POLICY BRIEF

Food security and political security implications of crop and livestock diseases in the Indo-Pacific

EXECUTIVE SUMMARY

Food security, which is one of the most pressing global challenges, requires efficient, resilient, and sustainable agricultural production. Many countries in the Indo-Pacific region face food insecurity ranging from 5% of the population in Indonesia to over 50% in Cambodia. Food insecurity has cascading effects and can lead to political instability.

Biosecurity is designed to reduce the risk of biological threats to human, animal, plant, and environmental health. The implementation of biosecurity measures such as surveillance enables us to predict, prevent, prepare, and respond to these outbreaks faster, reducing their impact and minimising the cascading disruptions in the Indo-Pacific region.

Stronger collaborative surveillance networks within the Indo-Pacific region will generate timely actionable analysis. This involves improving military-to-military surveillance partnerships, in which Australia uses its expertise and commits to helping other militaries develop laboratory and epidemiologic capacity. Aligned with the Strategy of Denial strengthening biosecurity in the Indo-Pacific will support regional security and prosperity while identifying and mitigating biosecurity risks before they reach our border.

THE HEADLINES

1. Pests and diseases affecting crops and animals reduce production leading to food supply shortages, trade disruption and price shocks, all contributing to food insecurity.

2. Food insecurity is a significant concern in the Indo-Pacific region with over 50% of the population in Cambodia at risk. Food insecurity has cascading effects and can lead to political instability.

3. The Defence sector is uniquely positioned to leverage its relationships with Indo-Pacific partners to strengthen surveillance for the early detection of crop and livestock disease outbreaks.

4. Defence provides assistance during a significant animal or plant disease emergency in the IPR: planning support, logistics and infrastructure, communications, surveillance, and operational support such as decontamination of vehicles to prevent disease spread.

Proudly supported by the

Murdoch University

Lincoln University

QUT

Australian Government
Defence

Why is it important for Australia to support biosecurity efforts in the Indo-Pacific?

Food security, which is one of the most pressing global challenges, requires efficient, resilient, and sustainable agricultural production. The intensification of land-use and livestock systems in agricultural landscapes have been key strategies for efficient production, deemed necessary for providing enough food for a growing human population.

However, intensification involves a loss of biodiversity and progression towards monocultures are associated with an increased vulnerability to pests and diseases. Biosecurity risks are growing and increasing in complexity. Together with intensification in agriculture, outbreaks of diseases in crops and livestock are driven by factors such as unpredictable trade and travel patterns, and climate change. This is demonstrated by the incursion of lumpy skin disease and African swine fever in the Indo-Pacific region, combined with the spread of endemic diseases such as foot-and mouth disease in livestock and rice blast affecting multiple staple crops including rice, wheat, and maize. It is evident that we are dealing with multiple risks, on multiple fronts, concurrently.

Political stability and food security are often linked, although the relationship is complicated and not necessarily direct or causal. We often hear how political instability, such as war and armed conflict, cause disruptions of food supply chains leading to food insecurity. Similarly, food insecurity and shocks resulting from the disruption to the production and supply of food, can lead to political instability. This has been demonstrated by the food riots in several developing and emerging nations across Africa and Asia in 2008, and the Arab Spring in 2011. Pests and diseases directly affect production in crop and livestock systems, but also have trade implications. These cascading disruptions do not remain with their immediate cause but flow on into other parts of a system.

Biosecurity is designed to reduce the risk of biological threats to human, animal, plant, and environmental health. The implementation of biosecurity measures in areas most vulnerable to pests and diseases in our food system will enable us to predict, prevent, prepare, and respond to these outbreaks faster, reducing their impact and minimizing the cascading disruptions. In this context, the Australian government works with overseas counterparts to identify and mitigate biosecurity risks before they reach our border, while undertaking capacity building activities.

METHODS

Methodological framework

Food security occurs when all people, at all times, have physical and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life. The food security framework is designed to assist in assessing the state of food security. It includes four pillars – **availability, access, utilisation**, and **stability**, and two temporal dimensions, **chronic** and **transitory** (Box 1). Acknowledging the complexity of the issues related to agricultural production and disease outbreaks, a risk analysis approach was used to estimate the impact on food production, trade, food prices and the four pillars of food security.

Box 1. Four pillars of food security

Food availability: The availability of sufficient quantities of food of appropriate quality, supplied through domestic production or imports (including food aid). Diseases in crops and livestock can affect direct impact on households that produce food for consumption.

Food access refers to the affordability and allocation of food. Diseases in crops and livestock disrupt trade and cause price shock thus have an economic impact on households that purchase food.

Utilisation of food through adequate diet and safe food. Some plant and animal diseases are directly transmissible to humans via food, whilst others can contaminate water. This brings out the importance of non-food inputs in food security, such as access to clean water and sanitation, food safety policies and education.

Stability of the other three dimensions over time: Even if your food intake is adequate today, you are still considered to be food insecure if you have inadequate access to food on a periodic basis. Diseases in crops and livestock reduce food stability though unpredictable production, and food price shocks.

Transitory food insecurity occurs with a disease epidemic, where there are sudden changes in food supply and trade. For example, the incursion of African swine fever in the Indo-Pacific in 2018.

Chronic food insecurity results from long term poor productivity from crops and livestock affected by endemic diseases. This can be caused by annual cycles of rice blast in areas reliant on rice as a staple crop.

Source: FAO, 2006 and World Bank, 2022

Description of the threats

African Swine Fever: a transboundary animal disease

African swine fever (ASF) is a viral disease affecting farmed pigs and wild boar, with a very high mortality rate. ASF virus can be transmitted through pork and pork products in which the virus can survive for a long time.

Transboundary animal diseases are highly contagious and easily transmitted within and between livestock populations. ASF has spread to 18 countries in the Indo-Pacific since it was first introduced to China in August 2018. In Vietnam, where pork accounts for 75% of meat consumption, the pig population decreased by 40% in the worst affected areas during the first year of the outbreak, causing disruptions to supply (availability). There was also an estimated loss of 240,000 formal sector jobs, which affected households' income (access). With more than five million pigs culled to try to minimize the spread of the disease, drinking water was contaminated by pig carcasses affecting food utilisation. The unpredictable spread of the disease led to market volatility (stability), not only in the price of pork, but chicken beef, and lamb prices rose due to increased demand as substitutes. The ASF epidemic demonstrated the enormous impact a disease outbreak can have on the supply of staple food and effects that ripple through other sectors.

The impact of rice blast *Pyricularia oryzae (syn. Magnaporthe oryzae)* in the Indo-Pacific

Outbreaks of diseases in crops are detrimental in countries and regions that rely heavily on staples like wheat or rice that are largely produced as monocultures. The Indo-Pacific region accounts for 26% of global rice consumption and contributes to 40% of staple exports.

Rice blast is a fungal disease caused by Pyricularia oryzae capable of causing severe losses, with decreased yields in affected crops ranging from 50-85%. A simulation model of an epidemic of rice blast in Thailand predicted an 80% reduction in production (availability), and switches from being a net exporter to net importer, with an 11% increase in global food prices (access). Among the countries exporting to Thailand are Laos and Myanmar.

They are likely to respond to opportunities of higher global prices by exporting more, thus decreasing their national calorie intake, contributing to food insecurity. As the price of rice increases, households resort to accepting lower quality products increasing their risk of food-borne disease (utilisation). Global rice markets are agile, enabling large importers to change suppliers following a disease outbreak. This results in lack of market stability for exporters in the Indo-Pacific.

What role can Defence provide in the prevention and containment of animal and plant diseases?

The involvement of Defence in regional training exercises in humanitarian assistance and disaster relief, such as

Exercise Croix du Sud, enables sectors to effectively work together when called upon in times of crises. In a similar way, the inclusion of Defence in multilateral biosecurity strategic planning in the Indo-Pacific will prepare partner nations to respond to transboundary plant and animal disease outbreaks, whilst enhancing interoperability between Australia and regional partners.

In establishing and sustaining an emergency response to a biosecurity incident, countries will often experience substantial demand on their available human resources and infrastructure. Although not its primary role, Defence is involved in scenario planning and training exercises for emergency animal disease in Australia. With its strong disaster relief capabilities internationally, Defence may support logistics and communications by providing advice for setting up command centres and aerial surveillance. In the context of plant and animal disease outbreaks, Defence may consider using skills to advise on-the-ground operations such as the decontamination of vehicles to prevent disease spread, control of animal movement, and providing food to animals in movement restricted zones.

RECOMMENDATIONS

- Building on the long-term relationship with the Department of Agriculture, Fisheries and Forestry (DAFF) in Australia, Defence as part of a whole-of-government approach continues work with Indo-Pacific region country partners in formulating national plans to prepare and respond to animal and plant disease outbreaks including those outlined in the Pacific Biosecurity Strategy 2022 to 2027.
- Stronger collaborative surveillance networks within the Indo-Pacific region will generate timely actionable analysis. One way of improving surveillance is military-to-military partnerships, in which Australia uses its expertise and commits to helping other militaries develop laboratory and epidemiologic capacity.
- The Defence sector maintains infectious disease surveillance operations in the Indo-Pacific, incorporating diseases in livestock and crops for early detection of biosecurity threats.
- During a biosecurity incident in the Indo-Pacific region, Defence support on-the-ground operations such as the decontamination of crops and vehicles to prevent disease spread, control of animal movement, and providing food to animals in movement restricted zones.

Enquiries:
A/Prof Kirsty Bayliss: **K.Bayliss@murdoch.edu.au**
Dr Mieghan Bruce: **Mieghan.Bruce@murdoch.edu.au**

This brief presents findings and policy lessons identified in a paper prepared by researchers from Murdoch University through the EIR project funded by the Defence Strategic Policy Grants Program (SPGP). This brief was produced by Mieghan Bruce, Kirsty Bayliss, Barbara Kachigunda, and Rochelle Spencer. Opinions stated in this brief are those of the authors and do not necessarily reflect the views of Defence partners.

Murdoch University

QUT

LINCOLN UNIVERSITY
TE WHARE WĀNAKA O AORAKI