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HUMAN-CROCODILE INTERACTIONS IN GOA

UNDERSTANDING THE RELATIONSHIP THROUGH
THE TRADITION OF CROCODILE WORSHIP



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“Few animals are as charismatic as crocodilians, and as poorly understood by the general public.”

Rick Shine, University of Sydney

INTRODUCTION



Mugger crocodile in the water | Credit: Opensource/Canva

The urban narrative around human-wildlife interactions has been focused predominantly on the notion of conflict. Shrinking habitats have led to a worldwide increase in negative consequences and challenges due to human-wildlife conflict (Pooley, 2016). However, it is not the entirety of the story of human-wildlife relationships in India. Humans have always shared spaces with animals, and different cultures associate with nature and wildlife in distinct ways (Dhee D, Athreya V, Linnell JDC, Shivkumar S, Dhiman SP, 2019). It may be preferable to talk about human-predator relations, with conflict as a subset of relations, alongside coexistence predicated on interventions to alleviate negative impacts of predators; coadaptation, where humans and predators adapt to accommodate one another; mutual avoidance; and mutual flourishing (Pooley 2016; Carter & Linnell 2016).

In his paper, Cultural Herpetology of Nile Crocodiles of Africa, Pooley demonstrates the factors that influenced the widespread image of crocodiles as man-eaters. It is evident from Pooley's work that the prominent European narratives of 'frightening' species with human killing instincts had overlooked the historical perspective of other cultures who lived alongside crocodiles. The accounts of folklore from the Nile, Egypt, and the Philippines tell us that people have historically shared spaces with crocodiles and have associated with them in the form of stories and traditions and often revered them (Dornan, 1934).

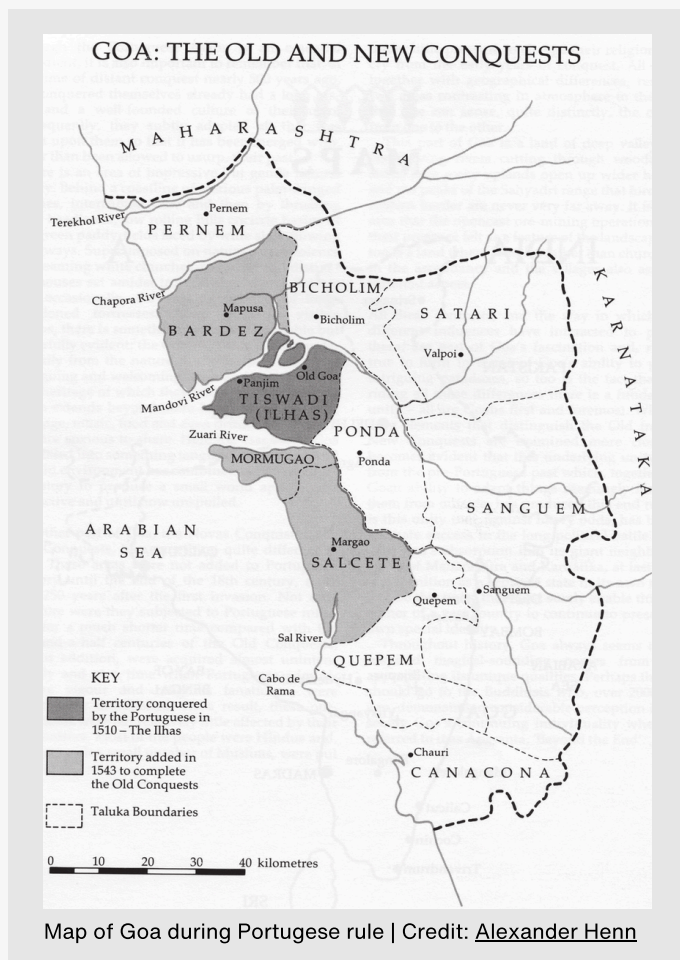
In the Philippines, crocodiles are part of folklore proverbs and thus have been incorporated into lives culturally. Crocodiles used to be associated with water and agricultural fertility and were even thought to be guardians of the underworld, causing people to pray and make offerings to them (van Weerd & van der Ploeg, 2012, p. 43; Tsuji, 2012, p. 119). Philippine folklore describes how people coexisted with crocodiles in the past. This study concludes that people and crocodiles built a harmonious relationship, and many can learn from the fading cultural values portrayed in folklore. According to van Weerd and van der Ploeg (2012, p. 42), the crocodile was regarded as a friendly creature that often approached to listen to people's conversations and even allowed people to step on its back to cross the water.

Muggers at Peer Khan Jahan Ali Pond in Bangladesh are considered holy, and blessings are believed to be granted by placing cash offerings on the croc's tail. In Hinduism, crocodiles have gained a deep sense of respect through myths. It is displayed on the mount of the Varuna (water) and river Yamuna. The sun temple of Konark In Orissa has a huge stone crocodile that people worship. In Gujarat, three tribal communities worship 'Mugger Dev, a double-headed crocodile carved in wood and a goat is sacrificed to propitiate this god. The most revered goddess of Gujarat, Khodiyar Maa, also has a crocodile as her mount (Borkar, 2003). In the Charotar region of Gujrat, humans and crocodiles often share the same water bodies without fear of each other.

Social factors such as culture, stories, experiences and perceptions play a prominent role in creating and sustaining a social capacity for coexistence. This study addresses the nuances and complexities of human-mugger interactions and the cultural practice of crocodile worship (*Maange Thapnee*) in Goa.

Recognizing such nature-culture relationships and sharing them with wider audiences will help preserve the traditions and influence conservation efforts in India. Understanding the role of oral narratives and cultural practices can contribute to decolonising conservation practices.

STUDY SITE



This study was conducted in the coastal state of Goa, located on the western coast of India. It is a small yet captivating state renowned to many for its scenic beaches and Portuguese architecture. With a coastline stretching over 103 km alongside the Arabian Sea and an area of 3,702 km², Goa is home to a diverse social, cultural, and ecological heritage.

Geographically, Goa comprises lowlands, plateaus, hills, waterfalls, rivers, and mangrove forests, making it a hotspot of rich biodiversity. It is divided into two districts, each composed of 12 talukas. Seven fishing villages in Ponda (now in the South Goa district) and Tiswadi taluka (North Goa district) were selected to study crocodile worship and understand human-crocodile interactions in Goa.

Ponda and Tiswadi Taluka lie centrally in Goa, surrounded by a robust ecosystem of rivers such as the Mandovi, Zuari, and the Cumbarjua Canal. Most of the villages on the banks of this river ecosystem of Goa have Khazan farmlands, manas (sluice gate operating) and a system of bundhs (dykes) used for agricultural and fishing purposes based on the seasons.

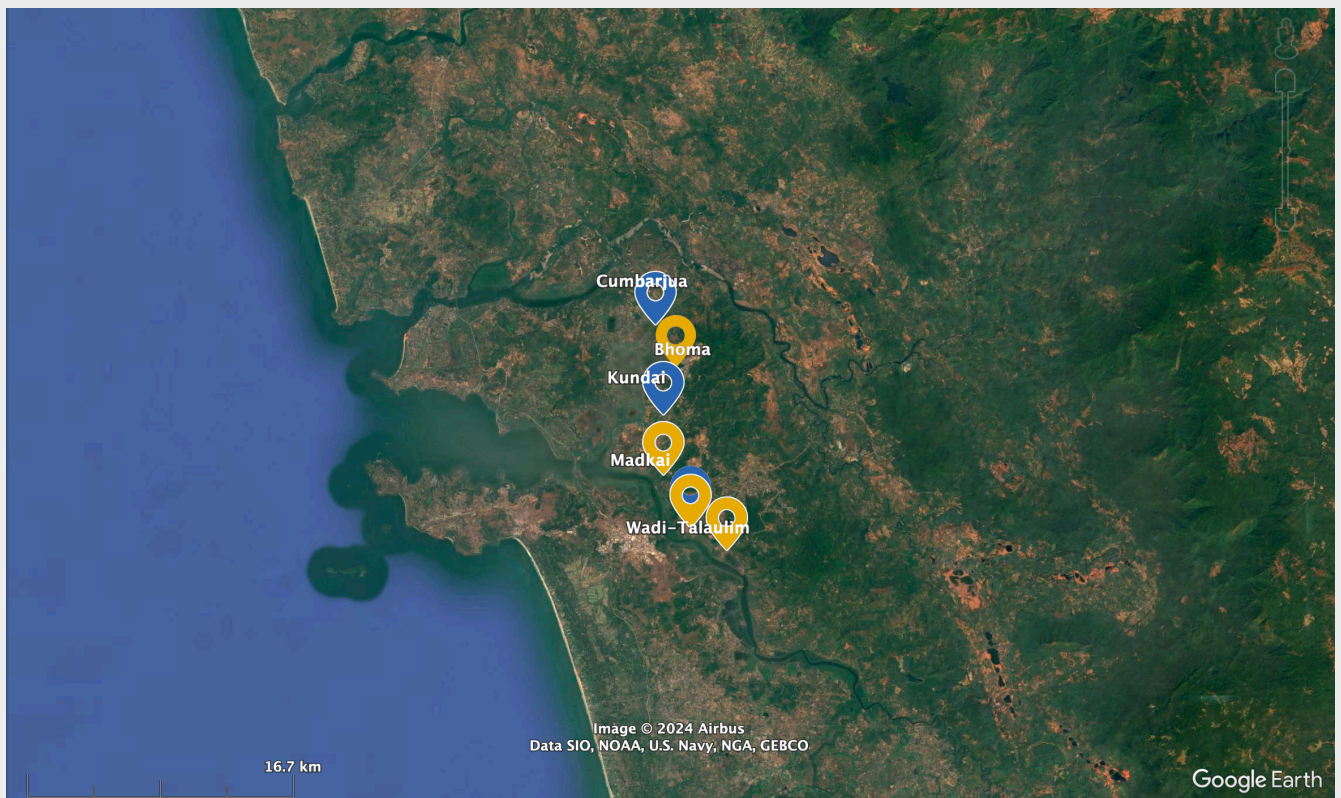
Four villages in Ponda taluka where *maange thapnee* is still practised today were selected to observe and understand the ceremony. One village in Tiswadi taluka was selected where relatively more crocodiles are sighted. Still, crocodile worship is not observed to gain a better insight into human-crocodile interaction and the significance of the ritual in the coexistence of humans and crocodiles in the study area.

Goa's population is more than 1.2 million people, with 65 per cent Hindus, 27 per cent Christians, and 6 per cent Muslims (Census 2011, Government of India). It has the identity of an Indian state embedded with Portuguese features in its architecture, folklore, cuisine, and the everyday life of many of its people. The historical background for this is Goa's early and long-lasting colonisation, which subdued the region for almost half a millennium, from 1510 to 1961, under Portuguese rule and Catholic hegemony (Henn, 2014).

Yet, oral narratives and traditions of indigenous communities have survived the test of time through their resistance and remain prevalent in some parts of Goa to this day. These traditions provide fascinating insights into the coexistence with nature through cultural practices. Goa is home to several indigenous communities, including the Kunbi, Velip, Gowdas, and Dhangar tribes, who have been an integral part of the region's socio-cultural fabric for centuries before the Portuguese invasion. Ponda and other talukas (New Conquest) in the east remained under the protection of Indian rulers till the latter half of the Portuguese rule. They thus became a safe space for deities and temples from other parts of Goa (Henn, 2014).

Goa is also one of India's few states with a wild population of mugger crocodiles (*Crocodylus palustris*). They have adapted to both freshwater and brackish water environments. According to a rapid assessment survey conducted by Nirmal Kulkarni and Devdutta Naik in 2013, about 40 marsh crocodiles live in the salty waters of the 15-kilometer channel of Cumbarjua Canal. Personal accounts of fishermen confirm the population of muggers in both the Mandovi and Zuari rivers.

Most young and old men from the selected villages are involved in fishing activities, if not as an occupation, then as a hobby. This results in regular interactions with muggers in or near the robust water ecosystem of estuaries and canals in Goa.



Map of the study villages. | Credit: Google Earth

STUDY DESIGN & METHODS

The Principal Investigator (PI) and co-researcher spent four months between mid-December 2022 and March 2023 at the field site. The Human research ethics approval was received in February from the Ethics Committee of the Wildlife Conservation Society-India for application number 017 (2023). After receiving the approval, semi-structured interviews and focus group discussions were conducted with stakeholders in different villages using a semi-structured questionnaire.

Ethnographic approaches are increasingly being employed to study the diversity of human-wildlife relations, particularly in the context of conservation. Ethnography allows for an exploration into the narratives, myths, stories, traditions, practices, and lived experiences of a group or community and how these shape people's beliefs and attitudes concerning the area of inquiry (Nair R, Dhee, Patil O, Surve N, Andheria A, Linnell JDC and Athreya V, 2021).

For the purpose of this study, short-term ethnographic research was conducted for three months to collect data on the ritual of *maange thapnee* and to understand human-crocodile interactions. Usually, a traditional ethnographic study includes a minimum of six months of fieldwork to understand the intricacies of a given topic in depth. Given the time restraint for the fellowship, we acknowledge that we used exploratory and qualitative methods such as semi-structured interviews, informal conversations, focus group discussions and participant observations. Through these methods, we documented not only the stories and significance of the worship of crocodiles in Goa but also understood the people's perception towards crocodiles based on their personal experiences, observations, and shared spaces.

SAMPLING

Snowball and purposive sampling were used to select the respondents for the semi-structured interviews based on their role in the tradition of crocodile worship or their direct interactions with crocodiles. Efforts were made to ensure the inclusion of participants from diverse communities, classes, genders, and religious backgrounds from all the study villages. For snowball sampling, we found that approaching tea shop owners as the first point of contact helps identify potential respondents.

METHODS

The field team spent the first two months of the fieldwork developing an understanding of the history and culture of the landscape through regular visits to different villages, attending community and religious festivals such as Vardhapan (annual celebration of temple deities in villages of Goa), and visiting libraries in Ponda and Panaji. The PI and co-researcher utilized the initial visits to each village to establish rapport with the villagers through informal conversations. Through such regular engagements, we tried to understand the social structure, religious affiliations, and traditions, such as khazan farming in the villages of Ponda and Tiswadi talukas.

Before starting the fieldwork, the team approached the head of the village (Sarpanch/Panch) of each selected village to inform them about the scope and the duration of the study and to seek their support. An official letter was also submitted to each village panchayat, stating the objectives and significance of the study. Respondents were selected after two months of field visits to six study villages. Each participant of the study obtained informed oral consent. Participant observation was used to record the ritual *Maange Thapnee* in one of the four villages where it is practised. Informal conversations and observations were also collated by maintaining a field journal.

The semi-structured questionnaire for the interviews was prepared after carefully analysing informal conversations and field journals from the initial two months. The questionnaire was also shared with the WCS-India ethics committee for approval before data collection. It included questions in three categories: interactions and perspectives, folklore and the ceremony of *Maange Thapnee*, and ecological knowledge: stories, incidents, observed crocodile behaviour, and background information of the respondent. Each category had a set of further probes to ensure specific information from different respondents. Researchers did use the freedom to add/exclude some questions based on the background information and the initial responses of the respondents as they deemed fit at the time of the interview. However, the questions never went beyond the explicitly stated categories that were to be explored in the study.

Prioritizing the respondents' comfort, most of the interviews were conducted in the local language, Konkani, with the help of the co-researcher. In case respondents were comfortable with Hindi/English, the PI took up interviews or prompts in the interviews. Audio recordings of each interview were transcribed verbatim from Konkani/ Hindi to

English by the co-researcher. The PI later analyzed the transcripts through thematic coding in Excel and the paper-pen method. Emergent themes were discussed and reviewed with other fellows and the WCS-India team over multiple online and office meetings.

SAMPLE SIZE AND DESCRIPTION

A total of 30 semi-structured interviews were conducted in seven study villages, namely Adulshem, Wadi Talaulim, Durbha, Kundai, Madkai, Bhoma in Ponda and Cumbarjua in Tiswadi taluka in Goa. As only males are involved with the ritual of *Maange Thapnee* with diluted restrictions for women now, older men were selected to understand the ritual's history, significance, and process. Out of the 30 respondents, three were below 30, fifteen were between 30-60, and 12 were above 60 years of age.

Most respondents selected for the study were farmers and fishermen with either a daily office job/shop in the village or were retired. Two female respondents were included to understand the relationship with muggers in daily lives through a woman's perspective in addition to the informal conversations. Efforts were made to ensure participation from diverse castes such as Naik, Gaude, Gaonkar, Phadte, etc., acknowledging the social reality of contemporary Indian society. Interviews were conducted to maintain a fair and equal distribution of respondents from all seven study villages.

RESULTS



A view of Khazan lands | Credit: Akanksha Pandey

Before exploring the nature of human-crocodile interactions, it is important to understand the social and ecological traditions of Goa to have a better insight into the various factors driving this relationship, such as the Khazan system, mugger habitat, local customs and traditions, etc.

KHAZAN SYSTEM

The Khazan system in Goa, also known as the khazan lands or khazan agriculture, is an intricate traditional method of coastal wetland cultivation that has been practised in the region for centuries and is believed to have been invented by the Gowda community. It involves the construction of embankments or bunds along the estuaries and tidal creeks, creating enclosed fields subjected to tidal influence. These fields are utilized to cultivate paddy rice, vegetables, and other crops, using the nutrient-rich sediment deposited during tidal inundation.

A simple definition of khazan land from the Goan ecological perspective offered by Dr. Nandkumar M. Kamat-

Low-lying, mangrove-fringed, coastal saline lands (mesohaline) drained by the tidal estuaries have been subjected to planned and contour-integrated topo-hydro-engineering by the local communities to produce reasonably sustainable productive agro-ecological & agro-economic systems.

According to Kamat's paper, khazan lands in the Mandovi-Zuari complex and Cumbarjua canal are essential today for economic activities such as agriculture (local rice varieties), horticulture, sluice gate auction-based marginal fisheries, backwater fisheries etc. The structure of embankments (bundhs) controls the balance between the availability and flow of freshwater and saline water, which determines the existence of the khazan lands. Efficient maintenance of these bundhs is essential for khazan farming. In the past, these bundhs were made of silt, straw, and other sustainable materials found nearby. It is a time-consuming and strenuous process which requires community engagement. Recent changes in lifestyle, jobs, and unavailability of resources have led to a decline in the management of khazan land and have resulted in the depletion of khazan farming in Goa. (Fernandes and Karve, 2021)



Khazan agriculture field | Credit: Akanksha Pandey

All selected study villages had khazan lands ruined by saline water due to the lack of maintenance of the bundh, leading to water damage. Villagers cited a lack of cheap labour, resources, and support from the government as the reasons for land deterioration, which has led to minimal or no involvement of villagers in khazan farming at the present time. Few families continue farming on small pieces of land in the selected villages, but most rely on seasonal or freshwater farming. For new construction, many manas owners rely on concrete bundhs for sluice gate auction-based marginal fisheries. It is a concern for the loss of sustainable practices in Goa and can also greatly impact the area's biodiversity for muggers, otters and crustaceans.

One manas in Corlim village under Banastari bridge is an example of concretised bundhs, which impact mangrove health due to factors such as industrial waste, etc. Muggers in Goa are used to crossing traditional bundhs and entering manas during tidal shifts, often for easy catch from fishing nets. These newly built heightened and flat concrete bundhs (wide and solid enough for trucks to pass) also hamper the movement of the muggers in the area.

The ritual of *Maange Thapnee* recorded in the four villages during the fieldwork takes place on a specific spot on a bundh of a particular manas in the village. According to the village elders, the reason for the decline in the practice is that with time, more people from outside the village are taking over the manas through government auctions, and they do not heed local traditions and customs. In our observation, the practice continued on the manas where the owner believed or respected the local traditions.

CROCODILE HABITAT IN GOA

Crocodiles in Goa generally prefer to remain closely associated with a water source, such as a pond, lake, river or estuary. A luxuriant mangrove cover fringes the estuaries of Goa, and muggers have found a niche in the estuarine ecosystems of Goa. However, most of the crocodile habitat in Goa is man-made. Surprisingly, Muggers have adapted very well to the saline waters of the Cumbarjua Canal, which is unlikely to have happened anywhere in its entire Indian range (Borkar, 2003). Out of the seven selected villages, five lie near the banks of the Zuari River and two near the

Cumbarjua canal. Four villages reported regular sightings of mugger crocodiles near the bundhs, while the remaining three villages have frequent sightings during the monsoon season.

“Crocs are spotted (dikhega hei)!!!! In the rainy season, (crocs) are there the whole day. In summers, at least a few crocs are seen lying on silt (batik), in the sunlight too.”

“If we happen to go on the bundh, we can see an average of 1-2 crocs. It's there. Astaach-rehta hei hain... the place/spot where they reside gets smooth, and the plants don't seem to grow there.”

“Muggers are found in kharekshet. They are not in freshwater farms. That's a common understanding: If there's a sluice gate, there's a mugger. If there's a kharekshet, there will be a mugger. They rest on farmlands and go underwater if someone comes close to them.”



A crocodile in its natural habitat | Credit: Opensource/Canva

RAKHANDARS

Rakhandar is a Konkani word meaning protector. In Goa, the concept of Rakhandars holds great significance within the local cultural and religious practices. Rakhandars are also referred to as Devasar (used interchangeably in this text) and are considered divine entities with specific roles and responsibilities in the lives of the Goan community.

The history of Rakhandars in Goa can be traced back to the region's indigenous traditions and later influence of Vedic Culture.⁷ These demigods are believed to be intermediaries between humans and higher divine beings, possessing special powers and abilities to impact various aspects of human life. Devasar is believed to protect the village and its people, animals and property, and he resides on dams, across nallas, village boundaries, trees, etc. Many villagers believe that Devasar shows the right direction to the travellers through mountains and jungles and helps them reach their destination.

“Devsar resides on every bundh. We have so many such incidents. Devasar will call your name three times. So, if you are alone at night, you should never respond to it unless you hear it for the fourth time. When we go fishing early in the morning, we sleep on bundh at night. They don’t come on bundh at night. One time, we were sleeping on the bundh and woke up to see that Pandurang (another fisherman) was in the water, sleeping. We knew that Devsar did it.”

“We have seen rakhandar in the fields near the temple you visited for Vardhapan. That temple was established after that. We realized there was a rakhandar and it was a blessed spot. Many people saw an old guy from afar resembling a demigod. First, they (villagers) thought he was some shepherd, but the physical resemblance, headgear, etc. Then we established a temple and started worshipping.”

The worship of Rakhandars in Goa showcases the syncretic nature of Goan culture, wherein people from different religious backgrounds pay their respects to village deities. Each village has one or more than one Rakhandars who protect the village's boundaries. All seven study villages have their own Rakhandars or Devasars and stories of prevailing justice, punishment and guidance. Bhoma village residents believe they have two powerful rakhandars named Naagjhar and Kamodini.

Many people in the sample villages reported having seen Devachar and shared the same descriptive features or stories of punishment for wrongdoings.

Devachara is not worshipped daily like idols in temples. On Sundays and Wednesdays, some people offer him his favourite "Tot" (made up of rice, either with jaggery or without jaggery, on the banana tree leaves baked in the fire). The village priest, called Jalmi, is responsible for every puja related to rakhandar on behalf of the rest of the villagers. Sometimes, a rooster is also offered. A yearly rite is used to protect the boundary, and a live chicken is buried at Devachara abode at the boundary of the village. Every year, the same is opened, and a new chicken is buried (Gaude, 2009).

During the ritual of *Maange Thapnee*, prayers are also offered to village rakhandars to seek their blessings. It is important to note here that many rituals during *Maange Thapnee* are very similar to those for Devasara (discussed in detail in the next section), but multiple enquiries on this revealed that muggers are not revered as Devasara but as dev who rakhand or protect farmlands.

"No, devsar and maange thapnee are separate and different. This (Maange Thapnee) is to pay our gratitude for protection."

"In one way, it (mugger) is Devasar, God only. It protects us and does no harm, so we pay respect. Where there is water, there is mugger. So we pay our respect to them to not attack anyone who is going into the water..... I think muggers know, and our gratitude reaches them."



Rakhandar temple at Ponda | Credit: Akanksha Pandey

MAANGE THAPNEE DOCUMENTATION



Entrance gate of Adulshem village during their annual ceremony | Credit: Akanksha Pandey

Maange Thapnee is an agrarian tradition performed primarily by khazan land farmers to pay respect and gratitude towards the muggers who often inhabit the bundhs. Out of our sample villages, four villages in Ponda taluka still perform the ceremony yearly, specifically on Sundays or Wednesdays. Most people in these villages stopped khazan farming around 10-15 years ago but continue to practice crocodile worship.

“No, mostly everyone has stopped since the last 10-15 years after bundhs were destroyed. Some people still do it on small pieces of land (Marad). We also do it on the other side of the village.”

In all four villages, a life-size clay model of a crocodile is made by scooping silt from low tidal land on one side (of bundh) in a manas (sluice gate operating system). The overall ceremony distinctly differs in all four villages, including the time of the year, number of people involved, decorations, and offerings, but the sentiment remains the same: to offer prayers for protection. The ritual is performed mainly by a Jalmi (Gowda priest) with the help of other villagers, either on a Sunday or a Wednesday. Adulshem and Wadi Talaulim villages perform the ceremony according to the Hindu calendar on Amawasya (no moon) tithi of Paush month (January/February).

The following are excerpts from the PI's field journal from the various sites visited for *Maange Thapnee*:

ADULSHEM VILLAGE

We reached the spot of the ceremony by 3 p.m. We were informed that people would start gathering in the afternoon. It was a rather hot day. Eventually, around four o'clock, many people started coming to the shop. Many of them were not the residents but people who had come to attend the ceremony. Several photographers, researchers, members of the BMC (Biodiversity Management Committee of Goa State Biodiversity Board), and forest department staff were also present to observe the ceremony.

It was low tide, with less water, and the land was more visible on one side of the bundh than on the other days. The ceremony started with clearing the weeds in the space and making clean ground. They chose an intersection of bundhs as the place to start the ritual. It provided ample space for almost 40 people to stand in the area. We learned that Harish, son of the priest (Jalmi), will perform the ceremony as his father is not well. It would be his second year performing the ceremony. He came with a few polybags, which had essentials for the ritual. Chandrakant, one of the elders, continuously gave instructions to everybody. One participant took a bunch of shells from a polybag and put them on the ground. Harish started organizing other materials, such as incense sticks, bowls of vermilion, flowers, puffed rice and coconuts.

Over the hustle, one of the old members strips out of his clothes and moves down slowly in his loincloth on the left side of the bundh where there is less water. Others follow him, forming an assembly line and passing clay to Harish. The man in the loincloth collects the chunks of the clay and passes it on. Harish starts putting it on the ground and giving it shape as Chandrakant is instructing him to use both hands to make a perfect model of a crocodile, the length and width of the limbs, shape of the body, sharpening the tail, and using palms to give it a better appearance.

Three others join Harish in forming the clay model after they have collected enough clay (chikol) from the low water level side of the bundh. A few others are collecting dried sticks from the corners of the bundh to be used as the teeth of the crocodile. On the other side of the bundh, everyone who was collecting chikol went into the water to clean themselves.

Several people from the community and outside were making videos and taking pictures. After completing the model, Harish takes out a chunk of clay from the middle of the back to make a hole. Meanwhile, the person who took out the shells initially starts placing them on the model's top. Harish is also helping with the same. Another person carefully makes the eye on the model.

Chandrakant utters loudly, "*Om Namah Shivay*" before they start placing the shells on the model. He also instructed and corrected them to place the shells in a specific order. The open face of the shells has to be outwards. Harish placed an egg in the hole and covered it again with the clay. Five small banana leaves are placed in front of the face of the model. Puffed rice and some sweet (jaggery) are placed on them. Harish puts vermilion on the model, places three hibiscus flowers, lights up incense and places it on the side. Water from the coconut is poured on the face of the model. Someone takes the bowl of *sindoor* and puts it on the forehead of people attending the ritual.

A BMC member who had joined us asked someone to explain the ritual and the ceremony to everyone. At the end of it, Harish takes out the notebook and *gaanthi*. He takes attendance of all the 24 farmer families of the village involved in the ceremony by calling out names. Out of 24, at least one member of 21 families represented them. For those three who were not present, they put a knot on their string of thread. They will have to pay a fine next year during the *Godshe* (a *prasad*-making ceremony that happens two weeks before *Maange Thapnee*), after which they will open that knot again. Puffed rice is distributed to everyone as *prasad*, and eventually, everyone disperses.



Maange thapnee or crocodile model at Adulshem village | Credit: Manish Machaiah

WADI TALAULIM

This village is 2-3 km from Adulshem and follows almost the same tradition of *Maange Thapnee*. The only difference is that they still put a live chick in the back of the clay model instead of an egg, as done in Adulshem, and use rice flour, clamshells, and sticks to decorate the model.

“During malun month in (the offering) has to be done. For them (crocodiles) to protect, a specific day is decided on Amavasya, and it (ritual) should be done as the day (Amavasya) slowly proceeds to an end. A specific day is not observed (to perform the ritual)Sunday, Wednesday, or Monday is not necessary unless it (the ritual day) is Amavasya. On this (Amavasya) day, all the farmers bring the clay from the river, and the shape is made of him (crocodile from the clay). After doing the shape of his stomach, we don’t pray to the dead- it is important to be seen. Some sort of ‘aliveness’ has to be there (in the model) so the chick is kept inside the stomach for a very long time.

For it (the chick) to respire, a “katti” half coconut shell that has a hole is used to cover up(chick). This helps (the chick) to breathe. The reason behind (the ritual) is because if they (crocodiles) protect us (farmers) for the whole year, can we not pay our respect/gratitude by doing this?? “tejha maana katir aami te(ritual) karta” That is why we (farmers) do it.”

BHOMA

In Bhoma village, *maange thapnee* is part of a more elaborate ceremony of Bagavad (goat sacrifice) and Bhatt bhoj (offering food to brahmins). The ritual is associated with Kamodini rakhandar of the village, and the clay model is also placed next to the rakhandar gumti (small temple) on the bundh. Interestingly, the model is not decorated as in other villages, but flowers and incense sticks are offered. They offer a live chick as an offering/ food for the crocodiles.

“We add the chick exactly near the stomach. “Maange kale matlyr potaanuch pavta nit te” (the food has to eventually reach the stomach after eating).”

Bagavad only begins after the clay model is laid in the presence of members of the tenant association and a Jalmi who performs the ritual. There is no specific number of farmer families involved in Bhoma. However, one Naik family has the utmost importance to attend the ceremony along with the Jalmi. The ritual is performed in April/May.

“Devkarya starts after the clay croc has been laid. We then put a chick in the model. Now we do this to prevent any trouble caused to the farmers present, anyone who does manas, to prevent a hole in the fotaani, prevent any attack (of croc on humans) or any such incident (to avoid any inconvenience). The ritual has been practised not today but for a very long time... my grandfather has done it for 70 years. My grandfather also used to go with his grandfather (great-grandfather). All the elders used to be involved in the ritual. We can say that the ritual was a minimum of 100 years old. Even one of the members of the committee had to say that his dadu told him that the ritual had been going on for 100 years.”

MADKAI

Madkai lies on the banks of the Zuari River and is a fishermen's village famous for its clamshells during pre-monsoon season in the neighbouring areas. One of the Wada still performs maange thapnee in the least performative manner among all the study villages. Jalmi is responsible for the ritual and is accompanied by one or two members of the tenant association of the village. The ceremony is performed in April/May after the bundhs have been repaired for the year.

“Every year, the committee members fix their date and tell me to confirm, and then I go accordingly. Mostly, I prefer Sundays as I go to work on other days. I go there(for the ritual) at around 5 pm in the evening, and then the clay is drawn, and a model is made. Agarbatti, gandh, sindhur are all shown .. the egg is offered in the mouth of the model, followed by dry puffed poha. Then, the coconut is offered to the model of about half a meter in length.. the leaf with a thorny appearance found nearby is used on the model to indicate the scales on the back. Two small drops are made of clay and fixed to the model as eyes”.

ACCOUNTS OF HUMAN-CROCODILE INTERACTIONS

All of the respondents in the study have come across a mugger at least once in their lifetime, and very often, they shared a recent encounter. Even though there is a considerable difference in the frequency of mugger sightings among the sample villages during dry seasons, all the villages reported frequent sightings during monsoons. It was surprising to find that no respondent reported any fatal incidents of crocodile attack in their memory of at least 50 years. Multiple respondents from different villages cited reports of two negative interactions in Corlim and Kundaim villages.

Most of the human-crocodile interactions occur on bundhs, khazan fields, manas used for fishing and, of course, rivers, canals and lakes. One common response to mugger interaction reported during the fieldwork was that muggers go underwater as soon as they sense human presence.

“The croc was about this distance away (about 3 m). It was up near the bank of the river when it got into the water. ‘saarke, sushegaad devta.’ They (croc) don’t do anything to us, instead, they fear for their life of being killed by humans.”

“They(muggers) don’t do anything. What is there to do? Muggers go inside the water as soon as they hear humans approaching. Even on a boat like a ponyair (manual boat made out of mango wood), we make the sound ‘shoo- shoo’, and they go inside the water. Even children play near the water bodies and go swimming, and muggers don’t do anything. They just go away. They are afraid of humans, and that’s why they go underwater. They are more powerful in water than on land. Sometimes, they will even leave eggs and go away if they spot humans.”

Many fishermen have had close encounters with muggers in the water and have reported that they don’t do anything and just go away.

“Actually, the fact is that normally crocs don’t react or attack people in ponner or even if the humans are in the water. Now there is a saying that if your stars are not proper(astrological reading), then the croc can swing its tail, but so far, at least I haven’t heard crocs attacking humans or humans killed by them (croc) in our area or anywhere else.”

One of the respondents reported sighting a mugger as close to one meter away and an encounter where his brother was attacked by a mugger in Cumbarjua.

“We have seen (croc) for about 1 m close too. But normally, they don’t harm humans without any reason. if (crocs) gets the feeling that it is being harmed, only then it (the crocs) is going to slap its tail... When my brother went to catch fish (in bushes), a crocodile was resting there. It (crocodile) got hold of him as it got agitated! “ chaarvle nit te!!!”(gussa ayaa na usko). The crocodile got hold of his hand, presuming that he (brother) had come to catch him(croc). He got better in 15 days after that.”

It is interesting to note here that through their personal experience of sharing spaces with muggers throughout their lives, villagers tend to ‘reason out’ if not justify negative interactions instead of blaming the muggers for the incident. Most of the older respondents were more firm in stating that muggers usually avoid humans and don’t do any harm other than the occasional destruction of fishing nets when they get caught in the net trying to steal fish or otherwise.

“A woman from bangarya was fishing for crab (koble). A croc supposed to have come to eat the bait(chicken leg), mistakenly attacked her. It got hold of the leg and dragged her down. The dog who was accompanying the lady rushed back home and signalled her husband (about the danger) by moving in and out.. the man then rushed behind the

dog and saw her wife who was caught by the croc. Later, the croc released the woman, but the leg was injured since the croc had bitten the leg. The lady was then hospitalized.”

We interviewed one of the fishermen who was attacked by a mugger while fishing in Kundai village. He had a long, deep scar on his left thigh from the attack one year back. The forest department relocated the crocodile from that area, and the respondent was later compensated.

“I am the only one here (in kundai) attacked by a mugger. I had gone fishing, while “parsheta” (a way of collecting fishing by swimming along with the net), and unknowingly a mugger got in my hand (the croc was lying)... in defence it turned its back and attacked my leg.”



Crocodile feeding on fish | Credit: Opensource/Canva

ECOLOGICAL KNOWLEDGE

Out of the thirty respondents in the sample, based on their age, occupation and experience, ten could share insights into the behaviour of crocodiles. Most of them were old and retired fishermen, and others were in their late 30s, associated with fishing or auctioned manas with prolonged exposure to crocodiles and their habitat. Their knowledge and deep understanding of crocodile behaviour come from years of observations in shared spaces such as khazan fields, bundhs and water ecosystems. It is significant to note that this knowledge is not traditionally passed down to generations but acquired through personal experiences and observations. Thus, the details and depth vary from person to person based on their own interests, abilities and exposure. Older men had more insights and details of crocodile behaviour as they spent significantly more years fishing, had more interactions with muggers, and had more behavioural observations to account for.

Out of our sample of farmers, fishermen, and office workers, fishermen could share more detailed observations of crocodile eggs, dens, territorial behaviour, and individual differences in appearance and reaction.

“Near the banks (on the silt deposited in a place close to the banks rich in mangrove /bushes) they dig a hole, quite big(hand gesture- hole width about half m) where they lay their eggs of about 25-30-40 in one hole. The crocodiles frequently lie on the eggs just like hens.. and they go after a few weeks and dig up the hole, after which the babies come out ‘fata fata karun baiyr sarta’. The babies are about one ft. and then rapidly grow.”

“No, the crocs are not found in groups!!!! The crocs are solitary. If suppose one croc is present here (say at any point), the next croc would be 2m or 1km or 2km .. now the false assumption that the croc rested on the above surface is going to attack humans, they (croc) don’t even bother to prey the birds lingering around them.”

“Some (crocs) have specific places to stay, to store their catch which they feed on later (to store the food for the time being)... so they have a specific spot to stay.. they move from one place and travel to some other spot.”

CONCLUSION

This study shows that negative human-crocodile interactions are minimal in Ponda, Goa. The ritual of *Maange Thapnee* plays a role in influencing people's perception of muggers in the villages where it is practised. However, based on the findings, we can conclude that irrespective of the tradition of crocodile worship, people in Goa exhibit a degree of tolerance towards the species. Personal experience and observations of animal behaviour have shaped the perceptions and attitudes towards the muggers in Goa, providing a unique perspective towards this species and thus nurturing coexistence. The shared space culture is represented in the form of stories and practices passed down through generations. Traditions that are evolved around such folklore are often embedded in personal experiences of cohabitation with animals. Understanding the implications of such stories and the significance of indigenous knowledge can help us decolonise conservation practices.

Western narratives heavily influence conservation practices that have historically associated wilderness as pristine and devoid of human presence. The Yellowstone National Park model, often called 'fortress conservation', has emerged from the United States and has become the mainstream approach for global conservation. Fortress conservation is an approach based on defence: the defence of the natural environment against human intrusions (Duret, 2022). As the forest cover is decreasing exponentially around the world, more animals are moving towards human-dominated areas, leading to an increase in negative human-animal interactions. (Pooley, 2016) There is a growing need to learn from indigenous cultures who have historically shared unique relationships. Communities have coexisted with different species; some continue to do so through local customs, traditions and practices. (Nair R, Dhee, Patil O, Surve N, Andheria A, Linnell JDC and Athreya V, 2021) The human-crocodile relationship in Goa is an eccentric example of the same.

The historical accounts from the Portuguese era suggest the presence of crocodiles in Goa. (Borkar, 2002) Thus, it is fair to assume that people have shared the landscape with muggers in Goa for a very long time. Their personal experiences and shared space have led to distinct views and attitudes towards muggers in Goa, where a general tolerance towards muggers is observed. Examples of tolerance toward predators arise from the beliefs and behaviours of humans and animal behaviour (Pooley, 2016). It is fascinating to note that the details of the ecological knowledge shared by fishermen often concur with the scientific and biological information available. Many indigenous cultures across the globe have a deep understanding of the behaviour of animals they have shared proximity with over the years. This shared community knowledge of behaviour impacts their perception of the animal and enforces rationalized fear, mutual respect and avoidance, which helps to pave the way for coexistence.

Our study lays the groundwork for future research on this unique human-crocodile relationship in Goa. The differences in the tradition of *Maange Thapnee* in the four villages reflect the potential for in-depth and extensive research on the topic to uncover the nuances of the ritual and interactions. Future research is required to understand the historical significance of the ritual and its spread across the state of Goa.

REFERENCES

- Borkar, M. R. (1992). original croc worship 1992.pdf. Biology Education.
- Borkar, M. R. (n.d.). Ecological History , Contemporary Status and Conservation Future of Marsh Crocodile Crocody / us Palustris in Goa.
- Borkar, M. R. (2019). Cumbarjua crocodiles.pdf. The Goan.
- Borkar, M. R. (1995). Crocs in defence. Hornbill Magazine.
- Carter H, L. (2016). Co-Adaptation Is Key to Coexisting with Large Carnivores? Trends in Ecology & Evolution.
- Dhee, Athreya, V., Linnell, J. D. C., Shivakumar, S., & Dhiman, S. P. (2019). The leopard that learnt from the cat and other narratives of carnivore–human coexistence in northern India. *People and Nature*, 1(3), 376–386. <https://doi.org/10.1002/pan3.10039>
- Dornan, S. S. (1934). The crocodile in South African religion and folk lore. *South African Journal of Science*.
- Duret, C. (2022). Decolonising Conservation : Towards a Postcolonial Conservation Regime. 1–3.
- Fernandes, E., Karve, S., & Kulkarni, P. (2021). (PDF) Issues Affecting the Unique Bund Systems in the Khazans of Goa. Conference: NOCPDM-2021, May. https://www.researchgate.net/publication/360977671_Issues_Affecting_the_Unique_Bund_Systems_in_the_Khazans_of_Goa
- Gaude, S. (2009). silent goa -pdf. Human Resource Development Trust. Henn, A. (2014). Hindu-Catholic Encounters in Goa Religion, Colonialism, and Modernity.
- Manral, U., Sengupta, S., Hussain, A., And, R., & Badola, R. (2016). Human Wildlife Conflict in India: a Review of Economic Implication of Loss and Preventive Measures. *Indian Forester*, 142(10), 928–940. <http://www.indianforester.co.in>
- Nair, R., Dhee, Patil, O., Surve, N., Andheria, A., Linnell, J. D. C., & Athreya, V. (2021). Sharing Spaces and Entanglements With Big Cats: The Warli and Their Waghoba in Maharashtra, India. *Frontiers in Conservation Science*, 2(June), 1–14. <https://doi.org/10.3389/fcsc.2021.683356>
- Nandkumar M. Kamat. (2004). History of Khazan land management in Goa: ecological, economic and political perspective.
- Pooley, S., Barua, M., Beinart, W., Dickman, A., Holmes, G., Lorimer, J., Loveridge, A. J., Macdonald, D. W., Marvin, G., Redpath, S., Sillero-Zubiri, C., Zimmermann, A., & Milner-Gulland, E. J. (2017). An interdisciplinary review of current and future approaches to improving human–predator relations. *Conservation Biology*, 31(3), 513–523. <https://doi.org/10.1111/cobi.12859>
- Pooley, S. (2016). A Cultural Herpetology of Nile Crocodiles in Africa. *Conservation and Society*, 14(4), 391–405. <https://doi.org/10.4103/0972-4923.197609>
- Rubinoff, J. A. (2001). Pink Gold: Transformation of Backwater Aquaculture on Goa's Khazan Lands. *Economic and Political Weekly*, 36(13), 1108–1114. <http://www.jstor.org/stable/4410457>
- The Goa Foundation. (2002). Fish curry and rice (C. Alvarez (Ed.)).
- Tsuji, T. (2021). Crocodiles in Philippine Folklore. *Southeastern Philippines Journal of Research and Development*, 26(1), 19–34. <https://doi.org/10.53899/spjrd.v26i1.122>
- van Weerd, M., & van der Ploeg, J. (2012). The Philippine crocodile: Ecology, culture and conservation. Mabuwaya Foundation.

