

GREEN CAMPUS MOVEMENT

A preliminary assessment of actions and aspirations



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01

Making of a green campus

Urban India is facing a wide variety of environmental challenges. These range from polluted air, water and land, to climate change-induced extreme weather events, shrinking urban greens, loss of biodiversity, rapid depletion of resources and a rapid plunge towards an unliveable habitat. To stop this downward spiral, urgent and desperate action is needed to curb resource inefficiency and wastefulness, and stop destruction of habitat to promote well-being and liveability.

But this is possible only if we can change on-ground practices at scale and with speed across the urban landscape.

India has ushered in a whole gamut of policies and regulations in this arena over the last decade. They have established new principles of sustainability and environmental protection. Rules have been written on clean air, renewable energy, water and energy security, and waste management for a circular economy. Aligned implementation of these policies is expected to contribute towards India's commitment under the Nationally Determined Contributions (INDC) under the Paris Climate Accord to reduce emissions intensity of GDP by 30–35 per cent from the 2005 level by 2030. Their implementation will also help meet the goals of the National Clean Air Programme to reduce particulate matter concentrations by 20–30 per cent by 2024 from 2017 levels. This is the co-benefit framework to decarbonize the economy, improve climate responsiveness of cities, and secure public health and liveability.

Yet, so far it has not been possible to change on-ground practices at a scale. There is a big gap between policy and action. There is very little understanding on what it takes to transform systems, improve technical and design aspects of resource management and change behaviour and resource-intensive lifestyles. Localized and real action across the urban landscape is needed to demonstrate the change.

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MICRO-ACTION FOR THE BIG CHANGE

What can be a better location to demonstrate change in practice than the large number of institutional and educational campuses? Schools, colleges and other educational institutions of varying shapes and sizes function like a micro-ecosystem with finite but diverse resources. These micro-areas can test out techniques, technology, design approaches and governance systems to help create a bottom-up template of aligned action for the larger urban area to imbibe.

In smaller habitats, it is possible to demonstrate approaches, techniques and design of resource management in a more cohesive manner and also change the established way of doing things. This can cumulatively add up to bring the larger change.

Institutional campuses can act as a laboratory to experiment, incubate and demonstrate ideas and technologies, and innovate practical approaches. From their inception to operation, campuses can be planned and monitored for resource saving and efficiency, and environmentally responsible practices and behaviour. They can generate data and evidence to track gains and savings to validate approaches.

The bigger take-away is that such initiatives can be combined with learning and practical application to add value—and a practical edge to the education these institutions provide. This can create an aware citizenry on the campuses to enable behavioural changes.

It is possible to demonstrate how collective environmental audit systems can be institutionalized. They can be owned by the institution to helpidentify inefficiencies in the use of water and energy, generation of waste, gaps in conservation practices, and weaknesses in controlling pollution and heat island effects. This can help to channelize resources to improve wide ranging environmental performance—from waterholding capacity, to alternative sources of energy, resource savings and minimization of waste.

Moreover, the crisis of the COVID-19 pandemic has also highlighted the importance of adopting architectural design features for adequate sunshine, natural ventilation, and well-designed indoor spaces and proper waste management to curb the spread of infectious disease while improving energy efficiency. The pandemic has exposed how closed air conditioned spaces recirculate stale air, making these spaces highly infectious and dangerous.

If all educational campuses begin to get involved in demonstrating change and become part of the 'green movement', the multiplier effect of this localized action can be big. Several campuses across the country have already begun this process. But this needs scale and speed. The potential of this action is from the sheer numbers of campuses that already exist and the new campuses that will be created in future.

THE OPPORTUNITY

This initiative is intrinsically linked with the growth prospect of the education sector. The National Education Policy (NEP), 2020 aims to increase the Gross Enrolment Ratio in higher education, including vocational education, from 26.3 per cent (in 2018) to 50 per cent by 2035.¹ This means more higher education institutions will be established—nearly double the number that exist today. There are about 60,000 higher educational institutions in India according to the All India Survey on Higher Education (AISHE) 2018–19.² These consist of universities, colleges and stand-alone institutions.

While universities have been growing at a rate of nearly 7 per cent, colleges are increasing at a rate of 2 per cent on a year-on-year basis, according to AISHE data.³ Even in a conservative scenario, by 2035, the number of universities will more than triple and the number of colleges will nearly double. This higher educational infrastructure will solely be responsible for at least 2.9 billion tonnes of CO_2e emissions. Pressure on land and water, and from waste generation will be equally enormous.

Many campuses are involved in multi-faceted efforts to reduce their resource footprints and waste generation. Environmentally sensitive culture and values are taking shape. This is also influencing curriculumbased hands-on problem-solving experience for campus inmates while promoting real life work experiences and education. This is an opportunity.

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While the educational sector is expected to grow rapidly, the demand for green campuses is also going to grow stronger. In fact, this is in sync with the NEP objectives that asks for well-rounded understanding of environment beyond syllabus and to build essential skills and capacities among students and faculty.

However, the bigger opportunity has been created by the evaluation criteria of the National Assessment and Accreditation Council (NAAC) for evaluation of educational institutions and colleges. This requires mandatory self-evaluation of campuses and quality control of interventions. This self-evaluation of campuses is conducted by the respective Internal Quality Assurance Cell (IQAC) of institution. This is used for the purpose of rating the institution by NAAC.

The NAAC rating criteria among others requires sustainability and environmental performance of campuses. It is an opportunity to generate interest and also inform this process to catalyse the big change. It has begun to pique the interest of educational institutions to practice sustainability and become more performance-oriented.

The evaluation process of NAAC is reinforced by the incentive of Clean and Smart Campus Award. This award has been instituted by All India Council for Technical Education (AICTE) to promote eco-friendly and sustainable campuses. Similarly, 'Swachh Campus' of the Ministry of Human Resource Development (MHRD) and Mahatma Gandhi National Council of Rural Education (MGNCRE) adds to the pool of incentives.

As institutions seek consistent improvement in NAAC rating and participate in the award process, green audit or assessment of environmental performance of the campuses becomes a driving factor and an integral part of institutional policy.

A large number of college and university campuses have generated reports based on the NAAC indicators. NAAC calls these 'self-study reports' and compiles them in an online database. NAAC's self-study reports and their availability have been a useful resource for deep-dive assessment of interventions on the campuses. These reports have been submitted by campuses for NAAC ratings and have been prepared based on a set template. According to the NAAC template, information is sought on environmental efforts under the category called institutional values and social responsibilites segment spread across different criteria.

The 'NAAC Institutional Accreditation: Manual for self-study report (Universities), 2020' includes the Criterion VII for institutional accreditation system that is dedicated to Institutional values and social responsibilities under which the criteria for 'Environmental Consciousness and Sustainability' is included. The parameters covered under this criterion are considered to award points to the institutions. The points awarded are broadly linked with energy conservation and generation,

Criterion VII	Institutional values and best practices (100)
Key indicator 7.1	Institutional values and social responsibilities (50)
Environmental con	sciousness and sustainability
7.1.2	 Alternate sources of energy and energy conservation measures: 1. Solar energy 2. Biogas plant 3. Wheeling to the grid 4. Sensor-based energy conservation 5. Use of LED bulbs and power-efficient equipment
7.1.3	 Facilities in the institution for the management of categories of waste: Solid waste management Liquid waste management Biomedical waste management E-waste management Waste recycling system Hazardous chemicals and radioactive waste management
7.1.4	 Water conservation facilities available in the institution: 1. Rainwater harvesting 2. Borewell and open well recharge 3. Tanks and bunds 4. Wastewater recycling 5. Maintenance of water bodies and distribution system on the campus
7.1.5.1	 Green campus initiatives: 1. Restricted entry of automobiles 2. Use of bicycles and battery-powered vehicles 3. Pedestrian-friendly pathways 4. Ban on use of plastic 5. Landscaping with trees and plants
7.1.6.1	 Quality audits on environment and energy are regularly undertaken by the institution: 1. Green audit 2. Energy audit 3. Environment audit 4. Clean and green campus recognitions and awards 5. Beyond-the-campus environmental promotional activities

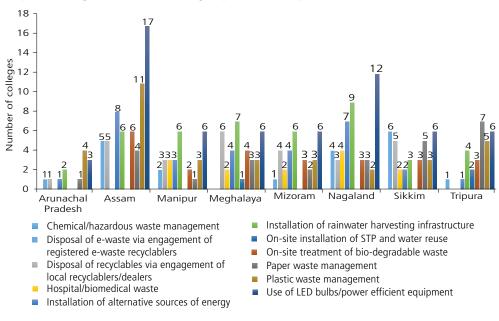
Source: NAAC Institutional Accreditaion Manual for self-study reports-Universities, 2020

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waste management of different categories, water conservation practices, environmental audits and other green campus initiatives (see *Table 1: Criteria of environmental performance under NAAC*).

This multi-sector criteria is all encompassing. The criteria of the NAAC template range from installation of alternative sources of energy, rainwater harvesting, water efficient fixtures, management of different streams of solid waste, wastewater recycling and reuse, among others. But, at this stage, there are no detailed sub-indicators to define the scope of each sector and outline the nature and expanse of interventions needed. Rather, the multi-sector criteria are broadly indicative. While they will have to be developed further going forward, some action has started to take shape based on them. While the NAAC indicators can be further improved and made more performance oriented, this has helped to understand and catalyse practice and interest among campuses.

CSE has begun state-wise analysis of campuses based on self-reported data to understand the nature of the interventions and to identify commonly practiced action in different regions. For instance, the analysis reveals that use of energy-efficient fixtures is the most popular action



Graph 1: Analysis of the self-study reports of campuses in the north-eastern region

Source: CSE

in (as many as 76) colleges from the states in the north-eastern region, followed by rainwater harvesting and exploring alternative sources of energy (see *Graph 1: Analysis of the self-study reports of campuses in the north-eastern region*).

Waste management is an area for which most campuses seek assistance. While studying the response of the campuses to the NAAC criteria, a few good practices have been identified. Some of the campuses in northeastern states have conducted energy or green audits to understand their performance. However, these campuses are few in number. This analysis has made it clear that there is a need to look deeper into the practices of the campuses to identify areas where technical knoweldge support may be needed.

LEARNING FROM EACH OTHER

This push towards promotion of green campuses is an opportunity for cross-learning among campuses. As more and more educational campuses begin to join the NAAC rating and make efforts to implement measures on ground, demand for knowledge and technical support for conservation and resource saving measures will get even stronger.

Campuses will mobilize resources and expertise to shape action. This is already triggering grand experiments that is throwing up diverse sets of actions and approaches in diverse ecosystems. Tapping this learning curve for cross-learning is very important.

From this perspective, therefore, Centre for Science and Environment (CSE) has taken the initiative to launch a network of educational institutions that are willing to change the practice and demonstrate change for resource savings and efficiency gains. These institutions—largely colleges and universities—are willing to explore the possibility of reducing their resource and waste footprints and building environmental awareness. CSE's green campus initiative had taken roots in 2017 (see *Box: CSE's green campus initative*). This preliminary first phase was rolled out more for sensitization and orientation of the campuses to deepen the understanding of the multi-sector initiatives needed and also to make them aware of the way to participate in the NAAC process more effectively.

CSE's green campus initative

CSE's Green Campus Initiative was launched in 2017 as an enabling platform. Since then, this initiative has engaged institutions, educators and students and guided them on how to shape environmental action. To foster learning and give it a proper direction, CSE put out the first toolkit titled *Green Sense: Educational Campus Inventory* during the launch of the Green Campus Initiative. This toolkit involved methods to inventorize and document data on resources consumption and waste. To support this process, orientation programmes were carried out with limited handholding exchanges with a few campuses. Some of the good practices were documented in *A Green Campus Compendium: Incubation, Experimentation and Demonstration of a Green Future*. Since then, the knowledge exchange effort under the Green Campus Initiative has helped to build a community of changemakers committed to on-ground change.

In COVID-19-ridden 2020, CSE has built engagement with campuses in different regions and conducted regional conclaves. Special efforts were made to conduct regional network meetings in the northern and north-eastern region and Maharashtra. Several universities like Guru Nanak Dev University, Amritsar; Assam Don Bosco University; Hansraj Jivandas College of Education, Mumbai; and Vivekanand Education Society's Institute Of Technology, Mumbai have partnered to mobilize regional networks for these orientations and conclaves. Over 400 educators have participated in the conclaves and shared experiences on their greening initiatives and self-study reports in 2020.

Online trainings have been conducted to strengthen technical capacity and to build skills of educators and students on environmental action. Educators have participated in learning environmental data collection, methods of conducting audits, reporting according to the NAAC requirements and other technical understanding of greening measures. They have also understood data analytics related to land, air, water, waste and energy in detail.

In that first phase, the focus was limited to a smaller number of institutions that had started to show interest in implementation of conservation measures. Partnership was forged with a smaller group to mobilize regional networks. Efforts were also made to engage with a few early starters more deeply to guide their action. Regional engagement with local networks in the north, north-east, east and west of the country pointed towards the need for nationalizing this effort, to help build scale and speed. CSE has taken the next step to have a more structured approach to build a national network of green campus to maximize outreach. The key objective of this green campus initiative is to ensure tangible and measurable improvement in environmental performance of campuses. NAAC has already catalysed a system that has compelled campuses to adopt sustainability measures. But such an effort can quickly degenerate to minimal and routine action if not guided by knowledge, cross-learning, capacity building and hand-holding.

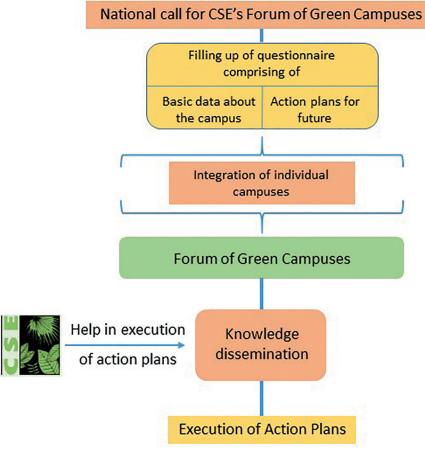
To build on this momentum and to expand the network, CSE has reached out to close to 100 educational campuses to be part of the CSE's forum of green campuses. This will be expanded further in the coming years. This network of forum campuses is to engage in cross-learning and experience sharing, track real world changes on campuses and good practices, build toolkits for providing technical knowledge support for designing implementation strategies and provide knowledge support for implementation.

In pursuit of these objectives, CSE has engaged with 97 campuses to share information on their respective green initiatives—their action plans and what they might have already implemented. These institutions have agreed to participate collectively in this cross-learning platform and to map out the initiatives in five thematic areas: energy, land, water, air and waste (see *Figure 1: The green campus network* for the methodology followed under this initiative).

In this participatory process, institutions have agreed to make voluntary disclosure of information on their current practices and their proposed plans. After getting consent from the educational institutions to participate in this platform, CSE sent out a short questionnaire to get a basic overview of the campuses, including building typologies, resource consumption patterns, institutional environmental policies and actions, current status of implementation and the plans for the future (see *Annexure 1: Survey questionnaire for data collection*). This remote data collection has helped to create baseline data on planning for infrastructure changes, policy amendments and awareness campaigns. About 97 campuses have shared information and their plans of action.

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Figure 1: The green campus network



Source: CSE

This information has been analyzed to understand buildings and campus typologies, resource consumption patterns, environmental policies, and action and action plans. The information gathered from the forum campuses can be largely divided into three parts:

- Basic data about the campus such as the location, climatic zone, area, campus typology, etc.
- Resource consumption patterns data such as water consumption, electricity consumption, waste generation, land allocation and existing measures.
- Action plans that the campuses propose to implement in the upcoming year related to the five themes of land, water, air quality, energy and waste.

While this has been a valuable effort, the information gathered is still very rudimentary. A bulk of it pertains to proposed action plans for on-ground sustainability and is futuristic. Only a few campuses have formulated green policies and created institutional systems to plan, implement and monitor some actions. A few campuses have started to prepare performance baselines and invest in no- to low-cost measures. Almost all campuses are actively disseminating knowledge on environmental sustainability through campaigns. The participating campuses are, however, in the very early stages of planning and do not have a lot to report on changes on the ground. A majority of them have prepared indicative plans or are in the process of preparing such plans.

Even though most of the initiatives are in a nascent stage and will take some more time to mature and show results, it is important to create this platform at the early stages of this exercise to share experiences and knowledge to strengthen the process and alsobuild confidence in the power of positive change.

This compendium is not the last word but only the preliminary first step that will evolve with time. This exercise will remain dynamic to communicate constantly updated information on action and results as the implementation matures and expands on campuses.

At this stage, this report presents brief profiles of the participating institutions, the scope of participation and the preliminary evidence of action, wherever possible. The self-reported data and information submitted by the individual campuses has been annexed to this report (see *Annexure 1: Survey questionnaire for data collection*). Please note that, at this stage, the financial allocation or financial plans for implementation have not been assessed.

Moreover, it may also be noted that due to the constraints imposed by the COVID-19 pandemic, ground-level assessment and investigation of action has not been possible.

But engagement with the campuses who have participated in this process has shown that there is a strong need and demand for technical capacity building and guidance. Participating institutions have expressed the need for knowledge sharing to support this process more intensely and

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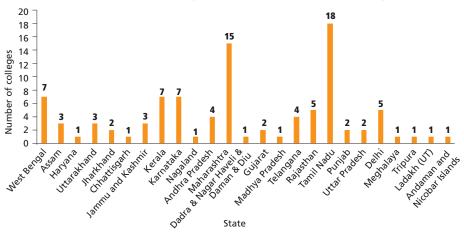
effectively. Therefore, it is envisaged that as part of the green campus initiative a technical guidance system for each thematic area will be created to guide on-ground action and build capacity in the forum campuses to enable this green movement.

Moreover, this green campus initiative will also inform the NAAC process to enable further detailing of scope of action, indicators for designing of strategies, methodology for the audit to assess environmental performance, and making the impacts of the entire process more measurable.

UZ The green campus network

SPATIAL SPREAD OF THE FORUM CAMPUSES

Before delving deeper into the nature and scope of action initiated on campuses, it is necessary to understand the geographic spread of the forum campuses in states and Union territories (UTs) that have participated in this initiative. About 25 states and UTs have representation among the forum campuses. Tamil Nadu and Maharashtra lead the tally with a representation of 18 and 15 campuses respectively. Other active states include Karnataka, Kerala and West Bengal (see *Graph 2: State- and UT-wise representation of the forum campuses*). But it is very encouraging to see participation from far-flung areas, including the Andamans and states in the north-eastern region. Institutions from Chhattisgarh and Jharkhand have also participated.

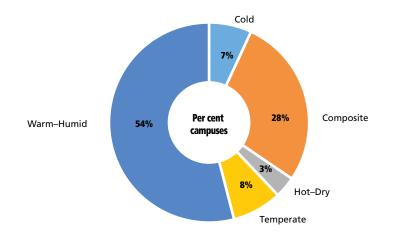


Graph 2: State- and UT-wise representation of the forum campuses

Source: CSE analysis

This essentially indicates how the green campus network represents the diverse ecosystem of India. Broadly, India has five climatic zones that are officially recognized for guiding energy conservation measures. The forum campuses represent all these climate zones (see *Graph 3: Climatic zone-wise classification of the campuses* and *Map 1: Location of the forum campuses*).

A substantial number of the campuses—as many as 54 per cent—are located in the warm-humid region, followed by campuses located in the composite climate at 28 per cent, and temperate zone at 8 per cent. This indicates that local solutions are taking shape in widely diverse ecosystem allowing for more innovation. It is an opportunity to demonstrate locally appropriate solutions and innovations.

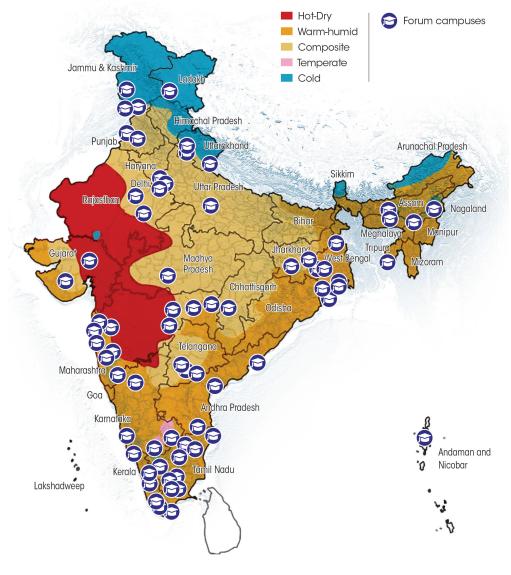


Graph 3: Climatic zone-wise classification of the campuses

Source: CSE analysis

CAMPUSES—VARYING SHAPES AND SIZES

The current network of green campuses display an array of areas, population sizes and building typologies (residential or non-residential). They are also situated in a variety of native climates and topographies. It is important to keep these factors in mind as they have a bearing on environmental challenges as well as the management and performance and scope of action at each campus.



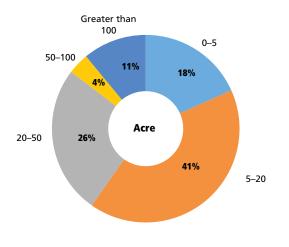
Map 1: Location of the forum campuses

Source: ECBC 2017

Source: CSE analysis

The campuses have been classified into five categories based on size: 0-5 acres; 5-20 acres; 20-50 acres; 50-100 acres; greater than 100 acres. Sixty per cent of the campuses are less than 20 acres in size. In fact, 18 per cent are spread over an area of less than 5 acres. On the other hand, only 4 per cent of the participating colleges claim to have more than 100 acres of land (see *Graph 4: Classification of the campuses as per area*).

The sprawl of a campus is an important determinant of the scope and magnitude of action. Smaller campuses may face greater limitations in implementing diverse initiatives, especially land-based action like largescale plantations, on-campus agriculture or large-scale deployment of renewable energy. Small size can also constrain action on internal mobility and transport within the campus. Such campuses may have to adopt more building-based initiatives like rooftop kitchen gardens, solar rooftop, etc.



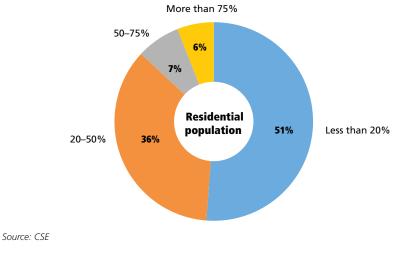
Graph 4: Classification of the campuses as per area

Source: CSE

The ratio of day-scholars to residential scholars determines the consumption pattern on a campus. Among the participating institutes, about 12–13 per cent have reported that more than 50 per cent of their student populations reside within the premises. These are the large residential campuses. More than half have reported that less than 20 per cent of their students reside inside the campus. The data implies that a majority of the campuses are day-scholar campuses.

A residential campus has higher occupancy hours. It requires dining halls and multiple meal times that generate more waste. It consumes more electricity and water and requires more extensive sanitation services. This also has a bearing on the intensity and extent of consumption of other resources as students spend more time inside the campus (see *Graph 5: Classification of campuses based on residential and non-residential student population*).

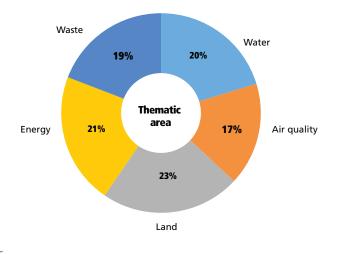
It is expected that the green campus action plans of the campus will reflect these unique imperatives that are relevant to the local context.



Graph 5: Classification of campuses based on residential and non-residential student population

SCOPE OF ACTION

An analysis of the self-reported action plans reveals that most campuses have shown interest in diverse thematic areas—water, energy, waste, air and land. However, there are variations in the degree and extent of interest in each area. Conservation and management of land has found the most traction among the five environmental themes. About 23 per cent of the campuses want to work on land as a resource. About 21 per cent have shown interest in energy conservation, 20 per cent in water conservation, 19 per cent in waste management and 17 per cent in air quality improvement (see *Graph 6: Categorization of action plans declared by the campuses*).



Graph 6: Categorization of action plans declared by the campuses

Source: CSE

03 Emerging action

Data shared by the campuses has thrown light on the pattern of resource consumption and their plans to change it for the better. But this data is inadequate and fragmented. There is less data on some parameters than on others. However, some indicative trends and variations can be extracted from the data set.

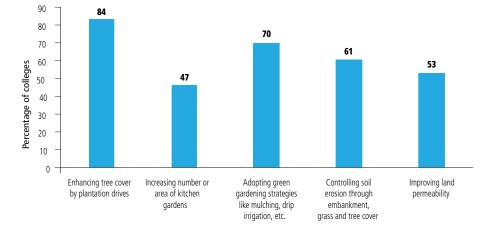
LAND-BASED ACTION

Land-based initiatives provide the campuses a huge opportunity to involve students. Such initiatives include plantation drives, efforts to control soil erosion, kitchen gardening, green gardening strategies and improving soil permeability to recharge groundwater. They provide students an opportunity to learn while connecting with bigger environmental issues.

A review of the data submitted by the campuses reveals that as many as 84 per cent are enhancing their tree cover through plantation drives. About 70 per cent of campuses have deployed green gardening strategies such as mulching and drip irrigation. About 61 per cent of campuses have reported measures for controlling soil erosion; 53 per cent of campus have reported action to improve permeability of soil and 47 per cent have reported kitchen gardening (see *Graph 7: Classification of land-based action on the campuses* and *Figure 2: Evidence of land-based action on the campuses*).

These initiatives are relatively simple to implement and do not need capital-intensive infrastructure. Moreover, gains from them are immense. Overall, these steps can help the campus to maximize benefits from land.

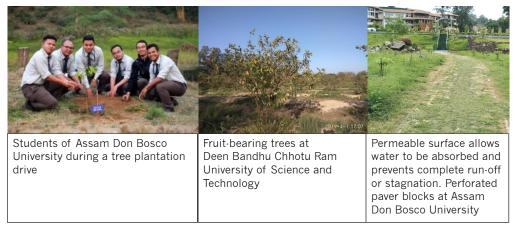
These initiatives are oriented towards preserving local biodiversity and meeting local food requirements. Tree cover enhancements help the campuses to control the micro-climate and reduce the heat island effect.



Graph 7: Classification of land-based action on the campuses

Source: CSE

Figure 2: Evidence of land-based action on the campuses



Source: Data submitted by respective campuses

Cooler surroundings delay or eliminate the need for energy-guzzling active cooling in the interiors of buildings (with air conditioning). Enhanced tree cover is also an oxygen source and sustains the natural habitat.

Broadly, it is understood that green gardening strategies like mulching and drip irrigation have indirect benefits of improving soil quality and maintain soil health. Several campuses have shown interest in horticulture. Kitchen gardens reduce dependence on external food supplies associated



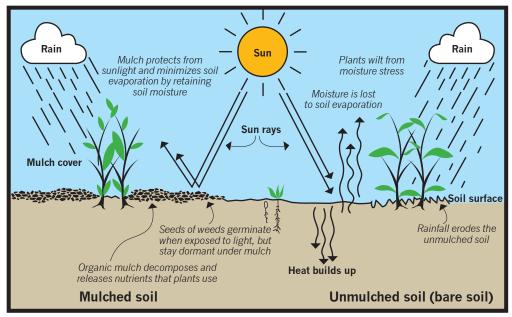


Figure 3: How mulching works

Source: CSE

with high embodied energy due to long distance transportation needs. Local gardens are an opportunity to improve food supply through organic farming and reduce or eliminate use of pesticides and chemical fertilizers. This not only enhances the nutritional quality of the food but also improves food security.

Many campuses with undulating terrain value top soil conservation and control of soil erosion. Vegetation holds the soil together and prevents it from being washed off. Small bunds are possible on large campuses. Notable evidence of action has emerged from educational institutions in the north-eastern region in this regard.

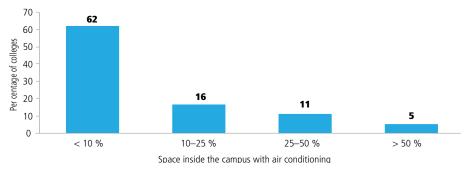
The broad spectrum of benefits of land-based interventions are known and well-understood in the campus network. But there is currently no methodology to develop detailed indicators to generate data as part of the audit system to track these benefits to understand the environmental performance of interventions. While such a guidance system can be developed for the green campus network, NAAC system should also be reformed for this granular effort to make the change measurable and tangible.

ENERGY SAVING

Electricity demand on campuses is determined by the requirement of lighting, fans and air conditioning, and use of appliance and computers. Reducing energy footprints of a campus is crucial to slowdown carbon emissions that trap heat and lead to climate change, and improve energy security. Therefore, energy efficiency and saving measures, and on-site renewable energy generation, are important at the habitat level.

At the early stages of this programme, campuses have not been able to report their annual energy consumption level holistically to help create baseline trends. Such data will become available when a more structured energy audit system is put in place. In the absence of holistic electricity consumption data, information on the use of air conditioners has been used as a proxy indicator for understanding what is contributing to energy intensity on the campuses. This considers the available evidence in India that has shown that air conditioners are major electricity guzzlers and can use up to 60 per cent of a typical household electricity consumption and create an imbalance in the energy use pattern.

Available information from campuses show that use of air conditioning is still not very wide and pervasive. Among the campuses under review, about 62 per cent have air conditioning in less than 10 per cent of their building space, 16 per cent have air conditioning in 10–25 per cent of their building space; 11 per cent have air conditioning in 25 per cent of their building space; and 5 per cent have air conditioning in more than 50 per cent of their building space (see *Graph 8: Percentage of air conditioned building spaces on campus*).



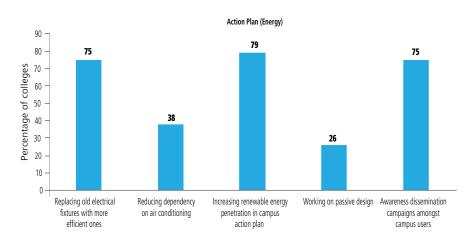
Graph 8: Percentage of air conditioned building spaces on campus

Source: CSE

This baseline presents an opportunity to intervene now to ensure that educational buildings adopt more bioclimatic measures through passive architectural features to decrease the heat load on buildings and reduce the need for air conditioning. It may be noted that about 70 per cent of the geographical area in India falls under warm temperatures and requires cooling measures. With rising affordability and access of air conditioning, it is becoming a one-stop solution to provide indoor thermal comfort. This alters behaviour in the long-run towards energy-guzzling lifestyles and reduces reliance on adaptive comfort methods. It also increases energy consumption vastly. Measures like defining threshold temperature use for air conditioners, defining set-points for AC usage and prioritizing usage of fans over ACs, cool-roof approach, shading of buildings, and insulation of walls can help stop, and even reverse, this trend.

ENERGY-SAVING INITIATIVES

Forum campuses have shown interest in a diverse set of strategies for energy saving and improving energy efficiency (see *Graph 9: Classification of energy-based action on the forum campuses*). Reducing dependence on air conditioning and working on passive design are the least popular actions, with 38 per cent and 26 per cent campuses opting for them respectively. An overwhelming 79 per cent of the campuses have adopted renewable energy



Graph 9: Classification of energy-based action on the forum campuses

Source: CSE

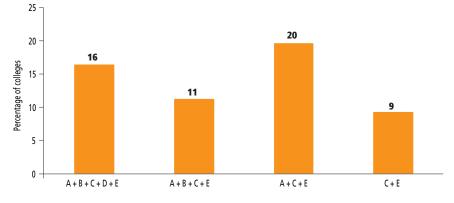
strategies and wish to invest in renewable energy infrastructure. Replacing old fixtures with energy-efficient ones and running awareness campaigns on energy efficiency are the other two popular actions with 75 per cent campuses opting for each of them. These can induce behavioural change and are not capital-intensive.

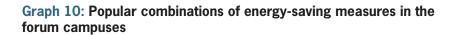
The strong interest shown in energy-efficient electrical fixtures and appliances is interesting. As technology improves with the passage of time, electrical fixtures keep becoming more efficient. While newer fixtures cannot be adopted frequently, there is a tipping point beyond which it is monetarily beneficial for a campus to replace old systems with newer ones as the benefits in operational cost savings outweigh the capital cost investmentsmade in replacing the fixtures. It is imperative that campuses identify the exact tipping point by conducting regular energy audits. The Bureau of Energy Efficiency has a star-rated programme that can help users decide the most efficient fixture and appliances.

There is also an overwhelming interest in renewable energy penetration that can be a major step in achieving energy self-sufficiency and security. The most popular form is solar, though wind energy, micro-hydel plants, biomass etc., are also being explored by campuses.

For simplicity, we have classified energy saving measures into five groups:a: Replacing old electrical fixtures and appliances with more efficient ones; b: Reducing dependence on air conditioning; c: Increasing renewable energy penetration on campuses; d: Working on passive design; and e: Running awareness campaigns. An analysis of the information provided by the forum colleges reveals that adoption of different energy saving measures is not uniform. About 16 per cent of the campuses in the network have adopted all the five strategies. About 20 per cent—the biggest group in the cohort—have adopted the strategies of replacing old electrical fixtures, renewable energy, and awareness campaigns. About 11 per cent have adopted all measures except passive design interventions.

This shows that with guidance it is possible to expand and deepen the portfolio of action on most campuses.





A Replacing old electrical fixtures with more efficient ones

B Reducing dependency on air conditioning

C Increasing renewable energy penetration on campus

D Working on passive design

E Awareness dissemination campaigns amongst campus users

Source: CSE

Among all the measures, the conscious use of passive design techniques to leverage sun and wind to cool down buildings and keep occupants thermally comfortable while reducing the need for energy consumption has the least number of takers. These measures are most useful during the design stages of a building and to some extent as retrofits. Implementing them will require deeper knowledge of certain techniques regarding building geometry; layout and site planning; orientation, size, shape and placement of windows and sun shading devices; day-lighting; ventilation; building materials; landscape elements; wall massing and others.

It is interesting to note that the Assam Don Bosco University in Guwahati has shared passive design techniques they make use of, such as optimized window sizes, proper shading devices and appropriately oriented buildings (see *Figure 4: Passive architectural design of Assam Don Bosco University, Guwahati*).



Figure 4: Passive architectural design of Assam Don Bosco University, Guwahati

Source: Assam Don Bosco University, Guwahati

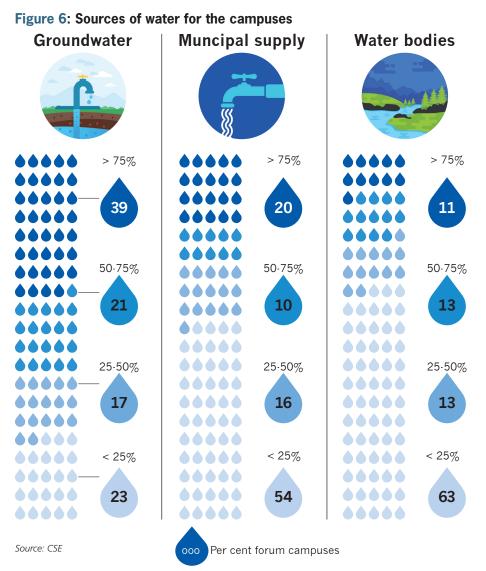
Figure 5: Evidence of energy action from other campuses Left: Use of occupancy sensors at the University of Science and Technology, Meghalaya; Right: 1,480 KWp grid-connected solar PV panels installed in Guru Nanak Dev University, Amritsar



Source: Data submitted by respective campuses

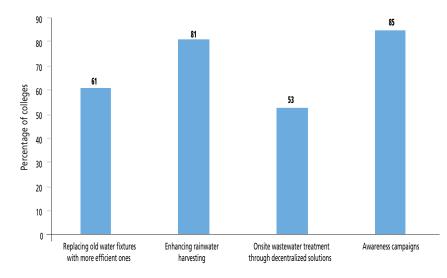
WATER-WISE

A review of the information submitted by the campuses reveals that water is a big concern and water conservation practices have drawn a lot of attention. It is evident that a large number of forum campuses use groundwater to supplement municipal supply. Some of them have access to water bodies as well (see *Figure 6: Sources of water for the campuses*). Groundwater extraction is the dominant source of water for the campuses. It is followed by municipal supply and then water bodies which form the least dominant source to meet water requirements at the campuses.



Forum campuses have shared information on strategies for water conservation. According to it, key interventions include rainwater harvesting, replacement of old water fixtures with more efficient ones, decentralized wastewater treatment and awareness campaigns (see *Graph 11: Distribution of water-based actions on the forum campuses*).

Rainwater harvesting is among the most popular intervention strategies. About 81 per cent of the campuses have listed rainwater harvesting as their planned intervention. Local solutions and techniques are being designed to harvest rainwater to enhance water storage and recharge aquifers and raise the groundwater table. This will also prevent urban and campus flooding. However, at this stage it is not possible to assess the adequacy of the design and scale of the interventions.



Graph 11: Distribution of water-based actions on the forum campuses

Source: CSE

About 61 per cent of the campuses are committed to replacement of old water fixtures with more efficient ones and 53 per cent plan to establish decentralized wastewater treatment systems. This opens up the opportunity to conduct water audits to understand the losses due to leakages and neglectful use that happens frequently due to faulty water fixtures. Existing water fixtures can also be retrofitted or replaced to achieve better water efficiency.

As many as 85 per cent of the campuses have focussed on building awareness campaigns around water conservation and saving. Influencing user behaviour is important and can be effective and doesnot require capital-intensive steps. Student- or management-led awareness campaigns, webinars or knowledge sessions can be taken up in this regard.



Barrel-type rainwater harvesting system in St. Edmund's College, Shillong collects rainwater from rooftops of buildings



A decentralized wastewater treatment system (DWWTS) spread across 2 acres at Guru Nanak Dev University, Amritsar, treats 2,500 kilolitres of wastewater per day

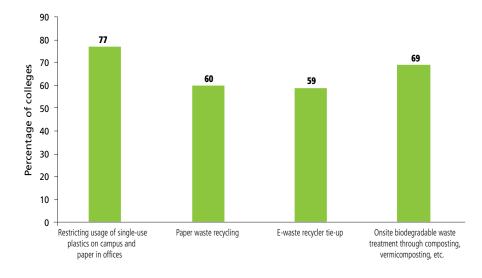
Looking at the long-term sustainability and reuse of treated wastewater, the alternate of decentralized or on-site wastewater treatment is an appropriate method, especially when it comes to educational campuses. Emerging technologies, based on natural systems, are not only cost-effective, but are also better for the environment, as treated water is often reused on-site, instead of being treated and discharged into a natural water body.

Some of these initiatives might require more capital investment from the campuses and might be longer-term initiatives. However, they provide an excellent opportunity of monetary savings on operational costs in the long-run by saving on water and energy bills. A clearer picture from campuses will emerge once implementation assumes scale.

WASTE MANAGEMENT

Interest in waste management is growing among campuses. It has been spurred to a great extent by multiple government initiatives that include Clean and Smart Campus Award by the All India Council for Technical Education (AICTE), Satat, framework for eco-friendly and sustainable campus development by University Grants Commission (UGC), and 'Swachh Campus' by the Ministry of Human Resource Development. These initiatives have laid the foundation for action on waste management. About 19 per cent of all actions shared by the campuses are related to waste.

The type of waste management strategies that the campuses have highlighted collectively include restricting use of single-use plastic and promoting paper-free offices, paper waste recycling, creating e-waste recycling tie-ups, and starting on-site treatment of biodegradable waste through composting and vermi-composting (see *Graph 12: Classification of waste-based action on the forum campuses*).



Graph 12: Classification of waste-based action on the forum campuses

Source: CSE

Classification of action according to these categories reveals that as high as 77 per cent of the campuses have proposed to restrict usage of singleuse plastic and paper. Multiple campuses have adopted a plastic-free campus policy. This category includes restricting packaged drinking water bottles, plastic carry bags, plastic cutlery, plastic straws, etc. Paperless policy in a campus is also an effective measure to reduce waste generation. Eliminating paper-based internal communications, and rationing of printer or paper usage are some of the measures that enable reduction of paper use over time.



About 69 per cent of the campuses have proposed adoption of on-site organic waste treatment measures. This includes on-site biodegradable waste treatment through composting and vermi-composting. It may be noted that around 60 per cent of the waste produced in an Indian household is organic in nature. This may vary depending on the nature of the campus. However, the organic component is expected to be the bulk of the waste generated in all campuses. The trend towards on-site waste treatment, including several types of composting and vermi-composting methods, is important. The efficacy of these techniques is, however, influenced by climatic conditions. Mulching of horticulture waste also helps to improve soil fertility.

About 60 per cent campuses have committed to recycling of paper waste and are also in the process of tying up with e-waste recyclers. Multiple paper recyclers offer services where they take the waste paper produced by the institutes and make customized stationary which can be bought back to the institute for reuse. This brings the paper waste closer to being brought into a circular loop of consumption. E-waste tie up is an easy and safe way to dispose of the e-waste produced on the campuses. Moreover, such tie-up do not entail any monetary obligations for the generators.

These initiatives require creativity and awareness at the management level, including in making policy decisions. However, these initiatives are easy to implement and in most scenarios do not require capital expenditure.



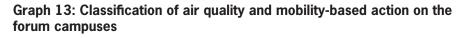
Figure 7: Evidence of action on waste on the forum campuses

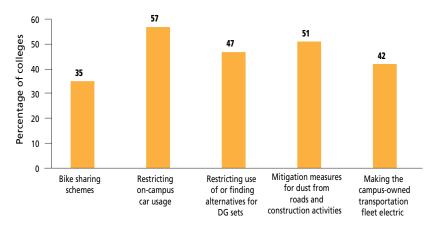
Left: An item promoting awareness to reduce use of single-use plastics at Gargi College, New Delhi; Right: A biogas plant at the University of Science and Technology, Meghalaya

AIR POLLUTION AND SUSTAINABLE TRANSPORT

Air pollution mitigation is yet another critical thematic area for the green campus initiative. It contains multiple sub-thematic areas including action on road dust and alternatives to polluting diesel generator (DG) sets for power back-up.

Sustainable mobility and transportation measures also help to not only reduce air pollution exposure but improve energy security as well. These measures include restricting car usage inside campuses, deployment of electric vehicles, and promotion of bike sharing and walking.





Source: CSE

According to the State of Global Air 2020, Health Effects Institute and the Institute for Health Metrics and Evaluation's Global Burden of Disease project, air pollution was globally responsible for 6.67 million early deaths in 2019. Micro-action on mitigation measures on campuses can cumulatively add up to address the public health challenge associated with air pollution.

A review of the action strategies on campuses reveals that mitigation measures against dust from roads and construction activities forms part of action plan of 51 per cent of forum campuses (see *Graph 14: Classification of air quality and mobility-based action on the forum campuses*). But there is lack of clarity regarding the nature and scope of action. Normally,

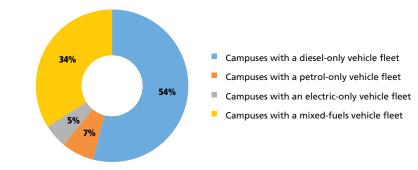
road dust mitigation requires proper paving of the entire right of way, cleaning and vegetative barriers. Similarly, construction or demolition activities related to new construction, refurbishment or retrofitting inside campuses will require wind barriers to prevent dust dispersion, covering and stockpiled materialand trucks carrying material, wheel washing and water sprinkling for dust suppression, etc. But such detailing has not been done yet. Detailed indicators for designing of a strategy have to be worked out for effective implementation.

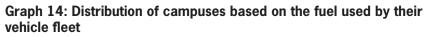
About 47 per cent of the campuses have proposed restricting the use of and finding alternatives to DG sets. This is a good step forward. Diesel emissions are a proven carcinogenic substance and pose a significant health risk. DG sets are responsible for direct toxic exposure given their close proximity to school premises. In fact, in cities like Delhi, DG sets are not allowed to operate during the winter months when air pollution levels are very high. In other cities too, campuses should be able to utilize the daily air quality data and daily air quality index from the official broadcast to stop operation of DG sets on days that are classified as 'very poor' or 'severe' in terms of pollution. Campuses must find ways to switch to cleaner fuels or sources for electricity back-up. Usage of this back-up energy should be optimized by diverting it to essential functions on the campus during outages.

Coming to mobility measures, 42 per cent campuses have plans to adopt electric vehicles and 35 per cent are planning bike sharing schemes. The Electric Vehicle Policy of Delhi has set a target that by 2024 one in every four new registrations in the city will be of battery-powered electric vehicles. With a stronger push towards electric vehicles by the government and more and more people opting for them, parking lots must be improved to cater to this vehicle typology by providing charging points.



Mitigation measures such as covering materials can be adopted to suppress dispersal of dust produced due to construction activities





Source: CSE

Mobility measures: At this nascent stage of the programme, the scope of mobility interventions can be very limited in scope and scale. Availability of space can also be a big constraint on smaller campuses. This also explains the comparatively lower number of campuses choosing air quality and mobility management measures. Most popular air quality-based actions include restriction on car usage inside campuses. Nearly 57 per cent of campuses have opted for this. Cars are a major source of air pollution on campuses (see *Graph 14: Distribution of campuses based on the fuel used by their vehicle fleet*).

Campuses usually own their own fleet of cars and buses. Most of these vehicles run on diesel. Now campuses are making an effort to use cleaner fuels like CNG or replace the fleet with zero emissions vehicles that run on electricity.

About 54 per cent of the campuses have vehicles that use diesel only, making it the predominant fuel type on the forum campuses. About 34 per cent of the campuses have a combination of petrol, diesel, CNG and electric vehicles in varying combinations. Around 7 per cent of the campuses have a petrol-only vehicle fleet and 5 per cent have only electric vehicles. It is interesting to note that campuses with mixed fuel sources, 41 per cent have some penetration of electric vehicles. This an encouraging trend.

Several campuses have successfully implemented bike-sharing schemes where a company provides bicycles for rent and charges students on a per hour, per day or per month basis. It is important to assess the demand for

these bicycles and ensure that adequate bicycle infrastructure, including stands, is in place.

There is considerable scope for scaling up action on air pollution mitigation and mobility management. This will require technical knowledge building strategy and proper orientation. It will also need detailed indicators and technical guidance to streamline efforts and make them work with pinpoint accuracy.

Figure 8: Evidence of action against air pollution on the forum campuses



Bike sharing scheme at Guru Nanak Dev University, Amritsar



An electric golf cart for intra-campus mobility at Deen Bandhu Chhotu Ram University of Science and Technology



Awareness posters to reduce motorized vehicle-oriented travel behaviour at Guru Nanak Dev University, Amritsar



This preliminary assessment of the environment plans that close to 100 campus have prepared as part of the NAAC evaluation criteria is indicative of the direction and scale of action expected on educational campuses.

At this stage, this is more of a review of the proposed plans and the scope of measures that the institutions have outlined. The scope of implementation is still very limited. That makes an assessment of adequacy and benefits of the measures difficult. Therefore, only a few ground-based practices reported by the institutions could be highlighted illustratively to indicate the nature of the practice. This is expected to change quite substantially with campuses ramping up implementation.

CSE will take this opportunity to leverage the Green Campus Initiative and the network to mobilize interest among the campuses to take steps beyond the common minimum, facilitate knowledge sharing, and build capacities so that the campuses can begin to plan and practice more transformative change. This will also help to enrich environmental education and improve environmental sensitivity and practices.

Already, this initiative has begun to create a learning curve at the campuses that have engaged to share their good practices. Some of these campuses have matured to organize their efforts cohesively (instead of working in a piecemeal manner); setup institutional structures and systems for planning, monitoring and implementation; dedicated resources; identified research avenues and conducted investigation; organized campaigns for behavioural change; executed pilot projects; and taken other initiatives for environmental action. This growth curve will now be scaled up for more far-reaching changes.



This network will mobilize technical know-how to design and implement better plans. As part of this initiative, toolkits are being developed on techniques, technologies and system design on all five themes.

This entire exercise will make the environmental performance of the campuses more measurable, both quantitatively and qualitatively, to ensure verifiable gains. The Forum of Green Campuses will also expand to include a new generation of green campuses.

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Annexure 1 Survey questionnaire for data collection

About the campus

Email Address:	Email Address					
Name of Campus:	Name of Campus					
Total Population of Campus:	Students: Support staff and faculty: Support staff and faculty					
Location and climatic zone:	City: City State: State					
Climatic zone :	Refer to this list to find the nearest city to your campus, please check here — (https://www.cseindia.org/static/images/city_climatic- zones_ECBC1.jpg) Climatic Zone O Composite O Temperate O Hot-Dry O Warm-Humid O Cold					
Upload 4 images of your campus. Including one of classroom:	Choose Files No file chosen					
How many reside in the campus (Residence inside campus) Click on the scenario that most accurately resembles your campus:	Faculty and support staff: ○ Less than 20% ○ 20-50% ○ 50-75% ○ More than 75% Students: ○ Less than 20% ○ 20-50% ○ 50-75% ○ More than 75%					
What is the predominant height of buildings in your campus.	◯ 1-2 storey ◯ 3-5 storey ◯ Above 5 storey					
Energy						
How much energy was consumed by the campus last year:	(Taken from energy bills - kWh)					
Does the following rooms have air conditioning? Click on the scenario that most accurately resembles your campus:						
How much space in your campus has air conditioning?	\bigcirc Less than 10% \bigcirc 10-25% \bigcirc 25-50% \bigcirc Above 50%					

Water									
How much water was consumed by the campus last year:	(Taken from water bills - in Kilo-litres)								
Tentative percentage of water requirements met in the campus by(Tick one)	Municipal Supply: O Less than 25% O 25-50% O 50-75% O More than 75% Ground Water extraction: O Less than 25% O 25-50% O 50-75% O More than 75% Water Body: O Less than 25% O 25-50% O 50-75% O								
Waste	More than 75%								
How much waste was generated in your campus last year (approximate):	(In Tons)								
Which of the following are allowed in your campus.	☐ Single use plastic ☐ Disposables at events ☐ Paper in office ☐ Physical posters for events								
Air									
Does your campus allow :	Motorized vehicles inside the campus								
Does your campus have: (tick none or multiple)	Diesel Generators A transportation fleet of vehicles owned by the campus								
If yes to the previous question, what kind of fuel is being used for it:	Electric Diesel CNG Petrol — Other (Please specify): Other (Please specify)								
What kind of cooking fuel is used in your campus:	Electric Diesel CNG Petrol Gas Coal Wood—Other (Please specify): Other (Please specify)								
Land									
Area of the campus in acres, hectares etc :	Please specify unit								
Approximate percentage of land dedicated to green areas	\bigcirc Less than 10% \bigcirc 10-25% \bigcirc 25-50% \bigcirc Above 50%								
Total Built up Area of campus :	Total Built up Area								

What comprises of your action plan in the upcoming year (tick one or multiple)

Energy:

campus :

C Replacing old electrical fixtures with more efficient ones

 $\hfill\square$ Reducing dependency on Air Conditioning

□ Increasing Renewable Energy Penetration in campus

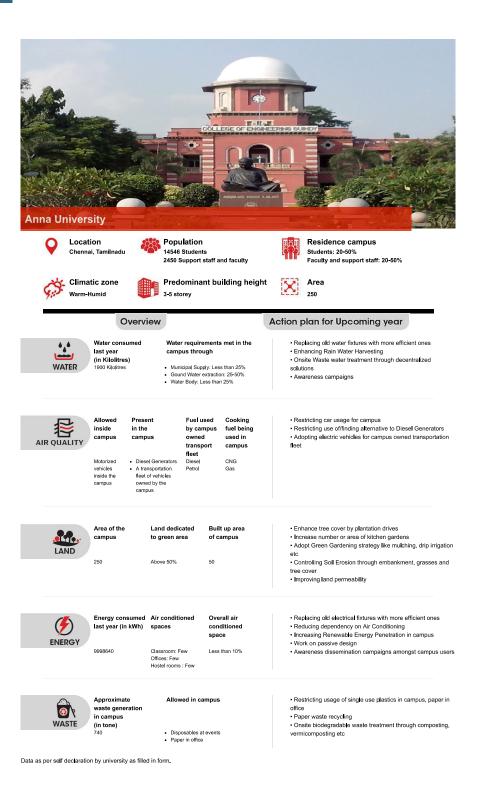
□ Work on passive design

	Awareness dissemination campaigns amongst campus users					
	Any Other: Any Other					
Water:	□ Replacing old water fixtures with more efficient ones					
	Enhancing Rain Water Harvesting					
	Onsite Waste water treatment through decentralized solutions					
	Awareness campaigns					
	Any Other: Any Other					
Waste:	$\hfill \square$ Restricting usage of single use plastics in campus, paper in office					
	Paper waste recycling					
	E-waste recycler tie-up					
	\Box Onsite biodegradable waste treatment through composting, vermicomposting etc.					
	Any Other: Any Other					
Air:	□ Bike sharing scheme					
	Restricting car usage for campus					
	□ Restricting use of/finding alternative to Diesel Generator's					
	\Box Dust mitigation measures from roads and construction activities.					
	\Box Adopting electric vehicles for campus owned transportation fleet.					
	Any Other: Any Other					
Land:	Enhance tree cover by plantation drives					
	Increase number or area of kitchen gardens					
	Adopt Green Gardening strategy like mulching, drip irrigation etc.					
	\Box Controlling Soil Erosion through embankment, grasses and tree cover					
	Improving land permeability					
	Any Other: Any Other					
	Submit					



Fazlani Aishabai & Haji Abdul Latif Charitable Trust's फजलनी आयशाबाई आणि हाजी अब्दुल लतीफ चॅरिटेबल ट्रस्टची AISHABAI COLI **GE OF EDUCATION** (Affiliated to SNDT Women's University, Mumbai) आयशाबाइ कालेज आ UD एजन (एस.एन.डी.टी महिला विद्यापीठ, मुंबईशी संयुक्त) पालिका Aishabai College of Education Location Population Residence campus 110 Students Mumbai, Maharashtra 5 and 7 Support staff and faculty **Climatic zone** Predominant building height Area Warm-Humid 3-5 storey Overview Action plan for Upcoming year Water consumed Water requirements met in the Awareness campaigns *** last year campus through 1 (in Kilolitres) WATER Municipal Supply: Less than 25% Allowed Present Fuel used Cooking **1** inside in the by campus fuel being campus campus owned used in **AIR QUALIT** transport campus fleet Area of the Land dedicated Built up area · Enhance tree cover by plantation drives 22 campus to green area of campus LAND Energy consumed Air conditioned Overall air · Awareness dissemination campaigns amongst campus users (f last year (in kWh) spaces conditioned space ENERGY Classroom: Offices: Few Less than 10% Hostel rooms Approximate Allowed in campus · E-waste recycler tie-up waste generation in campus WASTE (in tone)







ASSAM DON BU	OSCO UNIV	ERSITY			
Cocation GUWAHATI		Population ~1000 Students 289 Support staff	and faculty	PO	Residence campus Students: Less than 20% Faculty and support staff: More than 75%
Glimatic : Warm-Humi		Predominant b 3-5 storey	ouilding height	[X]	Area 274 acres
	Overview		A	ction p	lan for Upcoming year
las	ater consumed st year ı Kilolitres)	Water requirement campus through • Gound Water extra 25% • Water Body: More t	ction: Less than	• Enh • Ons soluti	lacing old water fixtures with more efficient ones ancing Rain Water Harvesting lie Waste water treatment through decentralized ons reness campaigns
AIR QUALITY Ins Call	lowed Present side in the mpus campus torized - Diesel Gen ticles ide the mpus	Fuel used by campu- owned transport fleet Diesel		• Dus activit	t mitigation measures from roads and construction ies.
LAND car	mpus to g	green area of	uilt up area campus 517.1 sqm	• Incre • Ado etc • Con tree c	ance tree cover by plantation drives asse number or area of klitchen gardens pt Green Gardening strategy like mulching, drip irrigation trolling Soil Erosion through embankment, grasses and over oving land permeability
	Offic	aces co sp	verall air onditioned oace ss than 10%	• Red • Incr • Wor	lacing old electrical fixtures with more efficient ones ucing dependency on Air Conditioning assing Renewable Energy Penetration in campus k on passive design reness dissemination campaigns amongst campus users
WASTE (in	pproximate sste generation campus tone) 0kg/day (organic) v university as filled in fo	Allowed in campo Single use plastic Paper in office Physical posters for orm.		office • Pap • Ons	tricting usage of single use plastics in campus, paper in er waste recycling tie biodegradable waste treatment through composting, composting etc























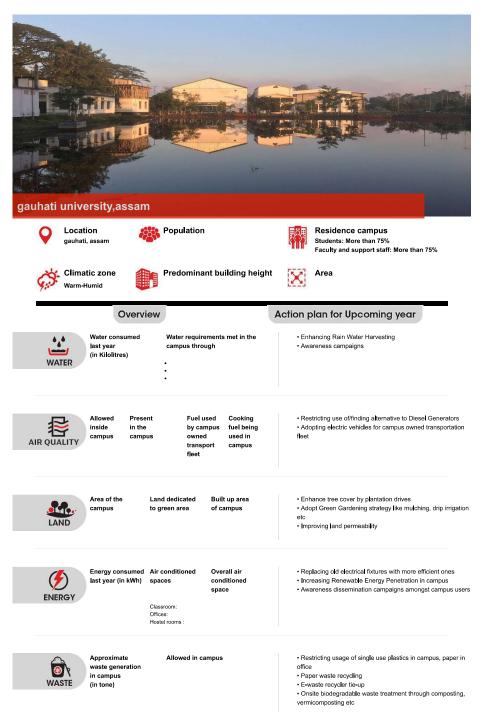
Dang Seva Mandal's A	Arts College			
Cocation Nashik, Maharashtra	Population 648 Students 24 Support sta	aff and faculty	Students: 5	ce campus 0-75% support staff: 20-50%
Climatic zone Warm-Humid	Predomina 1-2 storey	nt building height	Area 2 acres	
Ove	erview	1	action plan for L	Ipcoming year
Water consum last year (in Kilolitres) 28800 KL Kilolitree	campus throu		• Enhancing Rain \	Vater Harvesting
AIR QUALITY inside in campus c	resent Fuel u the by car ampus ownec transp fleet Diesel Generators	npus fuel being I used in	Restricting car us Restricting use of	age for campus /finding alternative to Diesel Generators
Area of the campus	Land dedicated to green area Between 25-50%	Built up area of campus 786,32 sq.mts.	Enhance tree cov	er by plantation drives
Energy consur last year (in kV 4660 KWH	ned Air conditioned /h) spaces Classroom: Offices: Hostel rooms :	Overall air conditioned space		ctrical fixtures with more efficient ones lency on Air Conditioning
WASTE Approximate waste generati in campus (in tone) 425 KG	Allowed in ca on • Paper in office		Onsite biodegrad vermicomposting e	able waste treatment through composting, tc



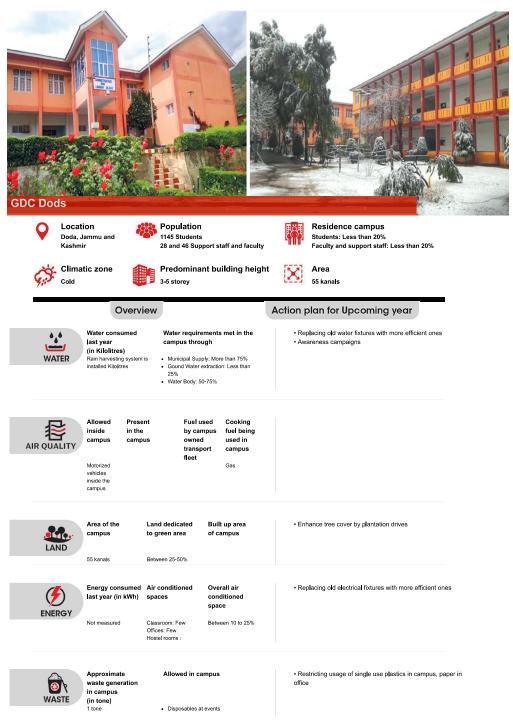


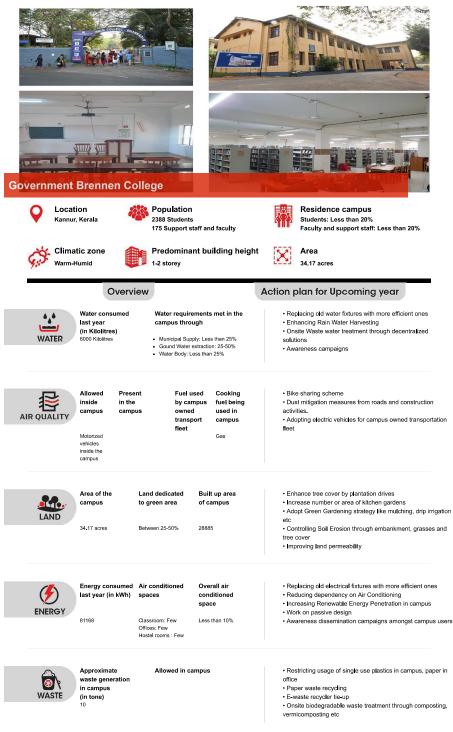






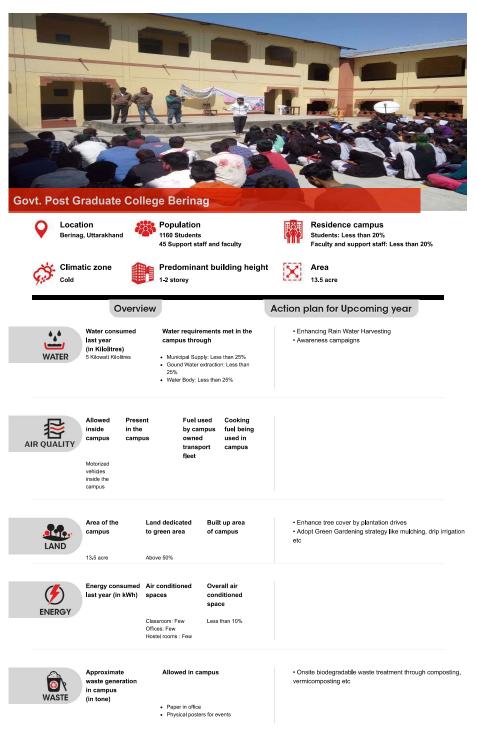








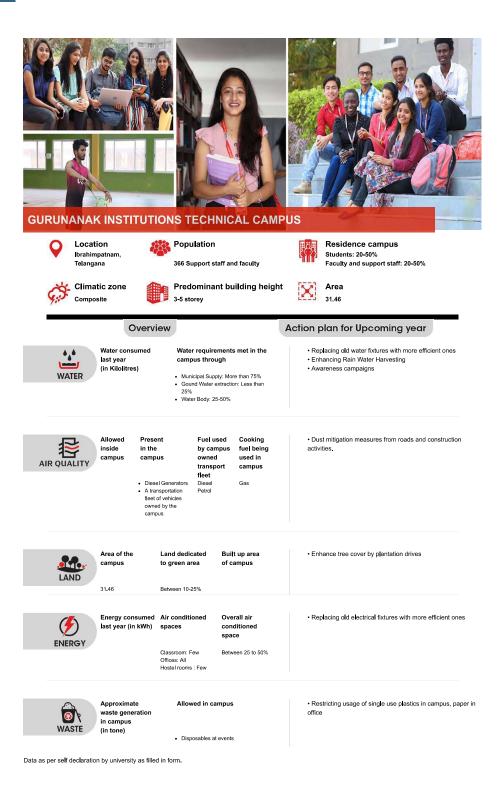
Government			Zanskar		
Padum LADAK	Zanskar, UT 🛛 🌋	Population 57 Students 15 Support sta	ff and faculty		Residence campus Students: Less than 20% Faculty and support staff: Less than 20%
Clima Cold	tic zone	Predominar 1-2 storey	nt building height	X	Area 12.5 acres
	Overvie	w	A	ction p	lan for Upcoming year
WATER	Water consumed last year (in Kilolitres) 1 Kilolitres	• Municipal Supp	ly: Less than 25% xtraction: More than	soluti	ite Waste water treatment through decentralized ons reness campaigns
AIR QUALITY		by carr s owned transpo fleet portation Diesel vehicles by the	npus fuel being used in	• Res	tricting car usage for campus tricting use of/finding alternative to Diesel Generators t mitigation measures from roads and construction les.
LAND	campus f	Land dedicated to green area Above 50%	Built up area of campus 2394.80 square meter	• Incr • Ado etc • Con tree c	ance tree cover by plantation drives asse number or area of kitchen gardens pt Green Gardening strategy like mulching, drip irrigation trolling Soil Erosion through embankment, grasses and over oving land permeability
ENERGY	New Campus	Air conditioned spaces Classroom: Few Offices: Few Hostel rooms :	Overall air conditioned space Less than 10%		easing Renewable Energy Penetration in campus k on passive design
WASTE	Approximate waste generation in campus (in tone) 0.11	Allowed in car Single use plas Disposables at Paper in office Physical poster in form.	tic events	office • Ons	tricting usage of single use plastics in campus, paper in ite biodegradable waste treatment through composting, composting etc





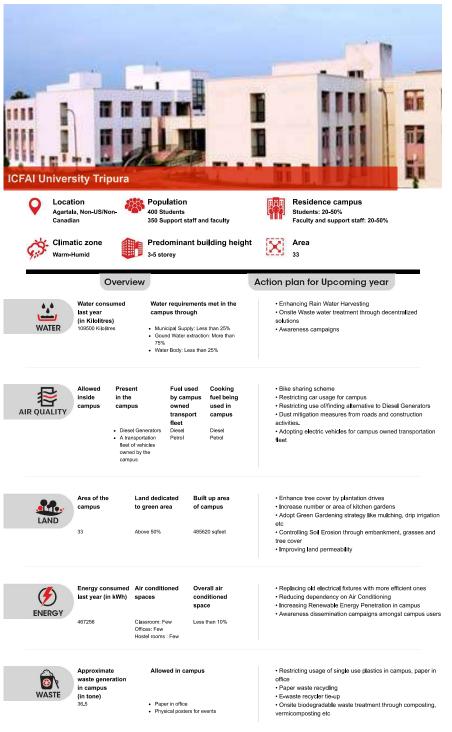


Data as per self declaration by university as filled in form.



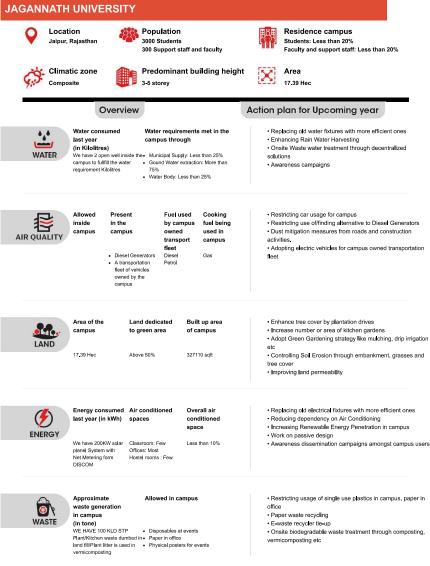


Horticultural College and		riyakulam
Periyakulam, Tamil Nadu	405 Students 87 Support staff and faculty	Residence campus Students: 20-50%
Climatic zone	Predominant building height 3-5 storey	Area
Overv	iew	Action plan for Upcoming year
Water consumed last year (in Kilolitres)	Water requirements met in the campus through • Municipal Supply: 25-50% • Gound Water extraction: 50-75% •	Replacing old water fixtures with more efficient ones Enhancing Rain Water Harvesting
vehicles • A tra inside the fleet	e by campus fuel being owned used in transport campus fleet el Generators nsportation Petrol of vehicles	
Area of the campus	Land dedicated Built up area to green area of campus	Enhance tree cover by plantation drives Increase number or area of kitchen gardens Adopt Green Gardening strategy like mulching, drip irrigation etc Controlling Soil Erosion through embankment, grasses and tree cover
Energy consumed last year (in kWh)	Air conditioned spaces Overall air conditioned space Classroom: Less than 10% Offices: Few Hostel rooms :	
Approximate waste generation in campus (in tone)	Allowed in campus Paper in office 	Restricting usage of single use plastics in campus, paper in office









ATT OF							
ihunjhu	ion Inu, Rajasthan	45 Students 20 and 45 Supp	port staff and faculty		Residence campus Students: 20-50% Faculty and support staff: 20-50%		
Clima Compo	tic zone	Predominar Above 5 storey	nt building height	[X]	Area 30 acres		
	Overvi	ew		Action p	olan for Upcoming year		
water	Water consumed last year (in Kilolitres) 1850000 Itres Kilolitres	campus throu	ments met in the gh xtraction: More than	• Ons solut	ancing Rain Water Harvesting ite Waste water treatment through decentralized ons areness campaigns		
AIR QUALITY	Allowed Presei inside in the campus campu	by cam	pus fuel being used in	• Res	e sharing scheme tricting car usage for campus pting electric vehicles for campus owned transportation		
LAND	Area of the campus 30 acres	Land dedicated to green area Above 50%	Built up area of campus 919971	• Add etc	ance tree cover by plantation drives pt Green Gardening strategy like mulching, drip irrigation roving land permeability		
ENERGY	Energy consumed last year (in kWh) 25600 Kwh	Air conditioned spaces Classroom: Few Offices: Most Hostel rooms : Most	Overall air conditioned space Between 25 to 50%		acing old electrical fixtures with more efficient ones easing Renewable Energy Penetration in campus		
(B) WASTE	Approximate waste generation in campus (in tone) 35 tons	Allowed in car Single use plast Disposables at 4 Paper in office Physical poster	tic events	• E-w • Ons	er waste recycling aste recycler tie-up ilie biodegradable waste treatment through composting, composting etc		



Jayaraj Anna	packiam Co	ollege For W	Vomen (Autor	nomous	s), Periyakulam
Cocat THENI,	ion TAMILNADU	Population 2411 Students 214 Support st	aff and faculty		Residence campus Students: 20-50% Faculty and support staff: 20-50%
Clima Warm-ł	tic zone ^{Iumid}	Predominar 3-5 storey	nt building height	\times	Area 58.73 acres
	Overvi	ew		Action p	blan for Upcoming year
WATER	Iast year ca (in Kilolitres) 6 Kilolitres		Vater requirements met in the ampus through Municipal Supply: Less than 25% Gound Water extraction: 25-50% Water Body: 50-75%		site Waste water treatment through decentralized ions areness campaigns
AIR QUALITY	vehicles • A tra inside the fleet	by cam owned transport el Generators Diesel sportation Petrol of vehicles d by the	pus fuel being used in		e sharing scheme t mitigation measures from roads and construction tites.
LAND	Area of the campus 58.73 acres	Land dedicated to green area Above 50%	Built up area of campus 2,21,349.3 sq.ft.	• Incr • Adc etc	nance tree cover by plantation drives rease number or area of kitchen gardens pt Green Gardening strategy like mulching, drip irrigation roving land permeability
ENERGY	Energy consumed last year (in kWh) 75341	Air conditioned spaces Classroom: Half Offices: Most Hostel rooms :	Overall air conditioned space Between 25 to 50%		placing old electrical fixtures with more efficient ones easing Renewable Energy Penetration in campus
WASTE	Approximate waste generation in campus (in tone) 10	Allowed in car Disposables at Paper in office		• Ons	per waste recycling site biodegradable waste treatment through composting, icomposting etc



KAMBA	-		OF AR			FOR WO		
Q	Locat TIRUVA TAMILM	NNAMALAI,	1833 A	Population 3200 Students 112 Support sta	aff and faculty		s	Residence campus tudents: 20-50% aculty and support staff: 50-75%
Ģ	Clima Warm-H	tic zone _{Humid}		Predominar 3-5 storey	nt building hei	ght 🔀	. i	Nrea 32acre
		0	verview			Action	n plo	an for Upcoming year
W/	last year campu (in Kilolitres)		campus throu Gound Water e:	ound Water extraction: More than			cing Rain Water Harvesting ness campaigns	
AIR QU	ALITY	Allowed inside campus Motorized vehicles inside the campus	Present in the campus • Diesel Gen • A transport fleet of vehi owned by th campus	ation icles	pus fuel being used in	•		cting car usage for campus ng electric vehicles for campus owned transportation
LA	ND.	Area of the campus 2.32acre	to g	d dedicated reen area reen 25-50%	Built up area of campus 123833.60 Sq.feet	• tr	Contro ee cov	ce tree cover by plantation drives Illing Soli Erosion through embankment, grasses and er ving land permeability
ENE	RGY	Energy cons last year (in l	(Wh) spa Clas Offic	conditioned ces sroom: Few es: Half el rooms : Half	Overall air conditioned space Between 25 to 50%			sing Renewable Energy Penetration in campus ness dissemination campaigns amongst campus users
Ŵ	ASTE	Approximate waste genera in campus (in tone)		Allowed in car • Paper in office	npus	o •	fice Paper Onsite	cting usage of single use plastics in campus, paper in waste recycling biodegradable waste treatment through composting, mposting etc







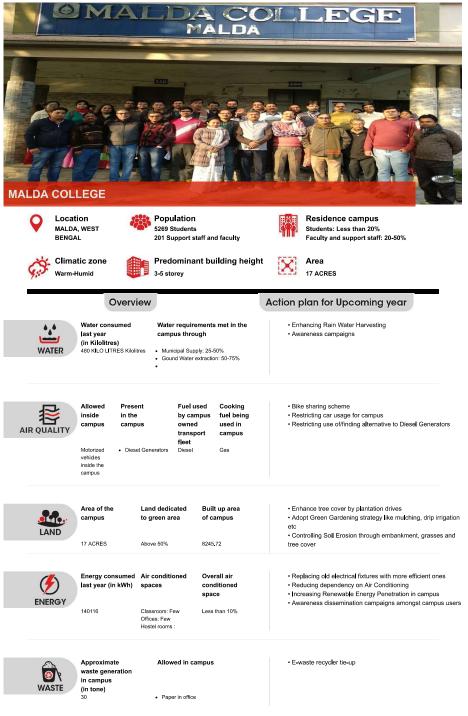




Maharana Pratap Govern	ment Post graduate Co	
Cocation Hardoi, Uttar pardesh	Population 1200 Students 32 Support staff and faculty	Residence campus Students: Less than 20% Faculty and support staff: More than 75%
Climatic zone Composite	Predominant building height 1-2 storey	Area
Overvi	ew	Action plan for Upcoming year
Water consumed last year (in Kilolitres)	Water requirements met in the campus through • Gound Water extraction: More than 75%	Awareness campaigns
Allowed inside campus AIR QUALITY	by campus fuel being	Bike sharing scheme
Area of the campus	Land dedicated Built up area to green area of campus Between 25-50%	Enhance tree cover by plantation drives
Energy consumed last year (in kWh) ENERGY		Awareness dissemination campaigns amongst campus users
Approximate waste generation in campus (in tone)	Allowed in campus • Single use plastic d in form.	Restricting usage of single use plastics in campus, paper in office

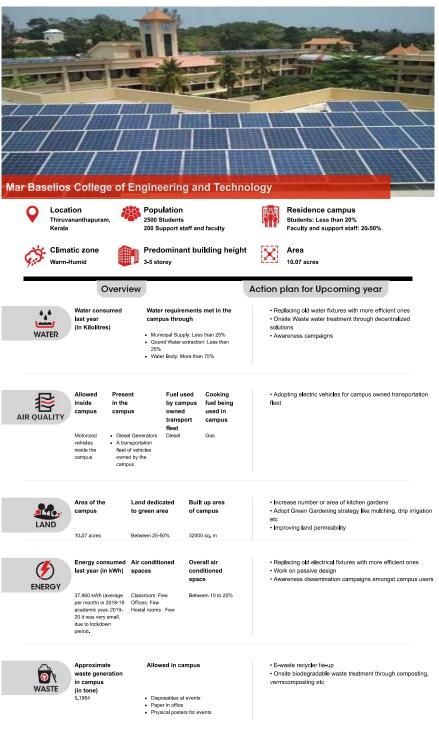
















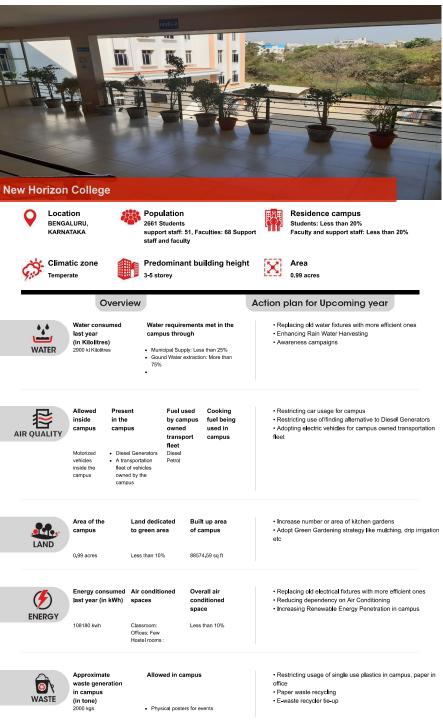


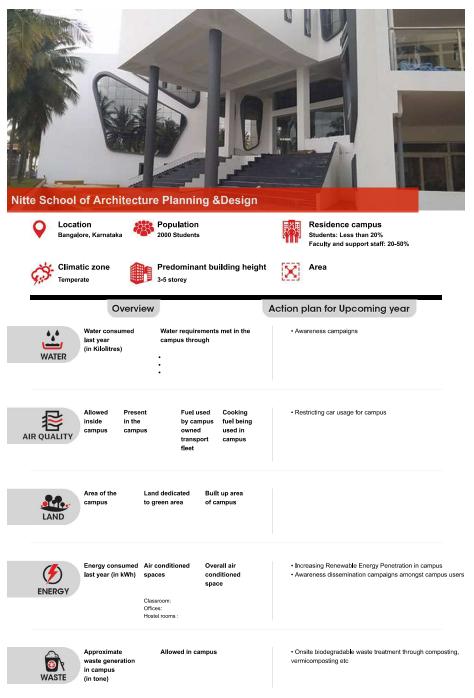
Mugberia Gangadhar M	Anticipal and a second se	
Contai, West Bengal	Population 3098 Students 138 Support staff and faculty	Residence campus Students: Less than 20% Faculty and support staff: More than 75%
Glimatic zone Warm-Humid	Predominant building heigh 1-2 storey	t Area 5.80 acres
Over	view	Action plan for Upcoming year
Water consumed last year (in Kilolitres)	Water requirements met in the campus through • Municipal Supply: Less than 25% • Gound Water extraction: 50-75% • Water Body: 25-50%	 Replacing old water fixtures with more efficient ones Enhancing Rain Water Harvesting Onsite Waste water treatment through decentralized solutions Awareness campaigns
Allowed inside campus • Die	e by campus fuel being	Restricting car usage for campus Restricting use of/finding alternative to Diesel Generators
Area of the campus	Land dedicated Built up area to green area of campus	Enhance tree cover by plantation drives Adopt Green Gardening strategy like mulching, drip irrigation etc Controlling Soil Erosion through embankment, grasses and
5,80 acres	Between 25-50% 2,37 acres	tree cover • Improving land permeability
Energy consumer last year (in kWh) 6000 KW	spaces conditioned space Classroom: Few Less than 10%	Replacing old electrical fixtures with more efficient ones Increasing Renewable Energy Penetration in campus Awareness dissemination campaigns amongst campus users
Approximate waste generation in campus (in tone) 12 tons	Offices: All Hostel rooms : Few Allowed in campus • Single use plastic • Disposables at events • Paper in office	 Restricting usage of single use plastics in campus, paper in office E-waste recycler tie-up Onsite biodegradable waste treatment through composting, vermicomposting etc



NAGAR	JUNA	GOVE	RNME	NT COLL	EGE			
•	Locat NALGO TELAN	NDA,	1	Population 4035 Students 132 Support st	aff and fa	aculty	Ö	Residence campus Students: Less than 20% Faculty and support staff: Less than 20%
Ģ		tic zone		Predominal			[X]	Area 23.6
		0	verviev	1		4	Action p	olan for Upcoming year
W/	ATER	Water consu last year (in Kilolitres 360 Kilolitres		Water require campus throu • Municipal Supp • Gound Water e 25% • Water Body: Le	gh ly: More th xtraction: L	an 75% .ess than	• Enh • Ons soluti	lacing old water fixtures with more efficient ones ancing Rain Water Harvesting ite Waste water treatment through decentralized ons areness campaigns
AIR QU	ALITY	Allowed inside campus Motorized vehicles inside the campus	Present in the campus • Diesel Ge	Fuel u by can owned transp fleet nerators Diesel	ıpus fı u ort c	cooking uel being sed in ampus ias	• Res • Res • Dus activi	e sharing scheme tricting car usage for campus tricting use of/finding alternative to Diesel Generators t mitigation measures from roads and construction ties, pting electric vehicles for campus owned transportation
LA	ND.	Area of the campus 23.6	to	nd dedicated green area ween 10-25%	Built up of camp 95000 SI	pus	• Incr • Ado etc • Cor tree o	
ENE	RGY	Energy cons last year (in 6	kWh) sp Cla Off	r conditioned aces ssroom: Few ces: Few stel rooms : Few	Overall conditi space Less that	oned	• Rep • Rec • Incr • Wor	roving land permeability lacing old electrical fixtures with more efficient ones lucing dependency on Air Conditioning easing Renewable Energy Penetration in campus k on passive design rreness dissemination campaigns amongst campus users
Data as ner self	ASTE	Approximate waste gener in campus (in tone) 12	ation	Allowed in ca Disposables at			office • Pap • E-w • Ons	tricting usage of single use plastics in campus, paper in er waste recycling aste recycler tie-up tie biodegradable waste treatment through composting, icomposting etc







and Contraction	
NSHM Knowledge Campus, Durgapur Group of I	nstitutions
Cocation Durgapur, West Bengal	Residence campus Students: Less than 20% Faculty and support staff: 20-50%
Climatic zone Warm-Humid 3-5 storey	Area 23.65 acres
Overview	Action plan for Upcoming year
Water consumed last year (in Kilolitres) Water requirements met in the campus through User fectual from bills Kilolitres • • • • • • • • • • • • • • • • •	Replacing old water fixtures with more efficient ones Enhancing Rain Water Harvesting Onsite Waste water treatment through decentralized solutions
Allowed inside campus AIR QUIALITY AIR AIR QUIALITY AIR QUIALITY AIR QUIALITY AIR QUIALITY AIR QUIALITY AIR A	Restricting car usage for campus Adopting electric vehicles for campus owned transportation fleet
Area of the campus Land dedicated to green area Built up area of campus 23.65 acres Above 50% 44935 sq m	Increase number or area of kitchen gardens Adopt Green Gardening strategy like mulching, drip irrigation etc
Energy consumed Air conditioned Overall air last year (in kWh) spaces conditioned space	Replacing old electrical fixtures with more efficient ones Increasing Renewable Energy Penetration in campus Awareness dissemination campaigns amongst campus users
1460 Classroom: Few Between 10 to 25% Offices: Most Hostel rooms : Few	
Approximate Allowed in campus waste generation in campus (in tone) 4.5 - Paper in office	Paper waste recycling
Data as per self declaration by university as filled in form.	







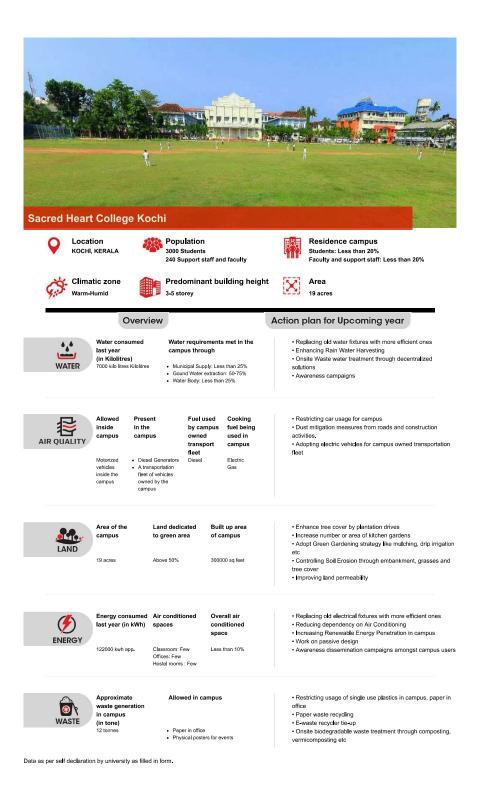








Sacred Heart Colle	ege (Autonomous		
Cocation Tirupattur, Tamil	Support Staff		Residence campus Students: Less than 20% Faculty and support staff: Less than 20%
Glimatic zone Warm-Humid		int building height	Area 23.59 Acres
Ī	Overview		Action plan for Upcoming year
Water cc last year (in Kiloli 1990 Kilo	campus thro tres) Litres Kilolitres • Municipal Sup	ements met in the ugh ply: Less than 25% extraction: More than	Replacing old water fixtures with more efficient ones Enhancing Rain Water Harvesting Onsite Waste water treatment through decentralized solutions Awareness campaigns
Allowed inside campus Motorized vehides inside the campus	Present Fuel u in the by ca campus owne trans; fleet • Diesel Generators Diesel	mpus fuel being d used in	Restricting use of/finding alternative to Diesel Generators
Area of t campus 23.59 Acre	to green area	Built up area of campus 43071.3 Square Metres.	Enhance tree cover by plantation drives Adopt Green Gardening strategy like mulching, drip irrigation etc Controlling Soil Erosion through embankment, grasses and tree cover
	consumed Air conditioned (in kWh) spaces Ah Classroom: Offices: Few Hostel rooms :	Overall air conditioned space Less than 10%	Replacing old electrical fixtures with more efficient ones Reducing dependency on Air Conditioning Increasing Renewable Energy Penetration in campus Awareness dissemination campaigns amongst campus users
Approxin waste ge in campu (in tone) 91.250 Ter Data as per self declaration by unive	eneration us ns • Disposables a • Paper in office	it events	Restricting usage of single use plastics in campus, paper in office Paper waste recycling



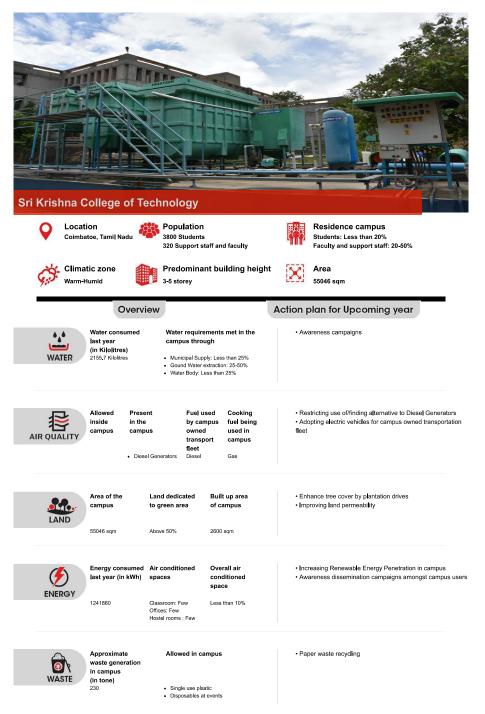












Shri Ramdeobaba Colle	ge of Engineerin	ng and Mar	agement	, Nagpur
Cocation nagpur, maharastra	Population 4500 Students 321 Support staff and	d faculty	Stude	dence campus nts: Less than 20% ty and support staff: Less than 20%
Climatic zone	Predominant bui 3-5 storey	ilding height	Area 18.49	
Overv	iew	A	tion plan	for Upcoming year
Water consumed last year (in Kilolitres) 57000kilo litre Kilolitres	Water requirements campus through • •	met in the	 Enhancing 	old water fixtures with more efficient ones Rain Water Harvesting ste water treatment through decentralized campaigns
Allowed inside in the campus campus	by campus bus owned transport fleet	Cooking fuel being used in campus	 Restricting 	g scheme car usage for campus use of/finding alternative to Diesel Generators tion measures from roads and construction
Motorized • Dies vehicles inside the campus	el Generators Diesel	Gas	 Adopting el fleet 	lectric vehicles for campus owned transportation
Area of the	Land dedicated Built	up area	Enhance tr	ee cover by plantation drives
campus LAND		impus	 Increase nu 	umber or area of kitchen gardens n Gardening strategy like mulching, drip irrigation
18,49acres	41858	3.28sq mt	tree cover	Soil Erosion through embankment, grasses and and permeability
Energy consumed last year (in kWh)		rall air litioned se	 Reducing c 	old electrical fixtures with more efficient ones lependency on Air Conditioning Renewable Energy Penetration in campus
220951.5KwH	Classroom: Few Betwe Offices: Few Hostel rooms : Few	een 10 to 25%		
Approximate	Allowed in campus			usage of single use plastics in campus, paper in
WASTE waste generation in campus (in tone) 0.001	 Disposables at events Paper in office Physical posters for events 	ents	office • Paper wast • E-waste re- • Onsite bioc vermicompo	cycler tie-up legradable waste treatment through composting,







St. Joseph's College (Au	tonomous), Irinjalakuda		
Cocation Thrissur, Kerala	Population 2850 Students 250 Support staff and faculty	Residence campus Students: Less than 20% Faculty and support staff: Less than 20%	
Climatic zone	Predominant building height 3-5 storey	Area 7	
Overv	iew	Action plan for Upcoming year	
Water consumed last year (in Kilolitres) 61000 Kilolitres	Water requirements met in the campus through • Municipal Supply: Less than 25% • Gound Water extraction: More than 75% • Water Body: Less than 25% • Water Body: Less than 25%	Replacing old water fixtures with more efficient ones Onsite Waste water treatment through decentralized solutions	
Allowed inside campus Allowed inside campus Press in the campus Press in the campus Press in the campus Press Pres	by campus fuel being	Restricting car usage for campus	
Area of the campus	Land dedicated to green area Built up area of campus Above 50% 23527.26	Enhance tree cover by plantation drives Adopt Green Gardening strategy like mulching, drip irrigation etc	1
Energy consumed last year (in kWh) ENERGY 100	Air conditioned spaces Overall air conditioned space Classroom: Few Offices: Few Hostel rooms : Few Less than 10%	Replacing old electrical fixtures with more efficient ones Increasing Renewable Energy Penetration in campus	
Approximate waste generation in campus (in tone) 150	Allowed in campus • Paper in office d in form	Restricting usage of single use plastics in campus, paper in office E-waste recycler tie-up	



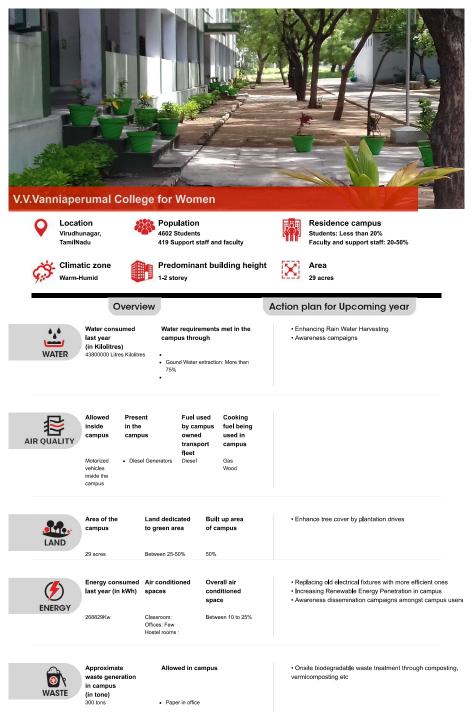
























The idea of a green campus movement is deceptively simple. Creating a green educational campus not only makes a tangible environmental difference, it also educates those who are directly involved—the staff and students on the campus—as well as others by creating living examples that can be replicated.

This preliminary assessment of the actions and aspirations of the members of Centre for Science and Environment's Forum of Green Campuses is a clear vindication of the immense benefits and the great potential of the movement



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