

THE GLOBAL BURDEN OF ANIMAL DISEASES

GBADs - Case for Engagement and Investment



GBADS

Understanding the economics of animal diseases to
ensure human health and preserve livelihoods

Case for Engagement and Investment

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① Why creating the Global Burden of Animal Diseases programme?

Livestock production and aquaculture are critical to human nutrition and health, sustaining the livelihoods of many of the world's poorest people. Terrestrial and aquatic farm animals play essential roles in society, providing income, food, clothing, building materials, fertilisers, draught power and inter-generational capital. Across the world, 1.3 billion people are directly dependent on farm animals for their livelihoods, 600 million of whom are smallholder farmers in some of the most economically disadvantaged countries of the world. The health and productivity of these smallholders' animals are under constant pressure from communicable and non-communicable animal diseases; inadequate access to feed, forage and clean water; injuries and predation. Poor animal health leads directly to poverty and malnutrition in human populations, exposure to zoonotic disease risk, poor health, and reduced welfare. Disease also causes welfare issues in animals. Furthermore, at the global level, the decreased productivity, which results from diseased animals, exacerbates climate change and environmental degradation, as extra resources are required to produce each unit of output (e.g. more water or grain to produce each kg of meat or eggs).

The World Organisation for Animal Health (OIE) has estimated that, in recent decades, morbidity and mortality due to animal diseases has resulted in a 20% global loss in livestock production, estimated to cost US\$ 300 billion per year¹. As a result, hundreds of millions of dollars are invested annually to mitigate animal diseases and health problems. Yet where and how this money is invested to address these problems is poorly documented; an ability to fully assess health outcomes, including disease, especially among vulnerable smallholders, is therefore severely limited.

We lack a systematic and standardised process to determine the burden of animal health issues, including disease, if there is any impact on human nutrition, health and well-being, and the consequences of any preventive or curative interventions over time. How burden is apportioned between

smallholders and the commercial sector, by region and gender, and how it is passed on to consumers or borne by producers with or without government support, is also largely unknown. Without good comparative tools and data, it is difficult to develop a compelling case for better animal health management or devise equitable policies for programmes to improve animal health, productivity, human health and economic development. This limits the ability of the public and private sectors to apply animal health and production sectors to target resources because there is a lack of understanding of the issues which have the most significant impacts.

Applying an economic lens to understand the burden of animal diseases is paramount. The Global Burden of Animal Diseases (GBADs) programme takes a comprehensive approach, enabling users to better measure, justify and apply investments. GBADs will contribute to strengthening the food system for the benefit of society and the environment. It is an example of One Health in action.

SUSTAINABLE DEVELOPMENT GOALS



② What is GBADs?

A brief history

The innovative and ambitious GBADs programme was born through a collaboration between leading animal health decision-makers and scientists committed to generating data and information to improve human-welfare outcomes in line with the Unit-

¹| World Organisation for Animal Health (2014). - Impact of diseases on meat and milk. Available at: <https://rr-africa.oie.int/en/news/impact-of-diseases-on-meat-and-milk/> (accessed on 1 December 2021).

ed Nations Sustainable Development Goals. In May 2016, Professor Jonathan Rushton, agricultural economist at the University of Liverpool (UoL), who specialises in the economics of animal health and food systems, gave a presentation to the OIE World Assembly of National Delegates titled 'Economics of Animal Health: Direct and Indirect Costs of Animal Disease Outbreaks'². The presentation culminated in the adoption of OIE Resolution No. 35, creating a mandate to 'develop and test a methodology to determine the global burden of animal diseases in order to address deficiencies in economic information on national and world impact of animal diseases'. The following year, the OIE published an issue of the Scientific and Technical Review dedicated to the economics of animal health, edited by Prof. Rushton³. In March 2018, another significant milestone was achieved when the UoL and N8 Agrifood Resilience Programme led a workshop at the OIE to initiate the GBADs programme. Subsequent to the workshop, through a formal letter of agreement signed by the OIE's Director General and the UoL, an interdisciplinary partnership was launched to develop the GBADs initiative. In summary, since 2016, the OIE has supported the development of GBADs, a consortium of organisations and universities led by the UoL that work at the crossroads of public policy, private sector strategy and academia.

The purpose

GBADs will utilise and add value to data from animal and human health information systems to improve decision-making processes. The programme will develop standardised terms and methodologies to estimate economic components, including production loss, expenditure and trade impacts. GBADs will produce a range of products including an online information portal that will allow users to access data. This will be governed through a stewardship framework that addresses data quality, security and confidentiality, and will provide access to visualisations and analytical products (e.g. reports on sectors or themes). These outputs will enable the examination of animal disease burdens by type of farmer, and in

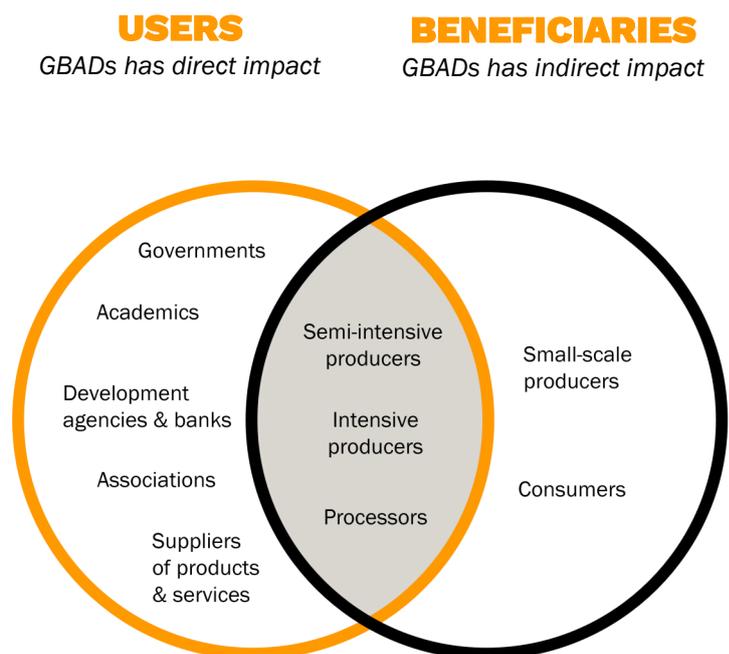
the longer term by consumer, by geographical region and by time period.

In its implementation, GBADs aims to enable societies⁴ to monitor the burden of animal diseases, including in small-scale farming systems and by gender, providing a system with clear indications of the effectiveness of preventive or curative interventions for animal health.

Users and beneficiaries

GBADs outputs will provide benefits to a range of end users, directly impacting their ability to make informed decisions. Some stakeholders will be beneficiaries of optimised animal health information and improved decisions at policy level, as well as being users of GBADs information at local level. Other beneficiaries of GBADs will indirectly benefit. For example, the optimisation of resources used in livestock value chains will potentially increase the margins of small-scale producers and consumers. Figure 1 below illustrates the stakeholder groups which will benefit from the improved evidence for decision-making provided by the GBADs programme.

Figure 1: Beneficiaries and users



²|Rushton J. & Gilbert W. (2016). - [The economics of animal health: direct and indirect costs of animal disease outbreaks](#). 84 SG/9.

³|Rushton J. (ed.) (2017). - [The economics of animal health](#). Rev. Sci. Tech. Off. Int. Epiz. 36 (1).

⁴|Societies is understood as a set of organisations, communities, producers, decision- and policy-makers.

③ Theory of Change

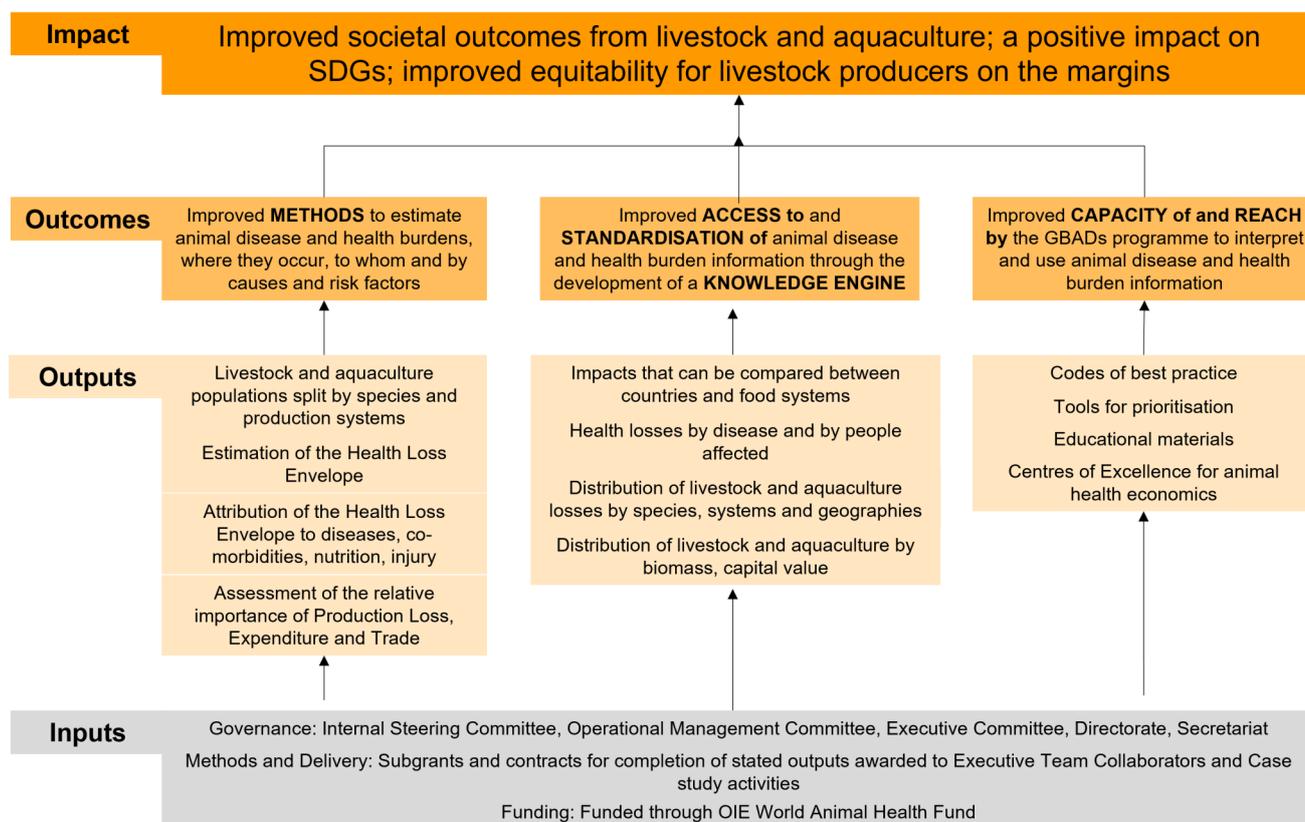


Figure 2: GBADs Theory of Change

④ How will GBADs achieve its operational objectives

A phased approach

GBADs will be developed in the following phases:

Phase I (2018–2020) was carried out by the UoL with funding from the Bill & Melinda Gates Foundation and the United Kingdom's former Department for International Development⁵. This investment supported the implementation of an expert workshop to determine the need for GBADs and to develop a pathway to establish the conceptual framework and its implementation.

Phase II (2020–2022) is in the process of being implemented with funding from the Bill & Melinda Gates Foundation and the UK's Foreign, Commonwealth and Development Office, with complementary funding from additional donors (see page 12). The

investment proposal was developed through collaboration between the OIE and UoL, in addition to other GBADs partners⁶. Phase II includes a two-year proof-of-concept period during which GBADs will develop and test the methodology using country-level case studies.

Briefly, progress to date includes:

Methods

- Internally agreed methodologies to define the investment in livestock and the Animal Health Loss Envelope, that will be used to generate initial estimates of the burden of animal diseases by July 2022.

Information

- A data governance handbook used to guide the programme's approach to soliciting and collating data and information sharing.
- A prototype dashboard that uses FAOSTAT⁸

⁵As of 2 September 2020, replaced by the Foreign, Commonwealth and Development Office.

⁶Commonwealth Scientific and Industrial Research Organisation (CSIRO), Institute for Health Metrics and Evaluation (IHME), International Livestock Research Institute (ILRI), Murdoch University, Scienzano, University of Guelph University of Zurich and Washington State University.

⁷More information on the concept of Animal Health Loss Envelope and its meaning can be found in [OIE Panorama](#)

⁸Food and Agriculture Organization Corporate Statistical Database ([FAOSTAT](#))

and OIE-WAHIS data to provide estimates of biomass by species, country and year – this will provide a proof of concept for establishing real-time data flows.

Capacity and reach

- The establishment of a team of Ethiopian researchers at ILRI Addis Ababa who lead the Ethiopian burden estimation work.
- The approval of the University of Liverpool (together with collaborators University of Utrecht and the Norwegian Veterinary Institute) as the first OIE Collaborating Centre for

the Economics of Animal Health.

- The establishment of a second multi-year case study, in Indonesia (Java – poultry and cattle, and Sulawesi – pigs), with funding from the Australian Government.

Following validation of the methodology, subsequent phases are planned from 2023 to 2030, during which GBADs will focus on engaging users (public and private) and seek repeated feedback on the utility of GBADs products. Thus, GBADs aims to create a methodology that is valuable, widely adopted and ultimately embedded in an international code of practice.

Table I: GBADs' ten-year vision from implementation to institutionalisation

2020-2022	2023-2025	2026-2030
<ul style="list-style-type: none"> - Apply the GBADs methodology and publish it for comment - Estimate and publish the burden of animal diseases for at least one case-study country, which can be disaggregated by region and production system - Describe and publish the total global investment in livestock and aquaculture, including expenditure on education, health management, and research and development - Estimate and publish the Global Burden of Animal Diseases - Set GBADs, initially, in an institutional context 	<ul style="list-style-type: none"> - Use accepted economic and informatic methodologies and metrics to systematically describe and share data on the burden of animal diseases - Estimate the local burden of animal diseases for early case study countries to drive optimisation of investment decisions in animal health activities which in turn will lead to improved production efficiency, and increase household income of small-scale producers - Estimate the global burden of animal diseases at the sector level focusing on those of key importance in terms of feeding people and using scarce environmental resources (e.g. broiler, dairy, swine) - Estimate the burden of animal diseases on human health from zoonoses, food-safety-related issues and malnutrition 	<ul style="list-style-type: none"> - Embed the methodology in international code of practice - Encourage the adoption and use of the methodology by countries, and by private companies to prioritise investments and evaluate interventions - Use metrics to describe and compare the burden of animal diseases as it changes over time, by region and production system, and the impact on individuals with different gender and socio-economic status - Ensure that GBADs data and metrics are available as input for analyses of One Health issues (interaction among humans, animals, plants and the planet) - Support the teaching of the application of GBADs by centres of excellence

Several risks and challenges have been identified based around the following core categories:

- the security situation for country case studies
- data availability and accessibility
- funding
- institutionalisation and global acceptance of GBADs.

For this and subsequent investment periods (see Table I), a comprehensive risk register will be used to monitor and implement appropriate mitigation measures against the above categories.

Work streams

During the planning phase, key themes were established and principal investigators appointed to identify the main activities of each theme. Those themes are categorised into work streams, comprising a methods stream, a knowledge-engine stream, and a capacity and reach stream.

• Methods work stream

The methods work stream includes the following themes:

- population and production systems
- production loss and expenditure
- wider economic impacts
- animal health ontology and attribution
- human health.

An accepted overarching methodological framework, suitable for application in livestock and aquaculture sectors, is being tested at country and global levels in selected production systems. In addition, an ontological framework is being implemented to promote semantic interoperability between various animal health and financial data systems. Finally, exemplar studies for zoonotic and foodborne diseases are providing evidence of the potential for improved human health burden estimates as a result of robust quantification of their status in the animal population.

• Knowledge-engine work stream

Knowledge-engine development is led by one theme, the informatics theme, which manages the interface between data, analytics and information access across the programme. Best practices and the latest

technology in information architecture, cloud security and data-sharing are used, transforming data into useful and accessible information.

• Capacity and reach work stream

Developing the capacity of local implementing partners, while improving the reach of the programme is the responsibility of the disease prioritisation, engagement and education themes and is driven by establishing country- and sector-based case studies. The focus of this work stream is the implementation of the GBADs methods and dissemination, interpretation, and use of the information that is created.

GBADs will capture information on the economic differences between women and men. The programme will specifically seek gender information on the provision of labour, recognising that benefits, management and ownership of animals may differ between livestock species and production systems. Where data exist, gender will be disaggregated, and where data is lacking, GBADs will highlight gaps on gender information.

Data governance mechanism

Given globalisation and our interconnectedness, resulting in rapid disease spread, the importance of data and improving data-set value is paramount to policy-making at international and national levels. Policy-makers must rapidly create and coordinate actions based on complex information in order to positively impact the global health system. This is why the OIE, the intergovernmental organisation responsible for improving animal health and welfare worldwide, is actively and diligently striving to provide its Members and partners with unique and robust information to strengthen animal health institutions and partnerships. GBADs has been designed to complement the OIE's various data sets and to expand the information available to countries and stakeholders. The OIE collects, analyses, validates and disseminates a large volume of information through different platforms and processes to manage existing and novel diseases that could be of public health, agricultural, social and economic importance in the future. The [OIE-WAHIS](#) database is a real-time and comprehensive global resource that enables effective surveillance of transboundary animal diseases. While the [OIE Global Antimicrobial](#)

[Usage database](#) quantifies and characterises the use of antimicrobials in animals worldwide, a topic of high importance. Moreover, the OIE's [Performance of Veterinary Services \(PVS\) Pathway](#) and the OIE Observatory are two programmes that empower national Veterinary Services by providing information on gaps, inefficiencies, and opportunities for improvement based on international standards. The [OIE Observatory](#) is a continuous and systematic mechanism of observing and analysing Members' practices in the implementation of OIE standards. The PVS Pathway, is a capacity-building platform for the sustainable improvement of national Veterinary Services. GBADs will add and integrate information to improve decision-making on how to efficiently channel limited resources to address animal health and disease issues of high economic and social impact⁹.

The GBADs knowledge engine will be rooted in a standardised and well-defined data governance and provenance strategy, allowing GBADs to act as a trusted data broker. Brokering data means that GBADs will not own (or in many cases store) data that are disseminated through the system, but it will provide data that have been standardised using documented methods. The GBADs data governance and provenance strategy¹⁰ will engender trust and confidence among all data providers and users by ensuring that data are standardised, guarded against misuse, and transparently processed. Specifically, this will include regimented metadata standards, including controlled vocabularies, ontologies and structures that will form the backbone of the knowledge engine. Quality standards will allow data and metadata to be queried and will provide an understanding of how and when data sources can be combined. Emphasis on data quality will ensure detailed provenance for all information provided by GBADs.

⑤ GBADs resource needs

Support received to date

Since its very beginning, the GBADs concept has generated interest and support. In 2019, two sur-

veys were delivered to aid understanding on the needs of governments, non-governmental organisations and the private sector, in terms of addressing animal-disease issues. Over 90% of key animal-health decision-makers surveyed suggested that they would use GBADs analyses to support decision-making. Eighty percent of the same interviewees would also consider sharing data to support the GBADs programme¹¹.

During Phase II of the programme, GBADs' partners have secured financial support from other resource partners such as the European Commission, Brooke (an international animal welfare charity) and the Irish Government. Moreover, the University of Liverpool together with Utrecht University and the Norwegian Veterinary Institute were approved, at the 89th OIE General Session in May 2021, as the first OIE Collaborating Centre for the Economics of Animal Health, which will operate in the European region while also supporting the development of similar consortia in other regions (notably in Africa and Asia-Pacific, linking with GBADs case study implementation partners in Ethiopia and Indonesia, respectively).

A ten-year vision

The proposed mechanism for GBADs funding is through contributions to the OIE's multi-donor trust fund, the [OIE World Animal Health and Welfare Fund](#). The GBADs programme has a ten-year vision, which ends in 2030, and sets a clear pathway towards sustainability through use by countries, buy-in from the private sector, and commitment by international organisations and the global community (see Table I). Support for a programme as ambitious as GBADs and its required investment is dependent on the commitment of a diverse range of public, private, and philanthropic sources. These resources will be needed to fund 1) the core programmatic work of leadership, methods and engagement, 2) informatics systems, and 3) country-level case studies (see Table II).

The period 2023-2030 will require further significant funding for GBADs to be implemented successfully,

⁹ | The value-added of GBADs is technically sound and efficient economic methodology that supports decision-making on resource allocation integrated into OIE's international standards and guidelines. To encourage a broad use of GBADs by Members, partners, researchers and the international animal health community, training will be provided through the OIE and GBADs Training Platforms.

¹⁰ | Documentation of where a piece of data comes from and the processes and methodology by which it was produced.

¹¹ | <https://animalhealthmetrics.org/surveys/>

as the core annual spend on the parallel processes of developing and piloting the application is anticipated to be approximately US\$ 5 million¹². This investment will support the operationalisation of methods in a wider number of case studies, thereby expanding both the validation of methods and the coverage of estimations, in addition to providing continuous support for the programme's management.

It is essential that additional case studies are launched in diverse geographies and production systems in order that the programme's impacts are generated across the spectrum of socio-economic contexts. Using the Indonesian case study (launching in early 2022) as an example, a budget of approximately US\$ 500,000 per year is sought for each case study¹³. Informatic resources will increase as the analytical processes are embedded and updated in the knowledge engine, processes

are implemented to assure data governance, links to data sets are established and maintained, and data sets are cleaned and catalogued. Based on experience from programmes with significant IT build or maintenance components, the expected budget for this element is US\$ 2 million annually.

GBADs secured a principal grant of US\$ 7 million to launch Phase II, along with US\$ 1.7 million in complementary investments. While approximately US\$ 1.4 million of in-kind contributions have been received during Phases I and II. GBADs' partners will continue to engage in resource mobilisation and dialogue with existing and new resource partners to ensure sustained investment. It is expected that not all funding will be coordinated through the OIE, and that all GBADs' partners will contribute to resource mobilisation efforts targeting different groups of investors. Early work and results from

Table II: Estimated costs of the programme from 2023 to 2030 (in US\$ million)

	2023	2024	2025	2026	2027	2028	2029	2030	TOTAL
Leadership, Methods, Engagement	5	5	5	5	5	5	5	5	40
Informatics	2	2	2	2	2	2	2	2	16
Number of country case studies (at US\$ 500k/yr.)	3	5	10	10	10	15	20	30	-
Case studies (total cost)	1.5	2.5	5	5	5	7.5	10	15	51.5
TOTAL	8.5	9.5	12	12	12	14.5	17	22	107.5

local- and global-sector case studies will be used to demonstrate the feasibility and value of GBADs methodology to convince resource partners of the importance of investing.

© Adapting to meet success criteria

For GBADs to achieve global acceptance and be-

come successful, the following success criteria need to be met:

- validation of the methodology at different stages
- definition and acceptance of the utility of GBADs methods and outputs
- technical reliability and financial support

A results framework has been populated with out-

¹² This figure does not take into account potential future inflation

¹³ This figure is an estimation based on an average calculation of costs incurred for the implementation of cases studies at time of writing. It does not represent a fair pricing for each future country case study selected as costs will reflect the resource required to achieve the agreed scope in the desired duration of implementation for each study.

puts aligned with those in the Theory of Change anchored at the programmatic level (see page 9). These outputs are the responsibilities of GBADs partners who lead themes in their respective areas of expertise. A classic project management process is being implemented which tracks the progress to completion of outputs and uses a monthly reporting process to raise and solve issues. Yet pre-determined outputs may prove to be inappropriate in scope or timing, or perhaps no longer relevant. Therefore, GBADs aims to employ sound adaptive management practice with a focus on achieving the success criteria (listed above) in Phase II and broader programmatic outcomes in subsequent phases. The success criteria will create opportunities to learn from achievements, identify challenges, and open pathways for improvement when testing the assumptions that bridge programme outcomes with its overall impact. The measurement of the success criteria does not lend itself to evaluation within the siloed structure described in pages 9 to 12. Instead, these are cross-cutting criteria that rely on the ability the GBADs team (comprised of the nine themes and Directorate), to combine the various elements of the research into a methodology that is credible, coherent, and useful. The monitoring, evaluation and learning (MEL) approach that GBADs is taking maps the siloed outputs onto each success criterion and identifies additional monitoring mechanisms that will be required to provide evidence of enhanced, higher-level, and longer-term focus leading to global ac-

ceptance and use.

7 Contact information

You can learn more on:

- GBADs [website](#)
- OIE's [GBADs digital narrative](#)
- OIE [Panorama](#)

Should you have any questions please contact following focal points for the programme:

University of Liverpool

Jonathan Rushton

Programme Director

j.rushton@liverpool.ac.uk

World Organisation for Animal Health

Edna Massay Kallon

OIE Technical Lead – GBADs

em.kallon@oie.int

③ GBADs current collaborators

our FUNDERS



An Roinn Talmhaíochta,
Bia agus Mara
Department of Agriculture,
Food and the Marine

our PARTNERS



our COLLABORATORS



Universiteit Utrecht





WORLD ORGANISATION FOR ANIMAL HEALTH

Protecting animals, preserving our future

12 rue de Prony
75017 Paris, France
www.oie.int