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Chapter 14

Post Traumatic Eco-Stress Disorder (PTESD): A Qualitative Study from Sundarban Delta, India

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Additional information is available at the end of the chapter

http://dx.doi.org/10.5772/52409

1. Introduction

International Classification of Diseases, ICD– 10, [78] defined PTSD (code F43.1) as: "Arises as a delayed or protracted response to a stressful event or situation (of either brief or long duration) of an exceptionally threatening or catastrophic nature, which is likely to cause pervasive distress in almost anyone…. Typical features include episodes of repeated reliving of the trauma in intrusive memories ("flashbacks"), dreams or nightmares, occurring against the persisting background of a sense of "numbness" and emotional blunting, detachment from other people, unresponsiveness to surroundings, anhedonia, and avoidance of activities and situations reminiscent of the trauma. There is usually a state of autonomic hyperarousal with hypervigilance, an enhanced startle reaction, and insomnia. Anxiety and depression are commonly associated with the above symptoms and signs, and suicidal ideation is not infrequent. The onset follows the trauma with a latency period that may range from a few weeks to months. The course is fluctuating but recovery can be expected in the majority of cases. In a small proportion of cases the condition may follow a chronic course over many years, with eventual transition to an enduring personality change." *PTSD was first recognized as a clinical entity in the third edition of the* the Diagnostic and Statistical Manual of Mental Disorders in 1980.

In the last 30 years considerable research has accumulated which has provided deep insight not only into the epidemiology but also the conceptual framework of different categories of trauma and its differential impacts and coping psychodynamics. The classification of causes of trauma based on available research findings may be categorized as follows:

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1. Eco-Stress traumas resulting from natural disasters like cyclone, earthquake, flood, hurricane, tsunami, bushfire, tornado, drought and wild animal attacks.

2. Technological traumas like plane crash, industrial accidents, domestic accidents, nuclear reactor explosion and oil spills etc.

3. Human induced (direct) trauma like sexual assault and rape, violence, terrorist attack, vehicle accident, combat and military trauma, illness, death and hostage taking etc.

The nature and extent of ecological traumas [2] are usually more pervasive and collective [58] and entail a strong sense of powerlessness and destiny/spiritual dimension among the victims [44]. PTSD is quite common after eco-disasters and it is estimated that the prevalence rate of PTSD related to natural disasters is currently between 8.6% and 57.3% depending on assessment methodologies, instruments and timing [75].

The present work based on the case studies from Sundarban, India, attempting to highlight the development of post-traumatic symptomatology after wild animal attacks, viz., Tiger, Shark and Crocodile, in the context of a unique ecological landscape of the delta region. All natural disasters and incidents are ecological events and their impact on humans (in terms of psychological, physical, economic and social) can be seen as an extraordinary eco-stress that is operative behind the development of post-traumatic stress disorder and hence the defining terms PTESD (to separate it from Technological and Human related traumas).

2. The Study Area: Sundarban

Sundarban is the largest estuarine mangrove forest in the world; stretching over an area of about 10,200 Km^2 (42% is in India and 58% in Bangladesh). It comprises outer deltas of the Ganges, Brahmaputra and Meghna rivers at the confluence of Bay of Bengal. The Indian portion is located about 130 km southeast of Kolkata (West Bengal State), between 21°31′ to 22°53′N and 88°37 to 89°09′E coordinates, at an altitude of 7 m from the sea level.

The Indian Sundarban (Fig.1) extends over some 102 islands (54 are habitable) and mudflats intersected by major distributory rivers and innumerable intricate network of tidal estuaries, creeks, and canals that support the world's largest tidal halophytic mangrove forest (4266 Km^2). UNESCO declared Sundarban National Park as World Heritage site in 1987 and in 1989 it was designated as a Biosphere Reserve under the UNESCO 'Man and Biosphere Programme'. Sundarban Biosphere Reserve covers the delta south to Dampier-Hodges line (an imaginary line that indicates the northern-most limits of estuarine zone affected by tidal fluctuations) and includes Sundarban Reserve Forest (SRF), Tiger Reserve and human settlements. The Sundarban Tiger Reserve (STR) was established in 1973 and Sajnakhali Wildlife Sanctuary in 1976. The name Sundarban comes from mangrove names: the *Sundari* (beautiful) tree (*Heritiera fomes)* and ban from *Bani* (*Avicennia officinalis).* The other meaning of *ban* is forest as well [40].

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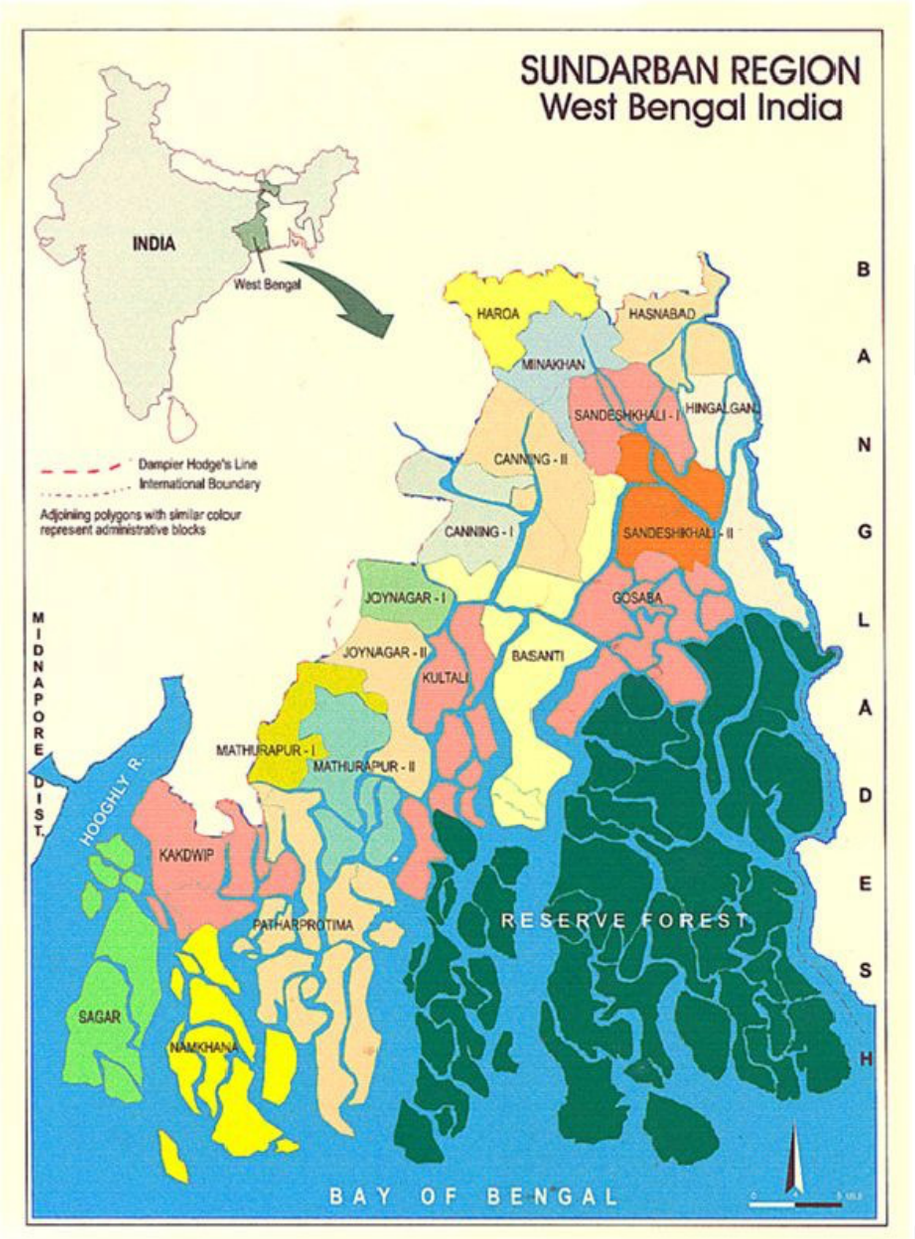


Figure 1. Sundarban Region

The Sundarban ecosystem carries a great regional ecological significance. Sundarban has extremely rich and unique biodiversity of aquatic and terrestrial flora and fauna, which supports 334 species of plants, 44 species of fish, 8 species of amphi-bians, 53 species of reptiles, 161 species of birds and 49 species of mammals [66]. It support one of the sub-continent's largest tiger populations, the Royal Bengal Tiger (*Panthera tigris tigris*), who are well-known for their swimming, man-eating and eco-adaptive behaviours. Census of 2004 (pugmark method) estimated the tiger population at 274 [8]. Its high density relative to the availability of prey, and recurrent encounters with local people in the Tiger Reserve are probably the reasons for its habit of man-eating [13].

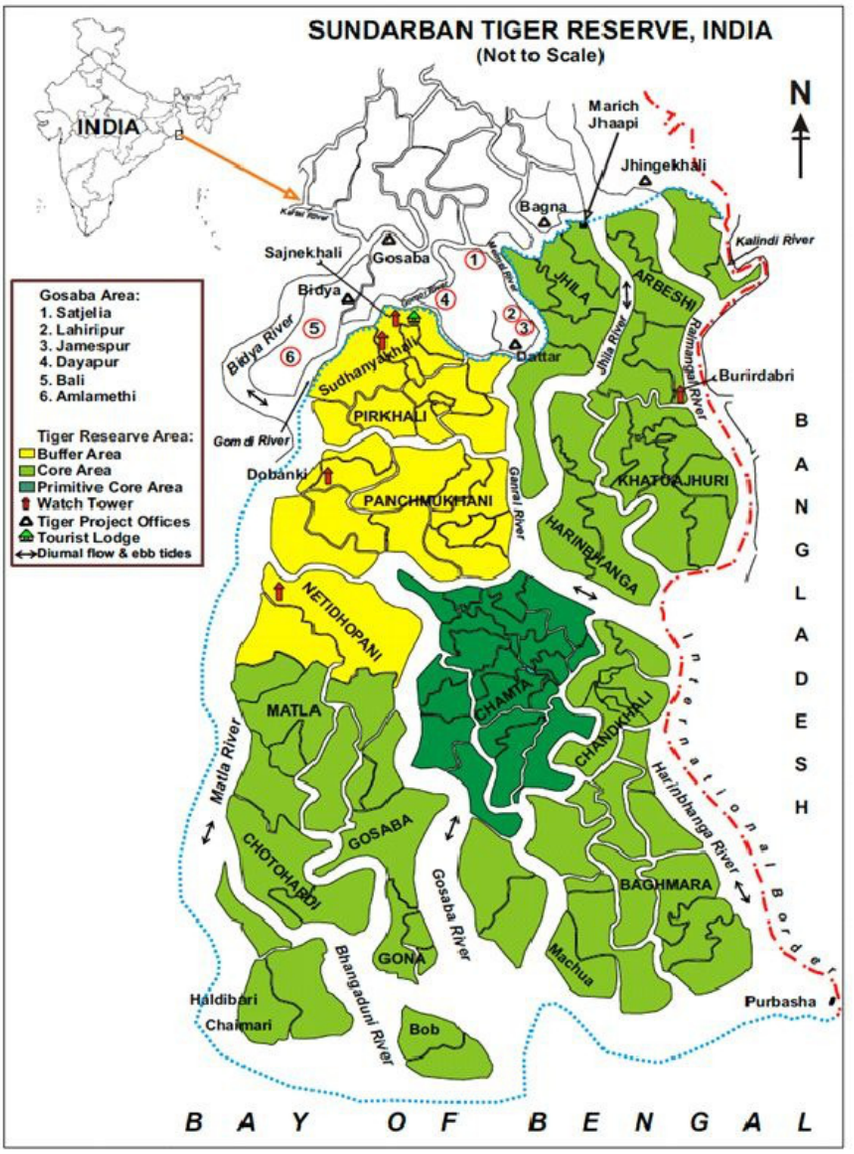


Figure 2. Gosaba and Sundarban Tiger Reserve

STR (Fig.2) is bounded in the East by international boundary with Bangladesh and in the North-West it is surrounded by numerous villages, thus making the reserve vulnerable to ever increasing biotic interference in the form of livelihood forest explorations, illegal fishing, timber smuggling and poaching. STR extends over 2,585 Km^2 (1,600 Km^2 land component, and 985 Km^2 water components) with three designated zones: *Core* or *Wilderness zone*: 1,330 Km^2; Primitive *zone (inside* core): 124.40 Km^2; *Subsidiary wilderness zone*: 241.07 Km^2 and *Buffer zone*: rest of the area, where activities are regulated. Around 0.22 million people are living in 66 villages within 2 Km of the buffer zone of STR. Between 1975 to 1982, an average of 45 people was annually killed by tigers. This casualty rate has fallen (Fig.3) since the introduction of various preventive measures like use of deterrents in the form of electrified human dummies and face masks worn on the back of the head during forest activities.

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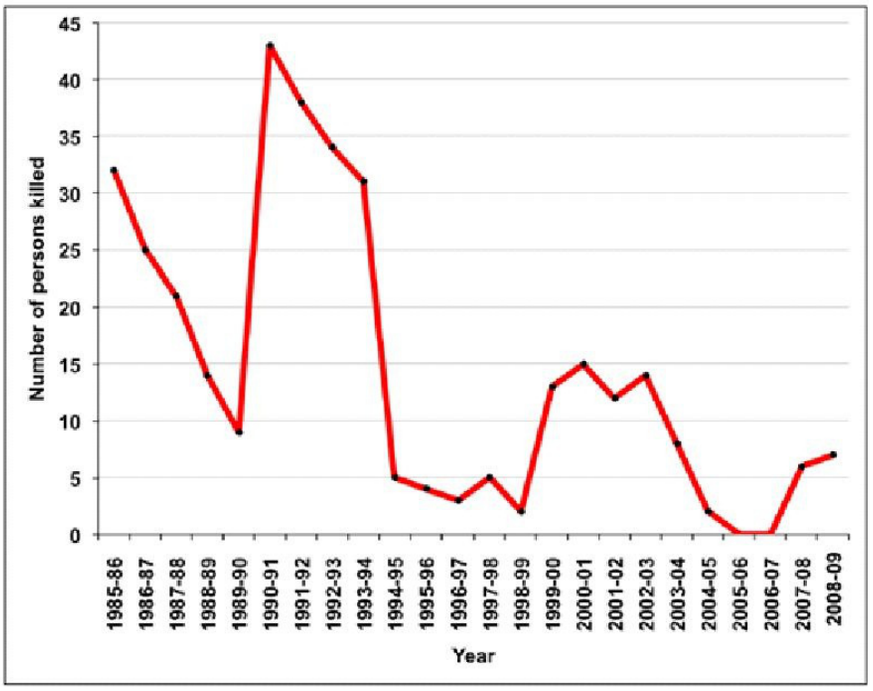


Figure 3. Humans killed by Tigers in STR from 1985 to 2009 (adopted from [50].

SRF and Livelihood measures: The Indian Sundarban comprises thirteen community development blocks in the South 24 Parganas District and six blocks in the North 24 Parganas District of West Bengal State and has a total population of 4.1 million [12]. 85% live on agriculture, of which 90% are landless agricultural labourers and marginal farmers. Around 3.5 million people live around Sundarban, 32% of whom depend on the resources of Sundarban mangrove forest directly or indirectly. Some 35,330 people work in the forest annually, of whom 4,580 collect timber and firewood, 24,900 are fishermen, 1,350 collect honey and 4,500 are involved in other activities. On average some 4,000 fishermen are active each day, and the mean annual fish catch is 2,500 tones (14).

Dependence of fringe population on Sundarban's eco-reserve (resources) is high, and the main groups are:

a. Fisherfolk - catching fish in creeks, rivers and sea.

b. Wood Cutters and fuel wood (Golpatta- *Nypa fruticans* and Hental bush- *Phoenix paludosa* – also used for thatching) collectors: The yearly average timber collection from SRF is about 1, 20,000 quintals. Usually a team of 5-8 wood cutters are led by a *Boulay* inside the SRF. *Boulay* is a man with traditional expertise, who knows the magic of keeping the team out of danger in the forest and they are supposed to have supernatural power to make the work area protected so that tiger cannot enter into the 'chanted' territory.

c. Honey and wax collectors: from wild bee (*Apis indica)* hive - is a seasonal activity (during months of April-May) and 4-5 member group is lead by a *Moulay.* They are traditional experts and especially skilled persons who can locate the beehives in the deep

forest by observing the flying directions of bees and they also possess supernatural power to sense forest dangers and prevent tiger attacks by their ritual and chants. On an average 20,000 Kg of honey and 1000 Kg wax is collected yearly.

d. Crab collectors: Estuarine mud crab *Scylla serrata* (locally called *bada kanckara* – mangrove crab) is an edible species found in the mudflat of Sundarban forests and has a good market demand, both locally and overseas. There are many crab fisheries in Sundarban region that are running this lucrative trade [57]. There are different techniques of crab collection from the water or mud flat or burrows like using bamboo trap, bait, hook or hand picking [55], which is a very time-consuming and skilled technique. Many a time crab collectors are taken by the tiger, when they are concentrating on their catch [71].

e. Tiger Prawn (*Penaeus monodon*) Seed (TPS) Collectors (locally called '*meen dhara'*): is a lucrative on the spot earning of about Rs. 50–100 (USD $ 1 - 2) per day per person. Shrimp exports constitute 75% of total marine products to foreign markets from West Bengal. Tiger prawns live in the sea but enter the Sundarban rivers and creeks to lay their eggs. The spawns make their way back to the sea and that is when they are trapped by nets. There is large demand for prawn seeds from the neighbouring shrimp aquaculture industry and also from Bangladesh, resulting in substantial illegal cross border trade.



Figure 4. TPS collection by using *Tana jal* in Sundarban river [45].

A significant proportion of the women population of Sundarban is engaged in this non-farm livelihood activity (Fig. 4). The collection of juvenile shrimp has become a major income source with estimates of up to 40,000 collectors involved within the Sundarban. On an average 1,500 to 3,000 million seeds are collected per annum [32]. Two types of fishing gear are used: Hand operated net, locally called *Tana-jal or meen berajal* (Drag net) and Dip net- locally called *Naukar-jal* (boat's net), a triangular net with three bamboo arms. As they are always

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working in the waist-deep river water, they are prone to shark (Indian Dog Shark - *Scoliodon laticaudus*, locally called *Kamote*) and Crocodile (*Crocodylus porosus*) attack and usually develop some waterborne diseases, skin infections, reproductive tract disease (in female) and musculoskeletal disorders [37]. TPS collection inside the SRF always carries a high risk from tiger attack.

STR issues Boat License Certificate and seasonal Pass to each individual for entering into the forest for permitted activity (fishing, wood cutting or honey collection) in designated area. Fishing violations are legal offence and are registered under Compounded Offence Report (COR). It is reported that COR are increasing: from 361 in 2000-01 to 2,806 in 2007-08 [15]. Illegal trip inside the forest is locally called trip in '*Black*' (like urban use of black money or black market) and in case of any fatality they avoid reporting to the government health facility for the fear of police case and fine. In legal exploration if a death occurs from tiger attack, the victim's family is supposed to get some compensation.

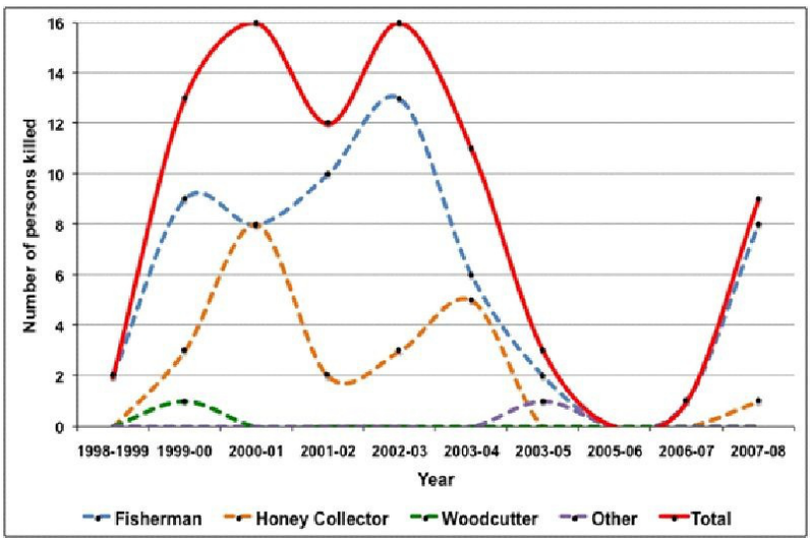


Figure 5. Categories of persons killed by Tigers in STR from 1998 to 2008 (adopted from [50]).

There are some agencies who offer life insurance policy on deposit of some regular money. No compensation is paid for crocodile, shark attacks and snake bites. The whole procedure is very complicated and in most instances the claim remains unmet because they are cheated for their illiteracy, ignorance and unfamiliarity with official rules. All these livelihood measures are highly dangerous and potential for death, mainly from tiger attacks (Fig. 5). Sundarban people mention all animal attacks as 'accident', as a parallel to 'auto accident' in urban locality.

People of Sundarban, both Hindus and Muslims, have a strong faith on mythical cult of *Bonobibi* (Queen of the forest), as protector inside the forest and *Dakshin Ray*, the God of Tiger. Invocation of Tiger God is a mandatory ritual for safe passage throughout the Sundarban forest territory. Inside the forest they never say the word 'Tiger' but to show reverence, they refer to the tigers as *Bara Miah* (Big Uncle). Before entering the forest, it is obligatory to offer

puja and pray to the Deity for support and safety. In each Sundarban village there is a Bonobibi shrine (*Than*) and at different entrance points to the SRF, there are idols of Bonobibi (Fig.6). Bonobibi Puja is a big social festival in Sundarban, celebrated once a year. Manasa is a cult of Hindu folk Goddess of snakes and protector from snake bite. Almost in every home in Sundarban, there is a sacred alter with a *Manasha shrub* (a Sij plant of a cactus family *Euphorbia genus*). People of Sundarban have deep faith in these mythical cults as their protector and fate-regulator which is being reflected in their day to day socio-cultural discourses [26].



Figure 6. Bonobibi idol at the Sajnekhali forest.

Health care in Sundarban region is pluralistic in nature. Each block has one main government Block Primary Health Centre (BPHC) with indoor beds and 3-5 Primary Health Centres (PHC) and 6-10 Subsidiary Health Centres (SHC). PHC and SHC offer only outpatient services. Distance, inappropriate infra-structure and shortage of health staff hinder the desired services to the people. In addition, many private medical practitioners provide health care to the people. There is an intricate network of Health Care Providers (HCP) mainly of non-registered practitioners, locally known as "Quack" and virtually they are the first line of contact for the vast majority of Sundarban people [23]. There is an extensive network of indigenous magico-religious healers like *Sarpa Baidya* (snake-bite healers), *Gunin, Ojha* and *Fakir* who by supernatural means and rituals (Jhar-Phuk, Chants, herbal roots and enchanted water, amulets or talisman) treat varieties of ailments, ranging from ghost-possession to veterinary problems.

Gosaba block (Fig.7) is at the extreme Eastern side of Sundarban region close to international border with Bangladesh. It is the last inhabited island before the Sundarban forest start. It is

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located at 22.16°N 88.80°E and has an average elevation of 13 feet from the sea level. It has 14 Gram Panchayats (democratically elected local self-government unit) of which Bali I and II, Gosaba, Rangabelia, Lahiripur and Satjelia are facing the STR buffer zone (and partly Core area), separated by Gomdi, Gomor, Sajna, and Melmel rivers respectively. Gosaba is the most poor and underdeveloped block in Sundarban and a significant proportion of population is thriving on forest resources.

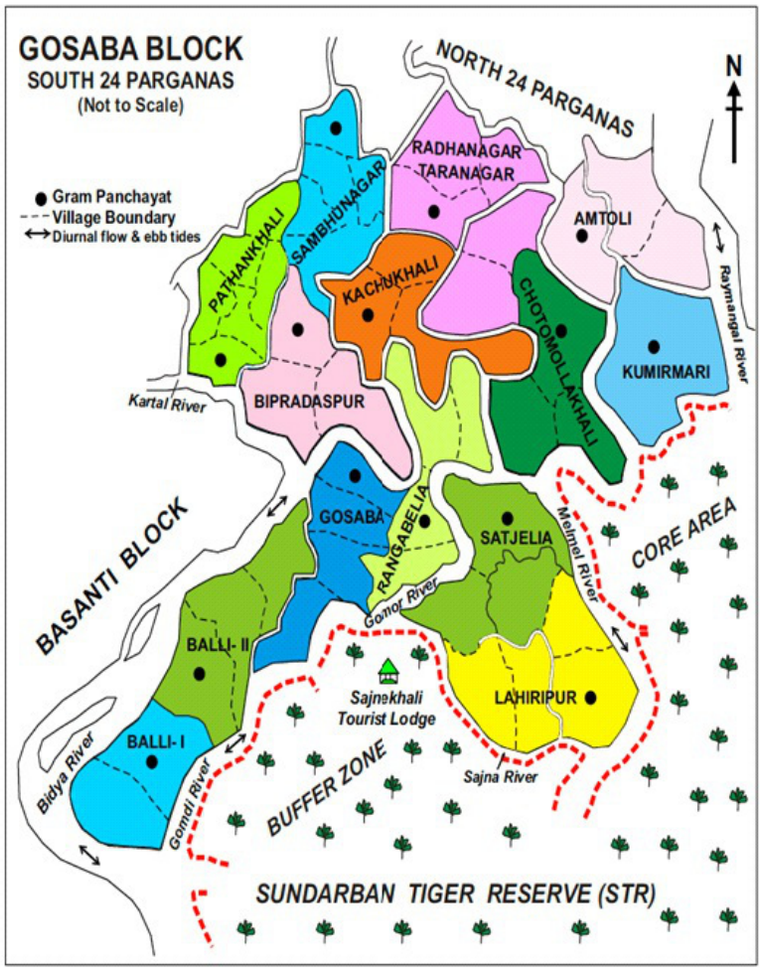


Figure 7. Gosaba Block and Sundarban Tiger Reserve.

Sundarban is one of the underdeveloped, poorest and most densely populated regions of South Asia, with an estimated 8 million people (India and Bangladesh combined) directly dependent on its fragile ecosystem. The level of literacy and per capita income is far below the state average and most of the people fall below the poverty line. The communication and transport network is very poor and most of the areas are inaccessible. Agriculture is hard and difficult and there is no industrial infrastructure. Provision of health care is extremely poor and electricity is almost non-existent. Frequent climatic insult is a regular feature—cyclonic storm; inrush of tidal waves and flooding is the cause of recurrent damage of

life, crops and property every year. Sundarban is an extremely backward region with a very poor quality of life of its inhabitants [16, 20].

3. Method

In the context of a rural mental health programme in the Sundarban Delta [17], a community study had previously identified deliberate self-harm by pesticide poisoning and human-animal conflicts as a locally recognized priority problem. This research was thus undertaken with reference to a framework that examined the problem of human-animal conflicts in relation to occupational nature, socio-economic factors and its impact on mental health and environment. The details of this study were reported elsewhere [24]. The present case studies were conducted in two villages of Gosaba block, namely Satjelia and Lahiripur during August 2005 to January 2006. A total of 111 (male 83, female 28) cases of human-animal conflicts were identified from those two villages among which 12 males (14.4%) and 17 (60.7%) females survived.

The present study group comprises a total of 13 cases (7 female and 6 male). 3 males and 4 females were from the survivor group. The other 2 males and 3 females were seen at the community mental health clinic conducted in Gosaba during this period. One case (7) was seen immediately after the accident with a follow up. Among the 13 cases, one was a posthumous study. 10 cases developed PTESD symptoms after tiger attack, 2 after shark attack and 1 after crocodile attack. An ethnographic history including the details of situation analysis of the encounter and physical injuries sustained and subsequent help seeking were elicited. In some cases detailed clinical examination including Mental State Examination was also done. Depending on the clinical presentation and history, an attempt was made to arrive at a provisional diagnosis and treatment was offered to those who agreed. In the clinical description all the animals are referred as 'it' because the sex of the animals was not known. All the in-depth interviews conducted separately and all of them have given written consent/ thumb impression for tape recording of the interview which was transcript later. They also gave written consent to publish their case studies in academic journals or meeting and use their photographs in academic papers. All the names used were changed or abbreviated.

4. Results: Case Studies

4.1. Case 1:

Mrs. Mondal, a 39 years old married woman, was in a fishing (tiger prawn) trip in the middle of February, opposite to Bali I block near Sajnakhali jungle in the SRF, 11 years ago. During the netting exercise, four people were on the *dingi* (country boat) and five were on the bank of the *khari* (narrow canal). She was on the bank on the right, behind the other four. A big aluminum pot, to collect juvenile prawns, was to her left while with her right hand, she was pulling the *mean-bera jal* in the river. It was about 3 am and as it was cold, she covered

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her head with a wrapper. Suddenly the tiger jumped from the slope of the *khari* onto her from behind. Having not landed on her precisely, the tiger's left paw hit the metal bowl and right paw hit her head. The wrapper therefore slid off, she became unbalanced and fell into the river along with the tiger. Immediately the tiger rushed towards her in an attempt to grab her head but that she escaped by going under the tiger's belly. The tiger then started throwing violent paw thrusts. She sustained severe injuries to her right upper arm, beneath the neck and bled profusely. The surrounding water became bright red ('like red chili') and as a last resort she swam deeper into the water, away from the tiger in an attempt to reach middle of the *khari* to get closer to the boat. By this time, people on the boat were shouting and thrusting their long bamboos on the water to ward off the tiger. The tiger left the prey and having reached the bank stared at the people briefly and disappeared into the jungle. She was immediately helped into the boat; she was crying out of terror and pain. It took three hours to reach Gosaba BPHC where she was treated with '56 stitches'. In the hospital she was drowsy and frequently shouted, "the tiger is coming…am I in the jungle?...standing there- run away- run away". She showed extreme fear and apprehension particularly at night. She said to one staff member, "I will not be spared, it will catch me again. Tigers always search for their missed preys."

After being discharged from hospital in a month, she remained very frightened. At night she repeatedly checked doors and windows and developed a conviction that tiger will attack her at home. She was not amenable to any logic. Her thatched cottage was just on the Melmel river bank and every night she put a kerosene lamp by the side of her bed. Any trivial sound outside would wake her from sleep. She took a *katari* (machete) and stood up in an attention stance as if the tiger is entering the room and she will hit with this weapon. In the midst of sleep she shouted "see the tiger is coming… beat it with *baitha* (rowing wooden sticks)" and became extremely emotional and cried profusely. Her religiosity increased many folds; she believed that it was due to kindness of goddess Bonobibi she was saved from the mouth of the tiger and clutches of death. She offered prayer with flowers twice daily at the Bonobibi *than* in the village. She became highly fearful and cried a lot when she heard of any news of a tiger-attack in the locality. She avoided not only any further fishing trip in the SRF but also avoided the jungle where she used to collect fuel wood. Her present living is TPS collection in the river (not inside the forest) and though previously she used to spend the whole day in waist deep water for netting, she was now unable to take a dip in the water to bathe by submerging her head under water. When asked about the reason, she said, "though the possibility of tiger attack no longer present, I feel frightened to take a deep bath. I feel anxious when I am not able to see my surrounding." Though she is doing all household tasks and maintaining regular TPS collection in the river, she still has fear of a tiger. She avoids going outside of her home after sundown and feels quite upset with any news of tiger attack in the jungle. She says, "The memory of the attack haunts my mind like a scary cinema show". She has developed multiple bodily pains, especially in the neck and both shoulders. Health and work ability-wise she said that she is now 40% capable and functional.

Clinical Impression: Chronic PTESD with psychotic symptoms and somatization.

4.2. Case 2:

Mrs. Mistry, 34 yrs old married lady had a *Kamote* attack in Melmel river near Marich Jhappi jungle in May at around 2.30 pm, seven years ago. She was in a fishing trip with three others in this TPS collection. She and another man was immersed waist deep in the water and were pulling the net through the water. It was a low-tide time and there was high force of the water gushing downwards (towards the sea). With some added rain, the water level raised and she was immersed up to her chest. She then felt something heavy under the water and before realizing she was pulled down into the water. She struggled to reach above the water for air but was forcefully pulled down under the water twice. She felt a sharp pain over her left buttock as if someone is cutting it with a sharp saw or "a big leech" is adhering to her body and within a second she realized that it was a *kamote* bite. She noticed the water around her turning bright red. She was repeatedly pulled into the water by the shark. Her right arm below the elbow was also bitten off. "With the salty water the burning sensation increased" and she became unconscious. She was rescued by others immediately and taken to Gosaba BPHC. A big portion of muscle mass from her left buttock and the whole lower right arm was missing. She was treated with multiple stitches. First few days in the hospital she was semiconscious and intermittently shouted "the kamote is coming.. kamote is pulling my legs - save me, save me,.. so much blood, wipe it" Her right arm was amputated below the elbow. After a month she was discharged.

Though physically she was recovering gradually, her fear about a *kamote* attack persisted over almost 4 years. She was always fearful and apprehensive, avoided going to the river, feeling terrified after seeing any floating log of wood or rubbish and misidentified those as *kamote.* Sleep was broken many times at night, having memories of the attack and quite often she jumped off from the bed onto the floor as if she is being attacked by something - she checked and rechecked her legs and muttered to herself "is it alright, is it alright?" She repeatedly and sometimes unnecessarily warned the fellow neighbours not to going fishing. If any animal attack news came to the community, she rushed into her room and cried loudly and profusely. She had fearful dreams of *kamote* attack and disturbed sleep for over two years. Her left leg shrunk and caused pain on pressure leading to difficulties in walking. With the amputed right hand she could not do household work properly. She felt extremely low with high anxiety, intensified by her inability to run the family chores due to the deformity. This brought a constant tussle with the family members. She narrated that: "I am a forest lady, forest is my mother but I cannot dream even to enter the forest or river again. I stopped fishing activities completely. I fear and tremble if I go up to waist-deep water in the river. … It is my misfortune or rather results of my sin. Many news paper people, forest department people and once a doctor like you came to see me. It is a great disgrace and shame that I have to show my injury by lifting my *shaere* up to the buttock...it is extremely insulting for a woman- I am so unfortunate. Probably it would have been better if it (*kamote*) killed me there, (profuse crying) but I am thankful to Goddess Bonobibi and Ma-Manasa that my life was saved. I don't know when I will get rid of the fear and bad dreams of this accident." She said since this incident she never regained her full strength and always felt morose and low. She always felt fearful without any apparent cause, lacked in energy, had poor appetite and

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extreme sleep difficulties. She received no governmental financial help. She is now working as a support worker in a local Child Development Centre.



Clinical Impression: Clinical depression with anxiety in addition to her chronic PTESD symptoms. She agreed to take a course of antidepressant and anti-anxiety medication and at follow up after four months she showed significant improvement in her symptoms.

4.3. Case 3:

Mr. Halder, 42 years, was in a crab collection trip for 8 days with other three partners, a year ago. This incident took place on the fourth day of the trip, at about 8 am, in the Dhutra *Khal* (narrow creek) near Netai Jungle of SRF. The men were placing *done* (bamboo made triangular trap) in the river, when the tiger leapt from his back from the *Hental* bush up on the riverbank. He immediately jumped onto the other side of the boat. The tiger attempted to reach him by leaning across the boat. He caught the tiger's fore legs with his two hands and pushed the boat with his chest towards the tiger to injure it. The tiger then lost it's balance and fell into the river. The tiger attacked him again and slashed his right chin and scalp with sharp claws but despite trying was not successful in biting his head. One of the fellow collector lost consciousness and fell on the bank and the other two shouted loudly and took the rowing sticks and thrashed the tiger with all their might. The tiger backed off and disappeared into the forest. He had profuse bleeding and was very restless in pain and fear and constantly shouted saying "save me please, I am dying". He was taken to Gosaba BPHC after 6 hours of rowing. He was much disoriented for the first two weeks, could not detect family members or neighbours, always looked frightened, and tended to cover his head with a blanket. He repeatedly sought reassurance from the doctor if he was alright. He

could not eat, so was fed by a tube in the hospital. There was a deep furrow on the right side of the head and his face was also deformed because of loss of muscle and deep scar. He complained of constant pain on the right side of the face. He was discharged after six weeks and stayed a few days in Gosaba with a relative. He was very frightened of returning home which was on the riverbank opposite SRF. He had a strong belief that he, who is once attacked by a tiger, will definitely be attacked by the (same) tiger again.

He was a very courageous man with a strong muscle build. After this tiger attack he changed completely. He became skinny and weak. He became very fearful, even in the daytime while at home and he thought tiger may come at any time to attack him. In the night, things became even worse. He often awoke from sleep shouting "what is that sound?" He enquired if his wife could smell the tiger. He took an iron rod and rehearsed and demonstrated as to how he would strike the tiger if it entered the room. He became very morose; his appetite reduced remarkably and spent the whole day sitting in the courtyard idly. If the neighbors asked how he is doing, he kept silent and tearful. Sometimes he lamented, "All my faith in Bonobibi has gone. I explored the jungle so many times with her blessings, but this time she turned her face away from me. How can I go to forest again! On whose strength I would depend? I will not offer any worship to her again." Since then he never entered the forest again, though the constant fear of tiger attack has subsided considerably. He still presents as fearful and tremulous if he hears any 'accident' news in the jungle, he avoids going out even in the day time, suffers disturbed sleep often with terrible dreams and has lose much weight. When asked about the reason for fear, he said "the scene of *bera-beri* (fierce struggle for life with the tiger) haunts my mind as if it is occurring now, and my body shakes, heart pounds and the terrible *haker* (roaring of tiger) comes to my ear." He completely abandoned any trip to the jungle since then. They received no governmental financial help. They have no land, his wife and elder son run the family by working as day labourers and collecting TPS from the adjoining river (not inside the SRF).



At Gosaba BPHC

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Clinical Impression: Acute Stress Disorder followed by PTESD with psychotic symptoms, and with depression. He agreed to take a course of antidepressant and antianxiety medication.

4.4. Case 4:

Mrs. Gayen, 38 yrs married lady, went to a TPS collection with a team of six others, four years ago. They were pulling their net in the high-tide water in a narrow *khari* near Marich Jhappi jungle. It was an April mid day, around 1 pm and they were very active because they had to spread the net properly in the gushing up water from the high-tide. Suddenly one of her fellow fisherman shouted "Alert! Alert! Uncle is coming". She looked back and saw a huge tiger jumping onto her and she immediately jumped into the river but not before sustaining some serious injuries. She narrowly escaped from the full force of the tiger's swing. She kept herself deep inside the river water, but the tiger kept trying to strike her submerged head violently with it's paws. The people started shouting, hitting the boat with sticks and pushing the boat to hit the tiger, which, after several failed attempts to reach its victim, began to recede and eventually disappeared into the forest. People then rescued her. She sustained a deep laceration to the back of her head and upper right shoulder. She bled profusely and became unconscious. They wrapped the wound with a towel and after four hours on the boat, reached a private clinic in Gosaba. The people avoided the government hospital as the incident took place when they were operating in 'Black'. She suffered repeated infections and took more than two months for her wounds to heal.

She developed extreme tiger fear after that. She was always fearful that she may be attacked again by a tiger, even at her home. Her thatched cottage was on a riverbank opposite the SRF. She could not go outside her room, even to use the toilet because of fear of being attacked by the tiger. In the midst of sleep she would wake up and shout "there is a tiger-see… save me, save me" and cried a lot. She was often inconsolable. She cried loudly by holding her head because of constant headache. She developed muscle and bone pain in neck and both shoulders. She left her occupation of TPS collection. Her extreme fear of tiger, even in the day, became a 'talk' in the community. Sometimes kids ridiculed her by saying, "Look there is a tiger" and watch her panic stricken behavior. During these times, she would run back to her cottage and ask her husband to take proper caution to fight away the tiger, as if it is certainly there and coming to attack her. Husband thought she developed some mental problem and thus consulted a *Boulay* and a *Gunin*. Both advised him to offer *puja* to Bonobibi shrine. After being treated (with jhar-fuk and herbal amulets) by the *Gunin*, she became 'somewhat normal' but still remains fearful of the tiger, she cannot go to the market on her own, she never goes out after evening and when she hears any news of such attacks in the forest, she becomes extremely frightened and tremulous.



Clinical Impression: Chronic PTESD with psychotic symptoms. She agreed to take a course of anti-anxiety medication.

4.5. Case 5:

Mrs. Mistry, 39 years old, (a tiger widow) accompanied her husband in a boat trip for TPS collection in Garal *khal* near Marich Jhappi jungle, four years ago. They started working at midnight so as to collect the early morning catch from the river and had been working late into the morning. Both husband and wife were busy pulling the drag-net laid in the river. By around 10 am they had collected a good number of juvenile Tiger Prawns. While walking behind her husband in waist deep water, she saw a tiger jump over her and onto her husband. In a split second, his head and part of his neck were inside the tiger's jaws. She described the incident: "I stood there aghast. My husband's head and face were inside the tiger's mouth. The tiger's long pointed teeth plunged into his neck and chest. It's eyes were red and terrifying. Blood was coming out like an open tap-water, he shook violently his both hands and legs in pain and I heard some peculiar sound. I was unsure if it was the tiger's growling or my husband's shrieks of terror and pain. Suddenly I got a supernatural power and courage, as if Bonobibi tranced on me. There was no one nearby. I had to save him. I pulled his legs with all my might to dislodge him from the tiger's jaws. The tiger stepped up on the bank dragging my husband… I was still in the water and kept on pulling his legs towards me but I was no match to the tiger's strength. It snatched my husband's body, my hands slipped and it dragged him into the forest... I could not save him (profuse crying)". By this time another fishing party came and they found her crying loudly and shouting for help. She went along with six others into the forest– all shouted and created sounds with crackers

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and wooden sticks. After a mile inside, by the side of a dense *Hetal* bush, they found the husband's body in a pool of blood – with the head and left leg missing. She fainted but was attended to. The lacerated body was buried on the river bank. It was not taken back in the village as they went in 'Black'. Because of the risk of police case, if the incident was publicly known, she could not perform the usual mortuary rituals at home, neither did she cry loudly or discuss this extreme misfortune with her neighbours. For the first three months, she could not dress like a widow because forest department may come for enquiry. She said "despite being a widow I had to dress like a married woman. I could not cry loudly or discuss the accident with others to ease my mind. I cried in closed doors, asking Bonobibi to give me strength".

First few weeks after the incident, were extremely sad. She was fearful and suspicious of facing enquiry about the illegal forest trip. Then she developed extreme anxiety, fear about the tiger, cried relentlessly, avoided social mixing and completely stopped TPS collection in the river. She was very suspicious that forest department or police will come to arrest her. She ate very little and confined herself in her cottage. If neighbours visited her she repeatedly asked them about any enquiry from forest department they knew about. At night she repeatedly checked the windows, door and the courtyard as if tiger is hiding there. Throughout the night she had frequent broken sleep and stood up on the bed and shouted "check the room…what is there.. what sound is that outside?.. O God-I could not save him" and cried profusely. A terrible repeated visual image (? dream) occurred often - 'a tiger is extending its paws towards her', which awoke her almost every night. She had insurance but no Pass but got no financial help. She had four kids, all were under 12 and she became overprotective towards them. She didn't allow them to go outside the cottage after evening. Her father came and consulted a doctor who gave some sleeping medicines and a *Gunin*, who by supernatural chant and ritual 'bound her cottage against potential tiger attack'. She was almost dysfunctional for two years and then started a job as a maid servant. She said though the tiger fear has diminished by 50%, she still is fearful and feels bereft of any courage to go out after evening. The recurring images of the 'fight scene' haunt her and she feels terrible with body shakes, uncontrollable tears and feelings of extreme helplessness and hopelessness. She said her mind wandered vacantly, always feeling low without energy in the body, feeling it would be better to die. She felt extreme guilt for not performing the death rituals for her deceased husband. "Whenever I sit alone, the scene of his mutilated body, his cry from the tiger's mouth, the sea of blood, the ferocious look of the tiger shatters me with terrible fear, anxiety and sadness. I only pray to Bonobibi to save my children and me. I can't remember when I had a good night sleep. I have no interest in life, I can't laugh with the neighbours, I have no appetite for food and I am just living for the sake of living". Her life changed completely for the worse, since the incident. Once, she thought about killing herself by hanging but because of the little kids she drove this 'bad thought' out of her mind. Her father took two of her kids to care for them.



Clinical Impression: Chronic PTESD with depression (with survivor guilt) and expressed her concern about the 'disturbing accident-memory' and agreed to take a course of antidepressant and hypnotic medication.

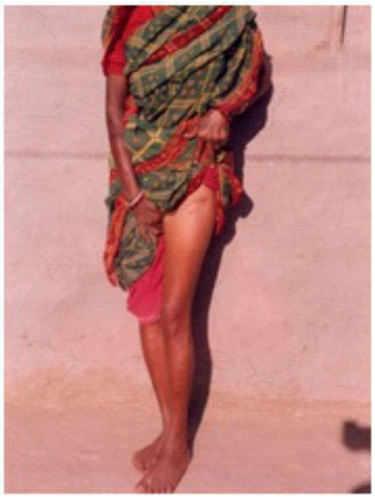
4.6. Case 6:

Mrs. Mistry, 26 years married lady, when 16 years of age, went to collect TPS along with her mother and five others. They were on a boat trip in Gomar River. It was late March at about 5 pm and they were all pulling the *meenjal* (fishnet) along the bank line. Suddenly she felt a tug and was dragged down deep into the river. Everyone rushed towards her and pulled her with great strength out of the water. It was a *Kamote* that bit her left buttock and the front portion of her thigh. It bled profusely. She fainted after seeing the gush of blood and was taken to the boat. She was treated in the Gosaba BPHC and recovered from the wound after four weeks. But she ended up with an ugly scar extending up to left mid thigh and she had difficulty walking. She later recalled that she felt some slippery big fish-type animal brush against her legs and that she consciously tried to avoid the creature by walking forward into the water. She then suddenly experienced a cutting sensation as if a sharp saw was driven into her thigh. She had excruciating pain and before even shouting for help she had fainted.

First six months was a big trouble for the family as she developed fear of *Kamote*. She avoided the river, abandoned TPS collection and refused to take bath in the river. Mrs. Mistry's mother recalled: "The river is our all time need. When my daughter was taken to the river for bathing, she was very resistive. After going as far as waist deep water, she would shout that there is something in the water underneath her and would rush back to the bank. She cried all the time without any apparent reason and in the night saw Kamote-dream, as if her legs were being pulled into the river. She used to shout in the midst of sleep: "help me, save me,

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Kamote is pulling me down". If any neighbour came to their cottage and gave detail about their fishing trip in the jungle, she refused to listen. She confined herself in the room. She was always fearful and asked her parents not to go in the river. She was anxious, fearful and absentminded for about two years after this incident. There was a deep scar mark on her back and the left leg has shrunk. There was a problem in marriage prospects because she had marks of animal scar on her body, which was taken by many as a bad omen. The family somehow managed to find her a match. Though the fear of Kamote has reduced significantly, she remains fearful of water, has abandoned any forest fishing entirely and avoids taking bath in the river, unlike before. When people narrate any such attacks she becomes upset and avoids participation in such discussions. Now she is working as an agricultural labourer. She says "I have no problem now, except my fear of water and that is why I always avoid river".



Clinical Impression: Chronic PTESD

4.7. Case 7:

Mr. Jana, a 48 years old man was asleep in his cottage. It was about 8pm in the summer month of May, four years ago. As it was very hot, he was unable to have a good sleep. He heard some sounds of dry hay as if something is moving across the courtyard. He thought of Bonobibi and prayed to save his family. He had heard that a tiger had crossed the river from SRF and thus he was suspicious. As he was tossing and turning in his bed, he heard a sound and got a '*botka'* smell of the tiger. He peeped through the window and saw the shining eyes of the tiger, as if two torch light bulbs were lit. The tiger was standing in the garden adjacent to the courtyard. He closed the door tightly and shouted for help: "tiger is in my house, save me, tiger in the garden". Immediately the neighbours rushed in with machetes, fire on wooden log and bamboo sticks. He, along with others attacked the tiger with sticks and sharp weapons. The tiger jumped on the crowd and knocked him to the ground. As he lay paralysed with fear, he found himself under the tiger's belly while it continually tried to

grab him with its paws. Amidst the commotion of screaming, bamboo sticks and clunking metal, the tiger slashed his neck and fled into the forest, while he lay on the ground with excruciating pain and bleeding. He was treated at Gosaba BPHC and developed an extreme fear of the tiger. In the night he cried and shouted repeatedly: "See tiger is there- tiger, kill it-strike it". In the hospital, his constant shouting at night caused inconvenience to other patients and he had to be transferred to a solitary room. After five weeks in hospital, his wound healed properly and one of the authors (ANC) interviewed him at the hospital. He was found in a severe anxiety state, feeling very low and crying. While narrating the incident, he would tremble and stammer, particularly when he described his belief that the tiger would return as it was deprived of its prey. Almost every night he had a fright filled dream-as if the tiger is silently approaching his cottage premises and sat silently with extending fronts paws ready to jump on him. Sleep broke out with intensification of fear and he needed someone to comfort him at that moment. He was also very emotional and concerned about his appearance- his left external ear (pinna) was partly lost with marked deformity on the right forehead and face- the mark of tiger attack for which, he thought, people would ostracize him as a bad sign: "People will avoid to see my face in the morning or before any journey as I would be considered as an "o-*jatra*" (an unholy face to be avoided before any journey).

In a second visit after four months, he still had the tiger-fear, could not go outside his cottage even in daylight, abandoned his kitchen farming, and cleared the area so that tiger could not hide. And with any news of a tiger attack in the jungle he became very upset, trembling and assumed a posture to refuse to hear the story. With time, the frequency of tiger-dream decreased but he continued to have sleep disturbances. He was unable to hear properly and this apparent deafness caused difficulties in communication. He conversed by sign language with hand gestures. For protection and self-confidence, he lit up a kerosene lamp by the side of his bed at night. He felt very insecure and had strong conviction that the tiger will catch him again. He earnestly requested the author (ANC) to find even a minimal-wage menial job in Kolkata, as his life in the village was fraught with fear. He said, "If Bonobibi wishes to save me, she can, otherwise I am doomed". He took a *Manat* (pledge) for a big offering to Bonobibi also. He avoided his forest activities (fishing, wood cutting) entirely and now earns a meager sum of money by TPS collection in the daytime only.



At Gosaba BPHC

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Clinical Impression: Acute Stress Disorder followed by PTESD

4.8. Case 8:

Mr. Halder, a 32 years old man, was in a boat trip with six others for Garan wood cutting in Chamta jungle in deep SRF, a year ago. The trip was for three days and was 'Black'. On the second day, at around 8 am, he was cutting the stem of a big tree with his wooden-handle axe. Others were around him in close distance. Suddenly a tiger came like an 'arrow' from the jungle and jumped over his back. As he turned, his axe struck the tiger on the head and it fell on the ground. But it immediately stood up and pounced on him again. His fellow wood-cutters cutters rushed to the scene shouting. They used their wood-axes and wood-logs to injure the tiger. The tiger then fled into the forest. He was severely injured but conscious and requested his fellows to flee away as soon as possible. He was highly apprehensive as he believed that the tiger may come again to collect it's missed prey. He was taken to an Amlamethi private doctor (to avoid government hospital because of police case). The wound was not very deep and the tiger might have been injured sufficiently not to be able to inflict any deeper injury. His wound healed within six weeks but he developed fear of the tiger- as if tiger is coming to attack him again. Particularly at night he could not sleep well- very often shouted and cried loudly "it has come near the door, no more time, it will bite me and eat me in the jungle, coming nearer, leaning on me to take me." He shouted by calling the names of those who were with him in that trip -"save me, hit the tiger, alert-very close by". To stop him, his wife often smacked his face- and he would then look vacantly and sigh "all has gone, gone". His food intake had diminished, as was his sleep. He became very silent and avoided socializing. He always complained of burning sensation and pain over the neck and back. He looked anxious and confined himself within the room the whole day. He asked his wife to check and recheck the cottage and the courtyard repeatedly to ensure that no tiger was there. If there were any noise or shouting in the neighbourhood, he became apprehensive and repeatedly asked what had happened. Sometimes he behaved very oddly, as if he was a different man and nothing has happened to him. His disability was interpreted by neighbours as a 'mental problem'. So an offering was dedicated to Bono-bibi and a *Gunin* was consulted, who after detailed ritual gave the verdict that in the jungle there were multiple 'accidental' deaths from tiger attacks and their bodies were buried under the mud without performing any death rituals. So the ghosts of the dead were roaming the forest and one of them has possessed him. He asked him every detail of the incident and then performed a *jhar-fuk* (chanting) with loud voice and burning red dry pepper, dry hay and ginger. He gave him an amulet to wear on his arm. Though he became relatively better, his irrational fear of the tiger prevailed. He cannot go to the local shop on his own or cross the river. He left all forest exploration. He said, "When I venture out, the jungle reminds me of the terrible scene of the accident. I feel shaky and mentally disturbed with anxiety and despair". Now he earns his bread by working as a day-labour.



At Gosaba BPHC

Clinical Impression: PTESD

4.9. Case 9:

Mr. Mistry, a 45 years old man, was on a four-day boat trip to Netai jungle for Dhum (Dhundul - *Xylocarpus granatum*) woodcutting illegally, seven years ago. He was with three others. It was around 10 am and everyone was busy identifying which trees to cut. He was engaged in cutting a long tree when a tiger attacked him from behind. He lost balance and fell on the ground. The tiger bit him on the left chest region and the back. He shouted for help and his companions rushed to attack the tiger with their wood-axes. They encircled the tiger from all sides and managed to scare it away. In addition to tiger wounds, Mr. Mistry also sustained head and facial injuries when he fell on the tree and then onto the ground during the tussle. He was disoriented for some time, asking repeatedly whether he is living or dead and he bled profusely from the excruciatingly painful wounds. He was taken to a private doctor (avoided government hospital for legal complication) and was treated for four months. For the first few days he was extremely week, kept absolutely silent, always looked suspiciously and answered questions incoherently. Then he became very frightened of anything related to tiger theme even when he is in the safe confines of his own home. At night he would wake up often and tended to cover his face with a quilt or try to hide under the cot. When asked why he behaved so, he said, “Can you not hear it coming? It will catch me, it is looking at me”. He trembled in fear and took long time to become normal again. When there was a storm or loud noise outside, he would hide under the quilt, trembling and would cry out, “few minutes more, it is coming; it will catch me, run away - run away”. It was not until six months that he partly recovered, although he continued to avoid the jungle and the river completely. He also avoided social mixing and any discussion relating to tiger

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attack in the forest. His wife said: "Few days ago a tiger came to the other village and villagers drove it back into the jungle. He was very upset on that day, constantly pacing in and out between the courtyard and the room, looking apprehensively out of the window and muttering to himself. One of his good friends comforted him by staying whole day with him. He is now helping him to go for TPS or crab collection, which he started very slowly again. We are too poor, no land, no boat, if the male of the family sits at home, then we have to starve. We haven't received any help from the forest department."



Clinical Impression: Chronic PTESD

4.10. Case 10:

Mrs. Mondal, a 41 years old married lady, was one among a team of five people who left for the jungle to collect TPS, three years ago. As the early morning catch is always good, they started their pursuit at about 4 am, pulling their *meen jal* (drag net) in the Khyal *khal* near Marich Jhappi jungle. The morning light was not very clear and she was wading through knee-deep water along the bank line with her net. The tiger leapt on her from behind and swept its paw on her head and left shoulder. She fell into the river and the tiger followed her into the water but could not bite her head. All others came to her rescue immediately and scared the tiger away with loud noises and creating frenzy with the rowing logs. She was taken to a private doctor in Satjelia and took three months to heal her wounds. First few weeks she was a bit disoriented, stared vacantly, quiet, extremely fright-ridden, with disturbed sleep, diminished appetite, automatic shaking with 'rolling eyes' and was unable to

move her head. She then developed fear of the tiger. She thought the tiger might come to the village and detect her. At night she would stand up shouting "tiger is jumping". She had frequent fearful dreams with themes of - a tiger approaching her with a wide-open mouth, tiger sitting inside the room, tiger chasing her etc. Often she heard the *Hakar* (roaring) and dreamt that "the neighbours who were killed by tigers are running with a *Da* (sharp traditional machete) and snatching her from the tiger". She would wake up in fear and often cried holding her husband. She abandoned TPS collection; never entered the forest again and still cannot go outside the cottage in the evening. She has constant neck pain and headache, which increases during the black moon. The scar on the scalp is painful which restricts her from combing her hair. Still she has extreme fear of the tiger and feels upset if any such news is coming in to the village. After this tiger attack she became dysfunctional (multiple bodily pain and headache, weakness, difficulties in turning head, memory problem), cannot do heavy household work, presents as unusually apprehensive and is frequently haunted by terrible memory of the assault.

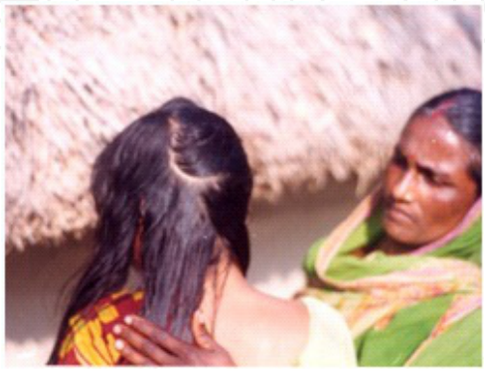
Clinical Impression: PTESD with somatic symptoms

4.11. Case 11:

Miss. Sarkar, an 18 years old single lady was on a trip to collect TPS with her father and maternal uncle, two years ago. It was end of July at around 10 am when her father was rowing the boat while she and her uncle were pulling the drag net in waist-deep waters of Garal *khal* near Marich Jhappi jungle. Suddenly they heard a terrifying tiger roar and in a blink, a tiger came 'like a kite' and jumped on her back but missed her narrowly. The paws only touched her head and part of right back as the tiger fell in the water. The two men responded instantly shouting to drive the tiger off while the father repeatedly thrashed his rowing log on the tiger's head and injured it enough to bleed and flee. Ms. Sarkar climbed back into the boat from the water. The tiger then went onto the bank, stood there for a second, gave a second glance and walked slowly into the thick jungle. Ms. Sarkar was taken to a private doctor in Tipli-Ghari bazaar and all her injuries healed with time. She is left with a big scar on her head and few scars on the right hand and back. She developed some 'mental' symptoms after the attack like - fear of the tiger, very low mood, suspicions that a tiger is hiding in and around the cottage, inability to go out after evening and feeling too nervous to talk about the incident. Sleep was very poor and dreams were about 'an attacking tiger', 'tiger roaring and thrashing its long tail'. She shouted in the midst of sleep "it is coming, leaping, strike it- strike it" and then cried profusely. She looked very distressed and always apprehensive. Her father gave a big offering to Bonobibi when a few neighbors were invited. She avoided everybody, remained quiet and kept to herself in her room. Few villagers said she is getting '*brain sort*' (mental illness) and advised to consult a *Boulay*. The Boulay from a nearby village presided and listened to the account. He said that his expertise in preventing tiger attacks would be effective only inside the jungle, therefore could not do anything to help in this case and advised to consult a *Gunin*. The *Gunin* then presided and completed a half-day ritual. He then cast a protection circle around the cottage that is meant to prevent the tiger from entering the premises. *Gunin* also gave a chanted Talisman to wear around

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the waist with red thread. As interesting as these rituals were, they made little difference to Ms. Sarkar's condition. She avoided TPS collection and stopped forest exploration because of the fear. No financial help was received. After a year and half she gradually became relatively better but facing another problem related to her marriage prospects. The groom's family is complaining that she has tiger marks/scars on her body and suspect that in future she may develop a 'mental problem'. Her mother is apprehensive and says, "we have to pay a high cost in dowry for the tiger scar".



Clinical Impression: PTESD

4.12. Case 12:

Mr. Sardar, a 32 years old man, was invited by his friend for a boat trip for TPS collection on a February morning, nine years ago. He reluctantly accepted the invitation. Both men were pulling the drag-net and collecting the juvenile prawns by washing the net in Ganral river near Pirkhali jungle. He heard a sound but thought that probably the sound was from the bank collapsing into the river. Then he saw a tiger standing about six feet away from him. The tiger leapt on him and he tried to escape by jumping into the water albeit unsuccessfully. The tiger held him by his back and tried to carry him into the forest. Mr. Sardar held onto a lodged log tenaciously and kept his head and body under water. While the tiger tried to strongly pull him away, he could hear his ribs break but he did not give up. The other man came along shouting and thrashing bamboos on water. Being unable to pursue the hunt under water, the tiger jumped back on the riverbank and disappeared. He swam to the boat and to his safety. He had sustained a laceration on his back down to the right arm pit. He was treated in the Gosaba BPHC. He developed lots of problems after this incident. He was profusely distressed by the memories of the 'accident' and was always frightened and had crying spells. In the early morning he would sit up on the bed and ask others to check the room and outside whether any tiger is roaming there, frequently he shouted in the midst of sleep "alert, alert, it is coming, I won't allow" and then sat in the corner of the bed. He stopped going to the jungle, always felt weak with back pain and could not do any work. He

often expressed utter hopelessness and helplessness regarding maintaining his health and his family. His elder son added: "We did not receive any financial help from the forest department, though he had a Pass and registry (insurance). He is still having some brain problem- very often he holds his head and his eyes turn red. He cannot work and cannot bear to think of entering the forest to make a living. We experienced some bad signs in the previous night – my mother's vermilion pot fell from her hand. She also broke a *Kalsi* (an earthen pot to collect water). Sometimes he urged us to move from this riverbank to some other village away from forest, but how can we do that? We are too poor, we have no land, and we depend on jungle and the river for livelihood". Mr. Sardar never ventured into the forest or undertook any forest activity after this incident.

Clinical Impression: Chronic PTESD with somatization

4.13. Case 13:

Mr. Mridha, 16 years of age (at the time), accompanied his mother on a crab collection trip in Gomor river, six years ago. At about 9 am he was on the bank and his mother was in waist-deep water. Suddenly his mother shouted, "save me- something is pulling me down". He jumped into water and caught hold of her. He then saw a crocodile's tail splashing on the water and lost his balance and grip on his mother. He then saw his mother being pulled under water. People rushed to the spot and saw the woman's body surfacing and submerging into the river. They chased the crocodile in a boat but it escaped under water along with its prey. Despite these attempts, Mr. Mridha's mother could not be saved. He was terribly upset that he could not save his mother. Since the body was not found, the relatives made a *Nara* (effigy with hay) and burnt it on the riverbank. On the same evening, the body was found floating in the river. Both legs were missing. The relatives left the body in the river (only after they took away the gold ear rings) as the mortuary ritual was already performed. Mr. Mridha struggled for over six months following this terrible incident. He was severely anxious and depressed, stopped going to school, was seen self-absorbed and avoided the river completely. When he saw a banana tree branches or anything floating in the river, he became extremely fearful and pointed to these objects as crocodile and threw bricks at them shouting "kill it, kill it". These 'accidents' are almost a regular event in Jamespur-Lahiripur area and with any such news he became very upset and returned to the cottage and sat quietly in the room. In the night he shouted in the midst of sleep "Mother! Mother! I am here" and woke up with lots of anxiety and crying. He lamented a lot and cursed himself for not being able to rescue his mother. Then a *Gunin* was consulted who performed a ritual and gave some herbal roots and leaves. Mr. Mridha then seemed somewhat settled but continued to remain very low in mood and energy and never went back to school.

He had two brothers and one sister. His father remarried. Family had extreme financial stress and he had to continue fishing trips. Four years from the incident, he was on a fishing trip (with his father) in Sarak Khalir jungle and was killed by a tiger. The above history was collected from his brother.

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Clinical Impression: PTESD with depression (with survivor guilt).

5. Discussion

It was a unique opportunity to study people who survived dangerous wild animal attacks during their livelihood measures. Virtually all of them have had near death experience. The detailed situation analysis in each case have shown that how terrible and life-threatening was the experience of these animal attacks. There are some reports of domestic animal like dog attacks to children and PTSD [62, 42] and one report of ASD and PTSD after being mauled by wild bears [35] but no reports available on PTSD following tiger, shark and crocodile attacks in the literature. This is the first comprehensive report of PTSD after wild animal attacks, viz., tiger, crocodile and shark.

All cases here met the criteria of PTSD according to DSM IV [3], viz., all have experienced an actual threat of death and serious bodily injury with a response of intense fear, helplessness, or horror' (Criteria A1, 2)), all of them reexperienced traumatic event either by 'recurrent and intrusive distressing recollections of the event, including images, thoughts, or perceptions' or flashbacks (Criteria B1) or 'recurrent distressing dreams of the event '(B2) or 'acting or feeling as if the traumatic event were recurring' through illusion of tiger perception in the vicinity, hallucinatory hearing of tiger's howling or dissociative flashback episode as if tiger is going to attack them and acted in response (B3), 'intense psychological distress' with related external cues- feeling extremely fearful and anxious while hearing any similar events in the locality (B4). All the cases have 'Persistent avoidance of stimuli associated with the trauma'- by avoiding trauma related conversations (C1), all have avoided activities related to trauma (abandoning their livelihood measures and places where trauma occurred, i.e., Sundarban Reserve forest or rivers) (C2). Most of them have shown 'Persistent symptoms of increased arousal' like difficulty falling or staying asleep (D1), or hypervigilance (D4) or startle response (D5). In all cases the onset of symptoms occurred within a month of the insult and persisted for more than one month (E) and the disturbances caused significant distress and impairment in familial, social and occupational functioning (F). In view of persistence of symptoms more than six months, all cases have had chronic PTESD course. It has to be remembered that there were no therapeutic interventions for their symptoms except some traditional attempts. Some of them had associated symptoms of depression (Case 2, 3, 5, 13), somatic dysfunction (Case 1, 10, 12) and survivor guilt (Case 5, 13). Two cases (3, 7) had an Acute Stress Disorder (DSM IV -TR code 308.3, [4]) immediately after the trauma and three cases (Cases 1, 3, 4) had psychotic symptoms.

In addition to the classical PTSD symptoms (including flashbacks, affective dysregulation and some with dissociative reaction), all the cases here also presented some culture-specific features as well. Some of the interesting features are discussed below. Nightmares are quite common, of the "re-experiencing" symptoms of PTSD, seen in approximately 60% of individuals with PTSD [47]. The cultural interpretation of nightmares influence attitude and help seeking behavior. Some cultures view nightmares as mental health problems, others

view them as related to supernatural or spiritual phenomena [38]. In three tiger attack cases (4, 8, 11) and one crocodile attack case (13) here, the nightmares and dream-related behaviours were regarded as mental symptoms and thus traditional healing from *Gunin* was called for. Post-traumatic dream is an important clinical symptom in PTSD. About 50% of post-traumatic dreams comprise replications of the traumatic events [79]. In the present case series all cases, except one (Case 9) had dreams of the animal attacks that disturb their sleep and arouse them with acting-out odd behaviours.

The present PTESD cases shed some interesting light on the situation analysis of trauma in respect to local socio-cultural perspective. It has to be remembered that these are not isolated incidents but rather human-animal conflicts which are ongoing events in SRF [70]. These people are extremely marginal and poor, without any land or wealth for living and all were attacked during their livelihood activities. In that sense these human-animal conflicts may be seen as an occupational hazard due to eco-specificity of SRF area. In fact, among the 13 cases the attack took place while 8 (61.5%) were involved in TPS collection in the river inside SRF; 2 (15.4%) during Crab collection and 2 (15.4%) while wood cutting in the SRF. One was an in-house attack by a straying tiger. Let us discuss the psycho-dynamics of PTESD according to the categories of trauma-causing animals.

Tiger attacks: Tiger and Sundarban Forest are almost synonymous [56]. Fear of tiger attack in the communities around fringe area of SRF and also during forest exploration is a constant threat [17, 60]. Most of the illegal forest intruders are poor and have dual fears during trespassing the forest, i.e., fear of the tiger and fear of the forest guards. Irony of the matter is that after such a life-threatening incident (or death) the whole matter arouses extreme fear of being detected and caught by the forest officials with consequent litigation and penalty. So to keep the attack and related injury secret is another stress to the victims. It not only adds another quantum of anxiety and suspiciousness to their PTESD symptomatology but prevents the inflow of social or community support. This is the reason why most of the cases here took treatment from private medical practitioners and are mostly reluctant to discuss their traumatic episodes publicly. It is also noted that none of the tiger victims here received any financial help, which was so crucial for their treatment and economic support at that point of crisis.

Living on the forest resources is a unique socio-economic dimension of Sundarban region. This enduring life struggle with different adversities including fatal tiger attack raised the status of the tiger to that of God. Counteracting this potential danger, the cult of Bonobibi as a protector, has become deeply ingrained into the belief system of these people. This religiosity is expressed in their day-to-day life pattern like in worshipping Bonobibi before entering the forest or having a strong faith and conviction that Bonobibi will certainly protect them during their in-forest activities. So any such attacks tend to shake their religious devotion and faith because the attack itself is the sign that The Goddess is displeased with the victim and therefore refused to protect them from the tigers. This generates a sense of guilt and sinfulness which impact on their post-trauma psychology immensely. So, some become more devotional to make up their spiritual deficiency by offering *puja* or vows to Bonobibi,

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while some become frankly disrespectful towards the Goddess. This bidirectional religious trend is also noted among the post-traumatic people after disasters [33, 39].

Post-traumatic grief may be an important psychodynamic contributor to PTSD symptoms [5], which is quite evident in the tiger-widow case (Case 5) here. The trauma scenario she described is horrific, devastating and had a significant impact on her grief and bereavement process. Grief is a healthy process by which an adjustment to loss of loved ones is balanced. Traumatic grief or complicated mourning is a situation where both trauma and grief coincide [67]. Traumatic grief occur when the circumstances of death is sudden and horrific and disrupt the normal mental functioning of the survivor. Grief intensity is related to the suddenness of the trauma and associated feelings of helplessness, powerlessness, threat to one's life, confrontation with shocking deaths and mutilations, and survivor guilt [7, 68]. Prolonged grief among traumatically bereaved relatives after natural disaster (Tsunami) is also reported [43]. The elaborate mortuary rituals act as a supportive social mechanism to channel out the grief reaction. But unfortunately the tiger widows in Sundarban are prohibited from this ritualistic way out (cathartic) process for cultural inhibitions. Most of the bodies of tiger victims are missing and for the recovered dead bodies the usual mortuary rituals are forbidden (as they are unnatural death) thereby hindering productive grieving. Crying, often loudly among solicitous relatives or neighbour is a cultural way of expression of grief in local culture but in case of illegal forest entry, the widows could not cry loudly to avoid the attention of forest guards and risk arrest or fine. For the same reason, the widows have to continue to behave like married women, wearing coloured apparels (widows are supposed to wear white saree) with bangles in both hands. This is a severe form of psychological torture and aggravates the traumatic stress manifold. Moreover, tiger widows are looked down in the community, because they are seen as a bad omen and blamed for their husband's death. They are stigmatized as those that brought misfortune. They are disrespected, and shunned by their in-laws as well as the community. Tiger widows are forced to live in dire poverty, with exclusion from the main stream community as outcasts and always cursed by all. In fact, in some of the forest blocks of Sundarban there are segregated hamlets in each village called *Bidhoba Palli* (Widow Hamlet). The widow has to take the responsibility of running the family with the kids. If the tiger-widow is of younger age group, the misery and hardship is more. In the present case, all these issues were proactively present and intensified her post-traumatic stress with depression. Cultural superstition, stigma and discrimination related to the nature of trauma intensify the stress and thereby cause the clinical course, chronic and more disabling. This is the usual story of other tiger-widows of Indian [6, 10] and Bangladeshi Sundarban [46, 1]. The increasing number of tiger-widows [63] is a serious psycho-social concern in this regard.

Cultural interpretation of trauma is a significant factor in the development of PTSD [64]. The cultural meaning of the trauma experience is crucial to understand PTSD symptoms. One related example may be the trauma of rape, since sexual assault carries elements of social shame and negative social attitude, its burden is more than the burden of a flood or a bomb blast. The myth and social stigma attached with tiger attack (e.g., unholy sign, displeased Bonobibi, cursed family, potential for mental or physical diseases, social isolation etc.) adds

further stress to the victims. Two symptoms here, tiger fear and the conviction of reattack need some clarification from eco-specificity and cultural context. Though tiger fear constitutes a core symptom of PTESD here, from ecological perspective this is not unrealistic altogether. Appearance of tiger suddenly within the domestic premises is an ecological reality because very often tigers stray inside the villages (Fig. 8), even into the kitchen or cattle-shed [53, 29, 72, 74, 50]. So this fear is not entirely imaginary but rather has pathological intensification as a part of their PTSD anxiety.

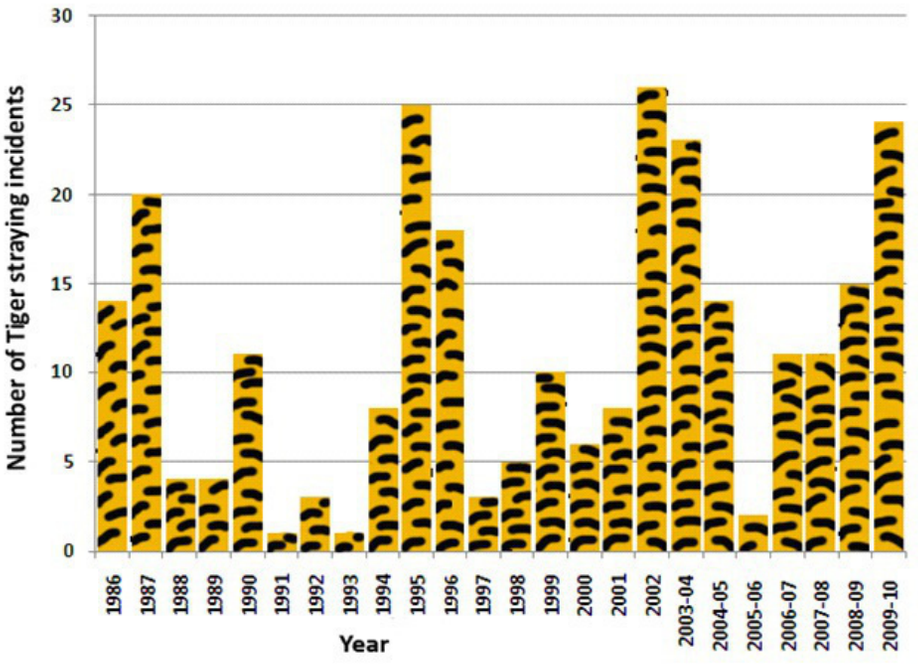


Figure 8. Tiger-straying incidents in Sundarban villages adjacent to SRF (adopted from [50]).

Conviction of reattack has a strong cultural connection with Tiger Cult [59] and folklore myth [41]. It is believed that the tiger always haunts it's missed prey like snakes and elephants and there are many popular anecdotal accounts circulating in the community. The acting out behavior to fight a potential intruding tiger is a symptom which has two components again. Firstly it implies an encroachment on a psychotic domain because inspite of explanation and support by the family member the victim believes that the tiger has come and secondly, it may be a transitory state of heightened anxiety as a part of PTESD flashback. In either component, there is loss of reality testing. Hearing a tiger's roar, hearing tiger's movement or smelling of tiger's odor during flashback – all are indicative of psychotic elements of PTESD. Positive symptoms like delusion and hallucination are not uncommon in PTSD cases [11, 34]. The strong and popular cultural belief that a missed prey will be taken by the tiger again is reported by all the cases here and that this cultural belief triggered lot of anxiety and abnormal behavior to ward off this alleged risk of further attack (by the same tiger). Hence, proper delineation of symptom pattern from the cultural perspective and eco specif-

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icity of the local universe [27] is important and will help to understand the PTESD psychopathology and their management.

Cultural experience and interpretation shape various responses to trauma [51], like meaning and implications of the trauma (tiger attack is not just an animal attack but it also reflects a spiritual dimension, i.e., that the Goddess Bonobibi and Tiger God Dakshin Ray, are angry or displeased and further misfortune may ensue), role of belief in 'fate', which increases hopelessness (other family members may fall prey to tiger's rage) and social vulnerability to trauma (stigma and discrimination of tiger attack in the community- hindering marriage prospects because of having a 'tiger mark' or 'Kamote mark' on the body or alleged potential to develop mental health problem after a tiger attack, or people avoid seeing a face with tiger scar etc). Mental symptoms after animal attacks here were considered in terms of supernatural context like possession or displeased God or Goddess in the community and thus called for traditional healing. Non-availability of modern treatment facility in these remote islands coupled with their strong faith on supernatural causation of these 'accidents' prompted them to receive folk treatment from the local HCPs and apparently this has benefitted the victims. So, the understanding of cultural perspective of the local eco-social universe is helpful for the *emic*-insight and may help in planning therapeutic intervention [76].

Crocodile and Shark attacks: Mauling by crocodile and shark are quite frequent in Sundarban rivers and cause significant mortality and morbidity [65, 61]. A survey in 2006 showed that 30 people had been killed by crocodiles in a span of three months in Patharpratima block of Sundarban [73]. Interestingly, one report showed that a crocodile devours a tiger [69]. Crocodiles and Gharials (*Ghavialis gangeticus*- a type of fish-eating crocodile), like tigers, is also straying frequently in the villages and takes shelter in sweet water ponds or inside swampy bushes. Usually the crocodile attacks are severe and since the prey is pulled down under the water, the survival rate is very low, even if rescued immediately. The incidents usually take place in front of many people who are on the river bed and many witness the horrific crocodile-human bloody struggle. Some who are directly involved in attempting to rescue the victim are prone to develop PTESD, as the posthumous case in this study. Some cases survived after losing some body parts, usually the legs. The muddy waters along the river banks are also infested with dog sharks *(Kamots)* and usually they don't kill the victim, but bite off chunks of flesh with their sharp teeth within a second. Often victims don't realise until the water around them turns red and some may bleed to death or lose their body parts (foot or hand or fingers). The author (ANC) has evidenced that after seeing a crocodile, which looks very terrifying and scary in the river of Patharpratima (Fig.9), people become so fearful that they avoid the river for weeks together. The world's largest captive crocodile breeding farm is at Bhagatpur, near Namkhana block of Sundarban. There are more than 300 estuarine crocodiles in the Sundarban National Park. Similar human-crocodile conflicts have been reported from the fringe area of Bhitarakanika wildlife sanctuary, Orissa state, India, where over fifty lives have been lost during the past ten years from saltwater crocodile attacks [54].



Figure 9. Crocodile in Ramganga river, Patharpratima Block, Sundarban.

The present study, comprising situation analysis of the wild animal attacks during livelihood activities of marginal people and consequent mental health morbidity in the context of Sundarban's unique eco-landscape, offers a new insight into the scope and extent of community mental health programme in the region. The clinical presentation of PTSD in all the cases here manifest a unique cultural component (reattack fear, flashbacks and acting out behaviours) to such an extent that it represent like a culture-bound PTSD syndrome. The therapeutic planning thus goes beyond the usual treatment methods with medications and calls for a multi-level comprehensive psycho-social and eco-cultural approach.

6. Conclusion

Human-animal conflicts are increasing worldwide [31] but there are limited reports regarding their impact on mental health. Ecopsychiatriy tends to unravel ecological influence on mental health. Ecospecificity of the region differs from place to place and thus has different impacts on local people [52]. Ecospecificity of Sundarban region is operative at the background of the morbidities discussed here. Ecological character of the region also influences people's behaviour. One such good example is the alarming rise of Deliberate Self-Harm (DSH), both fatal and nonfatal, by pesticide ingestion [19, 22] in Sundarban region. Eco-stress impacts agriculture in this delta region immensely by frequent storm, cyclone, flood, embankment rupture and tidal inundation of paddy fields, salinity of soil and thus makes agriculture a hard and risk-prone task. To compensate these, poor and illiterate farmers use or overuse pesticides, which are easily available in every grocery shop of each village [25]. This easy availability of pesticides acts as a potential catalyst to enhance the self-harm behaviour among the vulnerable subjects [21]. Similarly, forest-based living is the only available option for the poor and marginal people in the fringe area and during their eco-resource exploration they fall prey to animal attacks. Therefore social and economic development

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and alternative livelihood opportunities [28] in planning will aid the prevention of these casualties. Direct and indirect ecological influence plays a dynamic role behind human distress. The ecological change, for example climate change and sea-level rise [49] disturb the tiger habitat, thus causing more tiger straying into the villages, thereby increasing the potential for more human-tiger conflicts [9]. Excessive ecoresource, both riverine and forest, exploitation disturbs the food chain web and thus crocodile and sharks are haunting rivers close to human habitat more. The author (ANC) met a group of young students (Class five-six standards) in a Jharkhali village in Basanti block after Cyclone Aila (25 May 2009) who became terrified by at the sight of gathering black clouds in the sky (which reminded them of the devastating Cyclone) and left the school enmass to take secured shelter at home. So understanding of the local ecological landscape is very important eco-clinical task and may help in therapeutic planning and this is the reason that we propose the diagnosis of these cases as Post Traumatic Eco-stress Disorder. Management also needs to address the local cultural and ecological features contributing to the pathology [48, 30]. Cross-cultural research has shown evidently that culture shapes belief systems and thus influences the perception of traumatic events and their meaning, attribution and coping behaviours [76]. Given the importance of cultural context of traumatic experience, the use of DSM-IV Cultural Formulation has been in recent use for diagnostic formulation of patients of PTSD [36].

Conflict of Interest: None

Acknowledgements

The authors thankfully acknowledge the logistic help rendered by Sri Tushur Kanjilal, Tagor Society for Rural Development, Rangabelia, Gosaba, and Dr.Girin Mondal, Block Medical Officer, Gosaba BPHC during this study. World Bank through State Health System Development Project, Department of Health and Family Welfare, Government of West Bengal funded this study. Thanks to Dr. Satyadev Nagari, MRCPsych, Speciality Doctor, Stuart Road Clinic, Corby, Northamptonshire, U.K. for his critical comments on the draft paper.

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