

Traditional Ecological Knowledge of Tamilnadu (India) Fishermen

Ramasamy Santhanam

Fisheries College and Research Institute

Tamilnadu Veterinary and Animal Sciences University

Thoothukudi 628 008, India

Introduction

Traditional Ecological Knowledge (TEK) is defined as “the knowledge base on plants, animals, climate change, etc. possessed by both indigenous and local people over many hundreds of years through their direct contact with the environment. “Traditional ecological knowledge” is a cumulative body of knowledge and beliefs, handed down through generations by cultural transmission, about the relationship of living beings (including human beings) with one another and with their environment.

Comparison of TEK and Western Science

	Traditional Ecological Knowledge	Western science
1.	Holistic	Part to whole
2.	Includes physical and metaphysical well being linked to moral code	Limited to evidence and explanation within the physical world
3.	Emphasis on practical application of skill and knowledge	Emphasis on understanding how
4.	Trust for inherited wisdom	Skepticism
5.	Respect for all things	Tools expand scale of direct and indirect observation and measurement
6.	Practical experimentation	Hypothesis falsification
7.	Qualitative oral record	Quantitative written record
8.	Local verification	Global verification
9.	Communication of metaphor and story connected to life, values, and proper behaviour	Communication of procedure, evidence and theory
10.	Integrated and applied to daily living and traditional subsistence practices	Discipline – based

Salient characteristics of TEK

1. TEK is mainly qualitative
2. TEK is intuitive
3. TEK is holistic
4. TEK is moral
5. TEK is spiritual

6. TEK is based upon empirical observations and accumulation of facts by trial and error
7. TEK is based upon data gathered over a long period of time in the same area
8. TEK is sentimental

Present status of TEK.

The quantum of TEK in India is vast and its development is due mainly to the wide diversity of people, cultures, landscapes, ecozones and ecoregions. TEK is generally undocumented and is unfortunately being discarded in favour of more progressive modern science.

Uses of TEK

Baseline ecological information is a complete data set of the local environment ecology and is essential for the maintenance of an environmental monitoring program.

TEK of fishermen on climate change

Forecasting rains

Our fishermen have their own way of predicting and forecasting rains. First of all they are aware of months of rains in an year. They predict and foretell rains based on mainly movement of clouds, colour of clouds direction and intensity of winds. This forecasting of rains help them to plan their fishing operations, time of fishing accessibility to fishing grounds, etc.

The fishermen also predict rains by the following:

- i) Mass and sudden appearance of dragon flies
- ii) Movement of tortoise of ponds towards land area
- iii) Holding marriage for two asses
- iv) Sudden movement of ants with eggs from one place to other
- v) Singing of “Amithavarshini” raga by musicians
- vi) Dancing of male Pea cock using its beautiful feathers
- vii) Low yield from tamarind trees in a year will bring copious rains
- viii) Mating of cobra is known to bring rains
- ix) Croacking of frogs will bring rain
- x) Lightning at northeast will bring rains

xi) If lighting appears in east and west alternately, rain may come

TEK of fishermen on earthquakes

Appearance of earthquakes would be invariably associated with continuous howling of dogs.

Winds at sea

The fishermen while at sea for fishing, observe a calm area of about ½ sq. km which according to them appears at the junction of two winds flowing from different directions. In this calm area, insects like Dragon fly and Thumbi appear and dust also is very common in this area. This climate change is significant and is a regular feature at sea.

Prediction of favourable winds

In the absence of winds, vessels with sails normally run in the sea with current directions. At that time, ripples are seen as a mount by fishermen at far off places. The fishermen making use of this feature, predict winds and navigate the vessels. The fishermen starts whistling when intensity of winds would also increase as they predicted earlier. This knowledge of predicting winds helps the fishermen to safely sail the vessel and return the sea at a shorter time after their fishing.

Knowledge on tides

Mass movement of intertidal crabs towards land area is invariably associated with raising of water column i.e. tides when fishermen plan for suitable fishing operations.

Currents in sea

The fishermen identify current patterns in their own way as Neevads and attempt suitable fishing methods.

1. Karaikedutha Neevadu or Vaneevadu

This type of current pattern appears during December to February when the current flows from North and towards the shore. The clouds move from north to south or west. During this season, the sea is very calm when the fishermen attempt chank fishing as according to them the fish catch would be poor during this season.

2. Velankedutha Neevadu

During this season, the current flows from North but towards deeper inshore waters. The clouds move from North to East. As the sea is not calm during this season, the fishermen go for finfish fishing and not for chank fishing.

3. Soneevadu

During this season the sea will be rough, and the currents flow from south east to north east. Further, as the sea water is not clear, the fishermen know that there will be good fish catch in this season.

4. Pattu neevadu

The fishermen identify this season with no currents.

The fishermen are also capable of identifying the current directions by seeing the anchored vessel and its oscillations.

Knowledge on other environmental issues

- i) If a person has hurdles for his marriage, he should conduct marriage between Neem tree and peepul tree. By conducting so, the obstacles would be removed and the marriage will be settled for the affected person. Though it is a superstitious belief, at times it has proved to be beneficial for some people.
- ii) Growing tamarind tree and drumstick tree in front of the house will bring problems to the house owners. Hence, the fishermen normally do not grow this tree in front of their houses.
- iii) Fishermen ladies believe that their husbands will not have any problems for their life at sea, if marriage is conducted for plantain trees.
- iv) The fishermen believe that peacock should not be grown in the house as a pet animal. According to hem such practice will bring problems to their family.

Fishermen's TEK on Ecological changes and their impact on fisheries

The fishermen could identify the presence of fish shoals or fish schools through certain ecological changes in the sea. They are listed below:

- i) Congregation of birds in the sky
- ii) Formation of ripples
- iii) Sudden and rapid movement of fish
- iv) Black colour of sea

v) Unpleasant smell

The fishermen used to get good fish catch even one of the above parameters is observed in the sea

The fishermen of Tamilnadu (India) by virtue of their age and experience are able to identify the different wind patterns. Chiefly, four types of winds have been known to our fishermen. They are “Vadai Katru” – which blows during December – February; “Katchan Katru” during August – September ; Mel Katru – during September – October and “Kondal Katru” during October to November. Associated with these winds the fishermen are confident to catch specific fish species. During Vadai Katru season, fishes like trenched sardines, flying fish, tuna leognathids and seer fish are mainly caught by our fishermen. During Katchan Katru season, shrimps are caught. During Mel Katru season lesser sardines are mainly caught and during Kondal Katru season, engraulids are mainly caught.

Our fishermen have also classified an year into two main seasons namely Kodai season and Vadai season, and the duration of each of these seasons is six months. According to our local fishermen the Vadai season extends from September to February, when fishes like sardines, trenched sardines, seer fish, flying fish, tuna and carangids are abundant. The Kodai season which is with fairly high temperature compared to Vadai season; fishes like carangids, lethrinids, squids, cuttle fishes and sharks are mainly caught. The fishermen of Tamilnadu do not normally wear watches to find their timings while in sea. They make use of the number of stars and their size and location to navigate their fishing vessels during night hours; to operate fishing nets and reach the shore after the fishing operations are over.

Fishermen’s in TEK on fisheries resources

Endangered Species

The fishermen by virtue of their age and experience are able to recognize the endangered species of Gulf of Mannar, the first Marine Biosphere Reserve of Southeast Asia formed in 1989. This Gulf of Mannar is also known for the richest marine biodiversity and in India the first Marine National Park was formed in this area. Due to the rich biodiversity, this Gulf of Mannar area is also known as Biologist Paradise. The endangered species recognized by the fishermen are the following:

List of endangered species

- ◆ Pearl oyster (*Pinctada fucata*)
- ◆ Turtles
 - ◆ *Chelonia mydas* (Green turtle)
 - ◆ *Caretta caretta* (Logger head turtle)
 - ◆ *Lepidochelys olivacea* (Olive Ridley turtle)
 - ◆ *Eretmochelys imbricata* (Hawksbill turtle)
 - ◆ *Dermochelys coriacea* (Leather back turtle)
- ◆ Whale shark (*Rhincodon typus*)
- ◆ Sea cow (Dugong, *Dugong dugon*)

For each of the above species fishermen apply suitable fishing methods considering their food and feeding habits, breeding groups and potential fishing grounds of their abundance. For example, fishermen used to go for pearl oyster fishing during summer months when the sea water was clear without agitation but with fairly higher temperatures.

Similarly, they know the potential fishing grounds for various species of turtles are they know that the turtles and abundant only in areas of rich seaweeds. Similarly the seacow according to them is present only in areas of seagrass abundance.

Fishermen's TEK on the restoration of turtle populations

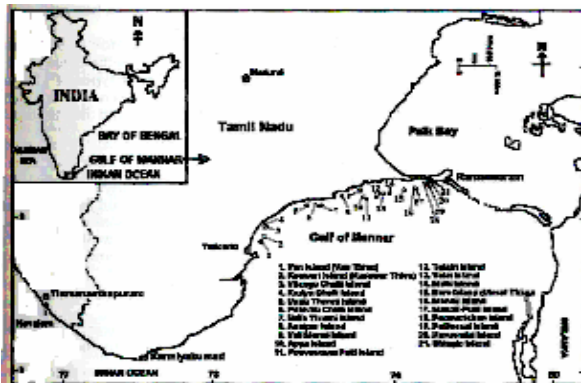
- ◆ No. capture of smaller sized turtles
- ◆ No dynamite fishing
- ◆ No capture of gravid animals
- ◆ No use of smaller sized mesh nets/traps
- ◆ No catch of eggs/juveniles
- ◆ Release of caught turtles
- ◆ Use of TEDS

Fishermen's TEK on Threatened Animals

The fishermen of Tamilnadu have also recognized 76 species of threatened animals of Gulf of Mannar as follows:

Threatened animals of GoM

- ◆ Sea horse
- ◆ Corals
- ◆ Gorgonians
- ◆ Spiny lobster
- ◆ Sacred chank
- ◆ Sea cucumber
- ◆ Baleen whale
- ◆ Toothed whale
- ◆ Dolphin(Common dolphin , Spinner dolphin,
Bottle nose Dolphin)



Map Showing Gulf of Mannar

Fishermen's TEK on the uses of corals

- ◆ Natural underwater barriers
- ◆ Feeding/breeding/nursery grounds
- ◆ Shelter for ornamental fish
- ◆ Live ornamental fish for export
- ◆ Sea fans ornamental purposes and for export.
- ◆ Sea cucumbers – Beche- de- Mer

Fishermen's TEK on causes for declining corals

- ◆ Over fishing - Fish with long life spawn
affected
- ◆ Illegal exploitation using dynamite and crowbars

- ◆ Effluents from industries
- ◆ Dredging – sedimentation
- ◆ Silt/mud from T. river
- ◆ Untreated sewage discharge
- ◆ Bleaching of corals associated with global warming

Fishermen’s TEK on restoration of coral reefs

- ◆ Artificial reef formation
- ◆ Domestic pollution – check
- ◆ Creating awareness for local community
- ◆ Alternate jobs for coral miners
- ◆ No extensive trawling in coral reef areas
- ◆ No use of corals in housing

Suggestions for safe guarding and popularising Fishermen’s TEK

In order to utilize and safeguard of TEK of fishermen, the following suggestions are offered. The historical interactions between scientists and fishermen revealed the need to improve communication and collaboration between these two groups. The researchers recommend creating monthly talking circles; training seminars for fishermen on scientific and conservation issues; continued mapping of traditional ecological knowledge of fishermen; expanding fisherman participation in sea sampling programs; participation of scientists in community forums; and regular discussion between scientists and the Social Sciences Advisory Committee regarding the needs of Fishery Dependent Communities.