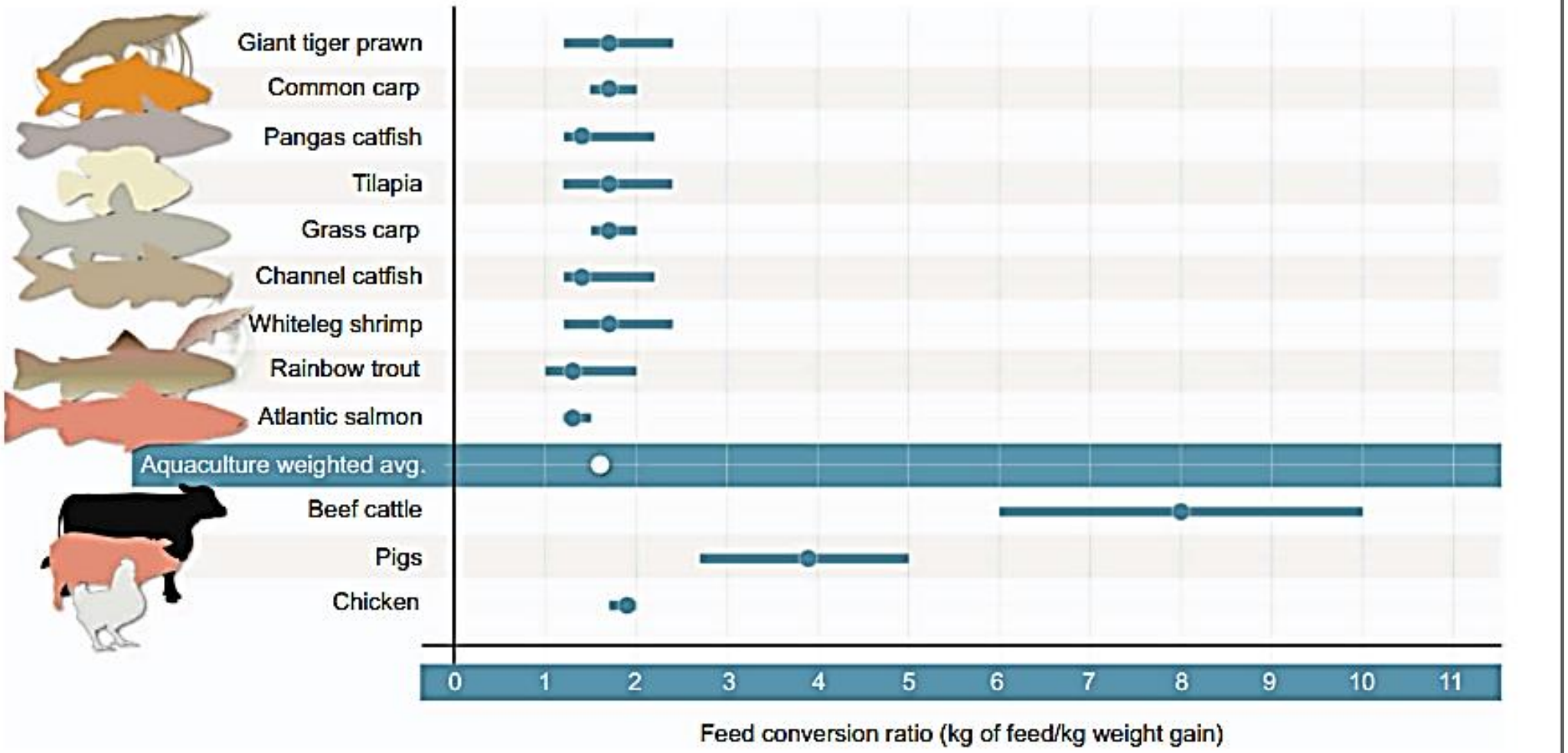
# Aquaculture

Dr. Mujtaba A.Tahir

# Why Aquaculture?

## Is a resource efficient means of food production




**Feed conversion ratios for selected aquatic and terrestrial farmed animal species. Dots represent means and bars indicate range. Lower values signify higher efficiency. Sources: Tacon and Metian (2008) , Smil (2013) , Shike (2013) , Zuidhof et al (2014) , and Rabobank Research (2015).**

# Temperature Changes in Small Water Bodies

- In artificial ponds where the depth is usually of 1 – 2 metres there will be only a minor difference between the surface and bottom water.
- The surface water temperature can be much higher in hot summer afternoons and it is likely that fishes congregating in the cooler and deeper portions of the pond survive such a critical condition.
- In certain tropical areas, the upper limit reaching near 40°C and the lower near 20°C in the same day.
- In such a condition it is questioned if fish mortality is due low temperature or to the highest temperature of the day
- quite often fish mortality is not due to a single factor such as temperature, but a combination of factors e.g. temperature x low oxygen x metabolite load x salinity.

# Temperature Relations of Large Bodies of Water

- most of the radiant energy of light is absorbed as heat by the surface and upper layers of water in the fish ponds, (because of the high concentration of dissolved organic and particulate matter on the top layer of water)
- lower water layer becomes cooler.
- This at times is quite beneficial, for during the hottest part of the day the fish can move down safely to the lower layers.
- Mixing of the layers would however take place due to wind action.
- Since water heated by sun remains in the epilimnion itself (mixing due to wind action restricted to the upper zone itself) there is a sharp difference in the physico-chemical and biological characteristics of epilimnion and hypolimnion.