Green Campus Initiatives for Climate Change Adaptation

INTEGRATING CLIMATE ACTION IN THE DEVELOPMENT PLANNING OF PUDUCHERRY UNION TERRITORY Two Day Workshop

PCCC - DST&E, Puducherry 06-05-2022



 $Dr.\ M.\ Nandhivarman,\ {\tt MSc.}, {\tt MBL}, {\tt PhD}.$

Coordinator Office of Green Campus Pondicherry University

The Progress of Global Sustainability

- Whistle Blower: Late 1960s "the Union of Concerned Scientists reported that fundamental transformational changes mitigating the environmental challenges are urgent, if we are to avoid the collision our present course will bring about".
- **Stockholm Conference**, **1972** the protection of the environment were incorporated into the 42nd Constitutional Amendment Act passed in 1976.
- **Brundtland Report, 1987** "Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs".
- The Earth Summit, 1992 The Earth Summit's landmark document 'Agenda 21', mapped out a comprehensive plan of 'down to action'.
- World Summit on Sustainable Development, 2002 'decade of education for sustainable development'.
- Sustainable Development Goals 2016-30







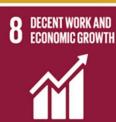






















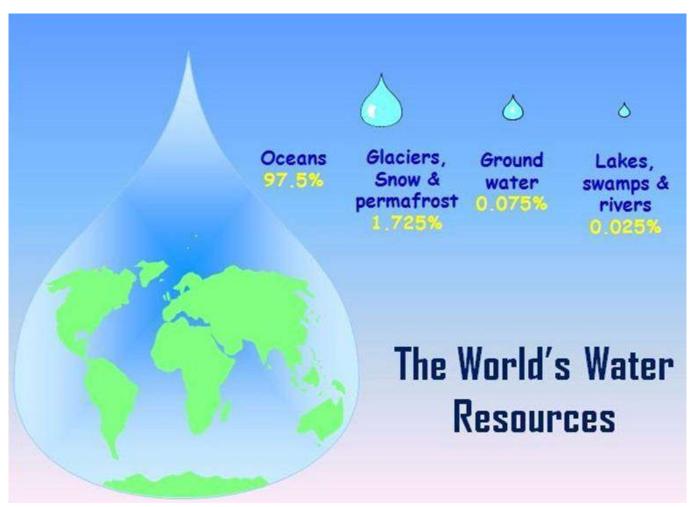












India's urban utilities usually **lose up to 40–60%** of the water produced

Every Indian Wastes Up to 45 litres of Water Per Day

30 to 60% of domestic drinking water is used to water yards and gardens





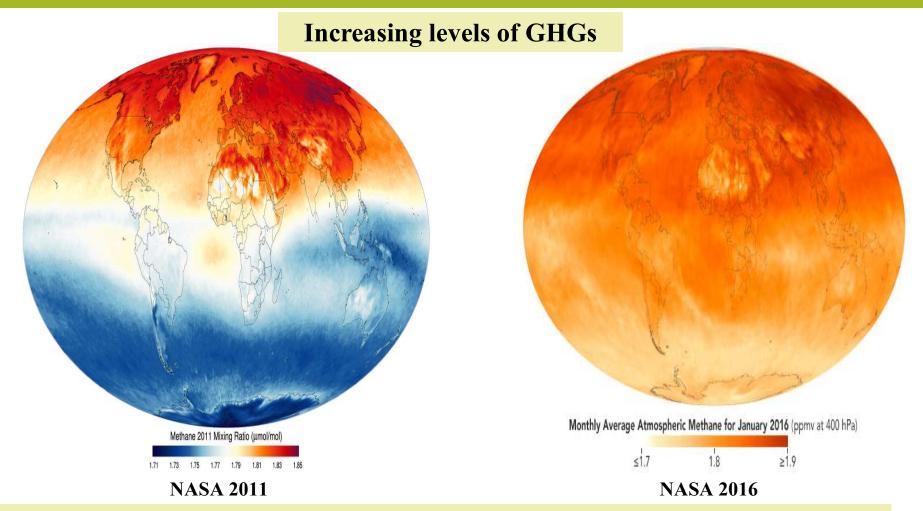
Raw Food Waste





Cooked Food Waste





6 major GHGs - Carbon dioxide (CO2), **Methane** (CH4), nitrous oxide (N2O), Hydrofluorocarbons (HFCs), Perfluorocarbons (PFCs), Sulphur hexafluoride (SF6), and Nitrogen triflouride (NF3)

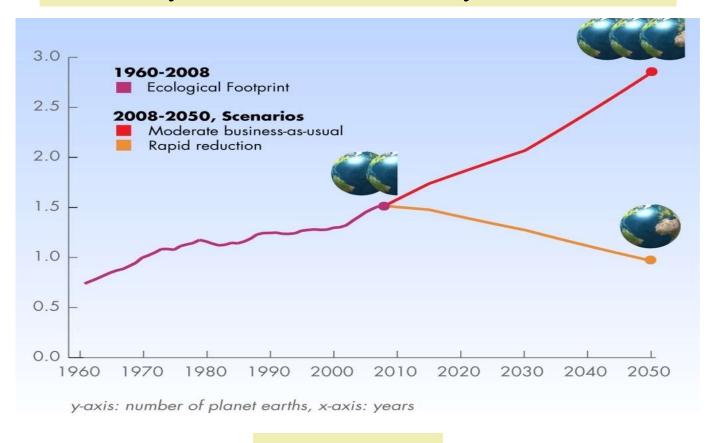
The Almost Forgotten Sink Hole







How many EARTH do we need by 2030 & 2050?



Over Exploitation



Cassin's auklet (Ptychoramphus aleuticus) is a small, chunky seabird that ranges widely in the North Pacific.





2014 summer mass death in US

Late summer of 2014, the **carcasses of thousands of Cassin's auklets** washed ashore from Northern California up to the north coast of Washington State.

The Coastal Observation and Seabird Survey Team estimated a toll between 50,000 and 100,000 deaths that year.

Scientists were uncertain about the cause of these deaths. While viruses, bacteria, and oil spills were ruled out, and the cause appeared to be **starvation**.

The efforts of these place-based data collectors — along with data on temperature, ocean circulation and the abundance of prey — have provided the first definitive answer to what killed the seabirds: starvation, brought on by shifts in ocean conditions linked to a changing climate.

North Pacific warmth which is pushing marine food chains, affected other species of zooplankton, krill, copepods and fish that normally develop in cold waters and the birds that consume them including the Cassin's auklets.

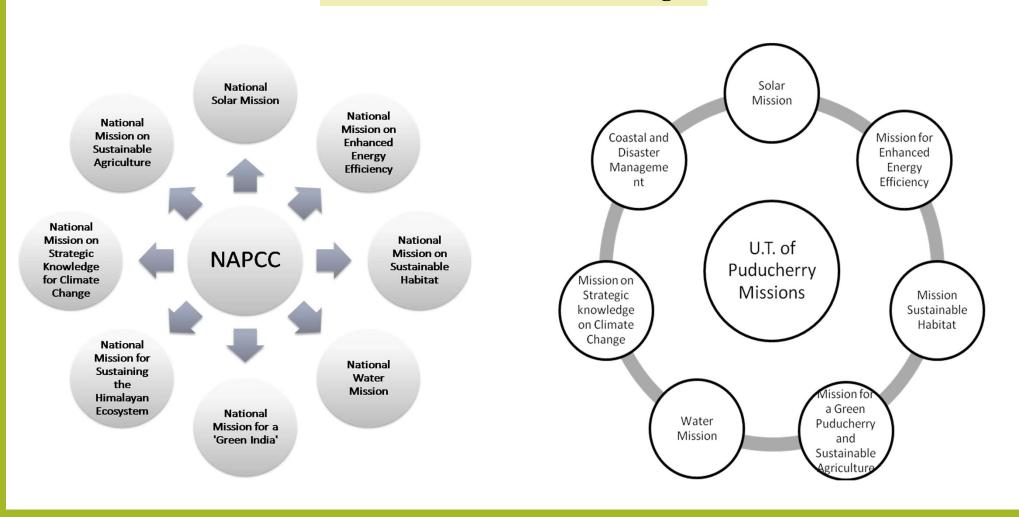




Mass Deaths



Action Plan on Climate Change



4 Pillars

Precautionary Principle 15 of the Rio Declaration

"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"

Fundamental Duties of a Man

Article 51A(g) 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'

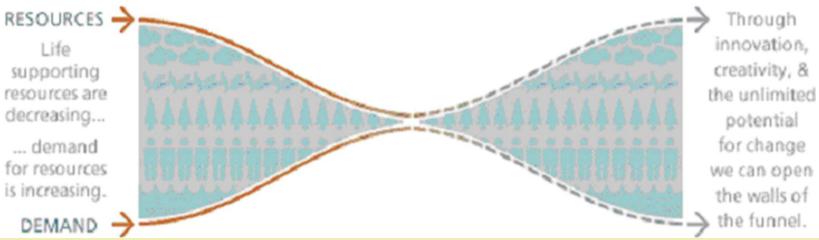
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Environment (Protection) Act, 1986

"environment" includes water, air and land and the inter-relationship which exists among and between water, air and land, and human beings, other living creatures, plants, micro-organism and property and the same shall duly be protected and conserved for common good



Backcasting is a planning method that starts with defining a desirable future and then works backwards to identify policies and programs that will connect that specified "future to the present".



The Natural Step (TNS) framework is based on scientific principles; is focused on the beginning of cause-effect relationships; and incorporates the wider environment-social-economic system in its thinking.

Designed to guide actions and behaviours, TNS framework works towards achieving sustainability.

Launch of Green Protocol @ PU





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







"Swachhata Hi Sewa Campaign"

UGC Guidelines for Ban of Plastic Use in Higher Education Institutions

Whereas plastic waste has emerged as one of the biggest environmental concerns adversely impacting the soil, water, health and well-being of citizens at large;

Whereas excess-consumption of plastic combined with limited waste disposal systems has become a challenge to the urban waste disposal systems, and has choked the rivers and water systems in rural areas:

Whereas the time has come for a systematic campaign to reduce the usage of plastic, especially the single use plastic;

Whereas the Government has decided to take plastic ban as a national level campaign to address the environmental hazards being and bring attitudinal changes that shun use of plastics; and

Whereas the educational institutions have the unique spread and influence to educate the students and households on the need for avoiding usage of plastics,

University Grants Commission hereby issues the following guidelines for all the higher educational institutions in the Country:

Guidelines

1. Scope of guidelines:

- (a) These guidelines are applicable to all the higher educational institutions (HEIs) in the Country.
- (b) They encourage HEIs (universities and colleges) to adopt policies and practices towards cleaner and plastic free campuses.
- All the HEIs in the Country shall strive to make their campuses 'plastic-free' by systematically banning use of plastics and replacing the same with suitable environmental friendly substitutes.

3. Every HEI shall:

- Ban use of single-use plastics in canteens, shopping complexes in the institution's premises and hostels, etc.
- Carry out awareness drives and sensitization workshops on the harmful impacts of single use plastics.
- Mandate all students to avoid bringing non-bio-degradable plastic items to the institution
- d. Encourage their students to sensitize their respective households about harmful effects of plastics and make their households 'plastic free'
- Install necessary alternative facilities like water units to avoid the use of plastic water bottles, and encourage use of alternative solutions like cloth bags, paper bags etc., instead of plastic bottles, bags, covers and other goods on campuses.
- 4. All HEIs which have adopted villages under Unnat Bharat Abhiyan shall undertake a campaign in their adopted villages till they are converted into 'plastic-free villages' through promoting awareness and encouraging shift to alternative products.

Towards the Elimination of Plastic Wastes @ PU Fostering UGC Notifications & Govt. of Puducherry Notifications

Measures Taken – Phase I



A release from Director of Department of Science, Technology and Environment, R. Smitha, said single use plastic materials such as polythene/plastic/polypropylene carrybags, polythene plastic cups, polythene plastic plates, styrofoam (thermocol) plates, styrofoam cups, plastic sheet pouches used to wrap cooked food, plastic sheets used to spread on dining table, water pouches, plastic straw and plastic flag would be banned in the UT, effective Friday.







House Keeping Staff Participation

Scientific Study (Inventories, Analysis, Strategies) 'Backend Approach' – Inventories











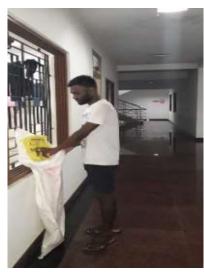




Students Participation







'Cotton Carry Bag Drive' - Elimination of Plastic @ PU



Department of Social Work, NSS (National Service Scheme), NCC (National Cadet Corps), of Pondicherry University, Puducherry Pollution Control Committee, Dept. of Science, Technology & Environment, and the Association for Promoting Sustainability in Campuses and Communities (APSCC), had initiated the 'cotton carry bag drive'







- **Tailor-Made Initiatives**
- Change in Approaches
- **Involving Volunteers**

Sorting of wastes generated during VIVA, Synopsis, Parties, etc. by the student volunteers (Pilot Scale)



Sorting, prevents spillage, reduces volume and easy for management



Sl. NO.	Banned Plastic Item by Govt. of Puducherry	Item Image	Stopped Using									
			Yes					No (Until Stock Exists)				
			Tea Shop	Fruit and Veg. shop	Tailor cum fancy shop	Cake Shop	Snack and fruit juice	Tea Shop	Fruit and Veg. shop	Tailor cum fancy shop	Cake Shop	Snack and fruit juice
1.	Polythene carry bags		1 ✓	Ô	√	4 ✓	5	-	²	-	-	-
2.	Plastic carry bags	0.	1	1	1	1	1	-		(S=)	(#E)	-
3.	Polypropylene carry bags	WW	1	1	~	1	1	2	-	_	-	_
4.	Polythene plastic cups		1	1	~	1	0	-	_			(
5.	Polythene plastic plates	950	1	1	1	1	1	2	-	n <u>a</u> s	-	
6.	Styrofoam (thermocol) plates		1	1	1	1	1	_	-			-
7.	Styrofoam cups	402	~	~	~	1	1	-				-
8.	Plastic sheet pouches used to wrap cooked food		1	1	~	0	1	-			0	-
9.	Plastic sheets used to spread on dining table		1	1	1	1	1	_	-	-		_
10.	Water pouches	1	1	1	~	1	1		-			-
11.	Plastic straw	MA	1	1	~	0	0	4		n ₌	Q	C
12.	Plastic Spoon and Fork	*(17/	1	1	1	0	1			(s =)	0	
13.	Plastic flag	503	√	1	1	1	1	18		1515		







Minimizing the usage of Plastics @
Shopping Complex
- UGC & Govt. of Puducherry
Notifications

Self Declaration by Eatery Owners @ Shopping Complex Switching to 'eco-friendly' materials and for certain materials until stock lasts

Minimizing the usage of Plastics @ Shopping Complex

- Self-declaration by the shop owners
- Over 70% of single use plastics are eliminated
- Elimination of plastic laminated paper cup







Plastic Wastes to Pavement Blocks/ Others*









- Cotton Back - Drops, Banners & Others, replacing PVC Flex



Transformation of used 'Cotton Banners' into carry bags and designer bags









Transformation of used 'Cotton Banners' into carry bags and designer bags



http://www.pondiuni.edu.in/sites/default/files/Appendix%20A-<u>C%20-21012020--.pdf</u> (Circular Dated: 21-01-2020)

http://www.pondiuni.edu.in/news/avoidance-pvc-flex-banners
(Circular Dated: 21-01-2020)

Pondicherry University

DDUCHERRY

Asiness I petitic

Quick Launch Actions (Sustainable Waste Management) @ PU





Plant, Tree, Horticulture Wastes are Source Segregated and Composted



Windrow Composting - Organic Waste from 'Common Waste Stream'



Paper, boards, plant materials, etc.

Appearance of Indicator Organisms in the Windrow Composting Pile in 1 month*



Windrow Composting









Earthworm

Quick Launch Actions (Sustainable Waste Management) @ PU

Un-shredded Fruit Waste

Source Segregation of Wastes @ Shopping Complex







Shredding minimized the volume of waste & paved way for easy handling







Source Segregated Fruit Waste & Tea Waste

Quick Launch Actions (Sustainable Waste Management) @ PU (Contd.)

Composting of Organic Fraction (Fruit Waste, Tea Waste and Others)

The leftovers are decomposing under the sun



Shredded fruit waste (Partial) would be consumed by the native wild animals within two days

The fruit waste from the Shopping Complex are not mixing with the 'waste stream'





Entrepreneurship Development

Climate Launchpad
Launching of 'Green Business
Ideas Competition' &
'Boot Camp'







Green Business Idea Competition @ PU





The green business idea named 'Green Voltz-Cera Tech System' which is a ceramic-based microbial fuel cell for wastewater treatment, resource recovery, electricity production, crop cultivation and revenue generation developed by the 'Pondicherry University Team' was selected for the International finals at Amsterdam, Netherlands.

Nation Building & Reversing the Loss of Biodiversity Program/ Projects with International Scope - Participation of Universities, Colleges, Schools and Communities

















Nation Building & Reversing the Loss of Biodiversity Programs/ Projects with International Scope (Contd.)

Top Soil Up-gradation for Ecosystem Restoration and Organic Food Production













y Directorate of School Education Government of Puducherry

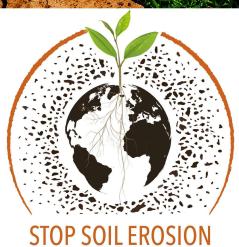
Dept. of Agri & Farmers Welfare Government of Puducherry

Partnering Organization

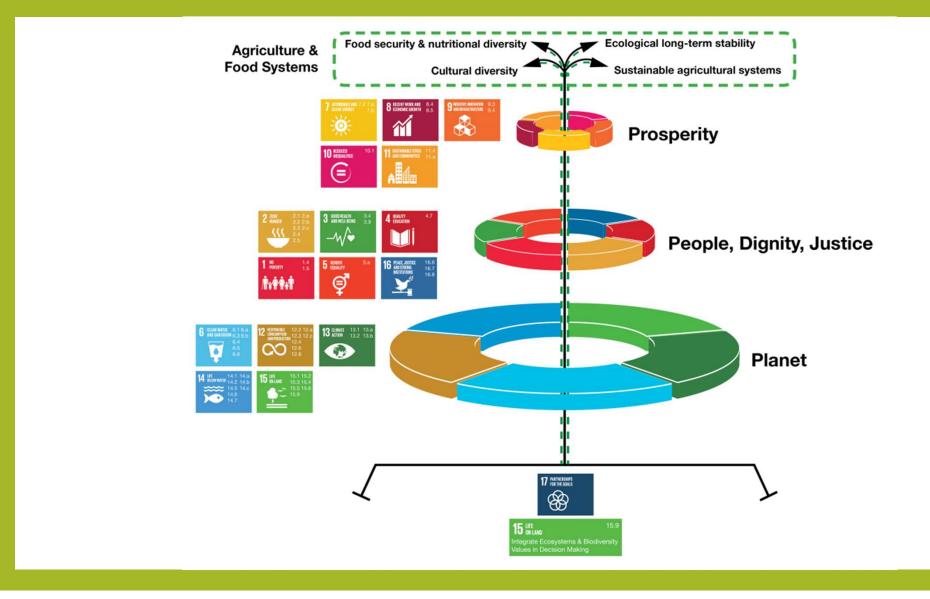
- 1. Pondicherry University
- 2. Department of Agriculture and Farmers Welfare
- 3. Directorate of School Education
- 4. Department of Wildlife and Forests
- 5. FAO Global Soil Partnership
- 6. Official FAO-GSP Partner APSCC

http://www.pondiuni.edu.in/news/approval-carry-out-multiple-student-centered-activities-cum-awareness-programs-and-internationa (Circular Dated: 21-01-2020)





STOP SOIL EROSION SAVE OUR FUTURE



Soil Ecology

Tertiary Consumers

(organisms that eat secondary consumers) centipedes, predatory mites, rove beetles, fomicid ants, carabid beetles

Secondary Consumers

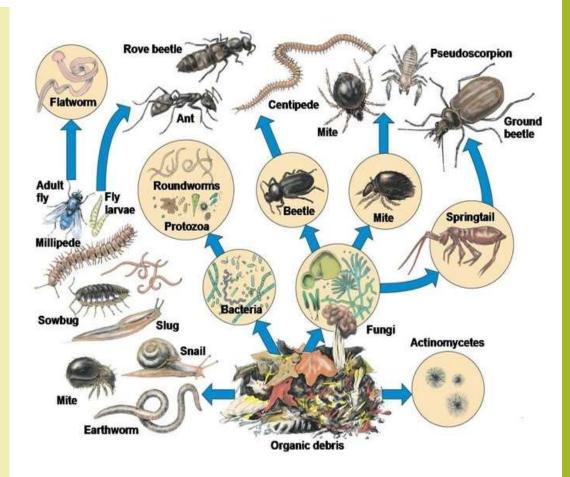
(organisms that eat primary consumers) springtails, some types of mites, feather-winged beetles, nematodes, protozoa, rotifera, soil flatworms

Primary Consumers

(organisms that eat organic residues)
bacteria, fungi, actinomycetes, nematodes, some
types of mites, snails, slugs, earthworms, millipedes,
sowbugs, whiteworms

Organic Residues

leaves, grass clippings, other plant debris, food scraps, fecal matter and animal bodies including those of soil invertebrates



Training & Capacity Building - Regenerative Agriculture

Soilless farming - Hydroponics and Aquaponics (soil Pollution Prevention)







Nutrient Solution Preparation











Lab-to-Land Environment Education

Training & Capacity Building (Contd.)

Bio-pest Repellent Preparation

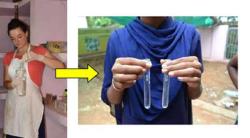
Lab-to-Land Environment Education

Establishing an Organic Vegetable Garden









Application of Vermicompost for Garlic







Seed Ball Production (Sand + Red Soil + Field Soil + Compost + Vermicompost + Seeds)







Resource Reusing - Discarded Plastic Cups for Seed Ball Germination Study









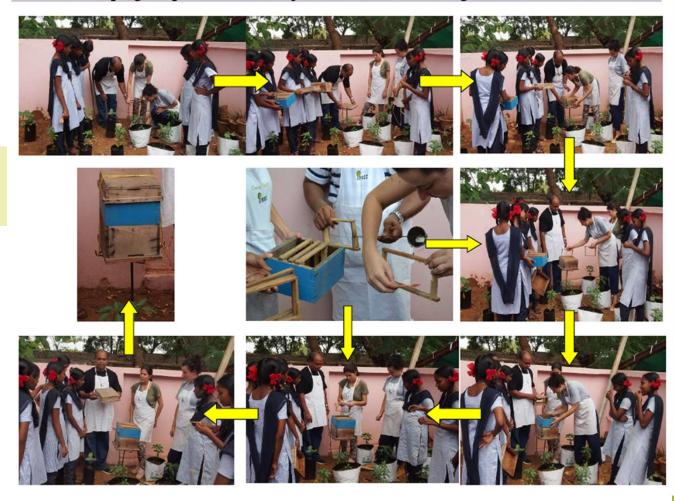






Establishing Apiculture Unit Step-by-Step Process Flow for the Natural Colony Establishment

Training & Capacity Building (Contd.)



Training & Capacity Building (Contd.)









Sekkizhar Government High School, Puducherry

Lab-to-Land Environment Education

Nation Building & Reversing the Loss of Biodiversity Programs/ Projects with International Scope

National Level Green Campus Initiative Awareness <u>Program</u>

Partnering Organizations

- Pondicherry University, India
- Department of Science, Environment and Technology (DSTE), Puducherry, India
- Puducherry Pollution Control Committee(PPCC), Puducherry, India
- University Leaders for a Sustainable Future (ULSF), USA
- SULITEST (Sustainability Literacy Test), France
- Association for Promoting Sustainability in Campuses and Communities (APSCC), India













National Level Green Campus Initiative Awareness Program (NLGCIAP)



Nation Building & Reversing the Loss of Biodiversity Programs/ Projects with International Scope (Contd.)

Conserving Fauna of Concern (Protection and Conservation)

Partnering Organization

- **Pondicherry University**
- Department of Wildlife and Forests
- Directorate of School Education
- Department of Agriculture and Farmers Welfare
- 5. United Nations Decade on Biodiversity - UNDB
- 6. Official UNDB-2020 Partner **APSCC**

http://www.pondiuni.edu.in/news/a pproval-carry-out-multiplestudent-centered-activities-cumawareness-programs-andinternationa (Circular Dated: 21-01-2020)



Mongoose

Peacock





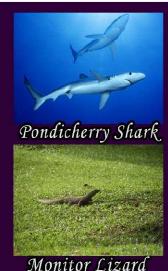


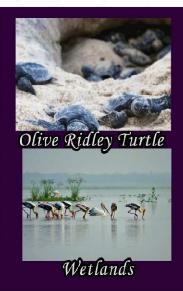












Nation Building & Reversing the Loss of Biodiversity Programs/ Projects with International Scope (Contd.)

Wetlands Conservation



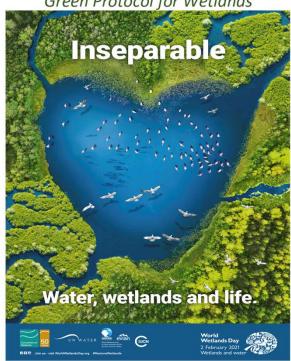








Green Protocol for Wetlands



Partnering Organization

- 1. Pondicherry University
- 2. Department of Agriculture and Farmers Welfare
- 3. Directorate of School Education
- 4. Department of Wildlife and **Forests**
- 5. FAO Global Soil Partnership
- 6. Official FAO-GSP Partner **APSCC**

Surrounding Community Participation

- · Awareness and education
- Say 'no to plastic' and 'any kind of disposables'
- · Avoiding the use sanitizers/ fertilizers/ pesticides or pouring them into toilet
- Never letting wastewater into wetlands
- No soaps, detergents and shampoos inside wetlands
- · Never letting fire, matches, cigarette butt, crackers and any flammable items into the lake
- No dumping of any waste on the bank or near any water body
- · Practicing 'self-hygiene' at all levels
- Planting residential rain garden Not encroaching
- · Absolute & strict adherence to water and wetland laws/ rules

Strategies for Lake Rehabilitation • Proper Fencing

- · Developing waking trail on the circumference of the wetlands
- · Biological parks
- Restore native pants
- · Adopt controlled 'treatment macrophyte
- · Develop a lake eco-club
- Promoting slow and sustainable boating
- · Develop educational material for restoration & sustenance
- · Absolute liability to monitor and maintain100% surveillance at all angles
- Income Generation 'user fee'
- · Encouraging research on flora and fauna

Strategies for Storm Water Drain

- · Maintaining the catchment areas and storm water drain channels
- · Preventing the entry of drainage into the water body
- · Preventing the dumping of waste (solid/liquid) into the storm drain
- · Preventing the entry of any toxic material (physical/chemical/biological) that are harmful to the wetlands and organism

Approach for Buffer Zone Sustainability

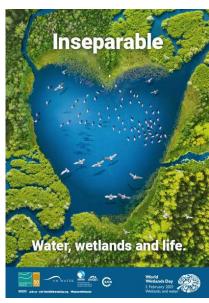
- · Planting a buffer strip of native plants along the water body, catchment areas and storm water drain channels
- · Protecting the nesting and roosting grounds of native birds
- · Preventing the poaching of birds and
- · Regulating the farming of cattle, sheep poultry, fish, prawn, crop, etc. around the

Action Plan for the Water Body

- · Development initiatives should focus on 'healthy water
- · Restricting direct human intervention into the water body
- · Never pumping water out of the wetlands
- Preventing the usage of engines and motors inside the demarked area
- · Preventing oil spillage
- · Restrict fishing
- · De-silting periodically
- · De-weeding annually
- · Encouraging research

Launching of Green Protocol for Wetlands









Nation Building & Reversing the Loss of Biodiversity Programs/ Projects with International Scope (Contd.)



The Vice-Chancellor Gurmeet Singh, Pondicherry University and Thiru P. Dhanabal, Chief Judge & Chairman, District Legal Services Authority, Puducherry jointly released the 'Activity Book' in the presence of Thiru L. Robert Kennedy Ramesh, Principal Sub Judge & Secretary, District Legal Services Authority, Puducherry, Prof K. V. Devi Prasad, Pondicherry University; Director Aravazhi Irissappane, KMCPGS; Eminent Professors from USA, Germany, Cyprus and the Conference Chairman, Dr. M. Nandhiyarman.









Training and Capacity Building for the Compliance of 'Green Protocol' @ Puducherry - India

Activity Report (Pictorial)



Prepared by

Dr. M. Nandhivarman, M.Sc., MBL, Ph.D. Coordinator, Green Campus, Pondicherry University, Puducherry, India

> Dr. Golda A. Edwin, M.Sc., Ph.D. Executive Director, APSCC, Puducherry, India.

> > January - 2020



Lab to Land Environment Education - Over 75 Green Practices were evolved for Action Research



























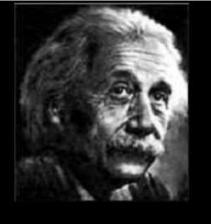


Importance of 'Apiculture' and its Role in Climate Change Adaptation



- 1) Pollination
- 2) Conservation of Natural Resources
- 3) Habitat Restoration
- 4) Awareness, Education and Research
- 5) Entrepreneurship





If the bee disappeared off the surface of the globe then man would only have four years of life left. No more bees, no more pollination, no more plants, no more animals, no more man."

Herbarium – A Climate Change Perspective

- ➤ Anthropology/ Archeology / Forestry
- > Ecology
- > Entomology
- > Environmental Regulation
- > Forensics
- > History
- ➤ Horticulture
- > Pharmaceutical
- ➤ Poison Control and Medical Care
- Veterinary Science
- ➤ Zoology, etc.







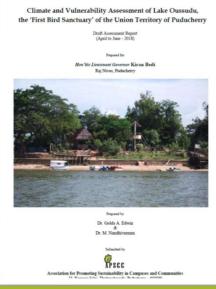


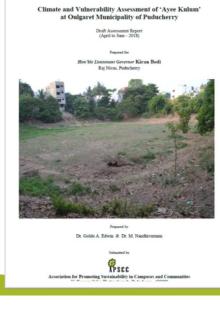


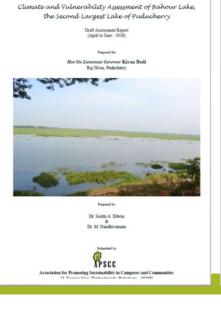


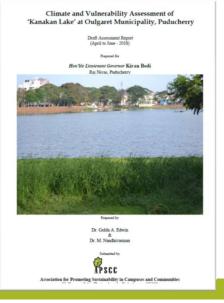
Resources

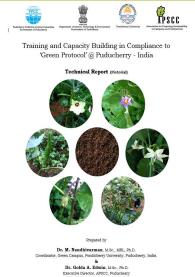


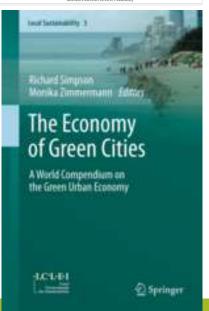


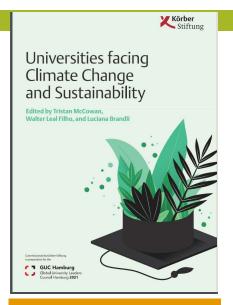






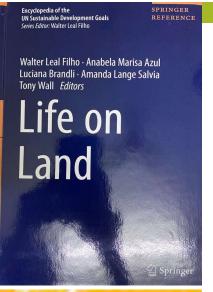


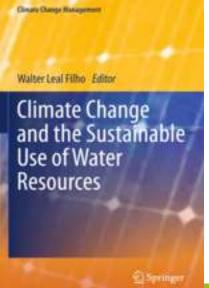


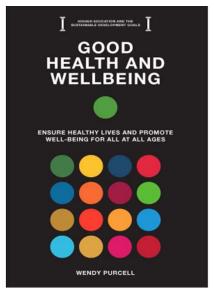


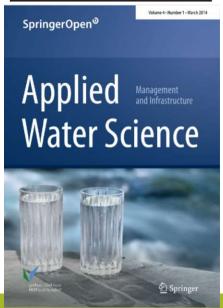


Sustainable Development at Universities: New Horizons









PETER LANG internationaler Verlag der Wissenschaften

Pondicherry University - The Times Higher Education University Impact Rankings & District Green Champion Award

Times Higher Education University Impact Ranking

PU ranked in 101-200 in two categories namely 'Gender Equality (Goal 5)'

'Climate Action (Goal 13)'

2020

Times Higher Education University Impact Ranking

PU ranked in 101-200 in three categories namely 'Gender Equality (Goal 5)' 'Partnerships for the goals (SDG17)'

Responsible consumption and production (SDG12)

PondicherryUniversityVC

693 Tweets

PondicherryUniversityVC Retweeted

Pondicherry University - PRO @PondyUniPro · Apr 7

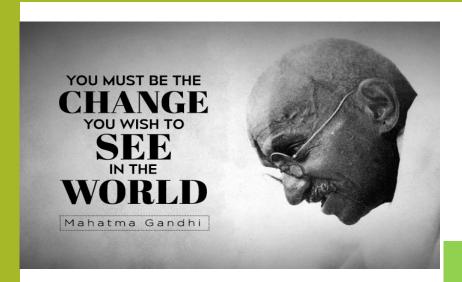
@PondicherryU recognised as District Green champion award for Pdy Dist by @EduMinOfIndia @MGNCRE. The award is given by Mr E. Vallavan, District Collector, Govt of Puducherry to Dr. M. Nandhivarman (CGC) & Mr. K. Mahesh, PRO & the same has been handed over to Prof @GurmeetSinghVC











Thanks

