A Bio-geographical Study on the Massive Decline in Popular Common Birds throughout the Selected Fluvio-coastal Landscape of Rural Purba Medinipur District in West Bengal

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Abstract - Having significant roles as predators, pollinators, seed dispersers, scavengers and ecosystem engineers in world environment birds are typically moveable character acted as a link between distant ecosystems, cycling nutrients and facilitating the dispersal of other organisms. For millennia birds have been designated in art, poetry, music and religion from corner to corner of human cultures alongwith the bird watching as an escalating trendy hobby integrating people throughout the globe from the sense of love and affinity towards the avifaunal aesthetic beauties.

A selected *fluvio-coastal* rural study area of Purba Medinipur district in West Bengal enriched by 478 documented and 278 observed bird species as per previous records has been emphasized in this paper for understanding the popular avifaunal state and status in the region. Based on extensive literature review, about 2-year's intensive academic survey, expert specific resource interviews, experimentations of previous checklists, justifying the existed *IUCN Red List* on regional or local scale and in depth data analysis and presentation using updated statistical and mapping software, this study attempts to examine the massive declining scenario of some sampled popular birds (67). The result of this bio-geographical study shows the terrible scenario of bird decline here during last 2-decades due to mainly acute human interference on natural landscape and its habitats. Whereas IUCN Red list shows the least concern scenario mostly (58.21%) of these species, the local status shows about 70% as threatened species alongwith 22% of unfortunate extinction in time and only 1.5% is at the least concern poorly. While huge aquaculture, brick manufacturing, advanced cropping intensity and settlement expansion have been the illegal, haphazard, unscientific and unplanned ways of life in the study area stimulating the *transformation and fragmentation of fluvio-coastal landscape* and its most of the *sensitive habitats*; such an issue like rapid avifaunal decline must be harmful to both man and ecosystem health drawing mammoth *human and environmental costs*. Hence, this paper is willful to probe proper pathways for sustaining future of valuable bird species and also man-nature health ensuring the *landscape sustainability* of this blue-green potential region.

Key words: *Massive Decline, fluvio-coastal, IUCN Red List, sensitive habitats, human and environmental costs, landscape sustainability*.

I. INTRODUCTION

The natural earth and its human race are in great dilemma experiencing with various problems and issues in time, with time and throughout the time. Human interventions and activities have been the driving forces and factors to the resources and species hurriedly towards extinction, undermining ecosystem and landscape as well as environmental functions and services which are crucial to our own survival. Increasing continuance of the various global and regional causes is leading to widespread species extinctions showing the downbeat imprint on water availability, food security and human health. Birds are in every corner of country and continent in the globe and also in mostly habitats and ecosystems. The avifaunal diversity has mesmerized humans for centuries in the world. But, recently alongwith the global climatic change, various uncivilized interventions of civilized people are driving the extent and diversity of birds in turn down way.

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Birds developed from a group of Theropoda dinosaurs during about 201- 145 million years ago under Jurassic Period. The lineage of the recent birds has been traced back to that far-off geological history in all the continents. From the time when the dinosaurs were extinct the bird has been only vertebrate having the body with feather. These feathered vertebrate multiplied and reached at stunning variety over the precedent 200 million years. It is currently called as Aves with sizable 36 Orders, a little of these are with more than 80 Families where many Families are with 300-400 species. [14]

Birds live in everywhere including both continent and ocean of today's world. The bird checklist reflects about 10,500 species which figure is incessantly increasing. [10] Biologists are continuously toting up more and more species in the checklist through sporadic detecting the new species with regular slitting the older. Unluckily, about 13% of bird has been threatened worldwide. In fact, the species diversity differs very much in different countries. Only five countries like Colombia, Peru, Brazil, Indonesia and Ecuador are featured by more than 1,500 bird species. Next 11 countries like Bolivia, Venezuela, China, India, Congo, Kenya, Tanzania, Myanmar, Argentina, Mexico and Uganda are with number of species between 1,000 and 1,500. For other countries, the species is ranged as less than 1,000.

The Avian checklists on the last 40 years made by the expertise have shown more than 750 species throughout West Bengal. Significantly, this figure is very large in number where spatial entity is small in size to the country. The bird bio-diversity in West Bengal is amazing, especially because the birds have to share this state with over 97.69 million people [1]. This great avifaunal diversity of West Bengal can be well-explained by its zoo-geographical aspects. It is also a part of the Oriental Realm having two Zoo-geographic Regions namely the Indian Region and the Indochinese region.

Bird is the good display and high-quality indicator of a strong and healthy environment. Avifaunal distribution and diversity are not constant with respect to landscape [4]. The state and status of avian diversity are changed based on various environmental factors including spatio-temporal climatic conditions, geomorphic existence, vegetation cover and variety of habitats [17] [37]. Avifauna is one of the greatest monitors of environmental changes and plays for assessing the nature throughout the history as "bio-monitors". All the changes in bird's population, behavioural patterns and reproductive ability are have been mostly utilized to scrutinize the long term effects of habitat fragmentation and ecological collapsing. That's why the avifauna is dignified as one of the good indicators of ecological status and quality in an ecosystem entity [11]. But regular published evidences in the news media and scientific papers and daily experiences show that a remarkable number of the common birds are trending on a decline to extinct. There is a heightened need to draw attention towards those common birds through constant monitoring and targeted conservation involvements in order to keep away from radical turn down in common species.

Recently, avifauna is hastily on the way out throughout the globe [5], synchronizing with a broad-spectrum turn down in worldwide biodiversity [8]. Responsible causes for this avifaunal declining, and its budding solutions, are differed with the variation of species and geo-political region [5]. Hence, nationwide and countrywide review and evaluations nature, trend and status of bird population are the bests for effective bird conservation and recovery actions since socio-economic forces for avifaunal change and also the conservation plans, policies, programmes and strategies are not same as with different countries [5] [8].

The study area, selected fluvio-coastal Purba Medinipur under West Bengal in India is a part of the sub-tropical region naturally enriched in bio-diversity having the landscape diversity of plains, coastal lands, wetlands, forest, rivers, estuary, etc. As per Avibase-Birds Checklists of the World for Purba Medinipur, the recorded bird species is 478 whereas it is 1399 in India. [22] According to most recent update (May-June, 2023) by eBird (2023), the observed species is 278. [9]

To understand the long-term changes in bird populations for a wide range of common birds across a variety of habitats at micro-level like Midnapore fluvio-coastal region and to promote awareness on bird conservation through the involvement of a large number of youth volunteer observers in survey work, this field based research work makes an effort to enlighten the issue and its recovery heartily. So, this study is not only for fulfilling the research interest, but also to highlight the root level environmental issue, finding out the pathways for its recovery and reflecting a red alert to society targeting specifically present and future potential generation.

II. BRIEF LITERATURE REVIEW FRAMEWORK

Table 1: Brief Literature Review Framework

Author (s)/ Researcher (s)	Published Year	Article in Journal/ Book/ News Paper	Major theme to be emphasized
Alexander C. Lees, Lucy Haskell, Tris Allinson, Simeon B. Bezeng, Ian J. Burfield, Luis Miguel	April 23, 2022	State of the World's Birds (Annual Review of Environment and Resources)	This review report enlightens the global spatio-temporal extent and distribution of bird's diversity. They opined that birds are possibly the most completely inventoried large taxonomic class of organisms, permitting a distinctively exhaustive understanding of how the Anthropocene has shaped their distributions and conservation status in space and time. This article says

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Renjifo, Kenneth V. Rosenberg, Ashwin Viswanathan, and Stuart H.M. Butchart			about the threats driving changes in avian species richness and abundance, highlighting the increasingly synergistic interactions between threats such as habitat loss, climate change, and overexploitation.
Jayashree Nandi	8th May, 2021	Hindustan Times, New Delhi	She reported on about half of the bird species population declining in New Delhi mainly due to human factors like loss or degradation of habitats, changes in land use, overexploitation, and climate change. [31]
Chiranjeevi Kulkarni,	May 09, 2022	Deccan Herald (DHNS), Bengaluru	He highlighted that an predicted 5245 bird species (48 %) throughout the globe are alleged to be the continuing population decline and he opined in his article based on nine researcher's studies that the existing conservation efforts are insufficient to control the threatening and loss of avian biodiversity. [20]
Neha Jain	21 February 2020	MONGABAY: News & Inspiration from Nature's Frontline in India	She presented a comprehensive report based on data collected by birdwatchers (including citizen scientists) where it's found that Indian birds are declining overall and call for instant research into the causes of the decline of 101 species classified as 'High Conservation Concern', 34 of which are now not scheduled in the IUCN Red List. [16]
Aathira Perinchery	May 14, 2022	Science: The Wire-Environment	According to her, bird populations have been declining increasingly in the last three decades – and we are why. Hence, habitat destruction and climate change have been emphasized as per report and she recommended for new study on 'important bird areas'. Her research mentions that almost 50% of bird species in India show drastic decline. India's birds are declining and in some cases, catastrophically, warn a report on the status of 867 bird species in India. [35]
Richa Malhotra	18 May 2022	Nature India	She highlighted bigger quantity of species are under threat in the tropics than in the temperate regions and habitat thrashing pushing more bird species to near extinction. [24]
Nikhil Devasar	2020	Big Little Nature Books: Exploring India's Flora and Fauna	He enlightened in his book that bird numbers and diversity are declining every year during our annual bird day counts. [7]
Pinak Priya Bhattacharya	September, 2021	Disappearing wetlands, pesticide use threaten bird population in N Bengal: Experts, The Times of India	He enlightens disappearing wetlands, pesticide use threaten bird population in North Bengal. According to him, consistent decrease in the number of wetlands and rapid usage of pesticides in paddy fields has left the bird population dwindling in North Bengal, said experts. Due to constant exposure to chemical fertilizers and pesticides in the paddy fields and also in the vast tea belt of the region, both migratory as well as domestic birds have suffered a sharp decline in their numbers, they said. [3]
Ashwin Viswanathan, et. al.	February, 2020	State of India's Birds 2020: Background and Methodology	The article presents the statistical methodology used to minimize biases inherent in semi-structured data, and to estimate indices of population trends (long-term trend over the last 25 years and current annual trend over the last 5 years) and range size for 867 of India's 1333 bird species. It also reflects the rationale used to place each species in a 'concern' category (Indian Species of Conservation Concern) and prioritize species for research and conservation. [41]
BirdLife International (2022)	2022	State of the World's Birds 2022: Insights and solutions for the biodiversity crisis.	According to this research report, one in eight bird species is threatened with extinction, and the status of the world's birds continues to deteriorate: species are moving ever faster towards extinction. The article suggests for Key threats to the world's birds require mitigation, including preventing overexploitation and illegal killing of birds, managing invasive alien species, tackling fisheries by catch, and minimizing the negative impacts of energy infrastructure. Many threatened species also require targeted recovery actions such as captive breeding and release, translocation, supplementary feeding and other species-specific interventions. [6]
Payra, A., et. al.	2017	Status and diversity of avifauna in coastal areas of South Bengal, India	The paper enlightens the status and diversity of avifauna in coastal areas of South Bengal, India from January 2014 to June 2016. As per this study, out of the 171 species bird species recorded in the study area, three species "near threatened"; and the remaining 168 species were "least concern", according to IUCN. The study contributes the abundance of avifauna for the first time in the coastal region of South Bengal along-with their primary habitats and migratory status. [34]
Atish Manna & Dr. Sumit Giri	January 2023	Diversity and abundance of shore and wader avifauna in Purba Medinipur coastal belt, WestBengal, India: A Comprehensive Study, Journal of Emerging Technologies and Innovative Research (JETIR)	The paper reflects wader's diversity on the coastal belt of Prurba Medinipur district in West Bengal.The study reveals total 60 species of shore and waders includes 13-families under 5-orders whereas due to human interference at several sites like Boguran and Bankiput lower diversity of species is observed. Hence, the research suggests for continuous monitoring of the wader avifauna needed for their protection with naturality. [25]
Arajush Payra	September	Avifauna of adjoining	The study on and along the Digha-Shankarpur estuary region of Purba

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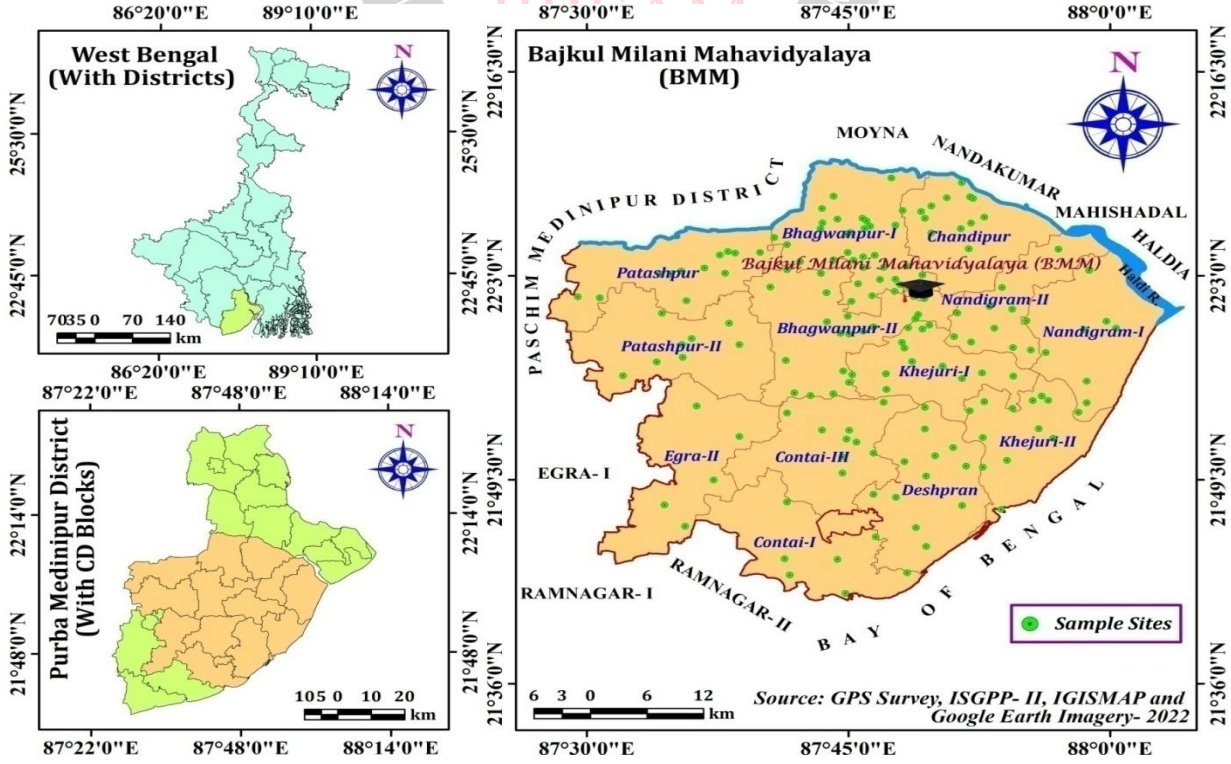
	2020	coastal areas of Purba Medinipur district, southern West Bengal, India: additional records and updated list (Cuadernos de Biodiversidad)	Medinipur district, West Bengal, India, reveals the record of 178 bird species in the region having 29 formerly not reported species here and total of 225 with present and past records. This study also shows 9 bird species as near threatened and 1 as vulnerable on this coastal stretch. [33]
Bain GC, et. al.	December 2022	Changing bird communities of an agricultural landscape: declines in arboreal foragers, increases in large species, The Royal Society Publishing	This paper examines how land-use change has affected birds of the Tasmanian Midlands, one of Australia's oldest agricultural landscapes and a focus of habitat restoration. Hence, surveying birds at 72 sites and testing relationships of current patterns of abundance and community composition to landscape and patch-level environmental characteristics have been emphasized. [2]
Manojit Sau, Mainak Chakraborty, Riya Das and Supratim Mukherjee	2018	Effect of Multiple Adjoining Habitats on Avifaunal Diversity in an Agriculture-Based Wetland Adjacent to the Hooghly River, West Bengal, India (THE RING 40)	This study significantly shows that when a wetland is enclosed by agriculture rather than aquaculture like fishery, bird's diversity is increased; while forestassociated with wetland-farmland maximizes species richness with minimum dominance and hence imparts greater stability to the overall community structure. [38]
Asif Hossain & Gautam Aditya	26 September, 2014	Avian Diversity in Agricultural Landscape: Records from Burdwan, West Bengal, India	This study shows the bird species assembly of agricultural landscapes of Burdwan in West Bengal, India. The study accounts the incidence of 3-species as IUCN NT category and many species having spare populace as per individual encounter rate and number in the habitation. [13]
Shishir Moral	15 May 2022	Birds are decreasing globally (Pratham Alo-Environment, Dhaka)	According to the report there are 11 thousand bird species around the globe among which 48% or 5,245 species of birds are decreasing. [30]
Abdul Jamil Urfi	20 February 2020	Why bird decline in India should worry all of us	As per this article, dipping avian populations are a direct indicator of environmental degradation. The report indicates that while 48% of common bird species of India have remained stable or increased in the long term, 79% have been on decline in the last five years. In all, 101 species have been classified as of 'high conservation concern'. [40]
Rajah Jayapal	21 February 2020	Down To Earth (Ishan Kurkreti)	According to him, "urbanisation biggest culprit for decline in India's bird population." [19]

Source: Author's Own Composition

III. LOCATION OF THE STUDY AREA



Map 1: Location of the Study Area with respect to Our College, Bajkul Milani Mahavidyalaya

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Location of any study area does not indicates only the geographical features, but also all the geo-environmental aspects directly or indirectly. Our study area, the specific part of Purba Medinipur district shows a large segment of fluvio-coastal West Bengal which is very important because of its fine and fantastic fluvio-coastal scenario with well anthropogenic set up. Geometrically, the study area is located in between 21°42′45″N – 21°10′45″N and 87°27′45″E-87°04′15″E. Geomorphologically, this area is one of the fluvio-coastal segments surrounded by Haldi and Keleghai rivers at the north and north-west, Pichhabani river at the south, Rasulpur river through the central part, Hooghly river and Bay of Bengal at the east and south-east under South Bengal Basin having the characteristics of fluvio-coastal landscape. Geologically, this is one costal section on the recent fluvio-coastal sedimentary and alluvial sub-formation of Quarternary-Holocene Sequence of Bengal Coastal Formation (6000-8000 BP). Not only that, this area is featured by the blue-green fertile and productive fluvio-coastal landscape having the geo-conference and enriched biodiversity under the excellent co-existence of river, forest, sea, sand and sun. From the view point of political and administrative background, the study area is one important fluvio-coastal rural region belonging under Purba Medinipur district in West Bengal. About 13-CD Blocks including Khejuri-I and II, Bhagwanpur-II, Contai-I and III and Deshaparan under Contai Sub-division, Nandigram-I and II under Haldia Sub-division, Patashpur-I and II, Egra-I under Egra Sub-division and Chandipur under Tamluk Sub-division have been considered for the study. Total sampled 184-villages having 780-respondents of the selected rural Purba Medinipur are featured by riverine, coastal, fluvio-coastal and inland landscapes in nature.

IV. OBJECTIVES

- *To know about the common popular birds existed in our habituated daily environment;*
- *To prepare a regional data book as the data bank for the common popular birds over time;*
- *To look-over the state and status of the common popular birds in local environment comparing to the regional and global backgrounds;*
- *To investigate the major responsible causes for massive declining the common birds throughout the time;*
- *To assess the impacts, vulnerability and risk of this huge common bird declining in the study area;*
- *To look into the roles of individuals, authorities, institutions and agencies for saving, protecting and conserving the common birds in self of man and nature both;*
- *To build up a sustainable plan justifying the managemental gaps for micro-level planning and management of such a vital issue in the selected region.*

V. MATERIALS, METHODS AND METHODOLOGY

5.1 Major methods, database, software and sampling techniques used for the study:

Whole of the study has been considered, conducted and completed in different sequential stages whereas different methods have been used at various stages as per research requirement. Table 2 and table 3 do not show only the major methods during different stages, but indicates the major databases, tools and techniques which are applied to fulfill the research.

Table 2: Stage/ Phase wise Various Methods for the Study

Pre-Field Stage	Field Stage	Post Field Stage		
Stage –I: Preparatory Phase (Stage of Preparation)	**Stage –II: Collecting Phase (Stage of Collection)**	**Stage –III: Processing Phase (Stage of Operation): Data Processing, Data Analysis & Interpretation**	**Stage –IV: Monitoring Phase (Stage of Justification)**	**Stage –V: Concluding Phase (Recommendation & Conclusion)**
• Study Area Selection • Problem Selection • Formulation of Problems • Statement of the Problem ❖ Literature Review: Offline Literature Review/ Library Research & Online Literature Review • Objectives Formulation • Preparation of Data Collection Tools & Techniques ❖ Sampling Techniques Fixation ❖ Survey Schedule/ Questionnaire Making	❖ Collection of Primary Data through different kinds of sampling and Physical and Socio-economic Survey regarding the issues & Institutional Survey with Photo Documentation ❖ Collection of Secondary like Data through Previous Records, Books, Reports, Articles, Journals, Documents from various sources	▪ Data gathering, compilation & organization ▪ Laboratory Analysis of collected samples & data documentation ▪ Various Statistical analysis and presentation with proper statistical software ▪ Mapping Analysis/ Digital Analysis of Remote Sensing Data: LULC, disaster impact assessment, hazard vulnerability assessment and other relevant mapping analysis with proper GIS software ▪ Interpretation / Discussion of all above statistical and mapping analysis ▪ Selection, editing and organizing the documented photos/ pictures for ground truth verification	Monitoring the data, result and presentation	➢ Making the draft of research report ➢ Making the summary of findings ➢ Multi-criteria Decision Making ➢ Making the recommendations for action ➢ Making the planning strategies & preparing the planning blueprint and ➢ Finalization of Research Report

Source: Author's Own Composition

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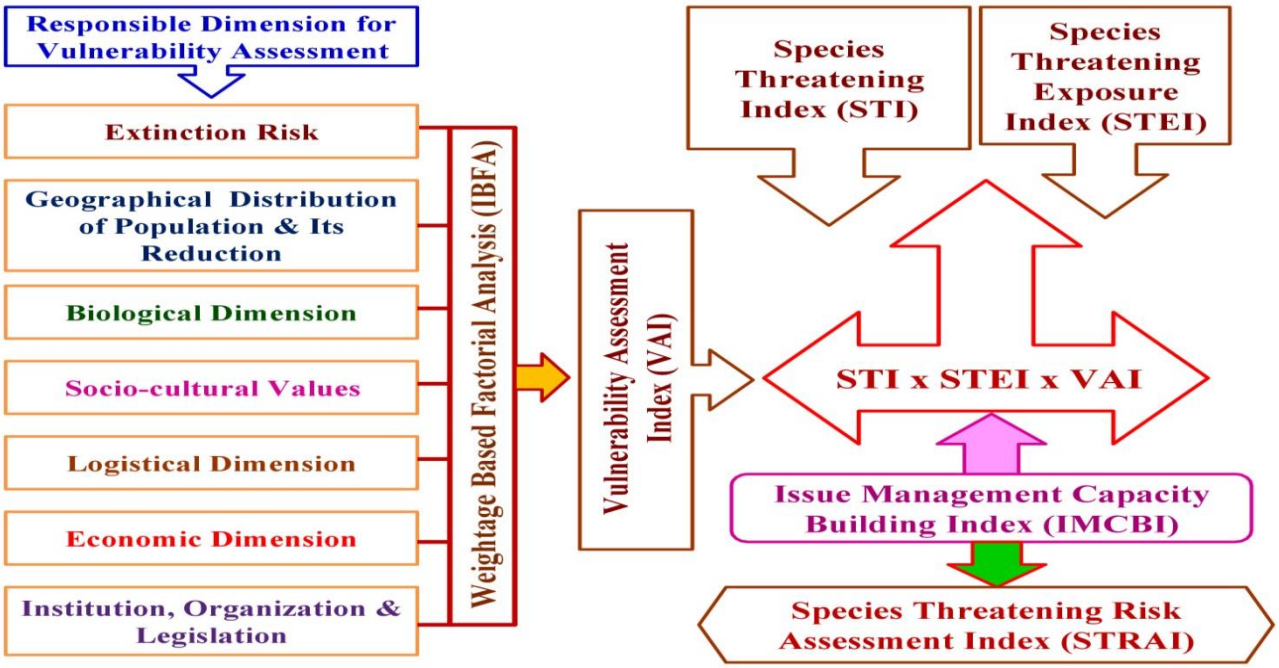
Table 3: Major database, software and sampling techniques used for the study			
Major Database	**Major Software**	**Major Survey Techniques**	**Major Sample Techniques**
• Satellite Images like ❖ LANDSAT-Series ❖ IRS Series, etc. • Different Base Maps collected from various institutions/ organization/ departments • ISGPP, IGISMAP and Google Earth Imagery-2022 • Bhuvan: Indian Geo-platform of ISRO • Database of Different Govt./ Administrative Offices/ Departments • Census Records/ Documents • Institutional/ Departmental/ Organizational Draft Report/ Audit Report/ Progress Report, etc.	• ARC GIS 10.3.1 • GPS • MS Excel • SPSS IBM	❖ Literature Survey ❖ Traversing & GPS Tracking ❖ Perception Survey on Target Group (Structured Questionnaire Method) ❖ Institutional Survey (Structured Questionnaire Method) ❖ Individual Interview (Formal Method)	❖ Systematic Random Sampling ❖ Sratified Random Sampling ❖ Stratified Random Sampling ❖ Purposive Sampling, etc. for sample CD Blocks, Villages and Respondent Selection for the Study
Source: Author's Own Composition			



Flow Chart-1: Estimation of Vulnerability Assessment Index and Species Threatening Risk Assessment Index for the Study Area

5.2 Respondents and Their Nature: Age of the Respondents for Perception Survey:

Table 4: Age of the Respondents for Perception Survey					
Sl. No.	**Age Groups of Respondents (Yrs.)**	**Number of Respondents**	**% of Respondents**	**Aged Categories of Respondents**	**Nature of Respondents**
1.	<30	27	3.46	Late Young to Early Mature	Academicians, Researchers & Environmentalists
2.	30-39	109	13.97		
3.	40-49	162	20.77	Mid Mature to Late Mature	Common People, Academicians, Researchers, Environmentalists & Experienced Persons
4.	50-59	178	22.82	Late Mature to Early Older	
5.	60-69	202	25.90	Elderly & Senior Citizens	Older & Experienced Common People, Academicians, Researchers, Environmentalists & Experienced Persons
6.	≥ **70**	102	13.08		
	Total	**N = 780**	**100**		
Source: *Field Study, 2021-2023*					

For this study on, we have selected 780 respondents for their valuable responses or perceptions. The data table 4 reflects that among the respondents, 17.43% belongs to late young to early mature including academicians, researchers and environmentalists in the study area whereas 38.98% of them is elderly and senior citizens including older and experienced common people, academicians, researchers, environmentalists and experienced persons. About 43.6% of the respondents under mature to early older category includes the common people, academicians, researchers, environmentalists and experienced persons. This respondent profile shows the enhancement on older, experienced and expert characters for such an important perception survey.

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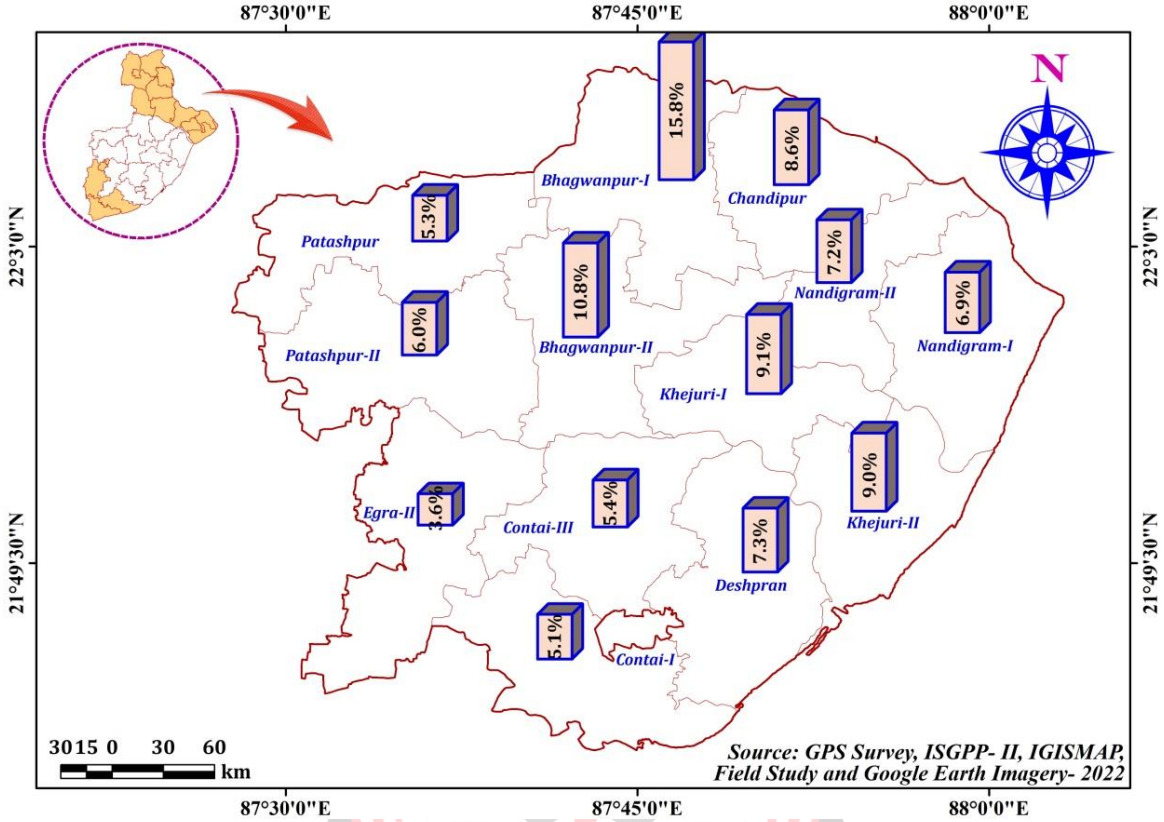
5.3 Categories of Sample Respondents:

The data table 5 indicates, most of the respondents (41.92%) is under older and experienced category whereas 35.38% is from common people, 15.9% is under academicians and environmentalists, 4.49% is included of organizational and institutional characters and only 2.31% from the research world respectively.



Map 2: Block wise Distribution (Number based) of the Sample Respondents throughout Study Area

Table 5: Categories of Sample Respondents

Categories of Sample Respondents	Number of Respondents	% of Respondents
Older & Experienced Person	327	41.92
Past & Present Researchers	18	2.31
Academicians & Environmentalists	124	15.90
Relevant Organizational & Official Characters	35	4.49
Other Common People	276	35.38
Total	**780**	**100**

Source: *Field Study, 2021-2023*

5.4 Categories of Sample Respondents as per Block and types of Surveyors:

Table 6: Categories of Sampled Respondents and Surveyors (as per Block Residence)

Residential Blocks	Number of Respondents	% of Respondents	Number of Surveyors	% of Surveyors	Categories of Surveyor	Number of Surveyors	% of Surveyors
Contai-I	40	5.13	6	5.71	Students of Zoology (UG)	26	24.76
Deshapran	57	7.31	8	7.62			
Contai-III	42	5.38	6	5.71	Students of Nutrition (UG)	18	17.14
Khejuri-I	71	9.10	9	8.57			
Khejuri-II	70	8.97	10	9.52	Students of Geography (UG)	10	9.52
Nandigram-I	54	6.92	8	7.62			
Nandigram-II	56	7.18	8	7.62	Students of Geography (PG)	9	8.57
Chandipur	67	8.59	6	5.71			
Bhagwanpur-I	123	15.77	17	16.19	Technical Field Workers	3	2.86
Bhagwanpur-II	84	10.77	10	9.52	Local Youths	13	12.38
Potashpur-I	41	5.26	6	5.71	Local Elderly	13	12.38
Potashpur-II	47	6.03	6	5.71	Local Academician	13	12.38
Egra-II	28	3.59	5	4.76			
Total	**780**	**100**	**105**	**100**		**105**	**100**

Source: *Field Study, 2021-2023*

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5.5 Categories of Sampled Respondents and Activated Surveyors (Sub-division wise):

Table 7: Categories of Sample Respondents as per Sub-divisional Residence				
Residential Sub-divisions	**Number of Respondents**	**% of Respondents**	**Number of Surveyors**	**% of Surveyors**
Contai	364	46.67	49	46.67
Egra	239	30.64	34	32.38
Haldia	110	14.10	16	15.24
Tamluk	67	8.59	6	5.71
Total	**780**	**100**	**105**	**100**

Source: *Field Study, 2021-2023*

The table 6 and 7 reflects the block wise and sub-division wise respondents and also extent and types of survey workers. Bhagwanpur-I and II, Khejuri-I and II, Chandipur, and Nandigram-II CD Blocks show the higher amount of respondents (15.77% , 10.77%, 9.10%, 8.97%, 8.59% and 7.18%) since these blocks as the neighbourhood administrative units of our college, Bajkul MIlani Mahavidyalaya have been emphasized for our study. In this case, others blocks like Nandigram-I, Contai-I and III, Deshapran, Patashpur-I and II and Egra-II have been considered also because of a remarkable students are from all those blocks of Purba Medinipur district. As per data, survey workers are mostly college level UG and PG students (59.99%) from the different disciplines like Zoology, Nutrition and Geography in Bajkul MIlani Mahavidyalaya whereas 24.76% are local youths and elderly people and 12.38% is as local academician. In fact 2.86% is technical worker for conducting the survey technically with success.

On the other hand, in the selected district, most of the respondents (46.67%) is from Contai Sub-division while 30.64% from Egra, 14.10% from Haldia and only 8.59% from Tamluk have been coined for this perception survey cum study. Further, most of the surveyors (46.67%) is from Contai sub-division followed by Egra (32.38%), Haldia (15.24%) and Tamluk (5.71%) respectively.

VI. RESULT AND DISCUSSION

6.1 State and Status of the Sample Common Birds in the Study Area:

6.1.1 Block and Sub-division wise Sampling of Common Birds with respect to Recorded and Observed Total in the Study Area:

Table 8: Categories of Recognized Sampled Common Birds as per Block Residence		
Residential Blocks of Sample Respondents	**Number of Sampled Common Birds**	**% of Sampled Common Birds**
Contai-I	59	88.06
Deshapran	62	92.54
Contai-III	47	70.15
Khejuri-I	54	80.60
Khejuri-II	61	91.04
Nandigram-I	58	86.57
Nandigram-II	52	77.61
Chandipur	48	71.64
Bhagwanpur-I	53	79.10
Bhagwanpur-II	54	80.60
Potashpur-I	46	68.66
Potashpur-II	40	59.70
Egra-II	45	67.16
Total	**N_B = 67**	**100**

Source: *Field Study, 2021-2023*

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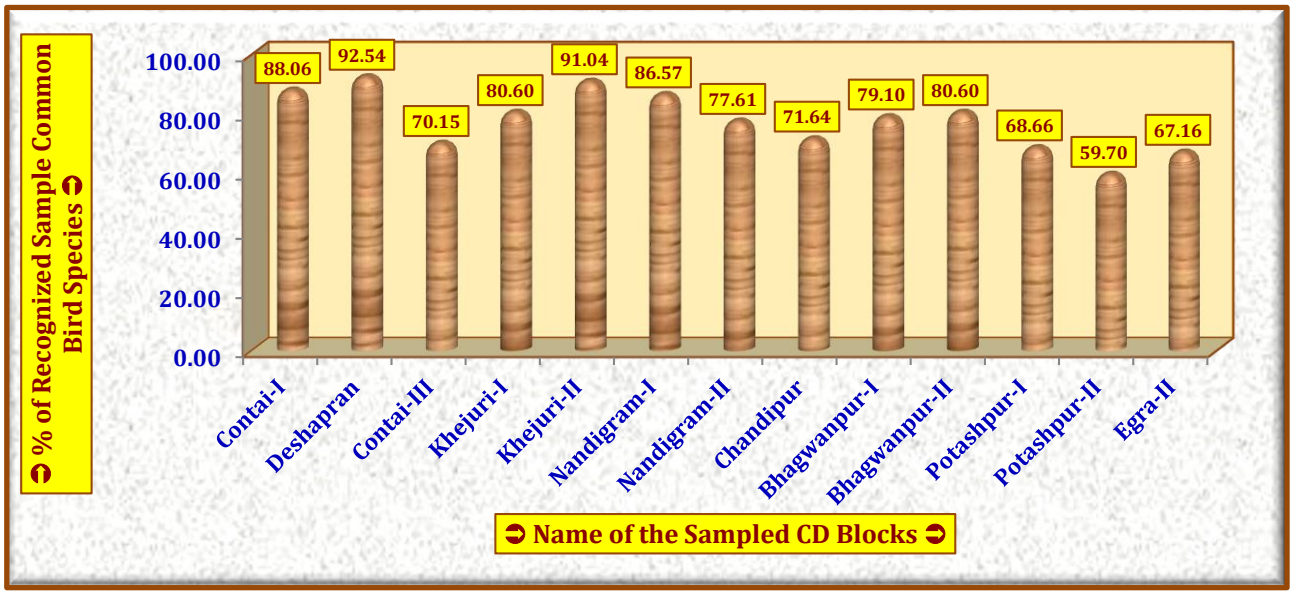

Figure 1: Recognized Sample Common Bird Species as per CD Blocks in the Study Area

As per survey on experts, academicians and environmentalists, it is clear that the total number local common birds including migratory and invasive others in the study area is 352 on the estimated research scale. As per habitat types, coastal and inland forests shows the highest intensity of bird species (22.44%) followed by aquatic habitat (21.88%), agro-habitat (15.91%), grassland and wasteland (10.80%) and domestic habitat (9.94%) respectively.

Table 9: Categories of Recognized Sampled Common Birds as per Sub-divisional Residence

Residential Sub-divisions of Sample Respondents	Number of Sampled Common Birds	% of Sampled Common Birds
Contai	62	92.54
Egra	53	79.10
Haldia	48	71.64
Tamluk	58	86.57
Total	**N_B = 67**	**100**

Source: *Field Study, 2021-2023*

Table 10: Sample Popular Common Birds in the Study Area

Habitat Types	Estimated Birds as per Avibase-The World Bird Database	Observed Birds as per eBird Field Checklist	Expert's & Institution's Estimated Figure of Birds		Identified Common Birds by Respondents			Sampled Common Birds by the Surveyors for the Study			
			Number	% w.r.t. Total	Number	% w.r.t. Respondent's Total	% w.r.t. Expert's Total	Number	% w.r.t. Sample Total	% w.r.t. Respondent's Total	% w.r.t. Expert's Total
Agricultural habitat	478	278	56	15.91	29	19.86	51.79	10	14.92	34.48	17.86
Aquatic Habitat			77	21.88	37	25.34	48.05	15	22.39	40.54	19.48
Domestic/ Household Habitat			35	9.94	18	12.33	51.43	8	11.94	44.44	22.86
Grassland and Wasteland Habitat			38	10.80	16	10.96	42.11	7	10.45	43.75	18.42
Coastal and Interior Forest Habitat			79	22.44	32	21.92	40.51	20	29.85	62.50	25.32
Other Habitats			67	19.03	14	9.59	20.90	7	10.45	50.00	10.45
Total	**478**	**278**	**352**	**100**	**146**	**100**	**41.48**	**67**	**100**	**45.89**	**19.03**

Source: *Field Study, 2021-2023*

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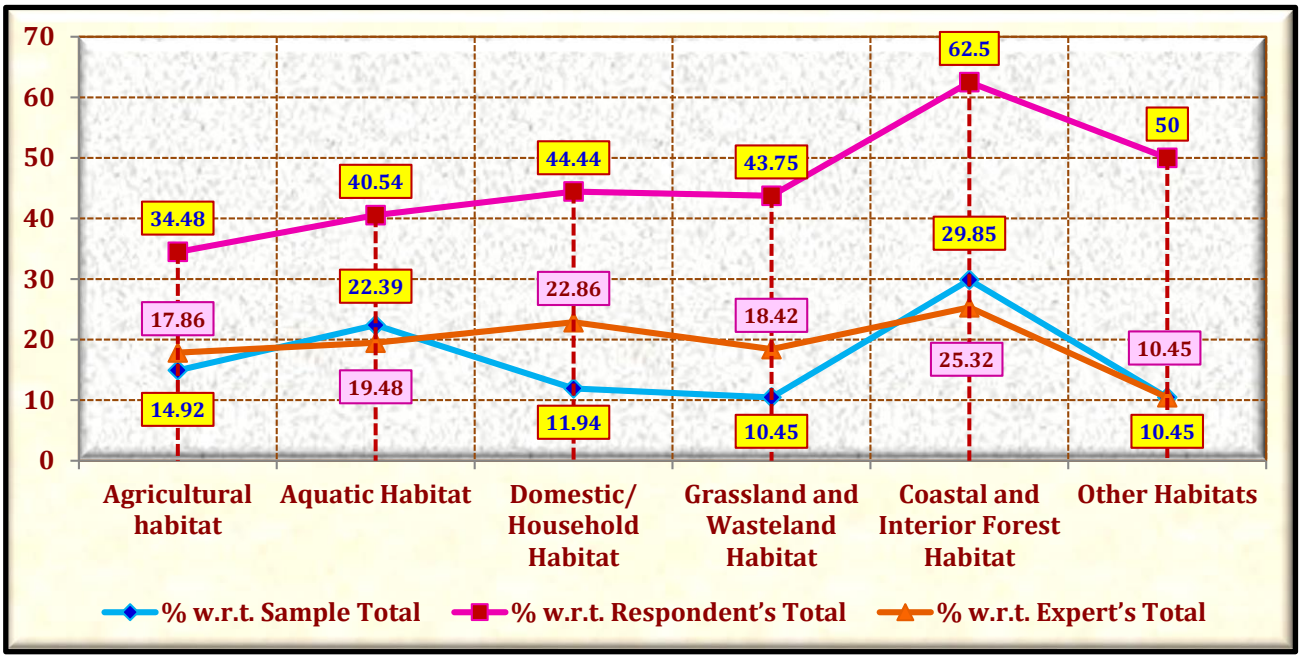

Figure 2: Comparative Scenario of Expert Estimated, Respondent's identified and Surveyor's Sampled Common Birds in the Study Area

As per perception survey, respondent's knowledge on 146 common birds is reflected whereas aquatic habitat (25.34%), coastal and interior forest cover (21.92%), agro-habitat (19.86%), domestic and grassland-wasteland (12.33%) habitats having sequential birds intensity have been experienced respectively. The data table 10 and figure 2 common birds have been selected from expert's estimated total 352 and respondent's known 146 common bird species which are 19.03% with respect to the total and 45.89% with respect to respondent's account respectively.

6.1.2 Sampled Common Birds showing their identity, habitat and status:

Table 11: Sampled Common Birds showing their identity, habitat and status

Local Name	Common Name	Scientific Name	Order	Family	Habitat	IUCN Status	IUCN Status on Regional Scale	Global Positioning Trend	Local Status
Baj	Hawk	Accipitridae	Accipitriformes	Accipitridae	Open places like fields	EX	EX	U	ANF
Shokun	Vulture	*Gyps indicus* (Scopoli, 1786)	Accipitriformes	Accipitridae	Tall trees to nest, high human-made structures	CR	EX	U	ANF
Chil	Kite	Milvus migrans	Accipitriformes	Accipitridae	areas of high human population	LC	CR	U	ANF
Shankhachil	Brahminy Kite	*Haliastur indus* Boddaert, 1783	Accipitriformes	Accipitridae	mainly on the coast and in inland wetlands, where they feed on dead fish and other prey	NT	EX	U	ANF
Balihans	Cotton pygmy goose	*Nettapus coromandelianus* Gmelin, 1789	Anseriformes	Anatidae	lakes and ponds with emergent vegetation, small village ponds, wet paddy lands, etc.	LC	EN	D	FC
Bhutihansh	Baer's Pochard	Aythya baeri	Anseriformes	Anatidae	densely vegetated coastal wetlands, or around ponds	CR	EX	D-U	ANF
Phuluri Hash	Falcated Duck	Mareca falcata (Georgi, 1775)	Anseriformes	Anatidae	shallow ponds, rivers with sufficient submerged, floating and emerging vegetation	NT	EN	D	R
Dhanesh	Hornbill	Bucerotidae	Bucerotiformes	Bucerotidae; Rafinesque, 1815	open woodlands and dense forests	LC	EW	U	ANF
Mohanchura	Eurasian hoopoe	*Upupa epops* Linnaeus, 1758	Bucerotiformes	Upupidae	heath land, wooded vegetation and grasslands	LC	EW	U	ANF

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Deshi Gangchosha	Indian Skimmer	Rynchops albicollis	Charadriformes	Laridae	rivers, swamps and coastal wetlands such as estuaries	CR	EX	D-U	ANF
Chamuch thuto Batan	Spoon-billed Sandpiper	Calidris pygmaea (Linnaeus, 1758)	Charadriiformes	Scolopacidae	Coastal mudflats	CR	EX	U	ANF
Dagilej Jourali	Bar-tailed Godwit	Limosa lapponica (Linnaeus, 1758)	Charadriiformes	Scolopacidae	estuary, intertidal mudflats and rarely freshwater wetlands	NT	CR	D-U	R
Kalogola Manikjor	Black-necked Stork	Ephippiorhychus asiaticus	Ciconiformes	Ciconidae	Freshwater, natural wetland habitats like ponds, marshes, flooded grasslands, swamps, rivers and water meadows.	NT	CR	U	R
Kala Manikjor	Black Stork	Ciconia nigra	Ciconiformes	Ciconidae	ponds, rivers, estuaries and freshwater wetlands	LC	EN	D-U	R
Boro-Modontak, Hargila	Greater Adjutant	Leptoptilos dubius (Gmelin, 1789)	Ciconiiformes	Ciconiidae	large platform of twigs placed at the end of a near-horizontal branch of a tall tree & stalks about in shallow water mass and garbage dumps	EN	EX	U	ANF
Ghughu	Spotted dove	Streptopelia chinensis	Columbiformes	Columbidae	woodland, scrub, farmland and habitation	LC	VU	D	FC
Payra	Domestic pigeon	Columba livia domestica	Columbiformes	Columbidae	Households, temples, mosque and other inhabitant infrastructure	LC	VU	D	C
Payra	Feral pigeon/ city doves, city pigeons, or street pigeons	*Columba livia domestica* Gmelin, 1789	Columbiformes	Columbidae	street, open field, paddy field, farmland, etc.	LC	VU	D	C
Dholatupi Paira	Pale-capped Pigeon	Columba punicea	Columbiformes	Columbidae	open, deciduous forest, bamboo, and agricultural fields	VU	CR	D-U	R
Macchranga	Kingfisher	Alcedo Atthis (Linnaeus, 1758)	Coraciiformes	Alcedinidae Rafinesque, 1815	Near pond, river and reservoir side tree/ forest/ woodland	LC	VU	D	FC
Nilakantha	Indian roller	*Coracias benghalensis*	Coraciiformes	Coraciidae	open woodland dominated by trees, human-modified landscapes such as parks and gardens, fields, date & coconut palm plantations	LC	EW	U	ANF
Chatak	Jacobin cuckoo	Clamator jacobinus	Cuculiformes	Cuculidae	thorny, dry scrub or open woodland	LC	CR	D-U	R
Bou Kotha Kao	Indian cuckoo	Cuculus micropterus	Cuculiformes	Cuculidae	Deciduous and evergreen forests, garden lands and thick scrub	NT	EW	U	R
Koyel	Asian Koel	*Eudynamys scolopaceus* (Linnaeus, 1758)	Cuculiformes	Cuculidae	light woodland and cultivation	LC	EW	D-U	R
Chokh gelo pakhi	Common hawk-cuckoo, Brainfever bird	*Hierococcyx varius*	Cuculiformes	Cuculidae	garden land, groves of tree, deciduous and semi-evergreen forests	LC	CR	U	ANF
Kokil	Cuckoos	Cuculus canorus	Cuculiformes Wagler, 1830	Cuculidae Leach, 1820	forests and woodland, Garden tree, domestic forest	LC	VU	D	FC
Banmurgi	Painted spur fowl	*Galloperdix lunulata* (Valenciennes, 1825)	Galliformes	Phasianidae	Bushes, thickets, jungles, etc.	LC	EX	U	ANF
Banmorag	Jungle fowl	*Gallus gallus*	Galliformes	Phasianidae	Bushes, thickets, jungles, etc.	LC	EX	U	ANF
Kala Titir	Black Francolin	Francolinus francolinus	Galliformes	Phasianidae	Scrubby habitats with plenty of cultivated crops tall enough. They prefer areas of thick vegetation, usually near water.	LC	CR	D-U	R

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Saros	Sarus crane	*Antigone antigone* (Linnaeus, 1758)	Gruiformes	Gruidae Vigors, 1825	Wetlands, uncultivated lowlands, paddy lands, riversides, reservoir, etc.	VU	CR	D	FC
Dahuk	White-breasted water hen	*Amaurornis phoenicurus* Pennant, 1769	Gruiformes	Rallidae	Near wetland, pond, lake, canal, small brushes, etc.	LC	CR	D-U	R
Kalamukh Perapakhi	Masked Finfoot	Heliopais personatus (Gray, 1826)	Gruiformes	Heliornithidae	walking in mudflat or swimming in shallow water & builds nests amongst thick bush or on horizontal mangrove tree branches	EN	EX	U	ANF
Bangla Dahar/ Bengal bustard	Bengal florican	*Houbaropsis bengalensis* (Gmelin, 1789)	Otidiformes	Otididae	open tall grassland habitats with scattered bushes	CR	EX	U	ANF
Tuntuni	Tailorbird	Orthotommus sutoriu	Passeriformes	Cisticolidae	open farmland, scrub, forest edges and gardens	LC	EN	D	FC
Chorui	House sparrow	*Passer domesticus*	Passeriformes	Passeridae; Rafinesque, 1815	Close to human habitats	LC	VU	D	FC
Chorui	Field sparrow	*Spizella pusilla* (Wilson, 1810)	Passeriformes	Passerellidae	The ground or in low vegetation, old fields and forest edges	LC	EN	D	FC
Doyel	Oriental magpie-robin	Copsychus saularis	Passeriformes	Muscicapidae	Close to farmland, woodland and human habitation	LC	CR	D-U	R
Finge	Black Drongo	Dicrurus macrocercus	Passeriformes	Dicruridae	Forests, open land, farmland and gardens	LC	CR	D-U	R
Babui	Weavers Bird	Ploceus philippinus	Passeriformes	Ploceidae Sundevall, 1836	Domestic forests, grasslands, cultivated areas, scrub	VU	CR	D-U	R
Jungle Crow	Carrion Crows	*Corvus corone*	Passeriformes	Corvidae	Areas of moors, woodland and farmland	LC	VU	D	FC
Patikak	House Crows	*Corvus splendens*	Passeriformes	Corvidae	Areas of human activity or habitation including cities	LC	LC	D	C
Danrkak	Large-billed crow	Corvus macrorhynchos	Passeriformes	Corvidae	Plain areas, bushes, jungles, bamboo forests, etc.	LC	NT	D	FC
Moyna	Myna	*Gracula religiosa* Linnaeus, 1758	Passeriformes	Sturnidae	Woodland & domestic forests	LC	CR	D-U	R
Shalik	Common Indian myna	Acridotheres tristis	Passeriformes	Sturnidae	Open woodland, cultivation and around habitation	LC	VU	D	FC
Satvaya	Jungle babbler	Turdoides striata	Passeriformes	Leiothrichidae	Jungle as well as well wooded compounds, gardens and groves of trees	LC	VU	D	FC
Halud Chokha Satvaya	Yellow-eyed Babbler	Chrysomma sinense	Passeriformes	Paradoxornithidae	grassy or thorny scrub both in dry and wet regions like farmland	NT	EN	D	FC
Bulbuli	Bulbul	*Pycnonotus cafer* (Linnaeus, 1766)	Passeriformes	Pycnonotidae	Open habitats, such as gardens, open woodlands, and even gardens	LC	EN	D-U	R
Lej jhola/ Khoyeri Hanrichacha	Rufous treepie	*Dendrocitta vagabunda* (Latham, 1790)	Passeriformes	Corvidae	Open woodland, roadside vegetation, habitation tree, garden, park, etc.	LC	EW	D-U	R
Dhula komar Shyama/ Shyama	White-rumped shama	Copsychus malabaricus	Passeriformes	Muscicapidae	Bamboo forests, lowland forest, etc.	VU	CR	D-U	R
Yellow Bird	Yellow-breasted Bunting	*Emberiza aureola* Pallas, 1773	Passeriformes	Emberizidae	Cultivated areas, rice fields and grasslands, preferring to roost in rice-fields	CR	EX	U	ANF
Bangla Ghashpakhi	Rufous-rumped Grassbird	*Graminicola bengalensis* Jerdon, 1863	Passeriformes	Pellorneidae	Tall emergent vegetation in or bordering freshwater swamps or along banks of rivers in the lowlands	NT	EN	D	FC
Shatadagi Ghashpakhi	Bristled Grassbird	Chaetornis striata	Passeriformes	Sylvidae	Grassland and marshland habitats	VU	CR	D	FC
Kalabook-Tiathuti	Black-breasted Parrotbill	Paradoxornis flavirostris Gould, 1836	Passeriformes	Timaliidae	Wetlands with tall reeds and grasses	VU	EX	U	ANF

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Tilabook-Tiathuti	Spot-breasted Parrotbill	Paradoxornis guttaticollis David, 1871	Passeriformes	Timaliidae	Wetlands with tall reeds and grasses	VU	EX	U	ANF
Lalmatha-Tiathuti	Rufous-headed Parrotbill	Paradoxornis ruficeps Blyth, 1842	Passeriformes	Timaliidae	Wetlands with tall reeds and grasses	VU	EX	U	ANF
Bok	Herons	Ardeidae. Leach, 1820	Pelecaniformes	Ardeidae Leach, 1820	Associated with water and feed on the margins of lakes, rivers, swamps, ponds, and the sea	CR	CR	D	FC
Kath thokra	Woodpeckers	*Dinopium benghalense*	Piciformes	Picidae; Leach, 1820	Woodlands, scrub lands & bamboo forests	LC	VU	D	FC
Bauri/ Bara Basanta Bauri	Blue-throated Barbet	Megalaima asiatica	Piciformes	Megalaimidae	Lowland and edge areas and degraded forests	LC	EW	D-U	ANF
Chandana	Alexandrine parakeet	*Psittacula eupatria*	Psittaciformes	Psittaculidae	Forests, woodlands, agricultural lands and mangrove forests	LC	EW	U	ANF
Fulmatha Tiya	Blossom-headed Parakeet	*Psittacula roseata* Biswas, 1951	Psittaciformes	Psittaculidae	Forest and open woodland	LC	EW	U	ANF
Tiya	Parrots/ Rose-ringed parakeet	Psittacula krameri	Psittaciformes; Wagler, 1830	Psittaculidae	Hightly timbered areas & farmed areas of the countryside	LC	CR	D	R
Pencha	Owls	*Otus bakkamoena* Pennant, 1769	Strigiformes	Strigidae	Jungle, wooded compounds, gardens & groves of trees near habitation	EN	CR	D	FC
Laxmi Pencha	Barn Owl	*Tyto alba*	Strigiformes	Tytonidae	Farmlands, forestlands, garden trees, bamboo forests, etc.	NT	CR	D-U	R
Konthi Nimpencha	Indian scops owl	*Otus bakkamoena*	Strigiformes	Strigidae	Forestlands, garden trees, bamboo forests, etc.	LC	EN	D	FC
Hutom Pencha	Indian eagle-owl	*Bubo bengalensis*	Strigiformes	Chordata	Forestlands, garden trees, bamboo forests, etc	LC	CR	D-U	R
Pankouri	Indian Cormorant	Phalacrocoracidae	Suliformes	Phalacrocoracidae; Reichenbach, 1850	Inland waters like pond, bills, canals, lakes, wetlands, etc.	LC	CR	D	R
Lalmatha Kuchkuchi	Red-headed trogon	*Harpactes erythrocephalus*	Trogoniformes	Trogonidae	Evergreen lowland, lower montane and taller upper montane forests	LC	EW	U	ANF

- EX: Extinct, EW: Extinct in Wild, CR: Critically Endangered, EN: Endangered, VU: Vulnerable, NT: Near Threatened, LC: Least Concern, DD: Data Deficient
- D: Declining, I: Increasing, S: Stable, U: Unknown, D-U: Declining-Unknown
- VC: Very Common, C: Common, **FC:** Fairly Common, **R:** Rare, ANF: Absolutely Not Found

Source: Field Survey-2021-2023, [9], [14] & [15]

Recognized sampled common birds have been shown in table 11 reflecting their identity, habitat and status applying the norms and standards of IUCN Red List, Global Positioning Trend and Local Status in the study area. Table 12 shows the collected data on migratory and abundance status of sampled popular species in the study area where it is seen that sampled 67 birds are of 18 orders and 38 families. Out of the surveyed bird species about 69% is resident whereas about 19% is local migrant and only 12% is as migrant in nature. Further, on the abundance scale, maximum 38.8% of the species are absolutely not found in the study area now where 31.3% are rare unfortunately diluting their dignities in the study area and 28.4% are occasionally found. This is surprising that only 4.5% is common.

Table 12: Migratory and abundance status of sampled species with their orders and families

Orders	Number of families	Number of species	Migratory Status			Abundance Status				
			RE	WM	LM	A	C	O	R	ANF
Accipitriformes	1	4	4	-	1	-	-	-	-	4
Anseriformes	1	3	-	1	2	-	-	1	1	1
Bucerotiformes	2	2	-	1	-	-	-	-	-	2
Charadriiformes	3	3	1	1	1	-	-	-	1	2
Ciconiiformes	1	3	2	-	1	-	-	-	2	1
Columbiformes	1	4	3	-	1	-	2	1	1	-
Coraciiformes	1	2	2	-	-	-	-	1	-	1
Cuculiformes	1	5	4	-	1	-	-	1	3	1
Galliformes	1	3	2	-	1	-	-	-	1	2
Gruiformes	3	3	3	-	-	-	-	1	1	1

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Otidiformes	1	1	1	-	-	-	-	-	-	1
Passeriformes	13	22	15	4	3	-	1	10	7	4
Pelecaniformes	1	1	1	-	-	-	-	1	-	-
Piciformes	2	2	2	-	-	-	-	1	-	1
Psittaciformes	1	2	2	-	-	-	-	-	1	2
Strigiformes	3	4	3	-	1	-	-	2	2	-
Suliformes	1	2	1	-	1	-	-	-	1	-
Trogoniformes	1	1	-	1	-	-	-	-	-	1
Total	**38**	**67**	**46 (68.7%)**	**8 (11.9%)**	**13 (19.4%)**	**-**	**3 (4.5%)**	**19 (28.4%)**	**21 (31.3%)**	**24 (35.8%)**

RE = Residents, WM = Winter Migrants, LM = Local Migrants, A = Abundant, C = Common, O = Occasional, R = Rare and ANF = Absolutely Not Found

Source: Field Survey, 2021-2023, [15] & [34]

6.1.3 Prior Habitats of the Sampled Common Birds in the Study Area:

Table 13: Prior Habitats of the Common Birds in the Study Area

Prior Habitats	Number of Bird Species	% of Bird Species
Agro-habitat: Farmland, croplands, paddy fields, vegetable lands, etc.	10	14.92
Aquatic Habitat: Ponds, canals, lake, channel and riverine wetlands, mudflat, etc.	15	22.39
Domestic Habitat: Settlement, garden, etc.	8	11.94
Grassland Habitat: Open grassland, meadows, etc.	7	10.45
Forest Habitat: Woodlands, normal and social forest, bushes, jungles, etc.	20	29.85
Other Habitat: Road, street, wastelands, construction zone, graveyard, etc.	7	10.45
Total	**67**	**100**

Source: *Field Study, 2021-2023*

As per perception survey, literature review and expert's interview, prepared data table 13 gives an account that most of the sampled common birds (29.85%) are featured by coastal and inland forest habitats whereas 22.39% is habituated with aquatic habitat, 14.92% is with agro-habitat, 11.94% is with domestic/ household habitat and 10.45% is with other types of habitats and niches respectively.

6.1.4 IUCN Red Book Status (3.1) of the Common Birds at Global Level & Regional/ Local Level:

Table 14: IUCN Red Book Status (3.1) of the Common Birds at Global & Regional/ Local Levels

IUCN Red Book Status (3.1)	Global Status of Bird Species		Regional/ Local Status of Bird Species	
	Number	%	Number	%
Extinct (EX)	1	1.49	15	22.39
Extinct in Wild (EW)	-	-	10	14.93
Critically Endangered (CR)	7	10.45	21	31.34
Endangered (EN)	4	5.97	8	11.94
Vulnerable (VU)	8	11.94	10	14.93
Near Threatened (NT)	8	11.94	2	2.98
Least Concern (LC)	39	58.21	1	1.49
Data Deficient (DD)	-	-	-	-
Total	67	100	67	100

Source: *Field Study, 2021-2023*

Table 15: IUCN Red Book Status (3.1) Categories of the Common Birds at Global and Local Level

Categories of IUCN Red Book Status (3.1)	Global Status of Bird Species		Regional/ Local Status of Bird Species	
	Number	%	Number	%
Extinct **(EX)**	1	1.49	15	22.39
Extinct in Wild **(EW)**	0	0	10	14.93
Threatened **(TH)**	19	28.36	39	58.21
Near Threatened **(NT)**	8	11.94	2	2.98
Least Concern **(LC)**	39	58.21	1	1.49
Total	**67**	**100**	**67**	**100**

Source: *Field Study, 2021-2023*

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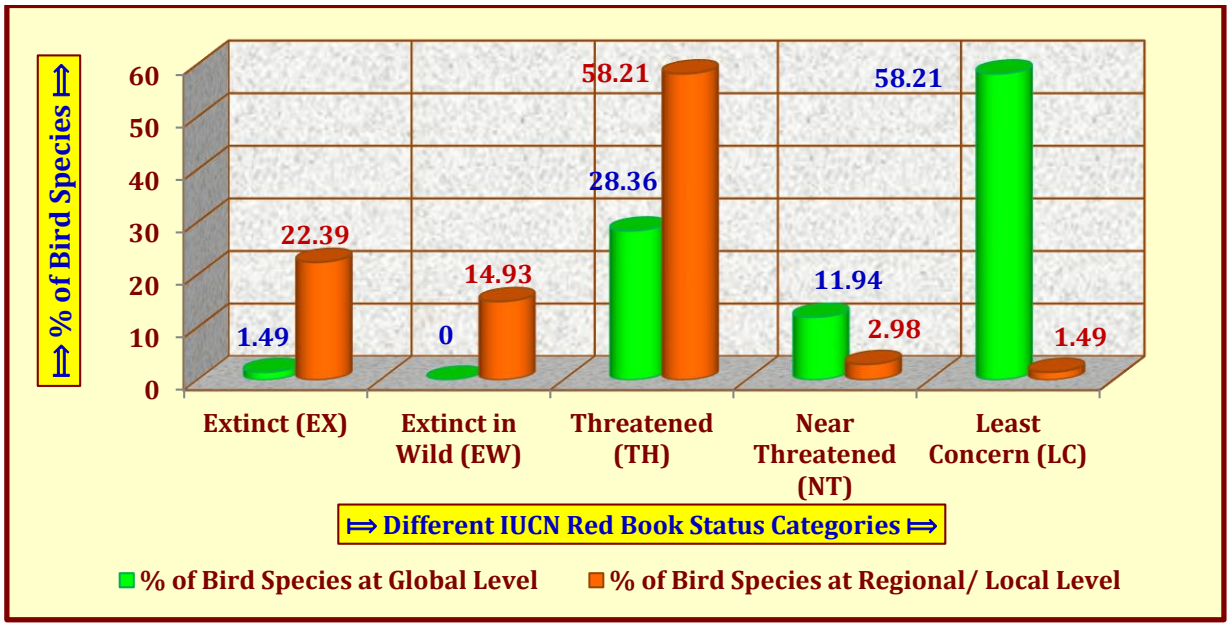

Figure 3: IUCN Red Book Status (3.1) Categories of the Common Birds at Global & Local Level

Survey generated and justified database and tables 14 and 15 and prepared figure-7 and 8 indicate 58.21% of the sampled species is under Least Concern (LC) category as per IUCN Red Book Status (3.1) while only 1.49% is at Extinct (EX) level and 10.45%, 5.97% and 11.94% are under Critically Endangered (CR), Endangered (EN) and Vulnerable (VU) categories respectively. Interestingly, 11.94% of the sampled birds are Near Threatened (NT) under red signal of IUCN. Hence, the data has also been justified on local as well as regional scale maintaining the IUCN Red Book (3.1) Status. Locally or regionally, the scenario is tremendous. This reflects that 22.39% of the sampled common birds have been extinct (EX) already from the study area and 14.93% are also extinct in the wild (EW). Remarkably, 58.21% of the sampled birds are under threatened situation (TH) whereas another 2.98% are near threatened (NT). Only 1.49% is least concern at local level which gives the absolutely red alarm to the regional environment.

6.1.5 Global Population Trend (GPT) of the Common Birds in the Study Area:

Table 16: Global Population Trend (GPT) of the Common Birds in the Study Area

Sl. No.	Global Population Trend (GPT)	Number of Bird Species	% of Bird Species
1.	Declining **(D)**	25	37.31
2.	Increasing **(I)**	-	-
3.	Stable **(S)**	-	-
4.	Unknown **(U)**	23	34.33
5.	Declining **(D)**- Unknown **(U)**	19	28.36
	Total	**67**	**100**

Source: *Field Study, 2021-2023*

The table 16 prepared from perception survey as per Global Population Trend (GPT) shows that 37.31% of the total sampled species are under Declining (D) category of GPT whereas 28.36% are going towards unknown from declining (D-U) trend and 34.33% have been unknown already having extinct in time.

6.1.6 Local Status of the Common Birds in the Study Area:

Table 17: Local Status of the Common Birds in the Study Area

Sl. No.	Local Status	Number of Bird Species	% of Bird Species
1.	Very Common **(VC)**	-	-
2.	Common **(C)**	2	2.99
3.	Fairly Common **(FC)**	19	28.36
4.	Rare **(R)**	21	31.34
5.	Absolutely Not Found **(ANF)**	25	37.31
	Total		**100**

Source: *Field Study, 2021-2023*

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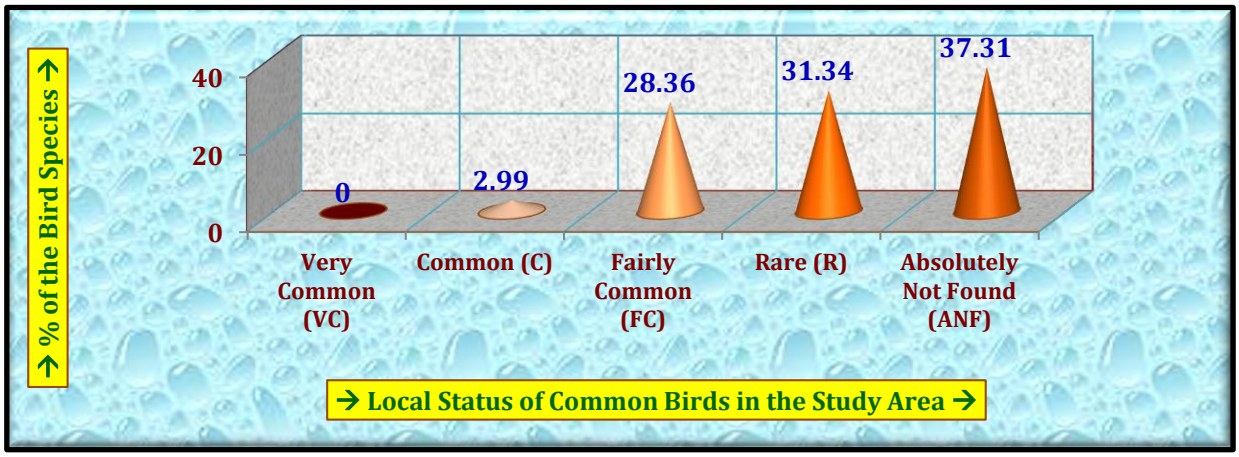

Figure 4: Local Status of the Common Birds in the Study Area

From the intensive observation and extensive survey, estimated data book, table 17 reflects that local status of 2.99% of the sampled common birds belongs to common category (C) whereas 28.36% are fairly common (FC) and 31.34% have been rare (R) in status. Immensely, 37.31% are absolutely not found (ANF) in the local as well as regional environment.

6.2 Causal Analysis and Impact Assessment for Huge Decline in Common Birds:

6.2.1 Major Causes for Common Bird Species Declination:

Table 18: Major Causes for Common Bird Species Declination

Sl. No	Major Causal Action/ Activities for Bird Species Declination	Number of Causal Responses as per Magnitude Scale							% of Causal Responses as per Magnitude Scale						
		VH	H	M	L	VL	NR	T	VH	H	M	L	VL	NR	T
1.	Settlement Expansion	189	271	154	106	33	27	**780**	24.2	34.7	19.7	13.6	4.2	3.5	**100**
2.	Road Expansion & Construction	102	245	146	183	78	26	**780**	13.1	31.4	18.7	23.5	10.0	3.3	**100**
3.	Hunting the Bird Species	98	217	168	176	93	28	**780**	12.6	27.8	21.5	22.6	11.9	3.6	**100**
4.	Illegal Agricultural Activities	111	249	186	154	57	23	**780**	14.2	31.9	23.8	19.7	7.3	2.9	**100**
5.	Illegal Aquaculture Practice	119	251	167	143	76	24	**780**	15.3	32.2	21.4	18.3	9.7	3.1	**100**
6.	Cleaning and clearing the bushes, jungles, thickets, etc. (Devegetation)	164	286	139	113	57	21	**780**	21.0	36.7	17.8	14.5	7.3	2.7	**100**
7.	Implementation of Various Development Projects	95	222	163	166	96	38	**780**	12.2	28.5	20.9	21.3	12.3	4.9	**100**
8.	Climate/ Physical Environmental Change	87	196	191	164	93	49	**780**	11.2	25.1	24.5	21.0	11.9	6.3	**100**
9.	Habitat Fragmentation & Ecosystem Disruption	123	294	151	126	64	22	**780**	15.8	37.7	19.4	16.2	8.2	2.8	**100**
10.	Introducing the exotic species by human practice	79	185	191	195	72	58	**780**	10.1	23.7	24.5	25.0	9.2	7.4	**100**
11.	Increasing Soil, Water and Air Pollution	198	266	102	133	51	30	**780**	25.4	34.1	13.1	17.1	6.5	3.8	**100**
12.	Affecting from electro-magnetic and thermal waves in terms of communicational and digital development	71	199	184	153	126	47	**780**	9.1	25.5	23.6	19.6	16.2	6.0	**100**
	Total							**780**							**100**

VH=Very High, V=Very, M=Moderate, L=Low, VL= Very Low, NR= No Response, T=Total

Source: *Field Study, 2021-2023*

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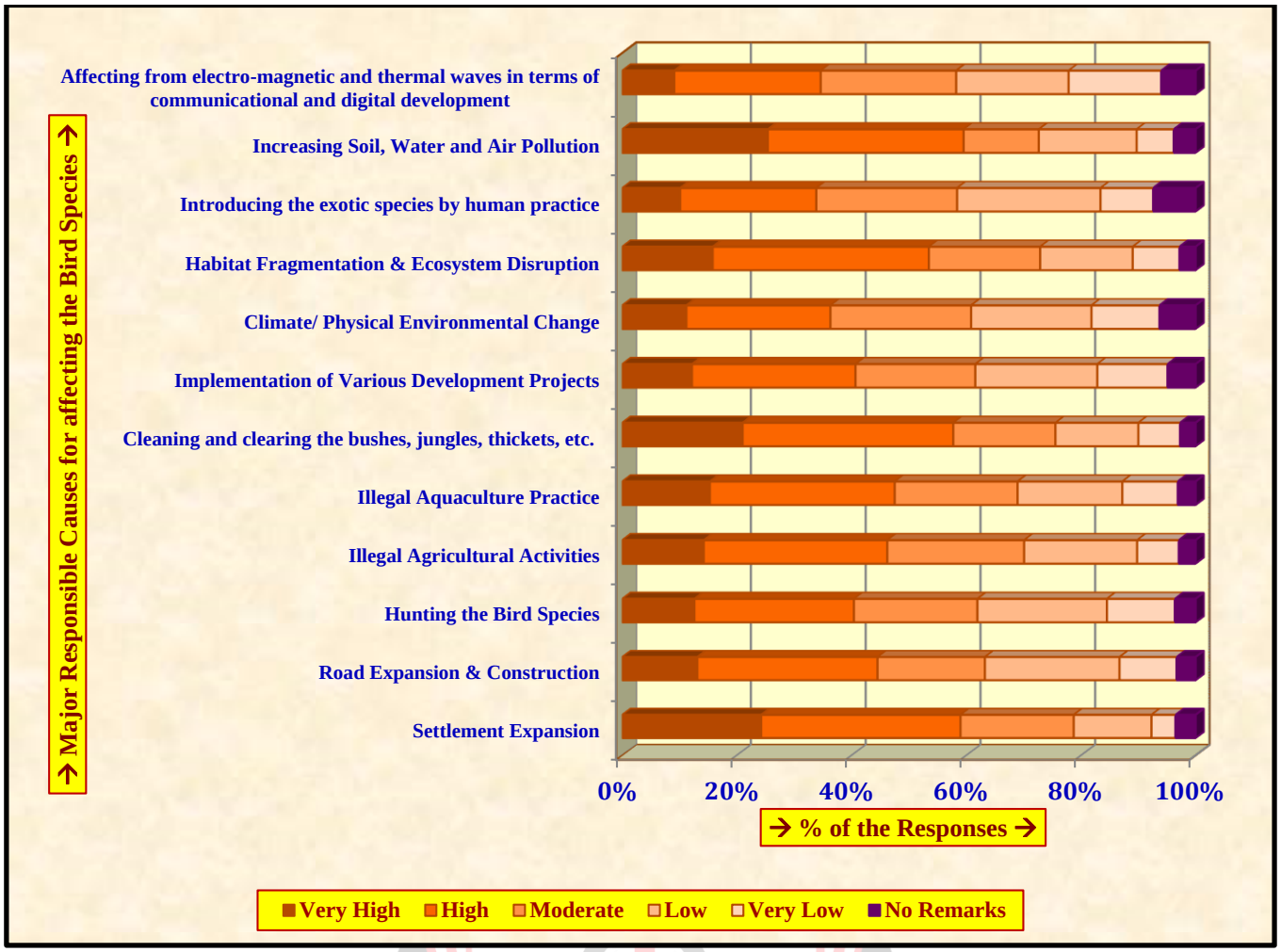

Figure 5: Data on Major Causes for Bird Species Declination

Since the issue is absolutely sensitive to the localities in regional environment, as the social part, we must have to understand assess the cause-effect of the common bird extinct and declining in the study area. From the minute observation, perception survey and interviews and prepared data table 18 and figure 5, there are observed different causes responsible for diluting and demolishing the bird species from our environment. Settlement expansion, road expansion and construction, hunting the bird species, illegal agricultural activities, illegal aquaculture practices, cleaning and clearing the bushes, jungles, thickets, etc. in terms of devegetation, implementation of various development projects, climate/ physical environmental change, habitat fragmentation and ecosystem disruption, introducing the exotic species by human practice, increasing soil, water and air pollution, affecting from electro-magnetic and thermal waves in terms of communicational and digital development, etc. are the major responsible causes as per perceptions of the sample respondents of the study area. The dignity and magnitude of the documented causes have been justified on the qualitative rating scale (Likert Scale). In case of the most of the causes, most of the respondents (>50%) have put their perceptions on very high and high rating segments which indicate the greater responsibility of those causes to extinct and decline the common bird species from their natural habitats throughout the study area. Mainly illegal, haphazard, unplanned and unscientific human practices have been dignified as the root causes for developing the issue over time here.

6.2.2 Major Physical Environmental Impacts of Common Birds Declining in the Study Area:

Table 19: Major Physical Environmental Impacts of Common Birds Declining in the Study Area

Sl. No.	Major Physical Environmental Impacts	Number of Impact Responses on Magnitude Scale							% of Impact Responses on Magnitude Scale						
		VH	H	M	L	VL	NR	T	VH	H	M	L	VL	NR	T
1.	Loss in species diversity	190	261	107	131	53	38	**780**	24.4	33.5	13.7	16.8	6.8	4.9	**100**
2.	Loss in biodiversity	199	274	131	113	34	29	**780**	25.5	35.1	16.8	14.5	4.4	3.7	**100**
3.	Fragmentation of natural habitat	124	254	160	135	75	32	**780**	15.9	32.6	20.5	17.3	9.6	4.1	**100**
4.	Disruption in niche and ecosystem	103	239	157	142	98	41	**780**	13.2	30.6	20.1	18.2	12.6	5.3	**100**
5.	Disturbance in Landscape Stability	116	229	171	154	77	33	**780**	14.9	29.4	21.9	19.7	9.9	4.2	**100**
6.	Decrease in zoo resources	163	270	155	96	73	23	**780**	20.9	34.6	19.9	12.3	9.4	2.9	**100**
7.	Decrease in Scenic/ Aesthetic Value of Nature	139	261	167	126	57	30	**780**	17.8	33.5	21.4	16.2	7.3	3.8	**100**

VH=Very High, V=Very, M=Moderate, L=Low, VL= Very Low, NR= No Response, T=Total

Source: *Field Study, 2021-2023*

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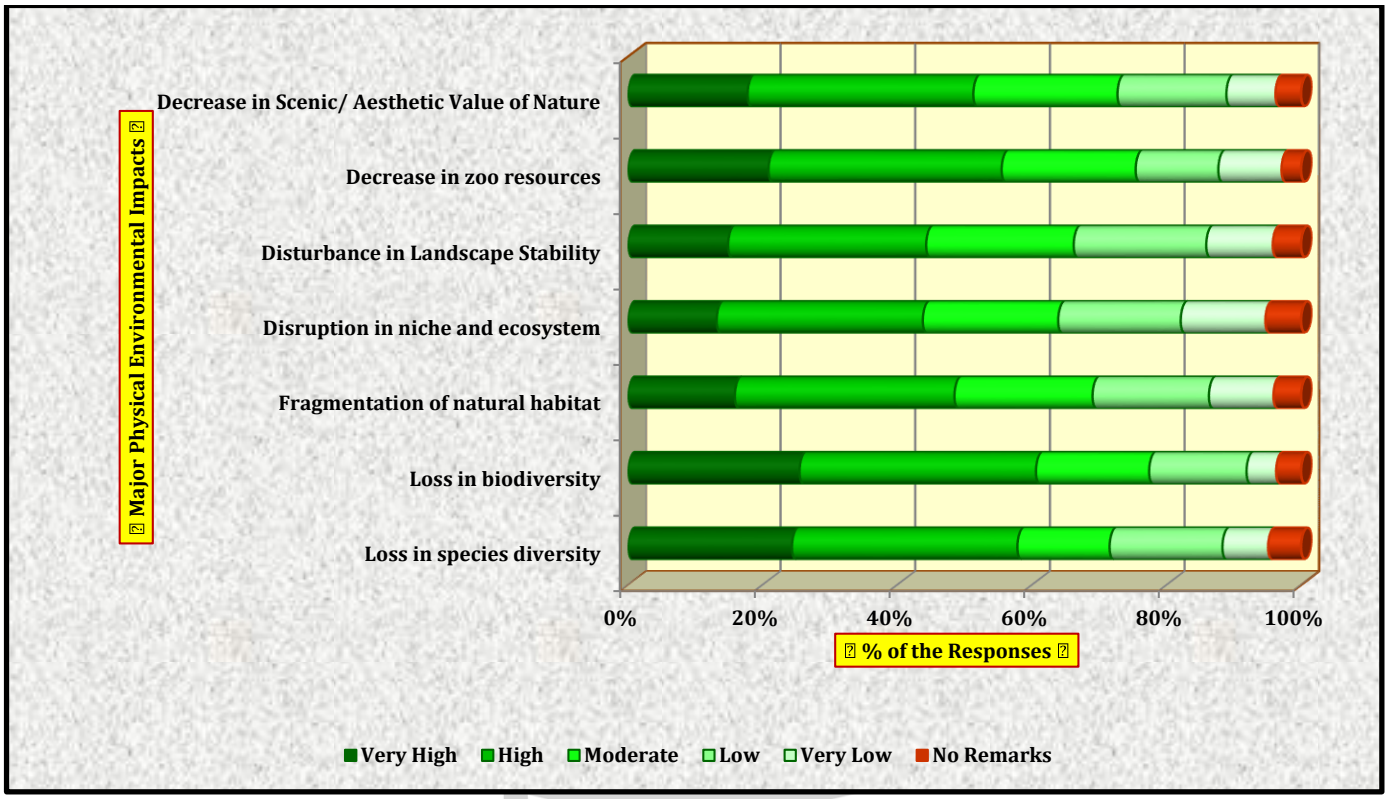

Figure 6: Data on Major Physical Environmental Impacts

The field based experience and documentation reflect the major physical environmental impacts on the local as well as regional ecosystems and environment due to declining common birds species throughout the study area. The data table 19 and figure 6 show the various impacts on physical environment as per respondent's perceptions and expert's analysis. The impacts like loss in species diversity, loss in biodiversity, fragmentation of natural habitat, disruption in niche and ecosystem, disturbance in landscape stability, decrease in zoo resources, decrease in scenic/ aesthetic value of nature, etc. have been the essential outcome in terms of environmental costs due to the issue here. The dignity and magnitude of the documented physical environmental impacts have been justified on the qualitative rating scale (Likert Scale). In case of the most of the impacts, most of the respondents (>50%) have given their votes on higher rating segments (VH and H) which indicate the greater magnitude of those impacts trending towards more extinct and declining situations of the common bird species from their natural habitats throughout the study area.

6.2.3 Major Anthropogenic Impacts of Common Birds Declining in the Study Area:

Table 20: Major Anthropogenic Impacts of Common Birds Declining in the Study Area

Sl. No.	Major Anthropogenic Impacts	Number of Impact Responses on Magnitude Scale							% of Impact Responses on Magnitude Scale						
		VH	H	M	L	VL	NR	T	VH	H	M	L	VL	NR	T
1.	Decreasing the zoo resources in the locality	163	270	155	96	73	23	**780**	20.9	34.6	19.9	12.3	9.4	2.9	**100**
2.	Decreasing the species diversity of the birds	190	261	107	131	53	38	**780**	24.4	33.5	13.7	16.8	6.8	4.9	**100**
3.	Loosening the sensual depth/ dignity of common birds in our society	202	271	134	110	39	24	**780**	25.9	34.7	17.2	14.1	5.0	3.1	**100**
4.	Change in domestic rare up of common birds in human life style	129	241	167	136	77	30	**780**	16.5	30.9	21.4	17.4	9.9	3.8	**100**
5.	Change in human food habit in taking bird's meat	83	196	181	174	107	39	**780**	10.6	25.1	23.2	22.3	13.7	5.0	**100**
6.	Loosening the occupation depended on birds resource	61	189	174	163	146	47	**780**	7.8	24.2	22.3	20.9	18.7	6.0	**100**
7.	Lacking the knowledge about these birds to newer generation	219	251	164	106	49	21	**780**	28.1	32.1	21.0	13.6	6.3	2.7	**100**

VH=Very High, V=Very, M=Moderate, L=Low, VL= Very Low, NR= No Response, T=Total

Source: *Field Study, 2021-2023*

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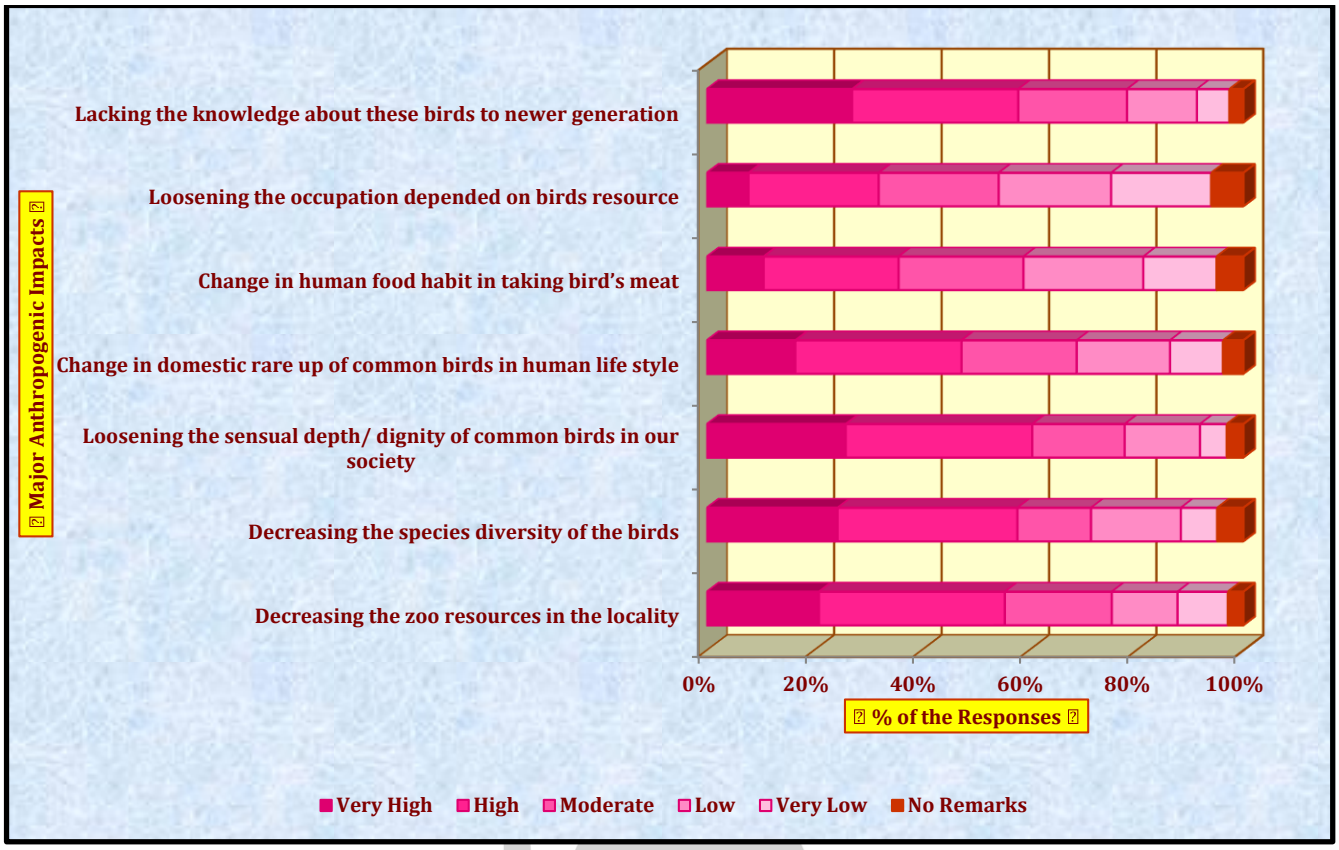

Figure 7: Major Anthropogenic Impacts

The perceptions from the respondents show the human costs of the same issue in the study area also. The data table 20 and figure 7 reflect the major impacts on the local as well regional society here. The documented impacts like decreasing the zoo resources in the locality, decreasing the species diversity of the birds, loosening the sensual depth/, dignity of common birds in our society, change in domestic rare up of common birds in human life style, change in human, food habit in taking bird's meat, loosening the occupation depended on birds resource, lacking the knowledge about these birds to newer generation, etc. are the perceived outcome as the human costs for declining the common bird species here. The dignity and magnitude of the documented human environmental impacts have been justified on another qualitative rating scale (Likert Scale). From the data analysis, it is that incase of the most of the impacts, maximum respondents (>50%) have given their responses on higher rating categories (VH and H) which significantly point to the greater magnitude of those impacts trending towards more extinct and declining situations of the common bird species from their natural habitats throughout the study area. Here, it should be notified that todays and future generations have been disrupting from the knowledge and practical understanding of the common bird in our habituated economic and techno-centric environment.

6.2.4 Estimation of Average Vulnerability Assessment Index for Bird Species Decline in the Study Area:

Table 21: Estimation of Average Vulnerability Assessment Index in the Study Area

Dimension	Factors	Weightage (4-Point Scale)	Average Weight	Share Weight	Dimension Indices	Average Vulnerability Assessment Index (AVAI)
Extinction Risk	Regional extinction risk	3.5	2.5	0.05	0.625	**0.725 (72.50%)**
	Global extinction risk	1.5				
Geographical Distribution of Population & Its Reduction	Restricted geographic range & restricted/ very small population	3.5	3.2	0.16	0.800	
	Population decline/ reduction	3.5				
	Global and national significance of regional populations	2.5				
	Current vs. past distribution	3.0				
	Abundance pattern/ status	3.5				
Biological Dimension	Taxonomic uniqueness	3.0	3.125	0.125	0.78125	
	Taxonomic level	3.0				
	Link to ecosystem services	3.5				

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	Keystone species status	3.0				
Socio-cultural Values	Cultural importance	3.0	2.875	0.115	0.71875	
	Public appeal	2.5				
	Educational value	3.0				
	Flagship species status	3.0				
Logistical Dimension	Types of actions required	3.0	2.90	0.145	0.725	
	Feasibility	2.5				
	Urgency	3.5				
	Conflicting issues	3.5				
	Adequacy of data	2.0				
Economic Dimension	Cost of action	3.5	2.50	0.075	0.625	
	Species' economic value	2.5				
	Potential economic loss if protected	1.5				
Institution, Organization and Legislation	Govt. or NGO Involvement	1.5	2.75	0.055	0.6875	
	Action required by existing agreement or legislation	4.0				
Source: Field Survey, 2021-2023 & Data Analysis						

The above table 21 shows the estimation of average vulnerability assessment index for bird species decline in the study area. On the qualitative scale the index has been determined with respect to 25 responsible factors (data on those factors have been compiled from perception survey, resource specific interviews and literature records) having equal weightage as 4 considering 100 as total. The result indicates Average Vulnerability Assessment Index (AVAI) as 0.725 (72.5%) which is high to very high from the status of vulnerability. Hence, it's clear that huge threatening and declining of avifauna from the land have been occurred for colossal human interventions on the habitats during the last two decades.

6.2.5 Estimation of Bird Species Threatening Issue Specific Risk Assessment Index (RAI) in Study Area:

Table 22: Estimation of Bird Species Threatening Issue Specific Risk Assessment Index (RAI) in the Study Area

Sampled Rural Blocks	Species Threatening Index (STI)	Species Threatening Exposure Index (STEI)	Species Threatening Vulnerability Index (STVI)	Issue Management Capacity Building Index (IMCBI)	Species Threatening Risk Assessment Index (STRAI)	**Species Threatening Risk Assessment Index (STRAI) in %
Contai-I	0.795	0.728	0.745	0.534	0.807446	**80.74**
Deshapran	0.805	0.736	0.758	0.536	0.837873	**83.79**
Contai-III	0.736	0.704	0.687	0.484	0.735465	**73.55**
Khejuri-I	0.785	0.695	0.704	0.558	0.688324	**68.83**
Khejuri-II	0.805	0.76	0.748	0.543	0.842774	**84.28**
Nandigram-I	0.745	0.701	0.715	0.485	0.769908	**76.99**
Nandigram-II	0.725	0.676	0.664	0.489	0.665494	**66.55**
Chandipur	0.685	0.664	0.652	0.438	0.677068	**67.71**
Bhagwanpur-I	0.685	0.645	0.644	0.434	0.655611	**65.56**
Bhagwanpur-II	0.715	0.652	0.655	0.446	0.684637	**68.46**
Potashpur-I	0.685	0.652	0.687	0.437	0.702123	**70.21**
Potashpur-II	0.695	0.661	0.665	0.441	0.692738	**69.27**
Egra-II	0.703	0.664	0.686	0.459	0.697646	**69.76**
** indicates the remarks on issue specific risk assessment whereas STRAI ⇨ 0 – 20% ⇨ Lower Risk, STRAI ⇨ 20-40% ⇨ Moderate Risk, STRAI ⇨ 40-60% ⇨ Moderate to Higher Risk, STRAI ⇨ 60-80% ⇨ High to Very High Risk and STRAI ⇨ > 80% ⇨ Very High to Acute Risk						
Source: Field Survey, 2021-2023 & Data Analysis						

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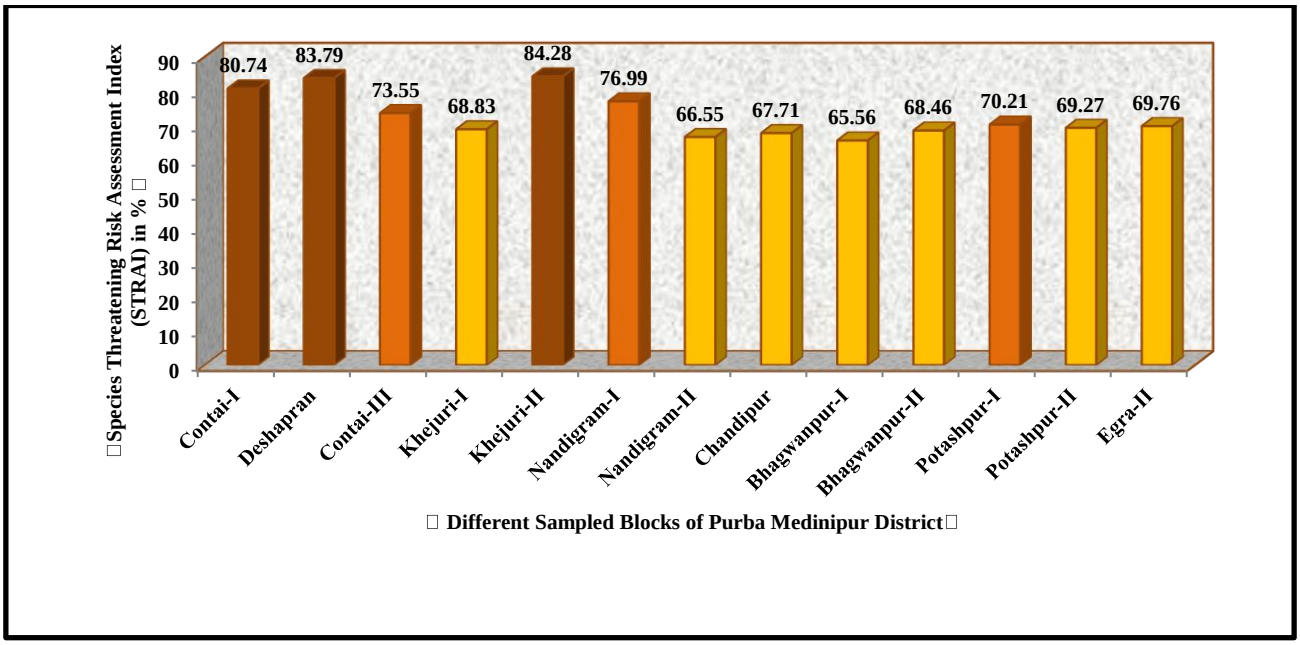

Figure 8: Block wise Species Threatening Risk Assessment Index (STRAI)

Table 22 and figure 8 show the Block wise Species Threatening Risk Assessment Index (STRAI) whereas the coastal blocks like Khejuri-II, Deshapran and Contai-I are featured by very high to acute risk and fluvio-coastal blocks Nandigram-I and II, Khejuri-I and Contai-III reflect very high risk. Other interior inter-fluvial blocks like Chandipur, Bhagwanpur-I and II, Patashpur-I and II and Egra-II are also characterized by high risk due to the enormous avifaunal decline throughout the study area. But, it's understandable that most of the coastal and fluvio-coastal landscape having marine, wetland, forest, estuary and other sensitive habitats and ecosystems have been tremendously affected by highest bird species threatening and down beat.

6.3 Running Reality as the Ground Truth of the Management:

Table 23: Role of Different Sites for Management of the Issue

Role of Different Sites for Management of the Issue	Perception (%) on the Magnitude of Satisfaction regarding Management													
	Over Satisfactory/ Mostly		Satisfactory/ A Lot		Traditional/ Quite a bit		Low/ A little		Very Low/ Not at all		No Remarks		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Role of Govt. & Higher Level Administration	13	1.67	55	7.05	114	14.62	265	33.97	290	37.18	43	5.51	**780**	**100**
Role of Biodiversity Board, Dept. of Environment & Forestry, etc.	18	2.31	49	6.28	133	17.05	247	31.67	286	36.67	47	6.03	**780**	**100**
Role of Local Administration & Biodiversity Circle	7	0.90	52	6.67	145	18.59	241	30.90	269	34.49	66	8.46	**780**	**100**
Role of Local Political Party & Selected Members	8	1.03	29	3.72	116	14.87	232	29.74	251	32.18	144	18.46	**780**	**100**
Role of NGOs	19	2.44	32	4.10	153	19.62	242	31.03	253	32.44	81	10.38	**780**	**100**
Efforts from Individual/ Community Level	24	3.08	73	9.36	149	19.10	217	27.82	262	33.59	77	9.87	**780**	**100**
N = 780	Source: *Field Study, 2021-2023*													

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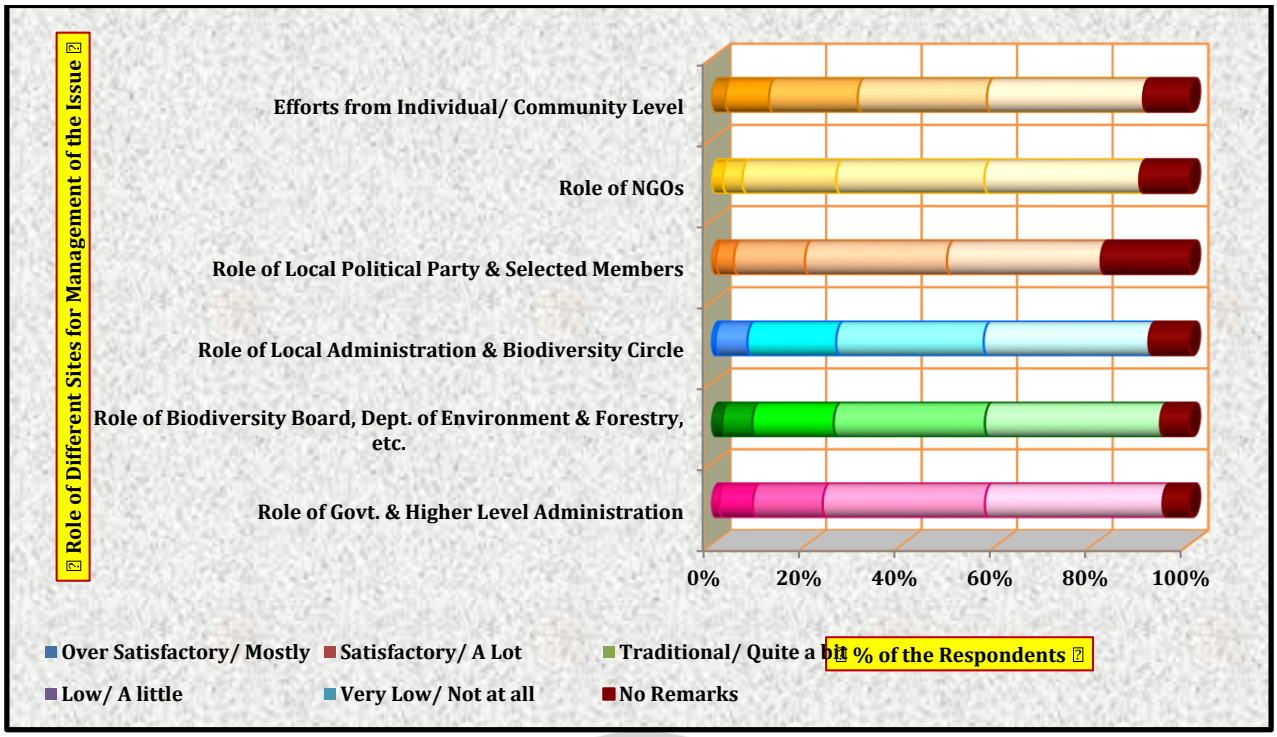

Figure 9: Role of Different Sites for Management of the Issue

To justify the roles of different sites for the management of the issue in the study area, this perception survey was also endeavored to find out the running reality in the ground truth of the management here. The data table 23 and figure 9 significantly reveal the roles of various ends where govt. and different allied institutions, authorities and organizations are absolutely failed to take over the situation in time. Very poor managemental roles from all those sites indicate the institutional failure or ignorance reality although bills and budgets from the responsible halls are declared, sanctioned and advertized with constitutional and democratic nobilities during every financial session regularly. Roles of local and higher administration in this case are beyond speech and spot light of hope. Biodiversity Boards cum Circles under most of the CD Blocks complete their annual project for monitoring, assessing and managing the local biodiversity under the shade of characters and colour. As the result, budgets are implemented on the stones and in the audit reports; credits are not going to society and environment influencing the richness, abundance and diversity of common birds in the ecosystems and habitats. Representatives, local leaders, politicians and political parties are not interested with a little bit of efforts for management of such type of environmental issues. Roles of different NGO are praiseful for their social works very much rather than likely environmental issue in the study area. Efforts from individual or community level for highlighting and managing the issue are also at poor level of satisfaction according to this perception survey. Comprehensively, ground truth of the management is at poor level and reflects the sad reality from the view point of common birds' protection and conservation for sustainable future.

6.4 Enormous Gaps in Plans, Policies, Ideas, Efforts and Actions:

Table 24: Existed Gaps in the Management as per Respondent's Perception

Sl. No.	Existed Gaps in the Management as per Respondent's Perception	Number of Respondent	% of Respondent
1.	Lack of individual knowledge, education and awareness about the local common birds and its declining impacts on society and environment	733	93.97
2.	Absolute lacking of thinking, efforts and actions at community level	747	95.77
3.	Administrative and economic thinking in parties and politics, not environmental enhancement in self-chair-space game	758	97.18
4.	Representatives in the reality of development and self enhancement, not in their roots like domestic corridors, familiar society and home environment	754	96.67
5.	Ignorance and careless mind set up regarding the issue at local administrative and institutional level	745	95.51
6.	Ignorance and careless mind set up regarding acts, policy and its implementation at higher administrative and institutional level	743	95.26
7.	Govt. highly involved in development process rather than environmental protection and conservation	731	93.72
8.	Power-Politics-Policy Conflicts in development and management processes	767	98.33
9.	Plan-Policy-Practice Gaps in the management of environmental issues	732	93.85
10.	Article-Amendment-Action and Bill-Budget-Benefit Conflicts, Confusion and Gaps	730	93.59
11.	Societal trend of NGOs rather than environmental affinity and welfare	752	96.41

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12.	Sleepy and silent mode attitude and status of the eligible sounded characters like environmentalists, nature lover, academicians, researchers, etc.	729	93.46
	Total	**N=780**	**N=100%**

Source: *Field Study, 2021-2023*

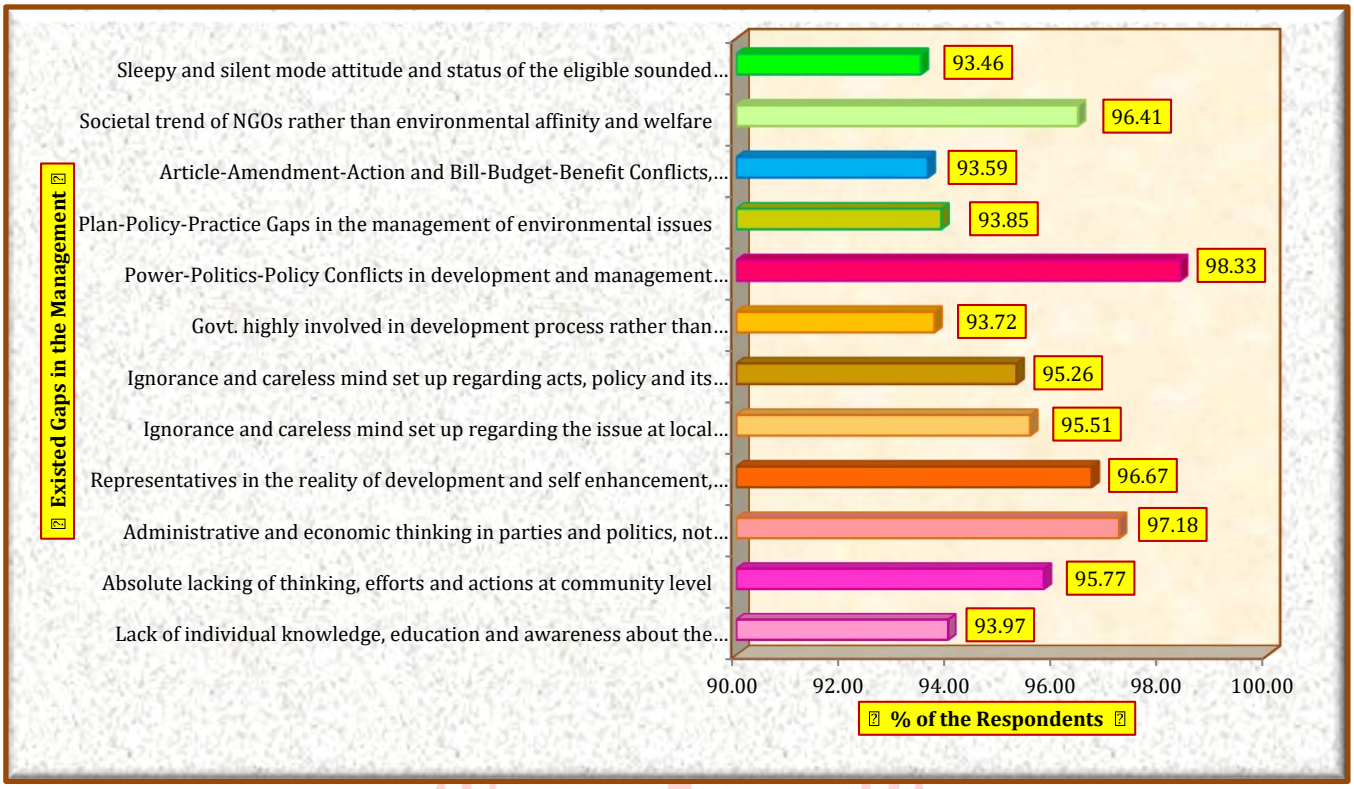

Figure 10: Existed Gaps in the Management as per Respondent's Perception

The data table 24 and figure 10 indicate the gaps in management as per respondent's perception. Lack of knowledge, education and awareness about the local common birds and its declining impacts on society and environment is the root level gap at individual level and absolute lacking of thinking, efforts and actions at community level is prominent in the study area. Administrative and economic thinking in parties and politics, not environmental enhancement in self-chair-space game has been reflected as the gap in management from the background political practice whereas representatives in the reality of development and self enhancement, not in their roots like domestic corridors, familiar society and home environment is also vital in gap analysis. Ignorance and careless mind set up regarding the recommended acts and policy relating common birds and its implementation at local and higher administrative and institutional levels are also the gaps from administrative dimensions whereas respected Govt. highly is heartily involved in development process rather than environmental protection and conservation. Power-Politics-Policy Conflicts and Plan-Policy-Practice Gaps have been reflected as the vital gaps in the proper development of the region and management of such type of environmental issues here. Article-Amendment-Action and Bill-Budget-Benefit Conflicts, Confusion and Gaps are also important for this poor management of the issue in the region. Societal trend of NGOs rather than environmental affinity and welfare indicates their beneficial efforts relating socio-economic sectors of the society. Unfortunately, sleepy mode and silent attitude cum status of the eligible sounded characters like environmentalists, nature lover, academicians, researchers, etc. are also the catalyst of the developing this issue throughout the study area. Interestingly, all of the above mentioned gaps have been dignified as the vital as the respondents have given their vote at large scale for those (>90% in case of every gap).

VII. Major Findings from the Field Based Project and Proposed Blueprint for Sustainable Management of the Issue at the Study Area in Time

7.1 Major Findings documented from the In-depth Observation, Extensive Literature and Perception Survey and Respondent's Proposal:

a) The study area is a large fluvio-coastal region bounded by Pichhabani River and Ramnagar-I and II CD Blocks at the south, Bay of Bengal and River Hoogly at the South-East and East, Haldi and Keleghai Rivers and Moyna, Nandakumar and Haldia CD Blocks at the North and North-West and River Keleghai, Egra-I CD Block and Paschim Medinipur District at the West;

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b) The study area having resource enriched fluvio-coastal landscape is influenced by Recent Quarternary Formation and controlled by geomorphic agents like Rivers Hooghly, Rasulpur, Pichhabani, Haldi and Keleghai and Bay of Bengal;

c) Respondents having more than 30-years of age has been emphasized for the study under the consideration of older, experienced, expert, academic, research and environment thinking special categories;

d) Broad level literature review, in-depth observation, extensive perception survey and qualitative data analysis have been the major techniques for data gathering and analysis for the study;

e) 184-villages of 13-CD Blocks under 4-Subidivisions of rural Purba Medinipur district in West Bengal have been the sample spatial units considering 780 efficient respondents;

f) 67-popular common bird species have been considered as the aimed sample from 146-species under respondent's knowledge and 352-species of expert's estimated figure in the study area;

g) Sampled common bird species are mostly featured by coastal and inland forest patches, agricultural lands, aquatic lands, grasslands, wastelands and domestic or household environments from the view point of habitat distribution;

h) As per IUCN Red Data Book (3.1) for justifying the global status of the sampled birds, most of them (58.21%) have been fallen under Least Concern (LC) category while 28.36% under threatened (TH), 11.94% under near threatened (NT) and only 1.49% under extinct (EX) categories have been reflected;

i) As per IUCN Red Data Book (3.1) for justifying the local as well as regional status of the sampled birds, a little bit of them (1.49%) have been fallen under Least Concern (LC) category while most of them, 58.21% under threatened (TH), 2.98% under near threatened (NT) and tremendously 37.32% under extinct (EX) and extinct in wild (EW) categories have been realized;

j) As per Global Population Trend (GPT), 65.67% of the sample bird species have steadily declined (D) and 34.33% have been wiped out from the region over last three decades and now these are considered as unknown avian characters to the today's generation. It's notified that nearly 48% of the global bird population has been declined for last 30-years and 79% has been decreased in the last five years as per 2022s GPT report;

k) As per local status justification, 37.31% of the sampled bird species are absolutely not found (ANF) whereas 31.34% are under rare (R) category and 2.99% are common (C) in existence. In fact, 28.36% of the common birds are fairly common (FC) here;

l) Causal investigation and analysis through this survey show that anthropogenic causes like habitat destruction, ecosystem encroachment, and various illegal human practices are more responsible (nearly 75%) for massive declination of the species rather than the physical environmental changes or causes;

m) From the study, it is reflected that both environmental and human costs are resulted from the huge declining of common bird species whereas generations must be suffered from societal and environmental impacts of it;

n) The survey shows the poor to very poor level of management of the issue from govt., higher and local administration, allied institutions and organizations, NGOs, community and also individuals;

o) Gap analysis and assessment show the Power-Politics-Policy Conflicts, Plan-Policy-Practice Gaps, Article-Amendment-Action Conflicts and Confusion and Bill-Budget-Benefit Gaps in the management process here;

p) Proposed managemental ways from the ends of respondents have been emphasized regarding education, awareness, roles of local and higher level administration, proper govt. responsibility, NGOs efforts and sounds from various types of thinkers and resource characters, etc.; and

q) Finally the observation, survey and whole study enlighten the issue with great alert and emphasize on its urgent management for the local as well as regional environmental sustainability; etc.

7.2 Proposed Managemental Ways as per Respondent's Perception:

Table 25: Proposed Managemental Ways as per Respondent's Perception

Sl. No.	Proposed Managemental Ways as per Respondent's Perception	Number of Respondent	% of Respondent
1.	More active role of Govt. & Administration by rules and regulation	757	97.05
2.	More active role of Biodiversity Board, Dept. of Environment & Forestry, etc.	719	92.18
3.	Strictly restriction on rural land conversion & land use change	763	97.82
4.	Strictly restriction on rural devegetation	709	90.90
5.	Documentation of threatening species & special care on its conservation and protection	683	87.56

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6.	Efforts to bring back the species through garden culture and regenerating likely habitat	659	84.49
7.	To make the generation as more knowledgeable about common birds & its importance through education and training	676	86.67
8.	Arrangement of workshop, seminar, discussion, awareness programme, etc. on the issue	646	82.82
9.	Root level efforts from domestic to local institutional sectors	638	81.79
10.	Effecting the plan, policy and programme in ground, not in bill and budget only	713	91.41
	Total	**N=780**	**N=100%**
Source: *Field Study, 2021-2023*			

This perception survey emphasizes also to know the respondent's proposals for proper management of the issue throughout the study area. The perceived responses draw out several proposals which may be helpful to outline the planning blueprint from the end of these project personnel. The table 25 reflects some strong proposed ways based on the respondent's ground truth and experienced reality. According to them, more active role of Govt. & Administration by rules and regulation, more responsibilities from Biodiversity Board, Dept. of Environment and Forestry, etc., absolute restriction on rural land conversion & land use change, supreme restriction on rural devegetation, documentation of threatening species and special care on its conservation and protection, efforts to bring back the species through garden culture and regenerating likely habitat, making the generation as more knowledgeable about common birds & its importance through education and training, arrangement of workshop, seminar, discussion, awareness programme, root level efforts from domestic to local institutional sectors, effecting the plan, policy and programme in ground, not in bill and budget only, etc. may be the proposed ways for management of the issue throughout the study area. In every case of proposal, more than 80% of the respondents have sounded for proper way out to recover, mitigate and prevent the issue for environmental better and its sustainability.

7.3 Targeted Species Recovery Actions:

Table 26: Targeted Species Recovery Actions

Targeted Species Recovery Actions	Extinct (EX)	Extinct in Wild (EW)	Critically Endangered (CR)	Endangered (EN)	Vulnerable (VU)	Near Threatened (NT)	Least Concern (LC)	Data Deficient (DD)
Supplementary foods/ water			√	√	√	√	√	
Disease control				√	√			
Predator control		√	√	√	√	√		
Captive breeding		√	√	√	√	√		
Reintroduction		√	√	√	√	√		
Translocation		√	√	√	√			
Nest/ colony protection			√	√	√	√	√	
Clutch/ brood manipulations				√	√			
Falling nest rescue				√	√	√		
Nest site provision				√	√	√	√	

Source: Field Survey-2021-2023 & [6]

As per table 26, the responsible characters like local communities, organizational and institutional relevant personnel, academicians, environmentalists, bird watchers, well wishers, naturalists, etc. should have to target for applying the tabulated species recovery actions against the numerous decline in common bird species here. Further as the legislative alternative we may follow the **Post-2020 Global Biodiversity Framework** (Table 27) formulated in **the United Nations Biodiversity Conference (COP15)** on 19 December 2022 with a landmark agreement to guide global action on nature through to 2030.

Table 27: Thoughtful Application of Post-2020 Global Biodiversity Framework

Goals	Targets	
Goal A: *Maintain/enhance area, integrity & connectivity of natural ecosystems. Halt extinctions, reduce extinction risk, increase abundance, safeguard genetic diversity.* **Goal B:** *Value, maintain and enhance ecosystem services.* **Goal C:** *Share benefits from sustainable use of biodiversity, including genetic resources.* **Goal D:** *Mobilize resources, build capacity, and transfer technology.*	**Target-1:** Spatial Planning **Target-2:** Restoration **Target-3:** Protected & Conserved Areas **Target-4:** Recovery Actions **Target-5:** Sustainable Use **Target-6:** Invasive Alien Species **Target-7:** Pollution **Target-8:** Climate Change **Target-9:** Benefits **Target-10:** Sustainable Production **Target-11:** Ecosystem Services	**Target-12:** Green/ Blue Spaces **Target-13:** Genetic Resources **Target-14:** Mainstreaming **Target-15:** Business Impacts **Target-16:** Citizen Actions **Target-17:** Biotechnology **Target-18:** Incentives **Target-19:** Finance **Target-20:** Information **Target-21:** Indigenous People **Target-22:** Inclusion
Source: [6]		

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7.4 Key actions urgently needing implementation under the 2030 targets:

Under the consideration of various goals and targets of **Post-2020 Global Biodiversity Framework by 2030** the following key actions should be emphasized in communal, organizational and institutional practices:

- Be familiar with the human right to a hygienic, healthy and sustainable environment, and implant this in all policies and programmes to achieve the Global Biodiversity Framework.
- Effort to eradicate illegal hunting and kill, capture and trade of birds throughout the region.
- Employ efficient bio-security to limit more spread of invasive alien species, and wipe out and manage these at main concerned locations like coastal and riverine areas.
- Enhance public alertness and participation in nature protection practices and programmes alongwith ensuring the compulsory education of environmental sustainability in curriculum.
- Execute urgent species-specific recovery actions, coordinated through action plans where appropriate, for those threatened species requiring such interventions.
- Lessen climate change by eco-friendly use and practices of fuels and other climate changing components and searching its nature-based solution, and making certain for renewable energy use to combat harmful impacts on birds.
- Mainstream biodiversity across sectors, especially agriculture, forestry, fisheries, etc. to changeover these for sustainable management practices due to minimizing unenthusiastic influences on birds.
- Make stronger the capacity of various relevant organizations and institutions to undertake proper efforts and actions inspiring and incorporating the communities as well as society in these.
- Make sure absolute participation and contribution of indigenous peoples as well as local communities in conservation for the management of key bird sites in the region.
- Preserve present less unharmed ecosystems and reinstate despoiled habitats to improve their connectivity.
- Scale up investment in nature through innovative finance mechanisms, redirection of harmful subsidies, and greater recognition of the value of the goods and services biodiversity contributes to economic prosperity and poverty eradication. [6]

7.5 Recommendations from Author's Horizon:

From the in-depth field observation, intensive literature review, extensive perception interviews cum survey and broad scale qualitative data analysis, we can recommend as the followings:

a) More active role of Govt. & Administration by rules and regulation should be implemented;

b) Major higher level govt. institutions like Biodiversity Board, Dept. of Environment & Forestry, etc. should be activated properly

c) Absolute restriction on rural land conversion and land use change should be maintained strictly from the ends of responsible authorities;

d) Absolute restriction on rural devegetation and coastal deforestation should be implemented;

e) Documentation of threatening species and special care on its conservation and protection should be emphasized from individual, academic and institutional ends;

f) Efforts to bring back the species through garden culture and regenerating likely habitat should be initiated with new pathways of common birds returning;

g) Efforts should be made of for the present and future generation to become more knowledgeable about common birds and its importance through education and training;

h) Regular arrangement of workshop, seminar, discussion, awareness programme, etc. on the issue should be done from the administrative and academic ends;

i) The plan, policy and programme should be effected in ground, not in bill and budget only;

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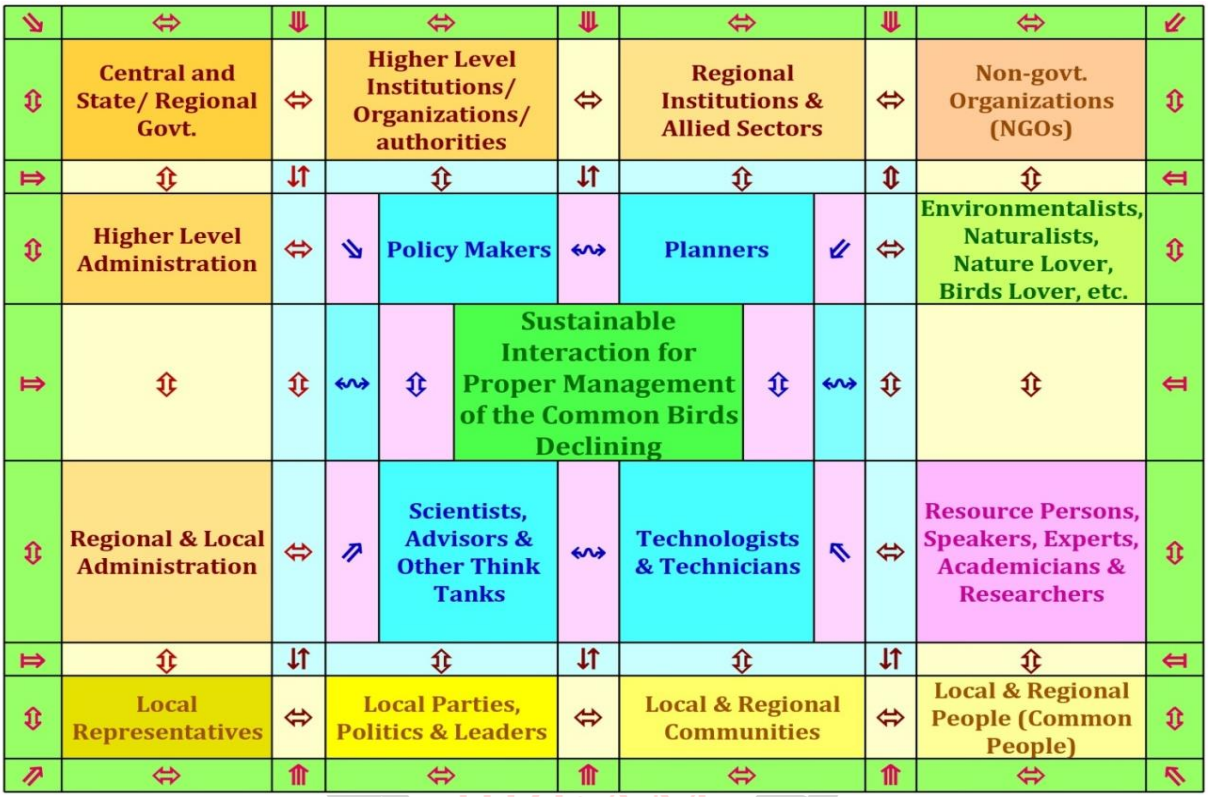
j) Acute mode and effective attitude of the eligible sounded characters like environmentalists, nature lover, academicians, researchers, etc. should be reflected as the catalysts of the developing this issue throughout the study area

k) Power-Politics-Policy Conflicts and Plan-Policy-Practice Gaps should be removed in the proper development of the region and management of such type of environmental issues here.

l) Article-Amendment-Action and Bill-Budget-Benefit Conflicts, Confusion and Gaps should also be important for proper management of the issue in the region.

m) Environmental affinity and welfare along with societal trend of NGOs should be emphasized for managing such an issue in the study area;



Model 1: Sustainable Interaction for Proper Management of the Massive Declining of the Common Birds in the Study Area

n) Instead of administrative, political and economic thinking in parties and politics, environmental enhancement in political practice should be considered and local representatives incorporated in the reality of development and self enhancement should also have the responsibilities to be with their domestic corridors, familiar society and home environment to solve such type of the issues in their region.

o) Finally, ignorance and careless mind set up of the local and higher administrative and institutional levels should be removed immediately and Govt. must have to consider the environmental protection and conservation like the heartily involvement in development process.

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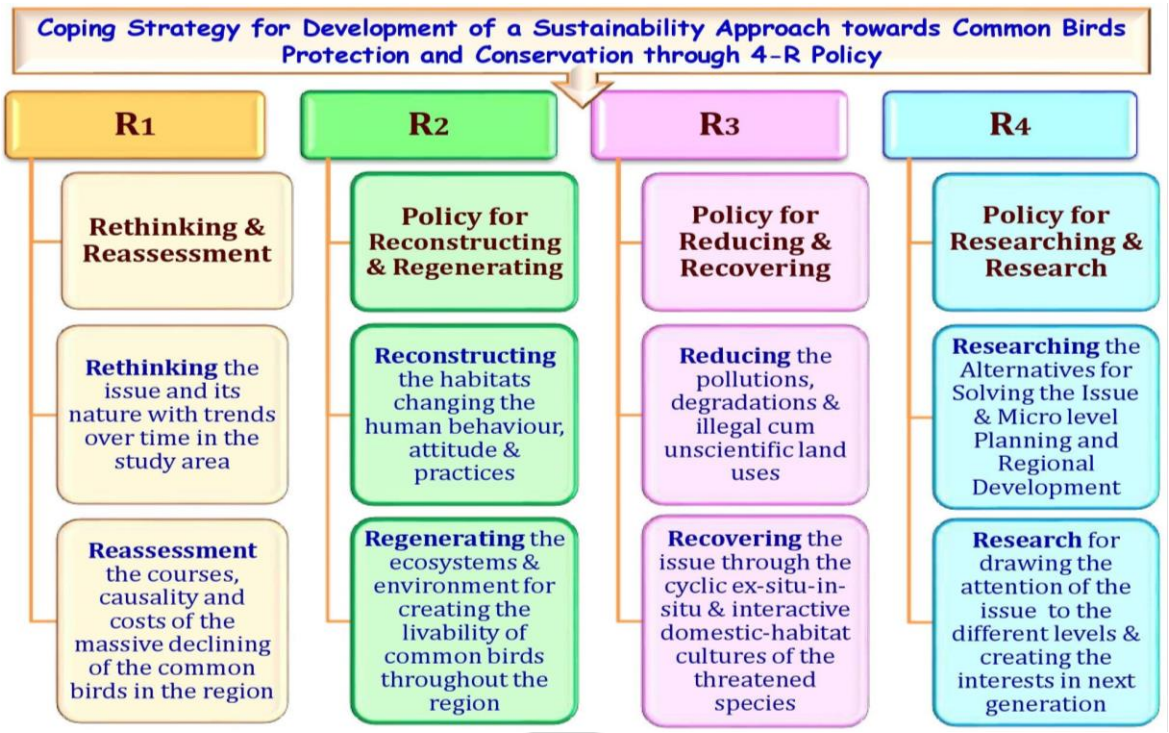

Model 2: Coping Strategy for Development of a Sustainable Approach towards Common Birds Protection and Conservation through 4-R Policy in the Study Area

VIII. CONCLUSION

This assessment of nearly 67 regional species makes it very clear that sampled popular birds in the region are in largely decline, in some cases terribly so. Many more species confirm a downward trend than an upward hopeness. When combined with information on range size and justified by the IUCN Red List categories, a total of 67 common bird species are identified for study whereas 39 are at Least Concern (LC), 8 are Not Threatened (NT), 19 are at Threatened (T) situation and only one is under extinct category (EX). But regional justification shows the tremendous declining of the species where almost 25 species have been demolished (EX and EW) from local environment, 39 are at threatened situation seriously (EN, CR and VU) and only 3 species are at near threatened or least concern status as per IUCN Red Data Book (3.1) at regional level. Comprehensively all the habitats of the common birds have been declined and destroyed drastically in the study area due to various kinds of illegal, haphazard, unplanned and unscientific human practices in terms of development over time. In this perspective, conservation action must be taken immediately to identify causes of decline and implement measures to halt and reverse the trend for these species. A further several species are of Moderate Conservation Concern. These species must be carefully monitored to rapidly detect and act upon signs of continuing decline. Species groups that are faring particularly poorly (>80% decline in the long term) include scavenging & open-country raptors, migratory shorebirds, gulls & terns, forest and grassland specialists, both long and short distance migrants, and carnivores. These results point to particular ecological traits that increase species vulnerability. Alongside these worrisome figures, there is also some heartening news. A little bit of these are species that have adapted well to human-dominated habitats even though they are not obligate human commensalism. From the results presented in this report, several priorities for policy and action should be emerged urgently. Three broad heads: policy and management, research, and public involvement and action should have to consider heartily in the bill, budgets and actions immediately from Govt. and administrative corners whereas other ends like common people, institutions, well wishers, civil citizens, environmentalists, academicians, social workers and researchers should have also the heartiest responsibility, liability and reliability to save, protect and conserve the common bird species in terms of our environmental stability and sustainability.

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