



ENVIS
India



Puducherry Pollution Control Committee
Government of Puducherry



सत्यमेव जयते
Department of Science Technology and Environment
Government of Puducherry



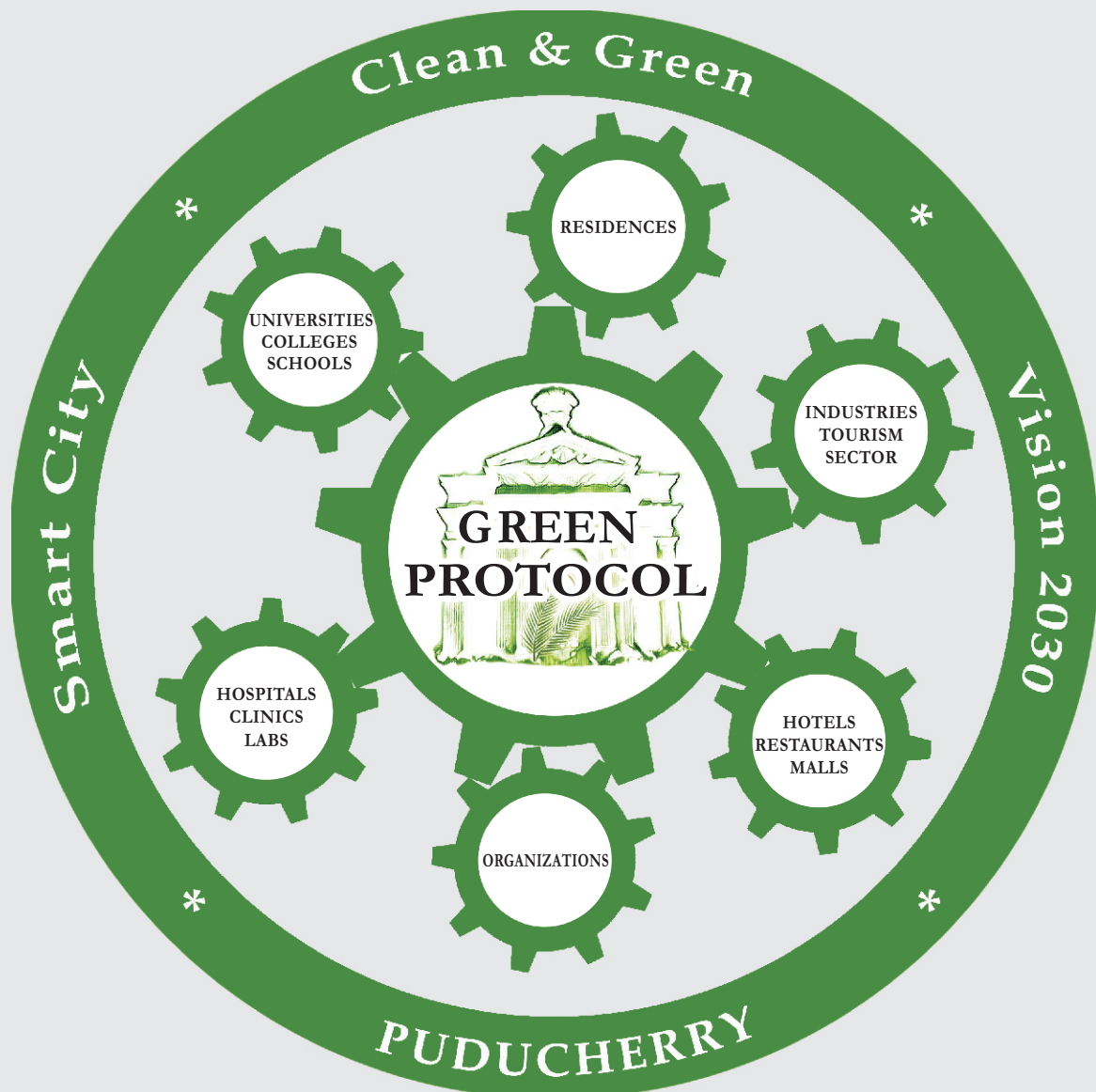
Pondicherry University



APSCC

Association for Promoting Sustainability
in Campuses and Communities

COMPREHENSIVE GREEN PROTOCOL
for the
Educational Institutions, Industries, Residences and Other Organizations
of the
Union Territory of Puducherry



Puducherry Climate Change Cell
Department of Science, Technology and Environment
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April - 2018

Comprehensive Green Protocol – Contributors

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Puducherry Climate Change Cell is established
with the support of the Department of Science and
Technology, Government of India under the
National Mission on Strategic Knowledge for
Climate Change

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Introduction

The ever increasing population especially in India has exerted pressure on basic life support systems like air, water, food, etc. The exploitation of the natural resources and human-induced pollution had triggered '*climate change*' not only in India but also globally. With more than 1.2 billion population, India probably will be severely impacted by the human-induced climate change. This problem has been thrust into public consciousness ever since scientific consensus emerged that '*warming of the climate system is unequivocal*'. India is both a major greenhouse gas emitter and one of the most vulnerable countries in the world with more than 7000 km of coast line, a predominantly agrarian economy, sensitive and fragile Himalayan eco system, and much more. The country is already experiencing changes including water stress/ scarcity, heat waves and drought, severe storms and flooding, deterioration of air quality and associated negative consequences on health and livelihoods.

To counter these adverse impacts due to development, National and International Governments and other organisations have put in a number of policies, legislation, programmes and projects. In tune with this, India had also formulated '*National Action Plan for Combating Climate Change*' (2008) encompassing eight missions namely:

1. National Water Mission
2. National Mission on Sustainable Habitat
3. National Solar Mission
4. National Mission for Enhanced Energy Efficiency
5. National Mission for Sustainable Agriculture
6. National Mission for a Green India
7. National Mission on Strategic Knowledge for Climate Change
8. National Mission for Sustaining the Himalayan Ecosystem

In continuation with the Government of India initiatives, the Government of Puducherry (DST&E) had also formulated '*State Action Plan for Climate Change*' (2012) encompassing region specific missions namely:

1. Solar Mission
2. Mission on Enhanced Energy Efficiency
3. Mission on Sustainable Habitat
4. Mission for a Green Puducherry and Sustainable Agriculture
5. Water Mission
6. Mission on Strategic Knowledge for Climate Change
7. Coastal and Disaster Management Mission

More recently, a new set of Waste Management Rules were also notified by the Central Government in 2016, where Solid Waste (Management and Handling) Rules, 2016 is one with a primary objective to emphasize more on waste minimization, segregation and decentralized waste management.

Keeping these objectives in mind, a consortium of organizations namely: the Department of Science Technology and Environment (DST&E), Puducherry Pollution Control Committee (PPCC) - Govt. of Puducherry, Pondicherry University (PU) and the Association for Promoting Sustainability in Campuses and Communities (APSCC) as lead organization, had joined hands and conducted the '*State Level Awareness Program on Sustainable Waste Management (SLAPSWM - 2017-18)*'. It was a series of 30 programs reaching over 5000 participants in between August 2017 – February 2018, for a diverse group of stakeholders in all the four regions of the Union Territory of Puducherry (Puducherry, Karaikal, Yanam and Mahe).

Based on the deliberations, discussions, sharing of experiences, it was felt that a comprehensive document needs to be prepared for the use of different stakeholders to effectively achieve the goal. Hence, an attempt is made to bring out a '*Comprehensive Green Protocol (CGP) booklet*'. This protocol would serve as a guide for all the sectors like educational institutions, hospitals, industries, hospitality sectors, residences and other organizations to commit themselves to '*sustainable development*' of the region.

Green Protocol

Green Protocol is a set of non-negotiable and/or standard operating procedure (SOP) where environmentally responsible practices, education and research go hand in hand thereby creating a healthy environment for the campus community. It focuses or involves the following steps:

- 1) judicious land use, strategic environmental planning and strict resource management i.e., sustainable management of water resources (ground/ surface/ rainwater), energy efficiency, conserving natural resources (water/ land/ air/ ecosystem services/ natural cycles/ flora/ fauna), habitat restoration, production/use of renewable energy and sustainable management of wastes.
- 2) enhancing the campus environmental quality by educating for sustainability thereby resulting in a healthy environment to live and learn.
- 3) carrying out all the functions according to a system-wide culture of environmental consciousness.
- 4) refusing/ reducing the use of disposables while dramatically increasing the use of reusable's like glass/ stainless /porcelain materials and cotton bags.

As an outcome, strategically these very principles would promote or lead to an elite and environmentally conscious cluster of campuses/ territories for the regional sustainability.

Why Green Protocol?

According to the projections of the United Nations Population Division, by 2030, each of the major regions of the developing world will hold more urban than rural dwellers, and by 2050, two - thirds of their inhabitants are likely to live in urban areas. In addition, by the year 2050, India will be the most populous country, with a projected population of 1.69 billion, compared with China's 1.30 billion. As the population increase (urban congestion) so do the consumption of the natural resources and dumping of wastes, resulting in: improper solid waste management (medical/ solid/ hazardous/ plastic/ e-waste); open drainage; water scarcity; ingress of seawater into the aquifer; domestic/ industrial

water pollution; cross-contamination; health issues and water-borne diseases; ever increasing air pollution and resource depletion. Unless the available resources are managed sustainably, it will result in the loss of ecosystem services and the ecological carrying capacity of the entire region. In view of this, the Government of Puducherry had already formulated a 'Vision for 2030' and called for the attention of educational and research institutions to supplement their effort on minimizing such issues. Hence this '*Comprehensive Green Protocol*' was evolved.

How and Where to Start Implementing the Green Protocol?

The ever-increasing overexploitation of natural resources and unsustainable waste management practices of the consumerist society necessitated a 'comprehensive green protocol'. Here comes the questions - Where to start? and How to start? Since it is a well-established fact that '*education is an indispensable element for achieving sustainable development*', and Puducherry being '*the educational hub*', educational institutions seems to be the best place, to start implementing the Green Protocol. When it comes to implementation, '*picking up low hanging fruit*' is ideal and the best strategy, because '*it saves, conserves and produces resources (natural and monetary)*'

Starting with the education sector, the 'Green Protocol' should also be implemented in all the other organizations, industries, residences, hostels, gated communities, etc. Especially the Universities, Higher Educational Institutions and Schools are the places where '*today and tomorrow's leaders are groomed*'. Further such institutions can also be considered as models for the society since the vast student community could be inspired, motivated and trained on campus so that they can take the message to the society at large. Incidentally, several researchers around the world have also confirmed that the students have a dual role to play: '*as students within the campus and as communities outside the campus*'. Such a thought-provoking and educational environmental program will not only empower the students to become aware of the value of resources (fresh and old) and resource recycling (up-cycling and down-cycling) techniques but also take these lessons to their homes and propagate to their circle and influence all sections of the society.

Principles Adopted for Green Protocol

Since, Post-Stockholm Conference in 1972, various International Conferences, Charters, Agreements, Agendas, Goals were enacted to '*safeguard the environment for man's future*'. Among these, UN Conference on Environment and Development called the Rio Declaration (1992) and Sustainable Development Goals (2016-2030) are of significance. In the recent past, India experienced both an accelerating growth rate along with unexpected environmental impact and unequal socio-economic development. However, challenges are still to be met in terms of creating awareness and ensuring the sustainability adoptions among the public. Listed below are a few significant initiatives undertaken thus far:

- India's First National Action Plan on Climate Change, 2008 (Government of India);
- Climate Change Action Plan, 2012 (Government of Puducherry);
- Waste Management Rules, 2016 (Ministry of Environment, Forest and Climate Change);
- Water Framework Act, 2016 (Ministry of Water Resources);
- Clean Puducherry and Green Puducherry (Government of Puducherry);
- Vision for 2030 (Government of Puducherry);
- Smart City (Government of Puducherry).

In addition, the 42nd amendment to the Constitution was brought about in the year 1976 (<http://www.environmentallawsofindia.com>). Two new Articles were inserted: Art.48-A and Art.51-A (g). The former, under the 'Directive Principles of State Policy', makes it 'the responsibility of the State Government to protect and improve the environment and to safeguard the forests and wildlife of the country'. The latter, under the 'Fundamental Duties', makes it 'the fundamental duty of every citizen to protect and improve the natural environment including forests, lakes, rivers and wildlife and to have compassion for living creatures'. The Supreme Court of India had also committed to the full implementation of the 'Sustainable Development Goals (2016-30)' before 2030. In view of these initiatives, every citizen has a moral role to play for the protection of natural resources. With this backdrop, the following are some of the relevant principles adopted for the development of this Green Protocol:

<i>Principles adopted from the Rio Declaration on Environment and Development (1992)</i>	
Principle – 8	To achieve sustainable development and a higher quality of life for all people, States should reduce and eliminate unsustainable patterns of production and consumption and promote appropriate demographic policies.
Principle – 15	Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation (<i>Precautionary Principle</i>).
Principle – 21	The creativity, ideals and courage of the youth of the world should be mobilized to forge a global partnership to achieve sustainable development and ensure a better future for all.
<i>Principles adopted from the Sustainable Development Goals (2016-2030)</i>	
Goal – 11	<i>Sustainable Cities and Communities:</i> - Make cities and human settlements inclusive, safe, resilient and sustainable.
Goal – 12	<i>Responsible Consumption and Production:</i> - Ensure sustainable consumption and production patterns.
Goal – 13	<i>Climate Action:</i> - Take urgent action to combat climate change and its impacts.

Steps Involved in the Implementation of the Green Protocol

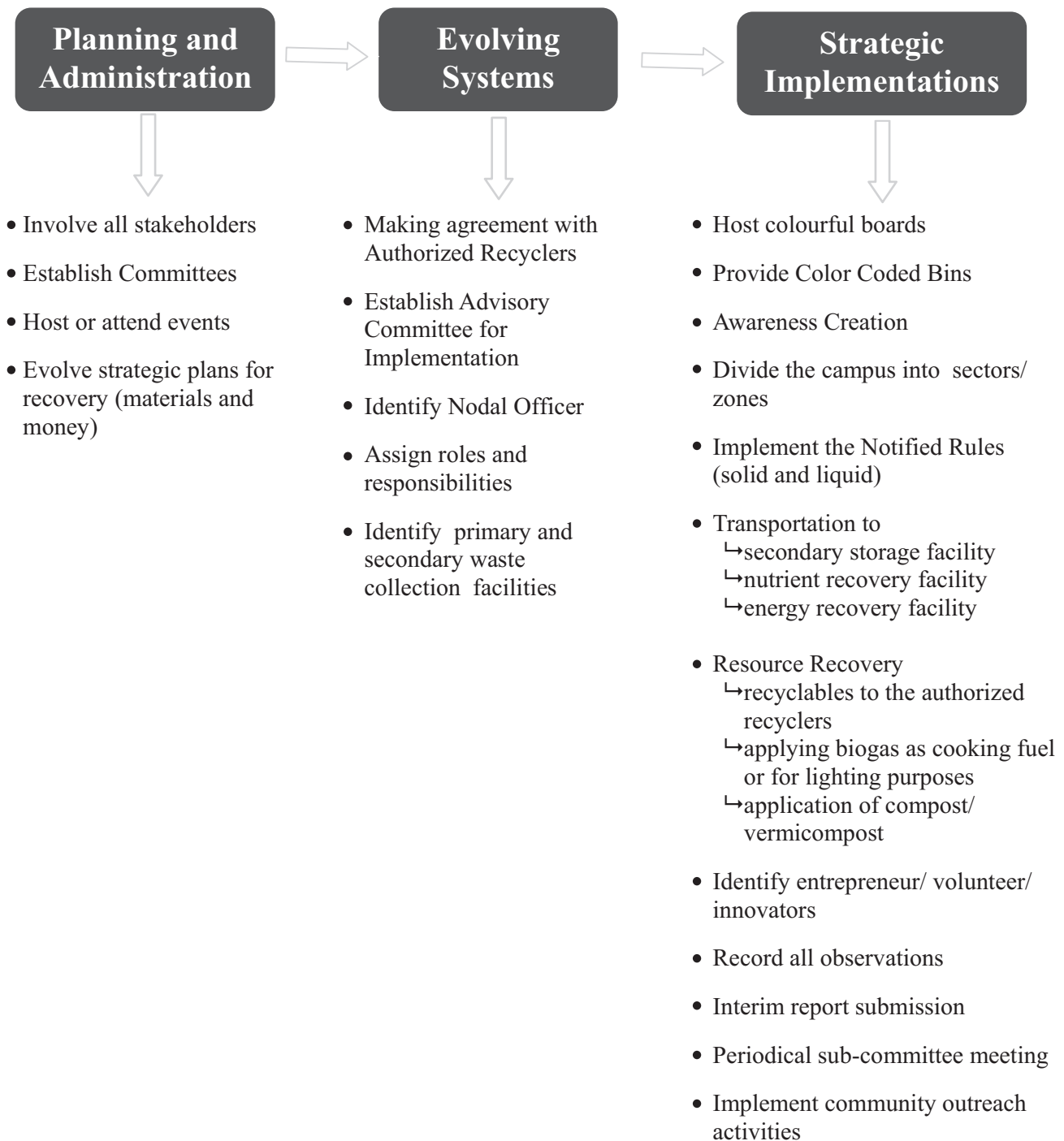
The below mentioned are some of the basic steps that were formulated for an effective implementation of the Green Protocol in an organizational setting, however, for residences and places of worship '*enlightened self-interest*' is appreciated:

Planning & Administration	Step – 1	Involve all stakeholders – Administration, Finance, Faculty, Purchase, Service Providers, Caterers, Sanitary Workers, Students/ Employees and others
	Step – 2	Establish 'Implementation Committee, Monitoring Committee, Documenting Committee and Sub Committees'
	Step – 3	Host or attend conferences, symposiums, summits, seminars, workshops, training, entrepreneurial development programs, etc.
	Step – 4	Evolve strategic plans to recover not only material resources but also monetary resources

Evolving Systems	Step – 5	An agreement shall be made with the Authorized Recyclers (Solid waste/ Plastic Waste /E-waste/ Biomedical Waste/ Hazardous Waste/ Construction and Demolition Waste)
	Step – 6	Establish Advisory Committee for the Implementation of the Green Protocol
	Step – 7	Nodal Officer shall be identified as an ‘Efficient and Effective Coordinator for the Implementation of the Green Protocol’
	Step – 8	Discuss, assign and document the roles and responsibilities of each committee and make them circulate the adopted green strategies among various stakeholders
	Step – 9	Identify ideal places for primary and secondary waste collection and segregation; energy and nutrient recovery (biogas, compost and vermicompost); and location for strategic application (kitchen, farming) and authorized recyclers for recyclables
Strategic Implementation	Step – 10	Host colourful boards with pictorial representation at various places and at every primary collection and secondary collection facilities
	Step – 11	Provide color coded bins at a strategic location and set up boards for information
	Step – 12	Awareness creation not only to the committees but also to residents, students, employees, on the importance of Climate Change Action Plan, Waste Management Rules – 2016 and Water Framework Act, 2016. Also, make them be aware of the environmental and health implications because of unsustainable natural resource utilization and waste (solid/liquid) management practices.
	Step – 13	Divide the campus into multiple sectors/ zones for easy implementation
	Step – 14	Implement the Waste Management Rules (Solid and Liquid) – starting at source
	Step – 15	Periodical transportation to the <ul style="list-style-type: none"> ↳secondary storage facility for segregation, sorting, and quantification ↳nutrient recovery facility (garden waste/ kitchen waste/ any organic waste) ↳energy recovery facility (kitchen waste/ any organic waste)
	Step – 16	Resource recovery <ul style="list-style-type: none"> ↳channelizing the recyclables to the authorized recyclers (plastics, tin, bottles, etc.) ↳increase the use of biogas as cooking fuel or for lighting purposes ↳increase the use of compost/ vermicompost for olericulture/ floriculture/ landscape, etc.
	Step – 17	Identify entrepreneurs/ volunteers/ innovators and collaborate for resource recovery
	Step – 18	Monitor every day at a set time by the team members and record all observations in the ‘dedicated log book’
	Step – 19	Periodical submission of interim report (hard copy and soft copy)
	Step – 20	Periodical sub-committee meeting and dissemination of the progress
	Step – 21	Implement community outreach activities

Note: Depending on the scale of the campus steps could be adopted/ fine-tuned/ re-modified

Schematic Representation of Steps Involved in the Implementation of the Green Protocol



Comprehensive Green Protocol (CGP)

1. Water Management

A. *Water Minimization, Recycling and Reuse*

- Minimize usage of water
- Avoid purchasing bottled water
- Prevent leakage
- Adopt strategies to judiciously manage water resources (e.g. groundwater, rainwater, wastewater, etc.)
- Install waterless urinal
- Adopt bio-toilets
- Avoid/ minimize the use of toxic detergents or cleaning agents and replace them with eco - friendly products.
- Channelize hand wash water directly to gardening
- Use treated water for toilet flushing
- Use treated water for soil application such as in flower garden, vegetable garden, herbal garden, etc..
- Use treated water for activities like edible fish culture, ornamental fish culture, hydroponics, aquaponics, etc.
- Use water footprint calculator
- Plan for zero liquid discharge into the municipal stream as far as possible

B. *Water Treatment*

- Install eco-friendly water treatment systems like ‘Constructed Treatment Wetlands’, ‘Root Zone System’, etc.
- Recommend/ adopt decentralized treatment systems wherever possible
- Separate treatment system is recommended for the research laboratory and for clinical activities
- Analyze the treated water for basic parameters as prescribed by the enforcement authority

C. *Water Conservation*

- Promote water-based water conservation strategies (e.g. integrated aquaponics, hydroponics, aquaculture, etc.) (dspace.pondiuni.edu.in/jspui/bitstream/1/2482/1/T6229.pdf)
- Use water metering for end users
- Install rainwater harvesting structures
- Install energy efficient water pumps
- Install state-of-the-art water taps for efficient water dispensing
- Adopt water body in the neighbourhood and protect its natural components
- Make the staff and students aware of the water crisis and develop strategies to stimulate water conserving attitude
- Establish a collaborative culture that spans across departments and divisions
- Planning and Enforcement Authorities should differentiate water stress and water scarce region and regulate the development projects (ongoing and future)
- Rehabilitate / repair/ restore water bodies
- Enforcement of ‘Wetland Rules’
- Develop on-campus water bodies through harvested rainwater and reclaimed/ treated water
- Adopt/ establish drip irrigation

D. Record Keeping and Maintenance

- Conduct periodical water use inventory analysis (water audit)
- Maintain a dedicated 'log book'
- Prepare monthly report and maintain a record

2. Soil Conservation and Sustainable Food Production

A. Interventions at Cropping Pattern / Stage/ Irrigation

- Plant vegetable seed that has 'three to six-month life cycle'
- Encourage the use of plantable seed paper/ seed balls
- Promote mulching
- De-weed at proper intervals
- Apply hand wash water (or) bathroom water (or) treated water (or) rejected water from the RO system for watering the plants
- Increase green belt surrounding the parking lots
- Plant pollutant tolerant species
- Promote the culture of economic, environment and health beneficial plantations
- Promote best management practices for stormwater percolation
- Promote fresh food rather than processed food
- Adopt barren land in the neighbourhood, and promote farming/ forestation
- Promote the plantation of energy crops
- Consume locally grown food to reduce food miles and wastage

B. Use of Bio-fertilizer and Bio-pesticide

- Practice composting and vermicomposting of organic waste and its application
- Produce your own compost - 'food waste + soil + leaf litter' and 'moisten and till regularly'
- Prepare your own soil for planting by mixing: -
'river sand + coir pith + field soil + compost + charcoal + cow dung + treated water'
(dspace.pondiuni.edu.in/jspui/bitstream/1/2482/1/T6229.pdf)
- Adopt sustainable animal farming methods (cattle, poultry, edible & ornamental fish) integrated with organic farming
- Periodically apply cow dung slurry over the soil
- Carry out soil testing to understand the nature of the soil conditions and then add required constituents (only natural) for soil enhancement based upon the lab report and soil preference
- Avoid the use of chemical fertilizers and pesticides
- Adopt the use of panchakavya, amudhakarasal and any other natural tonic
- Adopt judicious usage of bio-fertilizer or bio-pesticide in the field application
- Before sowing treat the seed with natural tonic
- Take measures not to waste cultivated fruits/ vegetables

C. Soil Conservation

- Promote soil-based water conservation (e.g. integrated xeriscape, hügelkultur, green wall, square foot garden, etc.) (dspace.pondiuni.edu.in/jspui/bitstream/1/2482/1/T6229.pdf)
- Develop green belt as far as possible
- Purchase pollutant removing ornamental plants for indoor and outdoor
- Educate the public not to dump batteries, e-waste, plastic on the ground (soil)

- Prevent the entry of broken glass onto the ground or any water body (lake, pond)
- Develop strategies that prevent soil erosion
- Make the staff and students aware of soil erosion/ pollution and its adverse effects, and develop strategies to stimulate organic gardening attitude
- Establish a collaborative culture that spans across departments and divisions
- Informing the users/ stakeholders regularly about the food that is wasted/ conserved, through permanent boards or database

D. Record Keeping and Maintenance

- Maintain a dedicated ‘log book’
- Prepare monthly report and maintain a record

3. Clean Air

A. Prevention

- Increase the usage of induction/ solar appliances
- Prevent the overuse of any appliances/ electronic goods
- Air-conditioned room should ensure proper ventilation every day
- Use appropriate HVAC systems (heating, ventilation, and air conditioning) and promote centralized air conditioning
- Promote the usage of eco-friendly paints
- Adopt minimal usage of indoor carpets
- Properly clean and ventilate the AC car
- Avoid the burning of any materials indoor or outdoor
- Use bicycles/ carpooling/ battery operated vehicle

B. Minimization

- Reduce the dependence on fossil fuels
- Maintain humidity via watering the plants through recycled water
- The transport system should maintain the engine exhaust at an optimum level
- Develop strategies either to prevent or minimize air pollution (smoke and others)
- Builders should ensure ‘air exchange rate (ACH - air exchange rate per hour)’ during construction
- Periodically remove grease from kitchen burners and vessels
- Prevent overheating of oil/ fat

C. Mitigation

- Periodical assessment of health-related air pollution prone regions
- ‘Planned plantation’ catering to atmospheric pollution diversion
- Always ensure free circulation of air indoors
- Maintain a demarcated and undisturbed area to promote biological diversity
- Increase the vegetative cover at all levels
- Practice indoor square foot garden/ vertical wall, to overcome ‘sick building syndrome’
- Develop aesthetic outdoor garden with organic inputs
- Use the plants that have pollutant removal efficiency
- Use the available windows as ventilators
- Install blinds/ curtains made up of natural materials

D. Record Keeping and Maintenance

- Maintain a dedicated ‘log book’
- Prepare monthly report and maintain a record

4. Energy Conservation

A. Energy Audit

- Monitor total facility demand and demands for individual end users
- Maintain a separate metering system for every department or building
- Make every effort to reduce electricity bill, through benchmark
- Plan and construct building catering to maximum entry of wind and light
- Green renovation, Green retrofit and Green refurbishment of existing buildings represent an opportunity to upgrade the energy efficiency
- Periodically conduct energy use inventory analysis (energy audit)
- In-house capacity building for the sustainable use of seasonal heating and cooling systems and for energy audit
- Hosting permanent board or database to inform energy consumption, units consumed, CO₂ emitted, and monthly electricity bills
- Use carbon / energy footprint calculator

B. Prevention / Minimization

- Encourage staff and students to reduce electrical loads both on and off campus
- During holidays/ non-working hours, unnecessary equipments/ appliances/ lights should be turned off
- Air conditioning thermostats and electric water heating systems should be turned off when not in use and maintained properly (periodic air filter cleaning)
- Identify strategies to reduce electrical load at the facility
- Shut down non-essential space cooling or heating, initially up to one hour before the normal close of each workday
- Turn off non-essential lighting and building systems such as lifts (i.e. a portion of all lifts) and reduce the number of lights at corridor/ veranda
- Avoid storing food in the refrigerator
- Develop green roof
- Enhance staff and student awareness of energy efficiency through training and less formal methods
- Provide mandatory and voluntary training opportunities on smart energy practices
- In addition to training/ capacity building, periodically run public service announcements about energy efficiency on radio/ televisions in canteens/ cafeterias and other public use areas; send periodic email/ WhatsApp messages about turning off mobile chargers/ laptops/ lights/ computers; post signs or billboards near walkways/ bus stop/ parks, etc.
- Never use the lift to the first floor – climb stairs and keep fit
- Adopt ‘right vessel right lid approach’ in the kitchen
- Promote cooking over ‘medium flame’ with lid on
- Always provide additional information for staff and students about how to manage energy use in the workplace and in their homes

C. Alternate/ Renewable Energy

- Promote energy production (e.g. Anaerobic bio-digester, solar campus, biofuel etc.)
- Adopt energy conservation strategies directly and indirectly (e.g. Green building, green purchasing, etc.)
- Sustainable transportation (e.g. bicycles, carpooling, bio-diesel for vehicles, solar-powered vehicles, etc.)
- Adopt strategies recommended by BEE (Bureau of Energy Efficiency)/ STAR (Rating Program)/ GRIHA (Green Rating for Integrated Habitat Assessment)/ Green Building

D. Record Keeping and Maintenance

- Maintain a dedicated 'log book'
- Prepare monthly report and maintain a record

5. Sustainable Management of Waste Resources

A. Organic Solid Waste

i. Kitchen Waste

- Minimize food waste generation in hostel mess / hotels / canteens and develop strategies to ensure 'zero food waste'
- Pre-cooked waste could be taken to nutrient recovery (composting facility)
- Post cooked waste could be taken to energy recovery (biogas facility)
- A portion of pre or post cooked waste could be sold as animal feed
- Coconut shell could be sold to the shell crafters, shell powder manufacturer or otherwise could be converted into activated carbon

ii. Garden Waste

- Leafy garden waste could be mixed with food waste while composting
- Twigs and wood could be shredded and used as mulch
- Quality compromised wood could be sized and used for gasification
- Spongy wood trunk could be used for Hügelkultur (raised garden beds)

iii. Farm Waste

- Farm waste (paddy straw, cereal plants, plantain, etc.) could be mixed with animal dung for biogas/compost/vermicompost production
- Leafy waste and other plant parts along with animal waste, from the 'farmhouse' or 'camp house' or 'authorities residences' should be composted and reused as manure within the campus / premises to improve soil fertility

iv. Animal Farm Waste

- Animal farm waste could be used for biogas production
- Urine in the diluted form could be used to supplement readily available plant nutrient
- Panchakavya or Effective Microorganisms solution could be produced

v. Slaughterhouse Waste

- Slaughterhouse waste could be used for biogas production

- The same could be buried (below 60 cm) in the strategic locations of the agricultural farm (preferably tree varieties)
- Dressed chicken feathers/waste should not be disposed of in the open places near water bodies

vi. Fish Market Waste

- Partially could be diverted for the manufacturing of pet foods
- Energy recovery from the intestine and other parts
- All the commingled refuse could be converted into nutrient-rich compost

vii. Vegetable Market Waste

- The vegetable market waste contains pesticide, so do not feed the cattle/ goat/ rabbit / any other domesticated animals with vegetable market waste.
- Organically grown vegetable waste could be used as animal feed
- Co-composting and delayed application is ideal

viii. Toilet Waste

- Try to minimize the sanitation chemicals as much as possible
- Plan to generate electricity (biogas) from the toilet waste at the institution / gated community
- Convert the biogas spent slurry to compost
- Promote the use of source segregated (urine) treatment units
- Sanitary disposers are mandatory in public places

B. Inorganic and Other Wastes

i. Paper

- Adopt the usage of one-sided paper for draft purposes
- Paper waste should be channelized for reuse in cardboard/ paper manufacturing industry

ii. Plastics

(<http://www.moef.gov.in/sites/default/files/PWM%20Rules%2C%202016.pdf>)

- Avoid usage of carry bags
- Plastics should be segregated and channelized to the authorized recycler
- **Recyclable Plastics (Thermoplastics):** Polyethylene terephthalate (PET or PETE); High-density polyethylene (HDPE); Polyvinyl chloride (PVC); Low-density polyethylene (LDPE); Polypropylene (PP); Polystyrene (PS); and other type of plastics.
- **Non-Recyclable Plastics (Thermoset & others):** Multilayer & Laminated Plastics, PUF, Bakelite, Polycarbonate, Rubber, Resin, Melamine, etc.

iii. E-waste

(<http://www.moef.gov.in/sites/default/files/EWM%20Rules%202016%20english%2023.03.2016.pdf>)

- E-waste that is condemned in any form along with worn out tube lights, bulbs, CFL, LED, etc. shall be collected and may be channelized to collection centres/ authorized agencies/ recyclers

iv. Bio-Medical Wastes

(http://www.moef.gov.in/sites/default/files/BMW%20Rules%2C%202016_0.pdf)

- Bio-Medical Wastes (BMW) segregation and processing at source (hospitals, clinics, dispensaries, intensive in-house treatment facility, etc.) shall be adopted and disposed through the authorized BMW managing agency
- Sanitary napkins, diapers, adult diapers, expired medicines need to be disposed off in the manner prescribed by the Local Enforcement Authority as per notification

v. Hazardous Waste

(<http://www.moef.gov.in/sites/default/files/Final%20HWM%20Rules%202016%20%28English%29.pdf>)

- Used batteries shall be disposed through authorized recycler
- Hazardous waste and chemical containers in any manner, from the research labs and others, shall be segregated and disposed of through the authorized hazardous waste managing agency
- Avoid the usage of hand wash sanitizers (it is meant mainly for the clinical purpose)

vi. Construction and Demolition Waste

(<http://www.moef.gov.in/sites/default/files/C%20&D%20rules%202016.pdf>)

- Construction and demolition waste may be reused for brick making and other remaking purposes, landfilling or otherwise disposed to the waste collection centre of the Local Body
- Collection Center shall be established within the institutional or industrial campuses (including corporates) for collecting, segregating, sorting, storing, and channelizing to the recovery facility or to the authorized recyclers

vii. Solid Waste

(<http://www.moef.gov.in/sites/default/files/SWM%202016.pdf>)

- None of the above-mentioned wastes (Plastic Waste/ E-waste/ Biomedical Waste/ Hazardous Waste/ Construction and Demolition Waste) should be mixed among themselves or among the general solid waste
- Increase the awareness on the open dumping of wastes and its health implications

C. Liquid Waste

Water is a common heritage, held in public trust, for the use of all, subject to reasonable restrictions. Human interventions such as over-use/depletion, abuse, pollution/contamination, and degradation of groundwater, catchment areas, rivers, water bodies, aquifers and wetlands are prohibited. Water must be protected and preserved for generations, calling for people-centered continuous and cohesive action with proactive planning and taking all appropriate measures for its effective protection, conservation, regulation and management.

(http://mowr.gov.in/sites/default/files/Water_Framework_18July_2016%281%29.pdf)

i. Greywater

- Greywater is the wastewater that is generated from sources such as sinks, showers, baths, clothes washing machines or dishwashers without any contamination from the toilet or other sources
- Greywater could be easily treated with the help of treatment wetland or other technologies for reuse purposes (<http://dspace.pondiuni.edu.in/xmlui/bitstream/handle/1/2558/T6307.pdf?sequence=1>)

- Thus treated greywater is generally safe to handle and could be used for toilet flushing, landscape, xeriscape or crop irrigation and any other non-potable end uses

ii. Blackwater

- Blackwater is the wastewater from toilets, which likely contains pathogens. Blackwater is distinguished from grey water, which comes from household use other than toilets
- Blackwater and greywater are separated in "ecological buildings", such as autonomous and green buildings, through separate holding / treatment tanks.
- Blackwater treatment for reuse is an expensive and time-consuming process, hence it is advised to minimize the generation of blackwater as much as possible
- The soak pit should be properly structured

6. Sustainable Use of Natural Resources

A. Water

i. Kitchen

- Prefer liquid cleaner over soap, and develop its application in diluted form i.e. minimal usage
- Always open the tap at an optimum level (never open fully)
- Never cool / clean / wash by using the direct water from the pumping system
- Use sand, ash and coir for removing stains, than stain remover
- Never use a water bath for lowering the temperature (i.e. allow it to cool on its own)

ii. Toilet and Bathroom

- Operate the tap for the required time only
- Repair for any leakage
- Prefer bucket and mug system instead of the shower
- Use less toxic soaps and shampoos
- Promote waterless urinal
- Adopt the usage of eco-friendly products than synthetic chemicals
- Develop strategies to minimize or prevent the application of toxic sanitary chemicals
- Use detergents that are less toxic to the environment
- Always prefer hand washing clothes and utensils which will use less water

iii. Others

- Never clean/ wash cycle, bike, car, truck, etc by using the direct water from the pumping system or by opening the tap fully
- With the help of a broom and coordinated effort, less water can be used for floor cleaning, than with the help of a hose directly from the water distributing system
- Use ash and coir for removing dirt/stains from floor, over strong detergents/ stain remover
- Never use phenol compounds for floor cleaning
- Try to drain water to the garden, from vehicle washing and floor washing
- The delivery truck van/ vehicles are not supposed to be washed within the premises (sometimes could be under exceptional circumstances with special permission)

B. Food

- Source vegetable/ fruits on alternate days
- Try not to waste, in fact, 'never waste'
- Peel only the skin, not the edible parts
- Cook only what is needed (never fully depend on refrigeration)
- Use varieties of oils/ fat (butter, ghee, groundnut, gingelly, sunflower, coconut, palmolein and alike) over single type (sunflower oil)
- Always contain the food in ceramic/ glass/ stainless steel containers
- Avoid the use of packed/ processed/ frozen foods
- Refuse the usage of disposable plastics (e.g. cups, plates and any form)
- Always purchase minimal quantities of groceries
- Try to procure/ produce food at an optimum level during festival/ function/ special days.
- Share/ donate excess foods with/to your neighbours/ orphanage (before the quality gets compromised)
- Carry your own coffee mug and dining kit to workplace
- Have additional coffee mugs and dining kits in your workplace
- Carry your own water bottle and don't use 'one-time-disposable-bottles'
- Avoid the purchase of water bottles and dependance on RO system (if possible)

C. Energy

- Cook the Indian way, that is cook over the minimum flame for a long duration
- Always use cooker for dhal/ meat preparation, or otherwise, cook on a low flame with intact heavy lid
- Always keep the cooking pot closed over a low flame (right vessel right lid approach)
- Avoid cooking differently for different individuals
- Use induction stove
- Use biogas if possible
- Avoid microwave re-cooking/ re-heating
- Turn off all electrical / electronic appliances when not in use
- Ensure personal appliances like, coffee pots, heaters, TV and radios are turned off when not in use
- Turn your vehicle off while waiting at traffic signal

7. Others

- Volunteer for any environment upgradation projects
- With enlightened self interest encourage/ involve others to develop/ adopt strategies for combating climate change
- Be a part of local charters /missions
- Become a member in any regional/ national/ global, agreements/ declarations for combating climate change/ sustainability
- Adopt any Sustainable Development Goals (SDGs) and dedicate yourself for bright future
- Encompass/ integrate environmental education, water, agriculture, conservation, habitat restoration, energy efficiency, revenue and employment generation
- Create awareness on all 'special day themes' through cluster approach for the environment and public benefit.
- Choose typefaces that could save space and compose text in a compact way to minimize printing pages
- Print only if necessary
- The industries and higher education sectors should adopt village(s) / school(s) / community to promote sustainable way of life

Conclusion

Implementing the green protocol, will change the way we live and make us more responsible towards the planet we depend on. This initiative will steer us forward in adopting more sustainable and eco-friendly strategies in all walks of life. Appropriate training should be imparted to the stakeholders in all sectors to adopt green living thereby ensuring all people join hands in tackling the present environmental challenges and lead the society towards peace and prosperity.



