

State of Engineering for Global Development



Asia

Written by: **Pallavi Kunwar**
E4C Jr. Fellow | Seoul National University, South Korea

Edited by: **Carolina Rojas**
E4C Expert Fellow | Universidad Tecnológica de Panamá, Panama

Grace Burleson
E4C Research Manager | Univ. of Michigan, Ann Arbor, MI, USA

Mariela Machado
E4C Program Manager | New York, NY, USA

Additional contribution: **Gautam Patel**
E4C Volunteer | Marwadi University, India

TABLE OF CONTENTS	Introduction, Methods, Definitions pg 1
	Overview pg 4
	Summary Table of Programs pg 5
	Program Descriptions pg 8
	Conferences pg 17
	Networks pg 18
	Journals pg 19
	Faculty pg 20

Disclaimer

To E4C's knowledge, this is the first report of this kind to attempt to list out all the definitions/views, programs and faculty who work in Engineering for Global Development in Asian countries. We recognize that there will likely be missing information in this first edition as this report remains a work in progress. Therefore, If you identify any programs or professors that you believe should also be included in this report, please email us at research@engineeringforchange.org.

Introduction

Engineering for Global Development (EGD) is a growing field in which technology and design are utilized to support communities around the world and improve the quality of life. EGD as defined by Engineering for Change (E4C) is an interdisciplinary practice that aims to improve the living conditions of underserved communities worldwide through the design and delivery of technology-based solutions combined with the building of local capacity. E4C believes that to do this effectively, practitioners must integrate their technical training with an understanding of economics and business, social science and politics to benefit people living in poverty.

This report aims to analyze the state of Engineering for Global Development in Asia through the examination of the way Engineering for Global Development is viewed and implemented by different academic institutions across the region. This report attempts to comprehensively highlight the many definitions, programs (undergraduate courses, masters, postgraduate and innovation centers, etc.) and professors and research groups dedicated to this work in different countries with the intention to further connect and understand the state of EGD-related programs across the continent. It is our goal that this report will be used by students interested in pursuing EGD opportunities as well as by members of institutions hoping to connect, collaborate, and share knowledge.

Asia covers 30% of the Earth's total land and 8.7% of Earth's total surface. With 60% of the world's population, Asia is home to 4.5 billion people and is the largest continent comprising of [48 countries distributed in 5 regions](#) which are as follows:

- **Central Asia** (Tajikistan, Uzbekistan, Kazakhstan, Turkmenistan, Kyrgyzstan)
- **East Asia** (China, Mongolia, North Korea, South Korea, Japan, Hong Kong, Taiwan, Macau)
- **Western Asia** (Georgia, Armenia, Azerbaijan, Turkey, Cyprus, Syria, Lebanon, Israel, Palestine, Jordan, Iraq, Iran, Kuwait, Bahrain, Qatar, Saudi Arabia)
- **South Asia** (Sri Lanka, Bangladesh, India, Afghanistan, Pakistan, Bhutan, Nepal, the Maldives)
- **South East Asia** (Indonesia, Malaysia, Singapore, Philippines, East Timor, Brunei, Cambodia, Laos, Myanmar (Burma), Thailand and Vietnam)

Countries Considered

Asia is not only home to many powerful economies like China, India, Japan and South Korea but is also home to some of the poorest economies in the world like North Korea, Afghanistan, Nepal, Tajikistan and Yemen. Asia is a continent of diversity, each country differs either in social, economical, cultural or political aspects. And since Asia covers a large part of the world, with a lot of differences, this edition of the State of EGD-Asia only managed to include information on 7 specific countries (India, Nepal, Sri Lanka, South Korea, Japan, Vietnam and Bangladesh) out of 48 countries as of now. However, more information on other countries shall be included in future as it is a work in progress.

India. Among the countries included in this report, India had the most engagement in the field of EGD. One of the major reasons for this was due to active participation of the government. With almost 66% of India's population living rurally as of 2018, the government of India has prioritized rural development by investing in innovation, education and infrastructures that meet the needs and demands of people in rural communities. It is also observed that many academic institutes were seen involved in practicing EGD in the form of academic courses, graduate programs, internship, fellowship, workshops, training, exchange programs or more abundantly incubation/startup centers or clubs within the university. More than 20+ academic centers were found within India specifically, which was mostly seen practiced in high ranked universities such as the IITs. This result indicates that the current status of EGD in India is very active and is a rapidly growing field with the support of Indian government and also through international collaboration .

Nepal. In the case of Nepal, the engagement of EGD despite is growing in demand. Within a handful of engineering universities, only two of the universities were seen practicing EGD in the form of innovation and incubation center and design labs. No engineering institutes delivered specific graduate or undergraduate programs or even the courses on EGD and nor were there any individual research labs owned by the faculties doing projects related to EGD. Hence, the result indicates that the current status of EGD in Nepal is not as active as that in India but, in future, EGD-experts based in Nepal claim that the field is envisioned to have a steady growth in the coming years.

Sri Lanka. In the case of Sri Lanka, there is a general lack of engagement in EGD practices across academic institutions. Desk research and an interview with a faculty professor from Sri Lanka identified that there are no specializations for EGD in graduate/undergraduate programs, academic courses or experiential opportunities. The interviewee also proposed the reason behind this could be due to lack of demand and general awareness of the EGD field among citizens, academics and practitioners.

South Korea. Awareness and engagement in EGD-related initiatives is growing in South Korea. A variety of academic professors were found working in the various fields of EGD, which was distributed across many Korean Universities. No specific graduate/undergraduate programs were identified for South Korea, however, several research labs with partial focus on EGD and few dedicated regional networks were discovered. The current status of EGD was seen to be quite active as the government of South Korea has been motivating the researchers and practitioners with funds and investment to work in this field as a part of Official Development Assistance (ODA) programs. Moreover, from an interview with one of the renowned professors in the field of EGD, we understood that the future of EGD is expected to grow more in upcoming years. A key reason behind this upsurge is growing interest among students to work in the field of EGD and available financial support from

Method

A list of institutions with EGD programs was generated by doing desk level research and interviews with 18 experts (e.g., faculty professors, students, and staff in the countries of interest). Professors conducting graduate-level research were identified either through information available on the internet or through reference and recommendations from E4C members. Relevant experiential activities such as workshops, training programs, internship opportunities and conferences together with regional networks were also identified. Most of the data for these institutions were collected via phone and Zoom interviews with several professors from different universities. Moreover, the conferences and journals that were identified under the umbrella of engineering for global development or its different names or denominations (listed in the next section) were also included in the present report. Independent innovation centers and organizations that were associated with universities were included as an experiential opportunity in this report.

Definitions

Engineering for Global Development (EGD) - EGD is an interdisciplinary practice that aims to improve the quality of life of underserved communities worldwide through the design and delivery of technology-based solutions combined with local capacity-building. To do this effectively, practitioners must integrate their technical training with an understanding of economics, entrepreneurship, social science and politics to benefit people living in poverty. Engineering education programs that support this definition are found at many institutions throughout Asia. Program-specific aims and goals may be broader or further specialized than the definition presented here. Likewise, terminologies and titles vary - such as "appropriate technology", "rural technology", "rural development", "sustainable engineering", "indigenous engineering", "jugaad Innovation", "innovation center", "incubation center", "design for development", "design for incubation", "social innovation" or "development design"; among others. Regardless of a lack of terminology-consensus in this field, this report includes those programs that E4C has identified as supporting a generalized and overarching definition of EGD.

Graduate degree (MS/PhD) - Advanced academic degree programs, such as Master's and doctoral degrees offered at an institution of higher education, such as a university or college.

Courses - Curricular units of teaching that typically last one academic term. In this report, we include both graduate and undergraduate level coursework under this definition.

Experiential Opportunities - Experiential opportunities take place outside of a traditional classroom setting including fieldwork, internships, Innovation centers, incubation hubs and study abroad.

Research - In this report, research is defined as practices that systematically investigate EGD-related topics, which lead to new conclusions and developments. These efforts are led by academic faculty members including professors, assistant professors, associate professors, and research professors.

Overview of the State of EGD-Asia

Results from our exploration show that 19 higher-educational institutions in the subset of Asian countries now offer a variety of EGD opportunities for students through curricular, co-curricular and extra-curricular programs and research. From these 19 institutions, the following number of EGD-related programs are available:

- Undergraduate degree: 0 institutions
- Graduate degree (masters): 8 institutions
- Graduate degree (PhD): 7 institutions
- Courses: 14
- Research: 19 institutions
- Experiential opportunities: 28 institutions

The programs included in this report range in size, sector of interest, and opportunities available. The number of programs is continuing to grow and is gathering pace. These opportunities not only prepare students for future careers in EGD, but also allow students to develop engineering design, teamwork, and project management skills. EGD teaching in universities often focuses on a collaborative approach in their relationships and partnerships with developing communities and economies.

There remain several opportunities for curricular EGD program growth and development in Asia. Of the 18 institutions included in this report, only five currently offer bachelors or masters degrees in related fields. Additionally, many institutions offer introductory and capstone classes, but lack vertical integration within their EGD programs leading to curricular gaps for students in their second and third year. Institutions with EGD programs have the opportunity to provide a context for engineering to teach the necessary skills and competencies that have not traditionally been included in engineering curriculum, which will ultimately prepare the next generation of engineers to innovate for the benefit of the common good.

Since EGD is an interdisciplinary field, terminology and names differ across institutions and regions. Across the countries investigated, various terminologies are used, presented below.

Country	Common EGD Terminologies
India	Rural engineering, Rural technology, Sustainable Technology, Appropriate technology, Design lab, Innovation lab, Entrepreneurship Center
Nepal	Appropriate technology, Innovation center, Design Lab, Rural Technology, Sustainable Engineering
Sri Lanka	Appropriate technology, Indigenous Engineering, Rural technology
South Korea	Appropriate technology, Engineer without border, ODA projects, Design Lab
Japan	Appropriate technology, Technology for Innovation, Global engineering
Bangladesh	Appropriate technology, Innovation and technology
Bhutan	Appropriate technology

Summary Table of EGD Programs in South Asia

Institution & Location	Program Name(s)	BS/ BA	MS	Ph.D.	Courses	Research	Experiential Opportunities
India							
Indian Institute of Technology Bombay (IITB)	Society for Innovation and Entrepreneurship (SINE)						X
	Centre for Technology Alternatives for Rural Areas		X	X	X	X	X
	IDC School of Design				X	X	X
	Biomedical Engineering and Technology Innovation Centre (BETIC)					X	
Indian Institute of Technology Delhi (IITD)	Centre for Rural Development and Technology			X	X	X	X
	AssisTech					X	
	ACT4D: Appropriate Computing Technologies for Development					X	
	Social Innovation Lab						X
Indian Institute of Technology Gandhinagar (IITGN)	Dr Kiran C Patel Centre for Sustainable Development				X	X	X
	Innovation and Entrepreneurship Center						X
Indian Institute of Technology Guwahati (IITG)	Center for Rural development		X	X	X	X	
	Sustainability & Social Innovation Lab				X	X	X
Indian Institute of Technology Kanpur (IITK)	Startup Incubation and innovation center						X
Indian Institute of Technology Kharagpur (IITKGP)	Center for Rural Development and Innovative Sustainable Technology					X	
Indian Institute of Technology Madras (IITM)	Indo German center for Sustainability (IGCS)				X	X	X
	Healthcare Technology Innovation Centre (HTIC)					X	X
	IITM- Incubation Cell (IITMIC)						X
	Rural Technology Business Incubator (RTBI)						X
	Entrepreneurship Cell of IIT Madras (formerly CTides) (E-Cell)						X
	Centre for Innovation (CFI)						X
	Center for Social Innovation and Entrepreneurship (CSIE)					X	X

Institution & Location	Program Name(s)	BS/ BA	MS	Ph.D.	Courses	Research	Experiential Opportunities
Indian Institute of Technology Roorkee (IITR)	Design Innovation Center (DIC)		X			X	X
	Tinkering Lab						X
	Technology Incubation and Entrepreneurship Development Society (TIEDS)						X
Indian Institute of Technology Hyderabad (IITH)	Center for Healthcare Entrepreneurship						X
	Design Innovation Centre (DIC)						X
Vellore Institute of Technology	VIT-TBI (Technology business incubator)						X
Nepal							
Pokhara University	Nepal Innovation Technology and Entrepreneurship Center (NITEC)					X	X
Kathmandu University	Design Lab					X	X
Japan							
Kobe Institute of Computing (KIC)	Graduate School of Information Technology					X	X
University of Tsukuba	The Appropriate Technology and Science for Sustainable Development program				X		
Tokyo Institute of Technology	Global Engineering for Development, Environment and Society		X	X	X	X	X
	Engineering Sciences and Design		X	X	X		
	Innovation Science			X	X		
	Technology and Innovation Management		X		X		
University of Fukuki	Global Engineering Program for International Students (GEPIS)		X				
	Global Engineering Program for Research and Development (GEP for R&D)			X		X	
South Korea							
Seoul National University	Design for Manufacturing (DFM)					X	X

Institution & Location	Program Name(s)	BS/ BA	MS	Ph.D.	Courses	Research	Experiential Opportunities
Bangladesh							
Bangladesh University of Engineering and Technology	Institute of Appropriate technology		X				
Bhutan							
Jigme Namgyal Engineering College	Center for Appropriate technology (CAT)						X

EGD Program Descriptions

The following list includes programs in universities but also related Innovation centers & labs, student led associations/orgs and regional partnerships.

[Centre for Technology Alternatives for Rural Areas, Indian Institute of Technology Bombay \(IITB\), India](#)

Courses: The center offers courses for the undergraduate level under the umbrella of Technology and Development (TDSL) program of CTARA. Students learn about analysis and design by working on collective ongoing projects which involves direct interaction and interface with the larger society and stakeholders.

Graduate: CTARA was established in 1985 as an independent center of IIT Bombay. This individual center in IIT Bombay offers Masters and PhD programs in Technology and Development. The program is designed to bridge the void between academic institutes and local society. Graduate students of CTARA are also given an opportunity to serve the society through being employed in various governmental departments at the centre and state; industrial houses, non-governmental organizations and community-based organizations.

Experiential: It offers ground level exposure to students by providing field visits of 9 weeks for Master's in Technology (M.Tech) students and 4 weeks stay for PhD students where they get to learn, interact and observe rural communities. Students develop analytical thinking and understand the exact problems faced by the community through data collection and analysis. The center also organizes different training and workshops within the study period.

[Technology and Development Solutions Cell \(TDSC\), Indian Institute of Technology Bombay \(IITB\), India](#)

Experiential: It is an initiative of CTARA that provides resources and consulting services to students and faculties working on technology-based solutions for solving development sector community problems. The center's main focus is on the water, energy, sanitation, healthcare, and agriculture sectors.

[Center for Rural Technology, Indian Institute of Technology Guwahati \(IITG\), India](#)

Graduate: The Center for Rural development in Guwahati offers students opportunities to learn more about rural technologies and development through their Masters and PhD courses. The courses within the program allows students to solve grass root problems holistically as they learn not only engineering but also management, communication and entrepreneurship.

Research: The center encourages the research activities on various problems faced by rural communities. It provides consultancy in various sectors for rural development but their projects and work are mainly concentrated on water, agriculture and sanitation.

[Centre for Rural Development and Technology \(CRDT\), Indian Institute of Technology Delhi \(IITD\), India](#)

Courses: CRDT offers a total of 24 courses mainly focusing on rural technology, development and management. The courses are elective and are open to both undergraduate and postgraduate students of the institute. Courses like Technology and Community Development, Technology Alternatives for Rural Development, Rural industrial planning and management and Rural Resources and Livelihoods aim to introduce students to grassroots level problems. These courses encourage students to solve some of the most pressing problems of the rural community.

Graduate: PhD and postdoctoral programs are available at CRDT. Some of the area of study for the PhD program covers artisanal technologies and rural industries; bamboo technologies, animal energy, renewable energy technologies; rural energy systems; biomass, combustion, clean cookstoves; solid waste management, treatment of industrial/domestic waste; wasteland reclamation; tissue culture; mushroom technology; ethnoveterinary medicine; ecological sanitation and more.

Experiential: The Centre also offers short-term courses and training programmes for both national and international participants with background in community development, research, policy making, entrepreneurship and governance. The center fosters and supports startups and social entrepreneurship as a mechanism for creating impact in several areas.

Research: With well equipped laboratories, the center provides a good environment for research with the focus on sustainable agricultural production, habitat, water, sanitation, and energy.

[Center for Rural Development and Innovative Sustainable Technology](#), Indian Institute of Technology Kharagpur (IITKGP), India

Research: With three different laboratories (Chemical And Biochemical Laboratory, Mechanical Fabrication Lab, Rural Technology Demonstration Laboratory), the center provides an environment for students and faculties to carry out research. The main focus area of the center is mainly agricultural practices and production, climate change and rural development, management, and planning. Center for Rural Development and Innovative Sustainable Technology was established in 1975 with the aim of becoming an outreach centre of IIT Kharagpur to address challenges confronted by rural communities and to improve their quality of life.

[Sustainability & Social Innovation Lab \(SSI\)](#), Indian Institute of Technology Guwahati (IITG), India

Graduate: Under Department of Design at IIT Guwahati, SSI lab offers a graduate degree program only for PhD. The program revolves around topics like sustainable design/management, low cost solutions, sustainable design, social innovation etc.

Experiential: The center also engages students in sustainability practices through internship opportunities, workshop training, research and social innovation.

Research: Undergraduate and postgraduate students can carry out research projects or their thesis projects related to design and sustainability through SSI.

[AssisTech](#), Indian Institute of Technology Delhi (IITD), India

Research: At AssisTech, a group of faculty, research staff and students, are engaged in research related to education, mobility and health. Specifically, their research team is dedicated to working on finding affordable solutions for the visually impaired with design, innovation on ICT or mechanical designs.

[ACT4D: Appropriate Computing Technologies for Development](#), Indian Institute of Technology Delhi (IITD), India

Research: ACTD4 is a group of faculty, research staff and students at IIT Delhi who are focused in solving problems of people living in developing/bottom-of-the-pyramid regions of the world. The group is focused on improving the life of people through their knowledge in design, information and communication technologies.

[Dr Kiran C Patel Centre for Sustainable Development](#), Indian Institute of Technology Gandhinagar (IITGN), India

Courses: The sustainability focused center revolves around the principle of appropriate, green and environmental friendly technology. It offers several courses to undergraduate and graduate programs such as sustainability and environment, and energy efficient designs.

Experiential: The center caters indigenous problems by attracting students and faculties through various experiential opportunities like conferences, internships, networking and training programs, workshops, field based projects and provides resources for social innovation and entrepreneurship.

Research: The center aims to practice sustainability through research on sustainable water management, energy, climate change and natural resources.

External collaborations: Belmont Forum, Columbia University, USA, Duke University, Fortiss, International Water Management Institute, Kanazawa University, Newcastle University, Purdue University, Queen's University, Royal Netherlands Meteorological Institute, Royal University of Bhutan, The University of

Edinburgh, University of California, University of Colorado, University of Ruhuna, University of Tokyo, University of Washington, Yunnan Minzu University.

[Indo German Center for Sustainability \(IGCS\), Indian Institute of Technology Madras \(IITM\), India](#)

Experiential: One of the main experiential opportunities offered by the center includes summer and winter courses, the two week long program consists of lectures, discussions, group work and field trips where the students get to learn and practice the interdisciplinary perspectives on different challenges of sustainability. Moreover, the centre also provides long-term visiting professorships (duration: 1 to 3 years) and postdoc positions (duration: 1-2 years) in specific areas of research.

Research: The center mainly focuses on research related to water, pollution, waste management, climate change and energy which are related to Sustainable Development Goals (SDGs).

External collaborations: Rheinisch-Westfälische Technische Hochschule Aachen, Germany and Maschinenfabrik Reinhausen GmbH (MR), Germany.

[Graduate School of Information Technology, Kobe Institute of Computing \(KIC\), Japan](#)

Graduate: The institute offers masters Level courses on ICT and ICT4D for Japanese and international students. Graduates of this program are capable of managing development projects, contributing to international cooperation and work on social development through information communication technology (ICT). The institute offers professional, vocational, practical oriented education in ICT and other digital industries in Japan.

[Global Engineering for Development, Environment and Society, Tokyo Institute of Technology, Japan](#)

Graduate: Tokyo Institute of Technology offers a variety of global engineering related courses, among them Global Engineering for Development and Society offers a graduate program for both Master's and PhD programs. Students involved in this degree program will be able to learn the value of co-innovation to solve the global issues, urban problems, socio-environmental problems and international development. The degree is a fine blend of engineering approaches together with humanities/social scientific approaches.

Research: Research for this program is carried out by graduate students as their thesis program. The sector of research is diverse and does not stick to only one sector.

Experiential Opportunities: Training, field work and surveys, internship are offered as an experiential opportunities to the students enrolled in this degree program.

[Global Engineering Program for International Students \(GEPIS\), University of Fukui, Japan](#)

Graduate: This degree program at University of Fukui offers a Master's level course for international students who are willing to study various fields of engineering. The students enroll for 2 years and acquire 30 credits or more and defend their thesis. The program offers varieties of courses that intersect the discipline of global engineering. This course is however opened only for foreign nationals who are residing outside Japan and English is used as a primary language for instruction in courses and for research supervision of this Master's degree program.

[Global Engineering Program for Research and Development \(GEP for R&D\), University of Fukui, Japan](#)

Graduate: This program at University of Fukui offers a Doctoral degree course for international students who are aiming to nurture human resources with their knowledge in research. The 3 year program is open for international students where they will be taught advanced research skills and highly developed practical skills which will make them capable of leading industry worldwide. Additionally, the Graduate School of Engineering has a fund to support a part of living expenses corresponding to admission and tuition fees for students in this Doctoral Program.

[The Appropriate Technology and Science for Sustainable Development Program, University of Tsukuba, Japan](#)

Graduate: The department of environmental sciences under the University of Tsukuba offers a doctoral degree program in Appropriate Technology and Science for Sustainable Development. The program entertains both local and international students by offering them holistic courses on development of social, economic and environmental conservation through appropriate technology.

Research: The three research areas are Eco-regional Sphere Development Studies (seven research fields), Food Technology Development Science (six research fields), and Regional Development Economics (seven research fields).

[Engineering Sciences and Design, Tokyo Institute of Technology, Japan](#)

Graduate: The department of environmental sciences and design under Tokyo Institute of Technology offers a graduate program for both Master's and PhD. The degree provides individuals with engineering design abilities to solve the various problems faced by humankind by creating new technologies, values, and concepts. All in all the degree provides an understanding of the value of engineering concepts and designs to build a better society.

Research: Research for this program is carried out by graduate students as their thesis program. The sector of research is diverse and does not stick to only one sector.

Experiential Opportunities: Training, field work and surveys, and internships are offered as an experiential opportunities to the students enrolled in this degree program.

[Innovation Science, Tokyo Institute of Technology, Japan](#)

Graduate: This program is developed for individuals who are interested in acquiring a doctoral degree in solving societal issues through science, innovation and management. The program duration is 3 years and it includes course works plus some research and internship opportunities.

[Technology and Innovation Management, Tokyo Institute of Technology, Japan](#)

Graduate: This program under Tokyo Institute of Technology also shares a common agenda of developing society through appropriate engineering. However, the only difference from the above mentioned degrees would be the inclusion of some management and business courses. The program offers only a Masters degree and is designed for 2 years.

[Design for Manufacturing \(DFM\), Seoul National University, South Korea](#)

Course: Design for Manufacturing is a 3 credit undergraduate course under the department of Mechanical Engineering at Seoul National University. The course opens every fall semester for anyone who is willing to learn more about design and innovation in the field of appropriate technology. The course mainly focuses on sustainable and low cost manufacturing design especially targeting the underserved communities.

Experiential Opportunities: The course also allows students to do projects as a part of their learning module. Students are encouraged to design and develop innovative yet simple and cost effective methods. The lab and the economic support is provided for prototype making.

[Institute of Appropriate technology, Bangladesh University of Engineering and Technology \(BUET\), Bangladesh](#)

Graduate: The Institute of Appropriate technology is one of the oldest institutes within the Bangladesh University of Engineering and Technology. The institute offers a post-graduate program, short courses and training program, research facility for carrying out R&D research to support development of indigenous communities through generation and dissemination of technologies appropriate to the national development objectives of Bangladesh. The postgraduate program of IAT was introduced in 2009 as Master of Science of Management of Technology (MoT). It is veiled as a useful degree program for the technologists, engineers, entrepreneurs, policy makers, planners, and implementers in a developing country like Bangladesh who intend to harness technology for development. Individuals with four years

bachelor degree or postgraduate degree in Engineering, Urban & Regional Planning, Agriculture Science, Physical Sciences, Bio-Sciences and Architecture (5 years bachelor degree) are eligible for admission into this program.

[Center for Appropriate technology \(CAT\), Jigme Namgyal Engineering College, Bhutan](#)

Experiential Opportunities: The Center for Appropriate Technology gained its recognition in 2014 by the Research and Innovation Committee of Royal University of Bhutan. This center assists in developing need-based sustainable, and quality technology to the community by facilitating appropriate technology related technology transfer skills, training, consultation, research and innovations with faculties, students and staff. It aims to promote innovation for developing appropriate and sustainable technology to promote socio-economic growth to improve the living standard of communities.

Innovation/Incubation Centers

The following list mostly includes experiential programs within universities that include an EGD-related focus for developing appropriate or human-centered designs and prototypes.

[Rural Technology Business Incubator \(RTBI\), Indian Institute of Technology Madras \(IITM\), India](#)

Experiential: Rural Technology and Business Incubator (RTBI) at IIT Madras is a registered not-for-profit society that aims to support rural and social inclusive start-ups, primarily those that enable scalable products and services for the under-served community. They practice rural engineering and innovation in form of business startup and social innovation of different sectors like agriculture, health, education and livelihood with the touch of ICT on each sector.

[Social Innovation Lab, Indian Institute of Technology Delhi \(IITD\), India](#)

Research: Among various other research labs under the Department of Design in IIT Delhi, social innovation lab is the only lab working in close proximity to the appropriate technology field. There is no specific focus area for the lab however, students and faculties related with the research lab work on promoting rural entrepreneurial ideas based on design thinking.

[Rural Technology Business Incubator \(RTBI\), Indian Institute of Technology Madras \(IITM\), India](#)

Experiential: Rural Technology and Business Incubator (RTBI) at IIT Madras is a registered not-for-profit society that aims to support rural and social inclusive start-ups, primarily those that enable scalable products and services for the under-served community. They practice the development of rural technologies in the form of business startup and social innovation of different sectors like agriculture, health, education and livelihood with the touch of ICT on each sector.

[Center for Social Innovation and Entrepreneurship \(CSIE\), Indian Institute of Technology Madras \(IITM\), India](#)

Courses: The center offers a 10 credit minor specialization program in Innovation and Social Entrepreneurship. It is specially offered to all the Bachelors in Technology (B.Tech) students in their 3rd and 4th year of their undergraduate degree but other students from different degree programs are also eligible to participate in this course as an elective. The courses aim to introduce students to concepts of innovation and social entrepreneurship so that they can develop projects to tackle problems that low-income households face in India.

Experiential: As an experiential opportunity, the center offers field visits, research opportunities through their winter and summer school programs on entrepreneurship.

External collaborations: Lemelson Foundation's RAMP program for social entrepreneurs, Villgro Innovations Foundation, other technology institutions including IITs.

[Design Innovation Center \(DIC\), Indian Institute of Technology Roorkee \(IITR\), India](#)

Graduate: The center has recently discussed starting two new post-graduate academic programs on Masters; (a) Industrial Design (M Des) and (b) Innovation Management (M I M).

Research: Research is carried out mainly based on projects related to the relevant problems of the North-West Himalayan region and other national priority areas of India. The research is mostly carried in the sector of livelihood and agriculture and is done by focusing on the development of a culture of human-environment engagement in collaborative partnership with different stakeholders.

Experiential: The center also holds innovative outreach programs like P2P (Prayogshala to Prayogshetra), U2U (Udbhavan to Utpadan) and COMAL (Common Man to Laboratory). These programs are initiated to take innovations at the laboratory scale to the field. Besides these programs DIC IITR also facilitates internship and fellowship opportunities, webinar, workshops to engage students and faculties in appropriate technology fields.

External collaborations: IIT Roorkee, IIM Kashipur, NIT Uttarakhand, College of Technology Pantnagar

Society for Innovation and Entrepreneurship (SINE), Indian Institute of Technology Bombay (IITB), India

Experiential: The center encourages young minds and talents through innovation and entrepreneurship by nurturing tech start-ups. It acts as a bridge between research and entrepreneurship. The main focus sectors of the center are water technologies, green business, health technology and IT/ ICT.

IDC School of Design, Indian Institute of Technology Bombay (IITB), India

Courses: IDC Bombay offers varieties of social innovation related courses in Bachelors and Masters degree programs. Bachelors students learn about indigenous practices through courses like creating thinking processes and methods, design society culture and environment, 3D modelling and innovation and design technology and innovation. Whereas master's students engage in indigenous practices through courses like rural study, design and social entrepreneurship and individual projects. Research was seen to be carried out individually by students as a part of their degree program on various design and appropriate technology related topics.

Experiential: The center also fosters students' knowledge on innovation and engineering through internships, workshops, summer programs, projects and friendly design competitions. The center has no such priority for specific sectors however work and projects are carried out in all sectors with a holistic approach.

Centre for Innovation (CFI), Indian Institute of Technology Madras (IITM), India

Experiential: Centre for Innovation (CFI) is a 'Student Lab' at IIT Madras and acts as a platform where students can generate their ideas. It incentivizes the students to develop socially relevant projects related to the field of rural technology in India. The area of interest includes agriculture, ICT, health and livelihoods. The center provides work space, mentoring and guiding to the enthusiastic students in business and entrepreneurship.

Biomedical Engineering and Technology Innovation Centre (BETIC), Indian Institute of Technology Bombay (IITB), India

Research: The R&D networking body is mainly focused on developing local medical devices with the help of government, academia, medical community, industry, doctors, investors and facilitators. The team within this center is responsible to foster new and enthusiastic med-tech innovators by providing adequate guidance and support at the time of proving concept, prototyping, product design and market.

Experiential: The center also provides time, space and resources for med tech developers and innovators to work on their startup and business. Besides the guidance for innovators, the center also holds major events such as Medical Device Hackathon (MEDHA), Medical Device Innovation Camp (MEDIC), Medical Device Expo (MEDEX) and Medical Device Innovation Symposium (MEDIS) to encourage participation and build networking within the community.

External collaborations: The external education partners include KJ Somaiya College of Engineering, Mumbai, MIT Art, Design & Technology University, Pune, Symbiosis International University, Lavale, and G.H. Rasoni College of Engineering, Nagpur.

Center for Healthcare Entrepreneurship, Indian Institute of Technology Hyderabad (IITH), India

Experiential: The Center provides unique opportunities to students interested in Health Entrepreneurship. It offers a year long fellowship program where students can grow by working on their ideas and innovation. Moreover, the center also provides a favorable opportunity to incubate as it is additionally conceptualized, administered and mentored by Bay area entrepreneurs, top academics from the US, Indian and Biomedical industry. Young minds are attracted to this center as in the hope to get benefited through

mentorship, access to funding opportunities and physical space. The center aims to catalyze healthcare innovations in order to provide affordable solutions that address the healthcare needs of India.

[Healthcare Technology Innovation Centre \(HTIC\), Indian Institute of Technology Madras \(IITM\), India](#)

Research: This multi-disciplinary R&D centre built in a joint initiative of Indian Institute of Technology Madras (IITM) and Department of Biotechnology (DBT) focuses on developing healthcare technologies for the country. With the joint efforts of technologists, engineers, doctors and healthcare professionals, industry and government, the center aims to create impact and drive innovation in healthcare and be a leader known for technical excellence and collaborative spirit.

[Innovation and Entrepreneurship Center, Indian Institute of Technology Gandhinagar \(IITGN\), India](#)

Experiential: The Innovation and Entrepreneurship Center (IIEC) under IIT Gandhinagar works closely with appropriate technology by providing students and faculties an opportunity to work on their technical innovation. It offers some shared infrastructure, work place, consultancy and guidance to promote techno-entrepreneurship through innovative and creative thinking using an interdisciplinary approach.

[IITM- Incubation Cell \(IITMIC\), Indian Institute of Technology Madras \(IITM\), India](#)

Experiential: The IITM-Incubation Cell is an incubation center that encourages and motivates students, faculties, aluminis and researchers to work in the field of socially-relevant technologies through human centered design innovation. The innovators and young entrepreneurs are provided not only with the right set of mentoring, resource/infrastructure, funding and legal/IP services but one can also take advantage of networking for marketing and getting their products and ideas validated. Moreover, the center also hosts talk shows and workshops related to core entrepreneurial themes and startup related topics.

[Entrepreneurship Cell of IIT Madras \(E-Cell\), Indian Institute of Technology Madras \(IITM\), India](#)

Experiential: The entrepreneurship cell at IIT Madras provides a variety of year-long events like Conclaves, Keynotes, Industry-defined Problems, B-Planning Competitions and Workshops, through both personal and collaboration-based approach. Moreover, the center has also become the first in the domain to promote entrepreneurship in school students through initiatives like Education-21 (E-21).

[Tinkering Lab, Indian Institute of Technology Roorkee \(IITR\), India](#)

Experiential: Tinkering Lab at IIT Roorkee is a learning and networking space for students of IITR where they can experiment and conceptualize and verify different scientific ideas. It is a lot similar to the DIY (Do-it-yourself) method where the students are encouraged to apply the knowledge that they have gained in the classroom. The lab also provides certain infrastructures and tools for prototyping.

[Technology Incubation and Entrepreneurship Development Society \(TIEDS\), Indian Institute of Technology Roorkee \(IITR\), India](#)

Experiential: This center under IITR facilitates, improves, promotes, trains and supports creative thinking, idea generation, and inventions among the students of IITR. The center leverages R&D infrastructure, provides mentoring and seed funding to startups. Moreover, they also build an ecosystem of angel and institutional investors, industry experts, and other entrepreneurship focused entities for the incubators.

[Technology business incubator \(VIT-TBI\), Vellore Institute of Technology, India](#)

Experiential: VIT Technology Business Incubator (VIT-TBI) is a joint initiative between VIT Vellore and Department of Science & Technology, Govt. of India. It provides incubation support such as access to knowledge, funding, infrastructure, mentoring and to start-up ventures. The center does not have a specific focus sector but works on solving the overall problem faced by society.

[Startup Incubation and Innovation Center, Indian Institute of Technology Kanpur \(IITK\), India](#)

Experiential: Like different above listed incubation centers, Startup Incubation and innovation center at IITK also practices appropriate technology in the form innovation and entrepreneurship in technology by providing young minds the right set of mentoring, resource/infrastructure, funding and legal/IP services. The center claims to be started around the time when the idea of incubation and seed funding was just coming into the scene.

[Design Innovation Centre \(DIC\), Indian Institute of Technology Hyderabad \(IITH\), India](#)

Experiential: The design center strives to impart quality design education for sustainability through field knowledge. The department envisions engaging technologies and people through innovation, collaborative designs and sustainable projects. The center focuses on general well being of the society through art and design.

[Nepal Innovation Technology and Entrepreneurship Center \(NITEC\), Pokhara University, Nepal](#)

Experiential: This independent research center at Pokhara University practices appropriate technology in the form of basic level research on different grass root level problems faced by the Nepalese community. The center provides work space, consultancy, guidance and infrastructure for motivated students and faculty members who wish to pursue their social entrepreneurial journey through design and innovation. It also facilitates internship opportunities and provides training and workshops frequently.

External collaborations: South Korea's Ministry of Science and ICT, Handong Global University (HGU)

[Design Lab, Kathmandu University, Nepal](#)

Experiential: This design and research lab falls under an independent center of the Mechanical Department in Kathmandu University. The recently opened lab provides students and faculty members an opportunity to work alongside to solve some of the pressing social and community problems. The center provides work space, consultancy, guidance and infrastructure for motivated students and faculty members who wish to work on grassroots level projects through their knowledge of design and innovation. It also facilitates internship opportunities and provides training and workshops frequently.

External collaborations: South Korea's Ministry of Science and ICT

EGD Conferences

The following list presents some of the top conferences with an EGD focus or an available EGD-related track.

EGD Conferences			
Conferences	Location	Years Active	Description
Rural Technology Development and Delivery	India	2	Thematic: RuTAG and its Synergy with other Initiatives Topics discussed: Achievements, difficulties, challenges and the way forward for RuTAG centers in the next 10-15 years.
Science and Technology ODA International Conference	South Korea	10	Thematic: Community prosperity through science and technology Topics discussed: Challenges, achievements, and difficulties related to appropriate technology practices, innovation for site specific technologies, small scale, decentralized, low-cost social technologies, new breakthrough and discoveries, appropriate practices, lower environmental impact technologies, sustainability and many more.
Innovations and Technology for Rural India (ITRI)	India	-	Thematic: Materials for rural applications Topics discussed: Nanomaterials and nanotechnology, alternate energy materials, energy storage system, smart and intelligent materials, rural IOT, affordable healthcare, biomaterials and biotechnology, applications sustainable development, smart and organic cropping, rural resource management, and waste management.
Indian Science Congress Association – Rural Development	India	-	Thematic: Rural development Topics discussed: Findings in various fields of sciences, including agricultural and animal sciences which will be very much effective for rural development.
International E-Conference on “Innovation in Rural Empowerment, Social Dynamics & Welfare in India”	India	-	Topic discussed: Community based rural development, economic and social aspect of rural development, energy, healthcare, finance, transport and water supply, agriculture in rural development, technology and innovation in sanitation and rural hygiene.

Regional Networks

[Rural Technology Action Group \(RuTAG- Popular Engineering Network\)](#)

Description: It is a group of academicians, scientists, engineers, NGO representatives, artisans, traditional craftsman, researchers, government agencies, social entrepreneurs, local farmers and technical institutes who are passionate to serve the rural communities through their ideas, innovation, skills, knowledge or research. It is a regional network and platform for discussing and practicing rural technology and innovation across eight IIT's across India. The main objective of this network is to support social entrepreneurship by identifying potential and best scalable practices. It doesn't have a specific focus sector by working holistically to solve the problem of rural communities.

Country: India

[Unnat Bharat Abhiyan \(UBA\) Network](#)

Description: UBA network is the widest national level network comprising nation knowledge institutes, government bodies, voluntary organizations, district administrations, local bodies and other stakeholders. The main aim of the network is to work for the common good of rural development.

Country: India

[Honeybee Network](#)

Description: A volunteer-based network that seeks innovative ideas and Traditional Knowledge (TK) produced at the grassroots level by an amalgamation of innovators, farmers, scholars, academicians, policy makers and entrepreneurs, institutions and civil society. The Network's primary purpose is to support grassroots innovators who are rich in knowledge, but not in resources. It was one of the pioneering organizations in India that focused principally on the poor.

Country: India

[RECAST \(Research Center For Applied Science And Technology\)](#)

Description: Network of academicians, researchers, scientists and innovators to practice social good through knowledge sharing within Tribhuvan University in Nepal.

Country: Nepal

[Academic Society for Appropriate Technology](#)

Description: Academic hub that includes researchers, practitioners, research projects to develop appropriate technology and solve social problems through science and technology. Social initiative established to promote the dialogue within engineering practices where the struggles of the poor and working class are considered in the development of technologies or engineering implementation projects. REPOS promotes the assistance of engineers to these communities based on the knowledge of contextualized engineering with the social, political, cultural and environmental issues specific to their realities.

Country: South Korea

[The Japanese Society of Irrigation, Drainage and Rural Engineering \(JSIDRE\)](#)

Description: The Japanese Society of Irrigation, Drainage and Rural Engineering (JSIDRE) is a network of professionals and members of technical organizations who work in close collaboration agricultural infrastructure and rural development. The network holds an annual meeting to discuss the new developments in the field of agriculture and rural technology.

Country: Japan

Journals

[Journal of Appropriate technology Society](#)

Description: The journal targets practicing engineers, engineering educators and anyone that seeks to better understand the progressive potential of appropriate technology. The thematic area is widespread but is mainly driven by studies that have worked on suitable, sustainable, medium-sized, small scale, decentralized, labor-intensive, low-energy, and eco-friendly technologies.

Country: South Korea

[Journal of Japanese Society of Irrigation, Drainage and Rural Engineering \(JSIDRE\)](#)

Description: The journal targets engineers, researchers and academics working in the field of agriculture, irrigation, drainage and rural engineering. The journal is published bi-monthly in english and is easily accessible to anyone.

The EGD-Related Research Faculty

Faculty included in this section conduct current, graduate-level, EGD-related research at higher-educational institutions in the selected countries in Asia. Included in the definition of researchers conducting EGD work are engineers, computer scientists, architects, and urban planners. **We recognize that this list may not be comprehensive and will naturally change overtime, please contact us at research@engineeringforchange.org if you know of a faculty member who is missing from this list.**

EGD Researchers		
Faculty	Institution	Sectors
Jeyong Yoon	Seoul National University, S. Korea	Appropriate technology/Water
Sung-Hoon Ahn	Seoul National University, S. Korea	Appropriate technology/Energy/Health/Design
Sooyoung Chang	Postech, S.Korea	Appropriate technology/Service Science
Seok Dockko	Dankook University, S.Korea	Appropriate Technology/Water
Young Soo Kim	Hanyang University, S.Korea	Appropriate Technology/Health
Shin, Gwy-Am	Ajou University, S.Korea	Appropriate Technology/Environment
MyoungSouk Yeo	Seoul National University, S.Korea	Appropriate Technology/Habitat
Sujatha Srinivasan	IIT Madras, India	Biomedical devices/Health/Design and Innovation
P. V. Madhusudhan Rao	IIT Delhi, India	Health/Design/ innovation/Entrepreneurship
Sharmistha Banerjee	IIT Guwahati, India	Sustainability/Health/ Agricultural Product Design
Ravi Mokashi Punekar	IIT Guwahati, India	Design/ innovation/Development Studies
B. Ravi	IIT Bombay, India	Medical Device Innovation/Health
Kwanwoo Shin	Sogang University, South Korea	General, low cost designs and innovations