

## Ecosystem service of coastal sand dune, the change of sake brewery environment with social situation

\*Kaneko Korehisa<sup>1</sup>

### 1.Hokuso Creature Association

Coastal sand dune is buffer zone between sea and land, fresh water layer is in the underground 10m before and after. Water of fresh water layer has used as domestic water of agricultural water and drinking water etc, and the function of coastal area plays a roll as ecosystem service (Kaneko et al. 2012, Kaneko et al. 2013). Chiba Prefecture, Japan, is bordered on three sides by the sea, and coastal sand dunes are distributed in a band shape. Although sake brewing recorded on the coast along Tokyo Bay in 1925, today, in several areas, sake breweries have completely disappeared. Although we considered that these breweries have received the benefits of ecosystem services of the coastal dune. There are no validation examples about these ecosystem services.

This research aims to clarify from landscape viewpoints and the potential environment (e.g., landscape, soil, deep degree and water quality of groundwater) whether ecosystem service of coastal sand dune was used by grasping the sake breweries environment of the period which was brewed in disappeared region and these disappeared factors. The records of sake breweries quoted.

Regarding the environment of the sake breweries that operated in the coastal area along Tokyo Bay in 1925, the breweries were often located within an altitude of 10 m and a distance of 1.0 km from the sea. The geographical features consisted of sand, sandbanks, natural levees. The surface geology consisted of sand-rich sediments, including sand 1(i.e., exceedingly soft). In the water environment, the depth of the groundwater was 3-10 m, and the hardness was middle hard water, hard water and strong hard water. I speculate that these sake breweries benefited from using the natural ingredients that formed in the coastal zone. I believe that sake brewing in these areas benefited from the proximity of the coast (i.e., ecosystem service).

Moreover, I clarified the following factors as for the extinction factors, Bankruptcies and reconstruction difficulties that followed the destructive 1923 Great Kanto Earthquake, Industrial adjustment in wartime during World War 2 (1939-1945), The changed availability of luxury goods (e.g., beer, wine, whiskey), Coastal industry development.

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