

CRITERIA 7.1.6:

QUALITY AUDITS ON ENVIRONMENT AND ENERGY ARE REGULARLY UNDERTAKEN BY THE INSTITUTION

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MODY
UNIVERSITY
OF SCIENCE AND TECHNOLOGY
LAKSHMANGARH • RAJASTHAN
A Leading Women's University

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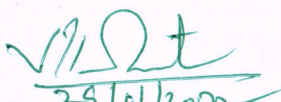
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AUDIT REPORTS AND CERTIFICATES:

Mody University of Science and Technology strictly adhere approved list of Ministry of Environment, Forest and Climate Change for selecting the recognized agency to conduct Green, Environment and Energy Audits.

The selected recognized agency certificates and report on Green, Environment and Energy audit annexed as follows.

- (i) 7.1.6 Annexure no 1
- (ii) 7.1.6 Annexure no 2
- (iii) 7.1.6 Annexure no 3


29/01/2020
Registrar

Registrar
(Mody University of Science and Technology)
Mody University of Science and Technology
Lakshmangarh-332311 Dist. Sikar

Certificate

This is to certify that Green Audit was carried out at Mody University of Science & Technology (Lakshmangarh, Sikar 332 311) during the month of November 2020.

The scope, coverage, findings and recommendations are submitted vide our report SCPL-PR-792-071220 dated December 7, 2020.

For **SENERGY CONSULTANTS PVT LTD**



Tushar Kamble
(Project coordinator)

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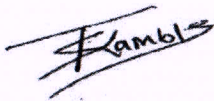
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Tushar Kamble
(Project coordinator)

7.1.6
Report

Report

On

Green, Energy & Environment Audit

For

**Mody University of Science & Technology
Lakshmanagarh 332 311**

Prepared

By

**Senergy Consultants Pvt Ltd
Mumbai**

November 2020

Helping You to Conserve Energy

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I

Introduction

Green, Energy & Environment Audit was undertaken at Mody University of Science & Technology (Lakshmangarh, Sikar 332 311) during the month of November 2020.

The organization is very keen to promote green culture wherever possible, as a commitment towards better environment and conservation of energy. A lot of efforts have already been put up to bring down the carbon footprint. To further optimize consumption and identify saving opportunities, M/s Senergy Consultants was assigned to carry out Green & Environment Audit of the premises.

This Audit Report presents the analysis of the data collected, observations made at the facility and is governed by the objectives, scope of work, methodology etc. discussed in the ensuing paragraphs.

Team:

The team members of the audit study.

- Mr Ravindra Datar
- Mr Dharmendra Kumar Upadhyay

Acknowledgment:

We wish to express our gratitude towards Dr Uma Bhardwaj for having given us the opportunity for conducting the study and the support provided during the study.

We are also thankful to Mr Ashok Ranwa for extending the necessary help and co-operation from their side.

II

Executive Summary

The premises were evaluated against the various criteria laid down by the National Assessment and Accreditation Council (NAAC). The major observations are.

Renewable Energy

- The college is planning to install Roof-top Solar Photovoltaic System for self-use; which may be expedited.
- Solar hot water system has been installed to meet major part of hot water requirements.
- The college has already installed biogas plant from plate waste and organic waste. The gas augments the cooking requirements in the canteens.

Green Campus Initiative

- The movement of vehicle inside the campus is restricted with vehicles of Special Dignitaries and VIP Guests are allowed to enter the campus.
- There are pedestrian friendly pathways for in-campus movement
- There is restriction on the usage of plastic, which may be extended to completely ban plastic usage inside the campus.
- The campus is surrounded with a lot of greenery, trees, and proper landscaping.
- The bicycles are allowed for in campus movement as required.

Environment & Energy Initiative

- Tree plantation is a regular activity and recently 50 neem trees were planted in Jeevan Jheel as a part of Monsoon plantation Drive.

Air Quality & Ventilation

- The classrooms and other area are well ventilated to ensure proper air quality.
- The fans are appropriately installed to ensure proper air circulation
- The indoor as well as outdoor plants have also been provided to improve the environment.

Lighting System

- The usage of natural light is optimized through well designed structure and windows.
- Almost all the lamps are replaced with LED, the remaining are being progressively replaced.
- The switching of the lamps is done manually, which may be carried out with sensor-based automation; especially for common area and washrooms.

Water Quality & Conservation

- The water is supplied by the Tube well, which is a common practice in and around Lakshmanagarh.
- Water purifiers & coolers are provided at convenient locations and on each floor.
- The rainwater harvesting system has been installed.
- The distribution network and piping are more or less satisfactory and adequate.

Waste Management

- The effluent water is treated in the Sewage Treatment plant; while the treated water is used for gardening.
- The organic waste is segregated and disposed of through Composite pit / Biogas plant. The manure is used in for gardening / inhouse plants.
- The electronic gadgets / waste is either donated if useful or handed over to appropriate waste collectors.
- The hazardous solid waste is disposed through Incinerator machine.
- The other solid waste is appropriately disposed of.

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Air Conditioning System

- The Air Conditioners are operated as required with manual control. The operation is minimal consequently automation may not be economical.
- The room temperature is maintained at 24 to 25 °C, which is well within the recommended values.
- The Air Conditioners are serviced regularly and properly maintained.
- Most of the Air Conditioners units are energy efficient with star rating of 3 and above.

Infrastructure usage

- Ramps are provided on the ground floor to address the needs of differently abled persons.
- The special toilets are available on the ground floor to address the needs of differently abled persons.
- The on-campus movement is distributed with multiple entrances as well as staircases.
- There are adequate fire extinguishers located at key areas. The college has initiated appropriate measures to meet the safety requirement.
- The draining system for washrooms is efficient and effective.
- No seepages were observed in the building premises.

Green IT culture

- The Energy efficient computers and laptops have been procured.
- The electronic communication is encouraged to minimize usage of papers.
- Most of the papers are reused for doubled sided printing to further minimize usage of paper.

III Electrical System

Gadget List

The details are as below:

Lamps:

Almost all the lamps are replaced with LED, the details are as below.

Description		Total	Operation	
			Hr/D	D/M
LED	7 W	3793	10	25
	15 W	500	10	25
	40 W	1684	10	25
RO	60 W	113	10	25

Computers:

Almost all the computers are with energy efficient LCD / LED monitors.

Fans:

All the fans are of standard rating and efficiency, the details are as below.

Description	Rating	Quantity
	W	No
Ceiling Fans	60	1700

Air Conditioning Units:

The Air Conditioning Units are with star rating of 3 and above, which are intrinsically operate at high energy efficiency, the details are as below.

Location	Type	Capacity	Quantity
Air Conditioner	Split AC	1.5 Ton	800
Air Conditioner	Split AC	2 Ton	400

Observations & Suggestions:

- Almost all the lamps are replaced with LED, the remaining are being replaced expediently.
- The fans may be progressively replaced with energy efficient BLDC fans, especially during replacements and new purchases.
- Most of the Air Conditioners units are energy efficient with star rating of 3 and above.
- The Air Conditioners are operated as required with manual control. The operation is minimal consequently automation may not be economical.

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Green, Energy and Environment Audit Report
Modi University of Science & Technology

- The rooms are well ventilated and provided with fans at appropriate location for proper air circulation.
- The temperature is maintained at 24 to 25 °C for air conditioning spaces, which is within the recommended values.
- The gadgets are services properly and maintained in good condition.

Electricity Bill:

Consumer Name: Modi University of Science & Technology						Consumer No. 0591/0003		
Tariff Category: 2011 XA		AJMER VIDYUT VITRAN NIGAM LTD						
Meter No.: 688572		Contract Demand: 2500 KVA						
Description	Unit	Jun-20	Jul-20	Aug-20	Sep-20	Oct-20	Nov-20	Average
Energy Consumption	KWH	141210	153630	171420	197010	152160	138900	159055
	KVAH	145830	156730	177270	202200	156120	143580	163622
Recorded Demand	KVA	363.6	412.2	508.8	479.1	502.8	375.6	440
Billed Demand	KVA	1883	1883	1883	1883	1883	1883	1883
Power Factor		0.968	0.979	0.967	0.974	0.974	0.967	0.972
PF Incentive / Penalty	Rs	-11247.4	-25332	-12895.07	-24409	-18852.6	-10448.8	-17197
Demand Charges	Rs	508275	508275	508275	508275	508275	508275	508275
Bill	Rs	2003608	2025830	2206363	2461034	2044885	1902969	2107448
Cost	Rs/KWH	14.19	13.19	12.87	12.49	13.44	13.70	13.25

Observations & Suggestions:

- The average cost of the power is around Rs 13.25/- per kWh, which is on the higher side due to very high billed demand. However, the actual demand as well as consumption is lower due lockdown restrictions. This is expected to be within the normal range, once the restrictions are lifted and activities are normalized.
- The actual demand is considerably lower than the billed demand, leading to very high demand charges. However, the actual demand may be lower due lockdown restrictions. This actual demand may be checked during normal operation and possibility of reducing the contract demand to bring down the bill demand near actual demand may be assessed. This will help in reducing the demand charges and optimize cost of power.
- The power factor was also observed to be on the lower side which may be improved to avoid penalty also get incentive. The values may be maintained above 0.995 to achieve maximum incentive and optimize power cost.

Power Factor Improvement:

The higher power factor entails substantial incentive and reduces maximum demand; while penalty is slapped if the power factor drops below 0.90. The amount is payable on the energy charges as per the details below.

Consumers under this schedule shall maintain an Average Power Factor of not less than 0.90 (90%). In case the Average Power Factor falls below 0.90 (90%), a surcharge @ 1% of Energy Charges for every 0.01 (1%) fall in average power factor below 0.90 (90%), shall be charged.

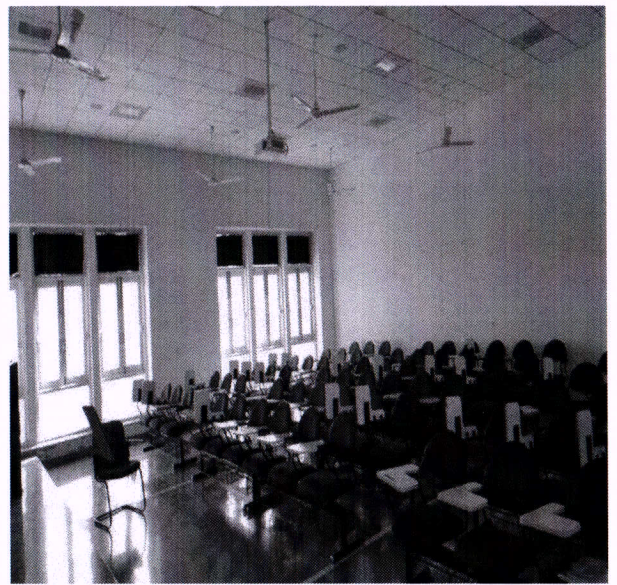
Also an incentive of 0.5% of Energy Charges shall be provided for each 0.01 (1%) improvement above 0.95 (95%) till 0.97 (97%). If the average power factor is above 0.97 (97%), an incentive of 1% of energy charges shall be provided for each 0.01 (1%) improvement above 0.97 (97%).

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IV Environmental System

Ventilation & Air Quality:

- The air ventilation is adequate.
- Several indoor & outdoor plants have been installed to improve air quality.
- It has been a general practice to switch off the fans & lights in an unoccupied area.



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Mody University of Science & Technology



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V Water Management

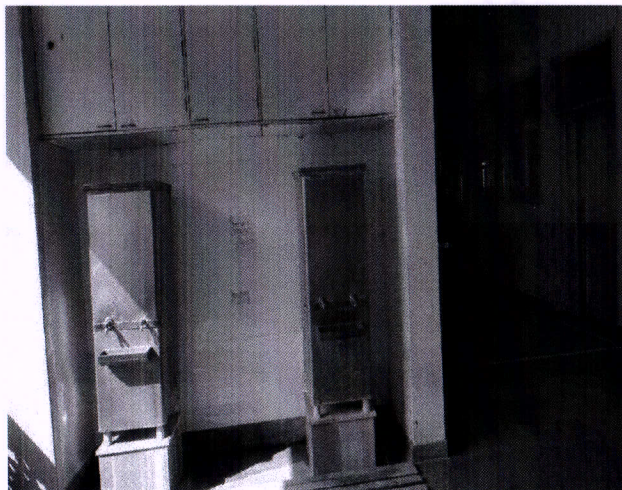
Consumption Pattern:

The water supplied by the Tube well is used for drinking and other requirements.



Water Purifiers:

The water purifiers are installed on each floor.



Water Distribution System:

The distribution network and piping are more or less satisfactory and adequate.

Rainwater Harvesting:

The rainwater is used for recharging of borewell water. This borewell water is used for cleaning, flushing and gardening purposes.

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VI Waste Generation & Management

Solid Waste:

- The organic is segregated in the college premises and disposed fed to the composting pit.
- The other solid waste is segregated, while hazardous waste is incinerated, the rest is disposed of appropriately.
- Each Floor is provided is with segregated dustbin for Recyclable waste and Non-Recyclable Waste
- The electronic gadgets with residual life are donated while the electronic waste is properly segregated and handed over to appropriate scrap collector.



Sewage & Wastewater:

- The sewage treatment plant is installed to treat the waste water.
- Treated water is used for gardening purposes only.

VII Infrastructure & Safety

Movement on-campus (Distributed / non-distributed leading to crowds)

- The premises are provided with multiple staircases with necessary entrances to ensure quick and effective movement in normal as well as emergency conditions.
- The movement of vehicle inside the campus is restricted with vehicles of Special Dignitaries and VIP Guests are allowed to enter the campus.
- There are pedestrian friendly pathways for in-campus movement
- There is restriction on the usage of plastic, which may be extended to completely ban plastic usage inside the campus.
- The bicycles are allowed for in campus movement as required.

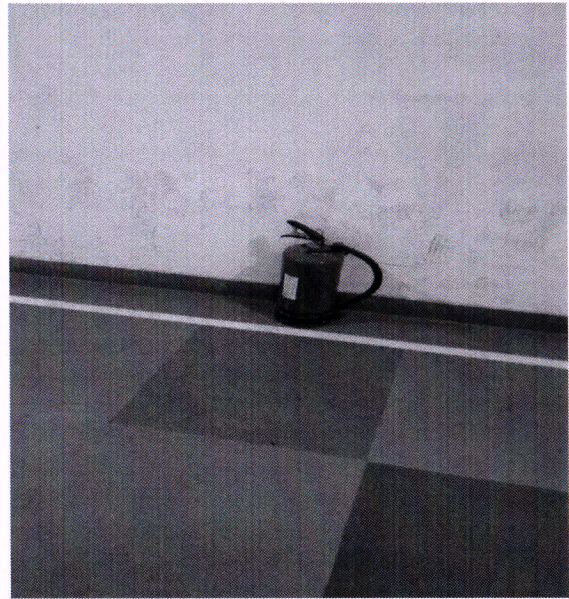


Parking space:

- There is adequate parking space for vehicles/four wheelers. However, almost all the students and many of the faculty members avail public transport system which is very convenient.

Firefighting & fire escape system:

- There are efficient fire extinguishers in the premises, which are checked / refilled as per the stipulated frequency.
- The premise is provided with multiple staircases with requisite entrances to ensure quick and effective movement in emergency conditions.
- Water sprinkler system is provided on 7th floor as per latest government guidelines.



Draining system:

- The drains from the washrooms and other areas are properly collected and disposed.

Seepage in the building:

- The premise was visually inspected for seepages. No seepages were observed in any of the places.

VIII

Green Culture

- The LED / LCD monitors & Laptops has been procured, which are energy efficient.
- These monitors are not only energy efficient but also generate minimal heat and cut down on air conditioning load.
- The electronic communication is encouraged to minimize usage of papers.
- Most of the papers are reused for doubled sided printing to further minimize usage of paper.

The following steps may be initiated to further enhance efficiency of the systems.

1. An efficient power management system may be incorporated to
 - a. Switch off the display if not in use.
 - b. Put the computer in Sleep mode / switching off the machines, if not used for prolonged period.
2. Optimize brightness of the screen.
3. Discourage use of screen savers, which has similar power consumption.

Paper-less communication:

The major internal as well as external communication is through electronic medium.

Re-using one sided paper for printing:

It was observed that two side printing / printing on the back side of used paper in more than 80% of the cases.

Rainwater Harvesting:

The underground tank has been made to collect the rainwater. The rainwater is used for recharging of borewell water. This borewell water is used for cleaning, flushing and gardening purposes.

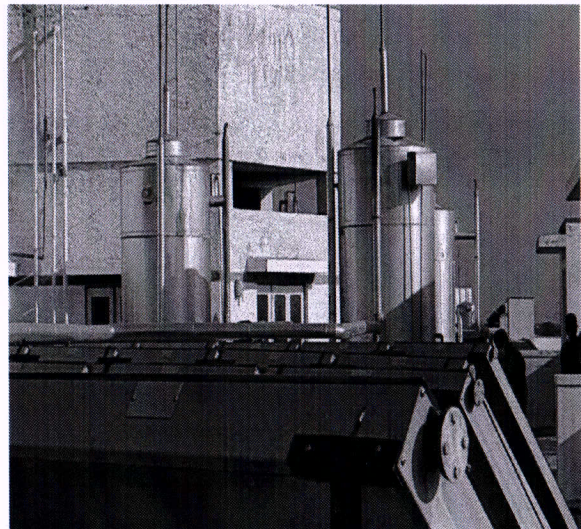
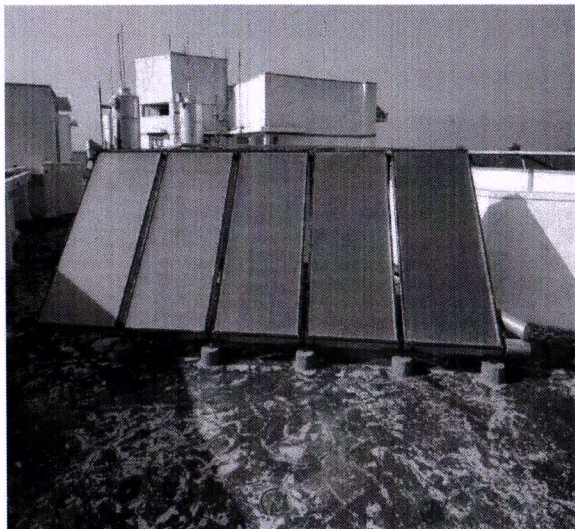
IX Renewable Energy

Solar Photovoltaic:

The college is planning to install Roof-top Solar Photovoltaic System for self-use; which may be expediated. The economics and payback period shall be attractive, considering higher power cost and good plant load factor. The possibility of going through ESCO or BOOT (build, own, operate, transfer) may also be considered.

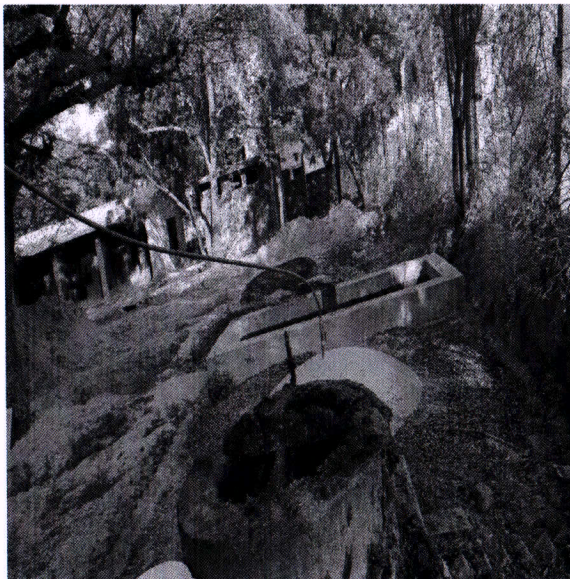
Solar Thermal:

The organization has installed rooftop solar water heater system on the terrace.



Biogas Plant:

The organization has installed biogas plant for cooking as the quantity of plate waste is substantial.



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7.1.6
ENVIRONH

**Diversity Assessment Report of Birds and Butterflies,
Mody University Campus, Lakshmangarh, (Raj.), 27.03.21 to
28.03.21**

Avifauna

Introduction

Birds are among the best monitors of environmental changes and play an important role in the control of insect pests, as predators of rodents, scavengers, seed dispersers and as pollinating agents and thus form an important component in natural ecosystem (Manjunath and Joshi, 2012, Yadav and Chauhan, 2018). The Indian subcontinent has rich in avifaunal diversity, more than 1,300 bird species (Rasmussen and Anderton, 2012). Avian community composition and species richness is associated with habitat structure as well as with abiotic factors such as temperature and precipitation; these are directly related to primary productivity, and have been broadly studied, both at local and regional scales and at different periods of the year (Wiens 1989; Honkanen *et al.* 2010). Avifaunal diversity has been decreasing rapidly due to the destruction of natural habitat by human activities (Bhadja and Vaghela, 2013). Protection and maintenance of avifaunal diversity is important in maintaining species diversity of plants and animals (Simeone *et al.*, 2002).

Present bird diversity survey intends to have the status of birds present in the Mody University Campus area. Earlier survey report was not considered for present records. This is the current checklist of birds present in the university campus with common names, scientific names, their international conservation status (IUCN Status), residential status to understand the seasonal variation in bird diversity and feeding habit to understand the feeding behaviour of different species. According to earlier survey, there are 96 species available but presently 74 species were reported because of the seasonal variation and **14 species** of birds reported first time from the university campus, based on earlier survey and present survey no. of species increased **from 96 to 110 species**.

Checklist of Avian Diversity based on current survey

S.No.	Common Name	Scientific Name	IUCN Status	Residential Status	Feeding Habit
Accipitriformes: Accipitridae					
1.	Black Kite	<i>Milvus migrans</i> (Boddaert, 1783)	LC	R	C
2.	Black-winged Kite	<i>Elanus caeruleus</i> (Desfontaines, 1789)	LC	R	O
3.	Shikra	<i>Accipiter badius</i> (Gmelin, 1788)	LC	R	C
Anseriformes: Anatidae					
4.	Spot-billed Duck	<i>Anas poecilorhyncha</i> (Forster, 1781)	LC	WV	O
Apodiformes: Apodidae					
5.	Little Swift	<i>Apus affinis</i> (J.E. Gray, 1830)	LC	R	O
Bucerotiformes: Upupidae					
6.	Hoopoe	<i>Upupa epops</i> (Linnaeus, 1758)	LC	R	I
Bucerotiformes: Bucerotidae					
7.	Indian Grey Hornbill	<i>Ocyrceros birostris</i> (Scopoli, 1786)	LC	R	O
Charadriiformes: Recurvirostridae					
8.	Black-winged Stilt	<i>Himantopus himantopus</i> (Linnaeus, 1758)	LC	R	O
Charadriiformes: Scolopacidae					
9.	Common Sandpiper	<i>Actitis hypoleucos</i> (Linnaeus, 1758)	LC	WV	O
10.	Green Sandpiper	<i>Tringa ochropus</i> (Linnaeus, 1758)	LC	WV	O
11.	Little Stint	<i>Calidris minuta</i> (Leisler, 1812)	LC	WV	O
12.	Wood Sandpiper	<i>Tringa glareola</i> (Linnaeus, 1758)	LC	WV	O
Charadriiformes: Charadriidae					
13.	Little ringed Plover	<i>Charadrius dubius</i> (Scopoli, 1786)	LC	R	I
14.	Red-wattled Lapwing	<i>Vanellus indicus</i> (Boddaert, 1783)	LC	R	O
15.	White-tailed Lapwing	<i>Vanellus leucurus</i> (Lichtenstein, 1823)	LC	R	I
Charadriiformes: Sternidae					
16.	River Tern	<i>Sterna aurantia</i> (J.E. Gray, 1831)	NT	R	O
Columbiformes: Columbidae					
17.	Blue Rock Pigeon	<i>Columba livia</i> (Gmelin, 1789)	LC	R	G
18.	Eurasian Collared Dove	<i>Streptopelia decaocto</i> (Fridvaldszky, 1838)	LC	R	G
19.	Laughing Dove	<i>Spilopelia senegalensis</i> (Linnaeus, 1766)	LC	R	G
20.	Red-collared Dove	<i>Streptopelia tranquebarica</i> (Hermann, 1804)	LC	R	G
21.	Spotted Dove	<i>Spilopelia chinensis</i> (Scopoli, 1786)	LC	R	G
22.	Yellow-footed Green Pigeon	<i>Treron phoenicoptera</i> (Latham, 1790)	LC	R	G
Coraciiformes: Coraciidae					
23.	Indian Roller	<i>Coracias benghalensis</i> (Linnaeus, 1758)	LC	R	C
Coraciiformes: Halcyonidae					
24.	White-breasted Kingfisher	<i>Halcyon smyrnensis</i> (Linnaeus, 1758)	LC	R	C
Coraciiformes: Meropidae					
25.	Green bee-eater	<i>Merops orientalis</i> (Latham, 1801)	LC	R	I
Cuculiformes: Cuculidae					
26.	Asian Koel	<i>Eudynamys scolopaceus</i> (Linnaeus, 1758)	LC	R	O
27.	Common hawk-Cuckoo	<i>Hierococyx varius</i> (Vahl, 1797)	LC	R	O
28.	Greater Coucal	<i>Centropus sinensis</i> (Stephens, 1815)	LC	R	O
Galliformes: Phasianidae					
29.	Grey Francolin	<i>Francolinus pondicerianus</i> (Gmelin, 1789)	LC	R	O
30.	Indian Peafowl	<i>Pavo cristatus</i> (Linnaeus, 1758)	LC	R	O
31.	Rock Bush Quail	<i>Perdica argoondah</i> (Sykes, 1832)	LC	R	O

Gruiformes: Rallidae					
32.	Common Moorhen	<i>Gallinula chloropus</i> (Linnaeus, 1758)	LC	R	O
Passeriformes: Alaudidae					
33.	Ashy-crowned Sparrow Lark	<i>Eremopterix griseus</i> (Scopoli, 1786)	LC	R	I
34.	Crested Lark	<i>Galerida cristata</i> (Linnaeus, 1758)	LC	PV	O
35.	Indian Bushlark	<i>Mirafra erythroptera</i> (Blyth, 1845)	LC	R	O
36.	Oriental Skylark	<i>Alauda gulgula</i> (Franklin, 1831)	LC	R	O
37.	Rufous-tailed Lark	<i>Ammomanes phoenicura</i> (Franklin, 1831)	LC	SV	I
Passeriformes: Cisticolidae					
38.	Ashy Prinia	<i>Prinia socialis</i> (Sykes, 1832)	LC	R	I
39.	Common Tailorbird	<i>Orthotomus sutorius</i> (Pennant, 1769)	LC	R	I
40.	Grey-breasted Prinia	<i>Prinia hodgsonii</i> (Blyth, 1844)	LC	R	I
41.	Rufous-fronted Prinia	<i>Prinia buchanani</i> (Blyth, 1844)	LC	R	I
Passeriformes: Corvidae					
42.	House Crow	<i>Corvus splendens</i> (Vieillot, 1817)	LC	R	O
43.	Indian Jungle Crow	<i>Corvus macrorhynchos</i> (Wagler, 1827)	LC	R	O
44.	Rufous Treepie	<i>Dendrocitta vagabunda</i> (Latham, 1790)	LC	R	F
Passeriformes: Dicuridae					
45.	Black Drongo	<i>Dicrurus macrocercus</i> (Vieillot, 1817)	LC	R	I
Passeriformes: Estrildidae					
46.	Indian Silverbill	<i>Lonchura malabarica</i> (Linnaeus, 1758)	LC	R	O
Passeriformes: Hirundinidae					
47.	Dusky Crag Martin	<i>Ptyonoprogne concolor</i> (Sykes, 1832)	LC	R	I
48.	Red-rumped Swallow	<i>Cecropis daurica</i> (Laxmann, 1769)	LC	R	I
49.	Wire-tailed Swallow	<i>Hirundo smithii</i> (Leach, 1818)	LC	R	I
Passeriformes: Laniidae					
50.	Bay-backed Shrike	<i>Lanius vittatus</i> (Valenciennes, 1826)	LC	R	C
51.	Long-tailed Shrike	<i>Lanius schach</i> (Linnaeus, 1758)	LC	R	C
52.	Southern Grey Shrike	<i>Lanius meridionalis</i> (Temminck, 1820)	LC	R	C
Passeriformes: Leiothrichidae					
53.	Common Babbler	<i>Turdoides caudate</i> (Dumont, 1823)	LC	R	O
54.	Jungle Babbler	<i>Turdoides striata</i> (Dumont, 1823)	LC	R	O
55.	Large Grey Babbler	<i>Turdoides malcolmi</i> (Sykes, 1832)	LC	R	O
Passeriformes: Muscicapidae					
56.	Brown Rock Chat	<i>Cercomela fusca</i> (Blyth, 1851)	LC	R	I
57.	Indian Robin	<i>Saxicoloides fulicatus</i> (Linnaeus, 1766)	LC	R	I
58.	Oriental Magpie Robin	<i>Copsychus saularis</i> (Linnaeus, 1758)	LC	R	I
Passeriformes: Nectariniidae					
59.	Purple Sunbird	<i>Cinnyris asiaticus</i> (Latham, 1790)	LC	R	N
Passeriformes: Passeridae					
60.	Chestnut-shouldered Petronia	<i>Petronia xanthocollis</i> (E. Burton, 1838)	LC	R	O
61.	House Sparrow	<i>Passer domesticus</i> (Linnaeus, 1758)	LC	R	G
Passeriformes: Pycnonotidae					
62.	Red-vented Bulbul	<i>Pycnonotus cafer</i> (Linnaeus, 1766)	LC	R	F
Passeriformes: Sturnidae					
63.	Asian Pied Starling	<i>Gracupica contra</i> (Linnaeus, 1758)	LC	R	O
64.	Bank Myna	<i>Acridotheres ginginianus</i> (Latham, 1790)	LC	R	G
65.	Brahmini Starling	<i>Sturnia pagodarum</i> (Gmelin, 1789)	LC	R	G
66.	Indian Myna	<i>Acridotheres tristis</i> (Linnaeus, 1766)	LC	R	G
67.	Rosy Starling	<i>Pastor roseus</i> (Linnaeus, 1758)	LC	PV	O

Passeriformes: Zosteropidae					
68.	Oriental White-eye	<i>Zosterops palpebrosus</i> (Temminck, 1824)	LC	R	O
Pelecaniformes: Ardeidae					
69.	Cattle Egret	<i>Bubulcus ibis</i> (Linnaeus, 1758)	LC	R	C
Pelecaniformes: Threskiornithidae					
70.	Red-napped Ibis	<i>Pseudibis papillosa</i> (Temminck, 1824)	LC	R	C
Piciformes: Picidae					
71.	Black-rumped Flameback	<i>Dinopium benghalense</i> (Linnaeus, 1758)	LC	R	I
Podicipediformes: Podicipedidae					
72.	Little Grebe	<i>Tachybaptus ruficollis</i> (Pallas, 1764)	LC	R	C
Psittaciformes: Psittaculidae					
73.	Rose-ringed Parakeet	<i>Psittacula krameri</i> (Scopoli, 1769)	LC	R	F
Strigiformes: Strigidae					
74.	Spotted Owlet	<i>Athene brama</i> (Temminck, 1821)	LC	R	C

Note: LC – Least Concern; NT – Near Threatened; R – Residential, WV – Winter Visitor; PV – Passive Visitor; SV – Summer Visitor, C – Carnivorous, F – Frugivorous; I – Insectivorous; O – Omnivorous; N – Nectarivores; G – Granivorous

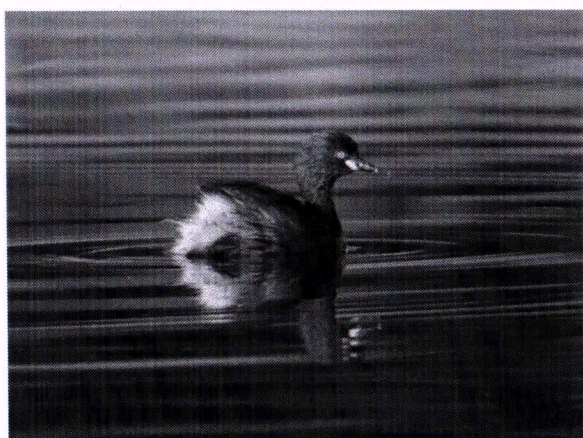
Some new reported bird species –



Spotted Dove



White-tailed Lapwing



Little Greb



Red-napped Ibis



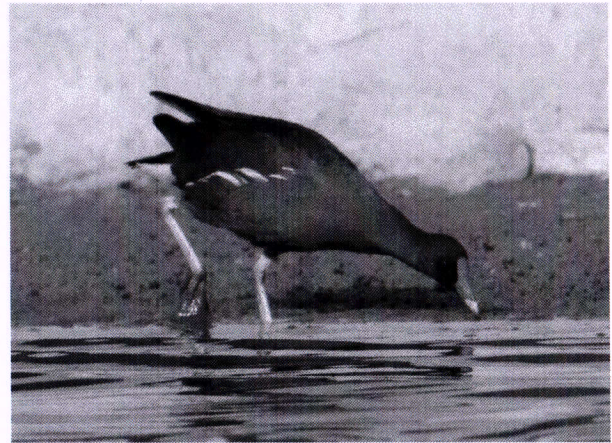
Wood Sandpiper



Red-wattled Lapwing



Long-tailed Shrike



Common Moorhen

Types of birds -

1. **Terrestrial birds** are type of birds that are generally found on the ground, not only foraging but also nesting and roosting on the ground or very low bushes. For most terrestrial birds that do fly, they generally stay low above the ground or close to cover when flying.
2. **Water birds, alternatively waterbirds, wetland birds or aquatic birds,** are birds that lives on or around water. These adaptations include webbed feet, beaks, and legs adapted to feed in the water and the ability to dive from the surface or the air to catch prey in water.

Suggestion for increasing the diversity of birds –

1. Improvement in water quality and oxygen level of water for wetland birds through addition of phytoplanktons in wetlands.

2. Area of the wetland should be increases in different depths, as many birds are surviving in deep water but some are in shallow water.
3. Wetlands are 100% opened to the predators, so it is required that 30-40% area of wetlands surrounding should have shrubs or bushes, for their protection and breeding.
4. Wetland birds are mostly depended on phytoplanktons, zooplanktons, fishes, crustaceans, molluscs, amphibians, reptiles etc., so quality and quantity should be increased by naturally without interrupting their behaviour.
5. Terrestrial birds are mainly feeding on seeds, grains, fruits, insects, grasses, nectar, flowers etc. so quality and quantity should be increased.
6. Food related to humans should not feed to the birds like cooked food material, grains and seeds should be provide in natural form.
7. Still fruiting plants and trees requires near to wetlands and campus.

Butterfly

Introduction

Butterflies support a range of other predators as well as parasites. They have been widely used by ecologists as model organisms to study the impact of the loss of habitat and climate change. Every butterfly has developed its own set of chemicals to prevent predators and parasites, discover a mate, and conquer the chemical defences of its host plant. Each of these chemicals has a potential value and could be subjugated cost-effectively.

Butterflies are central pollinators to many agricultural crops. Additionally, their ecological function is also a food source to predators like birds, spiders, lizards and other animals. Butterfly's beauty is like a flower, which displays attraction wherever it flies. Surprisingly, 90% of plants need pollinators for reproduction. Currently, there has been a decline of the bee population. Hence, butterflies are proving crucially vital to the eco system. The plants involved become more resistant to diseases. This gives them a better chance of survival. Reacting quickly and with careful evaluation, butterflies are known to react even to the slightest changes within the areas that they occupy. Stephen Dickie at Butterfly Conservation says that, "*Birds plan their whole breeding season around when caterpillars will be most abundant. If the butterfly and caterpillar numbers are depleted then there's not going to be a lot of food for developing chicks.*"

According to earlier survey 18 species of butterflies were recorded from the university, presently 19 species were recorded out of which 7 species were recorded first time. Now we say overall diversity of butterflies is **25 species** in the university.

Checklist of Butterflies based on current survey

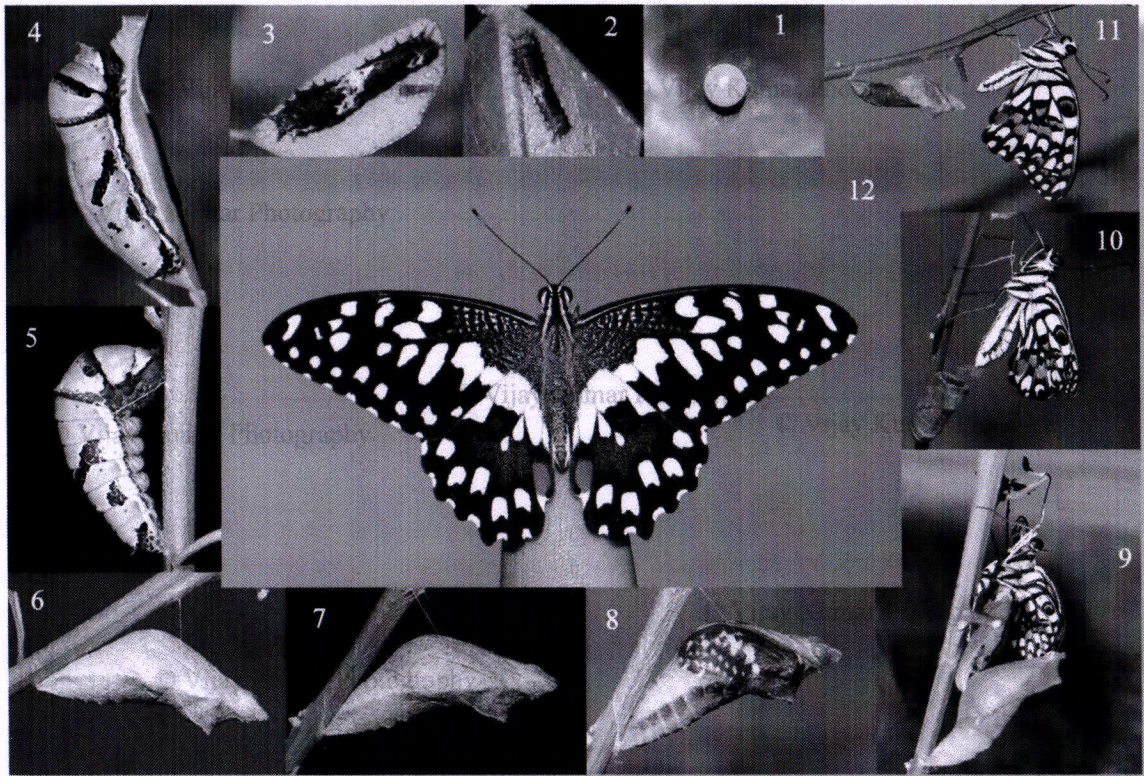
S.No.	Common Name	Scientific Name	Remarks
Hesperiidae			
1.	Indian Palm Bob	<i>Suastus gremius</i> (Fabricius, 1798)	New
Pieridae			
2.	Mottled Emigrant	<i>Catopsilia pyranthe</i> (Linnaeus, 1758)	
3.	Common Emigrant	<i>Catopsilia pomona</i> (Fabricius, 1775)	
4.	Common Grass Yellow	<i>Eurema hecabe</i> (Linnaeus, 1758)	
5.	Spotless Grass Yellow	<i>Eurema laeta</i> (Boisduval, 1836)	New

6.	Pioneer	<i>Belenois aurota</i> (Fabricius, 1793)	
7.	Small Salmon Arab	<i>Colotis amata</i> (Fabricius, 1775)	
Lycaenidae			
8.	Peablu	<i>Lampides boeticus</i> (Linnaeus, 1767)	
9.	Zebra Blue	<i>Leptotes plinius</i> (Fabricius, 1793)	New
10.	Gram Blue	<i>Euchrysops cnejus</i> (Fabricius, 1798)	
11.	Indian Lime Blue	<i>Chilades lajus lajus</i> (Stoll, [1780])	New
12.	Pale Grass Blue	<i>Pseudozizeeria maha maha</i> (Kollar, [1844])	
Nymphalidae			
13.	Plain Tiger	<i>Danaus chrysippus</i> (Linnaeus, 1758)	
14.	Striped Tiger	<i>Danaus genutia</i> (Cramer, 1779)	New
15.	Blue Pansy	<i>Junonia orithya</i> (Linnaeus, 1758)	
16.	Lemon Pansy	<i>Junonia lemonias</i> (Linnaeus, 1758)	
17.	Painted Lady	<i>Vanessa cardui</i> (Linnaeus, 1758)	New
Papilionidae			
18.	Common Rose	<i>Pachliopta aristolochiae</i> (Fabricius, 1775)	
19.	Lime Butterfly	<i>Papilio demoleus</i> Linnaeus, 1758	New

Life cycle of a butterfly –

To study life cycle of a butterfly needs peculiar observation in the field and expert in field survey

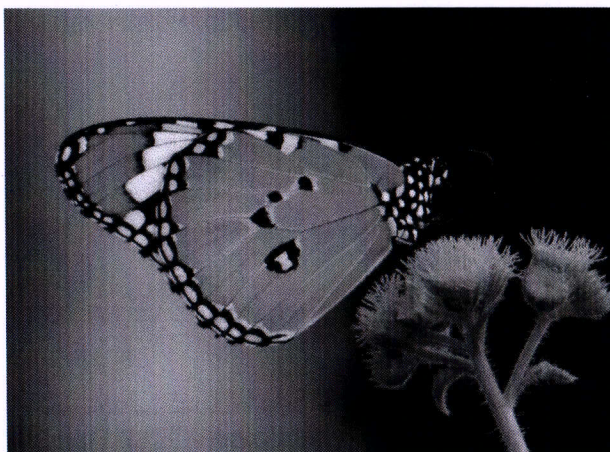
1. Egg
2. First Instar
3. Fourth instar
4. Final Instar
5. Formation of Pupa
6. Pupa I stage
7. Pupa II Stage
8. Pupa Final Stage
9. Eclosion of Butterfly
10. Drying wings
11. Spreading wings and drying
12. Complete drying and open wings



Life cycle of Lime Butterfly

Behaviour of butterflies – (Photos are used for awareness purpose)

1. Feeding on flower nectar



Plain Tiger



Lime Swallowtail

2. Feeding on micro nutrient (Mud-puddling)



Common Grass Yellow



Lime Swallowtail

3. Feeding on rotten food, fruits or any other materials



Common Baron



Common Mormon

4. Social behaviour of butterflies



Suggestions to improve butterfly diversity

1. To improve butterflies diversity in the campus, need to plant more larval host plants in the university campus.
2. Needs to provide extra feeding materials like above mentioned.
3. Need to observe regularly for breeding sites and feeding sites of the butterflies.
4. To improve butterflies diversity, needs to provide different habitat substrates like – grass, herbs, shrubs, climbers, small trees and large trees etc.
5. To regulate butterfly breeding needs active sites in the campus regarding their host plants for breeding, feeding, roosting, mud-puddling etc.

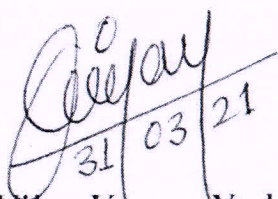
Strategic suggestion for the improvement of campus habitat -

1. Need to remove *Tectona grandis* (Teak) new plantation near to wetland because it's affects the soil quality and perform **allelopathic effects** on other vegetation ultimately affects the diversity of birds.
2. Recommending *Dendrocalamus gigantea* (Giant Bamboo) for plantation to create micro-habitat and provides extra subtract for birds and butterflies breeding and protection.
3. Recommending to create **Butterfly Park** in the campus, students will learn about the ecological research on butterflies.
4. Needs to create rosary and allied floricultural plantation in the campus to provides feeding substrates to the **bees, birds and butterflies**, an important “**B**” for nature.
5. To observe seasonal variation in diversity of birds and butterflies, it is requiring to evaluate diversity **once in two months (Bimonthly)**.
6. As I have observed the campus habitat, it has potential to regenerate the population of birds and butterflies but for that **need to recruit Biodiversity Expert or Ecologist** to monitor these issues in regular basis and established the trend with the regional climate change.
7. Creation of expert panel of scientists for the suggestions and habitat improvement and scientific restoration in the campus in all aspects so that, the site itself be a model for biodiversity and others may desire to replicate the same.

Working model with your institution for me-

1. Appoint as an **Independent Biodiversity Expert or Ecologist**, to monitor research and improvement in biodiversity in all aspects (Flora and Fauna – Wildlife) on regular basis.
2. Work as a **Consultant** with your esteemed institution.
3. Any more suggestions from your side?

“Make efforts to get what you like, Otherwise you will be forced to like what you get” - **Sir George Bernard Shaw**



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Plantation of STP (Banjara Basti): Plantation of 45 Neem trees at STP (Banjara Basti) on 16 Aug 2021.

TREE
PLANTATION





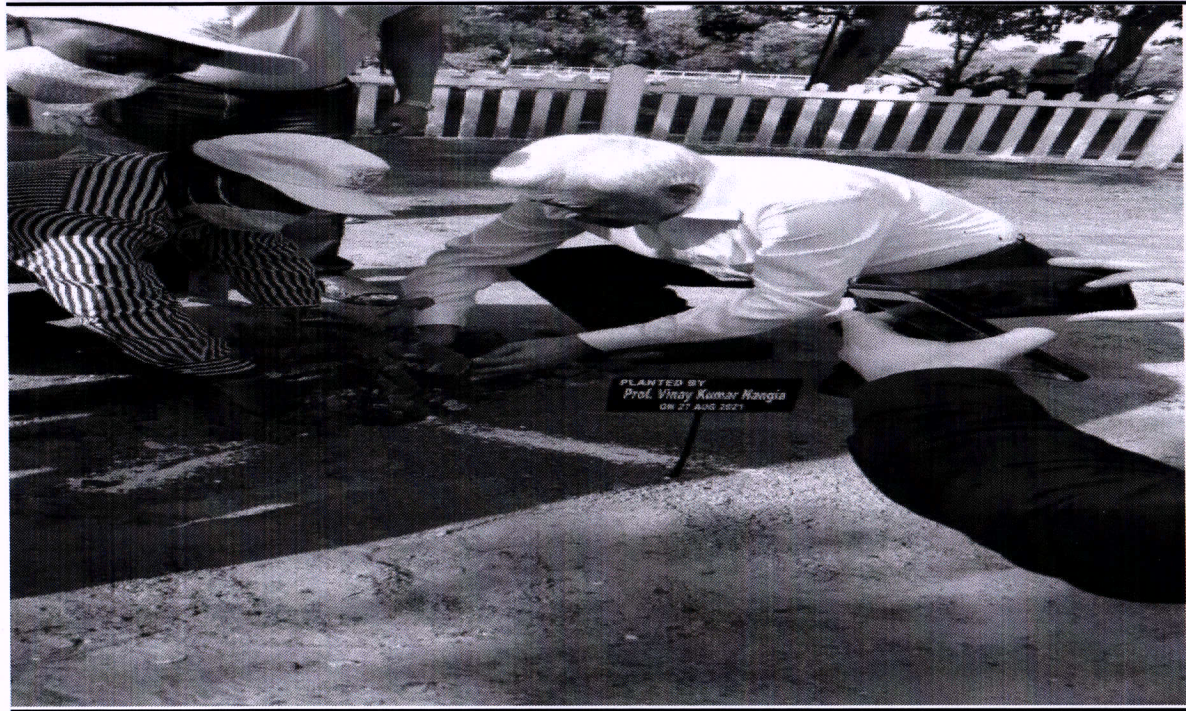
Plantation of STP (Jeevan Jheel): Plantation of 50 neem trees at STP (Jeevan Jheel) on 28 July 2021.



(campus

(Plantation drive by UGC team)







To,

The Registrar

Mody University of Science & Technology,
Lakshmangarh (Sikar)

Sub:- Plantation of Trees.

This is to certify that the team of Mody University, Lakshmangarh had planted 50 Neem Trees in STP (Jeevan Jheel) on 28th July 2021 as a part of Monsoon plantation drive.

Mody University has been doing such welfare activities/Plantation drives in past also.


Executive officer

 Municipal Board
Lakshmangarh (Sikar)

To,

The Registrar

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Executive officer


Municipal Board

Lakshmangarh (Sikar)