

Geographical Perspective of the Sea Turtle Nesting Beaches: The Human Threats on Sea Turtles and Their Nesting Habitat in Thalalla Beach, Matara

Shazna M.A.F.⁶⁴

Abstract

Thalalla Beach, situated in the southern coast of Sri Lanka has a high potential as a nesting beach and attracts quite a number of sea turtles (STs) for nesting in the year-round. The objectives of the survey are to identify Geographical importance of Thalalla beach as sea turtle (ST) nesting beach and to documenting the human threats to the STs and their nesting habitat. The survey was conducted between the period of April and December 2016 within the 3KMs distance in Thalalla beach. Field visitation carried out 6 days randomly and spend around 4-5 hours each time. Human activities related to the STs and turtle nesting activities were recorded by direct observation. Besides, questionnaire survey was conducted with 30 local people and officials. Purposive sampling technique was employed to select respondents. Six such discussions were conducted each lasting not more than 40 minutes. During the month of December higher number of visits by Leatherback, Green and Olive Ridley to Thalalla beach for nesting was recorded. STs visit the beach for nesting during night hours, and high from 11.00 pm to 1.00am compared to other time periods. Thalalla beach attracts mostly Olive Ridley followed by Hawksbill, Green and Leatherback turtles. The main threat to STs at Thalalla beach is stealing eggs. The stolen eggs are used for various purposes. This has drastically reduced the number of hatchlings which go back to the sea. Moreover, especially between December and April killing STs for selling as food, mainly for locals is one of the unfavorable situations in Thalalla. Since the fishery is the main livelihood in the Thalalla area, accidental trapping in fishing nets is another threat faced by sea turtles. According to the survey, a small group of people in the Thalalla area are engaged in making handicraft using ST's shells as their main livelihood. Besides, due to the intensive human activities at the beach replaced the area with more waste materials and this may reduce the arrival number of STs towards the beach.

Keywords: Sea Turtle, Nesting Habitat, Hatchlings, Human Threats

1. Introduction

Sea turtles (STs) are globally considered as threatened species as six out of the seven species are listed as threatened in the IUCN Red list of threatened species (Miller, 2004). Five out of the seven species of STs, Olive Ridley (*Lepidochelys olivacea*), Logger head (*Caretta caretta*), Hawksbill (*Eretmochelys imbricate*), Leather back (*Dermochelys coriacea*), and Green turtle (*Chelonia mydas*) regularly visits Sri Lankan beaches for the nesting purpose (Anoja, 2013). Most of the ST nesting beaches in Sri Lanka can be found in the southern, south western and the south eastern coasts and the threats to the STs are very high in these regions. Various human, animal and physical factors are contributing to the threatened status of the sea turtles. However, quite a number of human activities have been recognized as main threats to the STs and their nesting beach in Thalalla.

To whom correspondence should be addressed: shazna.ariff@gmail.com

⁶⁴ Faculty of Graduate Studies, University of Colombo.

Thalalla beach is situated in the Devinuwara DS division – Matara District – Southern Province. It is one of the famous fishery and tourist area with 97% of the population comprising of Buddhist people. It is a low coastal land area with annual rainfall of 1954mm and average temperature of 27.5°C, the area is also under the influence of South-Western Monsoon (Thalalla South GN Division, 2016). The coastal area of Thalalla contains a broader beach area compared to other nearby beaches and other suitable conditions which attract STs towards the area. And the Figure 1 provides the geographic details of the Thalalla beach.

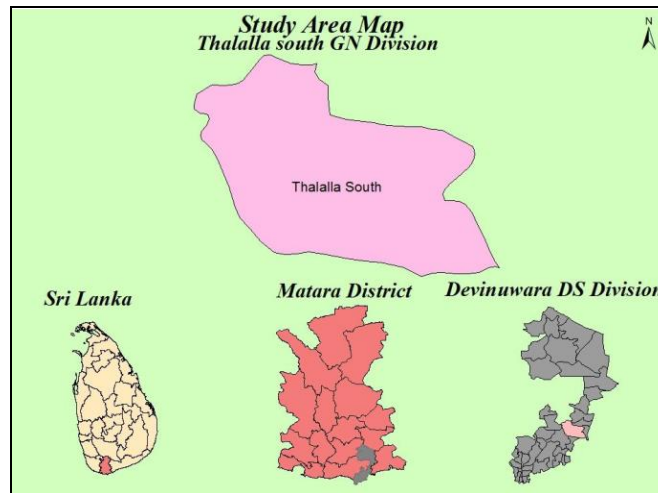


Fig. 1: Geographic Details of the Thalalla Beach

Mainly due to poaching of STs, their hatchlings, collection of eggs and other types of human pressure on beaches, such as development projects (including tourism activities, constructions, and fisheries) has resulted in a drastic reduction of sea turtles resulting in these species being listed as globally threatened. Accordingly, the research area potentially contains all the physical features that are needed to function as a nesting site of STs and many STs visit the Thalalla beach for nesting. However, Thalalla beach has not been identified as an important ST nesting beach and therefore no conservation measures are taken to date to protect the site as an important breeding ground of several globally threatened STs. Due to this, various threats are caused by the local people to the STs, their eggs and hatchlings in the nesting areas at Thalalla beach. Therefore, this study will focus on “Geographical perspective of the ST nesting beaches: the human threats on STs and their nesting habitat in Thalalla beach, Matara”.

The objectives of the present study are to identify Geographical importance of Thalalla beach as ST nesting beach and to documenting the human threats to the STs and their nesting habitat. Mainly what are the features of Thalalla beach which attract more STs than nearby beaches? What are the types of STs which visit the beach? What are the arrival seasons and the time period? Find out the various human threats on STs and their coastal habitat? And it is hoped that the research methods will provide fair and reliable results.

2. Literature Review

Quite a number of evidences revealed that Southern coastal is famous for ST nesting and threats for STs also very high. Conservation measures are under way for more than a decade but the threats are parallel increase with local tourism. STs are marine species that are threatened with extinction due to the human activities. According to the IUCN Red list of threatened species, Kemp's Ridley and hawksbill STs are listed as Critically Endangered species; Green ST is listed as an endangered species; the Leatherback, Olive Ridley and Loggerhead STs are listed as vulnerable species. Further, the Australian Flat Back ST is listed as a data deficient species (Uragoda, 1994; Miller, 2004; IUCN, 2016). The biological characters of STs, their reproduction methods, process of egg laying, possible conditions of sand area for egg laying, threats in the nesting beaches, protection methods of nesting beaches and the lack of protection measures are included in Rahman, 1986, detailed book on STs and this book highly strengthened researcher in different aspects to carry out this particular research.

Most of the literatures used for the particular research are highly focused on human pressures and threats on STs. Accordingly, extensive egg collection and consuming meat, destruction of nesting and foraging grounds of STs by the tourist industry and constructions, incidental by-catch in fisheries and certain activities at turtle hatcheries have been identified as major threats to STs in Sri Lanka (Uragoda, 1994; Dissanayeke, 2010; Kapurusinghe, 2004; Miller, & Spoolman, 2009; Ellepola *et al.*, 2014). And the destruction, degradation, and poor management practices of coastal habitats also leads to loss of ST species and the main threat for the STs is destruction of their coastal habitats (Miller, 2004).

Some literatures focused on threats to particular type of STs. Mainly the population of Leatherback STs has decreased by 95% in the Pacific Ocean. And the main argument is loss of STs is very high in the nesting beaches when compared to the oceans (Miller & Spoolman, 2009). And the Department of Wildlife Conservation of Sri Lanka (2014) has recognized the Leatherback Turtle as one of the 'Top Seven Wild Animals in Sri Lanka'. It also mentioned that a dramatic decline of the Leatherback's population has occurred from 1980 onwards to about 115,000 individuals. The major cause for the decline is the egg predation by humans and other coastal predators. They are also badly affected by plastic bags mistakenly identified as jellyfish and even small quantities of plastic debris can kill sea turtle by obstructing their digestive tracts. The article highly emphasizes human pressure and threats on STs in Sri Lanka and the urgent necessity of conservation of STs and their habitats. Human activities, especially collecting eggs is common practice in the Thalalla beach with other practices such as hunting of STs, fishing and constructions are threats to the entire nesting process of STs. Plastic and polythene waste are a very common site in the Thalalla beach.

Accordingly, it is urgent need to conserve STs and their habitat in Sri Lanka. The main conservation methods identified are 'Bottom up Approach', The Turtle Conservation Project – TCP and 'In-Situ Conservation'. These methods are highly accepted by the environmental managers and conservationists (Kapurusinghe, 2004). And a conservation plan introduced for India and Sri Lanka. In this, the STs are

migratory species therefore, conservationists should have background knowledge regarding their entire way of life including variety, prepared habitats, seasonal migration pattern, nesting areas, reproduction and challenges. It is confirmed by several researches that the STs of Sri Lanka migrate to the coasts of India and Maldives for nesting. Due to this, it is highly important to have a regional conservation plan (Sivakumar, *et al.*, 2010). And another main conservation method identified is STs' hatcheries and the best examples from Sri Lanka are Kosgoda, Bentota and Palatupana STs hatcheries (Uragoda, 1994).

3. Materials and Methods

The survey was conducted between the period of April and December 2016 within the 3KMs distance in Thalalla beach. Field visitation carried out 6 days randomly and spend around 4-5 hours each time. Human activities related to the STs and turtle nesting activities were recorded by direct observation. Besides, questionnaire survey was conducted with 30 local people and officials selected purposively who are highly related with the coastal. And also discussions were made with locals in order to extract more information regarding the issue from the depth of their minds. Six such discussions were conducted each lasting not more than 40 minutes included two males attached to the local tourism, an elderly male, an elderly fisherman, a retired female teacher and the Grama Niladari (male). The figure 2 below shows the detail of the selection of sample for the questionnaire survey conducted for this research.

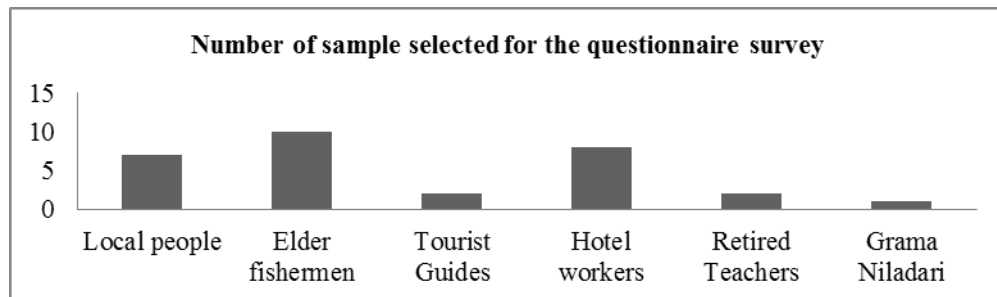


Fig. 2: Number of sample selected for the questionnaire survey

4. Results and Discussions

4.1. Spatial importance of Thalalla beach as ST nesting beach

According to the survey, broad sandy beaches, favorable climatic conditions, suitable vegetation cover and dispersals and texture of sand that makes up the beach are the favorable factors which attract STs toward the beach. The Thalalla beach contains a mixture of features as some sections comprise of broad sandy beaches with little vegetation while other sections contain broad sandy beaches with considerable vegetation cover and it proves the fact that research area can support diverse conditions required by different sea turtles for nesting as preferences for these physical factors may vary according to the types of sea turtle species concerned. For example Hawksbill STs prefers sandy beaches with high vegetation cover while the Olive Ridley prefers sandy beaches with fewer plants or no plants at all (Rahman, 1986). In addition, they also show a preference towards coastal sandy beaches with uniform wind flow as this will ensure that the temperature within the nest will not fluctuate erratically.

Therefore, they favors locations where there is no rocks or other obstructions, Thalalla beach is ideally suited for this purpose.

Normally, STs visit the Thalalla beach throughout the year for nesting. However, a higher number of visits can be observed from December to April while lesser number of ST nests during the period from June to October due to high tidal waves present during this period. During December and April, the sea level is lower than the other periods resulting in exposure of broad sandy beaches. According to the field survey, during the month of December higher number of visits by Leatherback, Green and Olive Ridley to Thalalla beach for nesting was recorded. Normally, STs visit the beach for nesting during night hours, generally between 9.00pm and 6.00am. However the arrival of STs in the area is high from 11.00 pm to 1.00am compared to other time periods. Further, the arrival of ST is comparatively high during the months of December. This is in accordance with the observations made during this study regarding the STs which visit the Thalalla beach for nesting is explained in Figure 3.

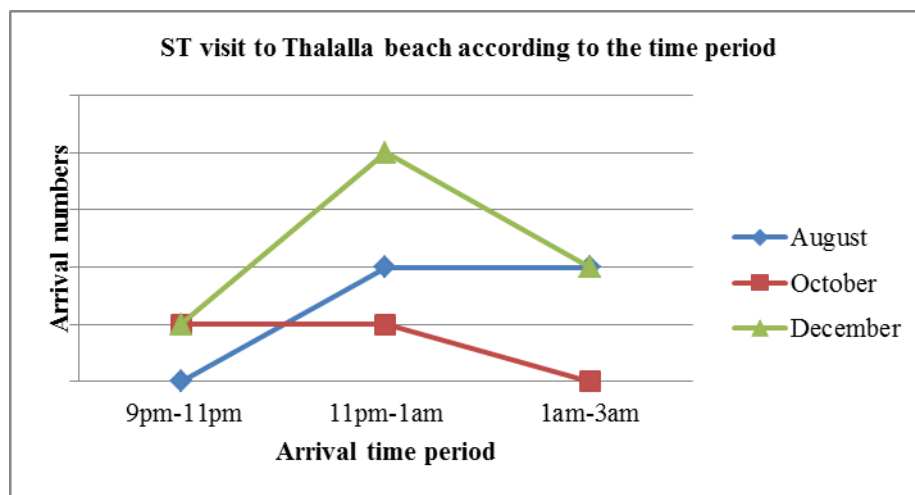


Fig. 3: STs Visit to Thalalla Beach According to the Time Period

And they visit the beach one or two days before the full moon in a month, as the moon light helps the STs to identify a proper nesting site and if there is no moon light even on a full moon day due to presence of thick clouds the STs do not visit the beach. Also normally STs approach the coast with great deal of caution and if it experiences any light or movements when it enters the coast, it hurries back to the sea. Accordingly this has been confirmed through discussions with different people in the RA. In that respect,

I have seen the arrival of the STs to Thalalla beach. Normally they won't arrive directly at once to the beach for nesting. They observe the beach from the shallow sea for about half to an hour and after assuring that there are no any threats to them, they enters the beach (Discussion 1).

Accordingly, Thalalla beach with broad and longer coastal area provides the optimal conditions for the STs for nesting. However, all five varieties of STs do not visit to this coast for nesting. The identified types of STs which arrives at the Thalalla beach includes Olive Ridley, Leatherback, Hawksbill and

Green STs. Out of these Thalalla beach attracts mostly Olive Ridley turtles followed by Hawksbill, Green and Leatherback turtles as explained in Figure 4. Based on these observations it is clear that the Thalalla beach is one of the potentially significant locations for ST nesting in the Southern coastal region.

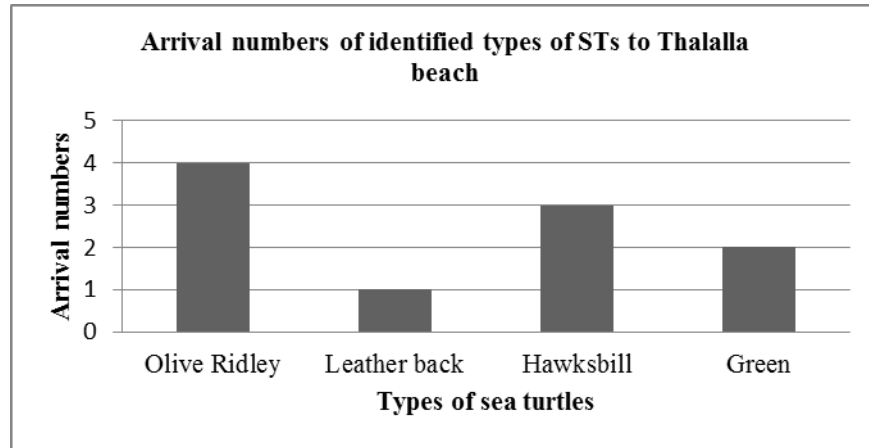


Fig. 4: Arrival Numbers of Identified Types of STs to Thalalla Beach

4.2. Process of ST nesting observed in the Thalalla beach

Generally STs spend most of their life time in the sea. However, they visit various coasts looking for nesting. Once the STs arrive at the coast, they roam on the beach for at least half an hour and select a suitable place for nesting. Normally they select an area which has sand with low level of moisture for nesting. Once the STs select a suitable place, they will clear the area of things which might harm the eggs using their forelegs. Then they dig the pit using their forelegs and rear legs alternately. Later they take out the sand using their legs, widening and deepening the pit using their mouth. Normally the depth of the pit is approximately 32 inches (Richard, 2008). After digging the pit as described earlier, they start to lay eggs. First they keep their rear legs at the edge of the pit and keeping its body parallel to the ground. Then they drag their head into the shell and insert its tail to the pit. And finally they start to lay eggs. The eggs come out in twos or threes at a time. Number of eggs coming out at a time varies according to the variety of ST concerned. But approximately 80-120 eggs can be found in a pit. Laying eggs also varies according to the age and size of the STs. After laying the eggs the STs start to fill the pit with the help of its rear legs with the sand outside the pit. Then it closes the pit by placing its tail and the rear legs. Finally they shape the sand in a way that's difficult to be traced by anyone and goes to the sea by spurring the sand.

Normally it takes 42-77 days for the eggs to hatch and as an average value; it is counted as 54 days. And the growth rate of eggs varies according to the position of pits. Considering sunlight and the shadow areas, the pit which is in the shadow area takes twice the time period to hatch when compared to the pits that are under the sunlight area. Also the hatching of eggs is quicker during the summer season when compared to rainy season. Approximately, it takes 56 days to hatch in summer season and

91 days in the rainy season. The hatchlings, which come out from the pits find their own way to the sea. Mostly this happens during the night hours.

4.3. Human threats to the STs and their nesting habitat

Naturally, STs live in the deep sea and comes ashore only for the purpose of nesting. However, it has been identified that during the entire process of the nesting from the arrival to the beach till returning back to the sea, the STs face numerous challenges and threats. According to the information gathered during this study the identified threats during the nesting stage of the sea turtles are stealing of ST eggs and hatchlings, killing STs intentionally for consumption of food mainly by locals and for making some handicrafts from the ST's shells. Besides, accidentally getting caught in the nets and hooks which laid by fisherman to trap fish. Moreover, tourism activities, coastal pollution and destruction of coastal vegetation cover are also threats to STs and their nesting beach.

Stealing of ST's eggs and hatchling is one of the major threats faced by STs in Thalalla beach. According to the survey, the stolen eggs are used for various purposes, some consumed either raw or cooked or they are being sold at the price of RS. 30.00 to 40.00 and during off season it may go up to RS. 50.00 to 60.00 to gain extra income mainly by the fishermen of the area. This has drastically reduced the number of hatchlings which go back to the sea.

Moreover, specially between December and April killing STs for selling as food mainly for locals is one of the unfavorable situations in Thalalla and big threat to STs. Since the fishery is the main livelihood in the Thalalla area, accidental trapping in fishing nets is another threat faced by sea turtles. Normally STs roam the shallow seas during their egg laying period. During this period they can easily get trapped in fishing nets that can cause injury or death to them. Further, sea turtles are also affected by illegal dynamite fishing that takes place in the area. And a photograph of dead ST washed on to the beach during the data collection is shown in the Figure 5.



Fig. 5: A Dead Sea Turtle Found in Thalalla Beach

According to the survey, a small group of people in the Thalalla area are engaged in making handicraft using ST's shells as their main livelihood. As Hawksbill ST has a unique shell, which is ideal for this purpose and are much sought after by tourists, they are most susceptible for this type of target killing for ornamental use. Normally they make hair clips, combs and sell to nearby tourist huts which are more preferable by tourists.

When considering the expansion of fishery industry and tourism development had a significant influence on arrival number of STs. During recent times the number of tourist hotels in this area has increased considerably. This development results in loud noises, bright lights at night time and the presence of tourists at the beach interferes with the arrival of STs to the beaches for the purpose of nesting. Further, destruction of coastal vegetation for the construction of hotels, pollution from tourism, consumption of STs and the hatchling as sea food by local tourist are other aspects that impact the sea turtles in Thalalla area.

Further, due to the intensive human activities at the beach replaced the area with more waste materials and this may reduce the arrival number of STs towards the beach. STs may also develop digestive problems after consuming the waste matters like polythene, while plastic and glass ware can directly damage STs and their eggs which are in discretely released to the beach by coastal communities. Accordingly, various kinds of pollutants identified in the Thalalla beach are listed in Table 1.

Table 1. Pollutants Identified in the Thalalla Beach

Types of Wastes	Identified at Thalalla Beach
Plastics	plastic bottles, ice-cream cups, parts of plastic bags, plastic containers, sun cream bottle, shampoo bottle
Polythene	shopping bags, lunch sheets, ice-cream packets
Fishery wastes	regiforms, pieces of nets, pieces of ropes
Glass wares	pieces of glasses, heroine bottles
Rubber wastes	pieces of sleepers, rubber sheets, fertilizer acing

Beside this lack of conservation actions in the area are also leads to unfavorable situation for the STs. As Thalalla beach is not considered as a protected beach, at present there is no conservation work being done compared to many turtle nesting beaches in the southwestern part of Sri Lanka such as Kosgoda, Rekawa etc., Therefore, various human activities that are detrimental to turtle nesting takes place without any regulation. This was also confirmed by the Grama Niladhari responsible for the area.

5. Conclusion

Thalalla Beach potentially contains all the physical features that are needed to function as a nesting site of STs and many STs visit the Thalalla beach for nesting. Though, Thalalla beach has not been

identified as an important ST nesting beach and therefore no conservation measures are taken to date to protect the site as an important breeding ground of several globally threatened STs. Therefore, this survey focused on “Geographical importance of the ST nesting beaches: the human threats on STs and their nesting habitat in Thalalla beach, Matara. During the month of December higher number of visits by Leatherback, Green and Olive Ridley to Thalalla beach for nesting was recorded. They visit between 11.00 pm and 1.00am compared to other time periods. Thalalla beach consists various threats are caused by the local people to the STs, their eggs and hatchlings in the nesting areas at Thalalla beach. Main threats for STs in the Thalalla are identified as stealing of eggs. Stolen eggs are used for various purposes. Killing STs for selling as food mainly for locals is one of the unfavorable situations in Thalalla and big threat to STs. Since the fishery is the main livelihood in the Thalalla area, accidental trapping in fishing nets is another threat faced by sea turtles. Moreover, a small group of people in the Thalalla area are engaged in making handicraft using ST’s shells as their main livelihood. As Hawksbill ST has a unique shell, which is ideal for this purpose and are much sought after by tourists, they are most susceptible for this type of target killing for ornamental use. Normally they make hair clips, combs and sell to nearby tourist huts which are more preferable by tourists. Besides, due to the intensive human activities at the beach replaced the area with more waste materials highly disturbing the arrivals of STs. STs may also develop digestive problems after consuming the waste matters like polythene, while plastic and glass ware can directly damage STs and their eggs which are in discretely released to the beach by coastal communities. However, Thalalla beach should be consider as one of the main STs’ nesting beach and adapt proper management measures to conserve entire ecosystem from threats.

Acknowledgement

I wish to acknowledge the contributions made by Prof. Devaka Weerakoon for his contribution as the supervisor. Also my thanks to the Grama Niladari of Thalalla GN Division, Mr. Manchu, Mr. Vazeerdeen, Mr. Maya, Mr Mohamed and Mrs. Husainiya for their participation in the field work.

References

1. Anoja, L. (2013). Coastal and Marine wildlife of Sri Lanka, *Magazine of Wildlife*, Sri Lanka: Department of Wildlife Conservation. 09(1), 98-103.
2. IUCN (2016). The IUCN Red List of Threatened Species. 2016(3). Retrieved from: <http://www.iucnredlist.org>
3. Miller, G.T. (2004). *Environmental Science*, UK: Thomson Learning.
4. Rahman, A. (1986). *Kadal vaal aamaihalin viyaththahu vaalkai*, palhalai kalaha maruthonri achchaham, Tanjavor (in Tamil)
5. Uragoda, C.G. (1994). *Wildlife Conservation in Sri Lanka*, Sri Lanka: A Centenary Publication.
6. Dissanayake, S.R.B. (2010). New Technics for Sea Turtles Conservation in Sri Lanka, *Magazine of Wildlife*, Sri Lanka: Department of Wildlife Conservation. 10(6), 16-21.

7. Miller, G.T. & Spoolmen, S. (2009). *Living In the Environment*, UK: Brooks/Cole Cengage Learning.
8. Ellepola,G, Harischandra.S, Dhanushka.M.G.G. (2014). In-Situ sea turtle nest protection program in Pannama-Okanda coastal stretch in the east coast of Sri Lanka: A successful conservation activity with community participation, *Journal of the Department of Wildlife Conservation*, Sri Lanka. Retrieved from:
<http://tcdc2.undp.org/GSSDAcademy/SIE/Docs/Vol14/24SRI%20LANKA.pdf>.
9. Sivakumar,k., Choudhury,B.C., & Dissanayeke, S.R.B. (2010). Joint Turtle Conservation programme of Sri Lanka and India: Sea Turtles of Sri Lanka, also Breeds in India and Maldives, *Magazine of Wildlife*, Sri Lanka: Department of Wildlife Conservation. 10(6), 112-121.
10. Kapurusinghe,T. (2004). Muhudu kesbe sangrakshana sidukalayuththe keseda?, *journal of sathsamudura*, 54-57 (in Sinhala).
11. Kapurusinghe,T. (2002) Present status of marine turtles in Sri Lanka, *The national symposium of Sea Turtle biology, conservation and management*, Sri Lanka. Retrieved from:
<http://seaturtlesofindia.org/wp-content/uploads/2015/07/TCP-2002.-Abstracts-presented-at-the-National-Symposium-on-Sea-Turtle-Biology-Conservation-Management-Sri-Lanka.pdf>.
12. Richard, B. (2008). *Ocean (Revealing the Secrets of the Deep)*, UK: Parragoni,
13. DWC (2014). The Top Seven Wild Sri Lanka, *Magazine of Wildlife*, Sri Lanka: Department of Wildlife Conservation. 10(1), 22.