

The background of the slide is a light gray gradient, decorated with numerous realistic water droplets of various sizes. Some droplets are at the top, some at the bottom, and some on the sides, creating a fresh and natural aesthetic.

# **COLLISION COURSE: WILDLIFE THREATS TO NEPAL'S AIR SAFETY AND THE SEARCH FOR SOLUTIONS**

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@WORSHIPNATURE

# NEPAL'S DIVERSITY AT A GLANCE

MAMMALS 220 SPECIES

BIRDS 900 SPECIES

REPTILES 153 SPECIES

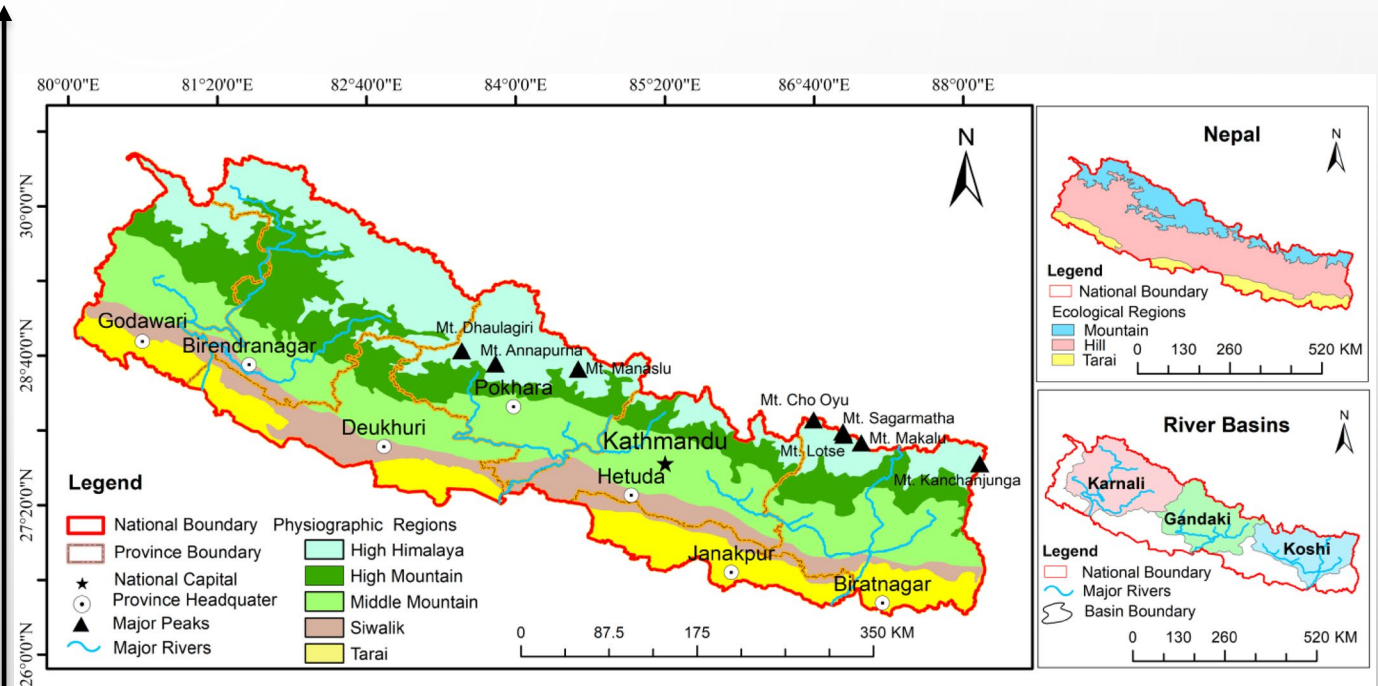
AMPHIBIANS 49 SPECIES

FISHES 230 SPECIES

INSECTS 12000+



# NEPAL'S BIODIVERSITY EXPLAINED



# BIOGEOGRAPHIC REGIONS OF THE WORLD



NEPAL'S POSITION SHOWN IN  
THE WORLD MAP WITH  
MAJOR BIOGEOGRAPHIC  
REGIONS

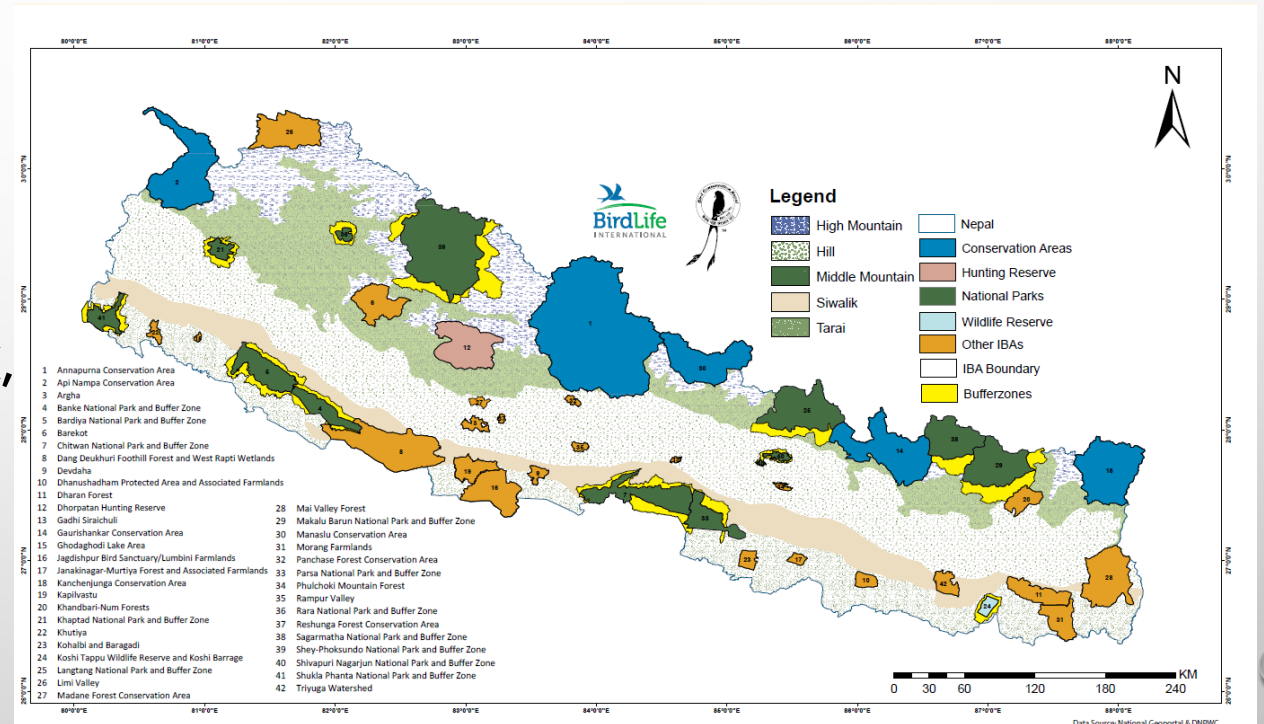


# BIODIVERSITY HOTSPOTS OF NEPAL

- NEPAL HAS 20 PROTECTED AREAS COVERING MORE THAN 23% OF COUNTRY'S LAND  
10 FCAS, 42 IBAS, 10 RAMSAR SITES, TWO CRITICAL RAPTOR MIGRATION SITES

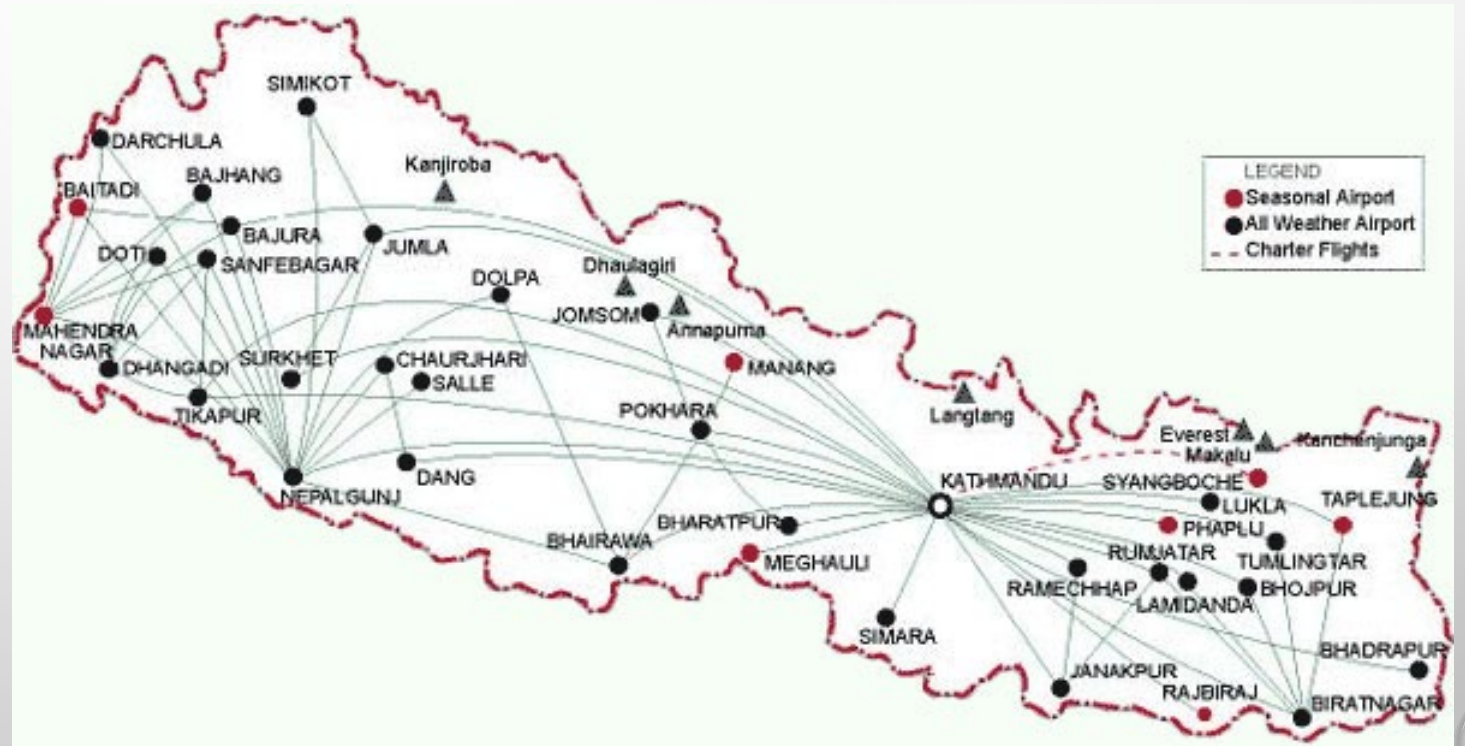
54% OF IBAS ARE OUTSIDE THE PA NETWORK,  
3 RAMSAR SITES NEAR SETTLEMENTS

35 FOREST TYPES, 75 VEGETATION UNITS, 2  
WETLAND TYPES, 118 ECOSYSTEMS  
5 PHYSIOGRAPHIC ZONES



# SPATIAL DISTRIBUTION OF AIRFIELDS IN NEPAL

- NEPAL HAS 52 AIRPORTS IN OPERATION WITH ALTITUDINAL VARIATION OF 233 TO 12,348FT
- THREE ARE INTERNATIONAL (TIA, GBIA AND PIA)
- 30 INTERNATIONAL AIRLINERS FLY MAINLY FROM/TO TIA
- 9 DOMESTIC AIRLINES WITH FIXED WING FLY TO—MAINLY THE MOST BUSY DOMESTIC AIRPORTS
- 12 DOMESTIC AIRLINES WITH ROTARY WING PROVIDE SERVICES—PRIMARILY THE MOUNTAIN REGION



SOURCE: CIVIL AVIAN AUTHORITY NEPAL

# WILDLIFE AT AIRPORTS

30 SPECIES OF MAMMALS -15 TO 20% OF NEPAL

MAMMALS 220 SPECIES

350 SPECIES OF BIRDS ->1/3<sup>RD</sup> OF ALL NEPAL BIRDS

900 SPECIES

15 SPECIES OF REPTILES – 10% OF REPTILES 153

SPECIES

15 SPECIES OF AMPHIBIANS -<1/3<sup>RD</sup> OF ALL NEPAL

AMPHIBIANS 49 SPECIES

??? FISHES 230 SPECIES

AT LEAST 1000S ---INSECTS 12000+





# POKHARA

WORLD'S BEST PLACE TO OBSERVE OLD  
WORLD VULTURES, THEIR DIVERSITY AND  
NUMBERS

ONE OF THE BEST PLACES IN THE WORLD FOR  
RAPTOR WATCHING---TWO OF THE WORLD'S  
RENOWNED RAPTOR WATCH SITES ARE CLOSE  
TO POKHARA---KANDE/THOOLAKHARKA AND  
KALI GANDAKI VALLEY

RAPTOR COUNTS CARRIED OUT IN  
THOOLAKHARKA---1000S OF STEPPE EAGLES  
PASS THROUGH HERE EVERY AUTUMN/WINTER

LAKE DISTRICTS---WATERFOWLS IN GOOD  
NUMBERS IN THE LAKES

AND AIRPORTS





# NEPAL DATA IN A GLANCE

BIRD HITS DOMINATE

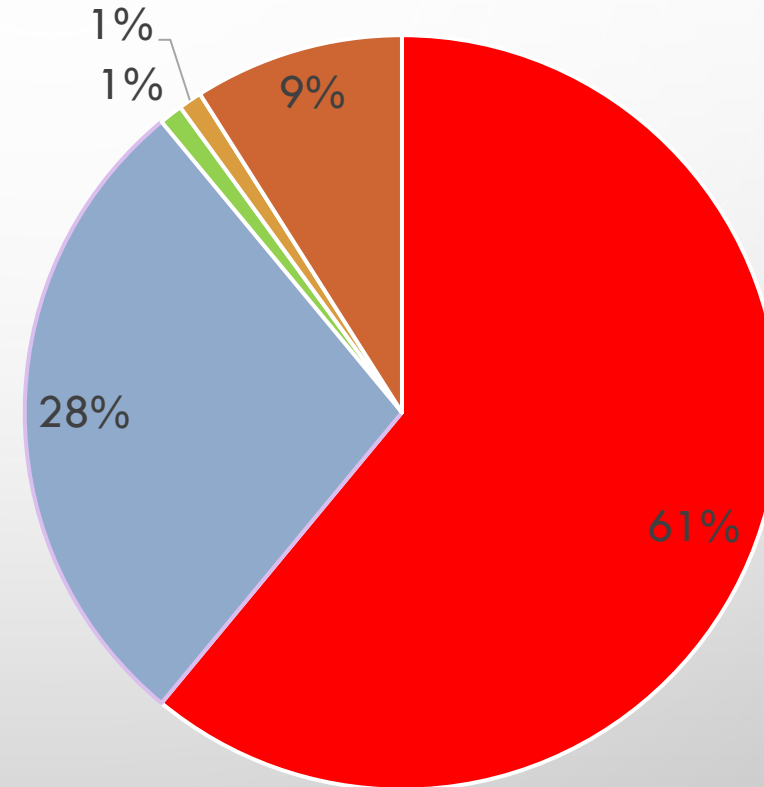
OTHER ANIMALS LESS

MOST PRONE AIRPORTS—BUSY  
AIRPORTS

FIXED WING/ROTAR AND JET  
ENGINES—THE FORMER

HUMAN FATALITY

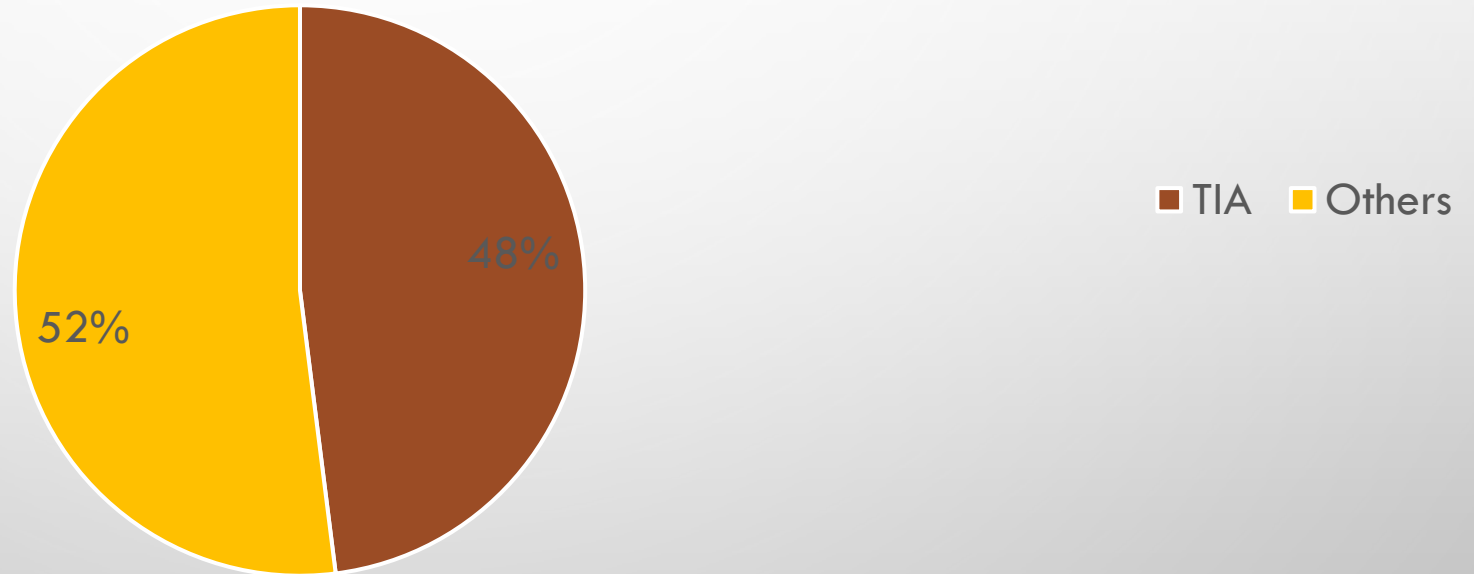
INJURIES



SOURCE: CAAN, DCL  
KARNA 2017 PPT

■ Landing ■ Taking off ■ Climb ■ Approach ■ Enroute

# TIA VS OTHERS



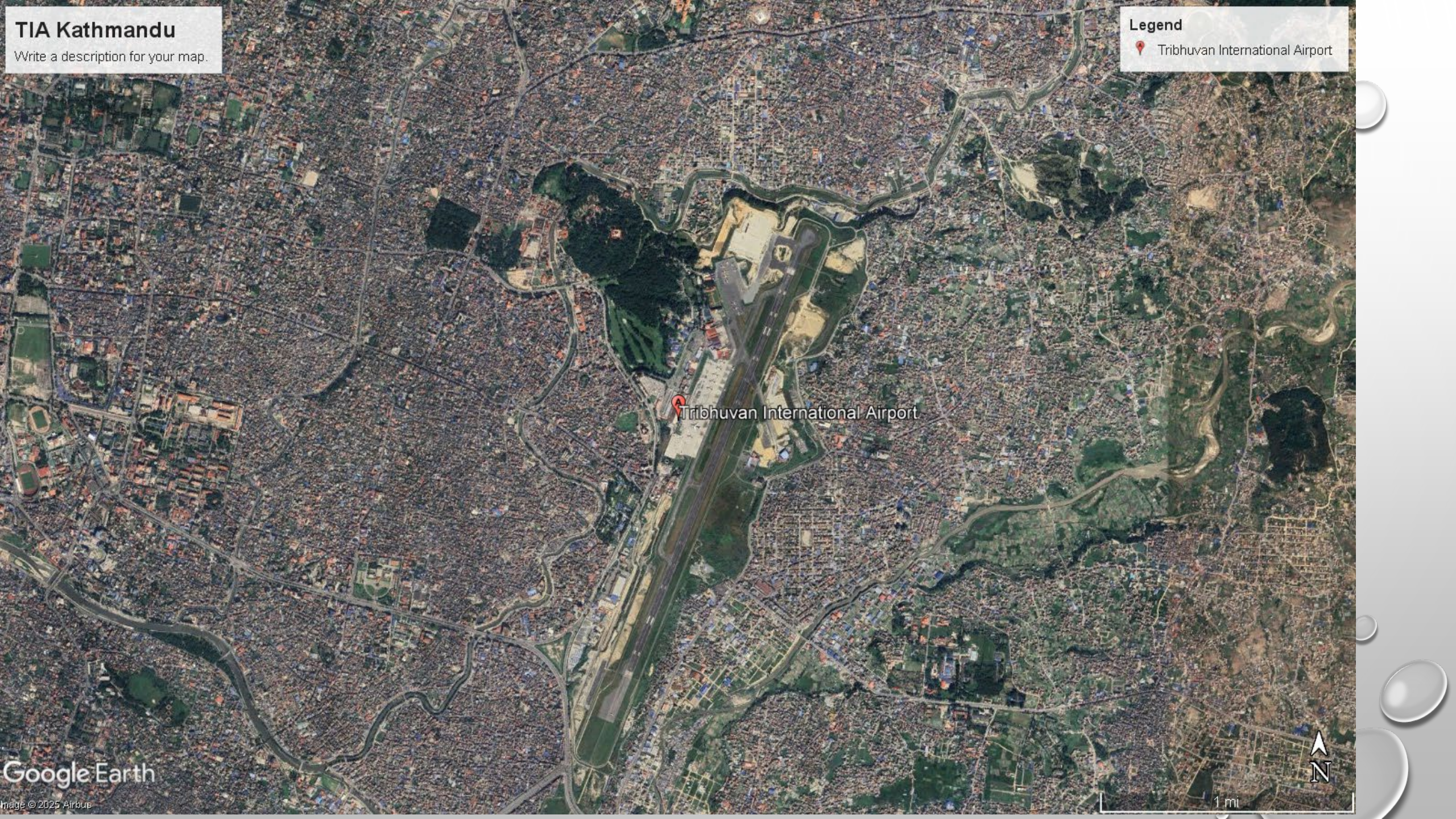
SOURCE: CAAN, DCL  
KARNA 2017 PPT

# WILDLIFE HAZARD MANAGEMENT

- REDUCING WILDLIFE HAZARDS AT AIRPORTS IS CRITICAL FOR AVIATION SAFETY, ESPECIALLY TO PREVENT BIRD STRIKES AND OTHER WILDLIFE COLLISIONS. THE MOST EFFECTIVE STRATEGIES COMBINE **HABITAT MANAGEMENT**, **MONITORING** AND **ACTIVE DETERRENCE**.
- WILDLIFE FAVOUR AIRPORTS BECAUSE MOST OTHER AREAS ARE DEVELOPED AND MADE UNSUITABLE FOR WILDLIFE. ALTHOUGH MODIFIED, THE AIRFIELDS CONTINUE TO ATTRACT ANIMALS THAT CAN THRIVE WELL IN THE OPEN, FRAGMENTED AND REMNANT HABITATS. HABITAT MANAGEMENT IS THE KEY TO REDUCING HAZARDS, ALTHOUGH A NUMBER OF OTHER ACTIVITIES ARE ALSO IMPORTANT THAT NEED TO BE DONE IN PARALLEL.







**TIA Kathmandu**  
Write a description for your map.

**Legend**  
Tribhuvan International Airport

Tribhuvan International Airport



# WILDLIFE HAZARD MANAGEMENT

- EACH AIRPORT IS IN A UNIQUE SETTING. TWO AIRPORTS CAN BE COMPARED FOR MANY ASPECTS BUT WILDLIFE WILL VARY DEPENDING ON LOCATIONS. SO TAILORMADE TACTICS ARE NEEDED FOR EACH AIRPORT.
- THEREFORE, DATA KEEPING FOR RESEARCH AND ANALYSIS IS IMPORTANT—WHAT STRIKES, WHICH TIME, WHAT HABITAT CONDITIONS, ETC ARE VITAL.
- NEED TO LEARN FROM OTHERS, BEST PRACTICE LESSONS FROM THE REGION



# ACTIVE WILDLIFE DETERRENCE

- WILDLIFE SCARING DEVICES (PYROTECHNICS/PROPANE CANNONS)—SOUND AND LIGHTS.
- FENCING (ELECTRIC, RAZORWIRE) TO KEEP OFF DEER, NILGAI, JACKAL, AND OTHERS.
- TRAINED FALCONS AND DOGS CAN HELP DETER ANIMALS.
- BIO-ACOUSTICS/—PREDATOR SOUNDS/DISTRESS CALLS USEFUL FOR SOME ANIMALS.
- OLFACTORY DETERRENCE: EG TIGER POO WILL DETER OTHER CARNIVORES/PREY ITEMS
- SCARE CROWS-MODERNIZED
- LASER LIGHTS—ESPECIALLY DURING NIGHT
- WARM LIGHTS BETTER: LESS INSECTS





# HABITAT MANAGEMENT TO DETER WILDLIFE

- AIRFIELDS ARE GRASSLANDS. MAINTAIN GRASS HEIGHT BETWEEN 15-25CM TO MAKE THE HABITAT UNATTRACTIVE TO BIRDS.
- REMOVE WOODY SPECIES, WOODLANDS OR SHRUBLANDS FROM THE RUNWAY VICINITY. THIS REDUCES PERCH, ROOST AND NEST SITES.
- ELIMINATE AREA THAT HOLD WATER/ DRAIN WETLANDS –COVER DITCHES IF THEY HOLD WATER FOR LONGER DURATION.
- MOSTLY THE INVERTEBRATES EG EARTHWORMS, SNAILS ETC CAN BE CONTROLLED BY THE USE OF NON-LETHAL CHEMICALS AND THOSE THAT DETERIORATE VERY QUICKLY/SHORT LIFE.
- DO NOT FEED ANIMALS BY EXPOSING FOOD WASTE. MANAGE TO REDUCE HABITUATING THEM FOR THEIR VISIT TO THE AIRFIELDS, STATIONS, AND IN THE VICINITY.



# WILDLIFE MONITORING FOR RISK ASSESSMENT

- REGULAR SURVEYS: MONITOR BIRD AND WILDLIFE POPULATIONS, WITH EXTRA EFFORTS DURING AUTUMN AND SPRING MIGRATION SEASONS.
- RADAR SYSTEMS: WILDLIFE RADAR CAN TRACK BIRD MOVEMENT IN REAL-TIME.
- STRIKE REPORTING AND ANALYSIS: MAINTAIN DETAILED RECORDS TO UNDERSTAND STRIKE TRENDS AND EVALUATE MANAGEMENT EFFECTIVENESS.



# PLANS/POLICY, TRAINING AND COORDINATION

- **WILDLIFE HAZARD MANAGEMENT PLANS (WHMPS):** TAILORED FOR EACH AIRPORT; MANDATED IN MANY COUNTRIES.
- **STAFF TRAINING:** EQUIP PERSONNEL WITH KNOWLEDGE AND TOOLS FOR WILDLIFE HAZARD MANAGEMENT. DATA AND KNOWLEDGE MANAGEMENT AS PART OF RESEARCH AND DEVELOPMENT.
- **COLLABORATION:** WORK WITH LOCAL WILDLIFE EXPERTS, CIVIL AVIATION AUTHORITIES, AND ENVIRONMENTAL AGENCIES. BIRD COMMITTEE AT NATIONAL AND SUBNATIONAL LEVELS REQUIRE BIRD BIOLOGISTS.
- **EDUCATION AND AWARENESS:** COMMUNITY MEMBERS/RELEVANT STAKEHOLDERS.





# THE WAY FORWARD

- WHERE AIRPORTS? SELECTION STAGE SHOULD HAVE INVOLVEMENT OF WILDLIFE BIOLOGIST. BEST TO AVOID BIODIVERSITY RICH AREAS—OR ELSE INVITES PROBLEMS!
- HABITAT MANAGEMENT IS THE KEY TO MANAGE WILDLIFE AT AIRPORTS (LANDSCAPING, BIRD FOOD INCLUDING WASTE MATERIALS, GRASS HEIGHT, ETC).
- EACH AIRFIELD IS UNIQUE SO NEEDS TO HAVE A TAILORMADE PLAN—LIVE AND FUNCTIONING.
- MANAGEMENT THAT AIMS KILLING IS NOT ETHICAL AND IS NOT A SOLUTION





*© Sandesh Photography*

THANK YOU AND  
SPECIALLY:

CIVIL AVIATION  
AUTHORITY OF NEPAL, ALL  
STAFF &  
DCL KARNAJI