Bird/Wildlife Hazards to Indian Airfields
Experience and lessons learned

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SACON & Bird/Wildlife Hazard Mitigation

CIVIL AVIATION (With Airports Authority of India)

- Phase I : **Bird Hazards in select Indian Civil Airfields** (2017-2020)

Funded by MoEFCC. Govt. of India [3 airports; Coimbatore, Ahmedabad and Kannur] + 1 GMR (Hyderabad)

- Phase II : **Bird Hazards in select Indian Civil Airfields** (2020-20--) Airports Authority of India. [2020-2023: Patna, Agartala, Bhopal,Indore and Surat; 2022-25: Varanasi, Varanasi, Calicut : 2003-26 Raipur, Jaipur]

- **MILITARY AVIATION (With Indian Air Force)**

- Phase I : Bird Hazards in 21 military airbases (2014 -2021)

- Training of Bird Hazard Combat Team (One training programme/year)

Approach and Study Design

- Document systematically the bird populations and their activity patterns in the airport, immediate surroundings of the airport and the entire landscape around the airport (10 km radius) area.

- Analyze the land use and land cover of the landscape and document the anthropogenic/economic activities that may affect the bird populations and movements studied through GIS techniques.

- The bird hazard to aircrafts is then studied based on the population and movements of 'problem' birds in the location, influencing factors and the ongoing management measures undertaken by the airport authorities.
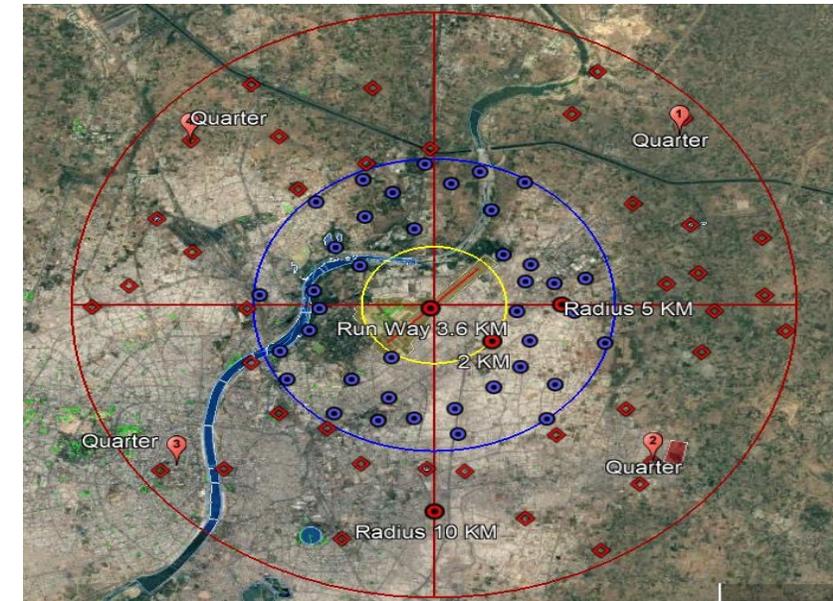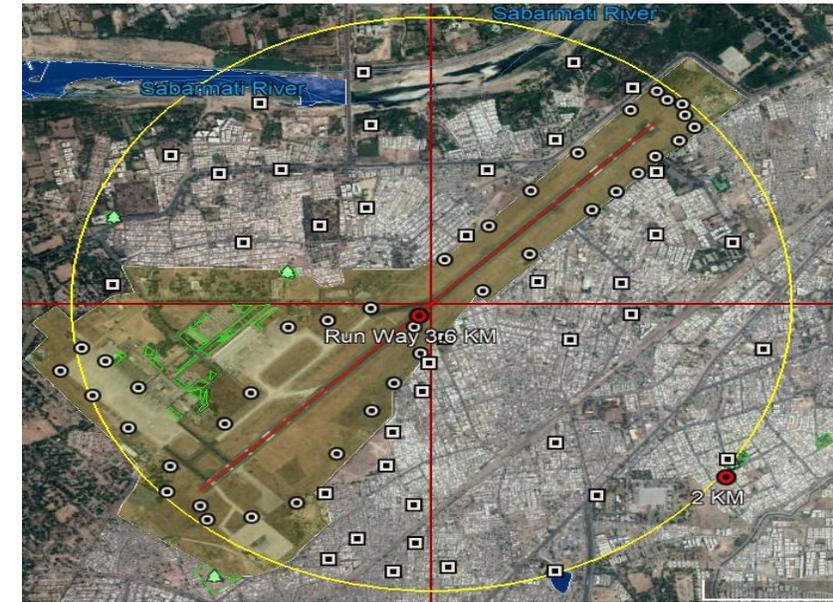
Methodology Bird Community
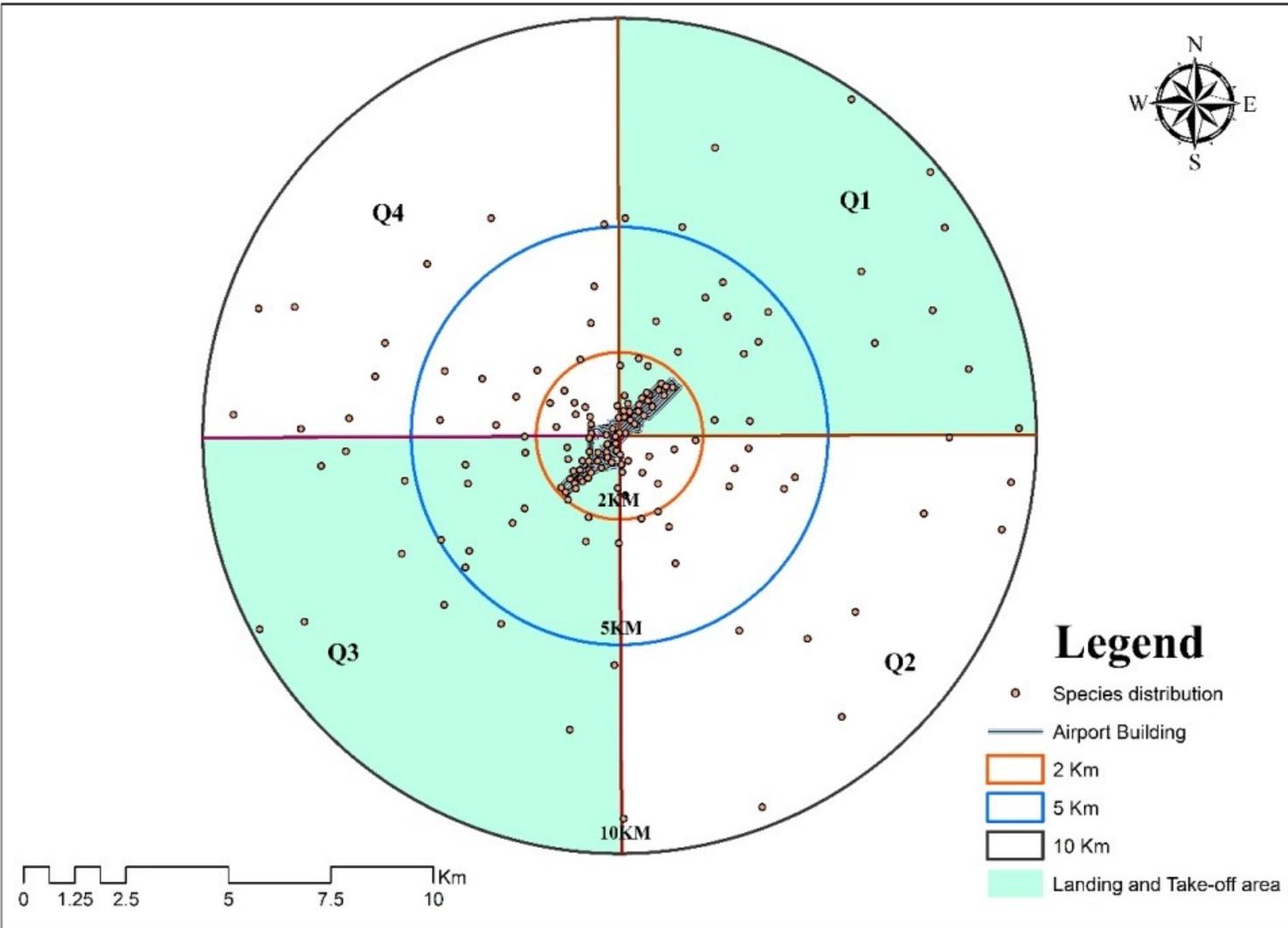
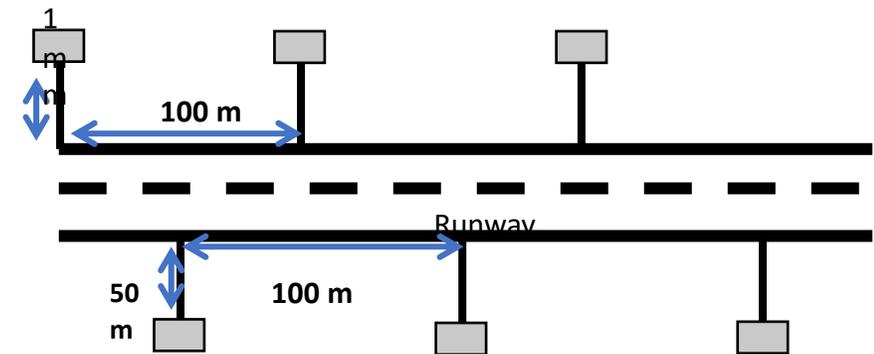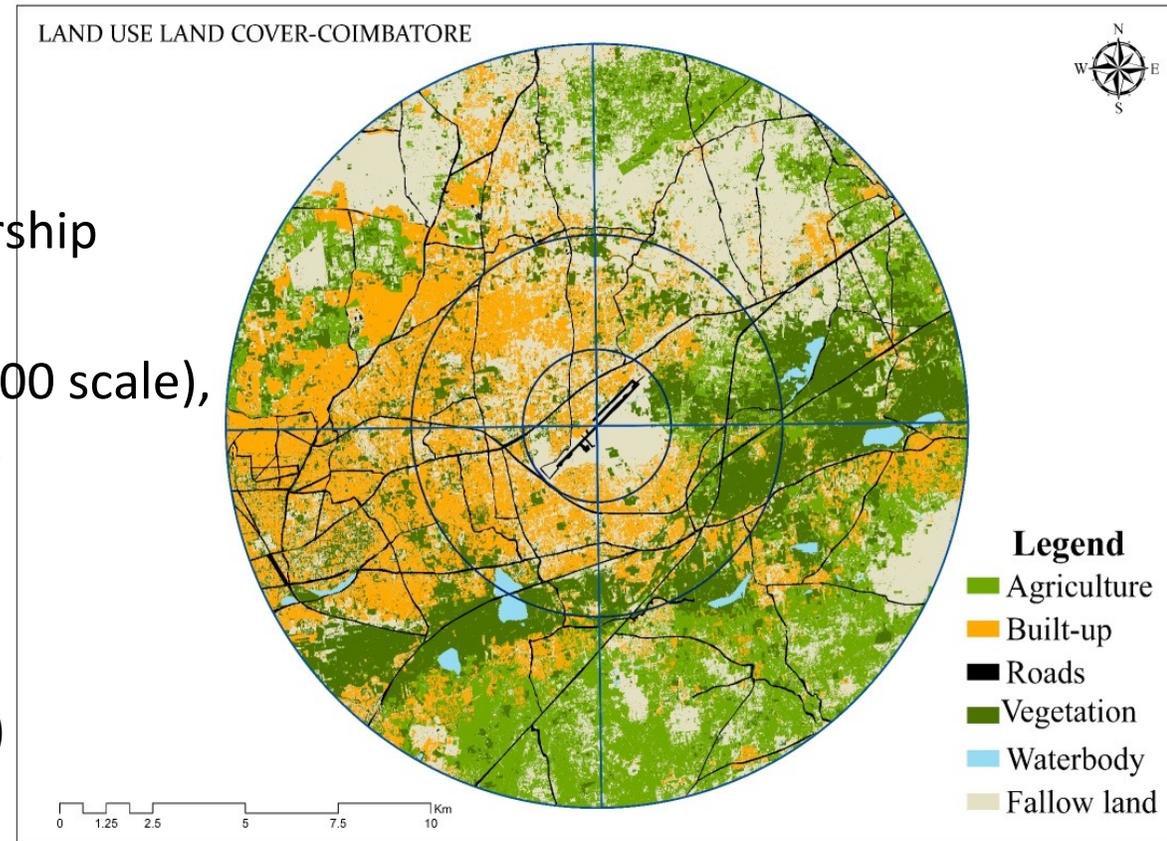| Code	Area	Locations of Bird data collection	Total Area sampled in Sq. Km	Number of samples	Time
CR	Inside Airport	Runway	0.4	80 ts	20 m/T
C0	Inside Airport	40 Points	1.71	160 counts	15 m/C
C1	Near Airport (2 km)	40 Points	10.85	80 counts	15 m/C
C2	Smaller land-scape (5 km)	40 Points	65.94	80 counts	15 m/C
C3	Larger land-scape (10 km)	40 Points	235.5	80 counts	15 m/C

Methods   continued…

2. Mapping the airfield and buffer of 10 km radius

- Characterization of landcover/landuse - extent, ownership (public/private), existing land use

- Data source - Survey of India (SOI) topo sheets (1:50,000 scale), Google earth images and open source satellite images (Landsat/LISS imageries)

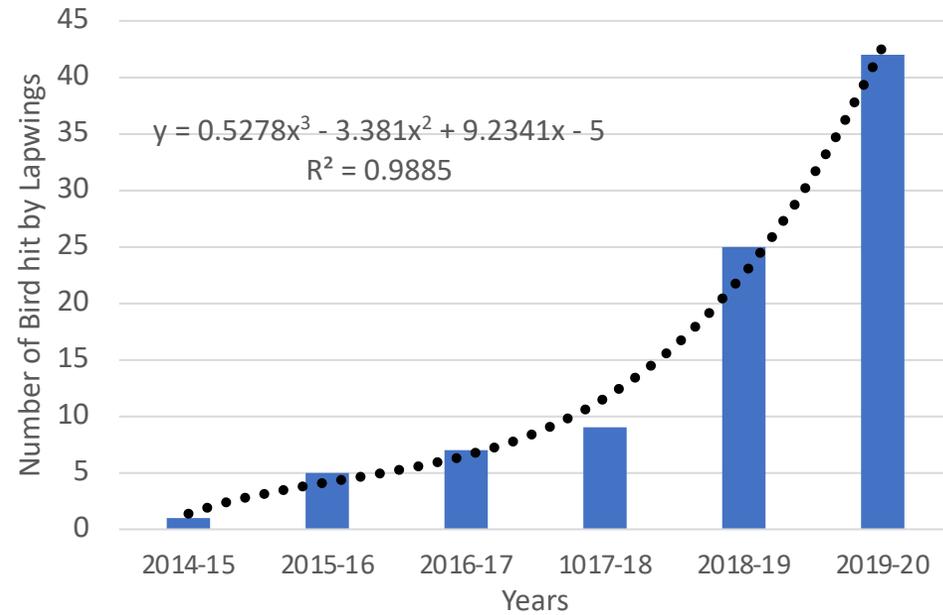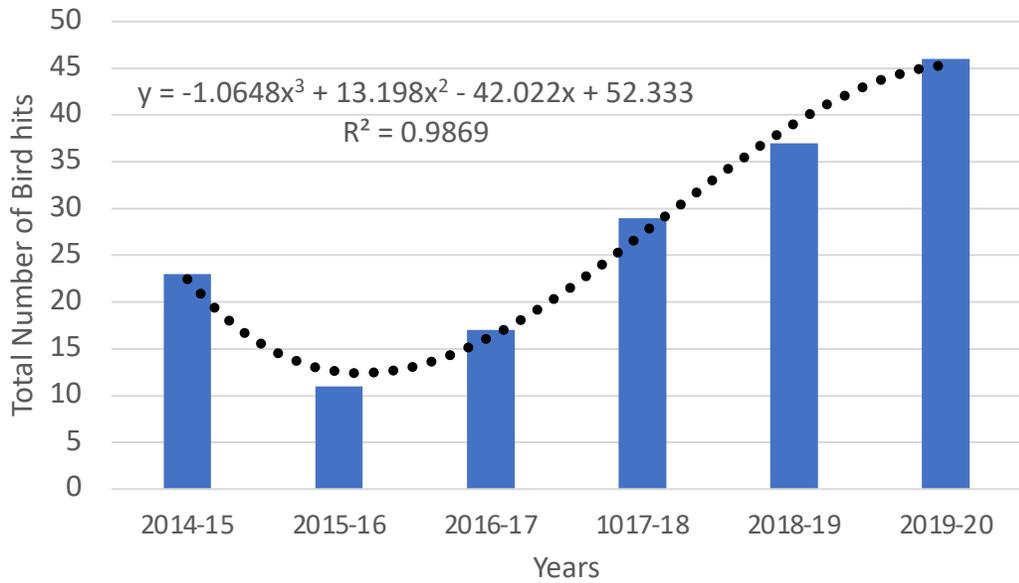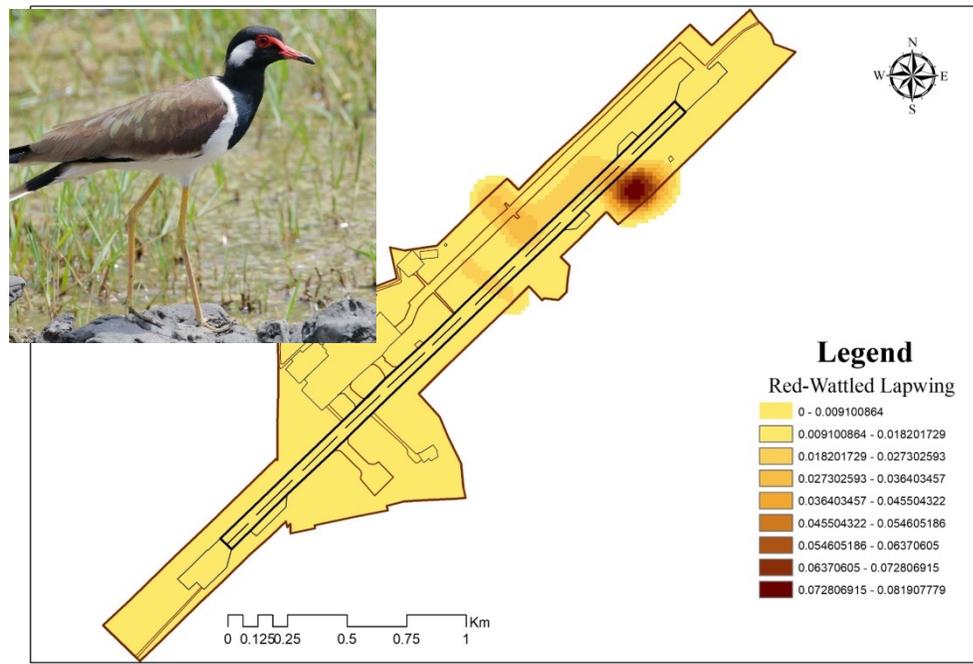- Tools and Techniques – qGIS/Arc Info; ERDAS Imagine/Grass/ENVI

3. Plant Community (Muller-Dumbois & Ellenberg, 1974)

- Limited to airfield only

- Quadrats (1mx1m) covering all season

- Variables collected – species, phenology, percentage cover of total stand (%), bare ground (%), litter (%), and dominant species.

4. Mapping of Anthropogenic pressures : The butcheries and garbage areas on the surroundings, 10km radius of the airfield was also noted.

LAND USE LAND COVER-COIMBATORE

Legend
- Agriculture
- Built-up
- Roads
- Vegetation
- Waterbody
- Fallow land

0   1.25   2.5   5   7.5   10   Km

C O I M B A T O R E

Legend
Yellow-Wattled Lapwing
- 0 - 0.004146874
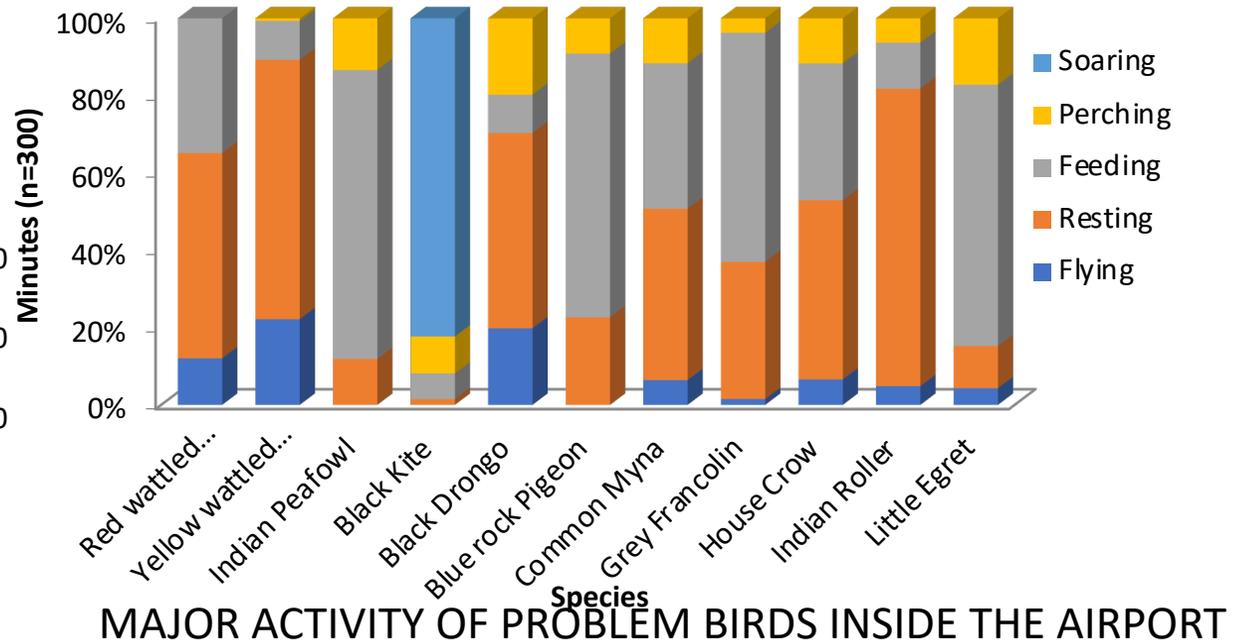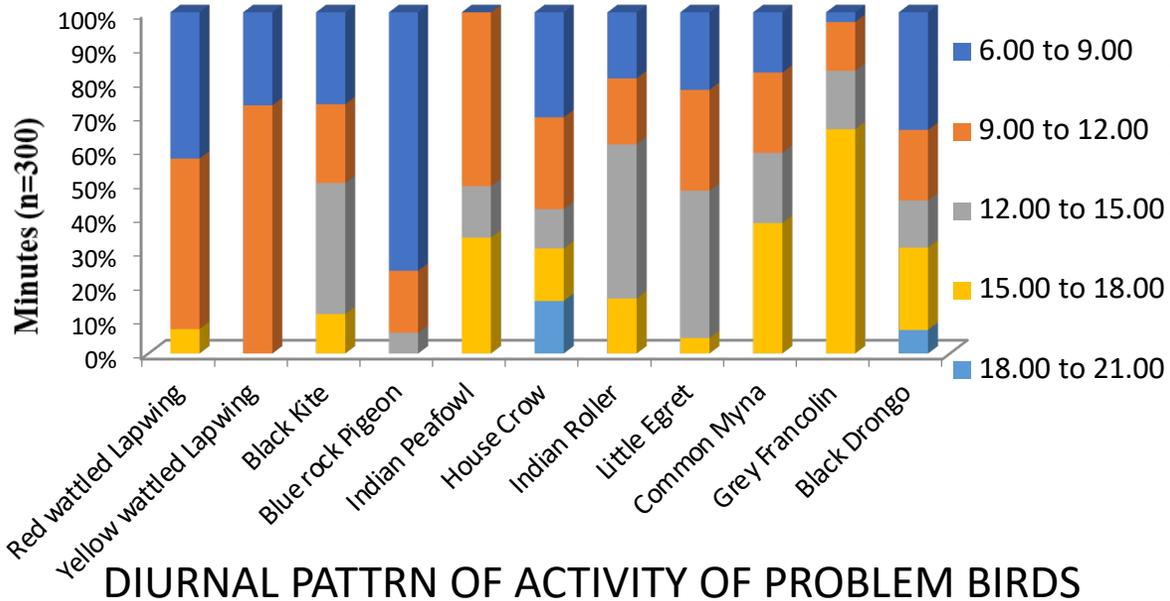- 0.004146874 - 0.008293748
- 0.008293748 - 0.012440622
- 0.012440622 - 0.016587496
- 0.016587496 - 0.02073437
- 0.02073437 - 0.024881244
- 0.024881244 - 0.029028118
- 0.029028118 - 0.033174992
- 0.033174992 - 0.037321866

Legend
Red-Wattled Lapwing
- 0 - 0.009100864
- 0.009100864 - 0.018201729
- 0.018201729 - 0.027302593
- 0.027302593 - 0.036403457
- 0.036403457 - 0.045504322
- 0.045504322 - 0.054605186
- 0.054605186 - 0.06370605
- 0.06370605 - 0.072806915
- 0.072806915 - 0.081907779

$y = -1.0648x^3 + 13.198x^2 - 42.022x + 52.333$
$R^2 = 0.9869$

$y = 0.5278x^3 - 3.381x^2 + 9.2341x - 5$
$R^2 = 0.9885$

MOST IMPORTANT PROBLEM AND THE CAUSE

PROLIFERATION OF TERMITES

Legend
— Runway
▨ Termite mounts

UNPREDICTABLE EVENTS

Snail activity in runway, Coimbatore airfield

Trachea sp.

Ariophanta sp.

DIURNAL PATTRN OF ACTIVITY OF PROBLEM BIRDS

6.00 to 9.00
9.00 to 12.00
12.00 to 15.00
15.00 to 18.00
18.00 to 21.00

MAJOR ACTIVITY OF PROBLEM BIRDS INSIDE THE AIRPORT

Soaring
Perching
Feeding
Resting
Flying
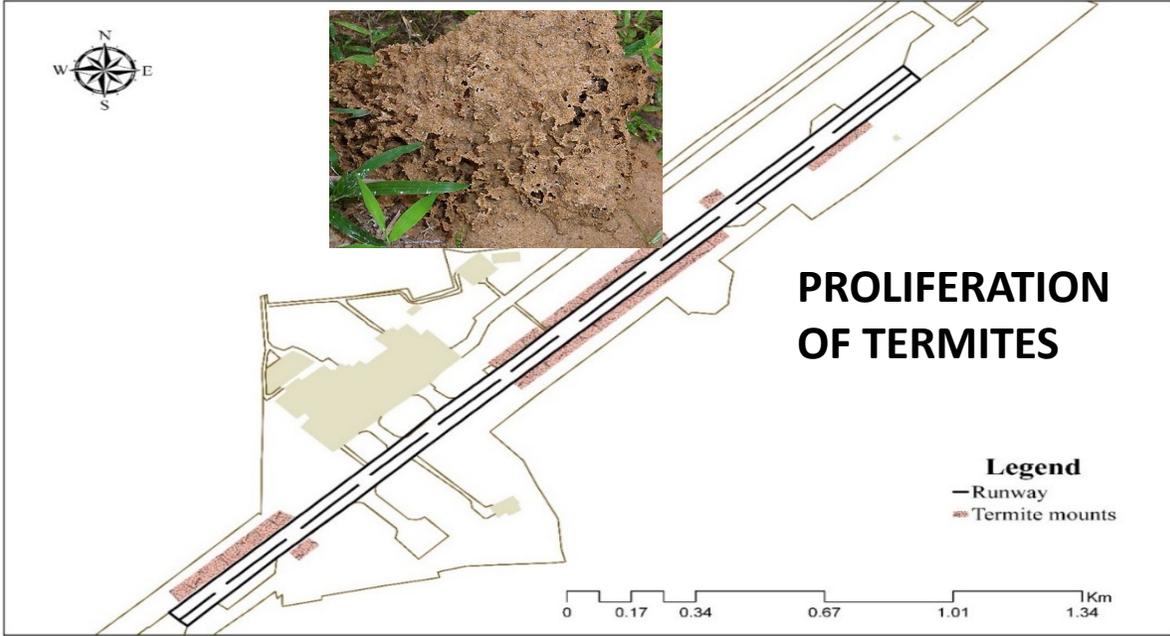
Bird movements across runway
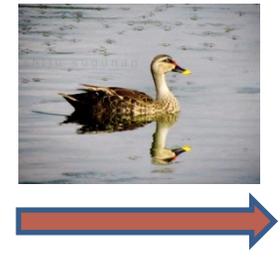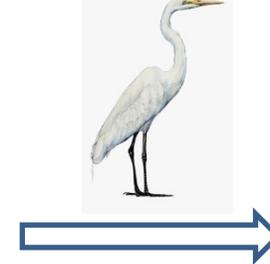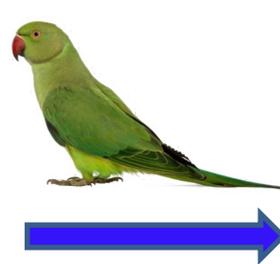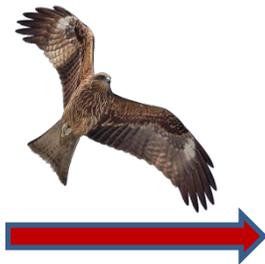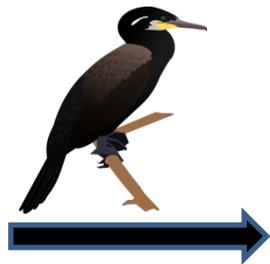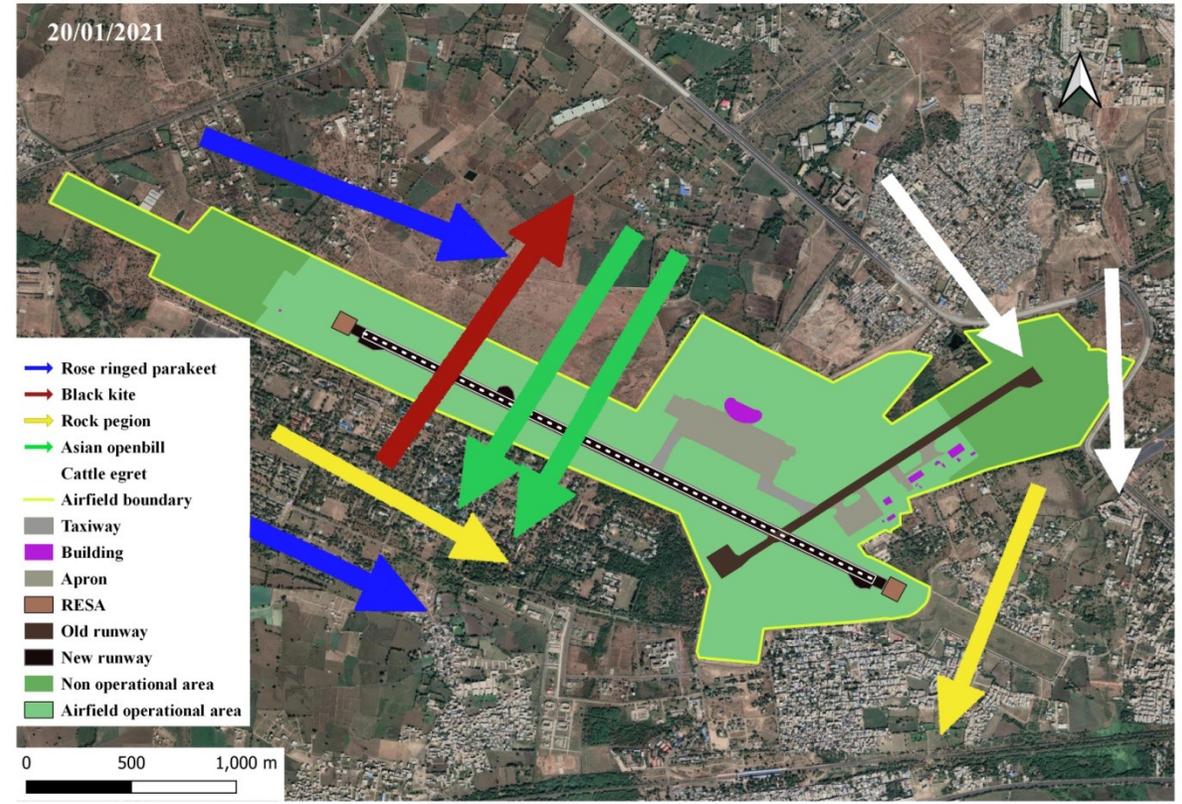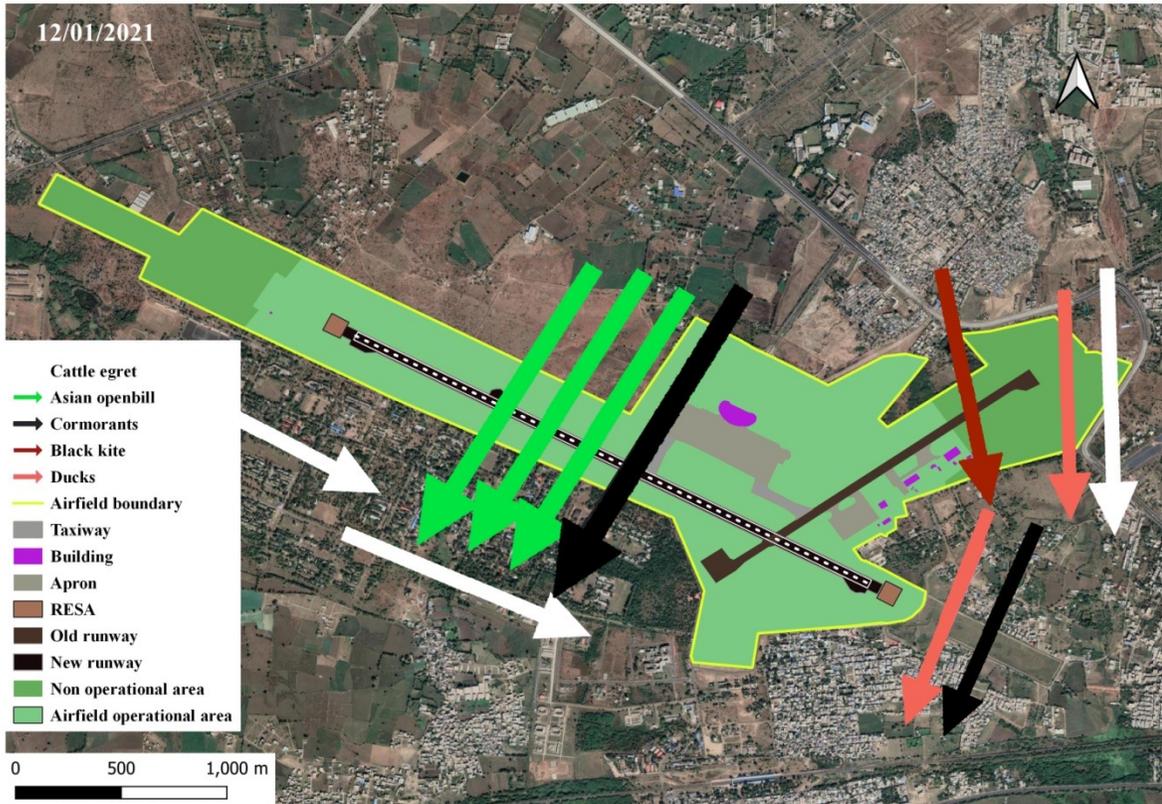
SACON's Approach to the problem

Multi Dimensional Approach

Ecological approach
Ecology and behaviour of the target species.
Understanding the movement pattern of target species

Urbanisation approach
Influence of urbanisation
Waste management
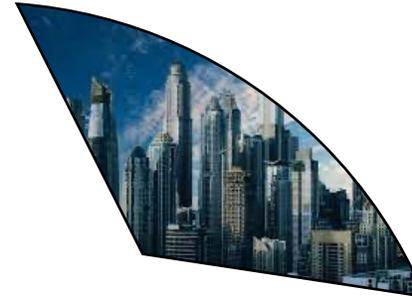
Habitat level approach
Resource availability for target species in the given habitat
Grass cutting before flowering season

Socio-cultural approach
Influence of socio cultural practices and economic activities in and around the airport.
Cultural background of bird feeding

Landscape level approach
Understanding the influence of larger landscape on the species distribution
Locating major feeding and roosting locations

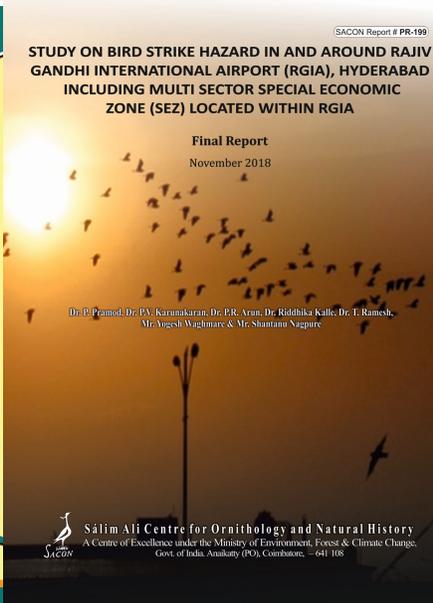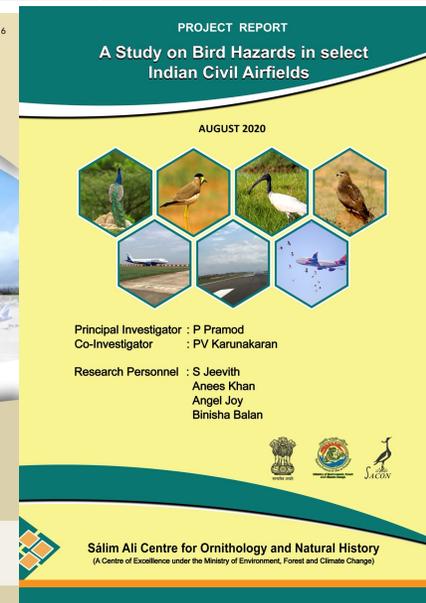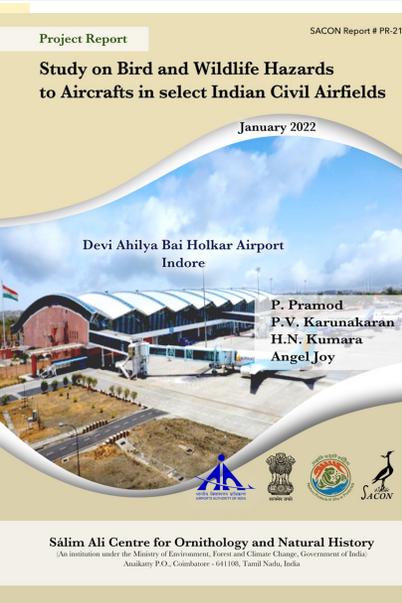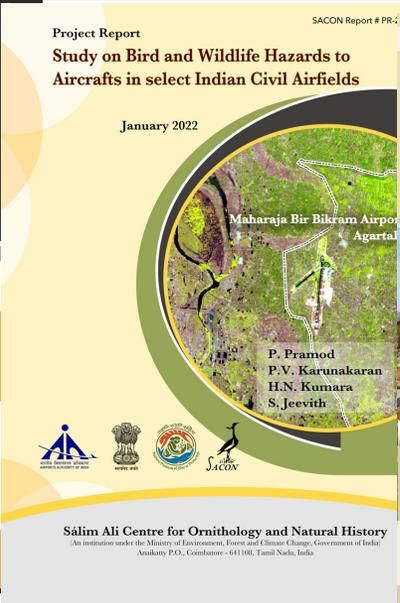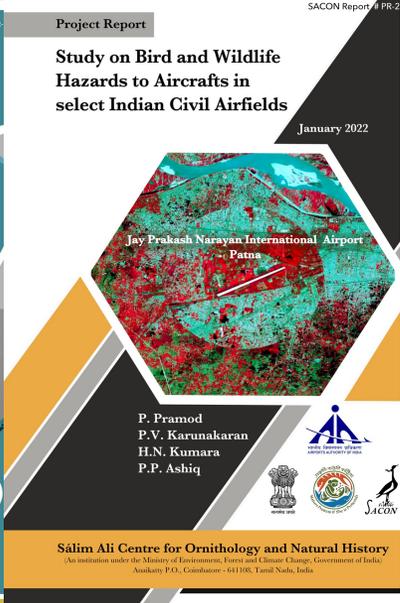| Project Activities	Output	Addl. services
Detailed study for one year	Interim report after 6 months Detailed report after 1 year with observational data and location specific recommendations	Training of BHCT staff for bird identification Sensitization meetings and workshops with AAI officials
Monitoring of implementation of recommendation and response of the birds.	Periodical (3/6 months) reports to APDs and AAI HQ the status of implementation with proofs.	Real time support for identification of birds after incidences & advices for mitigation.
Customized Training programme for BHCT staff and Aviation officials	**Indian Air Force** : One week customized programme - Basic & Advanced **Civil aviation** : One week programme and Online training cousse (proposed)	Training of field staff such as bird chasers during the project period.

Project Report
Study on Bird and Wildlife Hazards to Aircrafts in select Indian Civil Airfields
January 2022
Raja Bhoj International Airport Bhopal
P. Pramod
P.V. Karunakaran
H.N. Kumara
P.N. Anoop Raj
Sálim Ali Centre for Ornithology and Natural History

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January 2022
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P. Pramod
P.V. Karunakaran
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P.P. Ashiq
Sálim Ali Centre for Ornithology and Natural History

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Devi Ahilya Bai Holkar Airport Indore
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Angel Joy
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PROJECT REPORT
A Study on Bird Hazards in select Indian Civil Airfields
AUGUST 2020
Principal Investigator : P Pramod
Co-Investigator : PV Karunakaran
Research Personnel : S Jeevith
Anees Khan
Angel Joy
Binisha Balan
Sálim Ali Centre for Ornithology and Natural History

STUDY ON BIRD STRIKE HAZARD IN AND AROUND RAJIV GANDHI INTERNATIONAL AIRPORT (RGIA), HYDERABAD INCLUDING MULTI SECTOR SPECIAL ECONOMIC ZONE (SEZ) LOCATED WITHIN RGIA
Final Report
November 2018
Sálim Ali Centre for Ornithology and Natural History

SOLUTIONS ... !!! ???

1. Implement basic best practice strategies strictly.

2. Identify the location specific issues and address it effectively.

3. Develop a system in place to record systematic data on the Bird hits with more scientific details for the adaptive modification of strategies in future.

4. Ecological history of the location, imprinted memory of the birds, and sporadic weather events etc., can create unexpected bird congregations and associated problems. So, evidence based real-time management is more crucial for mitigating the Bird Hazard problem in future.

THANK YOU