

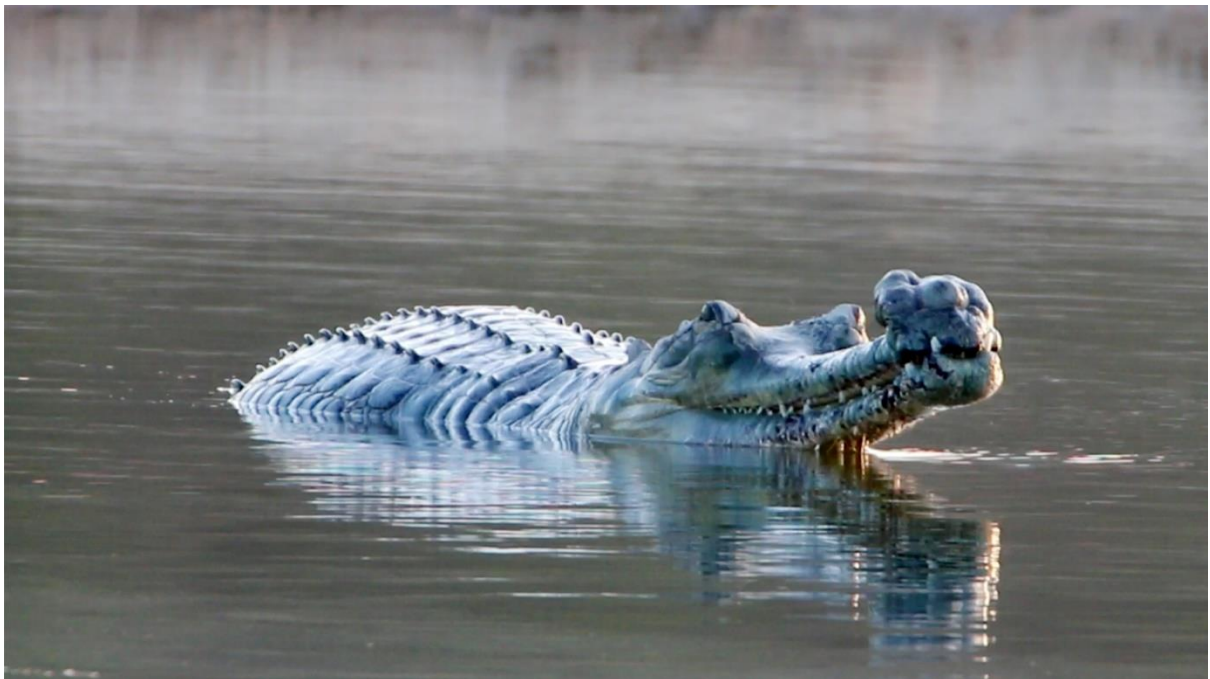


Gharial Ecology Project

Gharial Local & Global Foundation - Madras Crocodile Bank Trust

Project Report 2019-2020

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Government of Rajasthan
FOREST DEPARTMENT



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Introduction

The Gharial Ecology Project (GEP) has finished its 12th field season, since its initiation in 2008, immediately following the mass die-off in the winter of 2007-08. To date, our research approach has been productive, and has been sustained by strong support from the international zoo community and concerned NGOs. In particular, little was known about gharial reproductive behaviours, and the species is one of the most desired for exhibit, because of its unusual appearance and unique position as the only living member of its crocodilian subgroup. Gharials in captivity have the reputation of being very difficult to breed, and only recently has a North American zoo facility, Saint Augustine Alligator Farm, been able to successfully breed and produce a hatchling. Within India, gharial have been bred since the 1980s, but seldom have other captive facilities been successful with captive reproduction. International zoos have taken the lead in providing range country conservation funds. And there is sustained interest among crocodilian conservationists to foster field research and conservation efforts on the remaining extant populations.

The GEP has as its ultimate goals 1) to develop a comprehensive assessment of gharials in the National Chambal Sanctuary (NCS), 2) to identify and protect the species' critical riverine habitats, and 3) to reduce threats and challenges to the species' continued survival using our research outcomes. Gharials are Critically Endangered (=CR) with an estimated 650---700 mature adults globally; 500+ are resident in the NCS. Project activities are conducted by a small core staff (3-4) of Indian biologists / naturalists, under the banner of the Madras Crocodile Bank Trust (in south India, near Chennai, Tamil Nadu) and with inputs from the Senior Scientific Advisor, Professor Jeff Lang. Over the last decade (2008-2020), the GEP has produced a detailed description of gharial behavioural ecology in NCS. Adult gharials make seasonal migratory movements of 200+ km and exhibit complex social interactions at large crèches of hatchlings (Lang & Kumar 2013, 2016; summarized in Lenin 2018, and in Sohn 2018).

Gharial (*Gavialis gangeticus*) is a critically endangered crocodilian living in South Asian rivers. The only viable, self---sustaining population inhabits the Chambal River where a mass die-off occurred in 2007-2008. With international zoo support, ecological studies (2008-2020) of these gharials have been conducted in the National Chambal Sanctuary (NCS), utilizing telemetry to record their movements, activities, and behaviours relevant to the die-off, and critical to their conservation. To date, the results reveal new information about gharial spatial habitat use and seasonal movement patterns, as well as social structure and breeding biology. For the first time worldwide, this project provides the biological basis for science-based conservation actions to protect the remaining wild gharials in their natural river habitats. A training/education component develops an awareness of this magnificent species among the river folk it lives with, and teaches frontline staff about crocodilian biology, reptile conservation, and riverine ecology.

Wild vs Head-start release study:

In November 2018, Gharial Ecology Project took initiative of comparing the movements of Deori released head-starts with the same size juvenile in wild. So, in collaboration with MPFD, we tagged and released 15 head-starts from Deori Gharial rearing center in Nov 2018. At the same time, in collaboration with UPFD, we radio tagged 8 juveniles in wild. All the animals are in the size class of 1.2m to 1.5m. All the release and wild tagging operation are happened between Ater(MP)/Nandgaon(UP) to Chilonga(MP)/Garhaita(UP) stretch.

Most of the radios battery of these tagged animals are in their last stage now.

1. In Deori head-starts, we released 15 in which we had successfully tracked 6 throughout their battery life. Currently we are tracking 1 animal (Radio 16), which is also in its last stage of battery life.
2. Similarly, in wild juvenile we tagged 8 in which we had successfully tracked 2 throughout their battery life. Currently we are tracking 4 animals (Radios -02,04,10,12), which are also in their last stage of battery life.

Overall tracking summary table

Yellow Highlight -tracked completely till battery exhausted, **Red Highlight** -Eaten by mugger
Underlined – Actively tracking

From Release/tagged site	Wild tagged	Deori tagged
Moved Upstream	-	09F , 36M , 58F
Moved Downstream	<u>10F</u>	18M, 32F , 05F , 60M , 34F, 20F , 38F
Moved little	<u>04F</u> , 08M , 52F	<u>16F</u> , 62F
Not moved	30M , <u>02M</u> , <u>12F</u>	01F, 50F
Missing from beginning	06F	14F

Main observation:

1. Many of the wild tagged animals stayed in the same place where we tagged them. Some of them moved little ~1-2kms
2. We have observed muggers are taking advantage on the smaller size class of gharials from yearling to Juvenile. In this batch of released and wild animals, total 4 animals are eaten by mugger in which 3 are from Deori release and 1 from wild tagged.
3. For the couple of months after release, Deori Juveniles moved randomly and eventually settled in some place as a home stretch. Irrespective to the movement, most of the Deori released head starts are seen to be settled among the same size class of animals in the wild. The one which are not doing it are gone missing after that.

Tracking Details by animals:

Deori tagged:

1. Ater/Nandgaon release:

18M: Moved downstream in Dec 2018. Main settled site: Udi-Khera-Gyanpura-Kasowa stretch. Missing from July 2019. Might be battery of the radio exhausted now.

14F: Missing from beginning. Might be battery of the radio exhausted now.

01F: Not moved from release site. Moved down stream in first couple of months and went back to the release site after Jun 2019. Radio battery exhaust by mid-March 2020.

50F: Not moved from release site. Moved down stream in first couple of months and went back to the release site after Feb 2019. Eaten by mugger. Tracked until July 2019.

32F: Moved downstream in Dec 2018. Main settled site: Udi bridge. During monsoon 2019 moved little upstream and downstream from Barole to Khera channel and returned to Udi after monsoon. From Dec 2019, settled between Barole and Baswara. Radio battery exhaust by early June 2020

2. Nakhnole-Kamoni release:

16F: Moved little from Murong and Mau until Feb 2019 and back in release site. Moved downstream during Jun to Aug 2019 and moved back to release site after Sep 2019. Feb 2020 moved upstream and downstream between Nandgaon and release site and from end of Feb stayed in Nadgaon temple site. Active.

09F: Moved upstream in Dec 2018. Main settled site: Nandgaon temple-Nandgaon Bridge. Radio battery exhaust by mid-Feb 2020.

05F: Moved downstream after release. Main settled site: Udi-Khera Channel-Gyanpura. Eaten by mugger. Tracked until March 2019.

60M: Moved downstream after release. Main settled site: Pachigaon-Badpura. During July 2019, moved down until Udi bridge and August returned to settled site, Baswara. From Feb 2020, Showed little movement between Barole and Baswara. Radio battery exhaust by early June 2020

34F: Moved downstream in Dec 2019. Main settled site: Udi-Baswara. During June-Sep 2019, moved more downstream until Gyanpura-Chikni tower. Moved back to Udi railway bridge from Oct 2019. Missing from Dec 2019. Might be battery of the radio exhausted now.

3. Chilonga-Garhaita release:

20F: Moved downstream after release. Main settled site: Badpura-Udi railway bridge. Radio battery exhaust by early May 2020.

36M: Moved upstream after release. Main settled site: Maghera. Eaten by mugger. Tracked until July 2019.

58F: Moved upstream after release. Main Settled site: Nandgaon temple-Nandgaon bridge. Radio battery exhaust by mid-March 2020.

38F: Moved downstream. Main settled site: Nov 2018-May 2019 – Barole-Badpura June-Sep2019 – Udi-Gyanpura-Barecha-Tomarkola-Kanchuri. Missing from Sep 2019. Might be battery of the radio exhausted now.

62F: Moved little~5km up and down. Main settled site: Nov 2018-May 2019 – Chilonga May-Jul 2019 – Kamoni, Aug-Nov 2019 – Missing, Dec 2019-Feb2020 – between Baswara and Barole. Radio battery exhaust by mid-March 2020.

Wild Tagged:

1. Ater/Nandgaon:

30M: Not moved. Stayed in the tagged site. Main settled site: Nandgaon temple-Nandgaon Tower. In beginning of June moved to Maghera. Radio battery exhaust by mid-June 2020.

02M: Not moved. Stayed in the tagged site. Main settled site: Nandgaon temple-Nandgaon Tower. Active.

2. Dinnupura/Mukutpura:

04F: Moved little ~1km. Main settled site: Mau. In monsoon moved downstream to Kamoni and in Aug 2019 moved back to Mau. From Mid-March 2020, moved between Mau and Dinnupura Active.

06F: Missing for beginning. Might be battery of the radio exhausted now.

08M: Moved little ~1km. Main settled site: Mau. Eaten by mugger. Tracked until Mar 2019.

3. Nakhnole-Kamoni:

10F: Moved upstream after April 2019. Stayed in the tagged site from Nov 2018 to Jan 2019. Missing Feb-Mar 2019. Moved upstream to Maghera in Apr 2019. From Jul 2019 to Feb 2020 moved more upstream to Nandgaon temple. Animal was missing from mid-Feb to mid-June 2020 and got the signal back in mid-June from Nandgaon Temple itself. Active.

12F: Not moved. Stayed in the tagged site. Main settled site: Nakhnole-Kamoni. Active.

52F: Moved little ~3kms. Main settled site: Nov 2018-Mar 2019- Murong, Apr 2019 to Feb 2020 back to tagged site. During Monsoon and Mid-March moved until Murong and gone back to tagged site after 15 days. Radio battery exhaust by early June 2020.



Satellite tagging implementation:

During 2019 tagging operation we have used satellite radios to see its success in Chambal terrain. We tagged total 3 animals with satellite tags. One female in Mukutpura, UP - Dinnupura, MP (downstream stretch) and other 2 (1 female and 1 big ghara) in Baroli, MP – Devghar, RAJ (upstream stretch). These tags are programmed to send us the data of location of the animals weekly. It also has a VHF component to double check the locations by manual tracking. The animal tagged in downstream stretch spent near the tagged location until monsoon 2020 and after monsoon had made a long movement to upstream Dangbasai 30kms above Dholpur. Still to date she is spending her time in Dangbasai.

Another female we tagged in upstream moved in to Kuno during March 2020. We have explored the location where she moved in to Kuno river with the help of Kuno National Park Forest team and found nest of not only hers but also 5 other females along with her. This is the first evidence of gharial nesting in Kuno river. On that basis, we did assessment of Kuno river up to 60 kms from the Kuno-Chambal confluence. Also, this year, we have collaborated with Kuno FD team to release 50 juvenals from Deori head-start center in which we have radio tagged 6 animals to see their success of survival in Kuno river.

Since we had great success on SAT tags, during 2020 tagging operation, we have tagged 8 SAT tags out of 13 tags that we tagged.





Covid-19 Effects on project:

Effects of COvid-19 on Research Projects:

- Delay or cancel in all types of field works
- Nesting monitoring was missed mostly during month of March and beginning of April
- Post hatch survey conducted in restricted ways and limited stretch
- Behavioural observation for post hatch happened in only few places and post hatch observation is restricted Gohira down to Bareacha
- Crossing district border between Agra and Etawah was totally locked from March to April and then restricted till now.
- Field team are taking precautions like wearing masks and carrying hand sanitizers and sanitize themselves once returned from field and maintaining social distancing to all people in their village as well as in field.
- GEP field team is a part of Quick Response Team assembled by UPFD to attend wildlife emergencies during Covid-19 Lockdown.

Effects of COvid-19 on Wildlife:

Globally there is a perception that Covid-19 lockdowns were kept people intact in their homes. But in remote places like Chambal sanctuary, people who are away from village, working in big cities are came back to their home villages as the cities are lockdown and they cannot survive their anymore. In this returned people some of them are coming back to their home villages after 10 years or more than that. This reason made curiosity in these people to get around more in sightseeing and spending leisure time in river. A usual villager residing in the village are used to the atmosphere and know what dos and don'ts. But the returned people are seeing this atmosphere after so long busy city life. So, they involved in leisure fishing and swimming in the river. Swimming in the river with muggers can cause conflict and even people drowned during uncontrolled swimming activities in the deeper part of the river. NCS is a tristate sanctuary. During Covid-19 lockdowns, Forest departments of all three states faced many problems. By so far, Uttar Pradesh Forest department did show their presence in this hard time also. They assembled a Quick Response Team with all the research team working in NCS to be on place of call for any emergency. In Madhya Pradesh and Rajasthan stretch there were sand mining, rock mining and illegal fishing happening before the covid-19 lockdown situation. This lockdown situation became another hurdle for the forest department to show their presence in the river stretch more often. So, we noticed a huge number of increased mining activities in many sand bars. Because of the lockdown situation the sand and rocks are got deposited on the either side of the village roads from the river, which then got sold when the government relaxed the lockdown.

Illegal fishing gone to next level in some upstream remote areas of NCS. People made dynamite on their own using lead balls and small round rocks as shrapnel, Potassium permanganate as charge, and jute bag dipped in petrol as fuse. Usually, people use hook lines or nylon nets to catch fish, which is also causing damage to turtles and gharials. But this kind of handmade dynamite will make more destruction directly to the aquatic fauna.

The contract fishing place in pachanadha operated occasionally. Even in Yamuna this year none applied for the fishing contract because of these covid-19 lockdowns. Because the contract fishing mainly exports fish to West Bengal and Orrisa which depend on interstate travel, banned during the lockdown.



Quick Assessment during Covid-19 lockdown:

Introduction

Based on 2 dead gharials – 1 Adult male in Mau 5th March 2020 and 1 Female 1 km downstream Pinnahat ghat 7th March 2020, Uttar Pradesh Forest department, Mr. Maneesh Mittal, DFO NCS and Mr. Diwakar Sriwashtav SDO NCS assembled the expert team from Gharial Ecology Project(GEP-MCBT), WCS/Turtle Survival Alliance India program and Wildlife SOS. On 7th March, Mr. A. Jailabdeen Project Coordinator, GEP/MCBT and Mr. Pawan Pareek Project Officer, WCS/TSA India accompanied forest department and Dr. Illiyaraja Veterinary Officer, Wildlife SOS and helped in the process of necropsy of the female gharial and did the basic observations. On the same day evening Dr. Shailendra Singh Director, WCS/TSA India and Ms. Arunima Singh, Project Coordinator, WCS/TSA India joined the initial team for further examine.

Possible Hypothesis

Adult Male – Mau 5th March: According to the discussion with Forest department and Veterinary officer on the spot, it seems that the carcass was in decayed state from which they can't acquire any usable samples. But according to the behavioural field observation of GEP team, there were male-male competition and fights during the recent courtship season in last February might be the reason for loss of this adult male.

Adult Female – Downstream Pinnahat Ghat ~1km 7th March: According to the basic observation of the expert team on the spot and discussion with Forest department and Veterinary officer, this animal seems to have hepatitis failure. It also observed that the animal had 10 calcified eggs and 4 pre-mature eggs in the oviduct. This animal is around 3m in length which suggest that it a young matured female. Usually in crocodilians when the female matures, it starts to fertile from one ovary and after the finish subsequent breeding seasons the other ovary starts to produce egg. In this female, both oviducts had 4 and 6 calcified eggs and 3 and 1 premature eggs respectively. On consultation with Dr. Jeffrey W Lang Scientific Advisor, GEP-MCBT clarified the abnormal condition of the less eggs present in both oviduct of the young mature female. All the samples of vital organs are stored in formalin and Freezer for further examination.

Action Implemented

Based on the initial observations and Discussion with DFO and SDO NCS, Expert team decided to do a rapid assessment survey of gharials in the primary and secondary vigilant river stretch. The team mainly look for the evidence of any kind of infected or diseased gharials in this survey. According to the plan, Day 1 – 8th March 2020, team started the rapid survey form Nandgaon ghat to Garhaita ~25km in the morning session and Sahson to Pali ~6.5km in the afternoon session. During Day 1 survey, team sighted 136 gharials out of which 1 animal seems to be skinny and slow in response. We didn't encounter any visual abnormal behaviour of any other animals.

Immediate Recommendations

- It is recommended to do active monitoring of the lethargic gharial for the upcoming weeks in the frequency of Alternate days. It is natural for some gharials to miss their feed during post monsoon mass feeding times. During such times, gharial start to metabolise the body fat and become thin and bony. In such scenario of finding >5 individuals in the lethargic state, it is recommended to isolate them in ex-situ environment for the further diagnosis.
- Frequent boat monitoring of the gharial population should be carried out throughout the sanctuary area. During the monitoring, the staff should also observe the abnormality/mortality of other aquatic fauna. GEP staff – Pankaj Kumar, Anand Kumar and Raghavendra Kumar can be accompany the staff for further assistance and guidance for the monitoring.

Future Recommendations

- Accumulation of meteorological, hydrological, and industrial data for National Chambal Sanctuary should be recorded annually.
- Prey based toxicological data should be collected across the sanctuary limit annually especially during post monsoon.
- Scientific sample collection kit should be acquired by both the ranges (Etawah and Bah) to preserve the diseased animal samples for further study.

Survey Data table

Date: 8 th April 2020			Morning Session: 08.00 AM to 11.41 AM			Evening Session: 4:25 PM to 5:30 PM		
Time	Location		Total no of Gharial	Adult	Sub adult	Juvenile	Yearling	Mugger Crocodile
08.00 AM	26.77063	78.64626	0	0	0	0	0	
08.07 AM	26.76698	78.65291	5	0	2	1	2	
08.09 AM	26.76613	78.65487	9	2	4	2	1	
08.28 AM	26.76454	78.67239	6	0	1	5	0	
08.29 AM	26.76565	78.67462	11	0	7	3	1	1
08.38 AM	26.77375	78.67703	4	2	2	0	0	3
08.46 AM	26.7831	78.6792	4	1	3	0	0	
08.50 AM	26.78836	78.68399	5	1	4	0	0	2
08.53 AM	26.78931	78.68783	4	0	4	0	0	
08.57 AM	26.79096	78.69358	7	6	1	0	0	1
09.20 AM	26.79136	78.69591	4	0	0	4	0	
09.22 AM	26.79257	78.69823	1	0	0	1	0	
09.25 AM	26.79255	78.70314	0	0	0	0	0	
09.35 AM	26.79235	78.70345	3	0	0	0	3	1
09.40 AM	26.79249	78.70719	1	0	0	1	0	1
09.43 AM	26.79391	78.71149	1	0	1	0	0	
09.51 AM	26.79624	78.72287	2	2	0	0	0	
09.58 AM	26.79102	78.73007	1	1	0	0	0	
10.23 AM	26.78827	78.72824	8	8	0	0	0	
10.25 AM	26.78442	78.727	2	2	0	0	0	3

10.30 AM	26.77997	78.72664	8	4	4	0	0	
10.37 AM	26.77516	78.73112	0	0	0	0	0	1
10.44 AM	26.77693	78.7379	1	0	0	1	0	
10.46 AM	26.77845	78.73997	1	0	0	0	1	
10.47 AM	26.77921	78.7408	0	0	0	0	0	
10.50 AM	26.78425	78.74409	2	1	1	0	0	
10.54 AM	26.78789	78.75169	1	1	0	0	0	
11.11 AM	26.76771	78.76567	4	1	1	1	1	2
11.24 AM	26.75981	78.78337	2	0	1	1	0	1
11.38 AM	26.7628	78.80572	2	0	2	0	0	
11.41 AM	26.76451	78.80859	0	0	0	0	0	
04.25 PM	26.54005	79.09033	0	0	0	0	0	
04.30 PM	26.53679	79.09611	8	0	3	4	1	3
04.39 PM	26.53342	79.10872	0	0	0	0	0	2
04.44 PM	26.53185	79.11542	1	0	1	0	0	
04.46 PM	26.53068	79.11911	11	2	4	3	2	
04.49 PM	26.52954	79.1228	1	0	0	1	0	
04.52 PM	26.52856	79.12792	3	0	2	1	0	
04.55 PM	26.52825	79.13112	8	0	2	5	1	1
05.04 PM	26.5265	79.13753	3	0	0	0	3	
05.10 PM	26.52535	79.1408	2	0	1	1	0	1
05.30 PM	26.52507	79.10503	0	0	0	0	0	
Total			136	34	51	35	16	23
Date: 8th April 2020 Morning Session: 08.00 AM to 11.41 AM Evening Session: 4:25 PM to 5:30 PM								
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08.09 AM	26.76613	78.65487	9	2	4	2	1	
08.28 AM	26.76454	78.67239	6	0	1	5	0	
08.29 AM	26.76565	78.67462	11	0	7	3	1	1
08.38 AM	26.77375	78.67703	4	2	2	0	0	3
08.46 AM	26.7831	78.6792	4	1	3	0	0	
08.50 AM	26.78836	78.68399	5	1	4	0	0	2
08.53 AM	26.78931	78.68783	4	0	4	0	0	
08.57 AM	26.79096	78.69358	7	6	1	0	0	1
09.20 AM	26.79136	78.69591	4	0	0	4	0	
09.22 AM	26.79257	78.69823	1	0	0	1	0	
09.25 AM	26.79255	78.70314	0	0	0	0	0	
09.35 AM	26.79235	78.70345	3	0	0	0	3	1
09.40 AM	26.79249	78.70719	1	0	0	1	0	1
09.43 AM	26.79391	78.71149	1	0	1	0	0	
09.51 AM	26.79624	78.72287	2	2	0	0	0	

09.58 AM	26.79102	78.73007	1	1	0	0	0	
10.23 AM	26.78827	78.72824	8	8	0	0	0	
10.25 AM	26.78442	78.727	2	2	0	0	0	3
10.30 AM	26.77997	78.72664	8	4	4	0	0	
10.37 AM	26.77516	78.73112	0	0	0	0	0	1
10.44 AM	26.77693	78.7379	1	0	0	1	0	
10.46 AM	26.77845	78.73997	1	0	0	0	1	
10.47 AM	26.77921	78.7408	0	0	0	0	0	
10.50 AM	26.78425	78.74409	2	1	1	0	0	
10.54 AM	26.78789	78.75169	1	1	0	0	0	
11.11 AM	26.76771	78.76567	4	1	1	1	1	2
11.24 AM	26.75981	78.78337	2	0	1	1	0	1
11.38 AM	26.7628	78.80572	2	0	2	0	0	
11.41 AM	26.76451	78.80859	0	0	0	0	0	
04.25 PM	26.54005	79.09033	0	0	0	0	0	
04.30 PM	26.53679	79.09611	8	0	3	4	1	3
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04.52 PM	26.52856	79.12792	3	0	2	1	0	
04.55 PM	26.52825	79.13112	8	0	2	5	1	1
05.04 PM	26.5265	79.13753	3	0	0	0	3	
05.10 PM	26.52535	79.1408	2	0	1	1	0	1
05.30 PM	26.52507	79.10503	0	0	0	0	0	
Total			136	34	51	35	16	23

Team 2			Date: 9th April 2020					Morning Session: 07.30 AM to 02.00 PM	
Time	Location		Total no of Gharial	Adult	Sub adult	Juvenile	Yearling		
07.30 AM	26.536674	79.097008	18	1	6	10	1		
08.00 AM	26.571346	79.064343	15	2	6	6	1		
08.45 AM	26.589004	79.041954	22	0	14	6	2		
09.00 AM	26.617266	79.009623	5	1	4	0	0		
09.20 AM	26.628199	79.006361	19	0	10	7	2		
09.40 AM	26.642375	78.992639	10	0	4	5	1		
10.00 AM	26.669762	79.006283	6	3	0	2	1		
11.00 AM	26.672605	78.972410	17	5	7	5	0		
11.15 AM	26.656228	78.945799	14	6	5	3	0		
11.25 AM	26.688722	78.956529	6	2	4	0	0		
11.30 AM	26.701339	78.925978	4	0	4	0	0		
12.30 PM	26.701164	78.898918	4	0	4	0	0		
01.30 PM	26.742945	78.830727	2	0	0	2	0		
02.00 PM	26.764997	78.810933	5	1	3	1	0		
Total			147	21	71	47	8		

Annual Survey: 2019:

Date	PLACE	ADULT MALE			ADULT FEMALE	SUB ADULT	JUVENILE	YEARLING	Total Gharials
		Big ghara	Medium ghara	Small Ghara					
12-02-2019	Jaitpur-harigiri baba	1	0	0	16	14	13	6	50
13-02-2019	Dholpurdawn-take	1	0	0	6	5	5	3	20
13-02-2019	Tigre rithora	1	1	2	40	40	10	5	99
11-02-2019	Sankarpur	1	1	0	10	7	7	2	28
11-02-2019	Kutiyana-Bhaveswari temple	0	0	0	3	3	2	0	8
14-02-2019	Babusingh gher - Purani	2	0	0	41	29	2	4	78
14-02-2019	Barsala	3	1	1	31	26	12	6	80
11-02-2019	Rhea	3	1	1	45	26	7	3	86
11-02-2019	Used ghat/Raipur	1	0	0	3	9	10	5	28
18-02-2019	Khurd-Basoni	1	0	0	7	20	13	4	45
08-02-2019	Harlalpur	1	0	0	13	9	5	2	30
08-02-2019	Kachpura ghuda	0	0	0	2	6	8	3	19
10-02-2019	Ranipura - Gohira	4	3	7	46	15	8	0	83
10-02-2019	Nandgaon Temple	1	0	0	8	16	15	3	43
18-02-2019	Maggerapura/Kyarepura	2	1	1	26	19	6	1	56
19-02-2019	Dinnpura-Mau	2	0	0	16	10	4	2	34
17-02-2019	Kamony-Nakknole	0	0	0	0	0	0	0	0
19-02-2019	Garhaita-chlonga	1	0	2	18	19	3	3	46
13-02-2019	Pachigaon-Baroli	1	0	0	8	13	9	6	37
16-02-2019	Udi Bridge	0	0	0	1	10	9	5	25
15-02-2019	Khera Ajab Singh T, F & CH	4	2	2	56	51	26	8	149
16-02-2019	Chikni tower - Gyanpura	1	0	0	3	4	5	3	16
17-02-2019	Kasowa	2	1	2	24	13	3	2	47
17-02-2019	Bareacha	0	0	0	3	19	18	6	46
16-02-2019	Piluvan Nagala	1	1	0	5	10	8	2	27
21-02-2019	Jagtoli-Barcholi	1	0	1	3	8	13	3	29
21-02-2019	Sahson - Mahuwa suda	0	0	2	2	9	20	11	44
21-02-2019	Mahuwa suda -Patharra	0	0	0	1	33	38	15	87
14-02-2019	Yamuna Confluence	0	0	0	0	4	0	0	4
	Sub-total	35	12	21	437	447	279	113	1344
	Grand total	68			437	447	279	113	1344

2020:

PLACE	Date	ADULT MALE			ADULT FEMALE	SUB ADULT	JUVENILE	YEARLING	Total Gharials
		Big ghara	Medium ghara	Small Ghara					
Pali	28-Jan-2020	2	1	1	21	17	1	0	43
Bagdiya	28-Jan-2020	0	0	0	3	1	1	0	5
Barole	29-Jan-2020	2	1	1	29	20	0	0	53
Nadigaon	29-Jan-2020	1	0	1	9	8	2	0	21
Dang basai	30-Jan-2020	3	0	0	24	9	4	1	41
Jaitpur-harigiri baba	30-Jan-2020	2	3	1	13	14	8	3	44
Dholpurdown-take	31-Jan-2020	1	0	1	1	10	11	5	29
Tigre rithora	31-Jan-2020	3	0	2	38	28	2	0	73
Sankarpur	31-Jan-2020	1	0	0	8	13	12	8	42
Kutiyana-Bhaveswari temple	31-Jan-2020	1	0	0	4	7	8	3	23
Babusingh gher - Purani	31-Jan-2020	3	0	0	21	25	10	4	63
Barsala	31-Jan-2020	2	0	1	21	24	21	7	76
Gadijafar-Samauna	31-Jan-2020	1	1	0	2	21	17	4	46
Rhea	31-Jan-2020	4	1	1	30	24	9	4	73
Rhea-Pinnahat	31-Jan-2020				2	9	6	2	19
Used ghat/Pinnahat-Raipur	01-Feb-2020	1	0	1	10	5	0	0	17
Khurd-Basoni	01-Feb-2020	1	0	0	5	21	16	20	63
Harlalpura	01-Feb-2020	1	0	0	10	5	3	1	20
Kenzra	01-Feb-2020	1	1	0	1	5	6	4	18
Kachpura ghuda	01-Feb-2020	1	1	0	3	13	8	8	34
Ranipura - Gohira	01-Feb-2020	4	1	3	34	13	7	3	65
Nandgaon Temple	01-Feb-2020	2	0	0	7	11	33	12	65
Maggerapura/Kyarepura	01-Feb-2020	1	0	1	16	13	4	1	36
Dinnpura-Mau	03-Feb-2020	2	0	1	13	11	7	4	38
Kamony-Nakknole	03-Feb-2020	1	1	0	13	8	2	2	27
Garhaita-chlonga	03-Feb-2020	1	0	0	3	8	6	2	20
Pachigaon-Baroli	04-Feb-2020	1	0	0	8	11	5	1	26
Udi Bridge	04-Feb-2020	0	0	0	0	5	3	0	8
Khera Ajab Singh T, F & CH	04-Feb-2020	5	1	3	40	31	29	8	117
Chikni tower - Gyanpura	04-Feb-2020	0	1	0	5	7	6	2	21
Kasowa	05-Feb-2020	1	1	1	17	11	5	2	38
Bareacha	06-Feb-2020	0	0	0	2	16	10	1	29
Piluvan Nagala	06-Feb-2020	2	1	1	8	11	6	3	32
Jagtoli-Barcholi	06-Feb-2020	0	0	1	0	9	4	1	15
Sahson	06-Feb-2020	0	1	2	4	11	5	1	24
Sahson temple	07-Feb-2020	0	1	1	0	7	4	1	14
Kindol-Pali	07-Feb-2020	0	0	0	0	7	12	6	25
Mahuwa suda	08-Feb-2020	0	0	1	0	6	6	2	15
Mahuwa suda -Patharra	08-Feb-2020	0	1	1	0	14	13	5	34
Yamuna Confluence	08-Feb-2020	0	0	0	0	0	0	0	0
Grand total			95		425	489	312	131	1452

Community and Capacity building programs:

World wetland Day celebration 2 Feb 2019:

Program was conducted for schools' students on World Wetland Day in Saman Bird Sanctuary. The main objective of this program was to aware students about the importance of wetland and its role in ecosystem. Through the presentation, kids were informed about the reducing wetland areas and upcoming problem of drinking water in near future. A painting competition was conducted among the kids, in which they illustrate the importance of wetland and its impact of dried wetland on animals and human. Th students were taken to a nearest wetland to check the scenario of a wetland where people were doing agriculture nearby and birds were foraging. The program was concluded with a bird watching exercise. This program was participated by 200+ students and 8 schoolteachers.

Community program at Bhareh temple 13 April 2019:

A community program was organized for the villagers at Bhareh temple. The village is situated near the Chambal -Yamuna bank and their farming land are extended to the river system where they do crop cultivation with chemical fertilizers. This program basically themes for the organic farming for the villager. During the program, people were aware about the demerits of chemical farming and serious impact on human as well as animal health. They were informed about the organic farming techniques. During the program, a brief introduction on impact of chemicals on aquatic organism which go into the river. Later a skit prepared by village kids of garhaita was performed for villager in which they were informed about fishing and poaching pressure on the river and how animal suffers. This program was participated by 25+ villagers.

Community program in Gaati village 3 May 2019:

A community program was organized for the people of Gaati village. The main objective of this program was to aware them about the gharial status and behavior, and importance of Chambal River as an ecosystem. With the help of Power point presentation, villagers were aware about the gharials and Chambal river. During the program, they have been informed about the gharial behavior and their home range and importance of undisturbed river ecosystem. Documentary on gharial conservation were played to sensitize them towards its conservation. This program was participated by 30 + villagers.

Community program in Kheda Ajab Singh 4 May 2019:

A community program was organized for the people of Kheda Ajab Singh village. The main objective of this program was to aware them about the gharial status and behavior and importance of Chambal River as a riverine ecosystem. With the help of Power point presentations, villagers were aware about the gharials and other aquatic fauna and their relationship and importance in ecosystem as a food chain and food web. During the program, they have been informed about the gharial behavior and their home range and importance of undisturbed river ecosystem. They also informed about freshwater turtle species found in Chambal River and their importance in a riverine ecosystem as well as turtle myths. Documentary on gharial conservation were played to sensitize them towards species and river conservation. In this community program, 25+ villagers participated and benefited with info.

Teachers Training Program on World biodiversity day 22 May:

A Teacher's Training Workshop was jointly organized by Gharial Ecology Project of Madras Crocodile Bank Trust, Uttar Pradesh Forest Department and District Primary Education Department on International Day for Biological diversity at Sahson Rest house. The main objective of this workshop was to train elementary school teachers at riverside schools for conservation of the endangered Gharial (*Gavialis gangeticus*) through adopting an innovative (village) cluster based approach. The session in the workshop was "Introduction and concept of TTP", "Our River and its Social, Cultural, Economic and Ecological importance", "A brief description about Gharial (*Gavialis Gangeticus*); its importance and threats), "About National Chambal Sanctuary" & "Role of schools & teachers in Gharial and its habitat Conservation". During the program, teachers were taken to the field on boat to show gharial in Chambal. Few eco-games were performed for teachers to conceptualize the play way learning methods for the teachers for the school kids. This training workshop was participated by 15 schoolteachers from riverside schools. By following the teachers training workshop, schools follow up program were conducted in Kasaua UPS, Kasonga UPS, Miholipaar UPS, Bhawanidas pura UPS, Razpura UPS and Jaunani UPS. Rest of the school will be visited in September month 2019.

Community program in Baswara village 31 May 2019:

A community program was organized for the people of Baswara village. This village is situated on the riverbank and depending on rivers system even for drinking water. So, this program designed to aware villager about the sustainable use of natural resources. During the program, a lecture on sustainable use of natural resource were given with the help of ppt. They were informed about the importance of River and its animals which play a vital role in riverine ecosystem. During the program, they have been informed about the gharial behavior and their home range and importance of undisturbed river ecosystem. This program was participated by 40+ villagers.

World environment day celebration 5 June 2019:

On world environment day, in collaboration with UPFD, we conducted an awareness program for the villagers of Chakkarpura and Bhareh village people. With the introductory speech, information shared on values of celebrating World environment day and importance of healthy environment for mankind. They were informed about the self-sustained Chambal river eco-system and how it's perfectly work without human intervention. Next speech was given by Ranger, Etawah on importance of Plants and how they help to reduce the environment pollution and provide oxygen for us. Later, a presentation on Gharial Ecology Project activity and finding were shared them. At the end of the program, we planted indigenous tree with the help of villagers in Bhareh rest house. This program was participated by 50+ villagers and 8 forest guards.

Education program for Students of Upper Primary School, Razpura village, Etawah, 22 July 2019:

On 22 July, an awareness program was conducted for students of Razpura schools. The kids were aware about the Chambal Ecosystem, and its importance as a river for locals. During the program, the information on Gharial conservation in Chambal river and its long-term goal was shared in simple dialect and with the help of diagrams, pictures and through story telling. They were further informed about the model of self-sustainable ecosystem and consequences of human intervention which are solely responsible for demolishing this species. The evaluation of the program was done through a question-based game, in which kids divided in teams, and play a game. So, there are many stages in this game in which children ask questions each other to cross every stage and then the one who gives the correct answer, reached at the new stage. This program was successfully conducted with 26 schools' kids and 3 teachers.

Education program for Students of Upper Primary School, Kasonga Village, Etawah 23 July 2019:

On 23 July, a program was conducted for students for Kasonga village school. This was the second time, when the GEP team was following them after a Teachers training program held on 22 May this year. During the program, Kid was aware about the gharial and other sympatric species and importance of Chambal river as a Gharial ecosystem. During the program, the information on Gharial research and conservation was shared with kids with a simple dialect and with the help of photos. The program evaluation was done through a question-based quiz, in which kids divided in teams, topic related questions were asked to them. At the end of the program, the plants were planted during the last year program in which students taken responsibility of plant, were checked, and photographed with students. This program was successfully conducted with 11 schools' kids and 1 teacher.

Education program for Students of Upper Primary School, Naglabhawani-daspura Village, Etawah, 24 July 2019:

On 24 July, an awareness rogram was conducted for students of Rajpura UPS school. A general information on gharial and Chambal River given to students. During the program, a eco-game "hug the tree" was conducted for the students to understand the importance of indigenous trees. In this program, blind fold wearing students allowed to touch a tree and after a long move to the beginning point, he asked to identify the same tree what he hugged. A question-based exercise was conducted to check the perception of students. This program was successfully conducted with 23 schools' kids and 1 teacher.

Education program for Students of Upper Primary School, Jaunani Village, Etawah 25 July 2019:

On 25 July, an awareness program was conducted for students of Jaunani UPS schools. The kids were aware about the biodiversity of Chambal Ecosystem, and importance of Chambal as river. During the program, information on Gharial, Mugger, Dolphin, turtles, and birds given to them aware about the conservation and population status of these animal. This program was successfully conducted with 130 school's students and 5 teachers.

Education program for Students of Upper Primary School, Kasaua Village, Etawah 29 July 2019:

On 29 July, an education program conducted in for the students of Kasaua UPS schools. This was started with a revision session in which students were informed about the basic information about the gharial, Chambal river etc. A question- answer based quiz conducted among students to evaluate the knowledge and perception about the gharial and other Chambal river fauna. During the program, Kids raised a question about the plastic pollution in Yamuna river and inquired about the plastic presence along Chambal and its impact on gharial. They were informed about reduce, reuse and recycle, and shared that gharial is a fish eater species and if fishes hide in plastic bag, and would be eaten by an aquatic animal will harm them to the death. A picture shown to them, in which a fish is captured in plastic bag and swimming as an example. This program was successfully conducted with 25 schools' kids and 4 teachers.

Education program for Students of Upper Primary School, Miholipaar Village, Etawah: 6 August 2019:

On 6 August, an education program conducted in Miholipaar UPS schools. The kids were aware about the biodiversity of Chambal ecosystem, and importance of Chambal as river. During the program, information on Gharial, Mugger, Dolphin, turtles, and birds given to them to aware about the conservation and population status of these animal. This program was successfully participated by 30+ school's students. We had to stop the program due to condolence in village and part of the program was conducted on 29 August.

29 August: - On demand of schoolteachers, after the exams in schools. Part of the program continued with a briefing of first part of the program and later they were informed about the reduce, reuse, and recycle of non-biodegradable substance and have been shared demerits of these substances when goes into the river like plastic bag. A picture shown to them, in which a fish is captured in plastic bag and swimming as an example. A questioning based game was conducted to evaluate the success of the program, in which 75% students correctly answered reasoning-based questions. This program was successfully participated by 30+ schools' kids and 3 teachers.

Education program for students at Upper Primary School, Gaati village Etawah 5 September 2019:

On 5 September, an education program conducted in for the students of Gaati UPS schools. Program was started with an introductory speech, in which kids were informed about the gharial conservation. They were informed about reduce, reuse, and recycle, and the best way to protect our environment and river ecosystem by following activities classified under reduce, reuse, and recycle. With the help of games, they were informed about impact of human activities on Chambal fauna and flora and how badly they are affecting river ecology. Kids were appealed to share this note to their family members and bring this in enforcement so that we could ensure the survival of our Chambal River. This program was successfully conducted with 35+ schools' kids and 3 teachers.

International vulture day (IVD) awareness program 7 September 2019:

Since 2009, IVD is being celebrated every first Saturday in Sep month worldwide in support of CR vulture population. To mark the day, we conducted an awareness program on world vulture day in Jarhau junior school. With introductory speech on vulture population and threatened status, students were informed about the reasons of their declination and medicine to mitigate

the situation. They were informed about the importance of animal and vital roles they play to balance any kind of eco-system. Later a rally is conducted along the village to aware village people by appealing them for animal conservation. 100+ students participated in this program with 2 ranger and 2 forest guard.

Capacity building program for UPFD 14 Oct 2019:

For the year 2019, a capacity building workshop was conducted for the forest department staff from the ranger rank to forest guard and boat man to training various field techniques and methods including species identification and stationary counting and boat survey.

The program was started with a pre-evaluation exercise, in which a MCQ based questionnaire was distributed among the participants to answer the question based on wildlife research, conservation and management. After the completion of pre-evaluation, capacity building workshop was conducted on various topics including Human crocodile conflict, Snake Rescue and release, status, and species identification of Chelonians in NCS, Research techniques of Turtle and Crocodiles, Indian Wildlife (Protection) Act, 1972, New upgraded technologies in wildlife conservation based on NCS environment. After completion of indoor session, an evaluation exercise conducted with help of MCQ question paper.

For training on Radio telemetry and Tracking and Aerial survey techniques, participants were taken outdoor to teach about the telemetry by using VHF received and yagi antenna and aerial survey techniques by flying drone. During the session they were informed about the different signal frequency and its explanation and the drone controlling technique and collection of reading on size class of gharial, length of sand bank or river stretch etc.

This workshop was successfully conducted with 30+ participants, participated from four protected area including National Chambal Sanctuary, Saman Bird Sanctuary (Mainpuri district), Sur Sarowar Bird Sanctuary (Agra), and Patna Bird Sanctuary (Jalesar Road).

Summary of Model village program:

This year, two model villages were selected by Gharial Ecology Project (GEP) to develop a model village program. Selection was made under the consideration of village location, where the villager is situated and importance of village community for Chambal River sanctuary and for Gharial and other aquatic fauna. Selection based on the riverside village which lies about 500m to 1km range from the Chambal, preferred gharial nesting site along the village sand bank and dependency of local community on river for various purposes including water lifting for crop irrigation/cultivation, fodder for cattle, cattle grazing in bank, bathing and fishing, wood cutting and Wildlife Human Conflict (WHC) including Human Crocodile conflict (HCC). This way, two villages selected named Kheda Ajab Singh and Gohra.

1. Kheda Ajab Singh:

This village is situated along the lower Chambal and surrounded by Chambal River from three sides. This village is considered as potential gharial nesting site, and every year an average of 30 to 40 gharial nests observed by GEP team. Complaints about the mugger in village pond is being reported every year after post monsoon. Thankfully, there is no mugger attack on human reported since last a decade but attack on cattle by leopard, hyena and mugger reported sometimes. Because this village is covered by forest from three sides, so community highly depends on forest resources.

2. Gohra village:

This village is situated along the upper Chambal under the state boundary of Uttar Pradesh and surrounded by Chambal River water during the peak monsoon, at least for a month, travel outside from village is possible only by motorboat, and during flood, supplies provided by the NGO's and forest department for the survival of villagers. During flood in Chambal, Chambal river water spread over the large extent of lowland of village, most of the farmers lose their crop during the flood season which directly hit their economy and that is why they must borrow money on interest for the next crop. Due to which their dependency increases on the river system to return borrowed money. This village is also considered as potential gharial nesting site, and every year an average of 10 to 15 gharial nests observed by our team along the sandy bank of river. Other reason of the selection of this village was this village is pass way for two more river side village including Ranipura and Gudha village, where people go through this village when go to nearest town.

During flood, when lateral movement of aquatic animal started in Chambal, they reside in crop field for at-least a month and its great chances of muggers' attack emerges during this period of time. Complaints about the mugger attack in village has also been reported on human as well as cattle. Besides, attacks by leopard, hyena is common in this area and this year two fatal attacks reported from the vicinity of this village.

- **Stakeholder meeting in Kheda Ajab Singh:**

The stakeholder meeting was conducted on 6 Dec for the villagers of Kheda Ajab Singh village. The objective of the meeting was to get support of villagers to implement the designed model village plan in this village. The meeting was started with an introductory speech, in which outline of model village were shared to the village people and their inputs as a local person noted down to develop village as a model in lower Chambal. Dr. Ashutosh Tripathi (consultant/community coordination, GEP) explained about the awareness through the slogan wall painting specially for teenagers and kids of village, organic farming for the framers of village, vermin-compost manufacturing and small industries based on organic farming and vermin-compost, an option of livelihood with low cost investment policy. With that Dr. Tripathi prepare a list of Indian govt. scheme and number of beneficiaries from the village. In this meeting, it has been observed that there is no govt. scheme taken by any farmers due to lack of awareness or their ignorance. This meeting was participated by 50+ stakeholders.

- **Stakeholder meeting in Gohra Village:**

Same as Kheda Ajab singh (model village -1) The stakeholder meeting was conducted on 22 Nov for the villagers of Gohra village village. The objective of the meeting was to get support of villagers to implement the designed model village plan in this village. The meeting was started with an introductory speech, in which outline of model village were shared to the village people and their inputs as a local person noted down to develop village as a model in lower Chambal. Dr. Ashutosh Tripathi (consultant/community coordination, GEP) explained about the awareness through the slogan wall painting specially for teenagers and kids of village, organic farming for the framers of village, vermin-compost manufacturing and small industries based on organic farming and vermin-compost, an option of livelihood with low cost investment policy. With that Dr. Tripathi prepare a list of Indian govt. scheme and number of beneficiaries from the village. In this meeting, it has been observed that there is no govt. scheme taken by any farmers due to lack of awareness or their ignorance. This meeting was participated by 50+ stakeholders.

- **Volunteer training program:**

As per the plan of developing model village, we have to select volunteers from the selected villages, when we shared this plan to DCF and Ranger Bah and Etawah range, they suggested for making volunteers from every forest beat from Uttar Pradesh Chambal Stretch. Under the consideration of their input, and with the help of forest staff, we would be able to select volunteers from every riverside village of Chambal.

- A. Volunteer training program for the volunteers of Upstream Chambal villages at Nandgaon, Uttar Pradesh, 19 Dec 2020:**

This volunteer training program was conducted for the villages' lies in Bah range. The objective of this training workshop was to explain about the role of volunteers for the conservation of Chambal river system and their involvement in spreading conservation awareness among people about the wildlife and river conservation. The training was started with introductory speech, in which Dr. Tripathi listen every single volunteer for the issues in their respective village. Mostly the volunteers shared about the wild animal attack on cattle and human are causes of conflict which is increasing in upstream villagers along UP Chambal. Dr. Tripathi explained the solution on the mitigation of such conflict with the help of examples of other national parks and sanctuaries. He requested volunteers to set a weekly village level meeting for local to spread awareness, so attacks could be avoided. Further, Dr Tripathi explained about reasons of leopard, hyena, and mugger attacks and how to avoid such situations. This program was attended by 50+ volunteers in from 10 villages.

- B. Volunteer training program for the volunteers of lower Chambal village at Sahson, Uttar Pradesh, 18 Dec 2020:**

This volunteer training program was conducted for the villages' lies in Etawah range. The objective of this training workshop was to explain about the role of volunteers for the conservation of Chambal river system and their involvement in spreading conservation awareness among people about the wildlife and river conservation. The training was started with introductory speech, in which Dr. Tripathi listen every single volunteer for the issues in their respective village. Mostly the volunteers shared about the wild animal attack on cattle and human are causes of conflict which is increasing in upstream villagers along UP Chambal. Dr. Tripathi explained the solution on the mitigation of such conflict with the help of examples of other national parks and sanctuaries. He requested volunteers to set a weekly village level meeting for local to spread awareness, so attacks could be avoided. Further, Dr Tripathi explained about reasons of leopard, hyena, and mugger attacks and how to avoid such situations. This program was attended by 50+ volunteers in from 10 villages.

- **Workshop on Organic farming for villagers in Kheda Ajab Singh village, 20 Dec 2020:**

A workshop on organic farming was conducted for the villager framers of Kheda Ajab Singh. For this Dr. Rajesh Gupta work as Expert in Govt. Farmer Training Centre was invited to take session for this workshop. In this workshop, sessions covered on organic farming and it importance, self-manufacturing of vermin-compost, and introduction of running government schemes and available subsidies for setting up different small village level industries as the secondary livelihood options.

Program started with introductory speech by Dr. Ashutosh Tripathi, in which he explained about the outline of the workshop. Detailed sessions were conducted by Dr Rajesh on organic farming and its importance for Chambal ecosystem, vermin-compost making procedure. They were informed about the schemes for different small industries set up village level.

At the end of the program, evaluation session was conducted in which farmer invited to explain about the topics taken during workshop. This program was attended by 50+ farmers from Kheda Ajab Singh.

- **Workshop on Organic farming for villagers in Gohra village, 22 Dec 2020:**

On 22, a workshop on organic farming was conducted for the villager framers of Gohra village. The objective of the workshop was to promote organic farming in selected model village and encourage villagers to adopt it on large scale. For this Dr. Rajesh Gupta work (agriculture expert from Govt. Farmer Training Centre) was invited to take session for this workshop. In this workshop, sessions covered on organic farming and it importance for river ecosystem and public health, self-manufacturing of vermin-compost and small and large scale, and introduction of running government schemes and available subsidies for setting up different small village level industries for the villagers. Program started with introductory speech by Dr. Ashutosh Tripathi, in which he explained about the outline of the workshop. Detailed sessions were conducted by Dr Rajesh on organic farming and its importance for Chambal ecosystem, vermin-compost making procedure. They were informed about the schemes for different small industries set up village level. This program was attended by 50+ farmers from Gohra village and Gudha village.

At the end of the program, evaluation session was conducted in which farmer invited to explain about the topics taken during workshop. This program was attended by 50+ farmers from Gohra village and Gudha village.

- **Slogan wall painting in Kheda Ajab Singh and Gohra village:**

Painting of slogan on walls in Kheda Ajab Singh and Gohra village to raise the awareness on Gharial and River conservation especially for teenagers and kids.

Note: - these entire programs were conducted by taking all precautions as per Indian Government guidelines/norms under the Covid-19 pandemic situation.







