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Wildlife crime data integration from multiple sources: A way forward to ensure public access to information and data analytics

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Published on: Jun 01, 2020

DOI: 10.21428/cb6ab371.65fdbcb30

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Abstract

Over a while, the activities of criminals have expanded due to advancements in information and communication technology. In this background, police and intelligence agencies have been developing a robust crime database in order to anticipate, prevent, and monitor criminal activity. Hence, wildlife crime databases become a vital information system that helps enforcement officers to detect and prevent wildlife crime and to pursue wildlife criminals. Therefore, an attempt has been made in this paper to shed light on available wildlife crime databases in India. Further, an appeal has been made for the integration of such wildlife crime data from various sources and make it available in the public domain. This article has also touched upon the importance of data analytics and crime analysts to handle wildlife crime data.

Keywords: Crime Data, Database, Forest, Police, NCRB, WCCB, Wildlife Crime, Crime Analysis

Introduction

Wildlife crime refers to the taking, trading (i.e., supplying, selling, or trafficking), importing, exporting, possessing, processing, obtaining, and consumption of wild fauna and flora, in contravention of national and international law. Wildlife crime emerged as a significant threat to biodiversity, endangered species, and also to the livelihood of people. These threats, in turn, severely impacts national security, social and economic development of a country (UNODC, 2015). To understand the extent of wildlife crime, a report from United Nations Environment Programme (UNEP, 2016) estimated that illegal trade in wildlife is up to USD 20 billion per year (approximately INR 2000 Crores). By recognising this severe and immediate danger, the international community at large has start to acknowledge the magnitude and significance of wildlife crime. Over-exploitation of wildlife has accelerated its adverse impacts on sustainable development, good governance, the rule of law, and national security (INTERPOL-UN Environment, 2016; McFann & Pires, 2018). The Sustainable Development Goals (SDGs), otherwise known as the Global Goals, are also recognised wildlife crime as a menace to environmental protection. Among various targets of SDG 15 (Life on Land)¹ — Targets 15.7 and 15.c, explicitly spelt out wildlife crime and community participation to tackle the same (A/RES/70/1, 2015). The Government of India enacted the Wild Life (Protection) Act, 1972 (hereafter WPA), with the objectives of adequately protecting the wildlife through control of poaching, smuggling and

illegal trade in wildlife and its derivatives. WPA regulated the setting up of three types of protected areas in India, such as wildlife sanctuaries, national parks, and zoos for the protection of wildlife. Section 50 of WPA provided officers from the forest department and police department the power of entry, search, arrest, and detention related to wildlife crime. Hunting wild animals or picking, uprooting of specified plants named in various schedules are prohibited under WPA. Also, unauthorised possession, transport and trade of wild animals or plants, and destruction of protected areas/habitat will be punishable. A person who contravenes any provisions of WPA or any rule thereunder shall be guilty of an offence against this Act and shall, on conviction, be punishable with imprisonment for a term which may extend to three years or with fine which may extend to twenty thousand rupees or with both. If the offence committed is concerning to any specified animals, the offender will be punishable with imprisonment not less than one year but may extend to six years and fine shall not less than five thousand rupees.

Compliance with and enforcement of any criminal law always needs a dataset. DPKO & OHCHR (2011) have suggested using multiple data sources from police, judiciary, and correctional institutions to measure compliance and enforcement. Official crime data consists of incidents reported to and recorded by police remains as a significant indicator to measure police efficiency and effectiveness (He & Marshall, 1997; Loveday, 2000). In this background, an attempt has been made in this paper to bring out various sources of wildlife crime data in India and an appeal for the integration of such data to ensure public access to information.

National Crime Records Bureau (NCRB) and Wildlife Crime Data

Over a period of time, activities of criminals have expanded due to advancements in information and communication technology. Harnessing and exchange of relevant information on crime and criminals between various stakeholders become next to impossible as crime and criminal records are maintained manually. At this juncture, the need arises to computerise crime records for the prevention and detection of crime. In 1986, NCRB was set-up under the aegis of Ministry of Home Affairs, Government of India, as a computerised repository of crime and criminal data (NCRB, n.d.). NCRB publishes crime statistics, namely “Crime in India” as an annual publication. Crime data collected from City Crime Records Bureau (CCRB)/District Crime Records Bureau (DCRB) will go to the State Crime Records Bureau (SCRB). SCRB will share the respective States crime data annually with the NCRB. NCRB will compile all the data received from various SCRBs to bring out Crime in India statistics.

Over the years, crime statistics have become a crucial publication, providing useful and detailed information on crime statistics and trends in India. Crime in India statistics chaptered in various crime heads such as crime against women and children, juveniles in conflict with the law, economic offences, cybercrimes, and so on. For the first time from the year 2014, environment-related offences added to the crime statistics. The chapter on environment-related offences have present data on the incidence of offences, and gender-wise persons arrested. Further, police disposal such as (i) total cases investigated; (ii) total cases pending for investigation; (iii) charge sheeting rate and (iv) pendency percentage, etc. and court disposal such as (i) total cases went for trial; (ii) cases pending for trial; (iii) cases convicted; (iv) conviction rate and (v) pendency percentage, etc. As this paper deals explicitly with the prevalence of wildlife crime in India, the author (hereafter researcher) will only present the data related to the number of wildlife crime cases registered under WPA.

Table 1 gives an overview of the incidence of wildlife crime in India for five years (i.e., 2014, 2015, 2016, 2017, and 2018). From Table 1, it is inferred that Uttar Pradesh (UP), Rajasthan (RJ), and Karnataka (KA) topped the list based on the incidence of wildlife crime. Interestingly, the aggregate total of cases registered in UP and RJ alone constitutes 55 per cent of total (i.e., 4066 cases) wildlife crime reported all over India. Also, shockingly in the States/UTs like Meghalaya, Sikkim, Tripura, D&N Haveli, and Daman & Diu, zero cases were reported. Whereas in Goa, Manipur, Mizoram, Nagaland, Tamil Nadu, A&N Islands, Chandigarh, Lakshadweep, and Puducherry have registered cases in single digits by their respective police.

Table 1							
State/UT year-wise incidence of wildlife crime in India							
Sl. No.	State/UT	Year	Total				
		2014	2015	2016	2017	2018	
1.	Andhra Pradesh	9	2	3	3	3	20

2.	Arunachal Pradesh	3	3	1	2	2	11
3.	Assam	73	74	82	49	32	310
4.	Bihar	2	0	7	12	12	33
5.	Chhattisgarh	11	12	15	10	9	57
6.	Goa	2	0	0	0	0	2
7.	Gujarat	36	20	13	3	0	72
8.	Haryana	15	10	9	16	15	65
9.	Himachal Pradesh	15	12	19	18	24	88
10.	Jammu & Kashmir	0	4	4	12	5	25
11.	Jharkhand	0	34	0	2	0	36
12.	Karnataka	84	74	69	58	41	326
13.	Kerala	5	2	8	6	4	25
14.	Madhya Pradesh	15	3	5	10	58	91
15.	Maharashtra	56	20	33	52	47	208
16.	Manipur	0	0	2	1	1	4
17.	Meghalaya	0	0	0	0	0	0
18.	Mizoram	0	1	1	1	1	4
19.	Nagaland	0	0	3	0	0	3
20.	Odisha	1	0	1	3	8	13

1.	Punjab	5	1	2	7	4	19
2.	Rajasthan	219	239	190	208	220	1076
3.	Sikkim	0	0	0	0	0	0
4.	Tamil Nadu	2	2	0	0	0	4
5.	Telangana	3	9	17	1	3	33
6.	Tripura	0	0	0	0	0	0
7.	Uttar Pradesh	149	234		264	227	1176
8.	Uttarakhand	6	14	19	21	20	80
9.	West Bengal	45	50	47	59	42	243
Total (States)	756	820	852	818	778	4024	
1.	A & N Islands	0	0	0	2	0	2
2.	Chandigarh	1	0	3	2	0	6
3.	D&N Haveli	0	0	0	0	0	0
4.	Daman & Diu	0	0	0	0	0	0
5.	Delhi	12	8	4	4	3	31
6.	Lakshadweep	0	1	0	0	1	2

7.	Puducherry	1	0	0	0	0	1
Total (UTs)	14	9	7	8	4	42	
Total (All-India)	770	829	859	826	782	4066	
Source: National Crime Records Bureau							

Tamil Nadu Forest Department (TNFD) and Wildlife Crime Data

Tamil Nadu has a rich history of forest and wildlife management. The socio-cultural practices of the State have always been an impetus for the conservation and protection of abundant natural resources. Forest and wildlife management is an interdisciplinary approach and practice. Historically, forests in Tamil Nadu were managed by the community living in and around the forest. The first step towards wildlife conservation has initiated with the enactment of the Tamil Nadu Wild Elephants Preservation Act, 1873, which is a century ahead of the enactment of WPA. Soon after the enactment of WPA, to protect wildlife, various places were designated as a protected area (PA) (Tamil Nadu Forest Department, 2016). A protected area is a clearly defined geographical space, recognised, dedicated, and managed, through legal or other effective means, to achieve the long term conservation of nature with associated ecosystem services and cultural values (Dudley & Stolton, 2008). PAs in India are designated as national parks, wildlife sanctuaries, conservation reserves, community reserves and marine protected areas. The PA network in the State covers 7,069.72 km², with 5 National Parks, 15 wildlife sanctuaries, 15 bird sanctuaries and two conservation reserves. Some of the PAs are also constituent parts of four tiger reserves — Anamalai, Kalakkad Mundanthurai, Mudumalai and Sathyamangalam. As Tamil Nadu has abundant natural resources, Tamil Nadu Forest Department aspires to establish an intelligence network to combat wildlife crime and also to establish an electronic database of forest and wildlife offenders (Tamil Nadu Forest Department, 2016). To achieve these aspirations, the collection and storage of wildlife crime data have become a prerequisite.

Since wildlife crime data of Tamil Nadu is not available in the public domain, the researcher has requested the forest department to provide forest division wise wildlife crime data to understand its nature and extent. There is a dedicated wing called Protection, Vigilance & Wildlife Crime Bureau (PV&WCB) with TNFD headed by an officer in the rank of Additional Principal Chief Conservator of Forests (APCCF) to monitor the protection of forests and wildlife, collection of intelligence and wildlife crime records.

As discussed elsewhere, WPA provides officers from the forest as well as police departments the power to enforce wildlife protection. There are two agencies involved in the enforcement of WPA with two different databases — one from NCRB (data available in the public domain), another from the protection, vigilance & wildlife crime bureau (data not available in the public domain).

Directorate of Revenue Intelligence (DRI), Central Board of Indirect Taxes & Customs (CBIC) and Wildlife Crime Data

DRI is under the Ministry of Finance, Government of India, vested with powers to collect intelligence about the smuggling of contrabands including wildlife articles, keeping watch over critical seizures and investigation of cases and also to keep liaison with Central Bureau of Investigation (CBI) and the International Criminal Police Organisation (INTERPOL) for coordination. Apart from the above mandates, DRI is responsible for keeping statistics of seizures and watching trends of smuggling and supply. Specific to seizures, month-wise seizure reports being available on the DRI website with a limitation. Seizure reports only contain limited information on what is seized, the quantum of seizure, the value of seizure, and where it was seized. With this data, it is not possible to draw inferences on the extent of illegal wildlife trade (Directorate of Revenue Intelligence, n.d.; Express News Service, 2018). Apart from DRI, CBIC has Air Intelligence Unit (AIU) and Seaport Intelligence Unit (SIU). AIU and SIU are mandated to collect intelligence, identify the suspected passengers from Advanced Passenger Information System (APIS)², interrogating the suspected passengers to prohibit the smuggling of contrabands, including wildlife articles (Ahuja, 2017; Express News Service, 2019). During the exercise of writing this article, the researcher could not locate any data on wildlife article seizures from either AIU or SIU.

Wildlife Crime Control Bureau (WCCB) and Wildlife Crime Data

In 1994, the erstwhile Ministry of Environment and Forests (MoEF), Government of India, has constituted a committee on the prevention of illegal trade in wildlife and

wildlife products headed by Dr. S. Subramaniam to make recommendations. One of the recommendations of this committee was to establish a central task force designated as Directorate of Prevention of Crime against Wildlife, as illegal trade in wildlife emerged as organised crime. Initial proposal to house the Directorate under the Ministry of Home Affairs (MHA) was not accepted. However, later the MHA agreed for the creation of a wildlife trade prevention bureau under the MoEF. In 2000, India promised at the 11th Conference of Parties (COP) of Convention on International Trade in Endangered Species (CITES) to establish a wildlife crime cell to tackle the growing menace of wildlife crime. The name Wildlife Crime Control Bureau (WCCB) came to existence in the year 2007, and it is now in operation from the year 2008.

WCCB has various missions like gathering intelligence related to wildlife crime, co-ordinate efforts and action between stakeholders, capacity building of enforcement officials, and so on. Among the above-said missions, the vital mission is to develop a Wildlife Crime Database Management System (WCDBMS) for better analysis of wildlife crime (WCCB, n.d.). In order to obtain wildlife crime data from all the States/UTs, WCCB through an advisory addressed to all the Principal Chief Conservators of Forests (PCCF) (Head of Forest Force) and Director Generals of Police (DGPs) to provide wildlife crime data reported if any within 48 hours to WCCB. However, through advisories from WCCB sent to the PCCFs and DGPs, it is known that information from these departments are not reaching the WCDBMS in time to initiate multi-agency efforts to counter wildlife crime (WCCB, 2015).

Against this background, the researcher completed an internship programme with the Southern Regional Office of WCCB in Chennai during May and June 2019. The Regional Deputy Director and Wildlife Inspector has given an assignment to the researcher to submit a report on already existing WCDBMS. The researcher has conducted extensive work for two months on WCDBMS and submitted the report to WCCB. As an intern, the researcher learned that WCCB had created an online WCDBMS to get real-time wildlife crime data from police as well as forest officials. In this regard, a username and password shared with the police/forest department for timely reportage of wildlife crime from all over India. Police/forest department has to provide details like date and time of the offence, nature of the offence, place of seizure/arrest has made, details of wildlife articles seized including its common name and scientific name along with the personal details of the accused, etc.

WCDBMS

An essential prerequisite of any law enforcement agency is the ability to share information and intelligence quickly and securely among stakeholders. With the advent of information and communication technology, data has become fundamental for every law enforcement agency. Information and intelligence have been collected in the form of data and stored in the crime databases. Around the world, police, and intelligence agencies have been developing a robust crime database in order to anticipate, prevent, and monitor criminal activity. These databases will have both covert and overt intelligence. Though crime databases are a vital tool for law enforcement, due to poor design, they seem to be imperfect. Fundamental errors in data entry or information categorisation will cause difficulties in locating vital information in the database when needed. However, with proper and systematic planning, a useful database can be designed, and that will discriminate between relevant and irrelevant information. In light of the above, wildlife crime databases are vital information system that helps enforcement officers to detect, prevent wildlife crime, and pursue criminals (The World Bank, 2018). Building a robust crime database for conventional crimes is complicated as it has various crime heads like homicide, rape, sexual harassment, cheating, forgery, abduction, robbery, assault, burglary, etc. However, for wildlife crime, designing a crime database is not difficult as its nature and scope are very narrow.

Since conventional/traditional crime prevention mechanisms followed by government agencies were not sufficient for long-term implications, it necessitates the emergence of crime data analytics. With the advanced technologies that continuously generate and exchange data, data analytics could be employed to predict crime from happening. Crime analytic scientists distinguish data into two types — structured data and unstructured data (Tao et al., 2018). The following framework gives the overall picture of crime data analytics. WCCB has developed an online WCDBMS to get real-time data in order to analyse trends in crime and develop effective measures to prevent and detect wildlife crime across India (Press Information Bureau, 2018). From the above framework, it is understood that WCDBMS is a Government agency data that is not pre-processed. Hence, the data in the WCDBMS has not undergone the process — cleaning, integration, transformation, and reduction. The existing WCDBMS needs a complete revamp in order to attain its full potential to combat wildlife crime in India.

Further up-gradation to the WCDBMS

There has been a strong push for evidence-based policing around the world in recent years from researchers, practitioners, and policymakers. Although there is no single definition of the concept, evidence-based policing generally refers to police strategies

and tactics being guided by scientific evidence of effectiveness. This evidence can take many forms, although the evidence-based movement frequently turns to results from methodologically rigorous work and in particular randomised experiments and quasi-experiments that can provide the most believable answer to questions of whether a strategy or tactic works (Telep, 2018). Evidence-based policing is majorly dependent upon closed intelligence and open intelligence. As mentioned in Figure 1, through WCDBMS, we are collecting structured data (closed intelligence), and unstructured data (open intelligence) are absent. The combination of structured and unstructured data will give effective results while doing analysis. So, in order to capture unstructured data, a parallel database management system could be established in order to have open intelligence. In this era of technological advancements, collecting and collating open intelligence becomes doable with the help of online media (news and investigative journalism websites and alike), and social media networks (Twitter, Facebook, and alike), e-commerce websites (Flipkart, Amazon and alike). Hence, it is suggested that WCCB could also establish an open intelligence database system in order to combat emerging forms of wildlife crime in India.

Need for Wildlife Crime Data Integration

In light of the above observations, it is understood that we already have a database on wildlife crime by the police and forest departments of respective states. Moreover, with the effort taken by WCCB, there is a system in place to collate wildlife crime data from both police and forest departments, respectively. Wildlife seizure data from CBIC has to be shared with WCCB in order to make it visible in WCDBMS. All required now is to integrate the available data sources into a single database (Refer Figure 2). Further, make it available in a public domain in order to ensure public access to information as like NCRB publishes Crime in India. The following figure illustrates the proposed wildlife data integration model.

In this background, WCCB may be designated as a nodal agency to integrate wildlife crime data from all the above-said sources. As WCCB already has WCCBMS, immediate attention should be on improving the mechanisms to ensure real-time reportage of wildlife crime from police as well as the forest department. Furthermore, it is pertinent to bring in the old wildlife crime data from all the relevant stakeholders to WCCBMS. The significant step WCCB has to undertake is to make those wildlife crime data available for public information. Any information that would lead to locating any accused should not be made available in the public domain in order to ensure the privacy of the accused. Table 2 gives an overview of existing wildlife crime heads as in Crime in India statistics. Table 3 suggests that some new heads be added to existing wildlife crime data.

Table 2		
Data heads available in existing wildlife crime data		
Sl.No.	Existing data heads	Source of data
1.	State/UT wise incidence reported	Crime in India, NCRB
2.	State/UT wise number of persons arrested	Crime in India, NCRB
3.	Disposal of wildlife crime by police	Crime in India, NCRB

4.	Disposal of wildlife crime by courts	Crime in India, NCRB
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Table 3		
Suggested heads to be incorporated to the wildlife crime data		
Sl.No.	Suggested data heads	Explanation
1.	Date of case registration	Date on which the wildlife crime case is registered
2.	Name of the State/UT	List of States and Union Territories
3.	Name of the District	List of Districts within the selected State/UT
4.	Name of the forest division/police station	List of the forest division/police station within district selected
5.	Crime No.	If Forest Dept./WCCB (e.g. WLOR No. __/2020) If police FIR No. ____/2020
6.	Category of wildlife offence(s) under Wild Life (Protection) Act, 1972	<ul style="list-style-type: none"> • Hunting • Picking, uprooting, etc. of specified plants • Unauthorised possession, transport and trade • Protected areas/habitat destruction
7.	Species name	List of the common names (with scientific name in bracket) of the species under schedule I, II, III and IV of WPA. E.g. Spotted deer (Axis axis) Sch. III

8.	Current status of the case	<ul style="list-style-type: none"> • Under investigation • Under trial
9.	Disposal status of the case	<ul style="list-style-type: none"> • Acquitted • Compounded • Convicted • Discharged

Need for a Crime Analyst for WCCB and TNFD

International Association of Crime Analysts (2014) defines crime analysis is a profession and process in which a set of quantitative and qualitative techniques used to analyse data valuable to police agencies and their communities. It includes the analysis of crime and criminals, crime victims, disorder, quality of life issues, traffic issues, and internal police operations, and its results support criminal investigation and prosecution, patrol activities, crime prevention and reduction strategies, problem-solving, and the evaluation of police efforts. Crime analysts are the problem solvers within law enforcement agencies utilising analytical methods and theoretical knowledge to assist their functions (Drawve et al., 2018). Since the researcher is interviewing Tamil Nadu Forest Department officials for his Ph.D. research on wildlife crime prevention, they told that they are already occupied with various responsibilities. Hence, they could not even enter data to the WCDBMS on time. So, there is a need for a full-time crime analyst/s to take care of the WCDBMS. A crime analyst could analyse wildlife crime and use wildlife crime data to forecast when and where criminals are likely to strike. Based on the data, it is possible to detect and understand distinctions among wildlife crime patterns. With the use of crime and intelligence data, a crime analyst can design a directed patrol or tactical action plans that would result in effective response. The crime analyst will collect data, subject it to statistical tests, develop and test hypotheses, and write conclusions that adhere to commonly accepted criminal justice research standards. A person from the academic discipline of Criminology would fulfil the responsibility of a crime analyst. The skill for crime analysis will not be acquired by completing a post-graduate degree in Criminology; it is solely acquired by practice and experience. Hence, it is suggested that a person with a post-graduate degree in Criminology and its allied subjects like Criminal Justice Administration, Police Administration with at least two years of research experience/data analytic skills with proficiency in using Statistical Package for the Social Sciences (SPSS) and R programming/Python language and geographic information system application (for example QGIS) could be a prerequisite

qualification for the post of crime analyst with the WCCB and PV&WCB. As mentioned in Figure 1, a full-time crime analyst will do the pre-processing of the data entered to the WCDBMS by various officials from all over India and clean the data to remove any errors or gaps. Thus, only quality data alone be available in the WCDBMS; this will allow drawing various inferences in order to use the data better for the functioning of WCCB and State forest departments.

Conclusion

Wellness of forests are dependent on the protection of wildlife. By ensuring the protection of wildlife, it is very much possible to protect forests. One step towards ensuring wildlife protection is the enforcement of WPA to a larger extent. In order to measure the extent of enforcement of WPA, wildlife crime data becomes a crucial indicator. As discussed elsewhere, wildlife crime databases are vital information system that helps enforcement officers to detect, prevent, and pursue criminals. Hence, a centralised, integrated wildlife crime database becomes the need of the hour. The responsibility of the government does not end there on the creation of an integrated wildlife crime database unless the data is accessible to the public. Also, to bring most out of the integrated wildlife crime data, the role of a crime analyst becomes essential to draw actionable inferences from the available data. India should march towards data-driven enforcement to protect its wildlife.

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Footnotes

1. <https://www.globalgoals.org/15-life-on-land> [↵](#)
2. <https://boi.gov.in/content/apis-advanced-passenger-information-system> [↵](#)