The role of Social Network Analysis (SNA) as an evaluation tool in complex One Health partnership networks

Vink D[1*], Haesler B[1], Peyre M[2], Tomley F[1], Apgar M[3], Fournié G[1]

[1] Royal Veterinary College, London, United Kingdom
[2] CIRAD (French Agricultural Research Centre for International Development), Montpellier, France
[3] Institute of Development Studies, Brighton, United Kingdom
* dvink@rvc.ac.uk

ONE HEALTH POULTRY HUB

The One Health Poultry Hub

The UKRI GCRF One Health Poultry Hub ("the Hub") is a partnership network of approximately 120 researchers from 27 institutions in 10 countries. It addresses complex issues of poultry intensification and public health, with a geographic focus on **Bangladesh**, **India**, **Sri Lanka** and **Vietnam**.

One stated impact pathway to tackle such issues is to **strengthen research capacity and capability** on poultry intensification and public health. Increased interdisciplinary learning, collaboration and knowledge exchange between researchers and participants are core requirements on the pathway to achieving this aim.
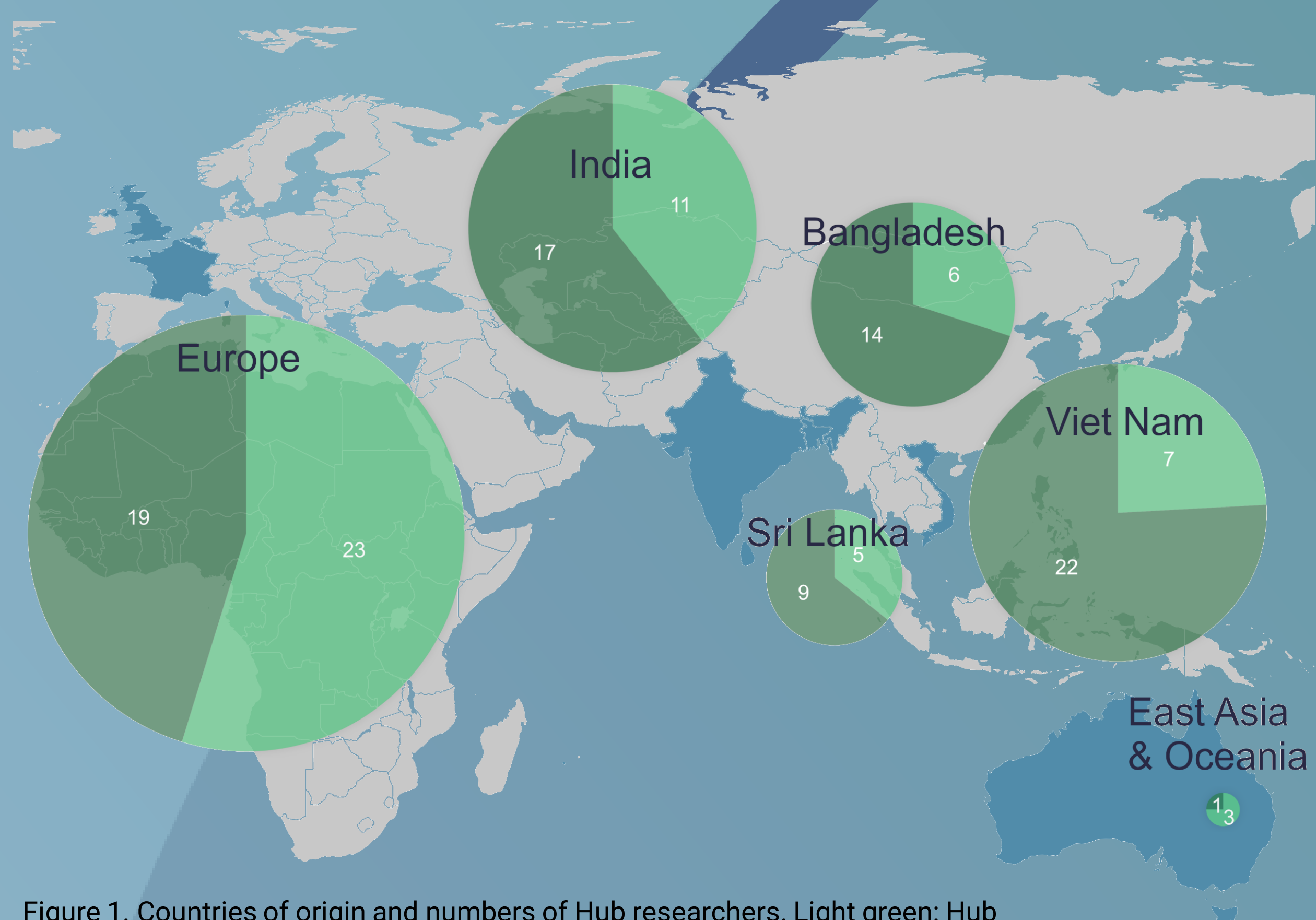

Figure 1. Countries of origin and numbers of Hub researchers. Light green: Hub investigators; dark green: contract researchers.

Objectives

We are investigating structural dimensions of collaborations between Hub participants, as well as dynamic changes in the network across countries and research areas. This evaluation is ongoing and periodic (as opposed to a pre- and post-evaluation).

Specific objectives are:

1. To assess the **way in which collaborations are being shaped** among Hub members over the 5-year lifetime of the programme.
2. To characterise the extent to which the **emerging network is dynamically changing** across countries and research areas.
3. To investigate **characteristics** in the development of the Hub network associated with factors such as career stage, discipline (biological science vs. social science) and gender.

Figure 2. Easier days: an all-Hub conference was held in Gujarat, India in February 2020, directly before onset of the Covid-19 pandemic.

Methods

Two online surveys were conducted a year apart. All Hub participants were invited to respond. The surveys covered three periods: **P0** (before March 2019), **P1** (March 2019 – February 2020) and **P2** (March 2020 – February 2021).

In each survey, respondents were asked to consider their collaborations and activities with all other Hub members. In addition, they were asked to indicate their primary scientific discipline or area of expertise, their primary role in the Hub, gender, and age category.

We applied Social Network Analysis (SNA) methods using these data to investigate the evolution of the Hub network over these three periods.

Findings

For all periods, networks showed a **high small-world index**. Network connectedness **increased during P1**, in a distributed manner. However, during **P2** (i.e. after onset of the Covid-19 pandemic), connectedness **decreased**, and the network became **more centralised**; although connections between the UK and study countries increased, **connections between study countries declined**.

Connectedness was significantly higher for social scientists, mid and late career stage, and male partners.
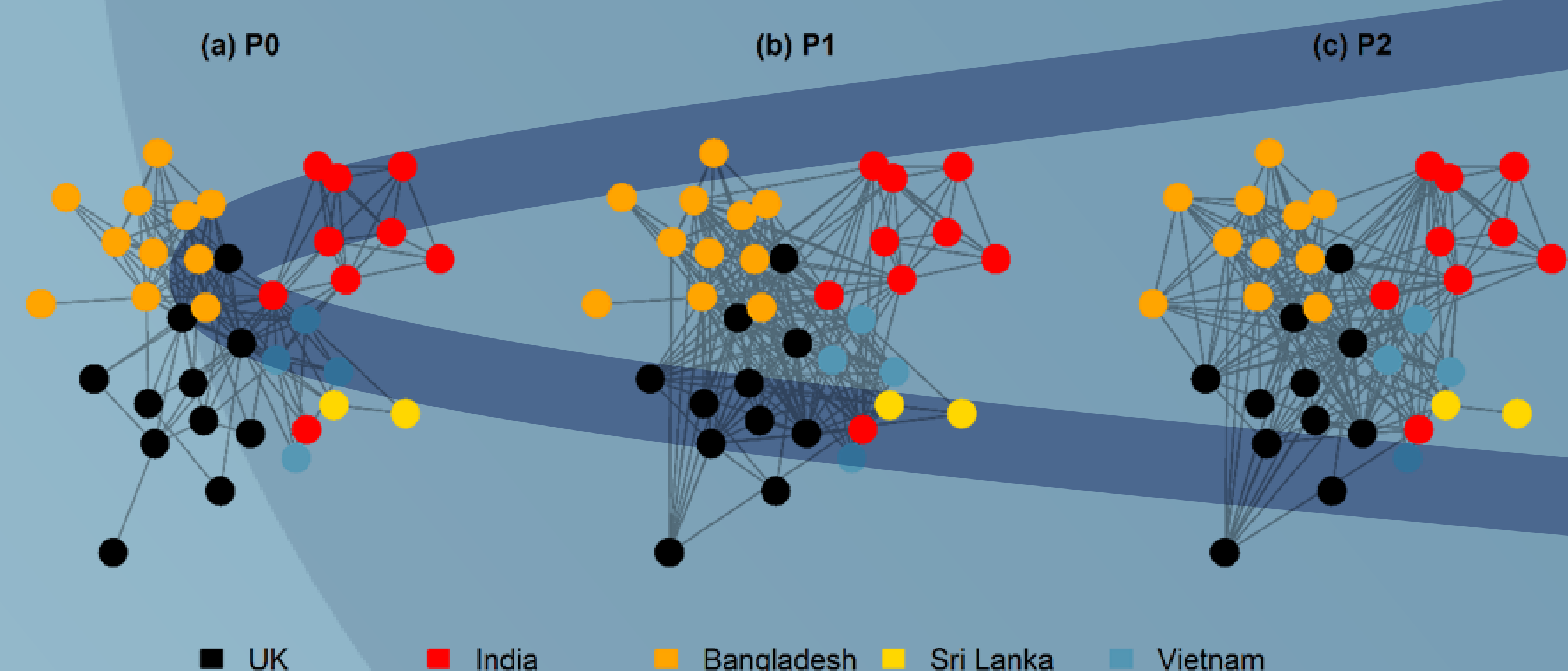

Figure 3. Network diagrams showing cohort networks. Nodes are coloured according to the country in which they were based.

■ UK   ■ India   ■ Bangladesh   ■ Sri Lanka   ■ Vietnam

Discussion

During **P1**, face-to-face meetings enabled partners from all disciplines and countries to interact directly. This facilitated an increase in network connectedness and reduction in centralisation.

P2 corresponded with onset of the Covid-19 pandemic. All communication activities were migrated to online platforms. Factors affecting participation included internet access and bandwidth; language challenges; and inhibitions due to perceived status or hierarchy (e.g. early career researchers).

Take home message

In large partnership networks, an **understanding of the dynamic relationships between partners is essential** to shape activities plus engagement and impact strategies. SNA enabled us to evaluate these relationships, and showed how they are affected by external events such as the Covid-19 pandemic.

SNA is continuing to inform the Monitoring, Evaluation and Learning (MEL) strategy of the Hub.

Scan ME!
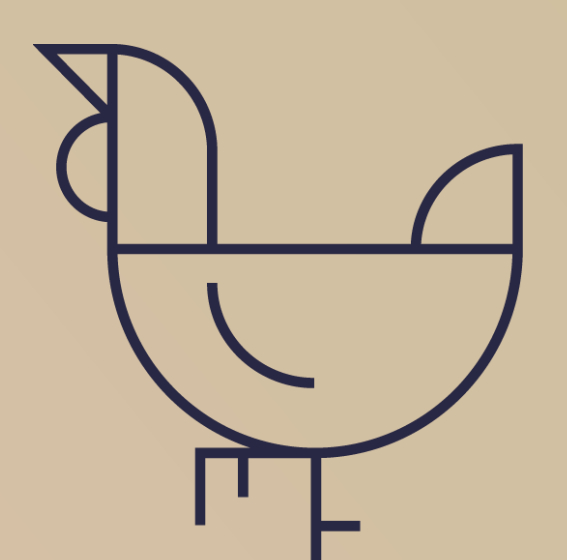
UK Research and Innovation

GCRF Global Challenges Research Fund