- The estimation of growth and mortality parameters of the population in Meghna River, Bangladesh was carried out by Miah *et al*., 1997 to assess the productivity potential of Hilsa fisheries. The assessment of population dynamics of *Tenualosailisha* in different landing centers of Bangladesh was done (Rahman *et al*., 2000) showing results for mortality rate, exploitation rate and relative biomass per catch.Narejo (2008) studied the feeding habits of *Tenualosailisha* from upstream zone of River Indus describing the results as with the increase of mouth gape changes the feeding habits at different zones. Karna *et al*., (2014) looked upon the food and feeding habits of Hilsa in Chilka lagoon, Orissa and found that Hilsa is a bottom feeder and mostly prefers copepods. The food and feeding ecology of Hilsa is a very important factor as the behavior is anadromous shifting from marine to freshwater fisheries. Hasan *et al*., 2016 studied the same factors in Meghna River basin and provided an in-depth understandingof the food and feeding biology of Hilsa at different age groups, with insights into selective feeding on different plankton using the electivity index.
- Baz, 2001 studied the biology of *Tenualosailisha* and also the fisheries which showed that loss of habitat and adjustment of water flow would affect the fisheries. The population dynamics of male and female hilsa, *Tenualosailisha* of Bangladesh was studied by Haldar and Amin (2005) to find the maximum sustainable yield (MSY) and the corresponding fishing mortality. The estimation of size frequency, distribution, sex ratio and

other related parameters of understanding the population dynamics of Hilsa by Amin *et al*., 2005 in Bangladesh revealed stock difference in terms of sex, maturity is very much important during the monsoon seasons mainly owing to the amount and type of food present in the waters. Continuing the work in Meghna River, Bangladesh for estimation of age, growth and mortality of Hilsa shad, *Tenualosailisha* by Ahmed *et al*., 2008, they concluded that the age description of Hilsa using otoliths would be an added arsenal in dealing with the over exploitation. In 2012, Mohamed *et al*., worked upon the variations of occurrence, abundance during the migratory/non-migratory period and also looked upon the variation in diet of Hilsa.

- Amin *et al*., 2002 worked upon the length weight relationship and also assessed the stock in landing stations of Goalundo, Chandpur, Khulna, Barisal and Chittagong, Bangladesh and revealed high stock productivity. The reproductive pattern of *Hilsailisha*with respect to the spawning season and length weight frequency was studied by Panhwar*et al*., 2010 supporting the concept of geographical and temporal variation.
- Lal *et al*., 2004 worked upon the genetic variation in Hilsa shad (*Tenualosailisha*) population in River Ganges without finding much difference within the population found in River Ganga and associated rivers though the polymorphic markers and data found during the study can be used as baseline information for monitoring the impact of ranching on genetic variability in populations. Technique like Random Amplified

Polymorphic DNA (RAPD) have been used to distinguish the populations of *Hilsailisha*of different locations on the Yamuna River at Allahabad, Ganga River at Beniagram and Lalgola River (which are downstream from Farakka barrage) at Feeder Canal, Farakka (which joins the Bhagirathi River), at Nawabganj on the Hooghly River and at Bhadbhut on the Narmada River by Brahmane *et al*., 2006 and the results indicating the presence of separate stocks or races of Hilsa that may be due to the river ecology, spawning grounds, nursery grounds of the juveniles, seasonal migration, and homing behavior of anadromous clupeids. The exploration of variability of genetic differences was studied by Mazumder and Alam, 2009 in Hilsa shad by PCR-RFLP analysis of the mtDNA with findings of low level of genetic variation coming from riverine, marine and brackish water sources. Narejo*et al*., 2008 worked on the morphometric and meristic differences between two types of Hilsa in the waters of Indus River, Pakistan which confirmed the presence of two separate species in the waters with different variable characters.

- Rahman and Cowx, 2008 studied the population dynamics of *Tenualosa ilisha* in Bangladesh waters for management of fisheries in a planned socio-economic condition for the fishing communities. Milton (2010) assessed the status of hilsa (*Tenualosa ilisha*) management in the Bay of Bengal for population risk and data gaps for more effective regional management of Hilsa fisheries. The assessment of stock population with the male female ratio was done in Iran (Roomiani *et al*., 2011) to find out

possible stock depletion or any biological or ecological reasons for cause of less catch. Bhaumik *et al*., 2011 worked on the size distribution, length weight relationship and sex ratio in Hoogly estuarine system for the commercial catch and analyzing the results showed that the chance of capturing females was more than that of male in sexually matured hilsa population. The population dynamics of Hilsa was studied during their migratory period by Panhwar and Liu, 2012 and the results showed only 10% of the previous fishery is remaining indicating that there is a serious problem of overfishing and that stringent regulations need to be installed. Further in 2012, Sachinandan Dutta and SugataHazra studied the population structure, mortality rate and exploitation rate of Hilsa Shad (*Tenualosailisha*) in West Bengal Coast of Northern Bay of Bengal, India after which it was discovered that the fish sizes were very much different than the ones found in Bangladesh. The statistical analysis of Hilsa population stock in Sindh, Pakistan (Panhwar and Liu, 2013) with parameters of growth, mortalities, recruitment pattern, exploitation and maximum sustainable yield were discussed. In Iraqi marine waters of northwest Arabian Gulf, Mohamed and Qasim (2013) studied the stock assessment and management of Hilsa shad (*Tenualosailisha*) which clearly indicated that Hilsa fisheries is being exploited in Iraqi waters and a urgent need to conserve the same using required government rules and regulations. Rajyalaksmi (1973) worked upon the population characteristics of Hilsa fisheries from 1963-67 in River Godavary

depicting reasons for decreasing the trend of over exploitation by prohibiting the catching of juveniles in early evening period and fishing in one mile spawning zone by the fishing industry. Flura *et al*., 2015 studied and worked upon the length-weight relationship and GSI of Hilsa, *Tenualosailisha* (Hamilton, 1822) fishes in Meghna River, Bangladesh and the results showed usual dominance of females over males as it is observed that males and females move in different shoals. In Hooghly estuary, West Bengal studies on length-weight relationship and relative condition factor on Hilsa fisheries was done by Sarkar *et al.,* (2017) which showed good conditions of fishery status at this region but lack of conservation and management practices would surely harm the catch in near future. Mohanty and Nayak (2017) studied the population dynamics using length-weight relationships and condition factor at Chilka Lake, Orissa and found that isometric growth has been followed by Hilsa though because of over exploitation and unplanned fishing the catches are decreasing.

- Shamim *et al*., 2011 worked upon the proximate composition of different portion of body of *Tenualosa ilisha* from two regions of Bay of Bengal, Bangladesh to assess the variation of fish flesh varies as per sex, season and feeding habit of fish. The changes in the nutritional profile of Godavari shad, *Tenualosailisha*(Hamilton, 1822) during its anadromous migration from Bay of Bengal to the River Godavari was studied by Madhusudan Rao *et al*., 2012 which showed high nutritive content and

high polyunsaturated fatty acids (PUFA) in hilsa of Godavari River. The nutritive value of Hilsa is very much higher than any other species found in Indian subcontinent which was worked upon by NowsadAlam and ShakuntalaThilshed (2012) depicting the nutrition and utilization of Hilsa. Polyunsaturated fatty acids (PUFAs) is one of the important components of fishes so looking onto the fatty acid profile of Hilsa with its significance and health benefits, Mohanty*et al*., 2012 found that medium sized Hilsa were very much richer in content for PUFAs.

- Considering the high fisheries exploitation Hilsa, Bala*et. al*.,2014 have worked upon modifying the policies and remodeling some of the programs so as to lessen the over exploitation of spawns and juveniles of Hilsa. In 2013, Bhaumik*et al*., studied the distribution pattern of *Tenualosailisha* in Tapi estuary, Gujarat which revealed that the developmental programs like construction of hydropower projects along the course of the river has severely affected the migration of Hilsa in Tapi River. In the Hooghly–Bhagirathi stretch of the Ganga River system, Bhaumik (2017) worked on sustaining the fisheries of Hilsa in the country by responsible fishing practices and stricter fish catch regulations and laws. The present status for decreasing the overexploitation and under catch of Hilsa fisheries in North Bay of Bengal, India by Das *et al*., 2019 working in the population dynamics revealed that at that place the Hilsa fishing is truly exploiting the populations and strict regulatory laws are required at a short period to curb down this exploitation.

- In Bangladesh, work was carried out to discover the spawning grounds (Shahadat*et. al,* 2014) results showing the presence of marine–brackish–freshwater ecosystems with favorable ecological parameters and rainfall patterns support Hilsa fishery in the coastal waters of Bangladesh. The anadromous behavior of Hilsa is one of the unique characteristic among the fishes. The study of the changing spawning pattern and production zone of Hilsa fishery in the Bay of Bengal due to various anthropogenic activities, climate change effect, increased siltation and rising of the river basins, the migratory routes as well as spawning grounds has been worked upon by Miah, 2015.
- Hossain *et al*., 2016 studied the habitats across the different life cycles of *Tenualosailisha* in the waters of Bangladesh for a cycle which will in general utilize various kinds of natural surroundings for generating, nourishing, nursery, development, movement or finally providing safe house. Thusly, a system of associated dual living spaces is fundamental for the feasibility of populations of migratory fishes.