**About The Symposium**

Birds, the second largest diversified group of vertebrates after fish, are one of the well-recognised indicators of the health of an ecosystem. It is important to note that disappearance of birds from an area generally signals the deterioration of the ecosystem. They play a number of roles in a given ecosystem, thereby providing several ecosystem services that can be categorized into four major groups, viz., provisioning, regulating, cultural and supporting services like predation, pollination and seed dispersal. Birds occupy multitude habitats, wherein drylands form one of the important areas though it experiences harsh environmental conditions. Drylands (including dry sub-humid, semi-arid, arid and hyper-arid lands) cover 41.3% of the earth’s land surface and dryland biodiversity plays a pivotal role in the global fight against poverty, climate change and desertification.

The status of dryland biodiversity perhaps is not quite clear, as many datasets are not typically differentiated into dryland and non-dryland biodiversity. Overall, 10,000 mammals, birds and amphibian species are estimated to be found in drylands, i.e. 64% of birds, 55% of mammals and 25% of amphibians of the world. Of the vast number of species occurring in dryland habitats, 4% of mammals and amphibians, and 3% of birds are endemic to drylands. Birdlife International has identified 217 Endemic Bird Areas (EBAs) worldwide of which, 24 are within drylands. The IUCN has also identified 1300 locations in drylands where the conservation and management of biodiversity is very essential. Conserving dryland biodiversity assumes significance for the sustainable development of two billion people living in drylands who directly and indirectly depend upon the local biodiversity (MEA, 2005). In India, drylands cover about 228 mha, which forms 69% of country’s land area, in which vast majority is located in Rajasthan and Gujarat States.

Our knowledge about the status and threats to dryland biodiversity of India especially in Kachchh is limited. Many species of dryland are under threat of extinction due to natural causes or anthropogenic activities. Therefore, to delineate future strategies for the conservation of avifauna in dryland habitat, an attempt was initiated through this symposium which aimed to bring researchers, professionals and amateur bird watchers together in a single platform to discuss and exchange the experiences in the field of Ornithology in respect to drylands and delineate future strategies for the conservation of birds in dryland habitats all dryland ornithological experts under a single platform.
The symposium was held at Court Hall, KSKV Kachchh University, Bhuj during 9-10 January 2015 under the auspices of Gujarat Institute of Desert Ecology, Bhuj. A total of about 211 delegates from 11 states of India participated in the seminar. IBC received 42 abstracts for presentation. The papers were presented in 4 thematic areas of Dryland Birds.

The distinguishing guests, delegates and other participants were made a field trip to Charri Dhand Conservation Reserve, one of the Important Bird Areas (IBAs) on 10th January 2015 for field observation and generating awareness among the participants.

**Inauguration Session**

The National Symposium on Dryland Birds: Strategy for Conservation and Management was inaugurated by Dr. P. A. Azeez, Director, Salim Ali Centre for Ornithology and Natural History, Coimbatore on 9th January 2015. He said that overexploitation of species, introduction of exotic species, pollution of urban, industrial and agricultural areas, habitat loss, alteration of water courses and excessive use of water resources had caused deterioration of marine ecosystems at an alarming rate. The welcome address given by Shri R. V. Asari, Director, Gujarat Institute of Desert Ecology and he also presented introductory note of the symposium.
The keynote address of the symposium was delivered by Dr. J.A. Khan, Chairman, Gujarat Biodiversity Board, Gandhinagar. He delivered the importance of dryland bird’s conservation for the country to the august gathering. He further said the necessity of awareness generation about the dryland birds through various programmes. He highlighted some historical accounts of birds, present status of biodiversity including birds in the country and Gujarat, evolutionary history of Birds, and many issues related to birds.

The inauguration session was honored by Dr. A. P. Singh, Member Secretary, Gujarat Biodiversity Board and representative of National Biodiversity Authority, Chennai, Shri. U. D. Singh, Chief Conservator of Forests, Kachchh and Dr. G.A. Thivakaran, Chief Principal Scientist, Gujarat Institute of Desert Ecology, Bhuj on dias.

The distinguished guests on dias have opened the Proceedings of the symposium.

Dr. A. P. Singh, Member Secretary, Gujarat Biodiversity Board has delivered speech on various aspects of Dryland Birds, especially on the status of birds in Gujarat and many issues related to dryland birds. Dr. U.D. Singh, Chief Conservator of Forests, Kachchh also delivered speech on this occasion. He highlighted the importance of bird’s conservation in dryland of Kachchh which is one of the gateways of birds in our country. The session was participated by many distinguished guest and personalities include; Shri. S. G. Mankand, Ex-Chief Secretary, Govt. of Gujarat and Chairman, Gujarat Institute of Desert Ecology, Bhuj; Smt. Vijayalaxmi Seth, Ex-Postmaster General, Gujarat and Vice-Chairman, Gujarat Institute of Desert Ecology, Bhuj; Shri. Chief
Conservator of Forests; **Prof. V. C. Soni**, Saurashtra University; **Prof. K.K. Sharma**, Ex-Vice Chancellor, MD University, Ajmer; **Prof. B. M. Parasarya**, Agriculture University, Anand, Dr. V. Vijay kumar, Additional Director, Gujarat Institute of Desert Ecology, Bhuj; **Dr. Y. V. Jhala**, Scientist-G, Wildlife Institute of India and more than 200 academics, scientist, naturalist and forest department officials.

The inaugural session was over by the vote of thanks delivered by **Dr. G.A. Thivakaran**, Chief Principal Scientist, Gujarat Institute of Desert Ecology, Bhuj.

**Technical Session: I**

The session was introductory, and included various talks that briefed about the status and scenario of birds in various dryland areas in India. The focal theme session on “Dryland Scenario – Status and Distribution” was chaired by **Prof. V.C. Soni**, Co-Chaired by **Prof. Geeta Padte**, Rapporteur by **Dr. B. Anjankumar Prusty**, Senior Scientist, Gujarat Institute of Desert Ecology, Bhuj and the invited speakers in the session were Mr. Arpit Deomurari of Foundation for Ecological Security (FES) and **Prof. K. K. Sharma**, former Vice-Chancellor, MDS University, Ajmer. In total, 11 talks were scheduled that included 02 invited lectures and 09 oral presentations. Of the 09 oral presentations, only five papers were presented owing to the absence of speakers for other scheduled papers.

The 1st invited lecture was delivered by Mr. Arpit Deomurari of Foundation for Ecological Security (FES), wherein details about the efforts and ongoing programme of FES in identifying data gaps in bird species distribution in various landscapes were discussed. Mr. Deomurari also spoke about the provisions of Indian Biodiversity Information System (IBIS), and various other issues viz., data gaps and critical issues in designing bird species distribution models; efforts in collation and synthesizing the bird diversity and distribution data in India; strengthening of IBIS platform for effective interaction among stakeholders in this regard.
The 2nd Invited lecture was presented by Prof. K. K. Sharma, formerly with MDS University, Ajmer, wherein use of bioacoustics tools in bird taxonomy was discussed. Prof. Sharma appraised the house about their efforts in this regard, and the usefulness of the bioacoustics tools, and its supplementary nature to classical taxonomic approach. He presented some his research findings in this regard, that included conventional approach such as Visual Encounter Survey, Call Counts, and bioacoustics tools for bird species identification, which includes recording of calls, and songs, identification, sound sampling and analysis, and analysis of sound spectrum. The recommendations of his research work emphasized the need for employing high resolution sound analysis systems in ecological studies.

The session was followed up by a talk by Dr. A. P. Singh from Gujarat Biodiversity Board (GBB). Dr. Singh appraised the house about various provisions of Biological Diversity Act, and the efforts made by GBB in documenting the biodiversity of the state, and its conservation involving communities at grass-root level. He also discussed about the constitution of Biodiversity management Committees (BMCs), documentation of biodiversity through People's Biodiversity Registers (PBRs). His talk also included the issues of Access and Benefit Sharing (ABS) mechanism in conservation and sustainable utilization of biological resources.

This was followed by a talk by Dr. Orus Iliyas from Aligarh Muslim University, which discussed about the bird species composition in and around Pench tiger reserve. Subsequently, J. Patrick David from Care Earth Trust, Chennai discussed their findings on a study on dryland birds of north Tamil Nadu. Ms. Arti Chavda from Virani Science College, Rajkot described her study findings on population status of House Sparrow in Rajkot city. She also described about the issues regarding urbanization and resource conflicts. Ms. Jagruti Rathod from Gujarat Ecological Society (GES), Vadodara presented her study findings on bird diversity in seven coastal talukas of Gulf of Kachchh, i.e.
Anjar, Abdasa, Bhachau, Gandhidham, Lakhpat, Mandvi and Mundra. She emphasized on the need for conservation of wetlands and patchy vegetation in the drylands landscapes lick Kachchh, for facilitating the roosting and breeding of various species and aquatic and land birds. The study also highlighted the need for delineating important bird areas outside protected areas. Overall the talks in this session were a blend of status reports, historical information on birds in drylands, use of advanced tools in bird studies, and legal and institutional provisions in conservation biodiversity.

Technical Session: II

The focal theme session on “Ecosystem Services of Birds” was chaired by A. P. Singh, IFS, National Biodiversity Board, Co-Chair Person Dr. I. R. Gadhvi (Department of Marine Science, M.S. University, Baroda) & Rapporteur – Dr. K. Karthikeyan (Scientist, Gujarat Institute of Desert Ecology, Bhuj).

The second session of the Symposium was on Ecosystem Services of Birds which comprises 2 Invited Lectures from Subject experts and 9 Technical paper presentations by participants from various Universities / Institutes.

The first Invited speaker of the session was Prof. V. C. Soni who has narrated the various Ecosystem services rendered by bird. He has also described in detail about role of birds in different ecosystems such as provisioning services (food, decorative, Guanos), regulating services (Predators, Scavengers), cultural services as motifs, religion and spiritual symbols and other supporting services including maintaining soil minerals etc. He also narrated on future efforts to be taken care of and also added points on highlighting the gaps on our knowledge. The second invited lecture was rendered by Sh. P. M. Parasharya from Anand Agricultural University. He has narrated in detail about the role on birds with special reference to Agro-ecosystem. His presentation also covered the Ecosystem services rendered by birds and he specially narrated on various
threats in the agricultural landscape including pesticide poisoning, vanishing hedges, nesting cavity loss, habitat loss and other infrastructural developments. He also added on the importance of eco-friendly management of agro-ecosystem for conserving birds. Among the oral presentations by the participants, Mr. M. Khalique given his presentation on Avifaunal Checklist in Atnarshighgarh sanctuary, Madhya Pradesh with special reference to their status. From the study the researcher suggested that the site is an ideal place for conservation of birds and she also added the threats received by the forests due to various threats and explained that the conservation programme among the local communities is required to sensitize the people for better forest management.

Mr. Gopesh Sharma has presented a research paper on toxicological aspects due to Environmental contamination in Keoladeo National Park in Rajasthan which is one of the early Ramsar sites in India. He concluded that major impacts are due to human disturbances of nesting trees and application of chemical fertilizers and pesticides in the foraging areas and he also explained that this above situation necessitates further investigation as the application of chemical fertilizers influences the breeding success and he has also recorded maximum probable concentrations of certain agrochemicals. Next to this, the presentation was given by Dr. C. M. Muralidharan from Date Palm Research station, Mundra. He has focussed in his presentation on Inventory and Diversity of Avian Fauna on fruit orchards at Sardar Krushinagar and has found that 44 species of birds have been recorded and his study registered that they were evenly distributed during August month. Another research study presented by the same participant on Population of Avian Fauna in relation to crop phenology in pearl millets and the study suggested that nylon net and cotton bags proved to be an effective device to reduce bird damage in pearl millet. Consequently, the Research study on Feeding sites of House crow in Junagadh, Gujarat was presented by Ms. Shabnam. K. Saiyad and she has presented data on House crow count at each feeding site of the study area and based on land use category. The researcher also recorded on macro and micro feeding sites at each feeding site and the study as a whole concluded that no major inter or intra species competition is affecting crows feeding resources.

Another interesting study on Community structure of birds in Bt and Non Bt cotton field was presented by Dr. R. M. Patel from Anand Agricultural University. The researcher has recorded 25 bird species during their investigation in Bt and Non Bt cotton fields
and they have concluded that irrespective of seasons, the bird diversity was recorded higher in Non B cotton fields.

As a whole, the entire technical session was found to be very interesting and highly informative. The researchers have discussed on various aspects of Ornithology research and many findings are found to be interesting and it was a interactive session as a whole.

**Technical Session: III**

The focal theme session on “**Issues and Threats on Birds**” was chaired by Prof. K. K. Sharma, MDS University, Ajmer, Co-Chair Person Dr. A.V.L. Narsimhacharya, Head, Department of Bioscience, S. P. University, Anand & Rapporteur – Dr. Jayesh B. Bhatt (Scientist, Gujarat Institute of Desert Ecology, Bhuj). In total, 8 talks were given by various presenters included two invited lectures and six oral presentations.

The 1st Invited lecture was given by **Dr. Sanjib Sarangi**, Odisha State Co-ordinator, Indian Gramin Service. The topic of his talk was “From a poacher’ village to a birder’ paradise: the story of Mangalajodi and ecotourism initiatives”

The 2nd Invited lecture was given by **Dr. I. R. Gadhvi**, Department of Marine Science, Bhavnagar University, Bhavnagar. The topic of his talk was “Status survey of Houbara bustard and Stoliczka’s bushchat in the Bhal area, Bhavnagar district Gujarat”.

**Dr. C.M.Muralidharan**, Scientist, SADU, Dantiwada was the first oral presenter of this session and his topic of presentation was “Relative abundance and extent of damage due to avian fauna on fruit crops and simple measures to mange”. He highlighted extent of damage of fruits by avian fauna and he also suggested some measures to reduce the damage. Dr. Amita Sankhwal of Gujarat Ecology Society, Baroda has given talk on “Urbanization and its impact on Avian diversity and density in Kachchh”. She highlighted various impacts of urbanization on avian fauna to the august gathering. Mr. Soumya Ranjan Mishra of Gujarat Institute of Desert Ecology, Bhuj has presented papers
on “Avifauna of Sambhar Lake, Rajasthan: A Bibliographic review, Issues and Threats”. Ms. Hetal Parekh has presented a paper “Accumulation of selenium in feathers of Western Reef Egret *Egretta gularis*, at Coastal area of Bhavnagar District, Gujarat”. In her presentation she expressed the impact of selenium accumulation on birds and its amount of accumulation in feathers of Egret. Dr. Rohit Prajapati has highlighted the Impact of water quality on macro fauna abundance in mangrove ecosystem of Gulf of Kachchh. Ms. Meeta Kumari presented a paper on Raising Public Awareness for Avian Issues: Attempts from an Amateur Student Researcher.

**Technical Session: IV**

The focal theme session on “**Conservation and Management of birds**” was chaired by A. P. Singh, IFS, National Biodiversity Board, Co-Chair Person Dr. I. R. Gadhvi (Department of Marine Science, M.S. University, Baroda) & Rapporteur – Dr. G. Thirumaran (Project Scientist, Gujarat Institute of Desert Ecology, Bhuj). In total, 6 talks were scheduled that included one invited lectures and five oral presentations.

The Invited lecture was given by Dr. Geeta Padate, Department of Zoology, M.S. University on topic “Insectivores Birds and Their Prey Base in the Terrestrial Habitats around Wetlands in Semi-arid Zone of Gujarat, India”. She stated that status of terrestrial birds in the dry land surrounding wetland for 2 years at Wadhwana Irrigation Reservoir in central Gujarat, India. Species richness, evenness, density and diversity indices for four different seasons (summer, monsoon, post-monsoon and winter). Totally 58 species belong to 11 different category were recorded based on their food habit/preference. Out of 58 species majority are insectivores (22) or feeding on insects with some other food items (9 species). She also stated that density of birds occurrence were more during post-monsoon season due to more food availability. The maximum density of terrestrial birds may be attributed to the flocks of species feeding on insects
as well as grains. She also emphasized that semiarid zone of Gujarat, resource partitioning in insectivores birds utilizing drier habitats around wetlands is observed as the season changes and the availability of insect species changes. Finally she highlighted that semiarid habitats support good diversity of birds as and when insect diversity and density are available.

Mr. Sujit S. Narwade, Bombay Natural History Society, Mumbai has given a oral presentation on Status and Conservation of Birds of Southern Tropical Thorn Forest of Great Indian Bustard Sanctuary Area, Deccan Plateau of Maharashtra, India. He mentioned that rainshadow areas of Solapur and Osmanabad districts of Maharashtra were selected for study of birds in South-western region of Deccan Plateau of Maharashtra. He stated that totally 239 species were documented from the study area with seasonal variations in population in different habitats (grassland, agriculture, wetland and patches of dry deciduous forest). Again he stated that 1 critically endangered and 1 endangered 3 vulnerable and 5 near threatened species were recorded. He mentioned that birds’ populations were dominant during summer large wetlands since other two wetlands dried. Finally he concluded that Great Indian Bustard population is declined in Maharashtra.

Dr. Jayesh Bhatt, Gujarat Institute of Desert Ecology, Bhuj has given oral presentation on People’s Perception on Conservation of Common birds: A case study in Villages of Kachchh District, Gujarat. He stated that study was carried out to gather information from peoples about common birds of Kachchh. He also revealed standard questionnaires were prepared and interviews conducted to gather information about the importance of bird’s existence in the ecosystem. The questions were asked to age (above 20 years) groups and also informal discussions were made revealed to birds during the manual data entry process. He highlighted that a total of 21 common birds’ species found in the human dominated landscape of Kachchh. Formers of the district gave more information about the birds as they are frequent birds watchers comparative to other professionals. He concluded that study indicates the people’s behavior and actions towards bird’s conservation and protection of ecosystem. He observed during the study that people are fascinated with the presence of birds around them. The study conducted also reveals the engagement of social fares from generations.

Mr. Davesh K. Gadhavi, Kutch Ecological Research Centre, Tera Village, Kutch has given oral presentation on Status of Bustard Habitat and Future Conservation Plans for
Critically Endangered Great Indian Bustard, *Ardeotis nigriceps* in Abdasa Taluka of Kachchh District, Gujarat, India. He mentioned that Great Indian Bustard (GIB) *Ardeotis nigriceps* has been declared as a critically endangered species by IUCN in 2011. In Gujarat state, except Kutch district, all other districts have lost their GIB population. He also stated that study was conducted in Abdasa taluka of Kutch district in Gujarat state. The selected area was scanned thoroughly to separate the bustard habitats which were being used by the birds from the area which were not being used by the birds. Finally he concluded that a total 1475.14 hectares of revenue land of five villages are being used by the GIBs. This area faces an immediate threat of habitats loss due to encroachment and other infrastructure development.

Mr. Akshit A. Suthar, Jalaram Society, Bhuj, Kachchh has given a oral presentation on Conservation of Highly Vulnerable Bird Species Stolikzha’s Buschat (*Saxicola macrorhyncha*) through Biodiversity Management Comittee (BMC) in Kachchh District. He stated that Jalaram society team working with Biodiversity Management Committee (BMC) of three thalukas such as Abadasa, Lakhapat and Nakhatrana of Kachchh district. He mentioned the following statement that white-browed bush chat (*Saxicola macrorhyncha*) also known as Stoliczka’s bushchat, is an old world flycatcher in the genus *Saxicola*. It is inhabits dry, sandy semi-desert and plain with low herbs and scattered shrubs, where ground cover ranges between 25% and 50%. He also mentioned that Abadasa taluka from Kachchh state of Gujarat is very rich in biodiversity and inhabits. The species eats insects and ants and has not been seen to eat seeds and vegetable matter. Again he stated that overgrazing by livestock may also reduce the extent of suitable habitat. Intensive use of chemical pesticides in cotton crops may negatively affect this species in Kachchh. Finally he concludes that there is need to continue to monitor its distribution, population status and seasonal movements.

Mr. Vibhuti B. Raval, Department of Bioscience, Saurashtra University, Rajkot, has given a presentation on Vertebrate Community Responses to the Changing Landscape in Saurashtra University Campus, Rajkot. She mentioned that vertebrate faunal species preferred different landscape depending to their feeding and shelter. Species shows many kind of responses to habitat fragmentation, some are advantaged and increase in abundance while other decline and become locally extinct. She also stated that during their investigation, more vertebrate species diversity found in forest habitat, while scatter distribution found on open ground. Human interference was also measured as
an effective factor for avian habitat and behavior. Again she stated that three different places (rocky area, wetland area, university building) were selected to carry out this study. She concluded that presences of migratory birds population are more in the month of October at wetland area.

**Valedictory Session:**

The valedictory session was presided over by Shri. R.V. Asari, IFS (Retd.) & Director, Gujarat Institute of Desert Ecology, Bhuj. The valedictory address was delivered by **Prof. V.C. Soni**, Saurashtra University, Rajkot. The session was also lead by Dr. A. P. Singh, Member Secretary, Gujarat Biodiversity Board and Prof. K.K. Sharma, Ex-Vice Chancellor, MD University, Ajmer.

The vote of thanks for the session was given by Dr. Arun Kumar Roy Mahato, Scientist, Gujarat Institute of Desert Ecology, Bhuj.
છારીદ હમારા વિહરતા: પાવિંઝોદા દેશના પક્ષીજની આકારોનો 

પ્રકારની પક્ષીજની આદિની એ અને તેની સંસાધનતા આતમથકતા પાલદારના પક્ષી મુજબના સંખ્યામાં 80%ના છે 'અતી પાક બુલ્લિનાટી આદિની' 'સામાજિક પક્ષીઓ' વિસ્તાર અંગે વિપરીત પ્રવર્તકો સુધી સમાધાન થયું હતું. સામાન્ય ભાવ્ય અને સરોવર, પાણી નિમ્ન વિસ્તારમાં વનિજ્ય સ્તરીના સુધી રોડ પી. ઇન્ડિયા સ્વયં‌સમારોહ વિશ્વસતિ લોકોના સંબંધ સંગ્રહ કરે હતે. પી. કે. સિમ્પન, મુજબ એ પાલ્લડારના પક્ષીની સંખ્યા હાલમાં આધિક્ય કરી હતી. 

તાજલી દરેક સ્ટ્રોમી ઇંગ્રિઝ, ઓસ્ટ્રેલિયા, સલ્વેની, ગ્રેનબર ઓદ્યાર્કના નામની વનિજ્ય સ્તરીના પક્ષીઓના પક્ષના શિક્ષણ સામાધાન છે. અને તેની વિશ્વસતિ લોકોની સંબંધ સંગ્રહ કરી હતી. આદિની પક્ષીઓ મુજબના પક્ષી આકારિકી મુજબના પક્ષી મુજબના સંખ્યામાં 50%થી વધારે હતી. અને તેમની સંભાળ અને અસરની સલાહ આપી હતી.
The National Symposium on Dryland Birds: Strategy for Conservation and Management
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