

# India's geospatial capacity building program: Tackling the elephant in the room- Leaving no one behind



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# The Transition...

**MDGs (2000-2015)**



**SDGs (2015-2030)**

Developing country focused



Universal

Social



Social, Economic, Environmental

Foreign Aid



Domestic Investment, Private Flows, and Aid

Official Statistics and Administrative Data



Big Data, Citizen Generated Data, Geospatial and Earth Observation Data, Open Data, and more



**17 Goals, 169 Targets, 232 Indicators = Huge Data**

# Key driver.....and changing geospatial needs!

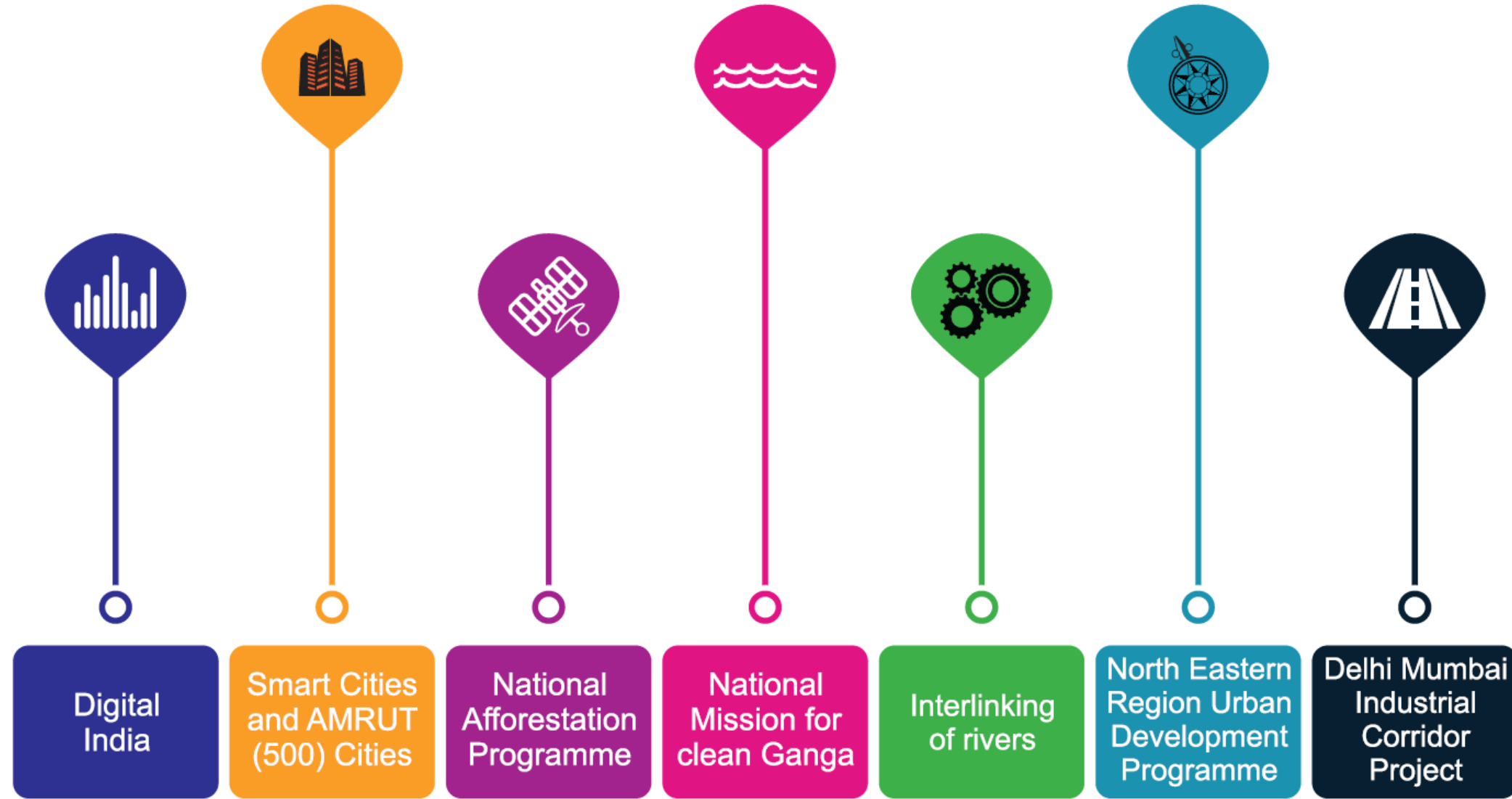


Image Source: Adapted from Geospatial World



# Key Turning Points....


**ADDING A NEW PARADIGM TO #AatmanirbharBharat**

**Landmark Reforms in Geospatial Technology Sector**



**GALLOPING TOWARDS A \$5 TRILLION ECONOMY**

- A policy to unlock altogether new avenues for business
- Apart from Start-ups, traditional sectors like Agriculture, Defence, Mining, Oil and Gas to benefit tremendously
- Massive employment opportunities



सत्यमेव जयते

**National Education Policy 2020**

Ministry of Human Resource Development

Government of India

Image Source: Geospatial World

Dr. Shamita Kumar and Dr. Shubha Pandey  
11 October 2022: Second UNWGIC, India

India's Evolving Geospatial Capacity Building Program: Tackling The Elephant In The Room – Leaving no One Behind  
Bharati Vidyapeeth Deemed University, IEER, Pune / Department of Science and Technology, Government of India

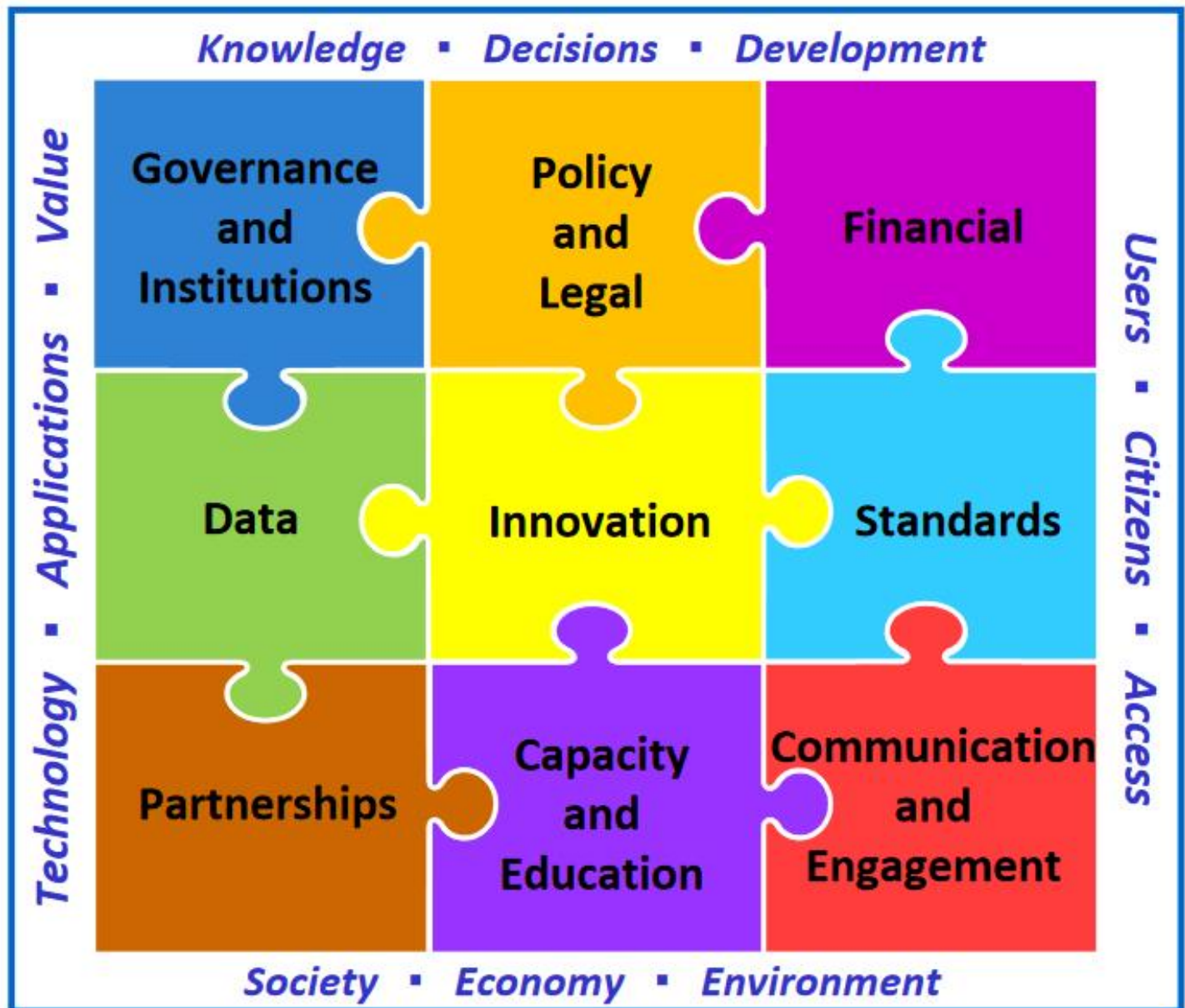
# The IGIF Framework

## 9 Strategic Pathways

*Governance* →

*Technology* →

*People* →



Anchored by 9 Strategic Pathways, the Framework is a mechanism for articulating and demonstrating national leadership in geospatial information, and the capacity to take positive steps.

# Vision of India's National Geospatial Program

To catalyze the geospatial ecosystem by focusing on promotion of its various components viz.

**International Cooperation**

**Science**

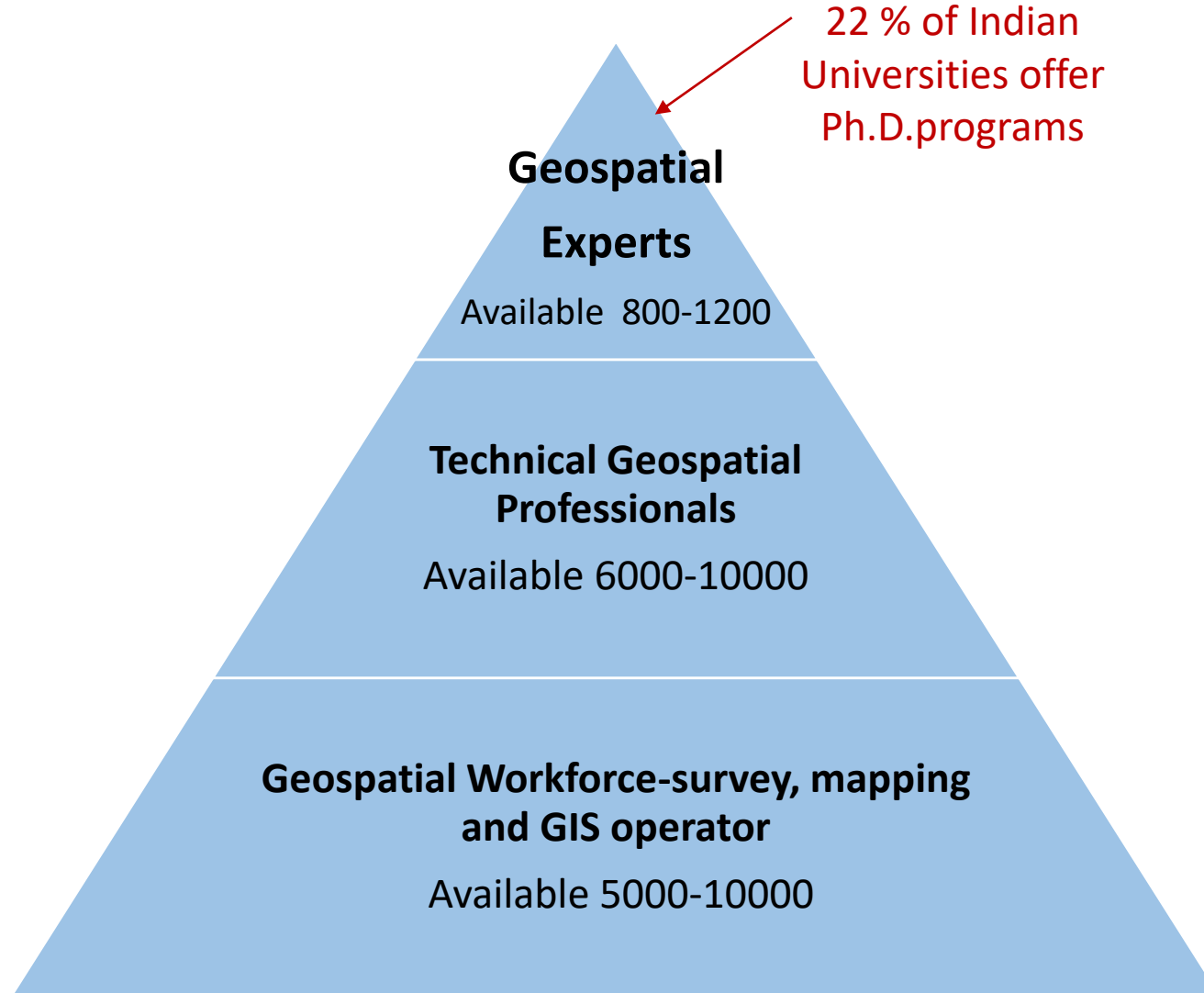
**Technology**

**Solutions**

**Enterprise**

**Capacity Building**

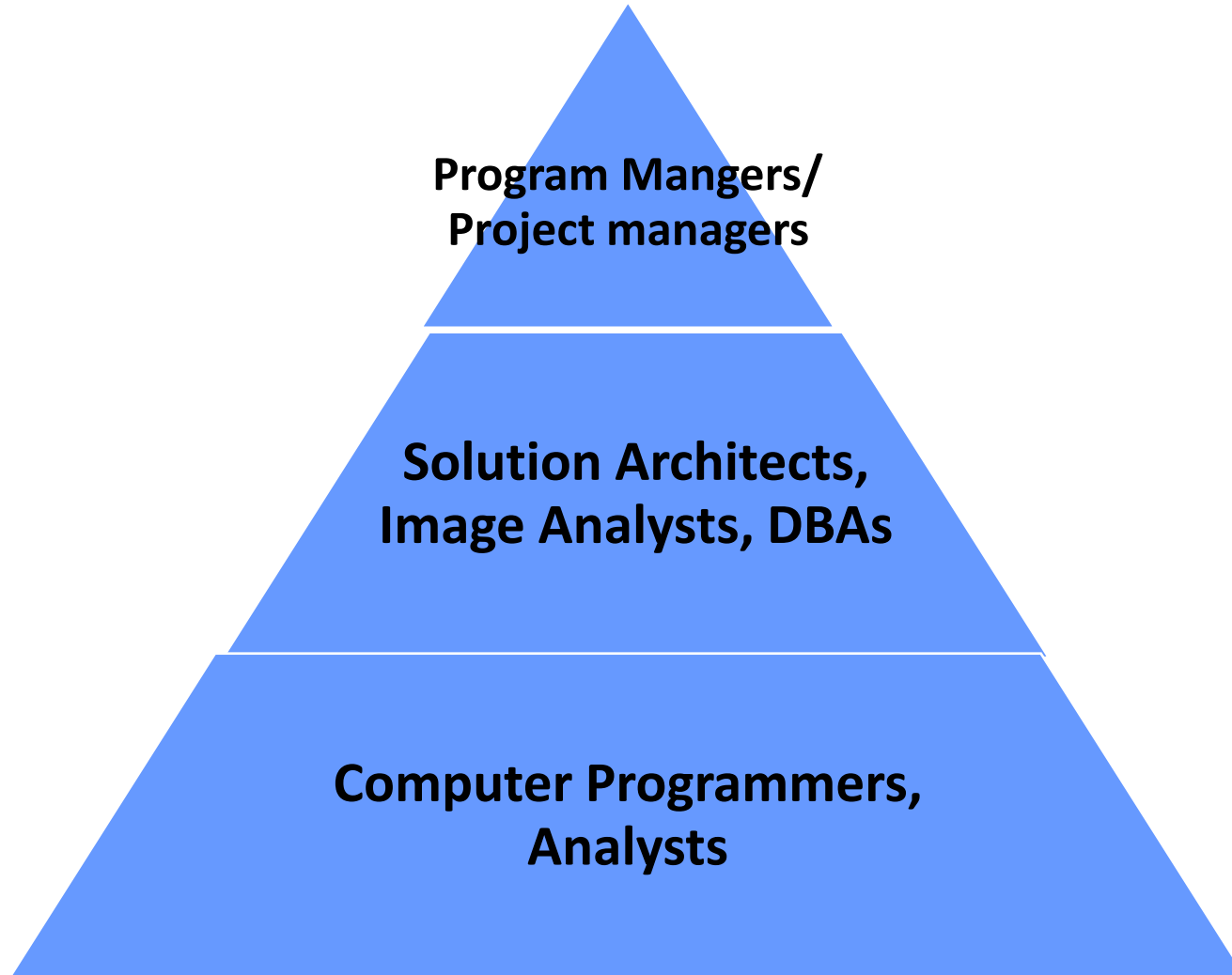
# Geospatial Capacity Building..the crux!



*Source: Geospatial Task Force Report, 2013*

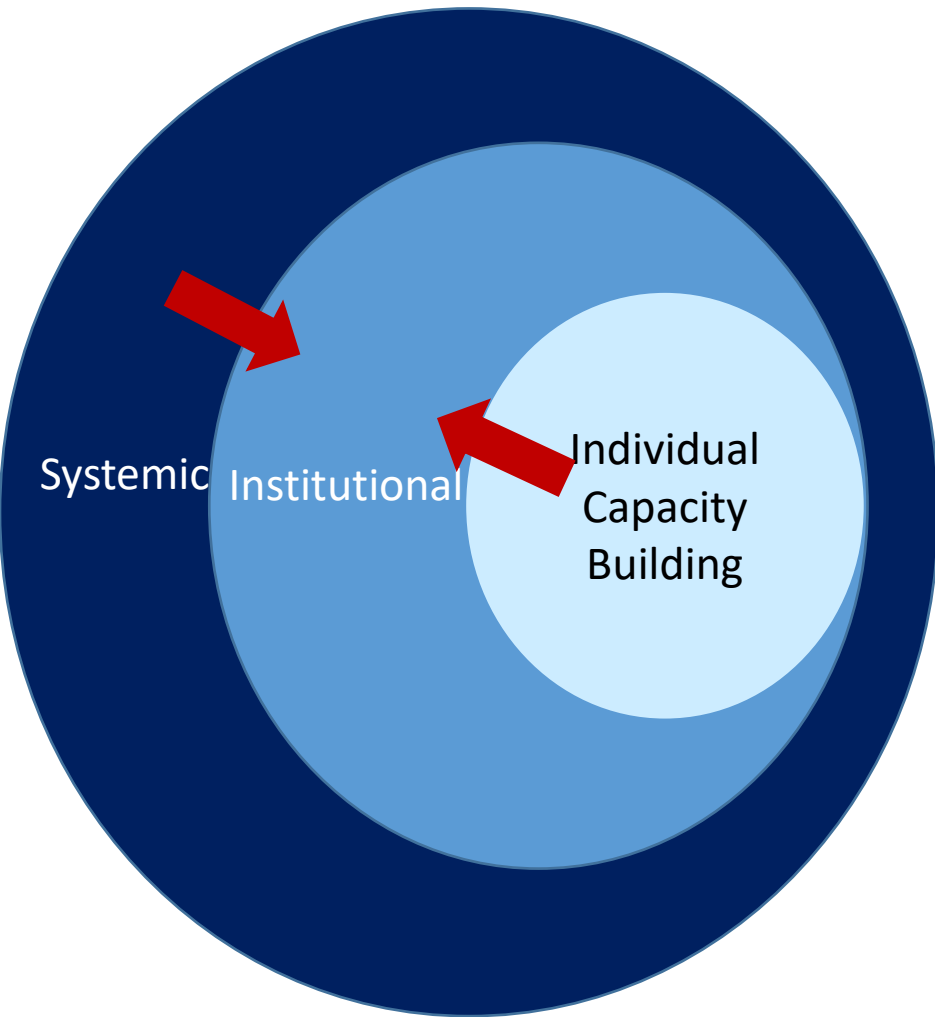


# Geospatial Capacity Building..what industry needs !



*Source: Shri Rajesh Mathur, Geospatial Leadership Summit, 2022*

# Geospatial literacy...the key



- Systemic: Overall policy framework
- Institutional: Overall organizational uptake and implementation of geospatial technologies
- Individual: Imparting knowledge, developing skills

# Key elements and guiding principles of a capacity building program



## Guiding Principles

Responsible

Collaborative

Relevant

Coordinated

Responsive

Resilient

Objective

Incentivized

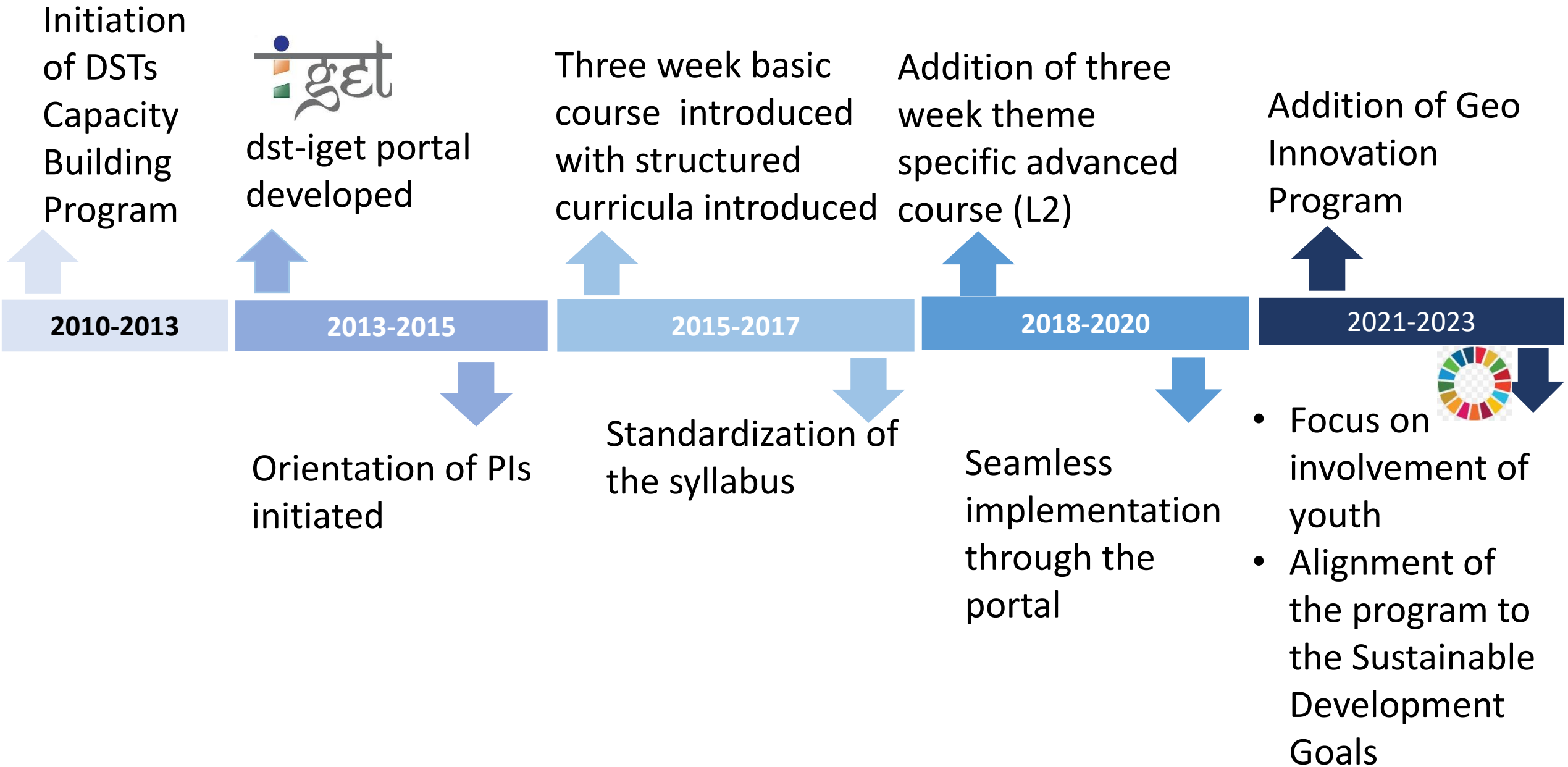
Inclusive

Sustainable

Holistic

Accountable

# Evolution of DST's Geospatial Capacity Building Program



# Structure of the Program

## LEVEL - 1

**T**he covers the basics of remote sensing, GIS and navigation and provides opportunities for hands on learning with open source software such as Quantam GIS and SAGA

## LEVEL - 2

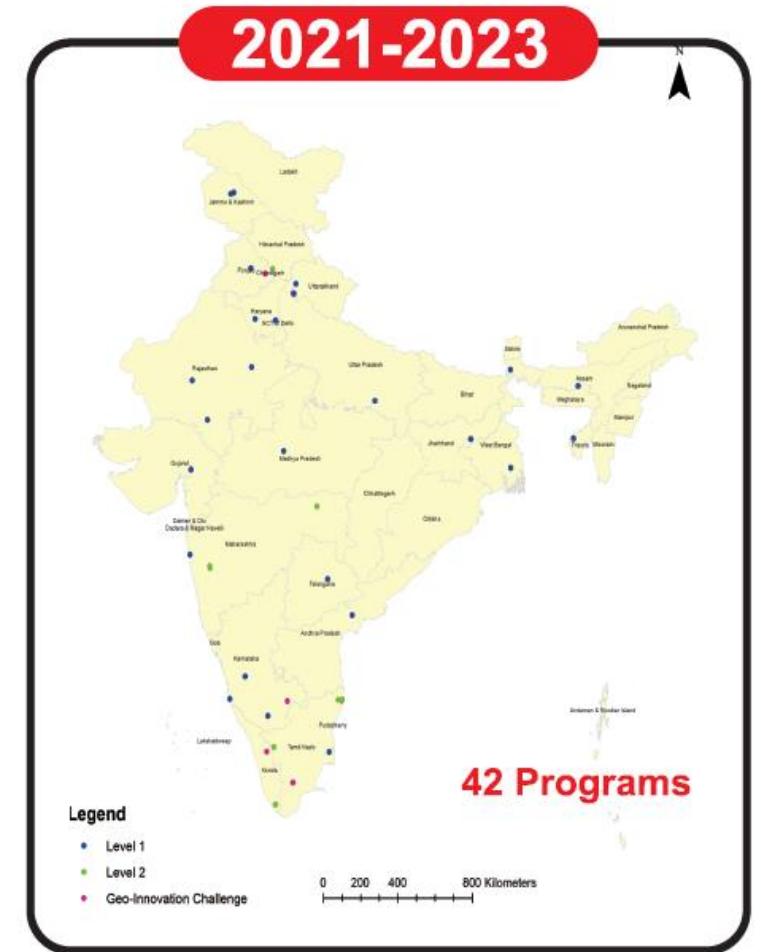
**T**he course builds capacities in sectoral areas eg: water resources and watershed management, disaster management, coastal vulnerability, eco system and biodiversity management through a comprehensive hands on approach using open source software.

## Geo Innovation Challenge

**T**his new program instituted for youth in the year 2021 recognizes, encourages and nurtures innovation in GI technologies for national socio-economic development processes among the youth of India will serve as a repository of ideas leading to the development of full proposals that could be supported by the DST at a future stage.



# Program Centres





HOME

ABOUT US

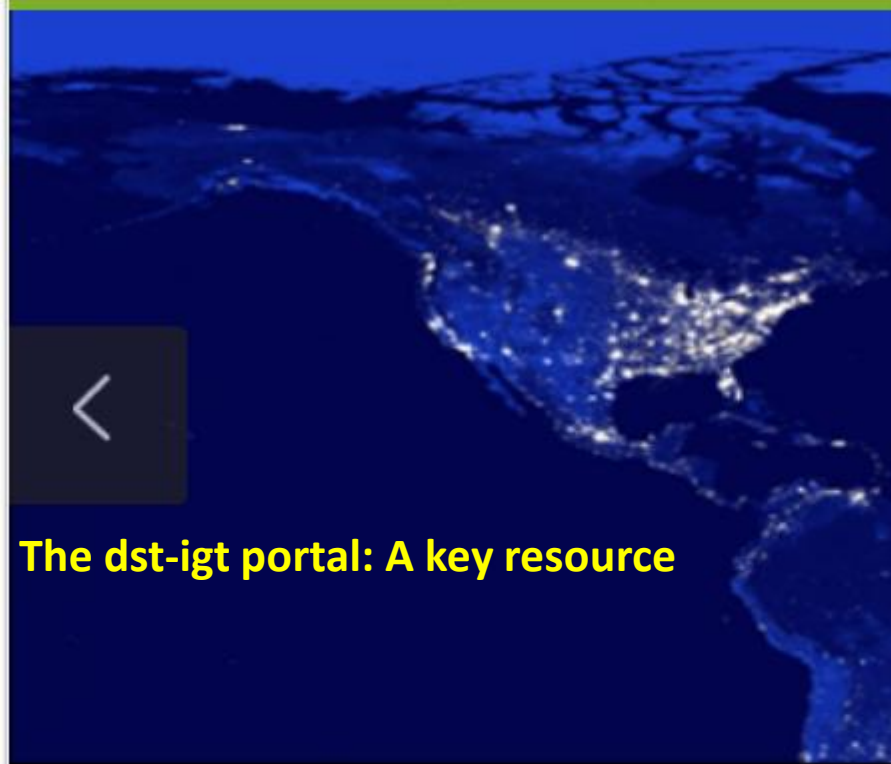
TUTORIALS ▾

RESOURCES ▾

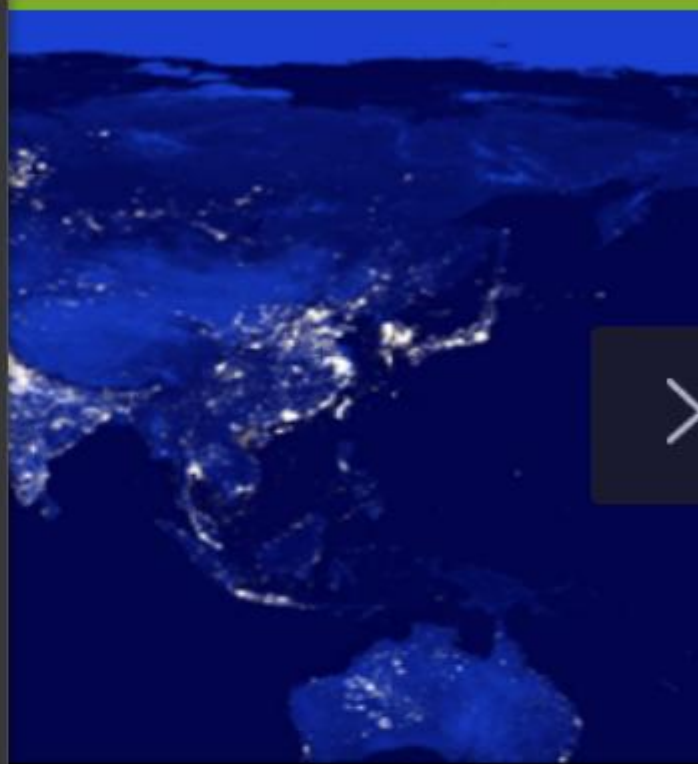
CONTACT US

SUMMER SCHOOL IN GST ▾

MOOCS



- UNDERSTANDING GIS >
- REMOTE SENSING >
- DATABASE >
- SPATIAL ANALYSIS >
- TRENDS IN GIS >
- CUSTOMISATION >
- CONTRIBUTORY TUTORIALS >



Introduction to QGIS

Projection

Georeferencing

Image Registration

Digitization

Map Preparation

Data Exploration

Working with Tables

Data Query-1

Data Query-2

Google Earth

GPS

The dst-igt portal: A key resource



Understanding GIS



Remote Sensing



Database



Spatial Analysis



Trends in GIS

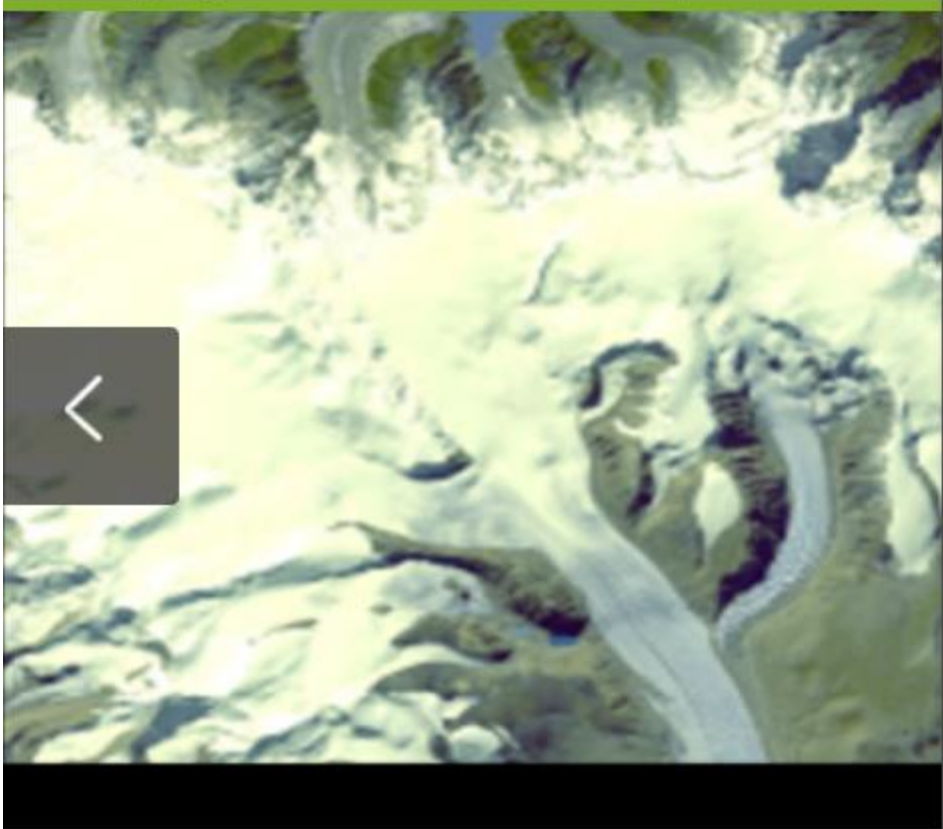


Customisation





## The dst-igt portal: A key resource

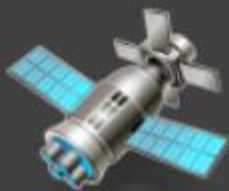


- UNDERSTANDING GIS >
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- Introduction to SAGA
- Understanding Image
- Visual Interpretation
- Georeferencing
- Mosaicking and Subsetting Image
- Introduction to Filters
- Unsupervised Classification
- Supervised Classification
- Terrain Analysis
- Change Detection



Understanding GIS



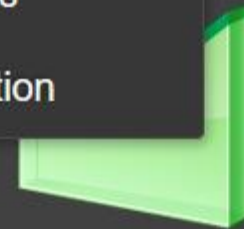
Remote Sensing



Database



Spatial Analysis



Trends in GIS



Customisation



# Image Registration

Objective: To georeference a satellite image using a georeferenced toposheet

Software: Quantum GIS

Level: Beginner

Time required: 3 Hour

Prerequisites and Geospatial Skills

- Quantum GIS should be installed on the computer
- Basic knowledge about the QGIS interface
- Should have completed Exercise ID: IGET\_QGIS\_003 (Georeferencing a Toposheet by Using QGIS)

[Download PDF +](#)

[Download Data +](#)

## TUTORIAL MENU

INTRODUCTION TO QGIS

PROJECTION

GEOREFERENCING

**IMAGE REGISTRATION**

DIGITIZATION

MAP PREPARATION

DATA EXPLORATION

WORKING WITH TABLES

DATA QUERY-1

DATA QUERY-2

GOOGL E FARTH

**The dst-igt portal: A key resource**

# Program Components



**Classroom Sessions**



**Hand on lab sessions with open source software**



# Program Components



**Field Sessions**



**Group work**

# Program Components

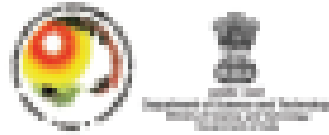


**Field Sessions**



**Group work**

# Key output..Contributory tutorials

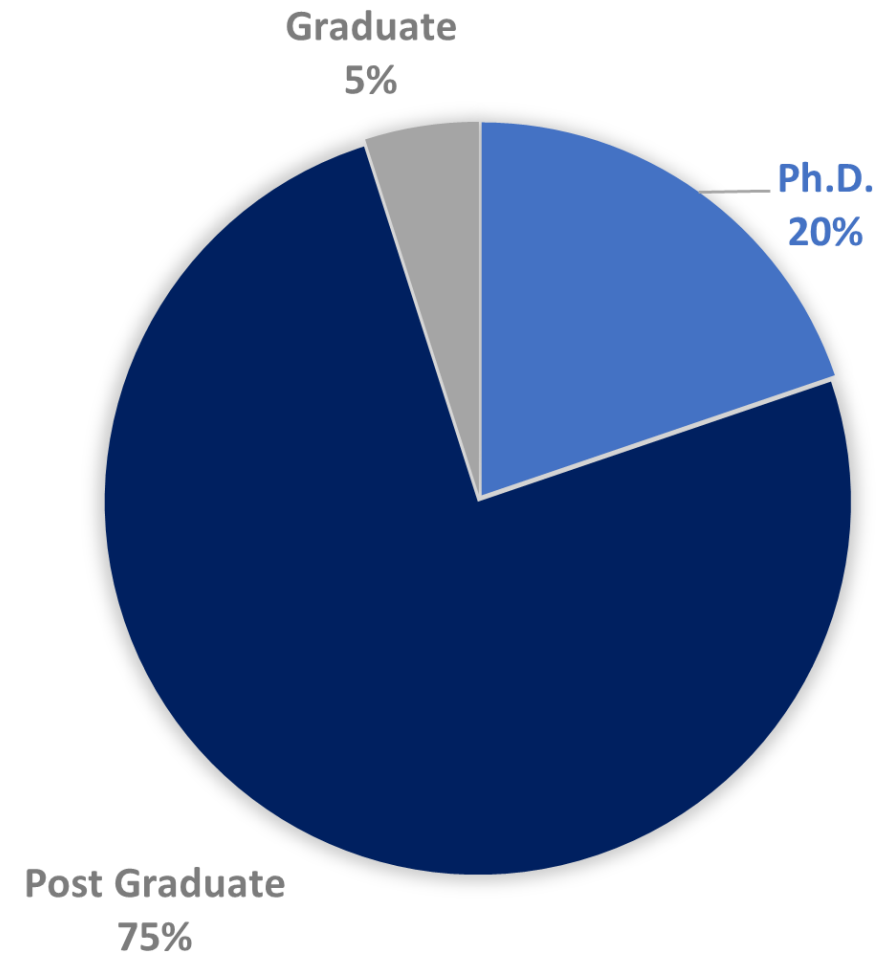
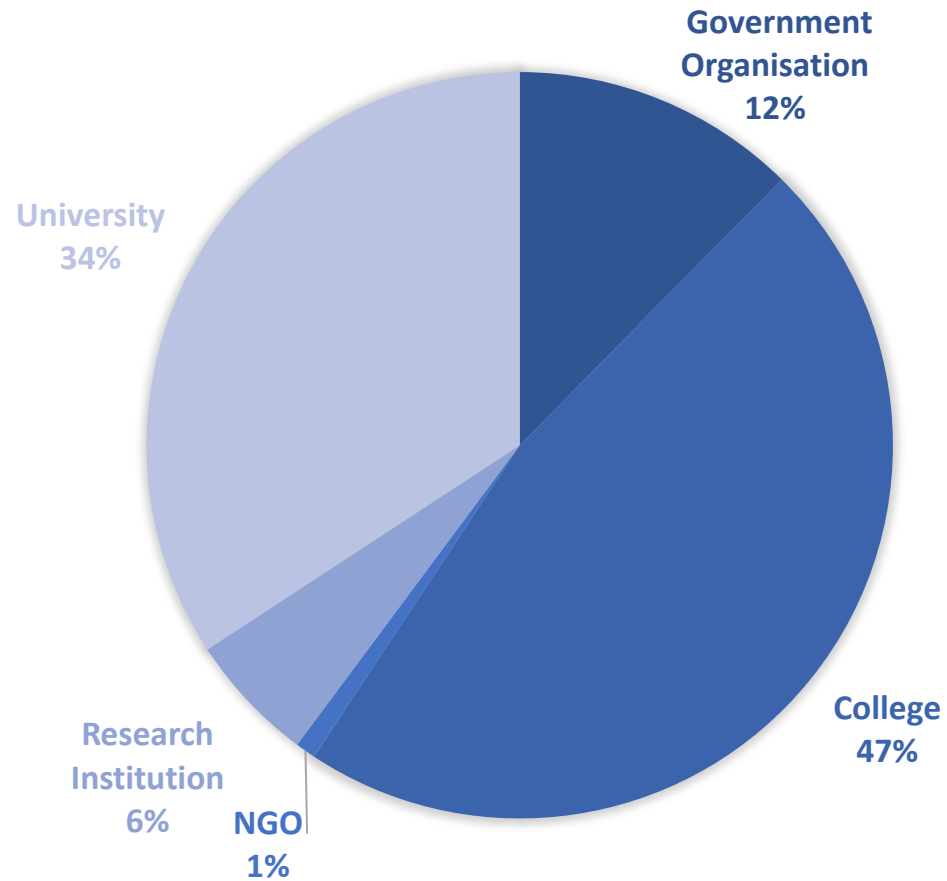


## Monitoring environmental status of Pune using Cloud QGIS

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Using desktop and cloud QGIS

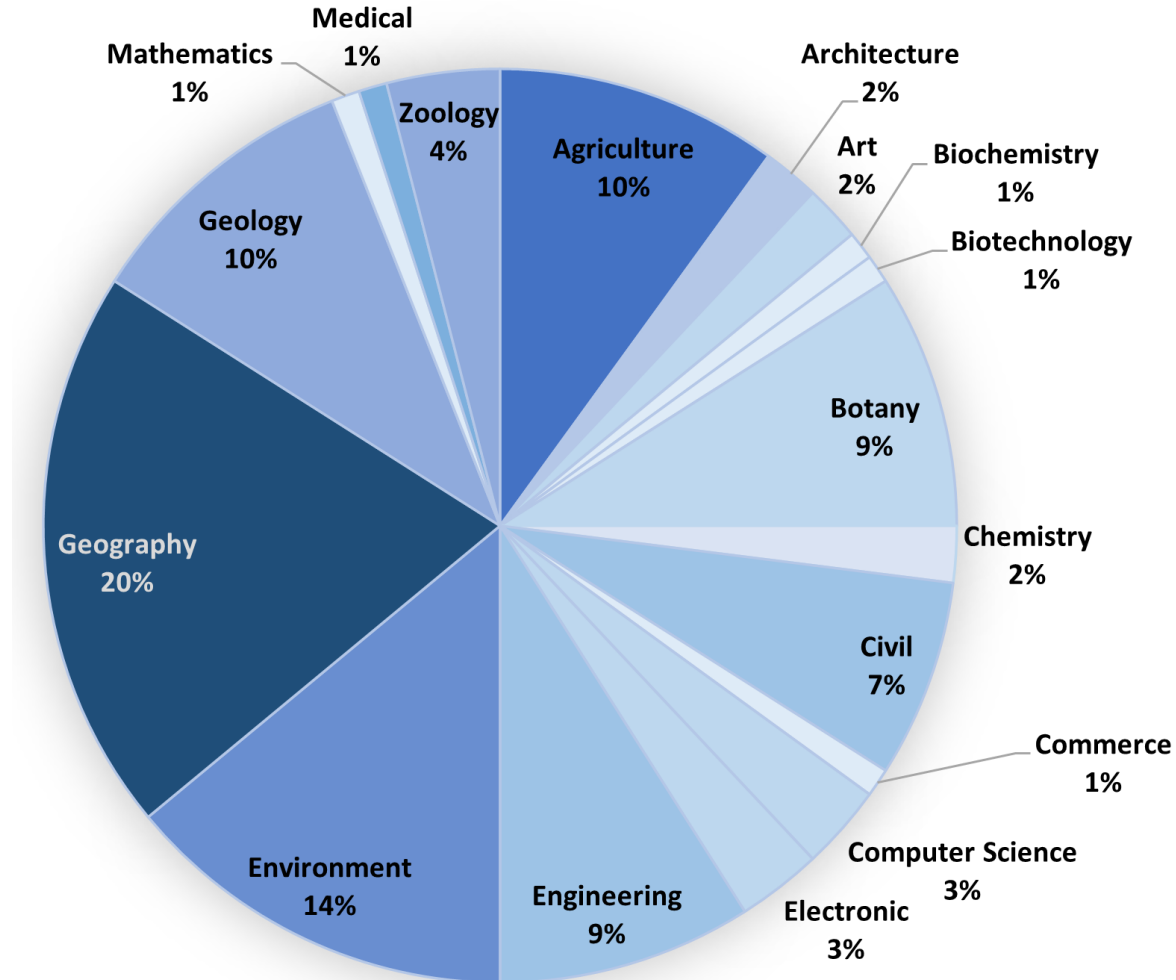
# Who were the participants?





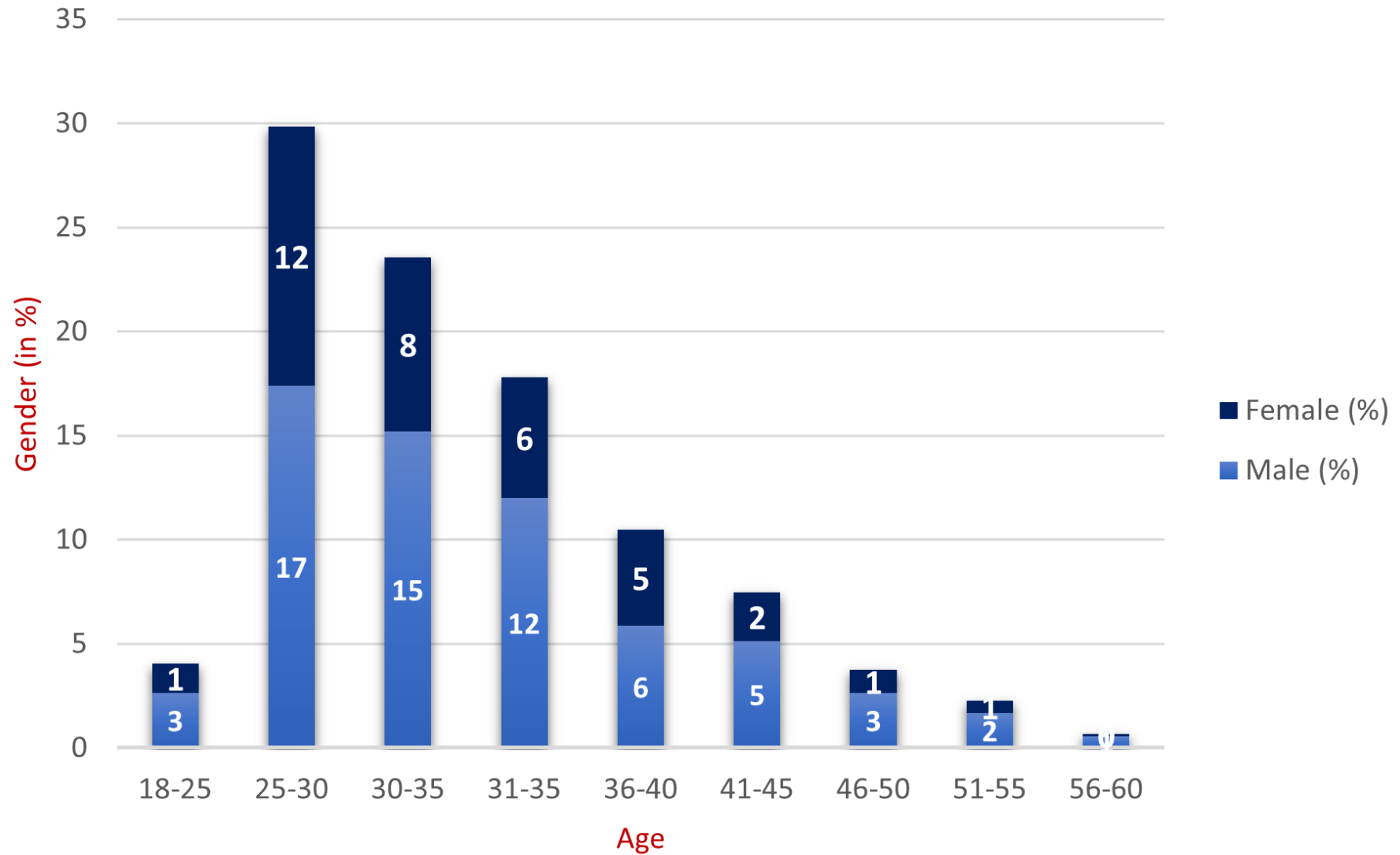
# Diverse domains..

## Participants Educational Background





# Gender Profile



# The Gen Z and Alpha program

Fields are the future!

Greens on my roof!

How clean is my city?

Atmanirbhar rural women

Trapping solar energy to light my city

Springs of life in Anantnag

Safe roads to schools

Sustainable Cities: Repair and recycling

A ride to the green side: Green spaces

Spatial thinking for



# Our learnings

- Structuring and standardization of the syllabus is key
- Accreditation by the University Grants Commission can add value
- Use of open source allows for course activated learning programs
- Huge potential in involving Gen Alpha

## National Geospatial Science Education Program

- Standardization of the curriculum
- Faculty Development
- Institutional and societal capacity building
- Quality Improvement

## Fostering development

- Earth science analytics
- Positioning technologies
- Scanning technologies
- Indigenous/open source Software development

## Fostering innovative applications

- Alignment with flagship programs of government
- Alignment with sustainable development goals

## Supporting geospatial startups

- Establish geospatial incubators
- Define enabling frameworks
- Set up mentoring support



.....**Thank you**  
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shubha.p@nic.in

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