Big data analysis to understanding online songbird trade in Indonesia:
What are the most traded species?

CIFOR | World Agroforestry | TRADE, DEVELOPMENT & THE ENVIRONMENT HUB | UK Research and Innovation | GCRF

Under the GCRF Trade, Development and the Environment Hub Project (TRADE Hub), the CIFOR research team is studying the wildlife trade in Indonesia with a focus on songbirds. The study is exploring the use of big data analysis and machine learning to monitor songbird trade in the online marketplace.

Why Monitor the Online Market for Songbirds?

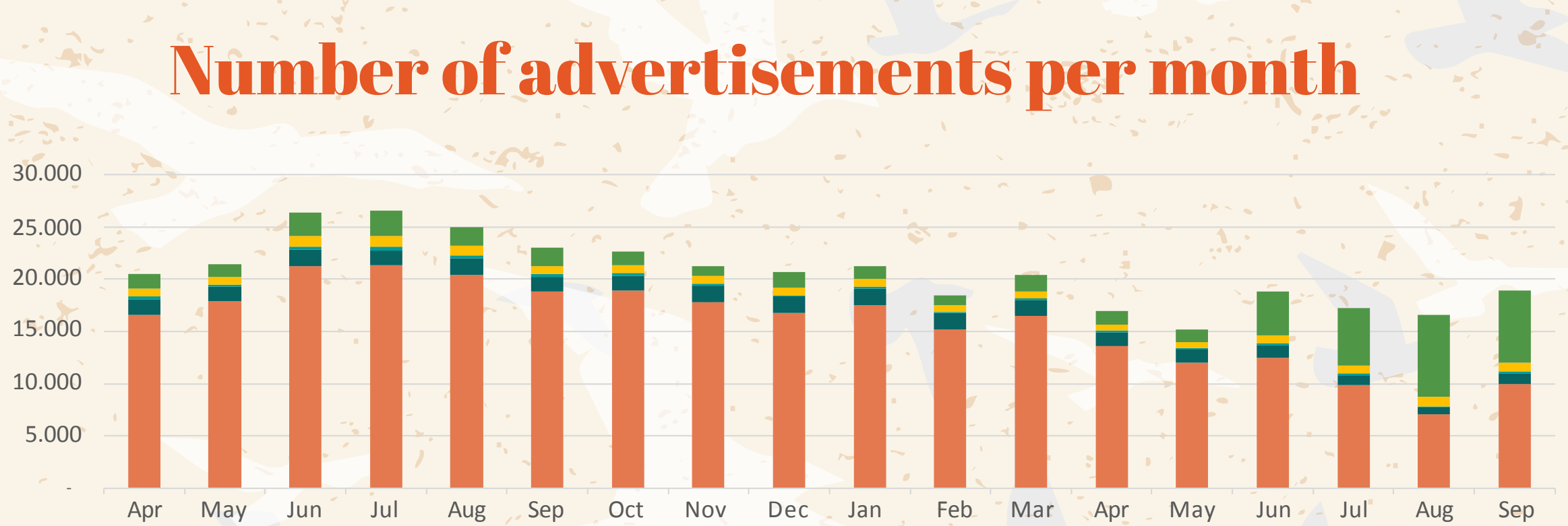
Songbird species are commonly traded in Indonesia due to the cultural practice of birdkeeping[1,2] and the trend of songbird competition.[1,3] Most of the songbirds traded are caught in the wild, making songbird trade recognized as a significant threat to Indonesia's biodiversity.[4,5] Several studies have reported the decrease in songbird population as an impact of the trade. [4,6,7]

Songbird trade is extending from physical marketplaces to online market platforms.[3,8,9] Our study demonstrated the use of big data and machine learning for monitoring the songbird online market. For this study, we defined songbirds as species from passerines and other birds that commonly participate in singing contests or as a master bird.

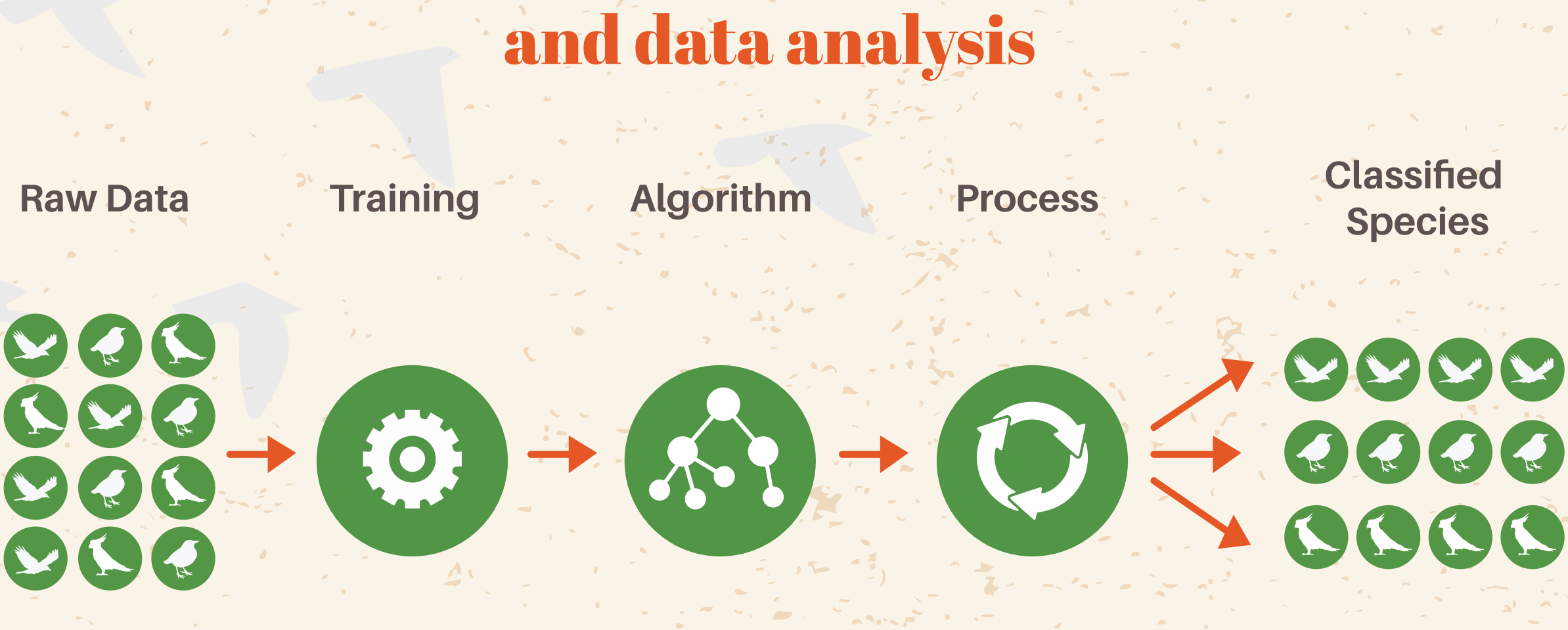
Big data collection

We collected 371,287 ads from an online marketplace from April 2020 – September 2021 and found 284,118 that listed songbirds from various taxa.

Number of advertisements per month



Machine learning development and data analysis

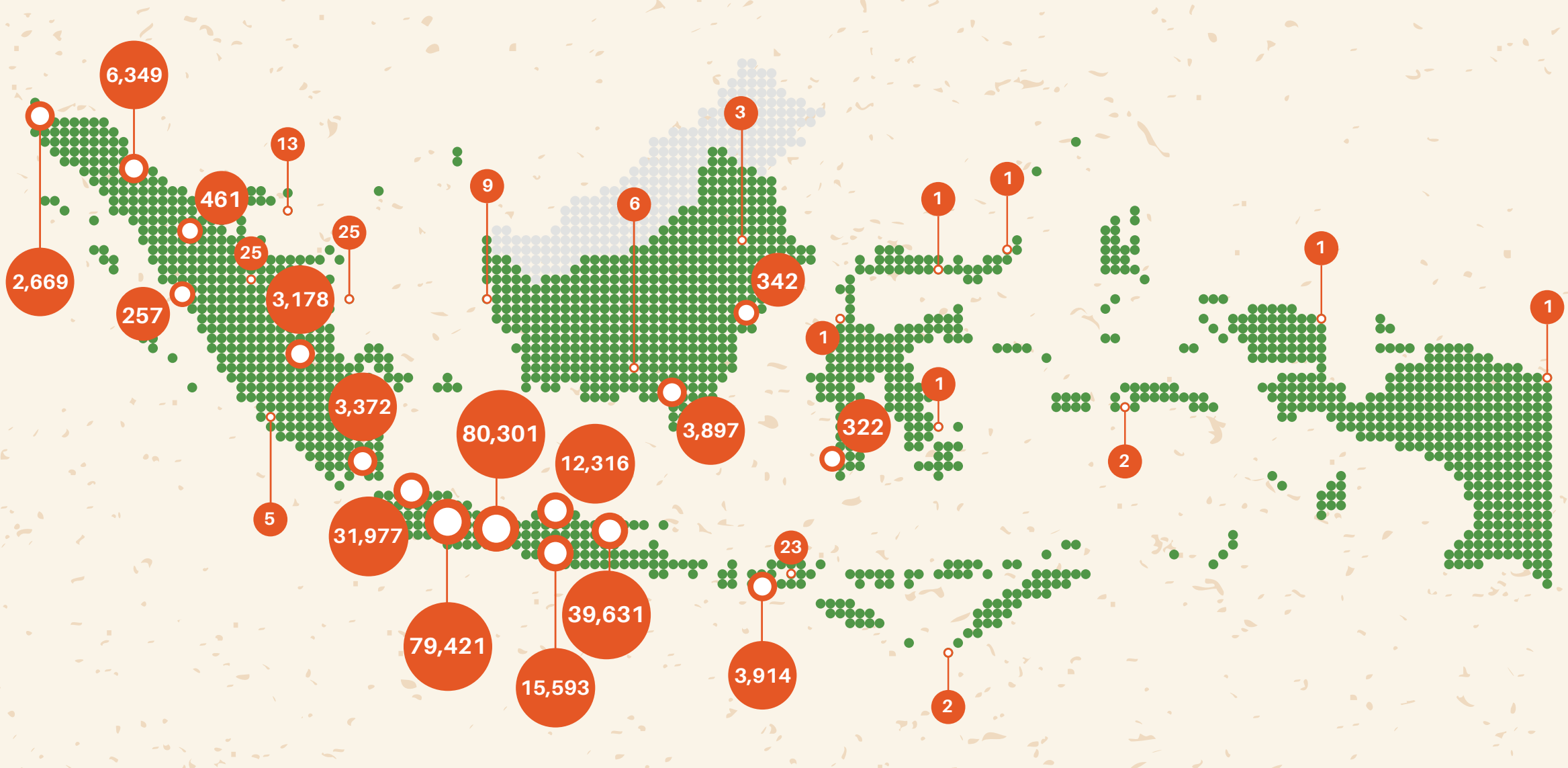

Raw Data → Training → Algorithm → Process → Classified Species

The unstructured dataset was collected from an online marketplace and classified by a machine learning algorithm to produce well-structured data ready for further analysis. In this ongoing study, the machine learning model result has an accuracy rate of 97%.

Key findings

Geographical distribution of online bird sellers

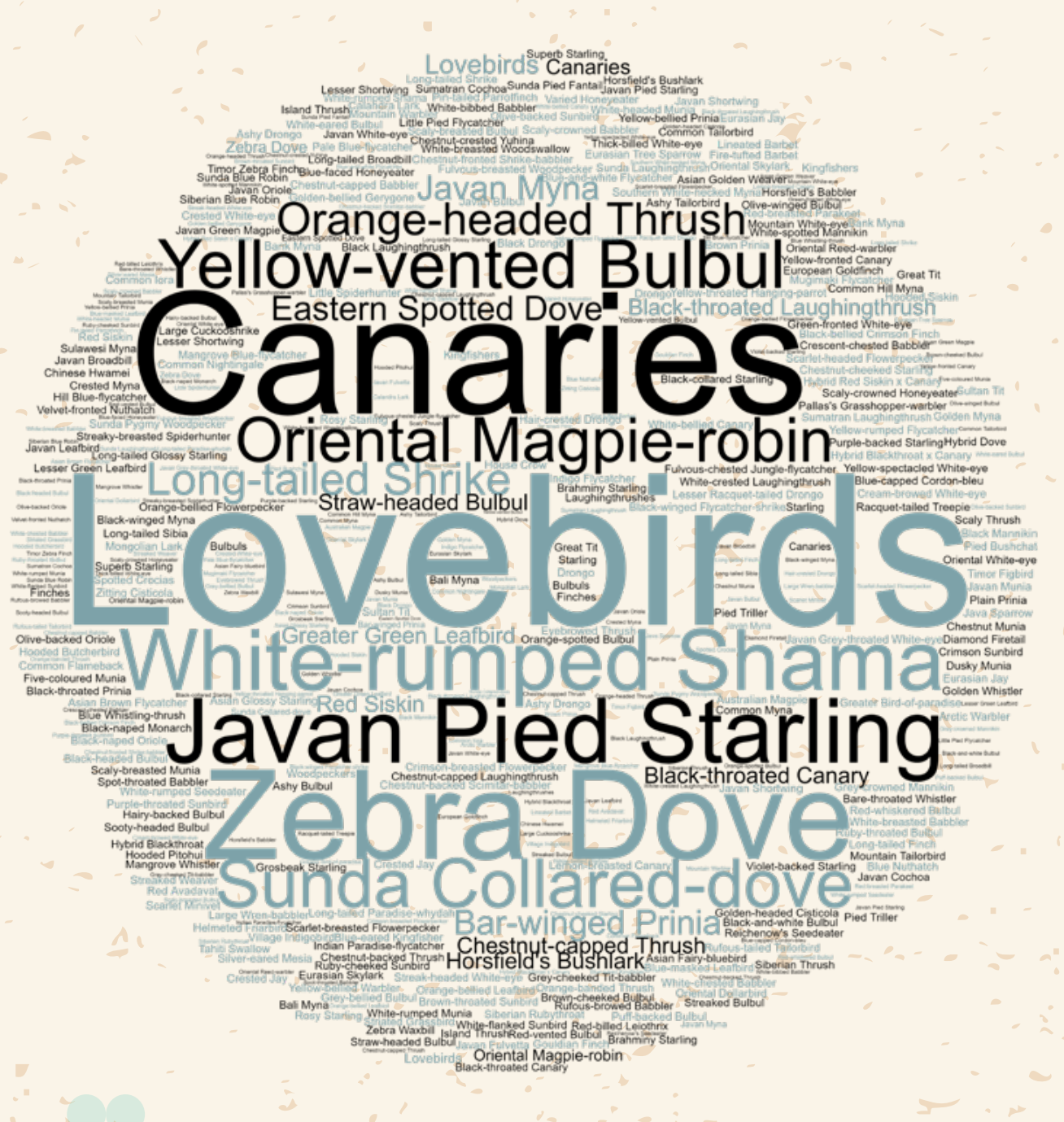
The advertisements were recorded from 249 districts and 32 provinces in Indonesia; 91% of sellers were located in Java Island.



What are the most traded species?

247 Songbird Taxa
49 Families

80% Native Indonesia
19% Non-native
1% Hybrid



Most Advertised Species

Lovebird
Agapornis spp.
30.2%
LC

Canaries
Serinus spp.
14.7%
LC

White-rumped Shama
Kittacincla malabarica
14.7%
LC

Oriental Magpie-robin
Copsychus saularis
4.2%
LC

Zebra Dove
Geopelia striata
4.2%
LC

Javan Pied Starling
Gracupica jalla
2.6%
CR

Yellow-vented Bulbul
Pycnonotus goiavier
2.0%
LC

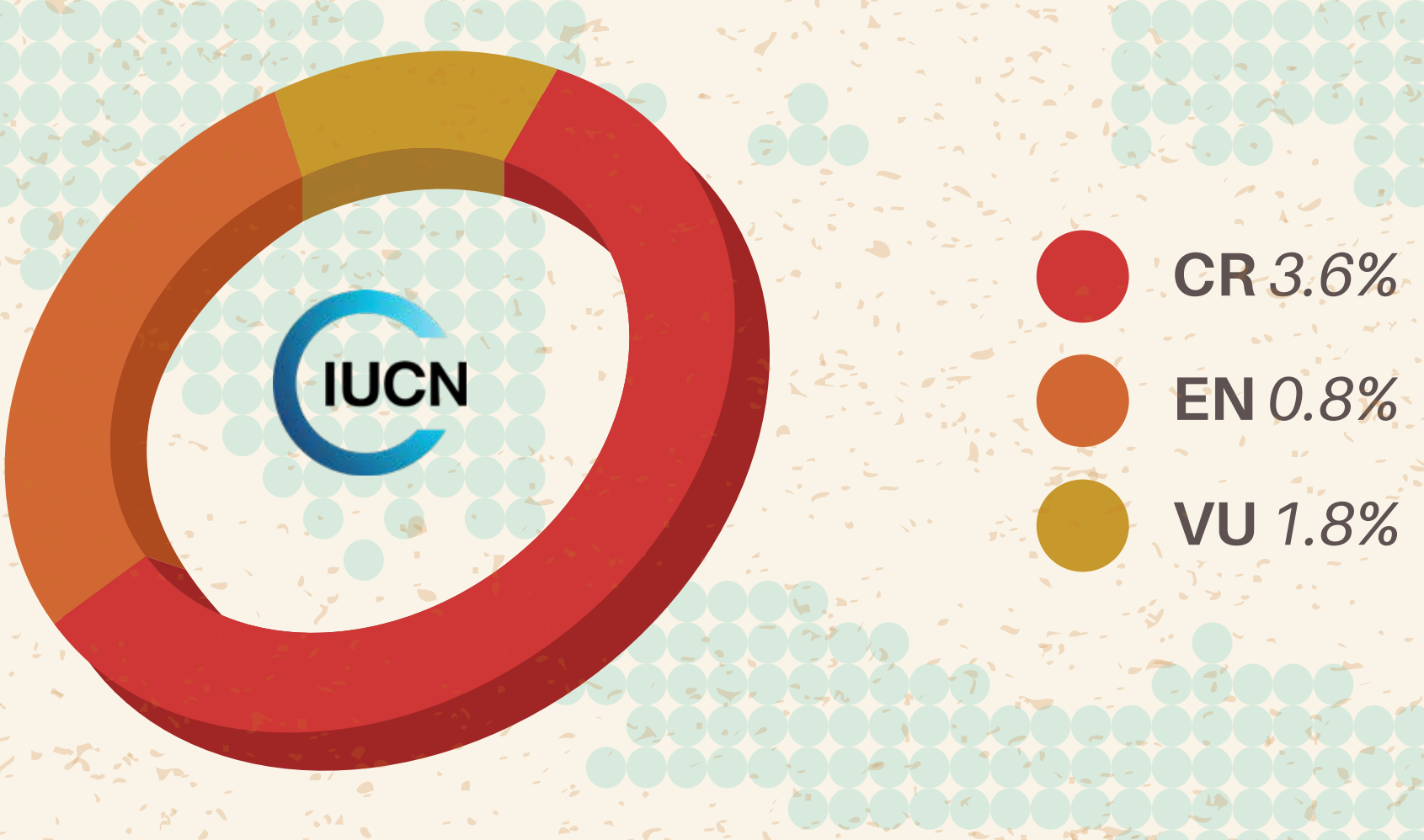
Sunda Collared-dove
Streptopelia bitorquata
2.0%
LC

Long-tailed Shrike
Lanius schach
1.5%
LC

Orange-headed Thrush
Geokichla citrina
1.4%
LC

Individual Advertised Birds by IUCN Status

6.3% are listed as threatened species by **IUCN**



Extinct | Threatened | Least Concern

EX EW CR EN VU NT LC

Most traded IUCN Red List Species

Key Findings Status of Species (IUCN)

Javan Myna
Acridotheres javanicus
VU

Javan White-eye
Zosterops flavus
VU

Greater Green Leafbird
Chloropsis sonnerati
EN

Red Siskin
Spinus cucullatus
EN

Javan Sparrow
Padda oryzivora
EN

Sumatran Laughingthrush
Garrulax bicolor
EN

Straw-headed Bulbul
Pycnonotus zeylanicus
CR

Javan Myna
Leucopsar rothschildi
CR

Short-tailed Green Magpie
Cissa thalassina
CR

Key Messages

- Several threatened species are traded online.
- Machine learning can help monitor the online market.

What's next in this study?

- Improve machine learning accuracy and knowledge to monitor new listed species.
- Continue monitoring to get better understanding of trends.

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