body of practical knowledge and theory is developed. Sample regional knowledge and practice (RKP) areas for some disciplines are given in the table below. Note that the table is indicative. Most areas require skills and expertise from several disciplines.

Department	Regional Knowledge and Practice Areas
Civil and Env. Engg.	Low-cost housing, Drinking Water, Watersheds, Irrigation, Sanitation and Soild-Waste
Mechanical Engg.	<i>Chulhas</i> and Cooking energy, Pumps and Irrigation energy, Small engineering enterprises, Solar thermal systems and their deployment
Chemical Engg.	Small food processing industries, Local manufacture of oils and soaps, Equipment for small enterprises, Pollution control and standards at regional level

Electrical Engg.	Rural grids, Energy audits for villages and towns, Pumps and Motors, Household appliances and their manufacture, Renewable energy systems for households and small enterprises
Computer Sc. and IT	Public transport, Logistics of PDS, GIS and E-governance at the Zilla Parishad, logistics of local railway network and bus stations
Chemistry	Regional water quality, materials and dyes used in local industry
History	Updation of the district gazette. Documentation of the history of public assets and institutions. Creation and documentation of people's narratives and of role models.
Economics	Analysis of city budgets. Assisting in the preparation and validation of the district economic survey.
Sociology	Supporting GPs in access to development services, monitoring PDS, documenting customs and practices. Documenting linkages with environment, e.g., <i>chulhas</i> and wells.

Step B. Coordination. Different practice areas across departments will need many common services, e.g., liaison with local agencies, data, logistics, and also lead to a regional plan and deeper interactions with regional players and bodies, e.g., the District Collector.

To manage this, the institution may organize a "Regional Development Center (RDC)", or revamp or start a CTARA (www.ctara.iitb.ac.in), School of Development, Department of Development etc., as it chooses. This will coordinate across all these regional knowledge areas, support and liaison for them with regional and state agencies, design appropriate cross- and inter-disciplinary curricula, define priorities over areas, guide RKP offerings, ensure utility and maintains standards. If necessary, it may run its own courses or programs, seek faculty on deputation from other departments and hire dedicated faculty members. The RDC may develop its own strategy on behalf of the institute on problem areas and agencies. It may also operate an extension, innovation and consulting incubation cell (such as TDSC, www.ctara.iitb.ac.in/tdsc) for starting fresh graduates into development areas.

Step C. Incentives. The institutions may evolve a method of measuring faculty contributions, attributing faculty time, and rewarding excellence in relevance. An allied recommendation is that they may together start a *Indian Journal of Development Sciences and Engineering* or a development track in *Sadhana* or *Current Science*, the journals of the Indian Academy of Sciences.

3. Support from MHRD, DST, ICSSR and GoI

(i) MHRD may first seek the opinion of each institution on the proposal, its possible impacts (both negative and positive), difficulties in its implementation and possible changes.

(ii) Institutions may then prepare a Project Plan to roll-out Steps A,B and C. This will mean changes in the curriculum, identifying areas and faculty members, assigning responsibility, space and budget for field-work and setting up the required liaison.

(iii) Creating expertise in areas such as *cooking energy*, will require field-work, reporting, some

new equipment and coordination staff. MHRD and DST together may support the development of various Regional Knowledge and Practice sectors and programs, through funding for laboratories, initial expenses, coordinator positions, chair-professorships etc. at the RDCs within IITs, IISERs, CUs and NITs. Suggested funding is Rs. 20-40 lakhs per year, per sector for 5 years.

(iv) Through the concurrence of the state governments, instructions may be issued to Secretaries of various agencies, District Collectors and other officers, to make available all relevant data, maps and documents, as and when needed, access to facilities, cooperation of staff, and wherever possible, travel to locations and support for basic expenses.

4. Outcomes

1. New practices and professions. New efficiencies. The knowledge so generated will be the empirical basis for new professions, new job definitions and new engagements. For example, a study of district and tehsil-level public transport will lead to new routes, new roles and new processes at bus-depots and at divisional offices. New entities such as the District Drinking Water Office may emerge which will guide the practices of water supply departments. It may also create new opportunities for professionals and for local companies in provisioning of development services. Finally, it may strengthen local industry by providing technical and analytic support.

2. IITs/IISERS//NITs/CUs as hubs and role-models. It is the mandate of the IITs and most other CFIs, to develop novel curricula which are needed by society and to establish new and relevant research areas. These institutions will serve as important role models and clear the way for regional institutions to experiment with ways of engaging with society. Eventually, over time, they will also develop expertise on regional problems.

3. Knowledge network in key areas. Nationally too, in any development area, for example, *chulhas* and cooking energy, or public transport, there may be 15-20 institutions working on a particular area. Their experience will help in devising actionable policies. This network of institutions will be a part of our national knowledge infrastructure, and will be of immense use in responding to crises such as droughts.

4. Enabling engagements. Finally, many states are looking at higher education institutions as partners in their search for ways of development. The Unnat Bharat Abhiyan and the Unnat Maharashtra Abhiyan are examples of this. For this, there needs to be a curriculum, research and funding framework for useful research and ways of engagement between institutions and state agencies. The establishment of RDCs is a step in this direction.

5. Notes

1. The role of the University and Higher Education Institutions. It has been argued that the university should be a place for critical and possibly dissenting thought and a platform for furthering democracy and modernity. However, for such a role to be envisaged, the broader university must first comprehend the ground reality and basic development processes and be able to offer constructive engagements. Only then can it credibly argue for universal values. The proposal aims to bring the necessary empirics and legitimacy to the participation of regional colleges in the development agenda. This it does by ensuring the participation of elite institutions and by building a bridge between them and regional colleges.

2. Minimal issues in accreditation/approval. The proposal makes no changes in core curricula of any discipline. It merely proposes special electives of regional relevance and a suitable inter-disciplinary training to support these courses. Thus, it has no implications for accreditation or curriculum approval with national bodies. Vis-a-vis international norms such as ABET, Indian degrees exceed the core requirements, and have very little inter-disciplinary, field, humanities or social science content. As a result our institutions do poorly in international rankings in academic reputation, and the usefulness of the knowledge of its graduates (even for IIT Bombay!). The proposal will in fact, enhance the rankings of our institutions. It will also help create linkages with regional institutions in applied social sciences or medicine, thereby improving the exposure of our students and faculty members to these important areas.

3. Background Paper. Much of the data on the poor performance of India in core engineering, development services, in the conduct of research and in the placement of our engineering graduates is available in my article, *The AICTE reform: an opportunity for engineering education reform*, which appeared in *Current Science*, Vol. 110, No. 2, 25th January 2016, and my presentation before the UGTE committee of the AICTE on 17th September, 2016. The links for both are:

<https://www.cse.iitb.ac.in/~sohoni/aicteCS.pdf>

<https://www.cse.iitb.ac.in/~sohoni/AICTEpresentation.pdf>