MEDIA RELEASE

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New One Health research findings back interventions for sustainable poultry sector development

Innovative research methods reveal evidence supporting a move away from technical fixes in favour of a more holistic approach to public health.

New interdisciplinary research findings lay bare the public health risks associated with the fast-developing poultry sector in Vietnam – and the limitations of technical interventions alone for decreasing disease risk.

The findings were revealed this weekend in Ha Long Bay, in northern Vietnam, at the final meeting of the Vietnam team of the GCRF One Health Poultry Hub, a multinational research and development programme which has spent five years exploring the disease risks associated with chicken farming and trading in Southeast and South Asia.

Key findings include:

- One in five chickens sampled in Vietnam's markets and slaughtering facilities carried the virus for H9N2 avian influenza ('bird flu'). While this sub-type of the virus is known as low pathogenic (causing only mild disease), it can lead to substantial production losses on chicken farms and often it is involved as a gene donor in the emergence of new virus variants. It is considered a potential pandemic threat.
- Up to half of markets and slaughtering facilities tested positive for the bacteria *Salmonella*, which causes food poisoning.
- One in three markets and slaughtering facilities tested positive for *Campylobacter*, another bacteria causing food poisoning.

A set of five policy briefs recommending ways forward for safer, more sustainable chicken production in Vietnam based on this important new evidence was launched at the meeting.

Prof. Vu Dinh Ton, National Coordinator of the Hub, said: "*This project is particularly special, with the participation of numerous partners from various fields both globally and in Vietnam. The diversity of these partners has created a significant resource for interdisciplinary collaboration and cohesive problem-solving.*

"After 5 years of project implementation, impressive results have been achieved. These outcomes hold significant importance in shaping policies and proposing measures for disease prevention and control. Additionally, the project has fostered relationships between researchers and stakeholders both domestically and internationally.*"*

Vietnam's poultry population grew at an average of 5.6% in the 10 years to 2020. It is projected to reach over 500 million in 2025, with 18 billion eggs produced annually. The intensification of

poultry farming is known to present new opportunities for disease-causing microorganisms (pathogens) to emerge and spread, undermining efforts to make food production sustainable. It also increases the risk that pathogens will 'spill over' from birds to people leading to disease outbreaks – and potentially another pandemic.

One Health

The GCRF One Health Poultry Hub has been the first research programme in Vietnam to take a holistic One Health approach to studying disease risk from chickens and eggs as they travel 'from farm to fork'. One Health is an approach which acknowledges the links between human, animal and ecosystem health and so understands that achieving best health for all requires effective and efficient intersectoral and interdisciplinary collaboration across the human, animal, plant and environment domains.

Biological scientists, social scientists, mathematical modellers and other experts in the Hub worked together to identify the factors influencing the presence and transmission of avian influenza viruses and bacteria that cause food poisoning as well as the spread of antimicrobial resistance (AMR) at various points along the extensive and complex chicken farm and trading networks.

They collected and analysed thousands of biological samples from chickens on farms, in markets and at places of slaughter at field sites in Ha Noi, Bac Giang, Hai Duong and Quang Ninh, in northern Vietnam. They also interviewed hundreds of farmers, traders, slaughterhouse workers and others in the poultry sector – as well as analysing policies and regulations guiding chicken and egg production and distribution, and interviewing people working directly in these areas.

Other findings from the Vietnam Hub team included:

- The viral prevalence of H9N2 avian influenza virus further increased as birds travelled from farms to markets and slaughtering facilities by two- to five-fold.
- The highest prevalence of H9N2 avian influenza virus was found in informal slaughter points where almost one in three birds tested positive.
- Higher viral prevalence of H9N2 was observed in coloured broiler chickens compared to white broilers. Findings from repeated farm sampling showed that at least 20% of chicken batches are positive with H9N2 avian influenza virus. Therefore, most chickens raised in Vietnam are exposed to H9N2 at some point in their lives.
- Six percent of chickens from markets and slaughtering facilities contained levels of antibiotic residues above the limit set by the European Union. This result is 60 to 120 times higher than levels found in the European Union (prevalence of 0.05-0.1%). This includes of antibiotics of importance in human healthcare, such as fluoroquinolones, whose use in animals is restricted.
- Genes conferring bacteria resistance against antibiotics important for human health were found at high prevalence in bacteria present in chicken guts, including bacteria causing disease in humans, such as *Campylobacter*.

As well as Vietnam, the GCRF One Health Poultry Hub has been working in Bangladesh, India and Sri Lanka. Key findings from these countries include:

- The prevalence of H9N2 in Bangladeshi markets is similar to that in markets and slaughtering facilities in Vietnam.
- About 4% of chickens marketed in Gujarat and 9% of chickens marketed in Bangladesh contained levels of antibiotic residues above the limit set by the European Union.
- A high prevalence of genes conferring bacteria resistance against antibiotics important for human health was found in bacteria present in chicken guts in Gujarat and Bangladesh.

Avian influenza in Vietnam is a constant menace for poultry production, leading to economic losses and damaging livelihoods. Avian influenza viruses also have the potential to contribute to future human influenza epidemics and pandemics. Food poisoning caused by species of *Campylobacter* and *Salmonella* carried by chickens imposes a considerable burden of human illness and can cause death. AMR is described by the World Health Organization as a Top Ten global health threat.

Alternative disease risk strategies

The work of the GCRF One Health Poultry Hub threw light on the wide variety of livelihood strategies deployed by people in Vietnam in chicken farming and trading, revealing both diversification and specialisation. Critically, it also showed how social, economic and cultural factors play a major role in determining who is at risk of getting ill, what that risk is and where it is greatest – enabling alternative, more effective strategies to reduce risk to be considered.

> ***Example 1: protecting farmers' livelihoods***. Researchers found that the high volatility of chicken market prices can threaten farm profits. As a result, farmers must adapt their practices to keep their business afloat – and they often have to prioritise short-term goals, which favour reacting when disease issues arise, rather than take a longer view, which would see preventive measures adopted. Hence, action to protect farmers against market volatility may be more beneficial in the long run than a traditional public health approach such as more biosecurity training.
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> ***Example 2: Improving small-scale slaughtering.*** Although the Government of Vietnam's policy has long been to encourage the building and use of large, modern slaughterhouses, factors as diverse as land-use rights and culinary preferences mitigate against both the development and use of such facilities. Of more benefit to public health would be supporting small-scale slaughterers to operate in safe and biosecure conditions.

The Hub's objective was to inform the development of economically, socially and environmentally sustainable policy and interventions that will result in improved health for people, animals and societies. The five policy briefs produced by the Vietnam team, all of which carry recommendations to reduce disease risk in Vietnam's poultry sector, cover the areas of: biosecurity, One Health, markets, slaughtering and gender.

The GCRF One Health Poultry Hub comprises 28 partners, from 10 partner countries, and is led by the Royal Veterinary College, UK. The Vietnam partners are: CIRAD; Department of Animal Health, Ministry of Agriculture and Rural development; National Institute of Animal Sciences; National Institute of Hygiene and Epidemiology; National Institute of Veterinary Research; and Vietnam National University of Agriculture.

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- Find out more about the GCRF One Health Poultry Hub at www.onehealthpoultry.org.
- Find out more about the Global Challenge Research Fund at ukri.org/what-we-do/browse-our-areas-of-investment-and-support/global-challenges-research-fund/