

**Equipment at  
School of Environmental Sciences  
Jawaharlal Nehru University (P11)  
New Delhi India**


## Background




At the beginning of the URGENT project, the end-user survey was conducted and an account of research needs in the School of Environmental Sciences, Jawaharlal Nehru University was taken into account. These helped in identifying the gaps and some of the equipment which could be used by MSc (Environmental Sciences), MA (Disaster Studies) and Doctoral (PhD) Research students. The equipment are also to be used for the course works revised and development within the scope of the URGENT project and other capacity building program. The equipment are available for the usage by all the project partner.

## Procurement process



The equipment proposed by the JNU (P11) were procured through a Government-Marketplace (GeM, <https://gem.gov.in/>) developed and by Commerce Department of Govt of India to bring transparency in all kind of procurement by the institutions and department within the Government of India framework.

## List of procured equipment with short description.

SNo	Equipment	Technical Specifications	Quantity	Photograph
1.	ORLAB With Accessories Kit Pusa Soil Test And Fertilizer	Portable Digital operated with battery/electricity Memory for data storage Multi-Parameter Soil Field Test Kit (pH; Conductivity; OC; N; P and K) and (Zn; S; B; Fe; Mn; Cu; Lime (acidic soils); Gypsum Portable Mini Shaker Programmed STFR Meter and Thermal Printer With Solar panel and battery for <i>in-situ</i> data analysis PC based software Accessories Kit	2	

2.	FLUKE Dual laser Class II Handheld Digital Infrared Thermometer	Large, easy-to-read backlit LCD display for easy viewing; 8:1 Distance to Spot ratio, 59 MAX; Operating Altitude : 2000 m Above mean sea level; Drop Test : 1 m; Protection Class : IP 40; Laser Safety : FDA and EN 60825-1 Class II; Electromagnetic Compatibility	2	
3.	Garmin Hand Held GPS	Type: Wireless Screen Size of around 1.4" x 1.7" GPS Receiver Display Resolution or around 240 x 320 pixels with 2.2" sunlight-readable color displays Support of GPS and GLONASS satellite With Map & Memory	5	
4.	Workstation (high end computing facility)	Processor(s) 2 x Intel® Xeon® Silver 4210R Processor, 2.40 GHz, 13.75 MB, Core 10 Chipset Intel® C600 series Chipset or better RAM 64GB (4 x 16GB) 480GB SATA 2.5 inch SSD Nvidia Quadro Series Professional Graphics 5GB Memory, P2200 Single width GPU with OS Window 10 Professional 64-bit Peripherals 24" LED FHD,	2	

		IPS,1920X1080, Monitor, Wired USB KBD Mouse		
5.	FLUKE Color LCD Touch Display Thermal imager 300000 Pixel	<p>Infrared spectral band from 7.5 <math>\mu\text{m}</math> to 14 <math>\mu\text{m}</math> (long wave)</p> <p>Infrared Resolution 640 x 480 (307,200 pixels)</p> <p>IFOV with standard lens/spatial resolution 0.93 mRad</p> <p>Field of View 34 °H x 24 °V</p> <p>Temperature ranges up to 500°C beyond with accuracy of <math>\pm 2</math> °C or 2 %</p> <p>Removable 4 GB micro SD memory card OR 4 GB internal flash memory</p> <p>One-handed image capture, review, and save capability (bmp and/or jpeg with provision to export file formats GIF, PNG, TIFF)</p>	1	
6.	FLUKE Color LCD Thermal imager 100000 Pixel	<p>Infrared spectral band from 7.5 <math>\mu\text{m}</math> to 14 <math>\mu\text{m}</math> (long wave)</p> <p>Infrared Resolution 384 x 288 (110,592 pixels)</p> <p>IFOV with standard lens/spatial resolution 1.91 mRad</p> <p>Field of View 42° x 30 °</p> <p>Temperature ranges from -20 °C to 550 °C with accuracy of <math>\pm 2</math> °C or 2 %</p> <p>One-handed image capture, review, and save capability (bmp and/or jpeg with provision to export file</p>	1	

		formats GIF, PNG, TIFF) Water and dust resistant Rugged hard carrying case		
7.	Military Compass (MHA) As Per MHA	Global Needle tilts up to 20° for balanced use world wide Clinometer with 2° resolution for measuring slope angle or gauging heights of passes, peaks or trees Sighting mirror and sighting line integrated into the cover. 1° resolution azimuth ring precise readings	2	
8.	Brunton Geological Compass Modern geological compass Rectangular $\pm 1/2^\circ$ Slope Indicator	Precision measurements of vertical angles through direct sighting; 3 different scales of angular measurement above and below horizontal: Left: Slope in Degrees, 0-90° Middle: 66' Forestry Chain, 0-200' Right: Slope Percent Grade, 0-150%; Side view of slope degree and percent grade.; Up to 10x magnification with an adjustable lens.	2	
9.	Laser Rangefinder/Hypsometer	Magnification 6x Linear Field of View 341 feet @ 1000 yds Angular Field of View 6.5 degrees Eye Relief 15 mm Operating $\pm 90^\circ$ Incline / Decline Range	2	

## Preliminary usage of the equipment for teaching/training and research activities

Some of the field equipment are being demonstrated and used during the field work of MA (Disaster Studies) students of Special Centre for Disaster Research (SCDR)..



The spatial data processing facility developed and installed in the Spatial Analysis and Informatics Laboratory (SAIL) in School of Environmental Sciences is being used by MSc.MA and PhD students.



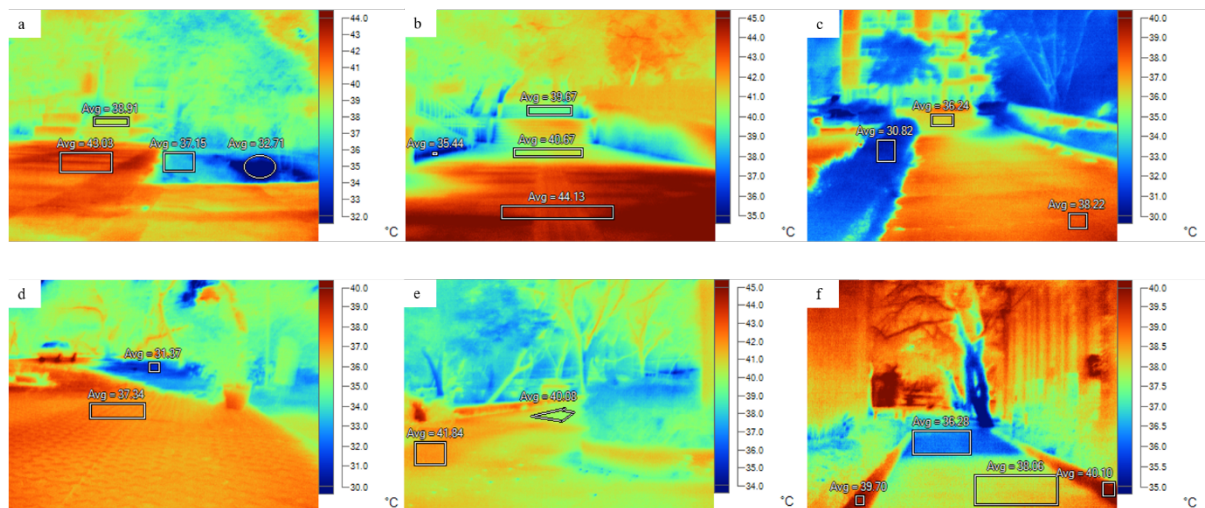




## Demonstration and testing of equipment.

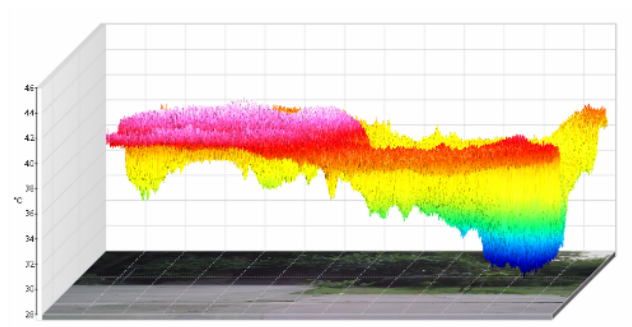


## Infrared imagery showing impervious and green areas of some of the experimental sites



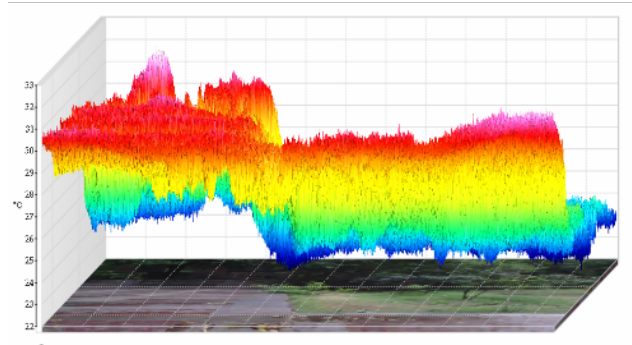


3-D Graph of thermal distribution on a normal day (a) and immediately after rain (b).



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a





b



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SNo	Title *purchased with the SUNRAISE financial support	Description	Photo
1.	<b>Computing facility - Workstations</b>	A laboratory with computing facility is developed for the satellite data processing and geospatial analysis. The laboratory has access to all kind of spatial datasets via web-link.	
2.	<b>Handheld GPS</b>	Multiple units of handheld GPS are maintained for the frequent field work wherein geo-tagging is required.	

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3.	<b>Military Compass as per MHA</b>	Modern geological compass Rectangular $\pm 1/2^\circ$ Slope Indicator (3 different scales of angular measurement above and below horizontal: Left: Slope in Degrees, 0-90° Middle) Up to 10x magnification with an adjustable lens.	
4.	<b>Brunton Clinometer Compass</b>	Clinometer with $2^\circ$ resolution for measuring slope angle or gauging heights of passes, peaks or trees Sighting mirror and sighting line integrated with $1^\circ$ resolution azimuth ring precise readings	

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5.	<b>Fisheye Lens (8-15mm F/42)</b>	A DSLR (digital single-lens reflex camera) mountable fish eye lens are available for forest inventory related activities. It is now being also used for the urban fabric composition.	
6.	<b>Willey Mills (3SS Sieves)</b>	The Willey mills sieve is available with hard tool steel knives bolted to a removable rotor for preparation of samples for soil and plant (leaves and wood) analysis.	

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7.	<b>Digester Kjeldahl</b>	Multiple digester is available for the Kjeldahl – it breaks down the bonds that hold the polypeptides together.	
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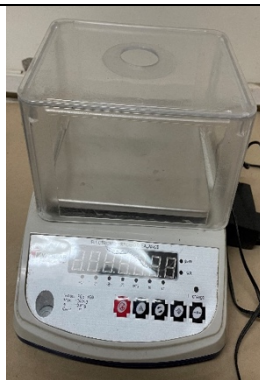


8.	<b>Kjeldahl Analytical set-up</b>	A complete set-up of Kjeldahl method, is available which is widely used for estimating the nitrogen content of foodstuffs, fertilizers, and other substances, including soil and plant parts.	 
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9.	<b>ORLAB Pusa Kit for Soil Test and Fertilizer</b>	Portable Digital operated with battery/electricity. Multi-Parameter Soil Field Test Kit (pH; Conductivity; OC; N; P and K) and (Zn; S; B; Fe; Mn; Cu; Lime (acidic soils); Gypsum Portable Mini Shaker Programmed STFR Meter and Thermal Printer	
10.	<b>Electronic weighing machine</b>	The weighing scale/machine is widely used for the preparation of solutions for chemical analysis and related experiment.	

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11.	<b>Hot Air Oven</b>	Hot air oven is used to sterilize the equipment and other materials that are used in a laboratory. These also being used to use dry heat to sterilize for the soil and plant part analysis.	
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12.	<b>Titration - analytical set-up</b>	Multiple units of Titration analytical set-up with pre-requisite chemicals is available for wide range of experimentation wherein the quantity of a reactant in a sample is to be determined.	
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13.	<b>Magnetic Stirrer</b>	A stationary electromagnet creating rotating magnetic field is available for the stir bar which is immensely used in liquid, quickly spin, or stirring or mixing a solution.	
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15.	<b>Soxhlet extraction unit</b>	Soxhlet extraction is used for extracting valuable bioactive compounds (nonvolatile and semivolatile organic compounds from solids such as soils, sludges, and wastes) from various natural sources.	
16.	<b>Color LCD Thermal imager 100000 Pixel</b>	Infrared spectral band from 7.5 $\mu\text{m}$ to 14 $\mu\text{m}$ (long wave), Resolution 384 x 288 (110,592 pixels), IFOV with standard lens/spatial resolution 1.91 mRad, Field of View 42° x 30 ° Temperature ranges from -20 °C to 550 °C with accuracy of $\pm 2$ °C or 2 %, Image format (bmp and/or jpeg with provision to export file formats GIF, PNG, TIFF)	

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17.	<b>Color LCD Touch Display Thermal imager 300000 Pixel</b>	Infrared spectral band from 7.5 $\mu\text{m}$ to 14 $\mu\text{m}$ (long wave), Resolution 640 x 480 (307,200 pixels), IFOV with standard lens/spatial resolution 0.93 mRad, Field of View 34 °H x 24 °V Temperature ranges up to 500°C beyond with accuracy of $\pm 2$ °C or 2 %, Image format (bmp and/or jpeg with provision to export file formats GIF, PNG, TIFF)	
18.	<b>Laser Rangefinder/Hypsometer</b>	Magnification 6x, Linear Field of View 341 feet @ 1000 yds, Angular Field of View 6.5 degrees, Eye Relief 15 mm, Operating $\pm 90^\circ$ Incline / Decline Range	





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### Advanced Instrumentation Research Facility (AIRF) – Jawaharlal Nehru University (JNU)

AIRF/JNU is a specialized research facility which houses about sophisticated state-of-the-art instruments with various supporting/ basic facilities. It caters to the interdisciplinary applications in research to all the JNU Science Schools as well as other academic research institutes and private companies/ industries within and outside Delhi.

This research facility serves as an academic, research and scientific service provider and facilitator. It also supports inter-disciplinary academic and research activities by conducting through regular workshops and trainings programmes.

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