

Title of PhD project / theme	<b>Impact of Climate change on fisheries/aquaculture: fish as nutritional resource for human health in Asia.</b>
Supervisory team	LSHTM: Alan Dangour Nagasaki: Atsushi Hagiwara
Brief description of project / theme	<p>Foods from aquatic environment provides important nutrition for human health. This includes high value proteins, long chain omega 3 fatty acids, vitamins and minerals. However, their supply is much in short of the demand of world population. Increase of total world fish production (incl. invertebrates and seaweeds) can be achieved by drastic increase of aquaculture production, even though capture fisheries has been in decline but they are vulnerable to climate changes. Since 71% of earth's surface area is water-covered, it has many things to be done for planetary health.</p> <p>This project will focus on sustainability, nutritional security and climate change involved in fisheries / aquaculture, and their impact on human health in Asian population.</p> <p>This will be the start of a collaboration between Nagasaki University Graduate School of Fisheries and Environmental Sciences and Centre on Climate Change &amp; Planetary Health, LSHTM focused on climate change, nutrition and human health. Prospective students are expected to facilitate this new collaboration by exploiting expertise and information of both units to investigate the impact of climate changes on food production, especially fish and nutrition in Asia and to propose a new solution. A novel idea and approach by prospective students will be welcomed.</p> <p>To learn more about the Centre, please visit <a href="https://www.lshtm.ac.uk/research/centres/centre-climate-change-and-planetary-health">https://www.lshtm.ac.uk/research/centres/centre-climate-change-and-planetary-health</a>. Some examples of novel technology development, invention, and socio-economical approach by Nagasaki University are: Climate-smart fisheries/aquaculture, Food security: comparison between developed and developing countries, Role and function of food fish in a society with aged population and low birth: Japan as a model, Low cost marine fish aquaculture (such as the use of ocean renewable energy, low cost</p>

	<p>fishmeal or substitute, low cost live food production for initial feeding etc.), Sustainable fishing villages</p> <p>Some recent related research from NU:</p> <p>Ogello et al. (2018) Composting fishwastes as low-cost and stable diet for culturing <i>Brachionus rotundiformis</i> Tschugunoff (Rotifera): Influence on water quality and microbiota. <i>Aquaculture</i> 486, pp. 232-239.</p> <p>Fuiri et al. (2018) Research and development strategy for fisheries technology innovation for sustainable fishery resource management in North-East Asia. <i>Sustainability</i> 10(1), 59; doi:10.3390/su10010059</p> <p>Lee et al. (2019) Genome-wide characterization and expression of the elongation of very long chain fatty acid (ELOVL) genes and fatty acid profiles in the alga (<i>Tetraselmis suecica</i>) fed marine rotifer <i>Brachionus koreanus</i>. <i>Comp. Biochem. Physiol., Part D</i> 30:179-185.</p>
The role of LSHTM and NU in this collaborative project	The student will be based in Nagasaki to collect data and investigate the impact of climate changes on fish production and their health impacts, also will spend periods of time at LSHTM for further data analysis.
Particular <i>prior</i> educational requirements for a student undertaking this project	<ul style="list-style-type: none"> <li>- master or its equivalent degree in relevant subjects (environmental sciences, fisheries, nutrition, epidemiology, population health etc.)</li> <li>- passion for innovation and fieldwork</li> </ul>
Skills we expect a student to develop/acquire whilst pursuing this project	<ul style="list-style-type: none"> <li>- Data handling, statistics and modelling</li> <li>- Understanding of social and environmental factors on industry</li> <li>- Interventions and political approach</li> <li>- Food security</li> </ul>