



A Collaborating Centre for animal health economics in the Americas

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Summary

Countries in the Americas play a vital role in global livestock and aquaculture production. With international trade of livestock and aquaculture products becoming an important source of income for countries, there has been an increased interest in using animal health economics for advocacy and allocation of resources. This article discusses the development of a new Collaborating Centre for the Economics of Animal Health and the applications of the Global Burden of Animal Diseases (GBADs) framework in the Americas region. Incentives for the increased use of economics in animal health decision-making and examples from the Americas region are examined. The article then discusses the newly formed World Organisation for Animal Health Collaborating Centre in the Americas region. Finally, it reviews two ongoing case studies that are implementing the GBADs framework in Peru and the United States of America.

Keywords

Animal health economics – Collaborating Centre – GBADs – Global Burden of Animal Diseases.

Introduction

The Americas – comprising 35 sovereign nations and 23 territories dependent on a foreign nation – are an important producer of animal protein. In 2021, the Americas produced about 107 million tonnes of meat in total from chicken (50.2 million tonnes), beef (32.9 million tonnes) and pork (23.9 million tonnes) (Table 1) [1], accounting for approximately 45%, 41% and 20% of total world beef, chicken and pork production, respectively. Like elsewhere, fishery and aquaculture are also important sources of protein and are a growing sector:

they provided about 7 million tonnes of fish and aquaculture products in 2021 [1]. Animal production is crucial for the economies of the Americas, as well as rural livelihoods and sustainable development, and is key to global food security.

International trade of animal protein is an important source of income for the Americas. In 2021, 18 million tonnes of meat, valued at US\$ 55,695 million, were exported from the Americas, representing 55%, 51% and 35% of total world chicken, beef and pork exports, respectively [1] (Fig. 1). As seen in Figure 2, exports of aquaculture from the Americas comprise 17% of the

Table I
Meat production from cattle, chickens and pigs, 2021

Region/country	Quantity (tonnes)
Caribbean	
Antigua and Barbuda	57.0
Bahamas	18.8
Barbados	161.0
Cuba	62,031.7
Dominica	563.6
Dominican Republic	62,317.0
Grenada	137.3
Haiti	49,027.8
Jamaica	6,545.0
Puerto Rico	5,395.6
Saint Kitts and Nevis	52.3
Saint Lucia	415.0
Saint Vincent and the Grenadines	177.5
Trinidad and Tobago	1,200.0
Central America	
Belize	1,536.0
Costa Rica	92,794.0
El Salvador	16,712.9
Guatemala	215,336.8
Honduras	66,000.0
Mexico	2,130,591.8
Nicaragua	167,369.0
Panama	76,422.0
Northern America	
Canada	1,385,544.0
United States of America	12,733,643.0
South America	
Argentina	2,981,690.0
Bolivia	284,195.2
Brazil	9,750,000.0
Chile	209,971.6
Colombia	758,736.9
Ecuador	229,014.2
Guyana	2,071.0
Paraguay	522,776.0
Peru	189,922.9
Suriname	1,821.0
Uruguay	572,522.0
Venezuela	371,425.6

Source: FAOSTAT [1]

world total (6 million tonnes). Animal health is a safeguard for efficient production, food safety, animal welfare, public health and environmental sustainability. It is also of paramount importance for securing access to export markets.

Nearly every country has its own animal health authority linked to its ministry of agriculture or similar administrative body; the head of the national Veterinary Services is usually the World Organisation for Animal Health (WOAH) Delegate. Veterinary Services competences include animal health and welfare, as well as food safety and international trade certifications related to animal products. Many countries in the Americas have sub-national animal health authorities that ensure coverage of animal health programmes and tailor disease surveillance measures, particularly in large countries with vast and complex livestock industries. Historically, public–private partnerships have been important to deal with control, eradication and prevention of animal diseases of national interest.

Incentives and impact assessment

Animal health burdens are associated with economic losses. Direct losses to the livestock sector are predominately due to mortality and morbidity, but there are also indirect losses and wider economic impacts. In exporting countries, animal health is perceived as a critical component of the livestock industry because animal diseases are often a trade barrier. As such, transboundary diseases (e.g. foot and mouth disease) tend to get investment priority, both from the animal health authorities and from the actors of exporting value chains, given the potential economic impacts across society of an outbreak and the resulting disruption of trade flows.

Potential public health and environmental losses are placed as barriers to trade but are rarely measured or estimated, although this may change with the increasing emphasis on One Health. Most animal health programmes are not based on any economic analysis, either for establishing investment priorities or for planning ongoing programmes. This is partly due to the perception that any effort to prevent or control a given disease will reduce the disease's economic impact, whatever it may be. It should be stressed that in exporting countries, the focus on trade/transboundary diseases might add to the perception that investments need not be underpinned by an economic analysis, given the sheer size of societal economic impact in the event of an impediment to trade. In fact, economic analysis is often used for advocacy purposes, to justify the maintenance of investments.

Animal health economic studies were particularly scarce between the 1950s and 1990s [2,3]. Since then, the number of studies has grown, perhaps due to the restructuring of Veterinary Services, lack of financial resources, private–public partnerships, and international policies, all brought on by changes in the 1990s [4].

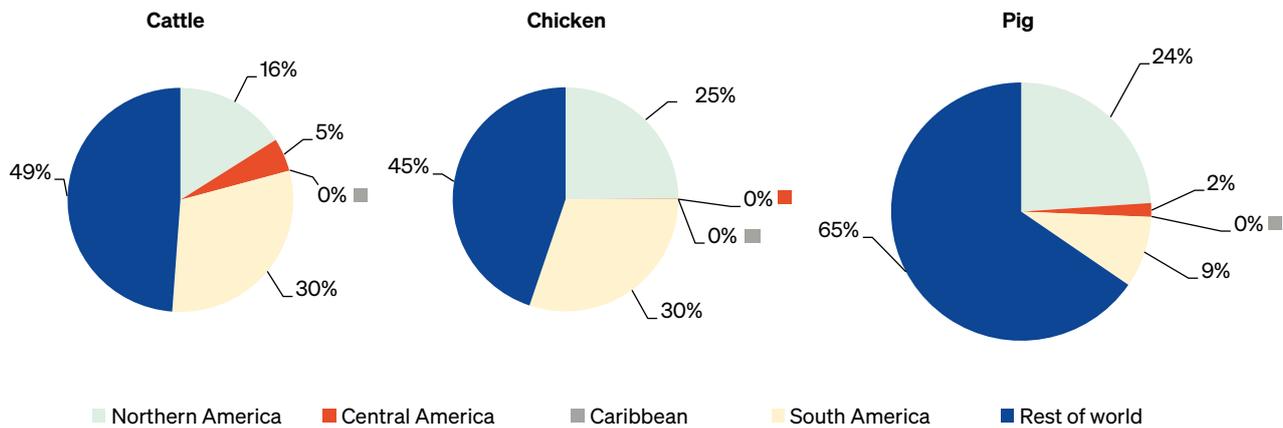


Figure 1

Meat exports across the Americas by species, percentage of world total, 2021

Source: FAOSTAT [1]

Note: Regional designations are taken from FAOSTAT, which defines Northern America as comprising the United States of America and Canada and includes Mexico in Central America

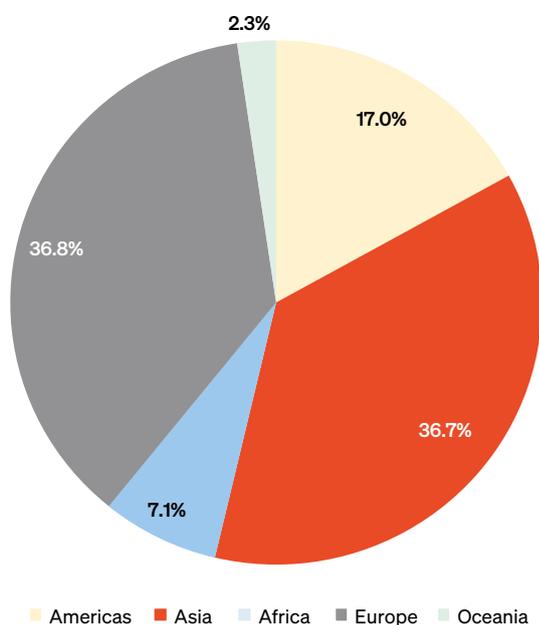


Figure 2

Global aquaculture exports by region, percentage of world total, 2021

Source: FAOSTAT [1]

Most studies have focused on transboundary diseases with trade implications, such as foot and mouth disease, using cost–benefit analysis and/or economic impact assessments. The interest of Veterinary Services in the economics of animal health has increased significantly, with their main goal being to justify their budgets. The Food and Agriculture Organization of the United Nations (FAO), the Inter-American Development Bank and WOAHP support consultancies and studies, while FAO and the Inter-American Institute for Cooperation on Agriculture (IICA) have promoted capacity building. Some Veterinary Services have estimated losses and justified national programmes, and several academic studies have also been carried out, as detailed by Rojas and Romero [4].

Veterinary epidemiology training in the Latin American and Caribbean region (LAC) was boosted in 2003 by the 10th International Symposium on Veterinary Epidemiology and Economics (ISVEE) in Chile. Between 2012 and 2015, networking and training activities engaged developed countries with LAC (e.g. a post-ISVEE workshop in 2015 [4]). WOAHP has endorsed capacity building to generate effective tools for the economics of animal health since its 84th General Session in May 2016.

Some universities have linked economics with their epidemiology curricula at veterinary faculties in LAC, such as the National University of San Marcos (Peru), University of Chile, University of La Salle (Colombia), University of Brasília and University of São Paulo (Brazil).

There is currently a growing interest in animal health economics within Veterinary Services, with advocacy as a primary goal, but also with the aim of supporting decision-making for efficient allocation of resources.

Previous efforts to build capacity on animal health economics

In 2015, IICA started delivering training in animal health economics, with workshops in Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Ecuador, Paraguay, Peru, Uruguay and Venezuela [5]. The Permanent Veterinary Committee of the Southern Cone (CVP) also has a strong interest in this area, having offered training on national brucellosis control and eradication programmes, with four of six countries completing a cost–benefit analysis of their programmes [6]. Barros *et al.* [7] conducted a retrospective study of the bovine brucellosis programme in the Brazilian state of Mato Grosso. After realising the added value of these trainings, the CVP offered a second cost–benefit analysis workshop in 2022. An outcome of interest was the expressed desire for an *ad hoc* animal health economics group and the creation

of a network of Veterinary Services. Moreover, interest was expressed in involving the region in the Global Burden of Animal Diseases (GBADs) programme.

Development of a World Organisation for Animal Health Collaborating Centre

WOAH Collaborating Centres are designed to provide scientific expertise and support to WOAHA and its Members in a specific specialty. In regard to the specialty area, the Centres also carry out and/or coordinate scientific research, collect/analyse/report data, provide scientific/technical trainings and meetings, identify and maintain expertise, network with other WOAHA Collaborating Centres and provide consultancy services to WOAHA when requested.

WOAH's Collaborating Centre for the Economics of Animal Health – Americas Region (CCEAH-A) was formed with five key partnering universities: Kansas State University, the University of Brasília, the University of São Paulo, the National Autonomous University of Mexico and Washington State University. These universities were selected as the key partners based on several criteria, including expertise of both the director and staff at each institution, common vision of the Centre among the universities' directors, and importance of the livestock and aquaculture industries in each country. The CCEAH-A will work with terrestrial livestock and aquatic animals, with a focus on building capacities for the systematic use of economics of animal health methods with outcomes that are aligned with the GBADs programme. Among the specific goals of the Centre are to:

- improve methods to estimate animal disease and health burdens, where they occur, to whom and by causes and risk factors;
- improve access to and standardisation of animal disease and health burden information through the development of a shared, cloud-based knowledge engine;
- improve capacity to interpret and use animal disease and health burden information.

These objectives will be addressed not only by a multi-disciplinary team of economists, epidemiologists, veterinarians, computer and data scientists and educators, but also through collaboration with academia, industry and government.

The application process for CCEAH-A started with discussions with WOAHA personnel, the office of the WOAHA

Delegate in the United States of America, and the director of CCEAH-A approximately ten months prior to formal submission of the application. These discussions allowed for a better understanding of the requirements, timeline, etc., of the application process. Next, the director at Kansas State University identified individuals at the other key partner institutions. Throughout this identification and networking process, the team was able to establish additional collaborating partnerships (e.g. with the IICA). After the key partners agreed to the vision and goals of the proposed Centre, the next step was to draft the formal application following WOAHA's Collaborating Centre guidelines. In mid-December 2022, the formal application, along with letters of support from the key partners' WOAHA Member Delegates (i.e. the Chief Veterinary Officers of Brazil, Mexico and the US), was submitted to WOAHA by the Chief Veterinary Officer of the US, as the lead institution's WOAHA Member Delegate. Over the next five months, several committees reviewed and evaluated the application, including both of WOAHA's Specialist Commissions – the Biological Standards Commission and the Aquatic Animal Health Standards Commission – as well as WOAHA's Council and its Regional Commission for the Americas. The application was endorsed by WOAHA's Council and the Regional Commission for the Americas, and in May 2023, during the 90th WOAHA General Session, the WOAHA World Assembly of Delegates confirmed the designation of the new CCEAH-A.¹

Coordination between WOAHA (at both global and regional levels), the new CCEAH-A, the GBADs team and IICA is critical to the uptake of GBADs in the Americas. As such, several initial case studies are in the beginning stages and will start to open the door for future work in the region with CCEAH-A's stakeholders. Among these are studies evaluating the health burden of Pacific white shrimp (PWS) in Peru and the broiler industry in the US.

Case studies in the Americas

As transboundary animal diseases are progressively eradicated, there will be a shift towards controlling and preventing endemic diseases. These diseases typically require sustained private–public investments and bring about the need for better prioritisation and optimisation of resource allocation. This is where animal health economics concepts become of paramount importance and, in turn, will drive interest in the GBADs programme.

Several case studies that will evaluate animal health burdens in the Americas region are in the initial stages. Two such case studies are briefly described on the next page.

1. Additional information on the formal application process for a WOAHA Collaborating Centre is available on WOAHA's website at: <https://www.woah.org/en/what-we-offer/expertise-network/collaborating-centres/#ui-id-2>.

Pacific white shrimp in Peru

Fisheries and aquaculture are a growing sector in Peru and are oriented to both domestic and export markets. Peruvian governments have seen potential in the country's aquaculture (which grew more than 40% between 2010 and 2020) and, in particular, have prioritised the production of PWS. In 2019, production of PWS was over 50,000 tonnes, strongly oriented to exports totalling about US\$ 230 million, and over 70% of total exports were destined for the United States of America and Italy [8].

Regarding health problems in PWS systems, the Ministry of Production and the National Fisheries and Aquaculture Health Agency (SANIPES) have followed WOA's notifiable disease list and prioritised them as follows:

- first level: white spot syndrome virus (WSSV), infectious hypodermal and haematopoietic necrosis virus (IHHNV) and necrotising hepatopancreatitis (NHP);
- second level: infectious myonecrosis virus, yellow head virus genotype 1 and Taura syndrome virus.

PWS health information comes mainly from the SANIPES surveillance system, including prevalence of prioritised diseases. However, there are no data concerning direct impact of disease or detailed cost expenditures. Although the SANIPES health programme budget is available, it is difficult to identify specific allocation to PWS diseases.

Preliminary work on PWS evaluated a potential production scenario without any disease and a scenario with a disease prevalence of 7.2% and 80% mortality. Assuming current export and production levels, the losses for WSSV, IHHNV and NHP were estimated at US\$ 13 million, US\$ 57 million and US\$ 41 million, respectively [9]. This information has the potential to better help the industry and policy-makers design and implement field data collection using the SANIPES structure and increase collaborations between the ministry and PWS farms.

Broilers in the United States of America

The poultry industry in the US is an important sector for both the national and global economies. Poultry sales in the country reached US\$ 76.9 billion in 2022, a 61% increase from the previous year, with broiler production having increased 22% since 2013 [10]. This increase in production is a result of domestic and foreign consumption. Poultry consumption in the US increased more than 16% between 2013 and 2022, while 17% of the country's broiler production was exported [10].

A case study evaluating the animal health burden for the broiler industry in the US is currently under way. Following the GBADs approach [11], this means calculating the Animal

Health Loss Envelope (i.e. the envelope containing the losses and expenditures resulting from individual animal health burdens) for the boiler industry. Both the current realised broiler production and ideal broiler production (i.e. with no animal health burdens) were first estimated. The Animal Health Loss Envelope was then broken into morbidity and mortality and condemnations. In other words, broiler production losses due to morbidity and mortality and condemnations were estimated. Based on 2020 data, the burden of disease for broiler production in the US was estimated at 2.3 million tonnes of lost production – 1.67 million tonnes due to mortality and condemnations and 0.64 tonnes due to morbidity [12]. These production losses were then evaluated using 2020 prices (e.g. housing, feed, labour) to estimate an economic burden of disease of US\$ 0.19 increased cost per kilogram of live weight [12]. Currently, a partial equilibrium model is being developed to evaluate changes in producer and consumer welfare for various participants along the supply chain, including international markets. Preliminary findings suggest feed costs are substantially higher due to animal health burdens. The findings from this case study will be shared with policy-makers and industry participants and will allow them to make better-informed decisions regarding animal health investments and resource allocation.

Conclusions

Interest in the burden of animal health, including the economics of animal health, has been growing over the past two decades. Recently, the GBADs programme has developed a systematic framework to measure losses associated with animal health issues. This article focuses on the development of WOA's CCEAH-A and applications of the GBADs framework in the Americas region.

The CCEAH-A was recently established to address such issues. The CCEAH-A will develop systematic economic methods and tools, promote the use of economics in animal health planning and decision-making, provide information on the burden of animal diseases, build networks of animal health economists, and support the establishment of future Collaborating Centres in this specialty in other regions. Additionally, the CCEAH-A will work closely with the CCEAH for the European region to take advantage of its experiences with GBADs.

Several applications, or case studies, of GBADs in the Americas are in progress, and others are in initial discussions. The preliminary findings suggest that animal health burdens have significant economic impacts on the PWS and broiler industries. With additional investments or better allocation of current investments in animal health systems, it is possible to reduce the animal health burden on society.

Un Centre collaborateur dédié à l'économie de la santé animale dans les Amériques

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Résumé

Les pays des Amériques jouent un rôle crucial dans la production mondiale d'animaux d'élevage, qu'il s'agisse d'espèces terrestres ou aquatiques. Le commerce international des produits issus de l'élevage et de l'aquaculture étant désormais une source importante de revenus pour les pays, la possibilité d'utiliser les concepts de l'économie de la santé animale à des fins de plaidoyer et d'allocation des ressources suscite un intérêt croissant. Les auteurs abordent la désignation d'un nouveau Centre collaborateur pour l'économie de la santé animale ainsi que les applications du programme « Impact mondial des maladies animales » (GBADs) dans la région des Amériques. Ils examinent les avantages d'une meilleure prise en compte de l'économie dans les prises de décision en matière de santé animale, illustrés par quelques exemples concrets relevés dans la région. Ils décrivent ensuite la création du nouveau Centre collaborateur de l'Organisation mondiale de la santé animale dans la région des Amériques. Enfin, ils présentent deux études de cas menées actuellement concernant la mise en œuvre du programme GBADs respectivement au Pérou et aux États-Unis d'Amérique.

Mots-clés

Centre collaborateur – Économie de la santé animale – GBADs – Impact mondial des maladies animales.

Un Centro colaborador para la economía de la sanidad animal en las Américas

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Resumen

Los países de las Américas desempeñan un papel fundamental en la producción ganadera y acuícola mundial. Dado que el comercio internacional de productos ganaderos y acuícolas se ha convertido en una importante fuente de ingresos para los países, el interés por utilizar la economía de la sanidad animal en favor de la promoción y la asignación de recursos ha ido en aumento. En este artículo se analiza la creación de un nuevo Centro colaborador para la economía de la sanidad animal y las aplicaciones del marco del impacto global de las enfermedades animales (GBADs) en la región de las Américas. Se examinan los incentivos para un mayor uso de la economía en la toma de decisiones sobre sanidad animal, así como ejemplos de la región. A continuación, en el artículo se presenta el recién creado Centro colaborador de la Organización Mundial de Sanidad Animal en la región de las Américas. Por último, se examinan dos estudios de casos en los que se está poniendo en práctica el marco del GBADs en Perú y los Estados Unidos de América.

Palabras clave

Centro colaborador – Economía de la sanidad animal – GBADs – Impacto global de las enfermedades animales.

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