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Climate Change Effects on Bird's population in Afghanistan

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ABSTRACT
Climate change is one of the most serious environmental problem of the centuries which has affected all ecological processes and life on the earth. Birds play important role in ecologial stability and socio econimic development of socities. Climate change and overexpliotation are two major chalanges against conservation of birds diversity in the world specially in Afghanistan. Given the issues, this online survey based research was undertaken during 2021 to assess the level of knowledge about climate change among people, its possible impacts on bird's population and conservation strategies to cope with climate change in Afghanistan. Results of the study revealed that 95.1% of the respondents were aware about climate change. Source of information about climate change was also different among respondents as 50.6% had their own experience while 34.6% get information from internet and radio and telvosion was source of information for 6.2% of respondents. 71.6% of respondets know about different impacts of climate change. Climate change negitavely affected bird's population as 91.4/% of people said that bird's population had drastically decreased, on the other hand 86.4% of people claim that they miss many birds species during last two decades. Based on these findings it is suggested that habitat restoration is the most accepted conservation policy in Afghanistan context.

Keywords: Climate change, Birds, Biodiversity, Afghanistan

INTRODUCTION
Birds are the most important components of world ecosystem which play important role in socio-ecological stability because they are predators, pollinators, seed dispersers, scavengers and ecosystem engineers (Savage et al., 2008). Assessing world biodiversity status in relation to other ecological and anthropogenic disturbances would be prohibitively expensive and time consuming, so it is necessary to identify taxa that can act as indicators for the overall health of the natural world. Although there is no perfect indicator taxon, birds are widespread, extremely well studied, have population trends that often mirror those of other taxa, and are responsive to environmental change, making them good candidates (UNEP, 2008).

Nowadays one out of every eight bird species is threatened with extinction(world bank, 2012;Moller *et al*, 2010). The Red List issued by IUCN (International Union for Coservation of Nature) in 2013 presents 4 trends of birds globally. About half (49% or 5,412) bird species are declining state, 38% (4,234) are stable, only 6% (659) species are increasing while 6% (693) show unkown trend (IUCN, 2013. The obvious reduction in birds is essentially associated with impacting ecosystem functions and provision of ecosystem services. So the most threatinging factor to global diversity is the climate change. Climate change assumed an antropogenic-related event, which caused global warming of 1.1°C above preindustrial levels, and this is predicted to rise to 1.5°C between 2030 and 2052, and to 3°C by 2100 as global warming continues, negative impacts will multiply and intensify (xiaohan *et al* 2022; Lees *et al*, 2022). In the USA, 97% of bird species could be affected by two or more climate-related threats by 2100 if global temperatures rise by 3°C (Daiz and Malhi, 2022).

According to the Global Adaptation Index (2012), Afghanistan is the most vulnerable country in the world (NEPA&UNEP, 2014). Majority of the population are poor and dependent on natural resources for their livelihood (Mail, 2013). Afghanistan is not considered a biodiversity hotspot due its location absence of marine diversity and climate. The biodiversity index of Afghanistan is (-0.296) that is lower than neighbouingr countries (UNEP, 2008). In term of bird's diversity, Afghanistan have about 4 % of world bird's diversity (515 species) (FAO, 1993; (Mail, 2013). Overexploitation responsible for at least 45% bird species extinction in the

world (Daiz and Malhi, 2022). The major potential causes for the decline in bird population in Afghanistan are overexploitation and climate change. As mentioned earlier, Afghanistan is a poor and vulnerable country to climate change, Additionaly there is an active market of birds in Kabul where people can buy and sale birds for enjoyment and income (Savage *et al*, 2008). As bird's population have decline trends due to different causes so urgent action is needed to conserve and recovery bird's diversity. Some recovery actions and conservation strategies include captive breeding in zoos, reintroduction into the wild, moving individuals between locations, disease management, and provision of breeding sites, supplementary feeding can be used. This study was aimed to assess the effects of climate change on bird's diversity and evaluate different conservation strategies in Afghanistan.

MATERIALS AND METHODS

Study Area:

Afghanistan is a landlocked Asian country characterized by its rugged terrain and dry continental climate, though the mountains cause many local variations. Temperatures vary from minus 10 °C in winter to 44 °C in summer. Afghanistan is an arid country, where more than 50 percent of the territory receives less than 300 mm of rain (Anonymos, 2008).

Samples Collection:

This study was an online survey-based research conducted in Afghanistan during 2020. Google form was designed based on pre-developed questionnaire and shared through social media particularly Facebook and Whatsapp so majority of the respondents were educated persons who had the ability to use internet and social media. Data of 380 forms were arranged and entered into Excel sheets.

Statistical Analysis:

SPSS (version # 22) software was used for computing descriptive statistics and cross-tabulation.

RESULTS

Demographic Context:

Majority of the respondents involved in this survey were male (82.7%) while only 17.3% of female contribute. In case of age, 76.9% of respondents were in 25-35 years of age, 22.2% between 18-25 years of age and only 1.2% of respondents was above 45 years of age. Three different levels of education was determined majority of respondents (54.3%) had MSc, while only 3.7% had PhD and the remaining 42% of the respondents had BSc (Tab-1).

Table 1. Gender, age and education level of respondents

Gender				
	Male		Female	
Frequency	67		14	
Percent	82.7		17.3	
Age				
	Up to 25	25- 35	36- 45	Above to 45
Frequency	18	55	7	1
Percent	22.2	67.9	8.6	1.2
Educational level				
	MSc	BSc	PhD	
Frequency	44	34	3	
Percent	54.3	42.0	3.7	
Total		81		

Information about climate change: Majority of respondents 95.1% were aware about climate change but 4.9% did not know about climate change. The extent of knowledge about climate change had variation among respondents; 16.0% of respondents had greater extent of knowledge about climate change while 45.7% had little information, 37% had reasonable extent and the rest 1.2% had not any information and the phenomena of climate change (Tab-1).

Source of information: Information source of climate change was also different among respondents; majority of respondents (50.6%) had their own experience about climate change while, 34.6% of respondents get information from internet, radio and television was the source of information for 8.6% of respondents and the rest 6.2% of respondents get information from friends and neighbours(tab-2). Impacts of climate change:

Respondents had different ideas about impact of climate change; 48.1% of respondents were agree about the impact of climate change where 27.2% were strongly agree about the impacts of climate change, 13.6% had not any ideas while 6.2% and 4.9% of respondents were disagree and strongly disagree respectively about the impacts of climate change(tab-2).

Table.2- Information, source, level and perception about climate change

Table 2. Information, source, level and perception about climate change				
Questions	**Answer**	**Frequency**	**Percent**	**Ranking**
Are you Aware about climate change?	Yes	77	95.1	1
	No	4	4.9	2
Extent of Knowledge about climate change	Greater extent	13	16.0	3
	Know little	37	45.7	1
	Resonsible extent	30	37.0	2
	Don't know	1	1.2	4
Source of information on climate change	Radio and telvesion	7	8.6	3
	Internet	28	34.6	2
	Personal experience	41	50.6	1
	Friends and nighbers	5	6.2	4
Perception of Impact of Climate change	Strongly agree	22	27.2	2
	No Idea	11	13.6	3
	Agree	39	48.1	1
	Disagree	5	6.2	4
	Strongly disagree	4	4.9	5

Evaluation of conservation strategies: Among different selected strategies to cope with impacts of climate change majority of respondents (49.4%) were agree with habitat restoration (water and food source improvement), 18.5% wants to build embankments to prevent flood water for conservation of habitat, 16.0% wants to adjustment of time of stocking, 7.4% select indoor birds production facilities and the rest 8.6% of the respondents selects the increase of awareness about climate change and biodiversity distortion (tab-3).

Population trend: Majority of respondents (91.4/%) were agree that there was a drastically decrease in birds' population from last two decades and 8.6% of respondents were disagrees with this idea, 86.4% of respondents said that they miss many birds species that were seen 20 years ago, while 13.6% were disagree with this. The respondents of this survey were aware about the impacts of climate change on demographic factors, breeding performance and survival of bird's species because 71.6% of respondents were agree with the impacts of climate changes while 28.4% were disagree with these kinds of impacts. Climate change can alter the migration and laying time as 70.4% of respondent were agree with this while 29.6% of respondents said that climate change will not change bird's migration and laying time. People also know the overall effects of climate change on ecosystem as 49.8% of respondents said the climate change caused drastic changes in weather condition, 17.3% of respondents said that climate change caused poor survival of some birds species, 14.8% of respondents have ideas that climate change caused excessive sun shine, 9.9% said the climate change caused heavy wind storm which resulted destruction of bird's species and the rest 8.6% said that increase of flooding and drought incidence is the major effects of climate change(Tab-3).

Table 3. Population trends and strategies to cope with climate change				
Strategies to cope with the impacts of Climate Change (you can select multi options)	Use of indoor bird production facilities	6	7.4	5
	Dig bore holes/wells to supply water and food(habitat restoration)	40	49.4	1
	Information about climate change(awareness)	7	8.6	4
	Build embankments to prevent flood water	15	18.5	2
	Adjustment in the time of stocking	13	16.0	3
Do you feel in last two decades there is a change in bird quantity?	Agree	74	91.4	1
	Disagree	7	8.6	2
Do you feel at present people miss many bird species seen before 20 years?	Yes	70	86.4	1
	No	11	13.6	2
Do you feel there is impact of climate change on demographic factors, breeding performance and survival of birds	Yes	58	71.6	1
	No	23	28.4	2

DISCUSSION

The main points of this study can be summarized as below: 95.1% of respondents were aware about climate change but 45.7% of respondents had little information. Only 4.9% had greater extent of knowledge and 1.2% had not any information about climate change this might be due to lack of awareness program so awareness program is needed to increase the level of awareness. Source of information about climate change was also different as 50.6% had their own experience while 34.6% and 8.6% got information from internet and radio& television respectively. This suggests that social media could be effectively utalized for awareness programs.

Majority of the people 71.6% knows about the different impacts of climate change on ecosystems because Afghanistan is one of the vulnerable country against climate change. Different conservation strategies were assessed in this survey but majority of the respondents (49.4%) have selected habitat restoration however 7.4% select indoor bird's production facilities and the rest 8.6% of the respondents selects the increase of awareness program. In Afghanistan context habitat restoration and increase of awareness might the best policies due to its application and costs. Majority of respondents (91.4/%) said that in general birds population have drastically decreased and 86.4% of respondents thinks that the miss many birds species during last two decades so selected policies should be applied to conserve birds population and diversity.

CONCLUSION

Birds have close relationship with human. Bird's population have decreasing trends due to climate change because climate change will have destroyed habitat and alter bird's migration time and reproduction process. Overexploitation of natural resource and lack of legislation is another problem in Afghanistan so for conservation of bird's diversity these action should be taken urgently: (1) Awareness program about climate change and it's impacts; (2) Legislation of the use of natural resources; (3) Enforcement of lows and governmental policies; and (4) Habitat restoration to conserve birds' diversity and cope climate change.

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