Citizen Science Initiatives in India: An Evaluative Study

Anup Kumar Das
Centre for Studies in Science Policy,
Jawaharlal Nehru University, India
W: http://anupkumardas.blogspot.com

SCIENCE NEWS

Citizen science projects take flight

India's birds and mammals are getting help from research involving everyday people.

Richa Malhotra

doi:10.1038/nindia.2018.142 Published online 15 November 2018

Early results of citizen science projects in India, fed by thousands of people reporting wildlife sightings, are benefitting some vulnerable and ecologically important species.

Citizen science, which has gained currency across the world, allows professional and amateur scientists to collaborate on research that needs large-scale observational data.

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in *Genetics*

Groundwater depletion could affect winter harvests
in *Earth & environment*

New magnetic materials for data storage and memory devices
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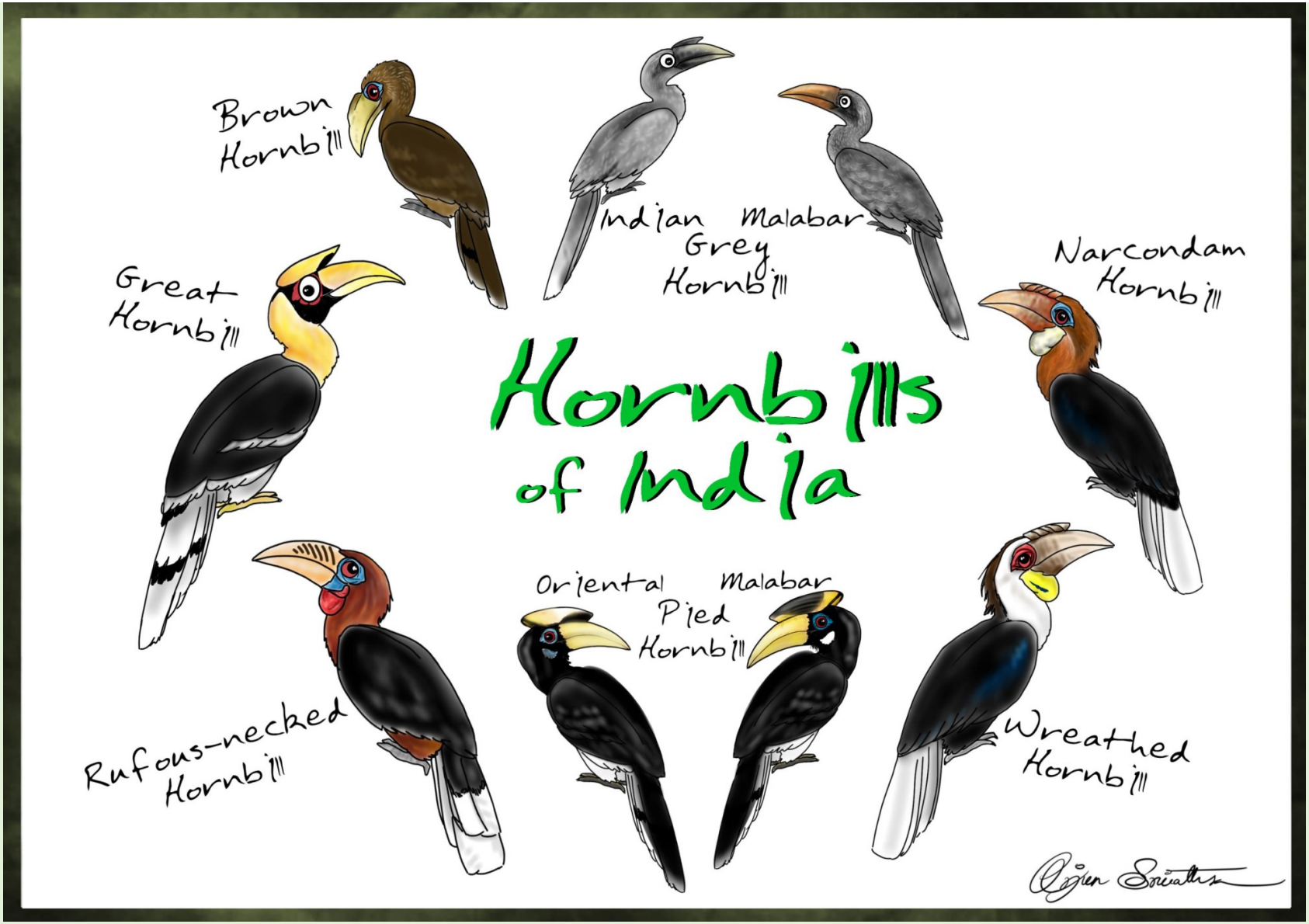


The nine hornbill species found in India. Source: www.natureasia.com/en/nindia/article/10.1038/nindia.2018.142

Goverment Of India

INDIA PAVILLION

DAY 02 I 18th FEB 2020

The 'State of India's Birds' report is the first example in India of a citizen science initiative doing wonders for science, conservation and policy. Time scale data on trends of bird population and distribution based on citizen science will help making timely decision for conservation and evaluation of conservation efforts.

DR. DHANANJAI MOHAN

Director, Wildlife Institute of India

CMS

COP 13

CONFERENCE OF THE PARTIES TO THE CONVENTION ON MIGRATORY SPECIES

17th - 22nd February, 2020

Mahatma Mandir Convention Centre, Gandhinagar, Gujarat

moefcc moefccgol moefcc moef.gov.in

Website: https://www.stateofindiasbirds.in

The State of India's Birds report is the first comprehensive assessment of the distribution range, trends in abundance, and conservation status for most of the bird species that regularly occur in India. With their ubiquity and ecological importance, birds are excellent indicators of the state of our natural world and are potent cultural symbols of nature. This national-level assessment of birds is a significant step forward in the monitoring and conservation of India's rich and varied biodiversity.

Home All Species Search for species...

Highlights

867

species of Indian birds assessed in this report

10,000,000

observations by birdwatchers form the basis of the analyses

100%

increase in the abundance of peafowl across the country over the past decades

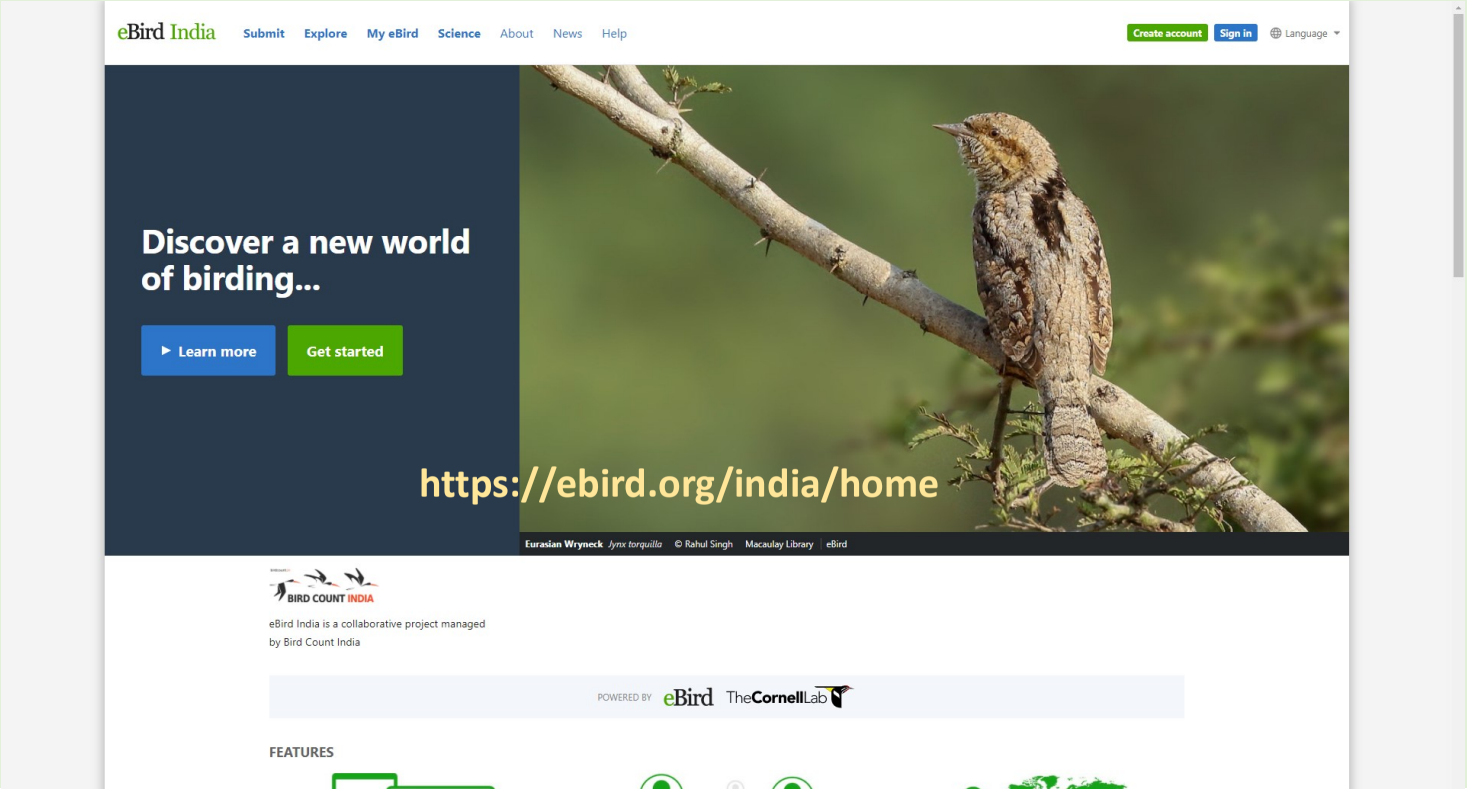
52%

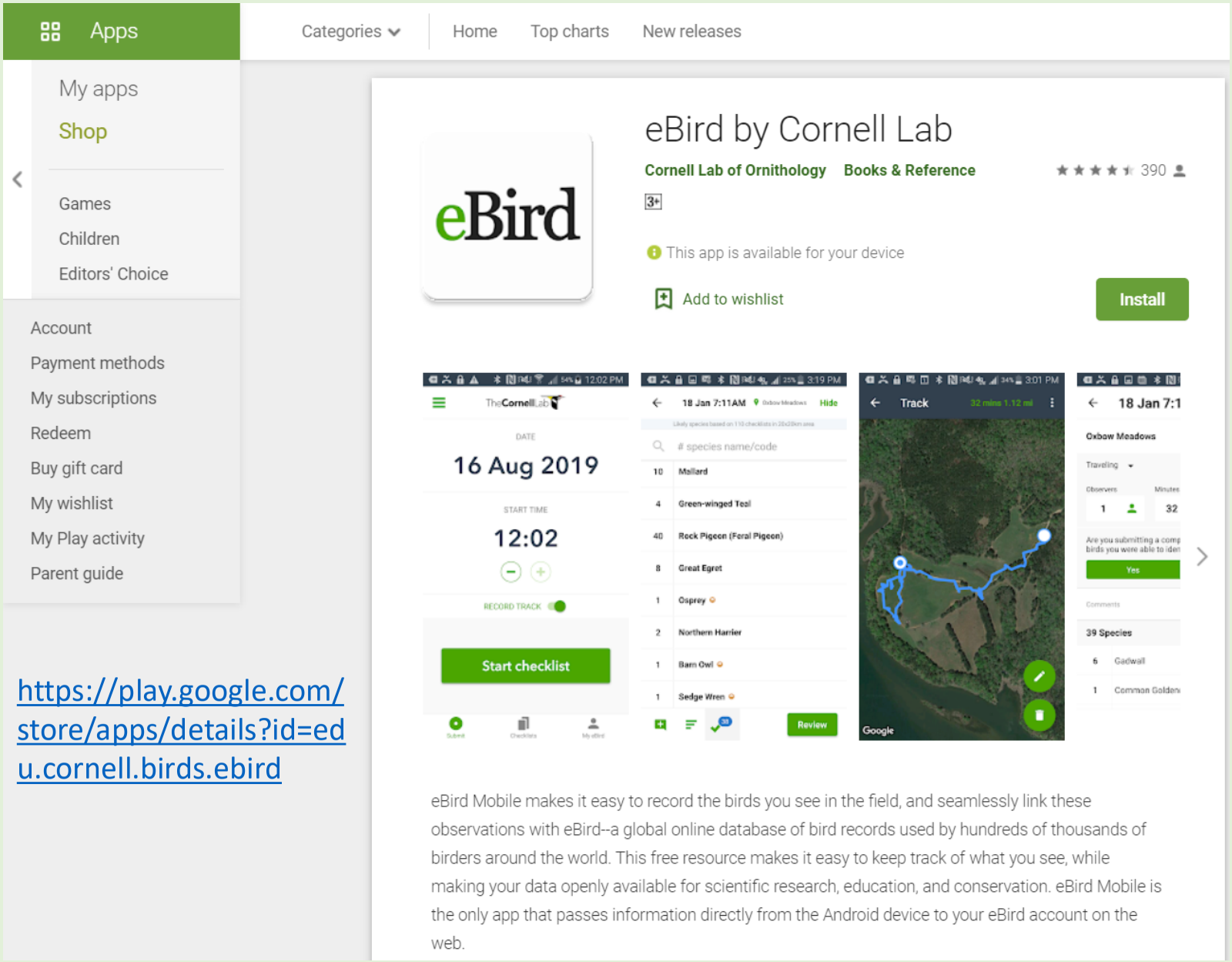
of species show clear declines over the past decades

101

species classified as of High Conservation Concern, and require immediate attention

eBird: CS-based Observational Data

- The primary data used in the report is the 10+ million observations uploaded by Indian birdwatchers to **eBird**, an online birding notebook. Data on eBird are freely available for research, education and conservation.
- The data from birdwatchers observations was combined with supporting information for each species — including their taxonomic grouping, their habitat, endemicity and diet — to create the summaries in the report.
- 



https://play.google.com/store/apps/details?id=edu.cornell.birds.ebird

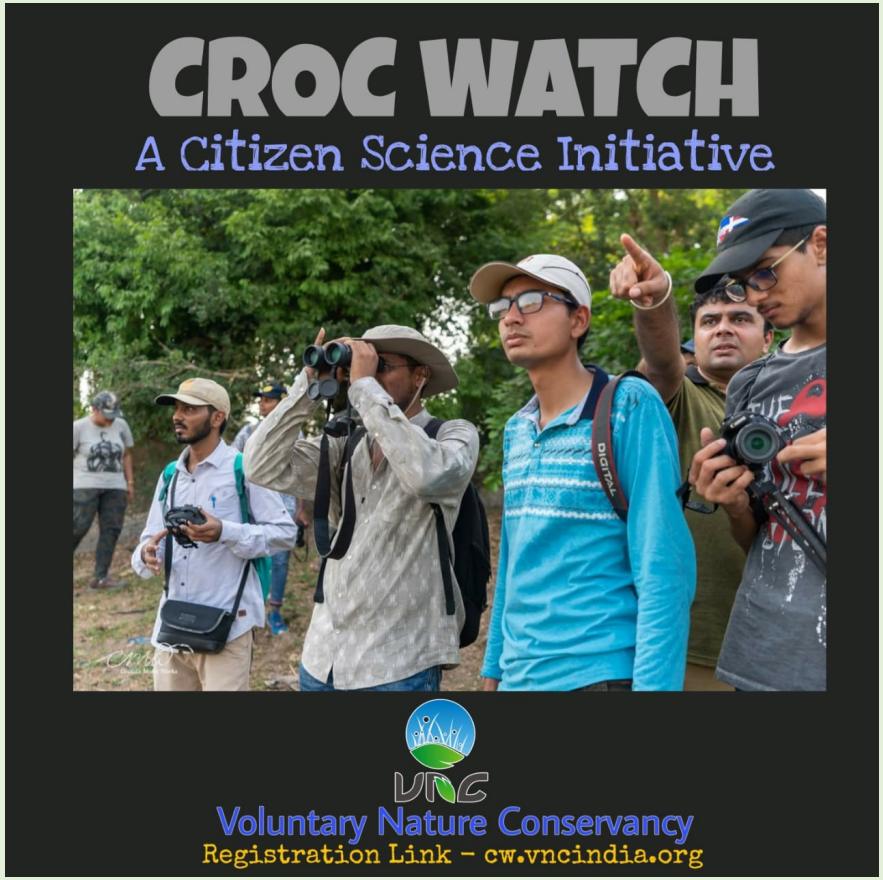
eBird Mobile

"eBird Mobile makes it easy to record the birds you see in the field, and seamlessly link these observations with eBird--a global online database of bird records used by hundreds of thousands of birders around the world. This free resource makes it easy to keep track of what you see, while making your data openly available for scientific research, education, and conservation. eBird Mobile is the only app that passes information directly from the Android device to your eBird account on the web."

Installs: 100,000+

Offered By: Cornell Lab of Ornithology
Available in 27 languages on iOS and Android, all for free.
"Easy data entry from the field, even when offline. All your lists and stats in your pocket. Wherever you go, eBird is there."

Other Citizen Science Projects

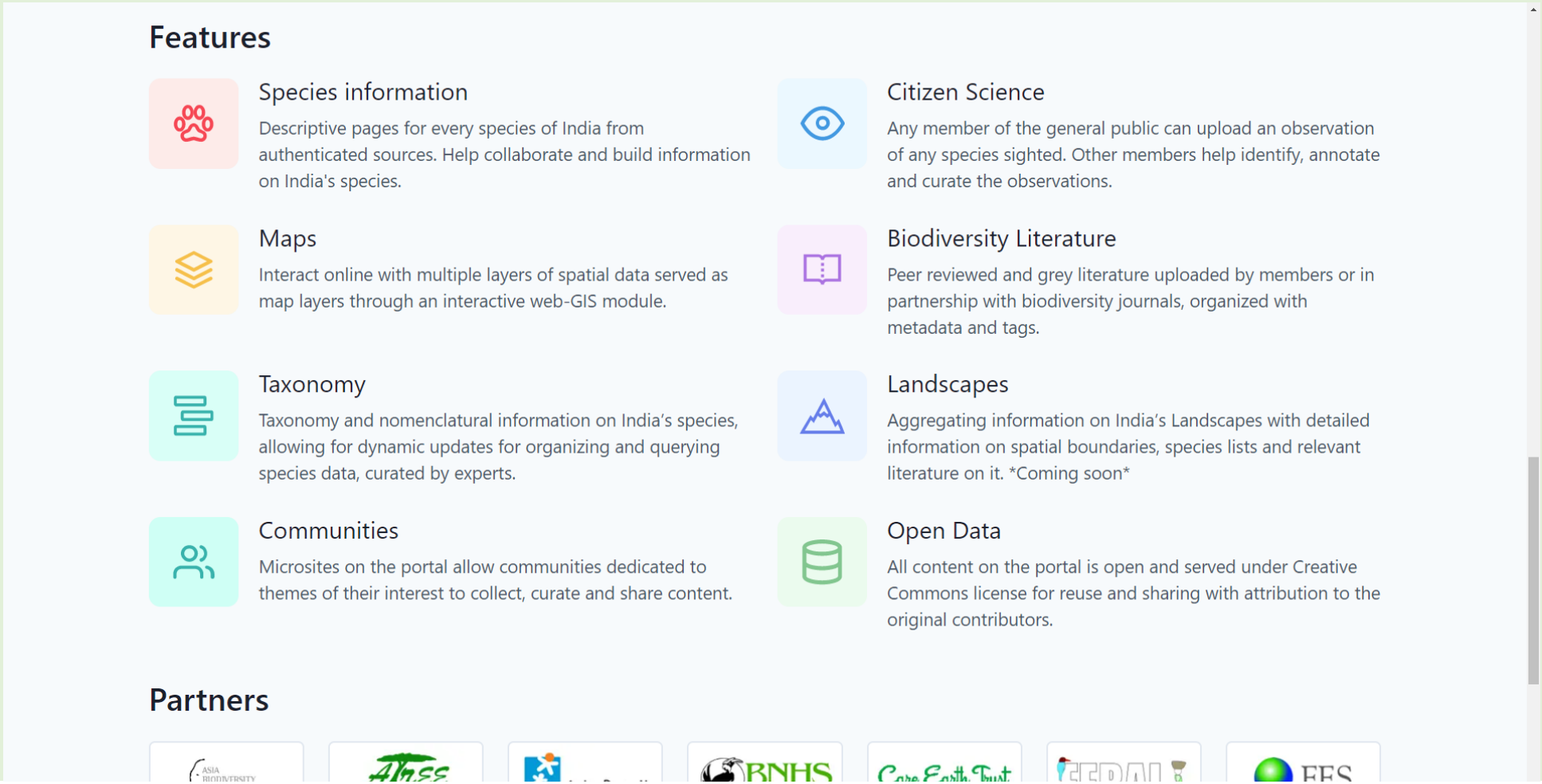


"**Croc Watch** is a citizen science initiative by *Voluntary Nature Conservancy (VNC)* to collect information on the three crocodilian species found in India and to create a database that can aid in the research and conservation of these species. The project relies on participation of individuals to contribute to sightings and other information. We are looking for records and/or images of the three species of crocodilians found in India". https://cw.vncindia.org

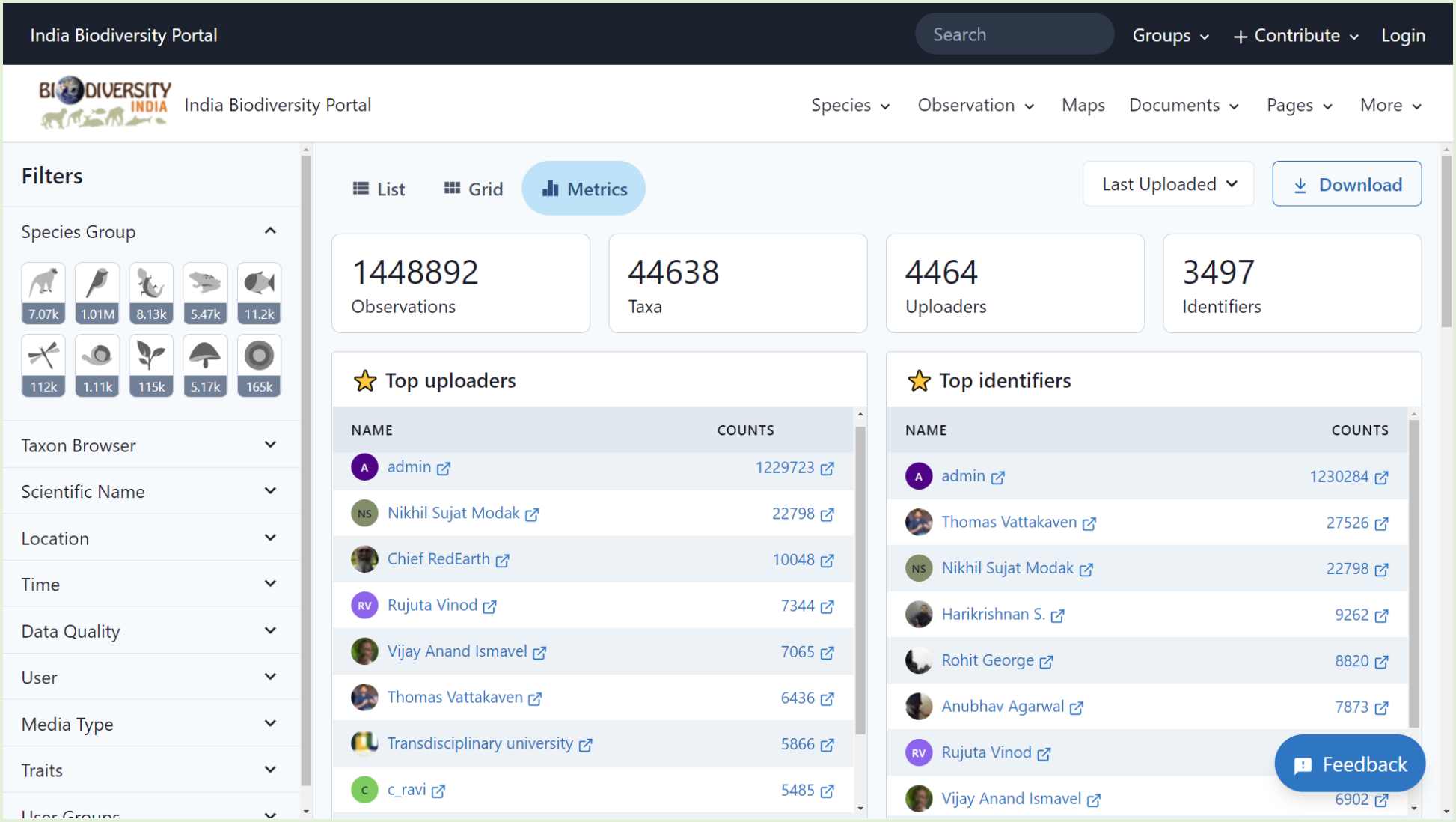
India Biodiversity Portal Indiabiodiversity.org

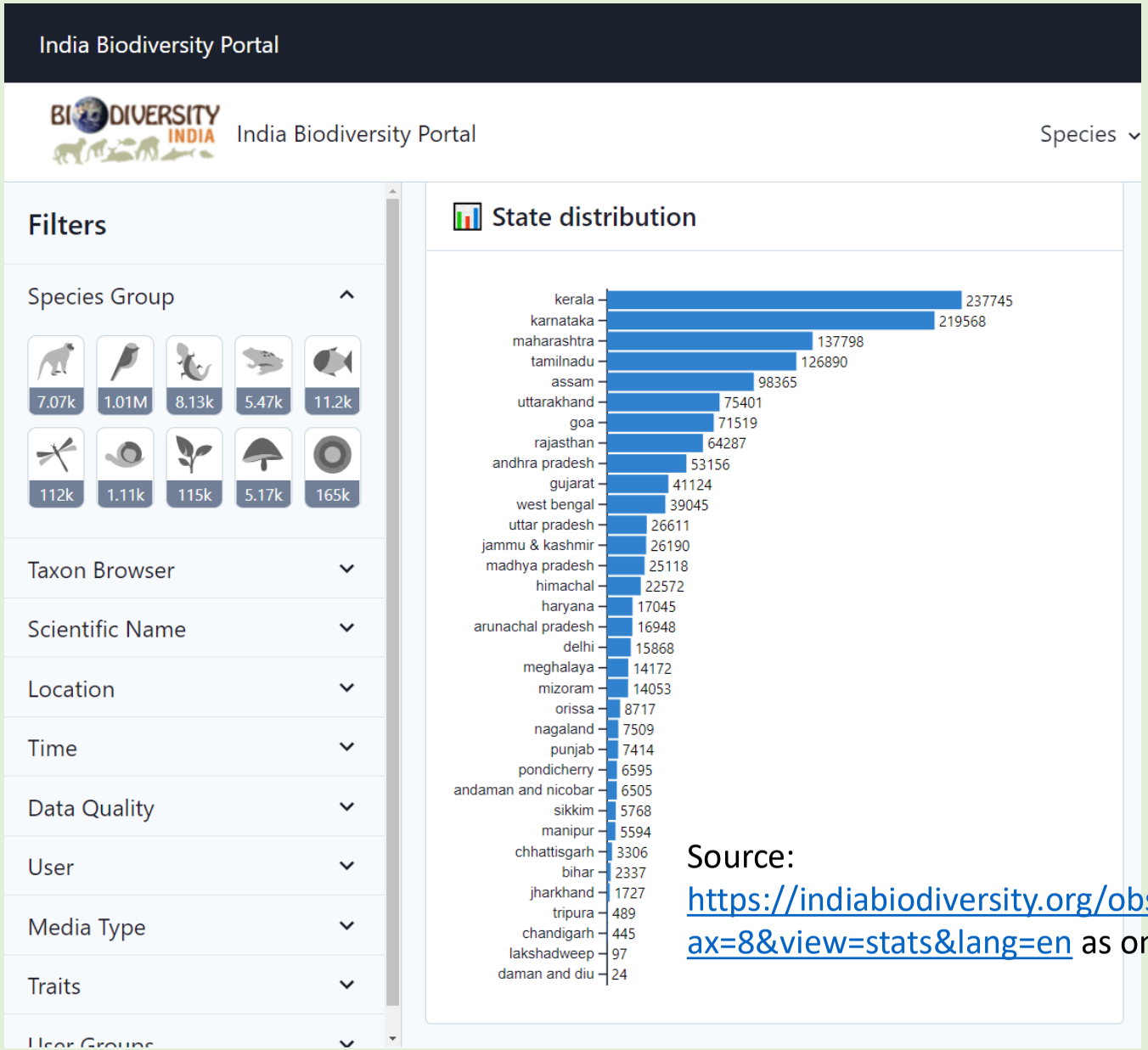
Free and open access to India's biodiversity information.

A unique repository of information on India's biodiversity. The Portal aims to aggregate data through public participation and provide open and free access to biodiversity information.



India Biodiversity Portal: Statistics





Distribution of Observations by Species Group

Birds	1.01M
Plants	115k
Arthropods	112k
Fish	11.2k
Reptiles	8.13k
Mammals	7.07k
Amphibians	5.47k
Fungi	5.17k
Mollusca	1.11k
Others	165k

Source: https://indiabiodiversity.org/observation/list?sort=created_on&offset=0&max=8&view=stats&lang=en as on 18-03-2021

India Biodiversity Portal: Android Apps

India Biodiversity Portal

India Biodiversity Portal Education ★★★★☆ 119

3+

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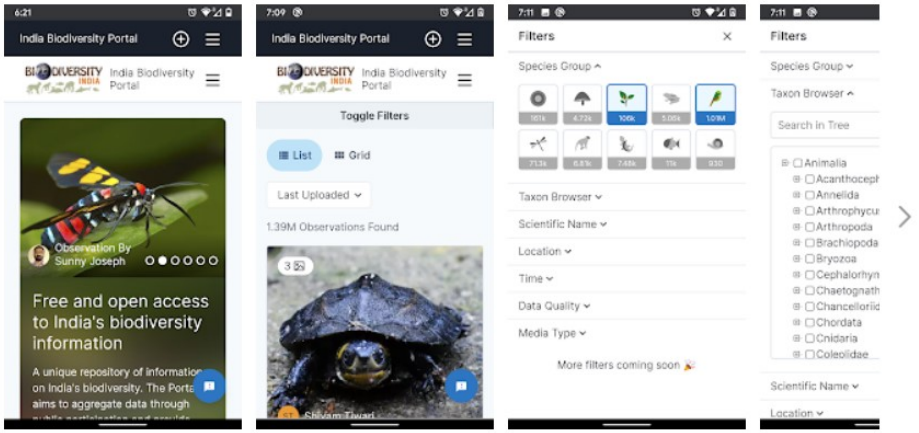

Curious about all the different species present near you? See a plant or an animal species you want to know about, document and share?

The India Biodiversity Portal (IBP) Android app now allows you to map the Indian sub-continent's precious biodiversity through citizen science. Access to the app is via a simple registration and login process.

Included in the app are the

Installs: 5,000+

Kerala Bioblitz

India Biodiversity Portal Education

3+

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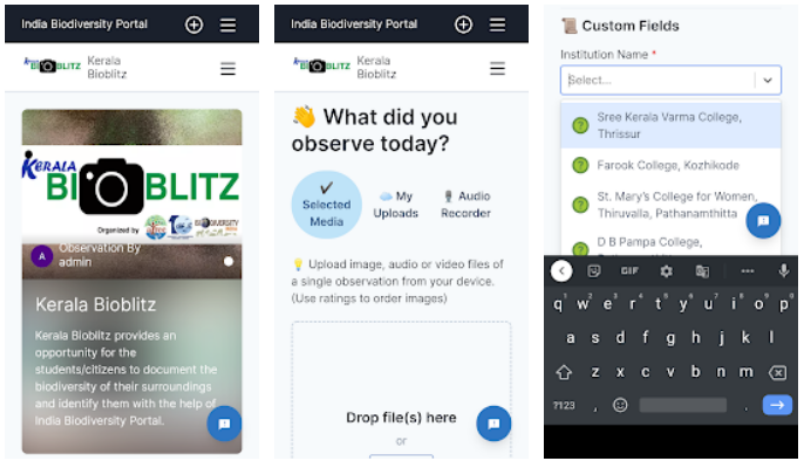

Documentation of Biodiversity is the foundation of any conservation action as many species of flora and fauna disappear from Earth each day forever. Here, Kerala Bioblitz provides an opportunity for the students/citizens to document the biodiversity of their surroundings and identify them with the help of India Biodiversity Portal. Documentation methods include photography, videography, and sound recording.

Installs: 100+

India Biodiversity Portal: Android Apps

Frog Watch

India Biodiversity Portal Education

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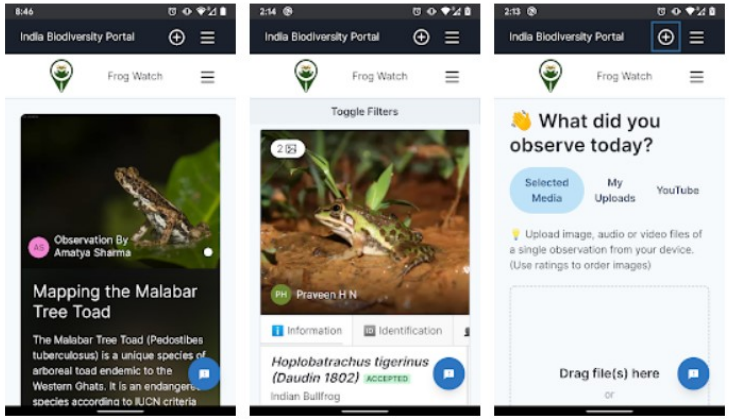

Frog Watch aims at mapping amphibians (frogs and toads, caecilians and salamanders) based on data that include observations, photographs, call records, identifications, locations, behaviours and so on collected by citizens and citizen science programmes in India.

WHAT'S NEW

Initial launch of Frog Watch

Installs: 100+

Freshwater Turtles and Tortoises of India (FTTI)

India Biodiversity Portal Education

3+

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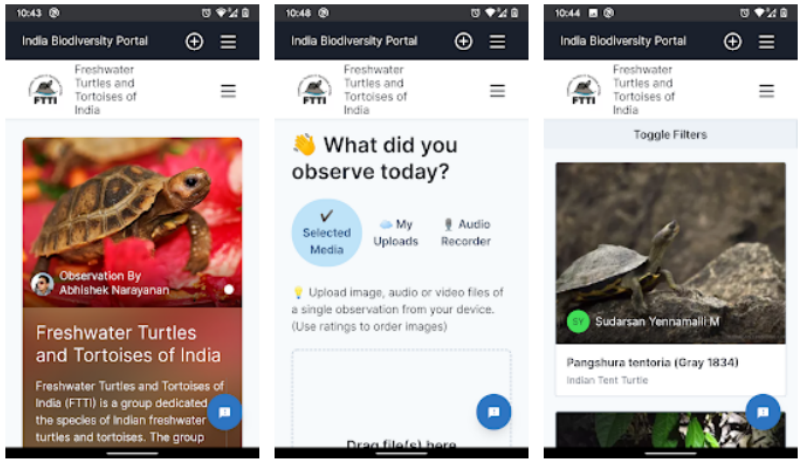

Installs: 50+

This app includes information on the freshwater turtles and tortoise species of India with species-page information on their identification features, habitats, geographical distribution, and basic ecology. It also includes a citizen science observations component for participants to upload sightings of turtles and tortoises from across the country and identify them. FTTI provides a platform for students, researchers and biodiversity enthusiasts (especially herpers!) in documenting much

India Biodiversity Portal: Android Apps

Bhutan Biodiversity Portal

India Biodiversity Portal Education

3+

This app is available for your device

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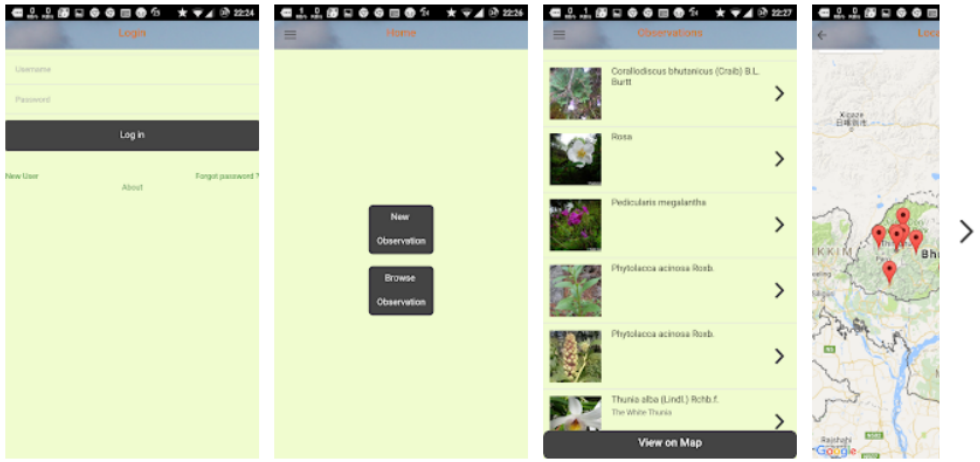


*** Facebook and Google login is temporarily disabled. You can associate a password with the email used in facebook, by clicking the Forgot Password link, and use that to login. Please bear with us until we enable login through Gmail and Facebook.***

Curious about all the different species present near you? See a plant or an animal species you want to know about, document and share?

Installs: 500+

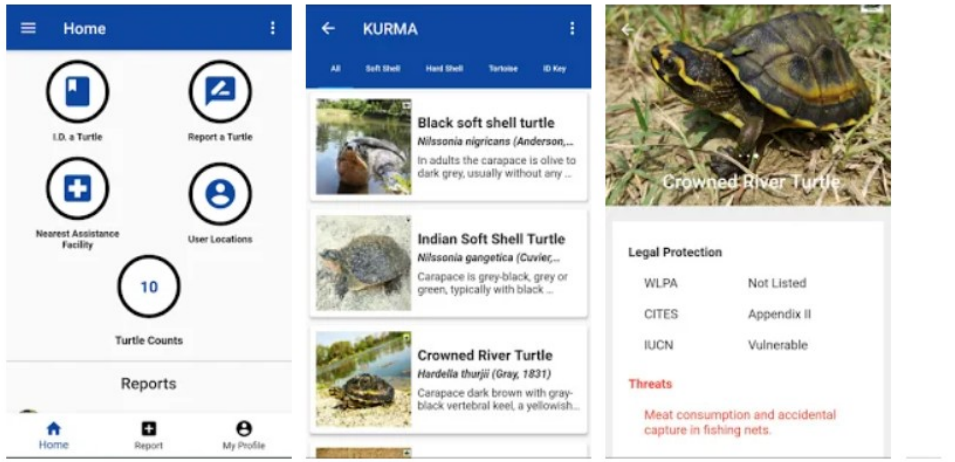
KURMA: Tracking Indian Turtles

Turtle Survival Alliance India Education 50

3+

This app is available for your device

Add to wishlist Install



This has been done as part of the nation-wide citizen science initiative-- Indian Turtle Conservation Action Network.

Built in digital field guide.

Covers 29 species of freshwater turtles and tortoises found in India.

Installs: 1,000+

Offered By: Turtle Survival Alliance India

This has been done as part of the nation-wide citizen science initiative of TSAI

Citizen Science in Monitoring AQI

Pak works with India to get air quality monitors

Badri Chatterjee
badri.chatterjee@hindustantimes.com

KATHMANDU/MUMBAI: In one of the first attempts at transboundary collaborations to tackle air pollution, India has begun working with Pakistan to set up real-time air quality monitors.

A citizen science collaboration by air pollution researchers from UrbanSciences in Mumbai and Pakistan Air Quality (PakAirQuality) Initiative in Islamabad is providing open data in Pakistan for citizens to get timely updates on air pollution across several major cities.

The decision was taken during an air pollution conference organised by the US state department 'Clean Air for South Asia' TechCamp in Kathmandu, Nepal last week. The first monitor went online in Karachi on Friday, reporting particulate matter (PM2.5 and PM10) data. A team in Pakistan is in the process of raising funds for additional air quality monitors to be installed in Karachi, Lahore, Islamabad and a few other cities.

Pakistani government officials, at the sidelines of the conference, told HT that air quality data was insufficient in Pakistan, as the government was not dispensing necessary funds. In Pakistan, different provinces are responsible for recording and maintaining air quality information, while the central government does not get involved directly, the official added.

"We are currently using outdated air quality equipment for major cities obtained under a Japan International Cooperation Agency (JICA) from as early as 2007. While the project ended in 2012, the air quality monitors are still being used. Considering the stringency of international parameters (safe limits), we are not sure how effective the data is in 2019," said Zaigam Abbas Baloch, deputy director of the Pak Environment Protection Agency, Ministry of Climate Change "The data is not real-time, but we are able to provide it after 24 hours. However, near real-time updates are being generated for Islamabad, which needs to be replicated across other cities."

According to Baloch, Pakistan currently has 20 manual air quality monitoring stations across cities namely Karachi, Lahore, Peshawar, Quetta, and Islamabad. Baloch said the Ministry of Climate Change had reached out to the Pakistan government for more funds, considering the urgency of addressing the health impacts of air pollution. "The project can't be named as of now, but we will enhance our monitoring situation and it will be funded by China," he said, adding, "Citizen movements (mostly sponsored by the US) are welcome, but they are not fit for monitoring air quality vis-a-vis Pakistan's safe standards, and we do not consider this as our official data."

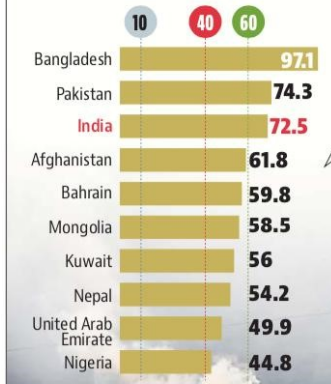
Citizen science-based air quality has the power and potential to fill the gaps in the government-based air quality monitoring, said Ronak Sutaria, founder and director, UrbanSciences. "The larger goal of this collaboration and initiative is to enable a more informed dialogue around air quality between citizens, civic officials and policy makers to better address the transboundary issue of air pollution between the two countries," he said.

The idea was first discussed during a conference in December 2018 when PakAirQuality team showed interest in India's first scientifically validated 'Atmos - Realtime Air Quality' monitors by UrbanSciences. In the recently concluded TechCamp, the first monitor was handed over to the PakAirQuality team. "Our aim is to promote local, national and cross-border efforts to address clean air as a global environment priority," said Jamie Findlater, senior consultant, TechCamp team under the US State department's Bureau of International Information Programs.

Abid Omar, who founded the PakAirQuality Initiative, a citizen network of 40 low-cost air quality monitors across 10 cities, said there was no official real-time monitoring.

TOP 10 MOST POLLUTED COUNTRIES IN 2018
(FOR ESTIMATED PM2.5 ANNUAL AVERAGE CONCENTRATION) – in µg/m³

WHO safe standard for PM2.5 annual average concentration | India's safe standard for PM2.5 annual average concentration | Pakistan's safe standard for PM2.5 annual average concentration



PM 2.5: The smaller kind, with a diameter not more than 2.5 micrometers. These are "fine particles" that can stay in the air for days or weeks and are small enough to invade even the narrowest of airways leading into the body. PM2.5 or lesser are the most toxic pollutant particles that are carried to lower airways of lungs and deposited in alveolar wall causing health ailments.

REAL-TIME DATA: WHY IT MATTERS
- Making air quality data accessible is an effective method to improve quality.
- Public readings generate awareness, which drives the demand for action
- Increasing the number of air quality monitoring stations accelerates access to real-time highly localised information

(Source: 2018 World Air Quality Report released in March by non-profit Greenpeace and IQ AirVisual, a software company that tracks pollution worldwide)

SITUATION IN INDIA

In India, air quality is being monitored at 779 locations covering 339 cities in 29 states and six union territories across the country, under NAMP

Further, real-time monitoring is taking place at 170 locations in 103 cities in 18 states and UTs, according to Union environment ministry. Additionally, under the

NCAP, environment ministry has released funds for installation of 65 continuous ambient air quality monitoring stations across 13 states and one UT by 2020.

CROSS-BORDER ALLIANCE

INDIA HELPING PAKISTAN TO SET UP REAL-TIME AIR QUALITY MONITORS

'The goal of this initiative is to enable a more informed dialogue around air quality to be undertaken between citizens and policy makers to address the transboundary issue of air pollution'

Badri Chatterjee

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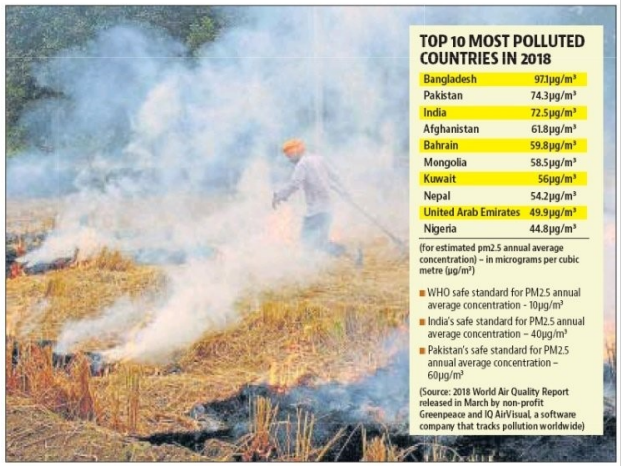

TOP 10 MOST POLLUTED COUNTRIES IN 2018

Bangladesh	97.1µg/m³
Pakistan	74.3µg/m³
India	72.5µg/m³
Afghanistan	61.8µg/m³
Bahrain	59.8µg/m³
Mongolia	58.5µg/m³
Kuwait	56µg/m³
Nepal	54.2µg/m³
United Arab Emirates	49.9µg/m³
Nigeria	44.8µg/m³

(for estimated pm2.5 annual average concentration) – in micrograms per cubic metre (µg/m³)

- WHO safe standard for PM2.5 annual average concentration - 10µg/m³
- India's safe standard for PM2.5 annual average concentration – 40µg/m³
- Pakistan's safe standard for PM2.5 annual average concentration – 60µg/m³

(Source: 2018 World Air Quality Report released in March by non-profit Greenpeace and IQ AirVisual, a software company that tracks pollution worldwide)

pensed by the central government.

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sponsored by the US) are welcome but they are not fit for monitoring air quality vis-a-vis Pakistan's safe standards, and we do not consider this as our official data."

Air pollution is the greatest environmental risk to health currently with an estimated seven million premature deaths every year, according to the World Health Organisation).

The 2018 World Air Quality Report released in March by non-profit Greenpeace and IQ AirVisual, a software company that

A Citizen Science collaboration by air pollution researchers from UrbanSciences in Mumbai (@UrbanSciencesIN) and Pakistan Air Quality (@PakAirQuality) Initiative in Islamabad is providing Open Data in Pakistan for citizens to get timely updates on air pollution across several major cities.

Respirer Living Sciences
@urbansciencesIN

Citizen-science led civic engagement combined with Data-driven journalism provides a powerful tool to build impactful narratives.

@MumbaiMirror drove around Mumbai with our researchers on Diwali night to find PM2.5 above 200 ug/m3 at all locations.

mumbaimirror.indiatimes.com/mumbai/civic/d...

7:40 AM · Jul 9, 2020 · Twitter Web App

6 Retweets **3** Likes

Other Documented Citizen Science Projects

Name of Projects					Reference
iNaturalist	Online platform for mapping and sharing observations regarding biodiversity worldwide.	13 Million observations	By end of 2019, 1 million users	Cited in 228 research articles in 2019 alone	https://www.inaturalist.org/stats/2019
Zooniverse (originally Galaxyzoo)	The pattern recognition capability of the human brain for the classification of galaxies.	Classified more than 98 million galaxies	End of 2019, nearly 2 million users	Contributed to over 160 research articles	https://www.zooniverse.org
ScienceAtHome project 'Quantum Moves'	Gamification' as a tool to find solutions to complex research problems of quantum computing.	Played *BringHomeWater* 8 million times	150 Thousand players (till publication in 2016)	Article accesses is 3736 according to Altmetric (October 2020)	https://citizenscincegames.com/games/quantum-moves/

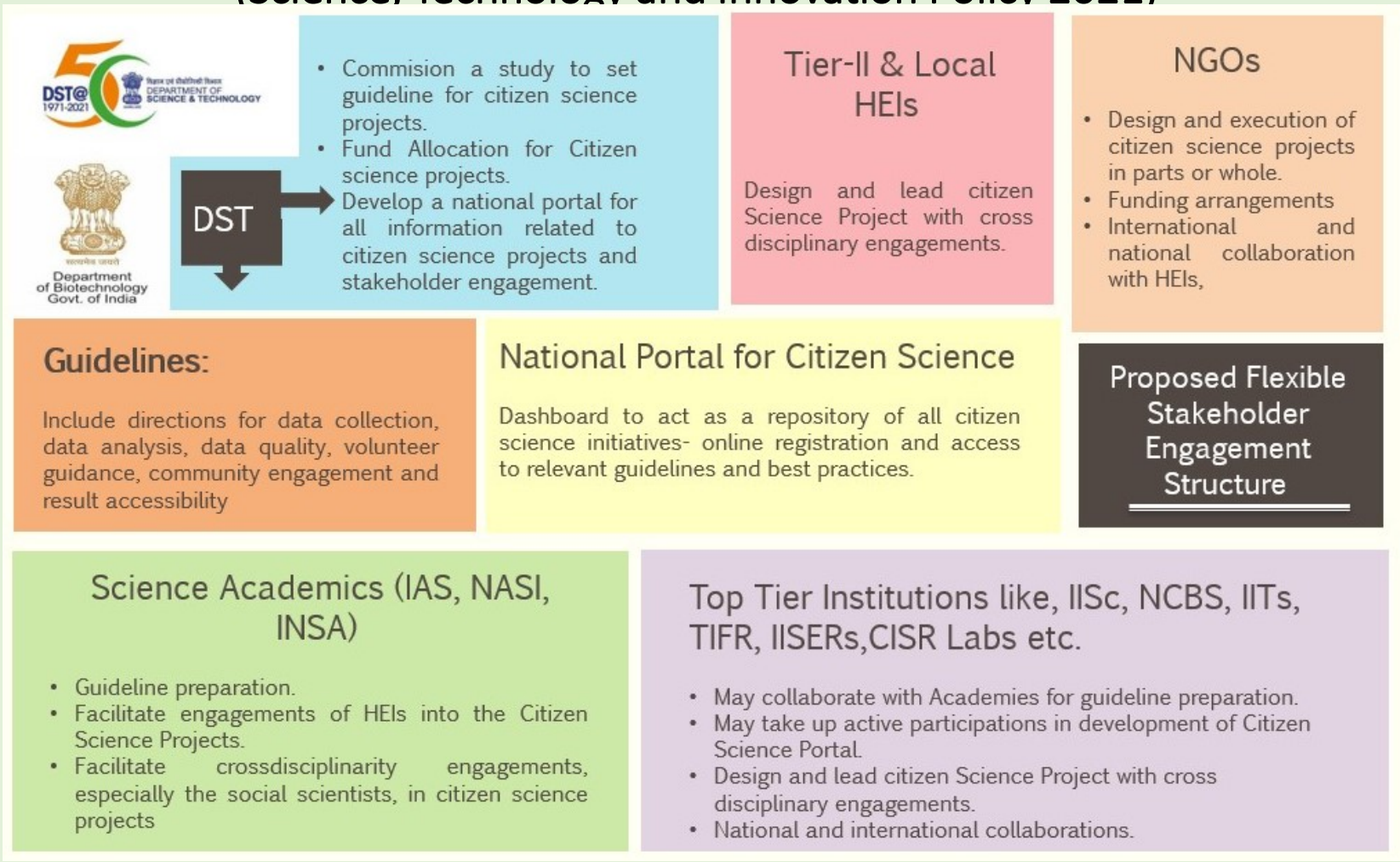
Some successful citizen science projects.

Source: Namdeo, SK and Koley, M (2020). *Citizen Science in India: Introduction, Challenges and Way Forward*. www.dialogue.ias.ac.in/article/30161/citizen-science-in-india-introduction-challenges-and-way-forward

Possible challenges with citizen science projects at a glance

Source: Namdeo, SK and Koley, M (2020). *Citizen Science in India: Introduction, Challenges and Way Forward*. www.dialogue.ias.ac.in/article/30161/citizen-science-in-india-introduction-challenges-and-way-forward

Possible National Framework and Stakeholder Engagements for the Institutionalization of Citizen Science Projects in India: As Proposed for STIP2021 (Science, Technology and Innovation Policy 2021)



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Thank You!!

E: Anup_csp@jnu.ac.in

W: http://anupkumardas.blogspot.com