INTERNATIONAL CENTRE FOR ANTIMICROBIAL RESISTANCE SOLUTIONS

Request for Proposals

Title: Solutions for integrating antimicrobial resistance (AMR) mitigation with climate-smart livestock and aquaculture systems in Asia and the Pacific

Issued Date: 15 May 2025

Submission Deadline: 30 June 2025

Table of Contents

1. ICARS Overview

ICARS partners with low- and middle-income countries (LMICs) in their efforts to mitigate Antimicrobial Resistance (AMR), informed by countries' National Action Plans, providing both funding as well as technical expertise to support intervention and implementation research projects across the One Health spectrum. Projects, in partnership with LMIC ministries, research institutions and other stakeholders, are co-created and co-developed to support solutions and interventions that are context-specific and cost-effective for sustainable scale-up. So far ICARS has supported over 55 projects in 25 LMICs, across the human, animal, and environment sectors. Supported projects span several intervention areas in the research-policy interface that are both AMR-specific and AMR-sensitive, including biosecurity, vaccination, Antimicrobial Stewardship (AMS) and Infection Prevention and Control (IPC). For more details visit: https://icars-global.org/.

2. BACKGROUND

Antimicrobial resistance (AMR) is among the most urgent global and One Health challenges of our time, with an estimated 39.1 million deaths attributable to antimicrobial resistance and 169 million deaths associated with antimicrobial resistance cumulatively between 2025 and 2050[1]. Since the launch of the global action plan on AMR in 2015, the urgent need to mitigate the threat of AMR has rightfully gained traction and recognition. However, despite the increased political awareness at global, regional, and national levels, alarming rates of AMR continue to increase, across many regions of the world, but with the most severe consequences and burden witnessed by LMICs.

AMR is a One Health challenge, spanning human and animal health as well as the environment. It is a global development issue that poses a serious threat to achieving the Sustainable Development Goals (SDGs). Without urgent action, AMR could push an additional 24 million people into extreme poverty by 2030 and lead to an 11% decline in livestock production in LMICs by 2050[2,3] .

AMR and Climate Change

Climate change is impacting human health, animal health, food, plant and environment eco-systems in numerous ways, and many of which contribute to the emergence of AMR. Changes in environmental conditions can result in an increase in the spread of bacterial, viral, parasitic, fungal, and vector-borne diseases in humans, animals and plants (IPCC, 2018[4]). The linkages between climate hazards, infection

[1] GBD 2021 Antimicrobial Resistance Collaborators. Global burden of bacterial antimicrobial resistance 1990–2021: a systematic analysis with forecasts to 2050. The Lancet. 2024;404(10459):1199-1226. doi: 10.1016/S0140-6736(24)01867-1.

[2] O'Neill, J. (2016). *Tackling drug-resistant infections globally: Final report and recommendations*. Review on Antimicrobial Resistance, chaired by Jim O'Neill. 160518_Final paper_with cover.pdf (amr-review.org).

[3] Adamie BA, Akwar HT, Arroyo M, Bayko H, Hafner M, Harrison S, Jeannin M, King D, Kweon S, Kyeong ND, Olumogba F, Rigby I, Song SJ, Yerushalmi E, Yugueros-Marcos J, Zakaria S. (2024). – Forecasting the Fallout from AMR: Economic Impacts of Antimicrobial Resistance in Food-Producing Animals – A report from the EcoAMR series. Paris (France) and Washington, DC (United States of America): World Organisation for Animal Health and World Bank, pp. 170. https://doi.org/10.20506/ecoAMR.3541. Licence: CC BY-SA 3.0 IGO.

[4] IPCC (Intergovernmental Panel on Climate Change). 2018. *Global Warming of 1.5° C. An IPCC Special Report on the impacts of global warming of 1.5° C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty*. Geneva, IPCC.
https://www.ipcc.ch/site/assets/uploads/sites/2/2019/06/SR15_Full_Report_High_Res.pdf

spread, and AMR are emerging and complex. Despite the well-established connection with rising temperatures documented over decades, the evidence base specifically connecting these climate factors to antimicrobial resistance is still relatively limited (Watts et al., 2018[5], MacFadden et al., 2018[6], Magnano et al., 2023[7]). This is particularly true for livestock and aquaculture systems in LMICs where the dual threat of increasing AMR and climate hazards could have significant impacts (World Health Organization[8]).

For both climate hazards and AMR, the returns on investing in containment and mitigation are expected to far outweigh the costs (Rupasinghe *et al*., 2024,[9]). However, more multidisciplinary research is needed to develop a robust and actionable evidence base on the linkages between the climate hazards on AMR in different scenarios and settings, and to investigate how the climate agenda and measures on the ground can become more AMR specific and sensitive. This aligns with the message from the Global Leaders Group on AMR, which calls for increased financing, political advocacy, and coordinated global action to understand and address the intersecting threats of AMR and the climate hazards before it is too late (Global Leaders Group on Antimicrobial Resistance, 2021[10]).

Global animal production will rise over the next decades to meet increasing demand for animal-sourced foods. Livestock production is crucial for global food systems and poverty reduction, supporting the livelihood of nearly 1.3 billion people. Climate change, especially global warming, will impact all livestock systems — grazing, mixed farming, and industrialized — differently. Extreme weather events can exacerbate the incidence of respiratory, gastrointestinal and vector borne illnesses which requires greater reliance on therapeutic antimicrobial use. This projected increased use is not just a reflection of expectation of increased biomass but also to combat emerging and rising infections as a results of extreme weather events. Livestock's contribution to greenhouse gas emissions varies by production system, necessitating context-specific adaptation and mitigation strategies. These may include breeding for disease and heat tolerance, new technologies, improved management, mixed crop-livestock systems, nutritional interventions, better water quality and harvesting, improved housing, enhanced animal waste management, alteration of livestock diets or feed additives and more effective disease and weather monitoring (FAO, 2017 [11]). High-risk areas for climate change, where most animal meat is produced, include South America, the Sahel, Sub-Saharan Africa, the Arabian Peninsula, and

[5] *The 2018 report of the Lancet Countdown on health and climate change: shaping the health of nations for centuries to come Watts, Nick et al. The Lancet, Volume 392, Issue 10163, 2479 – 2514*

[6] *MacFadden, D.R., McGough, S.F., Fisman, D. et al. Antibiotic resistance increases with local temperature. Nature Clim Change 8, 510–514 (2018). https://doi.org/10.1038/s41558-018-0161-6*

[7] Magnano San Lio, R., Favara, G., Maugeri, A., Barchitta, M. & Agodi, A. 2023. How antimicrobial resistance is linked to climate change: an overview of two intertwined global challenges. *International journal of environmental research and public health*, 20(3): 1681.

[8] https://www.who.int/news-room/fact-sheets/detail/climate-change-and-health

[9] Rupasinghe, N., C. Machalaba, T. Muthee, & A. Mazimba. 2024. *Stopping the Grand Pandemic: A Framework for Action. Addressing Antimicrobial Resistance through World Bank Operations*. Washington, DC, World Bank. License: CC BY 3.0 IGO.

[10] Global Leaders Group on Antimicrobial Resistance. 2021. Antimicrobial resistance and the climate hazards. Information note.

[11] FAO. 2017. *Livestock solutions for climate change*. Rome. https://openknowledge.fao.org/server/api/core/bitstreams/0d178ab7-b755-4eb2-a6cd-05ba1db35819/content

South and Southeast Asia (Kummu *et al*., 2021[12], FAIRR Initiative, 2022[13]). These regions are projected to have an increasing antimicrobial use in livestock (Mulchandani et al., 2023[14]). This underscores the need for collaborative cost-effective strategies and policies to address AMR and climate change, focusing on the most vulnerable areas and communities.

Equally important is the role of aquaculture (the farming of aquatic organisms) in meeting the growing global food demand. Aquaculture is the fastest-growing food production sector globally and is key to food security in many LMICs (FAO, 2024[15]). However, climate change affects global temperatures, sea levels, rainfall patterns, disease spread and algae blooms, all of which impact the aquaculture industry, particularly in coastal regions in Asia and Small Island Developing States. Aquaculture producers are also using high amounts of antimicrobials, and AMR has been reported in all of the leading aquaculture-producing regions globally (Schar et al., 2021[16]). The hotspot areas for climate change and AMR are anticipated to show a similar overlapping pattern for aquaculture and similarly calls for integrated strategies that can mitigate the dual threats of climate change and increasing AMR. Collaborative and cost-effective strategies and policies are essential to address both AMR and climate change, focusing on the most vulnerable areas and communities involved in livestock and aquaculture.

3. Purpose and Scope

This Request for Proposals (RFP) seeks to fund small-scale action research studies that integrate, and measure climate change mitigation and/or adaptation strategies with reduced antimicrobial use (AMU) and AMR mitigation measures in livestock and aquaculture systems across LMICs in Asia and the Pacific.

Building on the background context provided, this RFP aims to support research that identifies, measures and evaluates practical solutions that simultaneously address the dual challenges of AMR and climate change. The research should focus on testing and evaluating evidence-based approaches that can be implemented in resource-constrained settings where these challenges are most acute.

The scope of this RFP includes:

1. **Geographic Focus**: Research studies will be conducted in Asia and the Pacific region, with preference for projects in high-risk areas where climate change impacts and antimicrobial use in food production systems overlap. The projects can be set at a country, multi-country or regional level.
2. **Production Systems**: We will support up to 4 research studies on aquaculture and/or livestock systems.

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[12] Kummu, M., Heino, M., Taka, M., Varis, O. & Viviroli, D. 2021. Climate change risks pushing one-third of global food production outside the safe climatic space. *One Earth*, 4(5): 720-729.
[13] FAIRR. 2022. *Food systems and livestock production under climate change: the IPDD's sixth assessment*. https://www.fairr.org/policy/issue-briefings/food-systems-and-livestock-production-under-climate-change
[14] Mulchandani, R., Wang, Y., Gilbert, M. & Van Boeckel, T.P. 2023. Global trends in antimicrobial use in food-producing animals: 2020 to 2030. *PLOS Global Public Health*, 3(2): e0001305.
[15] FAO.2024. *The State of World Fisheries and Aquaculture. Blue transformation in action*. Rome. https://doi.org/10.4060/cd0683en
[16] Schar, D., Zhao, C., Wang, Y., Larsson, D.J., Gilbert, M. & Van Boeckel, T.P. 2021. Twenty-year trends in antimicrobial resistance from aquaculture and fisheries in Asia. *Nature Communications*, 12(1): 5384.

3. **Research Focus Areas (a minimum of 2 should be included)**:
    - Intervention studies:

a. Focus on livestock and/or aquaculture production that simultaneously quantify through measurements the reduction of antimicrobial use and greenhouse gas emissions.
b. Focus on livestock and/or aquaculture production that simultaneously reduce antimicrobial use and improve climate change resilience

- Adaptation strategies in livestock and/or aquaculture farming that address changing disease patterns due to climate change
- Systemic approaches for integrating AMR and climate-smart initiatives at farm, local, and/or national levels
- Business and/or financing models for dual-purpose (AMR and climate change) interventions
- Enabling policy environment for integrating AMR and climate-smart initiatives at farm, local, and/or national levels

4. **Examples** of potential research areas to include but not limited to:
    - Animal feed and/or feeding systems as AMR and climate smart solutions
    - Mapping common drivers of climate change and AMR emergence
    - Breeding solutions that tackle both climate change and AMR
    - Quantification of dual reduction in greenhouse gas emissions and/or climate change resilience and AMU and/or AMR
    - Educational interventions on the interplay of climate change and AMR
    - Climate smart water management and waste-water treatment with dual impact on reducing AMU and/or e AMR
    - Early warning and monitoring systems that contribute to climate-smart systems with reduced AMU and/or AMR
    - Integrated policy and/or regulatory models and comparison at different levels addressing the interplay of climate change and AMR
    - Systems and tools for data sharing on climate change and AMU and/or AMR
    - Public-private partnership models for integrated climate change and AMU/AMR interventions
5. **Project Duration**: Projects will have a maximum duration of 9 months from the signing of the grant agreement

4. Expected Deliverables

The expected deliverables from projects supported under this RFP must include two or more of the following:

a) **Comprehensive description of the baseline situation:** A comprehensive baseline assessment of current practices in the selected production systems, including antimicrobial use patterns, AMR status (if possible), climate-related challenges, and existing intervention approaches.
b) **Intervention Implementation**: Documentation, quantification and measurements of the process, and outcomes of implementing and evaluating the climate-smart AMR interventions, including enablers and barriers to implementation.

c) **Evidence Generation**: Quantitative and qualitative evidence on the effectiveness, feasibility, and sustainability of interventions that address both AMR and climate change in the selected production systems.
d) **Economic Analysis**: Economic evaluation and analysis of the implemented interventions, including potential economic benefits and barriers to uptake and scale-up.
e) **Context-Specific Recommendations**: Practical recommendations for policymakers, producers, and other stakeholders on implementing and scaling climate-smart approaches to AMR mitigation that are tailored to the local context.
f) **Knowledge Translation Materials:** Development of materials for different stakeholder groups to facilitate knowledge translation and implementation of findings.
g) **Dissemination Plan:** A comprehensive plan for disseminating research findings to relevant stakeholders at local, national, and international levels. Dissemination outputs can include but are not limited to case studies in a multimedia format, guidelines, handbooks, curriculum developed, policy briefs, and educational material.
h) **Monthly meetings:** The team is expected to arrange and hold a monthly meeting with the ICARS team to update, share their progress and financial updates, and inform about challenges.

ICARS will evaluate eligible proposals based on an overall determination on how well the proposal demonstrates the ability to meet Expected deliverables. As part of this determination, ICARS will evaluate the Methodology offered, the Project Team and the Budget, as described below.

5. Methodology Selection

Type of methodologies to be used could include but not limited to:

- Participatory research approaches that engage key stakeholders (farmers, veterinarians, policymakers, etc.) throughout the research process.
- Mixed methods approaches that combine quantitative data collection (antimicrobial use, climate metrics, production outcomes) with qualitative methods (interviews, focus groups) to understand implementation contexts.
- Implementation of standardised metrics to quantify reductions in both antimicrobial use and greenhouse gas emissions. For antimicrobial use, interventions should demonstrate measurable reductions quantified in terms of mg/kg of animal product or Animal Daily Doses. For greenhouse gas emissions, appropriate climate science metrics should be applied to ensure comparable and meaningful measurement of environmental impact.
- Intervention research designs that can demonstrate causality between interventions and outcomes, and that tests specific practices or technologies.
- Implementation science frameworks to systematically assess barriers and facilitators to adoption of climate and AMR-smart interventions.
- Economic evaluation methods to assess cost-benefit/effectiveness and sustainability of interventions.
- Environmental assessment tools to measure climate impact (such as greenhouse gas emissions, water usage, etc.) of production systems before and after interventions.
- Antimicrobial resistance and AMU surveillance methods to monitor changes in AMU and/or AMR patterns.
- Surveys and/or consultations to assess behavioural changes and intervention acceptability
- Cross-sectoral collaboration reflecting the One Health approach.

- Incorporating AMR/AMU research to ongoing climate smart interventions.

Please note that other evidence-based approaches, not mentioned above but considered important for achieving the aim of this proposal, may also be proposed, within the allocated budget.

ICARS will evaluate based on how well the proposal incorporates chosen methodologies in their suggestions for managing this project.

Please note, specific activities as well as the budget in the awarded proposal are subject to discussion with ICARS and adjusted according to these conversations.

6. Eligibility and Selection

6.1. Eligibility

Applicants must demonstrate the following criteria to be considered for funding:

- Demonstrated experience in AMR, climate change, and livestock/aquaculture production systems.
- Profit-making organisations, which include private companies and associations, are not eligible as the lead organisation or as a grantee party in a consortium for this project, except as an SME under section 6.4. However, they can be collaborators bringing their own funding or in-kind contributions.
- International organisations established by treaty or other instrument governed by international law with their own legal status (including United Nations Organizations or any international academic/non-profit/for-profit institution) are not eligible as the lead organisation or as a grantee party in a consortium for this project, except as an SME under section 6.4. However, they can be collaborators bringing their own funding or in-kind contributions.
- Funding is limited to project components conducted in LMICs in the Asia and Pacific region and the LMIC partner is responsible for implementing the grant in this region.

Projects can collaborate with multiple countries in the Asia and Pacific region. We expect that the lead organisation will disburse funds to eligible partner institutions. Additionally, we expect partnership contracts to be signed between the lead institutions and all partner institutions within the first 1 month of the project.

6.2. Submitting Institution

Proposals can be submitted by a single institution or a consortium of institutions. In the case of a partnership/consortium, one proposal should be submitted on behalf of all partners.

The lead institution must:

a. Be a registered legal entity in a LMIC in the Asia and Pacific region, and be willing and able to enter into a contractual agreement, as the commissioned organisation, with ICARS.
b. Have submitted a completed application as per the guidance in this RFP. We will be unable to accept incomplete applications and those submitted after the end date.

c. This work will be carried out with financial support from the International Development Research Centre (IDRC), Canada, and the Global AMR Innovation Fund (GAMRIF), part of UK Government's Department of Health and Social Care (DHSC), together with ICARS. The successful institutions will be required to comply with the grant conditions of ICARS and IDRC.

6.3 Project Team Selection

The project research team should demonstrate knowledge/experience/composition in the following areas depending on the scope of their proposal:

- Qualitative and quantitative research and desk reviews.
- Design and/or implementation of policy recommendations for projects and/or programmes, ensuring that interventions have sustained impact.
- Facilitating workshops and/or trainings.
- Knowledge about governance, policy and practice with relevance to AMR, climate change and development issues.
- Collaborating and engaging with diverse stakeholder groups (government, NGOs, private sector companies, and communities) to ensure the continuation of efforts.
- Understanding of the AMR, climate change and One Health sectors, recognising the interconnectedness of human, animal, and environmental health.
- Demonstrate equity, diversity, and inclusion in the project team.
- Demonstrate inter and multi-disciplinary expertise in AMR, climate change, livestock and aquaculture.

It would be an advantage to have expertise in:

- Reporting skills that track the progress, effect and, sustainability of projects/ interventions over time.
- A demonstrated understanding of AMR and climate change research and policy.
- Prior involvement in developing handbooks, guidelines, and resource multi-media materials.
- Demonstrated experience in timely granting and administrative processes.

ICARS will evaluate based on how well the proposed project team demonstrates knowledge and experience in the above areas and their ability to produce the Expected Outputs.

6.4 Subject Matter Experts

The project team can sub-contract subject matter experts (SMEs) from any country, though preference should be given to SMEs based in LMICs Asia and the Pacific region. There must be clear justification for sub-contracted SMEs from high-income countries and may not be allocated more than 10% of the budget.

6.5 Legal compliance and knowledge translation

The successful institutions will be required to comply with the grant conditions, including organisational policies of the offering institution. ICARS policies including the code of ethics and professional conduct and the anti-bribery, fraud and corruption policy, are publicly available on the following website: https://icars-global.org/icars-policies/.

The ICARS grant agreement template can be requested by email: cc_amr@icars-global.org

Proposals may not be based on any third-party sources, including artificial intelligence tools, in responding to this RFP without being properly referenced according to the International Committee for Medical Journal Editors (ICJME) guidelines: CP-ACPJ220177 1.19 (icmje.org). We reserve the right to reject any proposal, if we determine that the proposal has misrepresented the applicants experience or knowledge or use of third-party sources in connection with this RPF.

This RFP and ICARS grant conditions are subject to Danish law.

7. How to apply

7.1. Contents of a proposal

Proposals should be no more than 10 pages, not counting annexes. Elaborate or unnecessary voluminous proposals are not recommended. Proposals must be submitted in English. Proposals should include:

A cover letter, including:

- The primary contact person with respect to this RFP: the individual's name, address, phone number and email address.
- Contact persons at partner applicant institutions if relevant.

The body of the proposal including (not exceeding 10 pages):

1. Proposal Summary (no more than half a page)
2. Background and literature review
3. Aim and Objectives
4. Methodology
5. Activities (Gantt chart)
6. Proposed outline of resource content
7. Stakeholder involvement
8. Project Management and Team Composition
9. References

Finally, the following annexes should be included with the proposal:

- Gantt chart
- Budget (see guidance and templates in section 7.2 and 7.3 below)
- CVs of core project team
- The latest institutional Annual Audited Financial report

- Standard Operating Procedures (SOP) for Accounting, these must include Accounting Instructions with the description of the internal controls processes and procedures, risk management and financial grant management

Please note that additional documentation / information may be requested from the successful applicant depending on the nature of each partnership and the organizational structure of the downstream partner.

7.2. Budget Guidance

The project budget should include the following categories at minimum:

a) Salaries and Fees (including estimated number of billable days to complete the work and rates for project team members).
b) Travel and Subsistence.
c) Project activities including SME cost (if considered).
d) Dissemination costs, including all costs related to knowledge translation and dissemination.
e) Contingency costs – maximum of 5% of the total budget.
f) Indirect costs: (e.g. Audit, Overhead, etc) should be no more than 15% of the direct costs.

Please note that the specific activities in the awarded proposal are subject to discussion with ICARS and that the budget will be adjusted according to these conversations before the grant agreement is signed.

Ineligible budget items
Only costs directly related to the project should be charged to the project. The following costs will not be allowed:

a) Cost of alcohol is not allowed at any time.
b) Costs of non-project related activities, such as parties, socialising events, etc.
c) Office and other costs not directly related to the project, such as purchase of shared printer, kitchen and other shared equipment.
d) VAT in cases where the downstream partner is eligible for VAT refund.

Maximum overhead rates will be 15% if a co-applicant research institution, university, or partner stakeholder has an actual overhead/indirect cost rate that is lower, the lower rate will apply, and the institution/university/stakeholder should not increase the funding request to the maximum overhead rate allowed. Co-applicant research institutions or universities and partner stakeholders are required to provide documentation if they have a general overhead/indirect cost rate. The actual overhead awarded in a grant budget may vary up to the maximum overhead rate and is based on a case-by-case decision depending on factors including, but not limited to, the type of research project, the level of administrative effort required, the overall grant size and the extent of sub-awards.

Contingency: For flexibility purposes, a contingency of maximum of 5% of the direct costs can be included. It will be possible to use this amount for the cost of items directly related to the project that were encountered in the process of project implementation and that were unforeseen in the process of budget preparation. These costs should not include items that otherwise should be absorbed by the project overhead. Utilisation of the contingency must be communicated and agreed with ICARS during project implementation.

Audit: The annual and the final accounts must be externally audited, and the audit is to include the entire set of project accounts, including the accounts of every partner institutions/stakeholder. The maximum amount to be used for audits is 2000 USD for the project duration. The funds for audit are earmarked. Additional expenses will not be accepted but must be borne by the institution responsible for the financial reporting. The audit expenses are not subject to overhead.

7.3. Project proposal, Gantt chart, Budget, CV templates

Please use the following templates for your application:

1. Project Proposal template
2. Gantt Chart template
3. Budget template *(please note not all budget lines will be applicable)*
4. CV template

7.4. Funding and budget selection

The maximum budget allocated to the successful proposal will be 100,000 USD for a project duration of 9 months.

ICARS will evaluate based on how well the budget demonstrates a relevant and convincing allocation of costs applicable to this project. ICARS will further take the submitted Annual Audited Financial report and Standard Operating Procedures (SOP) for accounting into account in determining the robustness of the budget.

Please note, all costs associated with submitting this RPF must be carried by the applicant.

7.5. Where to submit proposal

Please submit your proposal to the following email address: cc_amr@icars-global.org

7.6. Proposal deadline

All proposals must be submitted by 30 June, 2025, 23:59 CET. Any proposals submitted after this deadline will not be considered.

ICARS reserves the right to change the conditions of the RFP in which case an amendment stipulating any changes will be published and the timeline will be revised.

8. Timeline for this RFP

The proposed timeline for the RFP process includes:

- **15th of May 2025:** RFP is published
- **30th of June 2025:** Deadline for submissions
- **31st July 2025:** Deadline for the review of the applications
- **31st August 2025:** Letters of commitment and grant agreements signed
- **1st September 2025:** Commencement of work
- **30th June 2026:** Finalization of work

Please note that the deadline for review and evaluation of applications, the signing of the Letter of Commitment and Grant Agreement, and the commencement of work deadlines may be subject to change.

ICARS reserves the right at its discretion to withdraw the RFP at any time for justifiable reasons without issuing any awards.

9. Questions

For any specific questions related to this RFP, please reach out through the email: cc_amr@icars-global.org