Evaluation Report – DRAFT

Evaluation of the Health Security Initiative's Applied Research Program

12 April 2024

Strategic input on health to the Australian Government

Specialist Health Service

Executive Summary

Introduction

This Evaluation Report presents the findings of an evaluation of the Department of Foreign Affairs (DFAT) Health Security Initiative's Applied Research Program. The Health Security Initiative (HSI) investment provided funding specifically for applied health research, addressing health systems and/or policy research in relation to health security in the Indo-Pacific region. The five-year investment (AUD31 million, starting FY2017/18) represents one tenth of the total HSI investment and included two funding streams: *The Stronger Systems for Health Security* (SSHS) Program and Co-funding with the Australian Centre for International Agriculture Research (ACIAR) of the *Research for One Health for Systems Strengthening* (ROHSS) program. 16 applied research projects were funded and included in this evaluation. The evaluation was conducted January – April 2024. The evaluation was commissioned by the Australian Department of Foreign and Trade (DFAT).

Evaluation purpose

The purpose of the evaluation was to provide key findings on program progress and achievements and provide recommendations to inform any future similar programming by the Global Health Division/Australian Government.

Evaluation approach

The evaluation employed a qualitative approach and used methods of multi-stakeholder key informant interviews (KII) and document review. The evaluation included both a breadth and depth of inquiry through an extensive review of relevant documentation, KII, and country case studies in Fiji and Indonesia. Breadth of inquiry was across all 15 funded investments. The evaluation team reviewed end-of-project reports and assessed documentation against seven areas of inquiry. Depth of inquiry was focused on projects implemented in Fiji and Indonesia. Twenty-six stakeholders were interviewed - 12 Indonesia, 10 Fiji - relevant to four projects, (Fiji - AMR/EMR; WISH; Indonesia – PINTAR and ZOOMAL) as well as four DFAT representatives to provide insight to the whole program.

Limitations

Limitations to the evaluation included a tight schedule which meant that some key informants were unavailable, and reliance of project reporting where presentation of achievements in some instances is limited. This resulted in a lack of evidence in some cases to inform evaluation findings.

Evaluation findings

The overall evaluation conclusion is that tangible, significant achievements have been made by most investments funded within the Applied Research Program. However, there is not a strong connection to a programmatic approach and program, EOPOs.

The focus on systems strengthening and One Health approach has been effective to promote multi stakeholder interest and commitment to health security. The systems approach employed by the investments proved beneficial to respond to COVID-19 as strengthened systems such as strengthened staff capacity and improved laboratory services were realigned to the COVID response.

The evaluation identified mixed achievement (effectiveness) of the Applied Research Program EOPOs. Some individual investments demonstrated high achievement while others demonstrated

very little Achievement of EOPO 1 and EOPO 2 were most demonstrated. The evaluation identified strong evidence of national-level improved capacity (EOPO 3).[1]

The evaluation team identified several unexpected outcomes beyond those set out in the EOPOs. These included strong strengthened (research) institutional partnerships in the region. Community empowerment, and reduction in disease most notably leptospirosis, typhoid, dengue, and diarrheal (LTDD) in Fiji resulting from WISH-Fiji.

The implementation of the 'One Health' approach has been effective and contributed to achievement of program EOPOs. The focus on systems strengthening and One Health approach has been effective to promote multi stakeholder interest and commitment to health security.

Seven key approaches are set out in the report which enabled outcome achievements. As identified in other parts of this evaluation report, the successful approaches were also instrumental in achieving efficiencies, effectiveness, and sustainability of outcomes. Successful approaches were primarily associated with good development practice in addition to strong capacity and reputation of researchers. The approaches are also reflective of past research[2] on effective research practices.

The evaluation identified strong evidence of efficient governance and management of both the Applied Research Program and of individual investments. Where good governance and management were present, this was largely maintained during changing contexts due to COVID-19. There were, however, areas for improvement at both Program and investment levels.

The evaluation identified mixed evidence of M&E systems being used by project teams to generate credible information that was used for management decision-making, learning and accountability purposes. Whilst there were examples of M&E being utilised to support project implementation this was not evident in projects which were implemented within shorter time frames and focused research questions.

Risk management was found to be mixed within projects assessed in this evaluation, some projects described their practices in project reporting whilst others were silent on this topic. Similar to findings on use of M&E systems, larger scale multiyear research partnerships tended to document risk management practices, whilst shorter-term projects with discrete research knowledge creation outcomes did not document risk management.

The evaluation identified mixed evidence that investments considered gender-related risks and promoted efforts to improve gender equality. Review of final project reports by the evaluation team using the Gender at Work framework revealed overall little evidence of gender equality outcomes being achieved, though the team has implied achievement based on many of the investments focus on inclusion of women in project teams and WISH-Fiji has strong evidence of gender-transformative change outcomes. The evaluation team notes that gender analysis was not required of project teams at the design phase, and no project had specific gender equality outcomes, notwithstanding that gender integration is a clear policy of DFAT which was not realised.

[1] EOPO1: Target countries have more collaborative and strengthened systems and practices to improve Health Security; EOPO2: Decision makers have increased understanding, access to evidence for informed decisions around Health Security; and EOPO3: Improved regional capacity (experience and expertise) in Health Security
[2] RDI Network (2007) and ACIAR (2024)

Across all the investments included in this evaluation, there was a lack of evidence that that people with disabilities and/or disabled peoples' organisations (DPOs) were in involved in planning, implementation, and monitoring and evaluation of the investments. This was true both during document review and KII. Furthermore, there was little evidence that the investments enabled people with disability to benefit equally.

The investments were largely aligned to partner government's development priorities and beneficiary needs. While a few examples were identified, in most instances, the investment final reporting did not document relevance of investments to Australia's policy priorities and national interests; reporting on this topic was required in designs but not a specific requitement for final project reporting.

The evaluation identified some evidence that achievements of the investments (aligned to the Applied Research Programs EOPOs) will be sustained. This evidence was not distributed equally across the three EOPOs, and not for all investments, and as noted in the report the evaluation revealed risks that may undermine the benefits enduring after the projects finish. Through document review and KII, the evaluation team identified risks that will continue after the investments have finished, undermining sustainability of achievements realised through the investments, and contribution to ongoing actions for health security.

Recommendations

As indicated in this evaluation report, some specific investments have contributed to significant achievements through effective and efficient partnerships and strategic approaches. These approaches are aligned to other research on effective international development research practice.[3] The recommendations reflect an ambition to scale these approaches to achieve development effectiveness and outcomes. It is expected that recommendations would be applied by individual investments as appropriate within scale and scope and context of the research.

While the recommendations are directed primarily to DFAT, the expectation is that within the management response to this evaluation, DFAT staff will clearly identify which specific Group, Division, Branch are most relevant to take responsibility to enact recommendations.

Further details about how to practically action the recommendations are provided in the body of the report.

Recommendation 1: Australia's future investment in applied health research and One Health should include explicit focus on strengthening institutional research capacity and local leadership in national contexts for sustained systems strengthening and health security.

Recommendation 2: Australia's future investments in applied health research and One Health should increase focus on strengthening the research-to-policy interface and policy outcomes.

Recommendation 3: Australia's future investments in applied health research and One Health should continue to strengthen end-user engagement in research design, implementation and sense-making of findings towards practical uptake and use.

[3] RDI Network (2017) and ACIAR (2024)

Recommendation 4: Australia's future investments in applied health research and One Health should strengthen country and regional level collaboration between research teams and communicate research findings to end-users through regional perspectives for practical uptake and use by national leaders.

Recommendation 5: Australia's future investments in applied health research and One Health should require application of best practice international development approaches as a foundation to research, to strengthen development effectiveness and achieve a broad set of development outcomes.

Recommendation 6: Australia's future investments in applied health research and One Health should strengthen program-level MEL to ensure that individual projects within a program align their EOPOs with the investment-level EOPOs.

Recommendation 7: Australia's future investments in applied health research and One Health should strengthen GEDSI through practical and sustained guidance to investment teams to ensure tangible contributions are made.

Recommendation 8: Australia's future investments in applied health research and One Health should maintain and strengthen a 'systems' perspective and transdisciplinary approach, including multi-stakeholder/sector engagement to contribute to regional health security.

Recommendation 9: Australia's future investments in applied health research and One Health should consider multi-stage, longer-term research funding to create foundations for partnership and research impact/development outcomes.

Contents

Acronyms

Acronym	Description
ACIAR	Australian Centre for International Agriculture Research
EOPO	End-of-program-outcome
EQ	Evaluation question
DFAT	Australian Government Department of Foreign Affairs and Trade
FERDI	Framework for Exploring Research for Development Impact
GEDSI	Gender equality, disability and social inclusion
HSI	Health Security Initiative
KII	Key Informant Interviews
LTDD	Leptospirosis, typhoid, dengue, and diarrheal diseases
M&E	Monitoring and evaluation
ROHSS	Research for One Health for Systems Strengthening
SHS	Specialist Health Service
SHSS	Stronger Systems for Health Strengthening
SRA	Short Research Activity
ToC	Theory of Change
TOR	Terms of Reference
UTS-ISF	Institute for Sustainable Futures, University of Technology Sydney

Investment acronyms

Acronym	Description
ADEPPt-PNG	Accelerating the Development of Evidence-based Policy and Practice in Papua New Guinea
AMR/EMAR-Fiji	Supporting Fijian health and agricultural authorities implement the National Antimicrobial Resistance Action Plan Enhancing the management of antimicrobial resistance in Fiji
COHERES	Collaboration on One Health Economics for Systems
EZARET-PNG	Drug sensitive and resistant tuberculosis and zoonotic infections as causes of lymphadenitis in three provinces in Papua New Guinea
HealthLit	Swinburne Institute - Development, implementation and evaluation of community-based communication strategies to respond to health security threats in diverse communities in Lao PDR and Cambodia
HPAI Policy	Nossal Institute for Global Health - Incentives for early declaration and effective prevention of Avian Influenza in the Mekong
PINTAR-Indonesia	Improving the dispensing of antibiotics by private drug sellers in Indonesia: a missing ingredient in the fight against antimicrobial resistance (AMR)
STRATUM-Indonesia/PNG	Menzies School of Health Research- Stronger Health Systems for multidrug-resistant tuberculosis and malaria
STRIVE-PNG NMVBDCP	Stronger Surveillance and Systems Support for Rapid Identification and Containment of Resurgent or Resistant Vector Borne Pathogens in Papua New Guinea National Malaria and Vector Borne Disease Control Program
STRONG-TL	Surveillance Training, Research Opportunities and National Guidelines for communicable disease control in Timor-Leste
V-RESIST-Vietnam	Combating the emergence and spread of antimicrobial resistant infectious diseases in Vietnam
WISH-Fiji	Securing health in Fiji through strengthened health systems and integrated water management to tackle typhoid, dengue, and leptospirosis
ZAPPA-PNG	Better understanding of the epidemiology, and improved surveillance capacity for zoonotic arbovirus infections in PNG
ZOOMAL-Indonesia	Zoonotic Malaria in Indonesia Evaluating zoonotic malaria transmission and agricultural and forestry land use in Indonesia

1. Introduction

This Evaluation Report presents the findings of an evaluation of the Health Security Initiative's Applied Research Program. The Health Security Initiative (HSI) investment provided funding specifically for applied health research[4], addressing health systems and/or policy research in relation to health security in the Indo-Pacific region. The evaluation was conducted January – April 2024. The evaluation was commissioned by the Australian Department of Foreign and Trade (DFAT).

This evaluation report has been prepared in line with the Department of Foreign Affairs and Trade (DFAT) M&E Standards (Standard 6) (see Annex 1).

2. Background and context

This Health Security Initiative (HSI) investment provided funding specifically for applied health research, addressing health systems and/or policy research in relation to health security in the Indo-Pacific region. The five-year investment (AUD31 million, starting FY2017/18) represents one tenth of the total HSI investment and included two funding streams:

1. *The Stronger Systems for Health Security* (SSHS) Program is a key investment of the Australian Government's Indo-Pacific Health Security Initiative. Following a competitive peer review process and selection process, convened by the National Health and Medical Research Council with SSHS, seven grants were selected totalling AUD16 million over three years.
2. Co-funding with the Australian Centre for International Agriculture Research (ACIAR) of the *Research for One Health for Systems Strengthening* (ROHSS) program which consisted initially of six Small Research Activities of which three successfully progressed through ACIAR's project commissioning process (total AUD10.2 million). Two received an additional ACIAR investment in 2023.

The two funding streams of the Program were managed separately. SSHS was managed through DFAT via the Indo-Pacific Health Security Initiative. Investments provided progress reporting via Smarty Grants. ROHSS activities were managed by ACIAR with summary reporting provided to DFAT.

The investments funded under the Program employed different modalities of delivery and included different objectives, though they all sit under the Applied Research Program Theory of Change (ToC) (see Annex 2). The ToC was developed after the investments were designed and funded. As described further in section 4.1.1 the ToC was developed collaboratively with representatives from all investments (including in-country partners), with agreed line-of-sight between specific investment objectives and the ToC EOPOs. The Applied Research Program Theory of Change (ToC) sets out three End-of-Program-Outcomes (EOPOs): EOPO1: Target countries have more collaborative and strengthened systems and practices to improve Health Security; EOPO2: Decision makers have increased understanding, access to evidence for informed decisions around Health Security; and EOPO3: Improved regional capacity (experience and expertise) in Health Security. Whilst the individual investments were reflected in the ToC, they were not expected to equally achieve the

[4] Funded applied health research is described in this report using 'investment' or 'project' interchangeably.

three EOPOs. The evaluation was tasked to assess investment achievements, and through these asses how these contribute and are demonstrative of achievement of program EOPOs.

Annex 3 provides a summary of projects funded under each of the funding streams and are included in this evaluation.

The applied health research program was affected by COVID-19 during 2020 and 2021 causing disruption to planned activities, and also realignment of investment resources to support Australian government response to the pandemic. As described in latter sections of this evaluation report, travel restrictions disrupted project partnership activities. In some instances, project priorities and resources (budgets and staffing) were realigned to respond to country level responses. The applied research program was well established to support Australia's regional response to COVID, with established partnerships, context and country level understanding and administration and financing management in place.

3. Evaluation overview

This section sets out a brief description of the evaluation approach.

3.1. Evaluation purpose

The purpose of the evaluation was to provide key findings on program progress and achievements and provide recommendations to inform any future similar programming by the Global Health Division/Australian Government.

3.2. Evaluation questions

The evaluation included 18 key evaluation questions, and additional sub questions focused on the seven areas of inquiry. These included the six Aid Quality Criteria - effectiveness; efficiency; gender equality, disability and social inclusion; relevance; sustainability - and recommendations.

Each part of the evaluation had key evaluations question to frame inquiry and write up. The set of key evaluation questions for each of the evaluations are set out in Annex 4, and also provided with each relevant section of the findings.

3.3. Evaluation approach

The evaluation employed a qualitative approach and used methods of multi-stakeholder key informant interviews (KII) and document review. The evaluation included both a breadth and depth of inquiry through an extensive review of relevant documentation, KII and country case studies in Fiji and Indonesia.

Breadth of inquiry was across all 15 funded investments. The evaluation team reviewed end-of-project reports and assessed documentation against seven areas of inquiry and using a set of analytical frameworks linked to the evaluation questions. Summary of the analytical frameworks used by the evaluation team is provided in Annex 5. The list of investments and lead organisation is provided in Annex 3. Four DFAT representatives were interviewed provide a broad perspective of the programs' implementation and progress achieved.

Depth of inquiry was focused on projects implemented in Fiji and Indonesia. Twenty-two stakeholders were interviewed - 12 in Indonesia, 10 in Fiji - relevant to four projects as noted below.

Two projects[5] include two phases of funding. Interviewees included project staff from Australian and local organisations and government (national and sub-national) representatives relevant to the projects. In addition to end-of-project reports, available project documentation was reviewed by the team as background information.

FIJI

AMR/EMAR-Fiji

- Supporting Fijian health and agricultural authorities implement the National Antimicrobial Resistance Action Plan
- Enhancing the management of antimicrobial resistance in Fiji

WISH-Fiji

- Securing health in Fiji through strengthened health systems and integrated water management to tackle typhoid, dengue, and leptospirosis

INDONESIA

PINTAR-Indonesia

- Improving the dispensing of antibiotics by private drug sellers in Indonesia: a missing ingredient in the fight against antimicrobial resistance (AMR)

ZOOMAL-Indonesia

- Zoonotic Malaria in Indonesia
- Evaluating zoonotic malaria transmission and agricultural and forestry land use in Indonesia

Project and country case studies are presented in Annex 6 and are also drawn on to inform the findings section. Case studies draw on data from document review and KII. They are presented through a realist evaluation approach. This approach describes context, mechanisms and outcomes and sets out a program theory of how change happens.

3.4. Evaluation limitations

The evaluation plan identified several potential limitations, some of which were realised and need to be acknowledged, since they will influence a reader's interpretation of the findings.

The tight evaluation schedule put pressure on the evaluation team to access key relevant individuals with direct involvement with the investments. This was largely mitigated by the team with a substantiative set of KII completed for the country case studies. The ACIAR manager of the ROHSS did not respond to repeated invitations to KII during the evaluation period, though they attended a 'sense-making workshop' conducted by the evaluation team where emerging findings and draft recommendations were presented for comment. One DFAT officer declined to participate.

The evaluation team acknowledge limitations associated with document review of end-of-project reports which informed response to evaluation questions. The DFAT Smarty Grant template for SHSS

[5] AMR/EMAR-Fiji includes two phases. ZOOMAL-Indonesia included two phases.

investments has text limits for key sections and defined headings, which may limit content provided by research teams. ACIAR reporting had no page limits, but pre-defined headings/content areas. restrictions. To note that the evaluation covers a range of investments with different budgets and time frames. The scope and reporting was generally appropriate for the size of individual investments.While other relevant program and project documentation (for Fiji and Indonesia case studies) was reviewed[6], assessment of these reports was not systematic to inform evaluation questions.

4. Findings

Evaluation findings are informed by the document review and KII carried out by the evaluation team. Findings presented below are presented under evaluation areas of inquiry responding to key evaluation questions.

4.1. Effectiveness

This section provides evaluation findings relevant to evaluation questions:

1. To what extent did the Applied Research Program achieve the expected EOPOs?
2. To what extent did the investments deliver unexpected outcomes in response to changes in the operating context?
3. What approaches and strategies implemented were most successful to achieving anticipated and unanticipated outcomes?
    I. To what extent has the program supported behaviour change among partners and beneficiaries?
    II. To what extent did policy dialogue or policy change contribute to program outcomes?
    III. To what extent has 'One Health' implementation been effective and contributed to program outcomes?

4.1.1. Achievement of expected End of Project Outcomes (EOPOs)

The evaluation identified mixed achievement of the Applied Research Program EOPOs, with some individual investments demonstrating high achievement and others little achievement.

Achievement of EOPO 1 and EOPO 2 were most demonstrated. The evaluation identified strong evidence of national-level improved capacity (EOPO 3).[7]

The evaluation was tasked to assess achievement against the Applied Research Programs' ToC, though funded investments were not expected to equally achieve all three EOPOs nor required to report on their achievements against this framework. The ToC was formulated after the investments were designed, funded and already underway. A workshop was held with research leaders (after the investments commenced) to collaboratively develop a ToC. Investment leads confirmed during this workshop that their expected outcomes were reflected in the Program's ToC. The evaluation team

[6] Other relevant documentation included additional progress reports, project case studies, academic papers.
[7] EOPO1: Target countries have more collaborative and strengthened systems and practices to improve Health Security; EOPO2: Decision makers have increased understanding, access to evidence for informed decisions around Health Security; and EOPO3: Improved regional capacity (experience and expertise) in Health Security.

identified investment achievements through document review and KII and allocated these to relevant EOPO categories. Ideally, a stronger alignment of investment reporting to program outcomes would have enabled the program to have a stronger demonstration of achievement of EOPOs. Informed by this assessment of the evaluation team, a recommendation of this evaluation is to strengthen program-level MEL for future investments.

The evaluation team identified evidence of achievements in EOPO1 in ten end-of-project reports, however six reports did not provide sufficient or relevant evidence of contribution to this outcome. Amongst those end-of-project reports providing evidence of achieving EOPO1, examples included (i) increased collaboration across sectors, including related to One Health, people, environment, and animals. For example, AMR/AMR-Fiji supported a national antimicrobial resistance committee, a multi-sectoral platform for implementing the national AMR action plan in Fiji. STRIVE-PNG, described achievements - "*This has been an opportunity to strengthen the collaboration between PNGIMR, NAQIA and Australian Partners in One health laboratory activities. The establishment of the PMU model has enabled the NMVBDP to draw on support for coordination and alignment with regional networks."* (ii) strengthened connections between different levels of government responsible for health security. For example, V-RESIST included collaboration between Ministry of Health, district hospitals, pharmacists, and laboratory staff. WISH-Fiji also involved increased collaboration across multiple sectors (health, water, environment) and from village, sub-national and national levels of governance. (iii) development of policies / guidelines for health security. For example, V-RESIST in end-of-project reporting documented "*New national AMS guidelines were formally adopted by the Ministry of Health as a direct result of this project. These guidelines provide a template for more than 2,000 district hospitals to scale up AMS nationally"* STRONG TL described how the project *"has contribute[d] to the development and implementation of an overarching critical care strategy for Timor-Leste, which centres training for referral hospitals in remote municipalities that is led by Timorese clinicians"* (iv) formation of committees to be responsible for health security, for example WISH-Fiji contributed to formation of village water committees. Through the collaboration with government ministries, a cross-sectoral National Drinking Water Quality Committee has also been established through cabinet approval in 2021 providing a legal platform to provide safe drinking water and ensure better preparedness and response to water-related diseases. (v) strengthened systems and practice were most evident in relation to improved functioning of surveillance and laboratory services, for example V-RESIST-Vietnam, STRONG-TL, WISH-Fiji, STRIVE=PNG.

The evaluation team assessed weak evidence of EOPO 1 achievement where details were provided by project teams which described collaboration within the research projects or where collaboration was still emerging, rather than in-country collaboration between local actors. For example, increased collaboration described between Australian and national organisations, (rather than within national organisations). Another project described initial efforts to increase coordination between national agencies, and whilst this was in place, there was not strong evidence that this had resulted in health strengthening outcomes. This can be viewed as the difference between output and outcome reporting, output reporting described in this case. Another project which was focused on scientific health research did not have intent to strengthen collaborative and strengthened systems and practices.

Investment end-of-project reports documented strong evidence that decision-makers have increased understanding, access to evidence for informed decisions around Health Security (EOPO 2). The evaluation team identified evidence of achievements in EOPO2 in eleven end-of-project reports, however five reports did not provide sufficient or relevant evidence of contribution to this outcome.

Strong evidence of achievement of EOPO2 included all investments within SSHS funding stream managed by DFAT, and as described in section 4.1.3 below, often involved a complimentary suite of interventions that included multi agency engagement, capacity strengthening and technical upgrades of equipment and production of new evidence. Strong evidence of achievement of EOPO2 included when evidence was provided and accessed by a multi-stakeholder group of decision-makers of health security, and they had practical reason to use the information to inform action. Dissemination to multiple actors provided the benefit of creating shared responsibility and cross sectoral collaboration for health security. Uptake and use were most effective where research teams were actively engaged in collaborative research activities with strong engagement of end-users in the research. for example, STRIVE-PNG reported:

> *Since the beginning of the program, STRIVE's team has worked closely alongside policy makers, implementers and researchers to roll-out a real-time sentinel surveillance system that integrates febrile illness, parasite genomic data and local entomological survey data, the first integrated sentinel surveillance system in Papua New Guinea. The surveillance team, partnering closely with Beyond Essential Solutions has continued to expand the visualization's and features available on the STRIVE-Tupaia platform, enabling decision-makers to co-visualize multiple data points captured on the platform to support decision-making systems.*

Achievement of EOPO2 was a highly valued outcome by DFAT representatives interviewed for the evaluation. A DFAT representative highlighted increased access and use of evidence for informed decisions around health security as a significant outcome of the program, citing numerous examples in Vietnam, Timor Leste and PNG.

> *One of the things that stood out was the valuing of country specific data that these projects were helping to capture. That extra value that they bring because they are using country specific data to analyse the problems that are inherent value to that country* (DFAT representative)

The evaluation team assessed weak evidence of EOPO 2 achievement where details were provided by project teams in end-of project reports about dissemination of project reporting, and little to no information provided on use by health security decision makers. For example, some projects described sharing of research reports with diverse audiences, however although this is important, it does not provide direct evidence of increased access and use of evidence. For example, the project 'Drug sensitive and resistant tuberculosis and zoonotic infections as causes of lymphadenitis in three provinces in Papua New Guinea' described in its final report:

> *Findings from this study will be shared with the PNG National Agriculture and Quarantine Inspection Authority (NAQIA) to contribute to the knowledge-base on detection of zoonotic pathogens in PNG. Findings will also be provided to the Fleming Fund team who are implementing a laboratory information management*

system (LIMS) at 6 sites in PNG…A newsletter and list of key stakeholders was developed to provide regular updates. Preliminary findings of the clinical sampling of LN of people with presumptive TB LN were presented at the PNG Medical Symposium in 2022. An abstract was submitted to the 2023 International TB Union conference. Full findings are being summarised to share with stakeholders in PNG and prepared to submit for publication in a peer-reviewed journal. Findings from FGDs were submitted to the 2022 World One Health Congress… An article based on the FGD findings is also being prepared to submit for publication in a peer-reviewed journal. The article will examine how certain animals are treated and prioritised in contemporary PNG, and what the implications are for developing zoonotic risk mitigation strategies within this context.

Another project described increased access by local and subnational government levels, though it is unclear how this access informs decisions about health security.

The evaluation team identified evidence of achievements in EOPO3 concerning improved capacity (experience and expertise) in twelve of the investments' end-of-project reports, including all SSHS managed investments, this improved capacity this was most evident nationally.

Improved capacity for different types of actors and at different levels was evidenced through both document review and interviews. Improved capacity included for front-line workers (for example, hospitals, pharmacists, community health workers), sub-national and national government leaders across multiple ministries, as well as local researchers.

Improved capacity was also demonstrated in multiple areas of health security demonstrating the importance of broad perspective of health systems strengthening. For example, there were numerous examples of increased capacity of surveillance activities, including laboratory services (improved staff capacity, improved procedures, guidelines, and laboratory infrastructure), this was coupled with increased access to new evidence to inform decisions making. Strengthened collaboration between relevant agencies ensured shared responsibility.

The evaluation team identified weak evidence of EOPO 3 mainly in instances when the project did not have a strong focus to achieve sustained capacity. For example, training carried out but for the intention of enabling research conduct. In other instances, focus was primarily on EOPO1 and strong coordination of relevant agencies for health security.

The implementation of the 'One Health' approach has been effective and contributed to achievement of program EOPOs. The focus on systems strengthening and One Health approach has been effective to promote multi stakeholder interest and commitment to health security. As described below, the One Health approach has an intentional focus on collaboration and systems strengthening to engage in a multi-stakeholder and multi-sectoral approach in shared responsibility for health security. Projects which implemented the One Health approach also had a strong focus on providing research evidence to motivate and strengthen commitments health decisions commitments and actions.

The evaluation team identified that the extent to which achievement of EOPOs was demonstrated across the individual investments varied, with SSHS managed projects providing stronger evidence of achievement than ROHSS managed projects. This may be due to the nature of different designs, time

frames and set objectives. The implications of this are discussed more under sections 4.4 (relevance) and 4.5 (sustainability).

4.1.2. Achievement of unexpected outcomes

The evaluation team identified a few unexpected outcomes beyond those set out in the EOPOs, including strong institutional partnerships in the region, community empowerment and reduction in disease. One DFAT representative highlighted strong institutional partnerships between Australian and those in the region which was enabled through the collaborative set up of the Indo-Pacific Centre for Health Security.

As described in section 4.1.3 , established relationships and networks of researchers from across the region was a foundation to effective delivery of investments and the continuation of these networks and relationships is an unintended outcome also achieved. The continued development of a strong health security research community provides opportunity for continued developments and achievements together. One DFAT representative cited this outcome as the most significant contribution of the program, noting:

> *"Building relationship between national researchers/MoH and Australia research organisations. Especially during COVID and working together. Either national MoH or research organisations get more information, ideas. The institutional partnerships help to move things forward".*

The evaluation identified change outcomes in relation to community empowerment, community improvements specifically in a small number of projects. WISH-Fiji described increased community understanding and action towards addressing water borne disease. This involved increased community engagement to strengthen inclusive governance arrangements, and local stakeholders to lead actions. This is also demonstrative of local community-level health system strengthening. Revitalisation of village water committees with prioritisation of women and youth as transformed local governance arrangements.

The evaluation identified reduction in disease impacts in the Indo-Pacific region as described as a broader goal in the Applied Research Program theory of change. As described by WISH-Fiji stakeholders during interviews carried out for this evaluation:

> *There were zero cases of LTDD[8] in the hot spot areas as a result of the project. It contributed directly to our work as environmental health workers which is the reduction of Leptosis, Typhoid and Dengue. Our work involved monitoring water safety plan management and improve water quality - so the project was directly relevant. The project contributed to the reduction of LTDD.*

4.1.3. Successful approaches and strategies

The evaluation explored which implementation approaches and strategies[9] were most successful to achieve anticipated and unanticipated outcomes.

[8] leptospirosis, typhoid, dengue, and diarrheal diseases (collectively LTDD)

[9] While the evaluation question defined approach and strategy the evaluation team did not discern any difference between 'approach' or 'strategy' and has grouped this category as one.

Seven key implementation approaches were instrumental in achieving efficiencies, effectiveness, and sustainability of outcomes. Successful approaches were primarily associated with good international development research practice in addition to strong capacity and reputation of researchers. These approaches are also reflected in research carried out on applied research. [10][11] The seven approaches are presented, below:

First, a central successful approach was **in country health leaders driving the research agenda.** This approach was evidenced at multiple tiers, national, sub-national and community levels. For example, ZOOMAL-Indonesia was driven by GOI leadership, who appreciated the approach and research findings. STRIVE-PNG included a strong focus on local leadership. It established a PMU which enabled NMVBDP to draw on support for coordination and alignment with regional networks. Through this way of working, the NMVBDP has been supported to have increased oversight of the Projects/Programs that sit under its leadership. WISH-Fiji had strong leadership at national, sub-national and community levels. The role of provincial councils (sub-national) was central to the successful implementation of the project and to sustained outcomes. WISH-Fiji included the role of community health workers as leaders and champions of the initiatives with other decision-makers in the community.

Second, an enabler of successful achievement has been **building from a foundation of established relationships and networks.** STRIVE-PNG described how leadership and pre-existing relationships influenced provincial buy-in and ownership of activities. Pre-existing relationships were also valued by DFAT representatives. As described by one individual:

> *So, all these organisations had a strong grounding in the countries where they were working, and the funding they received from us allowed them to expand on that, do things they'd always wanted to do with their partners. That sort of continuity, not only of funding, but of personnel, matters.*

Third, successful investments employed **systems thinking and a multi-sectoral approach.** with inclusion of **multiple government agencies.** This finding was most relevant to projects employing the One Health approach**.** The systems approach which prioritised engagement of multiple agencies was most prominent at national levels but was also revealed at sub-national levels as well. Cross sectoral collaboration was a key factor to promote interest and commitment in research findings. Activities included collaborative workshops, research, training activities to foster long lasting relationships between the sectors. For example, WISH-Fiji integrated nature-based solutions and health interventions to enhance watersheds and human health. STRIVE-PNG described its approach "to strengthen PNG capacity through active involvement of national policymakers, managers, the Provincial Health Authorities (PHA), researchers and other key stakeholders. The program supported the coordination amongst key vector stakeholders including PNG IMR, the National Department of

[10] RDI Network 2017- From evidence to impact: Development contribution of Australian Aid funded research: A study based on research undertaken through the Australian Development Research Awards Scheme 2007-2016, Authored by Debbie Muirhead with Juliet Willetts, Joanne Crawford, Jane Hutchison and Philippa Smales.

[11] ACIAR – 2024 Meaney-Davis J, Winterford K, Mienmany S, Douangsavanh S and Willetts J (2024) 'Assessing the research to policy interface in Laos', ACIAR Outcome Evaluation Series No. 8, Australian Centre for International Agricultural Research, Canberra.

Health (DOH) and key provincial stakeholders from the PHA and NAQIA". The project "Development, implementation and evaluation of community-based communication strategies to respond to health security threats in diverse communities in Lao PDR and Cambodia" described the One Health approach which "*involved human and animal health workers at national, provincial, district and village levels working closely together within communities. None of these workers had previously had an opportunity to work in a cross-disciplinary way at the village level, and the opportunity was highly valued by all team members*".

Fourth, the achievement of objectives was enabled through **a strong partnership approach.**[12] This was documented by a few projects in depth, including PINTAR-Indonesia, WISH-Fiji and STRIVE-PNG. For the PINTAR-Indonesia project, the program teams have met with bi-annually during the project with a stakeholder group of 35 people from universities, industries and government (MOH, FDA/BPOM). As described by a project team member *"The stakeholder group has been integral to the project, each time we had input for the project, they helped us in monitoring and evaluation as well. And to think about translation to policy as well."* STRIVE-PNG documented a strong focus on a partnership approach and reflected on the cost-effective approach in end of project reporting: *Bringing together partners from such diverse cultural backgrounds with different motivations for being involved in the partnership has been difficult to navigate at times. STRIVE's partnership health checks were an opportunity for partners to highlight challenges they are experiencing, suggest ways for improvement and discuss their fit-for-purpose engagement.*

Dissemination of research findings by local leaders was an effective strategy to encourage government responsibilities for strengthening health security. For example, the evaluation team identified that in relation to the ZOOMAL project, Indonesian researchers are very active contributors in malaria research and control program. This allows a trusted relationship with GOI partners. Indonesian leaders were able to present in the national meetings with Indonesian researchers, instead of people receiving advice from external, foreign experts for the policy makers. The core message coming from Indonesian project leaders was more effective. This was also described by PINTAR-Indonesia, during interviews carried out for this evaluation:

> *"Indonesian partners have been very committed to sharing/presenting this work. Before the results are shared more widely, we went back to the stakeholder group and shared the results, got feedback and also suggestions on how to present the results. That was a useful exercise.*
>
> *The director of pharmaceuticals and medical devices presented some of the study slides at an event hosted by the WHO Geneva on national action plan for AMR. In a way, that was most satisfying because that was the government that was using the result. Also, the team presented results last year at the point of care testing conference in Sydney, Australia. Early-mid career researchers have been presented the results at national and international events as well.*

[12] Whilst there are a variety of definitions of a partnership approach, partnership can be understood as involving "joint and shared benefit and shared risks. Resources from each party are shared together (co-mingling) to achieve the shared objectives and mutually agreed goals" See page 11 - Winterford, K. (2017). How to Partner for Development Research, Research For Development Impact Network, Canberra, Australia

It is useful to note that this implementation approach was compromised by COVID-19 as it was difficult to engage with local leaders on research findings due to travel restrictions.

Six, a key foundation and approach of the research investments was the conduct and **presentation of research findings as a stimulus for further research and initiatives.** For example, PINTAR-Indonesia produced new knowledge on antibiotic dispensing which provided a clear indication of the need for further work in this area. Similarly, AMR/EMR-Fiji produced various research findings and reports which provided a strong basis for future commitments and action. WISH-Fiji community-based activities were informed by assessments carried out in each village. The practice of surveillance was an important basis to justify prioritisation and action on key issues. Effective engagement and dissemination activities were coupled with the conduct and presentation of research findings, which meant appropriate decision makers accessed and used the information.

Lastly, a successful strategy employed by many projects was **the integration of multiple initiatives to support systems strengthening such as capacity development, infrastructure upgrades, coordination of multi-sector forums or committees** in addition to the conduct of research activities**.** The package of work carried out was relevant to low resource contexts where the broader health system required improvements. Many investments included upgrades of surveillance practices inclusive of laboratory infrastructure, staff training, procedures and guidelines. This holistic perspective provided multiple benefits of reinforcing benefits and outcomes in other areas.

4.2. Efficiency

This section provides evaluation findings relevant to evaluation questions:

1. To what extent did investments under the Applied Research Program make the appropriate use of time and resources for achieving outcomes?
2. To what extent did the investments represent value for money?
    I. To what extent did the governance and management arrangements support overall efficiency?
    II. To what extent did DFAT and the implementing partner personnel have the required skills and experience to efficiently deliver the program?
3. To what extent did the M&E system generate credible information that was used for management decision-making, learning and accountability purposes?
4. To what extent was risk management effective, were risk procedures followed?

The evaluation identified strong evidence of efficient governance and management of the Applied Research Program and of individual investments, including during changing contexts due to COVID-19, as well as areas for improvement at both Program and investment levels. Flexible, responsive, and understanding of the context was an area of strength of the overall management of the Applied Research Program.

Flexible management from DFAT, and the accessibility of the team to DFAT management was appreciated by PINTAR-Indonesia stakeholders. ZOOMAL-Indonesia stakeholders also valued the flexibility, noting that it was essential in terms of adapting to the situation aspect, with agreement for a no cost extension and delay of activities due to impacts of the COVID-19 pandemic.

DFAT representatives also described the partnership approach as valuable to create efficiencies, *"we spent a lot of time in the early stages, really getting to know these organisations before we made any funding decisions".* The Applied Research Manager was also in the role for the whole duration of the funding period, which is very unusual in the context of DFAT, which generally deploys two-year rotation cycles. DFAT contracting and compliance processes were valuable to manage risk. These were described by one DFAT representative as enabling efficient management processes especially relating to contract amendments This enabled strengthened the understanding of the context and also better engagement with project teams. As described by PINTAR stakeholders

> *"The DFAT people the team dealing with in terms of the management have a good understanding of the context where we were working. That's been a real plus.*

Investment level reporting was mostly efficient for DFAT management. Streamlined reporting in SmartyGrants provided an efficient way for DFAT to have oversight of SSHS managed projects. As described above, individual investments reported on governance and partnership arrangements which highlighted effective strategies to realise achievements (see section 4.1.3). As described by a DFAT representative, financial reporting from universities was limited, with no detailed variance reporting permitted in the online form. Informed by experiences during the Applied Research Program, templates have been refined. SmartyGrants provides a way to extract reports into compilation spread sheets which can be used to analyse individual projects and analyse across the portfolio to prepare compilation reporting,

Competent teams, and high-quality research processes including ethics approvals provided assurance to DFAT staff who described during this evaluation how they trusted the quality of research practices. Research institutions are trusted to carry out high quality research, with skilled personnel and established relationships in the region with key networks to allow insights into current and future health security priorities. As described by one DFAT representative "the universities all have their ethics requirements and I think that's one of the actually that's one of the key things".

Governance of projects was efficient in some contexts, supporting effective outcomes. Some projects set up steering committees, others used existing government structures or action groups as collaborators, informing next steps of the project or as end-users of research findings and leadership of further dissemination. This practice meant that the ways the project worked were fit for purpose in local contexts, research was owned by local actors and the utilisation of research findings was driven by local leaders, all of which support the achievement of project objectives**.**

The program demonstrated strong value for money, particularly in the ability of many programs to pivot in response to the COVID-19 pandemic. As described by numerous individuals interviewed for the evaluation, the personnel were in place to take direct action, partnerships were active and established to manage plans and resources, and local partners were able to continue work even when Australians could not travel. Infrastructure upgrades most particularly laboratory services were utilised well during the COVID-19 response with many surveillance procedures repurposed to respond to COVID. An additional and unintended consequence of these new ways of working was the demonstration and effectiveness of decolonised research with leadership roles being taken over by national individuals. This was a highly valued outcome as described by those interviewed in relation to the WISH-Fiji project.

The evaluation identified two areas where the overall management of the Program could have been strengthened, as described primarily through KII.

First, strengthen the Applied Research Program MEL Framework to capture a holistic perspective on the achievement of outcomes and goal. While a Theory of Change was prepared to define a holistic perspective of the Applied Research Program, this was not employed by the investments to report on achievements, and the Program could not capture evidence against the Theory of Change as part of overall management. Whilst the evaluation team mostly found alignment between the applied research programs' EOPOs and individual investment objectives, this was not a transparent or coherent message that was communicated. As described by a DFAT representative interviewed for this evaluation:

> *We had developed a PAF across all health security initiative and indicators. Then developed program logic with partners. Then the partners reported their own work. They didn't necessarily report on the indicators. Some projects didn't have MELF. Furthermore, the program logic was not employed to report progress against. Progress was often reported at output level not outcome level. Academics are not used to working with theory of change formats, indicators, MEL components.*

Linked to this point of strengthening MEL of the Program, the evaluation team noted a lack of evidence related to efficiency within investment reporting. Few reports mentioned and reflected on how the research was carried out (efficiency) and how this supported investment achievements (effectiveness). As described in 4.1.3 above in a few cases investments commented on how they were implemented.

Second, promote stronger collaborative engagement between investments for opportunities to have cross-learning, to have joined-up advocacy and influence activities. It's important to note that DFAT envisaged this role and while some activities were initiated, ongoing implementation was negatively impacted by COVID-19. Collaboration activities shifted to online. Over time, however, these became challenging to maintain. This deterioration in collaboration was also described by PINTAR-Indonesia stakeholders. At the commencement, DFAT set a strong collaborative approach across all the funded projects. Nonetheless, they felt they ended in separate ways. As described by project implementers, anything that DFAT can do so that the projects can continue to have opportunities for cross-learning will be well-received. Having some kind of forum where people can get together throughout the process and at the end of the program with DFAT would be helpful. Forums which enable evidence from across multiple settings to be shared provides a compelling argument for decision-makers to act. It was suggested to develop briefing notes bringing together insights from similar projects from different sites, facilitated by DFAT.

The evaluation team identified mixed evidence of M&E systems being used by project teams to generate credible information that was used for management decision-making, learning and accountability purposes. STRIVE-PNG was an example which documented its development and use of a M&E system. As described in the project final report, "*A comprehensive monitoring and evaluation framework (M&E) was developed at the commencement of the project and has been revised to incorporate Centre for Health Security principles and structures. This framework allows on-going collection of quantitative and qualitative data for both technical and partnership-based activities during the reporting period… STRIVE-PNG Partnership managers bring together program*

directors (quarterly), steering committee members (annually), and technical partners (monthly/ bi-monthly or quarterly) to reflect on progress achieved towards the project's indicators." WISH-Fiji described the challenges associated with M&E in its final reporting, including working within partner systems and COVID-19 restrictions. *"A key challenge was the limited scope of data collection and the lack of data availability particularly for disease case location data to determine direct impacts of project activities on disease outcomes. Availability of data from government partners and their participation in project activities including evaluation was also severely limited due to the impacts of the COVID-19 pandemic."* PINTAR-Indonesia described how the M&E framework was developed based on discussions with the field team and stakeholders and discussed in fortnightly meetings, to identify challenges and seek solutions to those challenges encountered. The final report also describes how before and after the intervention, a standardized patient survey was conducted to measure the impact of the interventions. Whilst there were examples of M&E being utilised to support project implementation this was not evident in projects which were implemented within shorter time frames and focused research questions.

Risk management was found to be mixed within projects assessed in this evaluation, some projects described their practices in project reporting whilst others were silent on this topic. Examples where risks were assessed and managed periodically included WISH-Fiji which described in its final reporting, "*The WISH Fiji project actively forecast and managed risks throughout the project".* STRIVE-PNG final reporting described how *"*STRIVE's partnership managers with support from project partners have developed a comprehensive risk register… *reviewed on a quarterly basis to effectively manage risks and mitigate potential negative impact on STRIVE's team, resources and the environment around".* Similar to the development and use of a M&E system, projects which were implemented within shorter-time lines did not include mention of risk management practices in their final reporting.

4.3. Gender equality, disability and social inclusion

This section provides evaluation findings relevant to evaluation questions:

1. To what extent did the investment analyse and mitigate gender-related risks and use sex-disaggregated data to target improvements for gender equality?
2. To what extent did the investments achieve gender equality outcomes?
3. To what extent did the investments actively involve people with disabilities and/or disabled peoples' organisations (DPOs) in planning, implementation, and monitoring and evaluation?
4. To what extent did the investment enable people with disabilities to benefit equally?
5. To what extent did the investment meet environmental safeguards policies, standards, and requirements?

4.3.1. Gender integration

The evaluation identified mixed evidence that investments considered gender-related risks and promoted efforts to improve gender equality. The evaluation team employed a gender integration continuum, ranging from gender unaware through gender aware and gender sensitive to gender

transformative [13] to assess the extent to which the investments funded under the Applied Research Program analysed and mitigated gender-related risks and used sex-disaggregated data to target improvements for gender equality.

Review of final project reports by the evaluation team using the continuum identified two projects that were gender unaware; ten projects that were gender aware; three projects that were gender sensitive, and one project that was gender transformative. This finding aligned with interviews with DFAT representatives interviewed for the evaluation, who primarily described limited to poor integration practice. For example: "I wouldn't want to claim victory in that one" and "not as good as we could have achieved."

Overall, there was limited evidence of gendered considerations in the investments. The evaluation team identified 'gender unaware', where there was no mention of gender in final project reporting. The evidence for 'gender aware' approaches included mention of gender, although this doesn't fully align to the definition outlined in the integration continuum, which has a stronger focus on unequal gendered relations.

Examples of 'gender aware approaches' included research which included gender specific focus group discussions or interviews with representation of women and men. 'Gender aware' approaches primarily focused internally within the project teams. Examples of internal focus included documentation of women and men in research teams, consideration of gender as part of recruitment within research teams or for scholarships or fellowships associated with the research. Other examples included collection of sex disaggregated data, though no mention of how this information would inform decision making was provided.

'Gender sensitive' approaches were categorised where more substantiative information (text) was provided in the final reporting with consideration of gender in research planning (gender balanced representation in stakeholder committees); in data collection; representation in research reporting; and production of resources informed by the research to specifically target women in the community. The project documentation provided information on how specific actions of the research team were informed by the different needs and interests of women and men.

One project - WISH-Fiji - was categorised as employing a 'gender-transformative' approach, since it sought to address underlying gender power imbalances; recognised harmful gender roles, norms and relations; acknowledged how gendered assumptions marginalise different genders; and the program's proactive effort to reduce gender-based inequalities. Efforts were made to create an enabling environment for women's participation in community water committees through broader engagement with men and leaders. All -seven stakeholders (Fijian and Australian) associated with WISH-Fiji described how the project educated communities on the important role of women in food production, household chores and the importance of women being members of the village water committees. This community-wide engagement provided an enabling environment to shift women's role in public life and decision-making. Further details are provided below in relation to achievement of gender outcomes and in Case Study 1 (Annex 6).

[13] Oxfam's guidance for gender transformation was used and presents continuum (Oxfam 2021). See Annex 5 for details.

The evaluation team identified several factors that contributed to little evidence of gender integration in the research investments (primarily described by DFAT representatives). First, gender analysis was not required as part of investment designs. This oversight has been addressed in the next phase of DFAT health programming, *Partnerships for a Healthy Region,* which mandates gender analysis as part of all investment designs. Second, the Gender Equality, Disability & Social Inclusion Advisor for the Global Health Division was not recruited till part way through the implementation period. Although there was access to generalist gender equality expertise through DFAT, there was a lack of dedicated gender and health expertise available to support partners. Third, while DFAT did provide initial orientation to the investment leads, without strong development expertise, many researchers lack the capacity to practically apply gendered considerations into their activities and expected outcomes.

The ACIAR *Gender Guidelines* were cited by one DFAT representative as helpful to ACIAR-managed investments, and a strong support for integration of gender consideration, however this was not evidenced by the evaluation team. The nine ROHSS investments were a mix of 'gender unaware', gender aware' and 'gender sensitive'.

4.3.2. Gender equality outcomes

The evaluation employed the Gender at Work framework[14] from Rao and Kelleher (2005) to assess the extent to which the investments funded under the Applied Research Program achieved gender equality outcomes. The framework includes four domains of change: *Consciousness and capabilities*: women's and men's individual consciousness (knowledge, skills, political consciousness, commitment); *Resources*: women's objective condition (rights and resources, access to health services and safety, opportunities for a voice); *Norms and cultures*: informal norms, such as inequitable ideologies, and cultural and religious practices; and *Rules and polices*: formal institutions, such as laws and policies.

Review of final project reports by the evaluation team using the Gender at Work framework revealed overall little evidence of gender equality outcomes being achieved. The team has, however, implied achievement based on many of the investments focus on inclusion of women in project teams and WISH-Fiji has strong evidence of gender-transformative change outcomes.

The evaluation team has implied changes in 'Resources', as women members of the research teams and those who have accessed training and scholarships through the investments have increased access to salaried positions, facilitating increased access to other resources such as improved services and increased voice. The investment reports did not include evidence on this.. STRIVE-PNG described in final reporting:

> *there remains a relatively equal gender balance amongst the project staff; we have continued to ensure over 40% of student applications are from women. In 2022, 66% of student applications have been from females and in 2023, 100% of student applications have*

[14] The framework includes four domains of change: 1. Consciousness and capabilities: women's and men's individual consciousness (knowledge, skills, political consciousness, commitment) 2. Resources: women's objective condition (rights and resources, access to health services and safety, opportunities for a voice). 3. Norms and cultures: informal norms, such as inequitable ideologies, and cultural and religious practices. 4. Rules and polices: formal institutions, such as laws and policies.

been from females; our recruitment process for Research Officers has ensured at least 67% of Research Officers engaged within STRIVE are women.

The evaluation team found strong evidence that WISH-Fiji has contributed to gender transformative change across all four domains of change within the Gender at Work framework. Changes to 'Resources' is implied, as noted above, for women intentionally included as part of the research team. Outcomes associated with 'Consciousness and capabilities' is evidenced by changes to women's and men's perspectives on the role of women in family and community life. Changes in 'Norms and cultures' is evidenced by new gendered relations, where women are taking on more active roles in public life and decision making through their intentional inclusion in community water committees. Women have become actively involved and were able to feel agency and had access to resources. Previously women's issues were left to "any other business", with this project, health became an agenda including women's priorities and became part of the main discussion points for the communities.

End of project reporting described in 19% of communities more than half the residents participating in WSSP planning were female. In almost half of communities involved (46%) at least one third of participants in this process were female. The project has contributed to a change in the acceptance by the Village or Community Council for the Community Health Worker (usually a woman) to present during Council meetings. 'Rules and polices' is evidenced by the establishment of a cross-sectoral National Drinking Water Quality Committee through cabinet approval in 2021 providing a legal platform to provide safe drinking water and ensure better preparedness and response to water-related diseases. This committee connects to village level committees where women have a central role in sanitary surveys, water safety plans, and drinking water quality monitoring and surveillance programs, integrating with water-related disease surveillance.

4.3.3. Disability inclusion and disability rights

Across all the investments included in this evaluation, there was a lack of evidence that that people with disabilities and/or disabled peoples' organisations (DPOs) were in involved in planning, implementation, and monitoring and evaluation of the investments. Furthermore, there was little evidence that the investments enabled people with disability to benefit equally. As described by a DFAT representative interviewed for the evaluation; *"disability was very much an add on, with limited engagement from the research teams".* Disability inclusion was required for SSHS final project reporting though not for ROHSS managed projects.

There were a few outliers to this finding. For example, a project manager for WISH-Fiji described that recognition of needs of people living with disability led to the construction of accessible toilets and provision of water pipes near to the home to reduce burden of water collection. STRIVE-PNG worked with Cheshire Home and the Callen Health Services to better understand how inclusion of concerns for disability could be considered. Washington Group short set of questions were added to the STRIVE PNG Case Report Form. As described in final project reporting *"The inclusion of these questions has enabled the STRIVE team to disaggregate data on people living with a disability that access services related to the project and ensure a representative sample is recruited at each site,*

providing the most accurate data to policy and decision makers" (STRIVE-PNG). The majority of investments

The document review of investments final reporting did not identify evidence of actions taken to meet environmental safeguarding policies, standards and requirements. This is to be expected since compliance to these safeguards was a pre-requisite to funding and reporting against this criterion was not required by DFAT.

4.4. Relevance

This section provides evaluation findings relevant to evaluation questions:

1. To what extent were the investments initiated by researcher and/or policy-political directions?
2. To what extent did the investments remain relevant to Australia's policy priorities and national interest, over the life of the investment?
3. To what extent did the investment align with the partner government's development priorities and beneficiary needs?

The investments were largely aligned to partner government's development priorities and beneficiary needs. However, the evaluation team found little evidence to assess the extent to which investments were initiated by researcher and/or policy-political directions. The lack of evidence may be attributed to the standard reporting requirements by DFAT and ACIAR and/or this type of background information was provided in investment designs and/or preliminary reporting. It is also relevant to note that specifics of who initiated the research focus and objectives is not frequently provided in international development research. This may be an area for improved reporting standards in the future. Also to note the investments were informed by findings from in-person regional consultations conducted at the initiation of the Health Security Initiative.

In most instances, the investment final reporting did not document relevance of investments to Australia's policy priorities and national interests. A few examples were provided, but reporting on this topic was not a specific requitement for project teams. Where alignment to Australia's policy priorities was provided, it was broad statements. For example: *'achieving the development goals of the Indo-Pacific Centre for Health Security in Fiji and the Pacific'* (WISH-Fiji); *'consolidated the established partnerships between Menzies, USU and EIMB and reinforced links between Australia and its nearer neighbour for a better approach to health security'* (ZOOMAL Indonesia and PNG); and *'this project addressed Australia's goals to work in partnership with PNG on regional issues affecting the poor, including sustainability and resilience of production systems, including livestock health and production'* (A One Health approach to establish surveillance strategies for Japanese encephalitis and zoonotic arboviruses in Papua New Guinea).

The pivot of many projects to support Australia's COVID-19 emergency response in the region, was highly relevant and aligned to Australia's policy priorities and national interests as well as partner government priorities. Numerous examples were documented where projects realigned their focus and resources to the COVID-19 response. The pivot included redeploying human resources to the COVID response. For example, WISH-Fiji seconded the project manager to the COVID-19 National

Taskforce assisting with lab testing and data management at Fiji CDC; ADEPPt-PNG Fellows applied their skills in direct support of the COVID-19 response, many assuming leadership roles. All PNG faculty assumed key roles in the pandemic response. Some took on senior leadership roles within the NCC; others served as Incident Managers at the Provincial Health Level and led RRTs and contact tracing efforts.

Additional programs of work were also initiated to respond to the emergency. For example, V-RESIST-Vietnam, where a second program of work was undertaken to inform Vietnam's pandemic response. This included measuring the prevalence of SARS-CoV-2 viral infection in several high-risk communities during the early phases of the pandemic; the conduct of qualitative research to develop strategies to reduce stigma and encourage testing for COVID-19; and epidemiological modelling to guide local and national decision-making by government leaders. STRONG-TL is another example of where additional scopes of work were supported and the COVID-19 response built on early results of the investment. STRONG-TL implemented support for infection prevention and control, and critical care management of acute respiratory illness; development and implementation of an overarching critical care strategy for Timor-Leste; laboratory capacity for diagnosis of infectious diseases including COVID-19 established in all 13 municipalities. At the peak of the second wave of community transmission of COVID-19 (Delta variant), the laboratories were able to process up to 2,000 tests per day (as documented in end-of-project report).

The relevance of the investments to the Australian Government's COVID-19 response was described by all four DFAT representatives interviewed for this evaluation. As described:

> *Capabilities were immediately recognised and seen to be able to provide support to the government's overarching response requirements.*

> *These organisations that we had supported to expand their presence in these countries were absolutely poised to expand further with emergency response funds.*

The investments largely aligned with the partner government's development priorities and beneficiary needs. The evaluation teams' document review of final investment reports provided strong evidence how the investments aligned and contributed to Partner governments development priorities. Relevance was evident primarily at national and sub-national levels and in fewer cases at the community level and relevance was enhanced where the project work spanned across these multiple tiers of governance. Relevance was further enhanced where there was practical engagement and change outcomes targeted at national, sub-national and community levels, delivering practical learning and insights for a variety of actors. For example, ADEPPt-PNG fellows' operational research projects were targeted to health priority areas and fellows ranking which priority area they wanted to contribute to, based on their position and interest areas within the health system. The '*Development, implementation and evaluation of community-based communication strategies to respond to health security threats in diverse communities in Lao PDR and Cambodia'* was relevant at both national and provincial levels. The project was highly valued due to both the opportunity for personal interaction and on-the-ground collaboration between animal and human health personnel, and as a potential practical means of implementing a novel One Health intervention.

Relevance was also enhanced where the project addressed the need for evidence to inform national level reform and policy. For example, the project *'A One Health approach to establish surveillance strategies for Japanese encephalitis and zoonotic arboviruses in Papua New Guinea*' aimed to address the 'need to increase, improve and support current research-based institutions and universities to produce top quality research and development outcomes that will provide solutions to challenges in areas such as medicine, climate change and disease patterns'. STRIVE-PNG also demonstrated strong relevance. As described in final reporting, it sought to "*contribute to the NMVBDP National Strategic Plan 2021-2025, strengthening the outbreak surveillance and response capacity through expanding the real-time sentinel surveillance system for Malaria and other VBDs. In 2022 and 2023, STRIVE's team has also been working closely with the NMVBDP throughout the development of the National Strategic Plan for Dengue and Arboviruses, ensuring data collected from the STRIVE PNG Program can inform, align, and support this critical process."*

The focus on a systems approach within the Applied Research Program provided a key foundation to the relevance of the investments to partner government priorities, which was especially evident in the pivot of many of the investments' pivot to the COVID-19 response. Areas of health system strengthening which were supported through the investments, such as staff capability, surveillance and upgrading of laboratories, capacity to prepare operationalise manuals, guidelines, Standard Operating Procedures (SoPs) were maximised and benefits realised in broader scopes than originally intended. As described by a DFAT representative interviewed for this evaluation:

> *"It goes back to that systems perspective having those things in place and having the capability to work at that holistic perspective then enables you to do that in different ways, not necessarily specific to that one issue".*

Examples of the relevance and value a systems perspective for health systems strengthening in response to COVID include in Cambodia, where the capability to prepare manuals and guidance was redeployed to prepare COVID-19 guidance. As described in final reporting from ZOOMAL-Indonesia:

> *"During the two years of COVID-19, the ZOOMAL lab examined 250,000 COVID-19 samples from all over North Sumatra. The ZOOMAL project recruited a total of 55 people to carry out examinations and opened five PCR labs in North Sumatra and Nias Island. If it weren't for ZOOMAL, this would be difficult to do, let alone promptly. The ZOOMAL trained research assistants/lab workers who became key resources for setting up the lab and staff training for COVID-19.*

Some final investment reports did not mention alignment with partner government priorities; this was also noted by DFAT officer interviewees. Research that focused on tuberculosis, malaria, zoonotic infections and avian influenza did not report alignment to partner government priorities. Whilst project documentation did not describe alignment, DFAT staff identified that these all are government priorities as evidenced by national plans and policies. Four out of the five investments which did not report alignment to partner government priorities were ACIAR managed Short Research Activities (SRA) with relatively smaller budgets (AUD 250,000) and time frames (two year). During the evaluation the team revealed mixed views related to the relevance of these projects, with some acknowledging that while not aligned with the partner government's development priorities, the research provided important contributions to knowledge and future development outcomes.

The evaluation also revealed a tension that while not relevant and aligned with the partner government's development priorities, some areas of health security, such as One Health are a priority in the region and will become even more so in the future, requiring action now. In many instances, the investments sought to mobilise and catalyse government commitment and action, to reorientate resourcing to new health security priorities. For example, AMR/EMR-Fiji sought to increase prioritisation of AMR by producing and sharing various studies and working to mobilise a national committee to promote action in this area. As described by a DFAT representative interviewed for this evaluation:

> *In some instances, the projects weren't the priority of the day. For example, One Health, we know that One Health is a big issue, but it's not priority anywhere, it's the poor cousin of human health. One Health – it's highly relevant but it's not prioritised, this Program sought to raise this as a priority issue.*

This issue of low partner government resources is explored further below in relation to risks to sustainability.

This same tension exists in relation to GEDSI (section 4.3), which a priority of the Australian government but is not necessarily a priority of partner governments in the region. GEDSI is relevant to achieving development outcomes and is a key strategic focus of the Australian development program.

4.5. Sustainability

This section provides evaluation findings relevant to evaluation questions:

1. To what extent is there evidence that the benefits of the investments will endure?
    I. To what extent are local systems strengthened through the investments? (EOPO1)
    II. To what extent do decision makers have continued access to evidence and information? (EOPO 2)
    III. To what extent national actors demonstrate ownership of health systems improvements? (EOPO3)
2. To what extent are there any risks that will continue after the investment / undermine sustainability?

There is some evidence of the possible sustained outcomes from the Applied Research Programs EOPOs. However, achievement was not equal across all three EOPOs nor across all investments. In addition, the evaluation revealed risks that may undermine the sustainability of achievements realised through the investments, and contribution to ongoing actions for health security.

There was strong evidence of the sustainability of health systems strengthening outcomes (EOPO1). This was most evidenced in relation to formation and ongoing activities of national committees, (for One Health); improved laboratory services; and development of clinical guidelines, manual and SOPs. STRIVE-PNG reported

> *"strengthening the NMVBDPs capacity to showcase the diverse portfolio of activities it leads in executive management meetings at the Department of Health and International Malaria Networks (APMEN & APLMA), result[s] in new*

opportunities to progress efforts towards malaria elimination... STRIVE has been intentionally designed to innovatively strengthen existing systems, strengthen existing expertise and capacity and be led by local leaders and organisations."

STRONG-TL also focused on local leadership, for example local development of national guidelines that have been prepared (2018) and already revised (2022) as described in final project reporting:

In each of clinical, surveillance and laboratory areas, supporting the development of national guidelines in Timor-Leste has been integral to ensuring locally-led changes in practice can be implemented in a sustainable way, linked to Ministry of Health approved policy and directions. The STRONG-TL team has partnered with the Ministry of Health to enable the development of local guidelines that are developed and published in the local language of Tetun. Key examples include IDSR, outbreak management, empiric antibiotic, rheumatic fever and rheumatic heart disease, and COVID-19 clinical, surveillance and laboratory guidelines.

The evaluation identified limited evidence within final project reporting that decision-makers will have continued access to evidence and information (EOPO2). In most cases the reports did not mention how or when local decision-makers would continue to access evidence to inform decisions. Where this was mentioned, the approach was vague. For example, that NARC would access information as part of the committee functioning, (AMR/EMR Fiji) and WISH-Fiji describes that *"integrated water management data is available to inform watershed activities".* The National Drinking Water Quality Committee that has been formally established with WISH-Fiji support puts the onus on government to review systems health data to assess risks and prioritise investment. At the time of writing this evaluation report, the Committee had not yet met. PINTAR Indonesia described how studies are available on a website.

The evaluation identified mixed evidence of national actors' continued commitment to health systems improvements (EOPO3). Evidence for achievement against this EOPO was sought through documents review and interviews in Fiji and Indonesia. Some reports did not report against this EOPO. Where project reports described national actors' continued commitment, there was strong evidence, with examples of commitment evident at community, sub-national and national levels. For example at the community level, concern for water-borne disease is incorporated within local (village) development plans in Fiji and water committees, the establishment of National Drinking Water Quality Committee, supported through WISH-Fiji and community-level commitment for One Health initiatives was also described by the project: *Development, implementation and evaluation of community-based communication strategies to respond to health security threats in diverse communities in Lao PDR and Cambodia*. National commitment described by the V-RESIST-Vietnam project in relation to policy take up: *New national AMS guidelines were formally adopted by the Ministry of Health as a direct result of this project. These guidelines provide a template for more than 2,000 district hospitals to scale up AMS nationally.* National actors relevant to the STRIVE-PNG project have sought additional grant money to continue initiatives underway. As described below, projects mentioned the need to access additional and continued funding as a foundation to sustain commitments.

The evaluation identified key enablers of sustainability which have also been relevant to promoting relevance, efficiency and effectiveness of investments. Key enablers of sustainability revealed through the evaluation include focus on a partnership approach and locally led

development, which means that health professionals and leaders are driving the agenda for change, at the start, during project implementation and following project completion. Projects which have initiatives at local, sub-national and national levels have stronger descriptions of sustained outcomes which is also linked to initiatives having a multi-sectoral approach which brings together diverse actors to be engaged, responsible and accountable to each other across multiple ministries, jurisdictions and disciplines.

The evaluation identified risks that will continue after the investments have finished, undermining sustainability of achievements realised through the investments, and contribution to ongoing actions for health security.

First, there is a risk that emerging outcomes have not been translated to policy change, budget commitments and embedded into health system architecture. The '*A One Health approach to establish surveillance strategies for Japanese encephalitis and zoonotic arboviruses in Papua New Guinea',* the end of project report states, "*NAHFTL should be given support and budget to build laboratory capacity, and upgrade and maintain the laboratory to international standards to meet ongoing requirements for disease control in PNG".*[15] Likewise the project '*Development, implementation and evaluation of community-based communication strategies to respond to health security threats in diverse communities in Lao PDR and Cambodia*' noted that "*Production of a scalable model then requires that we focus on developing a packaged intervention that can be implemented by joint teams of human and animal health workers at the district level and the processes by which such teams can be identified, trained, equipped, funded and supported to implement that packaged intervention.*[16]*"* DFAT representatives also described the challenge of working in low resource contexts, where leaders have competing priorities and limited funds to commit. Several projects including PINTAR-Indonesia and STRIVE-PNG are seeking additional funds to further the work. As noted by a PINTAR-Indonesia project team member: *"Despite being a low-cost intervention and having invested in the module development, difficult to identify who's going to be able to finance an expansion of this kind of intervention".* It's useful to note that the applied research program included a range of different investments, and not all of these were expected to achieve policy change, especially within short time frames such as through SRAs.

Secondly, risks documented by investment reporting were primarily focused on staff retention and maintaining staff capacity. Staff retention is a major risk to sustaining benefits. As described in one investment final report: *"there is a strong risk that the benefits of this project will be comprised. As there is no evidence of government support to maintain the improvements, strong staff capacity may shift into other areas."*

Thirdly, a risk is that research will not inform future health security decisions. A concern expressed by some investments is that while research outputs have been produced - often in the latter stages of the project - without further research uptake activities, the findings of the research may not be used. The main PINTAR-Indonesia report is under review before publication, but it is unclear if there

[15] DFAT representative advised that partner government funding has been subsequently granted. To note that whilst end of project documentation flags requirements for additional partner government commitments, revealing potential risks, research impact often happens long after a project finish which is hard to track.
[16] To note that DFAT representative advised One Health capacity building is part of Quadripartite Joint Plan of Action and will likely feature in the Pandemic treaty.

will be another stakeholder presentation. PINTAR materials are available online on a dedicated website. Based on interviews with government stakeholders, it appears unlikely that relevant stakeholders in the GoI are aware of where outcomes/research outcomes arising from PINTAR/DFAT-funded projects can be found. GOI/MOH is developing a national strategy for AMR control. It's unclear if or how PINTAR results will be used, now that the project has ended. In Indonesia, there are currently limited mechanisms to monitor the sale of antibiotics without prescription. MOH relies on self-assessment report from health facilities. The risk of sustainability is related to the funding availability. Maintaining the impetus of strong research partners who can have ongoing funding to front policy implementation is critical. As described by a PINTAR-Indonesia team member. *"This will not be sustainable (become a priority) as long as we cannot show how big the disease threat is. If there are no inspection tools, surveillance is not carried out, it will not be recorded."* This issue was also raised for WISH-Fiji where there is a need for ongoing M&E as described by provincial staff and also project managers to continue to inform decision makers.

5. Recommendations

1. Informed by the evaluation findings, what are recommendations for improving performance of Australia's future investments in Applied Health Research and One Health, including recommendations for improving GEDSI outcomes?
    I. Are there any areas for improvement in relation to MEL that should be considered in future investments?
    II. Are there any specific efficiency considerations for future related investments?
    III. Are there any specific considerations related to GEDSI and environment that should be applied to future investments?

The evaluation recommendations are intended to inform Australia's future investments in Applied Health Research and One Health. They have been informed by both the breadth and depth of inquiry into the Applied Research Program and are particularly informed by insights from Fiji and Indonesia contexts. As indicated in this evaluation report, some specific investments have contributed to significant achievements through effective and efficient partnerships and strategic approaches. These approaches are aligned to other research on effective international development research practice.[17][18] The recommendations reflect an ambition to scale these approaches to achieve development effectiveness and outcomes. It is expected that recommendations would be applied by individual investments as appropriate within scale and scope and context of the research.

While the recommendations are directed primarily to DFAT, the expectation is that within the management response to this evaluation, DFAT staff will clearly identify which specific Group, Division, Branch are most relevant to take responsibility to enact recommendations.

Recommendation 1:

[17] RDI Network (2017)

[18]

Australia's future investment in applied health research and One Health should include explicit focus on strengthening institutional research capacity and local leadership in national contexts for sustained systems strengthening and health security.

This could include:

- Australian government prioritisation of outcomes relating to strengthened institutional research capacity and local leadership in research within commissioned research or grants.
- Australian researchers continuing to promote and support local and early career researchers as future international research leaders.
- Australian commissioned research to be explicitly designed to strengthen institutional capacity of local research centres, such as in proposal development; partnerships; research quality assurance and policy relevance; financial accountability and monitoring and reporting; and providing direct funding support for administration.

Recommendation 2:

Australia's future investments in applied health research and One Health should increase focus on strengthening the research-to-policy interface and policy outcomes.

This could include:

- Intentional initiatives to strengthen research-to-policy[19] interface capability for both DFAT staff and researchers.
- When designing and revising investment theories of change, considering including policy outcomes and measures of both policy and practice change.
- Within research projects, promoting stronger engagement with high-level policy stakeholders that would provide critical understanding of the policy-making contexts.
- Ensure sufficient budget is allocated to stakeholder and policy engagement with sound strategies for such engagement.

Recommendation 3:

Australia's future investments in applied health research and One Health should continue to strengthen end-user engagement in research design, implementation, and sense-making of findings towards practical uptake and use.

This could include:

- Stronger engagement by DFAT Posts and project teams with key end-user groups at project commencement.
- Research teams strategically planning for the production, dissemination and engagement on research products to ensure effective outreach to key end-user groups, such as targeting those who need the data/information (physicians, clinicians, PS), communicating in ways

[19] Policy in this context includes all forms of institutionalised direction

that translate research findings for use, and taking account of relevant barriers and enablers to uptake and use.

- Research teams increasing local partners' role to lead activities that interface with policy-making, recognising their local contextual understanding.
- Research teams writing executive summary reports tailored to the needs of high-level policy makers and professionals, highlighting key findings and practical 'low-hanging fruit' policy recommendations.
- Research teams or partners facilitating strategic policy forums or discussions involving key end-users and related stakeholders.
- Research teams promoting and supporting policy end-users as 'research storytellers/brokers' for dissemination and engagement within their institutions and sectors. Research teams publishing in open access journals and providing accompanying digestible briefs that summarise academic or technical findings
- Inviting national policy makers and relevant sector professionals, not only funded researchers to participate in relevant DFAT regional cross-learning events.

Recommendation 4:

Australia's future investments in applied health research and One Health should strengthen country and regional level collaboration between research teams and communicate research findings to end-users through regional perspectives for practical uptake and use by national leaders.

This could include:

- DFAT coordination of investments through a program-wide MELF.
- DFAT facilitated or supported regional forums/conferences.
- DFAT and research teams sharing of research findings through briefing notes or curated materials appropriate for regional audiences.
- Research teams drawing on past research as the foundation of future research.

Recommendation 5:

Australia's future investments in applied health research and One Health should strengthen application of best practice international development approaches as a foundation to research, to strengthen development effectiveness and achieve a broad set of development outcomes.

This could include:

- DFAT ensuring researchers are equipped to employ good partnership practice[20], with a focus on locally led development.

[20] For example, see https://rdinetwork.org.au/wp-content/uploads/2020/08/How-to-Partner-for-Development-Research_fv_Web.pdf

- DFAT ensuring that community-based research supports empowerment outcomes (not extractive research) that is informed by ethical research practice.
- DFAT requiring researcher teams to clarify their theory of change, pathway to research impact and related development outcomes at the outset and refined iteratively during the investment.

Recommendation 6:

Australia's future investments in applied health research and One Health should strengthen program-level MEL to ensure that individual projects within a program align their EOPOs with the investment-level EOPOs.

This could include:

- DFAT investing in capacity strengthening of research teams and/or partners in MEL of research.
- Research teams reporting to shared objectives, which will enable sharing information across project teams.
- Research teams prioritise ownership and use of MEL processes and insights by local partners.
- DFAT leading dissemination of collated insights to broad audiences, including DFAT, project teams and Partner governments.

Recommendation 7:

Australia's future investments in applied health research and One Health should strengthen GEDSI through practical and sustained guidance to investment teams to ensure tangible contributions are made.

This could include:

- DFAT working to shift research teams' focus from compliance with collecting sex disaggregated data, to deeper appreciation of gendered power relations and recognition that every development initiative (including development research) has an influence on gender relations and gender equality and reinforcing or removing barriers to disability social equity and justice, whether intentional or not.
- DFAT leading sustained support to investment teams as part of initial designs and at regular intervals.
- DFAT prioritising inclusion of GEDSI analysis and planning in designs, ensuring appropriate resourcing within project budgets.
- DFAT reviewing project monitoring and providing advice for improvements in GEDSI.
- Partners' preparation of case studies of good practice in GEDSI and DFAT's facilitation of peer learning.

Recommendation 8:

Australia's future investments in applied health research and One Health should maintain and strengthen a 'systems' perspective and transdisciplinary approach, including multi-stakeholder/sector engagement to contribute to regional health security.

This could include:

- DFAT maintaining intentional focus on systems strengthening across a range of sectors and health system functions.
- DFAT continuing to prioritise the interactions between human (infectious disease), animal (zoonotic) and environment (ecosystem) as well as priority issues in the region such as non-communicable disease.

Recommendation 9:

Australia's future investments in applied health research and One Health should consider multi-stage, longer-term research funding to create foundations for partnership and research impact/development outcomes.

This could include:

- DFAT supporting longer-term (i.e. ten year) phased research funding, including institutional partnerships.
- DFATs' leadership of performance-based funding processes to assess quality, emerging impact and future impact opportunities to decide future funding. For example, DFAT utilising competitive funding processes which include an emphasis on past performance and potential for future impact as part of selection criteria for future phases of work.
- DFAT providing specific funding to enable uptake and use of promising/critical research findings that require further engagement to ensure influence and outcomes
- Multiple ranges of funding streams (from small budgets/shorter time frames with opportunity for extension to larger budgets/longer time frames), which could support different scales of research and leverage past and current investments to maximise and sustain emerging outcomes for longer term impact.

6. Conclusion

The overall evaluation conclusion is that tangible, significant achievements have been made by most investments funded within the Applied Research Program. However, there is not a strong connection to a programmatic approach and program, EOPOs.

The focus on systems strengthening and One Health approach has been effective to promote multi stakeholder interest and commitment to health security. This approach has enabled a broader range of decision-makers to engage in health security and has broadened national perspectives on health security to include people, health and the environment.

The systems approach employed by the investments proved beneficial to respond to COVID-19 as strengthened systems such as strengthened staff capacity and improved laboratory services were realigned to the COVID response. Skills and competencies developed through the projects were utilised to prepare guidance and manuals to guide the COVID-19 response. Research carried out

through the COVID-19 pandemic also proved the value of locally-led research and the importance of decolonising research practice in the region.

The evaluation identified the need and value of applied research to inform relevant and effective health security initiatives. The evaluation identified the importance of focusing on research approaches and processes which enable co-design and partnership approaches for implementation which actively engages end-users in the research, not simply as passive recipients or audiences for research findings at the project end. Future similar programming by the Global Health Division/Australian Government should prioritise how research evidence will be used and by whom to maximise research to policy influence outcomes.

A key insight from the evaluation team was the tension between policy led or researcher led research. While ideally relevant research is that which is informed by policy imperatives, and the need for evidence to address knowledge gaps, research can also generate evidence that catalyses and motivates new policy imperatives. The evaluation identified examples of these approaches and also effective co-design and collaborative approaches such that research agendas are iteratively informed over time by both researchers and health leaders. Future similar programming by the Global Health Division/Australian Government should intentionally engage with these issues to maximise contribution of applied research.

The importance of end-user engagement in planning, implementation and dissemination of research findings, to promote practical utilisation of research findings within local contexts was affirmed through the evaluation findings. A key insight from the evaluation team was the recognition that high quality research is required, though it is not sufficient to inform policy outcomes, as many factors influence public policy and practice. In other words, this suggests that effective research to policy adoption is influenced by factors other than research evidence. A stronger focus on co-design, utilisation of timely research findings that meeting policy and practice need of key end-user groups is required by both project leaders and also DFAT managers to realise the full potential of applied research.

The applied research program provided a significant contribution to the Indo-Pacific region to strengthen health security. This is was especially evident during the period of the program which was affected by COVID-19. Many of the funded investments pivoted activities to provide key contributions to national level. The systems strengthening approach provide effective to enable and equip national health decision-makers to lead improved health security in the region.

7. Annexes

Annex 1: DFAT Standard 10: Independent Evaluation Reports

Executive summary and introductions

Nr.	Element	Reference in evaluation report
10.1	The executive summary provides all the necessary information to enable primary users to make good quality decisions	See page i
10.2	The introduction provides a brief summary of the investment or program	Section 1
10.3	A brief summary of the methods employed is included	Section 3.3
10.4	Key limitations of the methods are described, and any relevant guidance provided to enable appropriate interpretation of the findings	Section 3.4

Findings and analysis

Nr.	Element	
10.5	The Report addresses all key evaluation questions	Section 4
10.6	The overall position of the author is clear, and their professional judgments are unambiguous	Section 4 and Annex 6
10.7	There is a clear line of sight from the key evaluation questions to the evidence presented, the findings, conclusions, and recommendations	Section 4 and Section 5
10.8	The Report identifies the strength of evidence that supports the conclusions and judgments made	Section 4
10.9	The relative importance of the issues communicated is clear to the reader	Section 4 and Section 6
10.10	There is a good balance between operational and strategic issues	Section 4
10.11	Alternative points of view are presented and considered where appropriate	Section 4
10.12	Complicated and complex issues are adequately explored and not oversimplified	Section 4, 5,6
10.13	The role of context and emergent risks to program performance are analysed	Section 4
10.14	It is possible to trace the factors, over time, that have led to the current situation	Section 4

10.15	Robust evidence and neutral language are used to communicate findings, not emotive arguments	Section 4
10.16	The implications of key findings are fully explored	Section 4, 5, 6

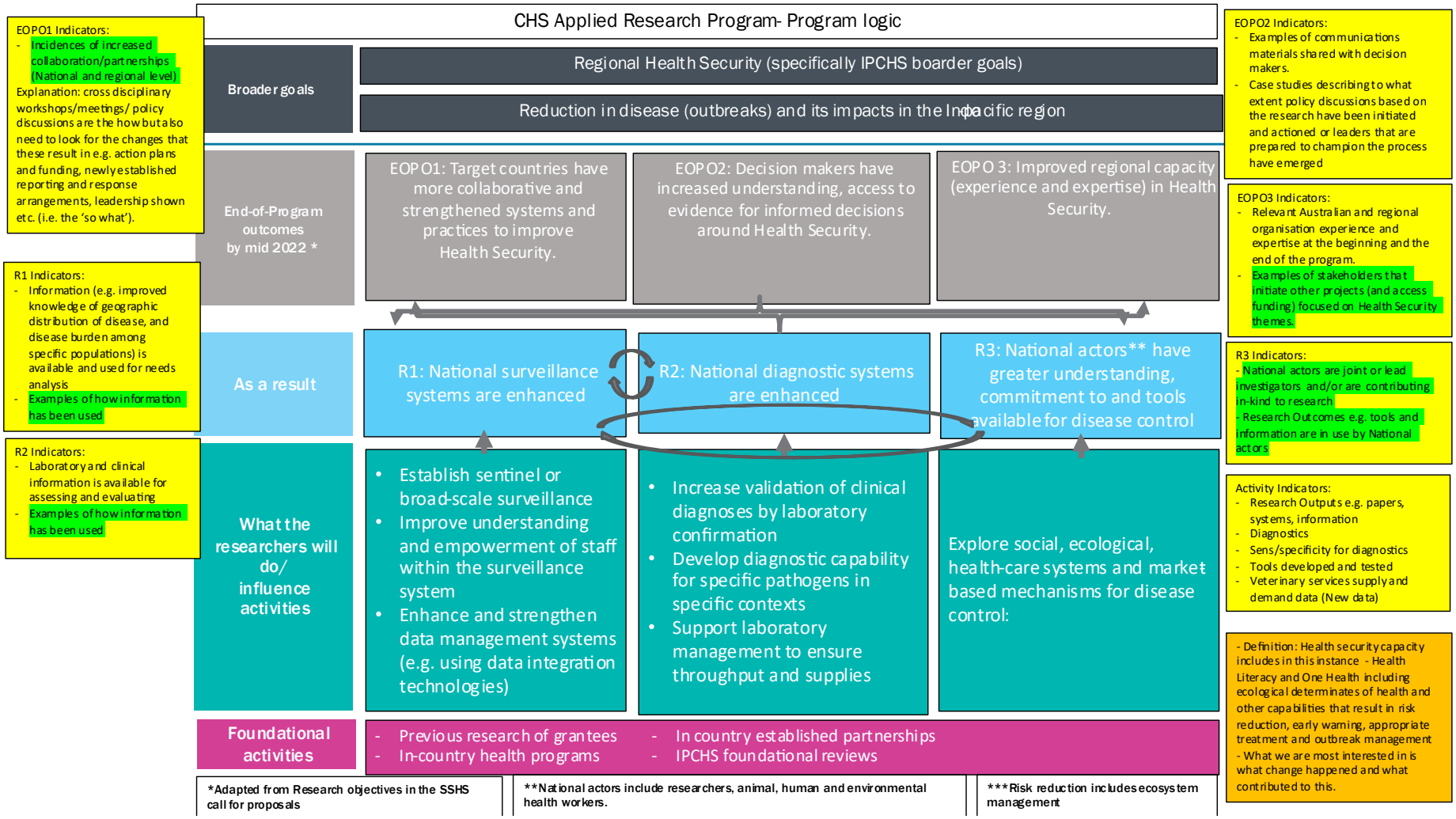
Recommendations and lessons

Nr.	Element	
10.17	There is a limited number of feasible recommendations	Section 5
10.18	Individual positions have been allocated responsibility for responding to recommendations	To be addressed in management response
10.19	Where there are significant cost implications of recommendations, these have been estimated	To be addressed in management response
10.20	The circumstances under which any important lessons are transferable are described	Section 5

Management response and publication

Nr.	Element	
10.21	Management responses outline whether DFAT agrees with the recommendations, and how and when recommendations will be implemented	
10.22	The final Evaluation Report and management response are published within the timeframes outlined in the DFAT Development Evaluation Policy	

Annex 2: Applied Research Program Theory of Change



Annex 3: Summary of projects funded under each of the funding streams and are included in this evaluation.

The tables below provide a list of investments under the two funding streams included in the evaluation.

1 - Stronger Systems for Health Security (SSHS)

Project Title	Country
1. University of New South Wales- Improving the dispensing of antibiotics by private drug sellers in Indonesia: a missing ingredient in the fight against antimicrobial resistance (AMR) (PINTAR)	Indonesia
2. University of Newcastle- Accelerating the Development of Evidence-based Policy and Practice (ADEPPt) in Papua New Guinea (PNG).	PNG
3. University of Sydney- Securing health in Fiji through strengthened health systems and integrated water management to tackle typhoid, dengue, and leptospirosis (WISH)	Fiji
4. University of Sydney- Combating the emergence and spread of antimicrobial resistant infectious diseases in Vietnam (V-RESIST)	Vietnam
5. Menzies School of Health Research- Surveillance Training, Research Opportunities and National Guidelines for communicable disease control in Timor-Leste (STRONG TL)	Timor Leste
6. Burnet Institute- Stronger Surveillance and Systems Support for Rapid Identification and Containment of Resurgent or Resistant Vector Borne Pathogens in Papua New Guinea (STRIVE-PNG)	PNG
7. Menzies School of Health Research- Stronger Health Systems for multidrug-resistant tuberculosis and malaria (STRATUM)	Indonesia and PNG

2 - Research for One Health for Systems Strengthening (ROHSS)

Project Title	Country
1. Burnet Institute - Drug sensitive and resistant tuberculosis and zoonotic infections as causes of lymphadenitis in three provinces in Papua New Guinea (EZARET) SRA	PNG

2. CSIRO - Better understanding of the epidemiology, and improved surveillance capacity for zoonotic arbovirus infections in PNG (ZAPPA) SRA	PNG
3. Menzies School of Health Research – Zoonotic Malaria in Indonesia (ZOOMAL) SRA[21]	Indonesia
4. CSIRO - Supporting Fijian health and agricultural authorities implement the National Antimicrobial Resistance Action Plan SRA[22]	Fiji
5. Swinburne Institute - Development, implementation and evaluation of community-based communication strategies to respond to health security threats in diverse communities in Lao PDR and Cambodia (HealthLit) SRA	Cambodia and Laos
6. Nossal Institute for Global Health - Incentives for early declaration and effective prevention of Avian Influenza in the Mekong (HPAI Policy) SRA	Mekong (Vietnam, Laos and Cambodia)
7. Nossal Institute for Global Health- Collaboration on One Health Economics for Systems (COHERES)	Cambodia
8. Menzies School of Health Research - Evaluating zoonotic malaria transmission and agricultural and forestry land use in Indonesia (ZOOMAL)	Indonesia
9. Enhancing the management of antimicrobial resistance in Fiji (EMAR)	Fiji

[21] To note that project #3 and #8 are connected. Project #3 was an initial SRA which was followed by a more substantial research project, #8.
[22] To note that project #4 and #9 are connected. Project #4 was an initial SRA which was followed by a more substantial research project, #9.

Annex 4: Evaluation questions

Effectiveness

1. To what extent did the Applied Research Program achieve the expected EOPOs?[23]
2. To what extent did the investments deliver unexpected outcomes in response to changes in the operating context?
3. What approaches and strategies implemented were most successful to achieving anticipated and unanticipated outcomes?
    i. To what extent has the program supported behaviour change among partners and beneficiaries?
    ii. To what extent did policy dialogue or policy change contribute to program outcomes?
    iii. To what extent has 'One Health' implementation been effective and contributed to program outcomes?

Efficiency

4. To what extent did investments under the Applied Research Program make the appropriate use of time and resources for achieving outcomes?
5. To what extent did the investments represent value for money?
    i. To what extent did the governance and management arrangements support overall efficiency?
    ii. To what extent did DFAT and the implementing partner personnel have the required skills and experience to efficiently deliver the program?
6. To what extent did the M&E system generate credible information that was used for management decision-making, learning and accountability purposes?
7. To what extent was risk management effective, were risk procedures followed?

Gender equality, disability and social inclusion

8. To what extent did the investment analyse and mitigate gender-related risks and use sex-disaggregated data to target improvements for gender equality?
9. To what extent did the investments achieve gender equality outcomes?
10. To what extent did the investments actively involve people with disabilities and/or disabled peoples' organisations (DPOs) in planning, implementation, and monitoring and evaluation?
11. To what extent did the investment enable people with disabilities to benefit equally?
12. To what extent did the investment meet environmental safeguards policies, standards, and requirements?

[23] Expected EOPO as defined Applied Research Program Theory of Change

Relevance

13. To what extent were the investments initiated by researcher and/or policy-political directions?
14. To what extent did the investments remain relevant to Australia's policy priorities and national interest, over the life of the investment?
15. To what extent did the investment align with the partner government's development priorities and beneficiary needs?

Sustainability

16. To what extent is there evidence that the benefits of the investments will endure?
    i. To what extent are local systems strengthened through the investments? (EOPO1)
    ii. To what extent do decision makers have continued access to evidence to information? (EOPO 2)
    iii. To what extent national actors demonstrate ownership of health systems improvements (inclusive of human, animal and environment health systems) ? (EOPO3)
17. To what extent are there any risks that will continue after the investment / undermine sustainability?

Recommendations

18. Informed by the evaluation findings, what are recommendations for improving performance of Australia's future investments in Applied Health Research and One Health, including recommendations for improving GEDSI outcomes?
    i. a) Are there any areas for improvement in relation to MEL that should be considered in future investments?
    ii. b) Are there any specific efficiency considerations for future related investments?
    iii. c) Are there any specific considerations related to GEDSI and environment that should be applied to future investments?

Annex 5: Evaluation analytical frameworks links to evaluation questions

Evaluation analytical frameworks links to evaluation questions

	Frameworks	Link to evaluation inquiry
1	Evaluation questions	Overarching framework to guide the evaluation
2	Applied Research Program Theory of Change	Employed to assess effectiveness – with focus on the extent to which EOPO as defined in program theory have been achieved (EQ1)[24]
3	Framework for Exploring Research for Development Impact	Employed to assess effectiveness – with focus on approaches and strategies implemented (EQ3)[25]
4	Gender equality spectrum	Employed to assess GEDSI – with focus gender integration (EQ8)[26]
5	Gender at Work Framework	Employed to assess GEDSI – with focus gender integration (EQ9)[27]
6	Disability Inclusion	Employed to assess GEDSI – with focus gender integration (EQ11)[28]
7	One Health	Employed to assess effectiveness – with focus on approaches and strategies implemented (EQ3)[29]

[24] See Annex 2
[25] https://rdinetwork.org.au/wp-content/uploads/2020/02/From-Evidence-to-Impact-Full-Report.pdf
[26] https://policy-practice.oxfam.org/resources/transforming-gender-inequalities-practical-guidance-for-achieving-gender-transf-621183/
[27] Rao and Kelleher (2005)
[28] https://www.dfat.gov.au/sites/default/files/disability-inclusive-development-guidance-note.pdf
[29] https://www.who.int/news-room/questions-and-answers/item/one-health

Annex 6: Case studies

CASE STUDY 1: The Watershed Interventions for Systems Health in Fiji (WISH Fiji)

1.1 Summary of the SSHS Project

Fiji's health system continues to fight endemic and epidemic transmission of water-related diseases. Severe outbreaks of water-related infectious diseases referred to as the "three plagues": leptospirosis, typhoid and dengue (LTD) are key national priorities for the Fiji government with over 20 reported typhoid outbreaks since 2005, a 27,000-case outbreak of dengue in 2013-14, and a three-fold increase in leptospirosis cases post cyclone Winston in 2016 (University of Sydney, 2023). In the aftermath of Tropical Cyclone Harold in April 2020, the Ministry of Health and Medical Services (MOHMS) announced an outbreak in LTD cases in cyclone affected areas with 14 deaths and more than 4000 active cases of LTDS (FBC News, 2020).

Interestingly, LTD cases and syndromes associated with these diseases are correlated with environmental conditions, with large outbreaks typically occurring following heavy rainfall events and flooding (Lau et al. 2010; Nelson et al.2022 as cited in Wakwella et al 2022). Outbreaks are also more severe in areas with degraded watersheds (Jenkins et al. 2016 as cited in Wakwella et al 2022). However, few studies have explicitly connected watershed condition with public health (Kolok A et al 2009 as cited in Jenkins et al.2018).As a collaboration between the University of Sydney, Edith Cowan University, Fiji National University (FNU), Wildlife Conservation Society's Melanesia Office, in partnership with nine government ministries, provincial offices and the Water Authority of Fiji, the Watershed Interventions for Systems Health in Fiji (WISH Fiji) implemented a collaborative research-to-action approach of nested interventions within watershed units to reduce risk of water-related disease and improve downstream ecosystem health. (University of Sydney, 2023).

WISH Fiji developed an innovative integrated approach unifying action on human, animal, environmental health, natural resource management, and Indigenous local knowledge. Between 2018 and 2022, WISH Fiji was implemented in 29 Fijian communities across 5 watersheds in Fiji within Central, Eastern and Northern divisions.

WISH Fiji was designed to reduce risks to people from leptospirosis, typhoid, dengue, and diarrheal diseases (collectively LTDD) by improving overall 'systems health', which provides co-benefits for downstream ecosystems. Systems health is defined by the project as the emergent result of interactions and feed-backs between the environment and people, nested across different scales. Improved systems health is accomplished by: (1) identifying disease risks across nested scales (landscape, community, household, individual) through data gathering and participatory planning; (2) prioritising investments in interventions that maximise risk reduction potential for human health and downstream ecosystem; and measuring impact (WISH 2022).

The multi-sectoral, multi-disciplinary and across-government approach embedded the project activities into community and government plans, including strengthening of Village Water committees with the inclusion of women and youth. With project support, Cabinet approved the establishment of the cross-sectoral National Drinking Water Quality Committee. Staff from Fiji National University, the National Centre for Communicable Disease and sub-divisional health inspectors from the Ministry of Health and Medical Services (MOHMS) have increased their capacity on water quality assessments and laboratory testing.

WISH Fiji has been recognised internationally by research and health organisations. The Fiji government has used WISH project data in their UN SDG reporting, project staff and research investigators have delivered presentations at various global fora and published. articles.

1.2 Context, mechanisms and related outcomes of the project

CONTEXT

C1a - Elimination of LTD identified as key national priorities for the Fiji government

The Fiji government prioritised responding to severe LTD outbreaks that have been stimulated by heavy rains, flooding and degraded watersheds. The priority concern has informed MOHMS divisional environmental health officers' enthusiastic participation in the project

C1b -Heightened importance of systems strengthening approach to watershed management

The COVID-19 pandemic elevated conversations about health systems surveillance, in the public health field raising the global profile of the risk of zoonotic spillover associated with ways in which human activity can disrupt the integrity of natural ecosystems. The relevance of the systems approach to watershed management, pioneered by the WISH-Fiji program, took on heightened importance as a proof-of-concept delivery mechanism to reduce disease risk through proactive, systems planning approaches. Project Investigators and collaborators capitalised on this unique moment of time to activate conversations about ecosystem management for systems health through multiple approaches.

C1c– Emergence of localisation as an adaptation to COVID-19

The original design identified MOHMS as the key partner but with the COVID-19 outbreak MOHMS staff were fully occupied with the emergency response and so the FNU leadership and project team provided the continuity throughout the project implementation. The project team based at FNU had local knowledge, local insights and direct experience in biodiversity conservation and Water Sanitation and Hygiene (WASH) which contributed to the project's successful community engagement.

When Australian-based investigators could not travel to Fiji due to border closures, the project activities continued to progress due to dedication and local ownership by FNU and the Fiji government. With provincial officers overseeing the project watershed communities, they could contribute with local knowledge and ongoing impacts.

C1d -Existing relationships and contextual understanding

The lead Principal Investigator (PI) for this research project has been in Fiji since 1999 and completed significant work in Fiji on ecosystems-based management and had spent four years investigating typhoid in central division of Fiji. This previous work by the PI enabled the project to build on trusted relationships and be informed by contextual understanding.

The PI's longstanding relationship with Wildlife Conservation Society (WCS), enabled WCS to become an integral part of the project strengthening the focus on the environment and conservation and attract co-funding for the project.

MECHANISM

M1a -Evidence-based decision making for systems health supported

The research team used nine types of data-gathering instruments, based on known risks for LTDDs and downstream ecosystem health and presented the data to communities for them to decide on priorities for intervention. The research team's engagement with communities and facilitation of active participation enabled evidence-based and contexualised decision-making. Evidence of lab samples taken from the water sources were linked to upstream activities such as logging, gravel extraction, debris collection, and animal activities, presented to communities for them to decide on priorities for intervention.

The research team in collaboration with communities identified a total of 329 priority watershed interventions were identified across categories related to: water systems; animal management; land use management (including Nature-based Solutions); waste management; drainage; sanitation systems; hygiene; integrated planning; and health systems surveillance. Of these communities implemented 168 watershed interventions, principally related to improvements in water systems, integrated planning, land use management and waste management.

M1b - Participatory engagement processes emphasised

Through collective decision making, the research team worked with government staff to select the five project watersheds based on key selection criteria, including the history of LTDDs. The research team then consulted with provincial officers and MOHMS to identify 29 project communities A comprehensive process for obtaining free, prior and informed consent (FPIC) was carried out, piloting a new approach in collaboration with the Ministry of iTaukei Affairs.

M1c Development of WSSPs to strengthen Village Water Committees

WISH Fiji used Water and Sanitation Safety Plans (WSSPs) to assist communities to identify interventions to improve their water and sanitation infrastructure. To assist develop their WSSPs, key findings from the baseline surveys conducted in 2019 were shared by the research team with each community highlighting the risk factors that may influence the prevalence or susceptibility of a community to water-related diseases. The training on water and sanitation safety plans (WSSP) strengthened Village water committees who incorporated these plans into the Integrated Village Development Plans (University of Sydney, 2023; KII). WSSPs had previously been promoted by government but the evidence-based approach to inform WSSP actions by WISH Fiji highly valued by the communities.

M1d - Cross-sectoral approaches -convening and brokering sectoral collaboration

The research team played an important convening and brokering role to bring important sectoral actors together for joint planning at the district level including Ministry of Agriculture; Ministry of iTaukei Affairs; Ministry of Education; Ministry of Fisheries; Ministry of Waterways and Environment; MOHMS, Water Authority of Fiji; Ministry of Rural Development; Divisional Commissioners and Provincial Administrators. This multi-disciplinary and multi-ministry approach facilitated project success and deepened different parts of government engagement in the project and initiatives for a health system approach.

M1e Knowledge disseminated and shared through multiple channels and range of stakeholders

WISH Fiji approach has been referenced by other academia research as innovative and one of very few examples worldwide of such integrative programming specifically demonstrating Planetary Health in practice. Fiji government has used WISH Fiji data for SDG reporting to the UN. Several

universities are using the WISH Fiji project as a case study in Planetary Health and One Health courses. The research team made presentations about the project at the 2023 World Health Summit, World health Assembly, and have published articles to showcase the approach and gain insights from the research and collaborative practice in Fiji.

OUTCOME

O1 Reduction of risks to water-related diseases

Over 5,000 residents of project watersheds now have access to cleaner drinking water because of the project. More than 11 hectares have been targeted for riparian restoration, in partnership with the Ministry of Forestry, that will produce lagged risk reduction through sediment control and flood risk mitigation (University of Sydney, 2023).

Comparisons between initial and follow-up monitoring are demonstrating changes to risk levels resulting from project interventions. Divisional Environmental Health officers report zero cases of LTDD following WISH Fiji intervention in the watershed areas. (KII)

O2 Community ownership and empowerment

The project team invested 5-6 months at the start applying the FPIC process raising awareness and facilitating community's engagement in planning and decision-making processes. This led to community empowerment and ownership of the interventions and improvements embedded into the Integrated Village development plans.

O3 Strengthened and inclusive Village Committees

Engagement of women and youth in all community training was mandatory. By project end, 20 out of 29 village water committees had increased female membership; and 24 out of 29 villages had village health workers (predominantly female) represented on the water committee. One great change has been the acceptance of the Community Health Worker (usually female) by the village/community council to present during the village council meetings. This did not happen previously. Youths have become engaged and given the chance to lead community projects (KII).

O4 Gender transformative change

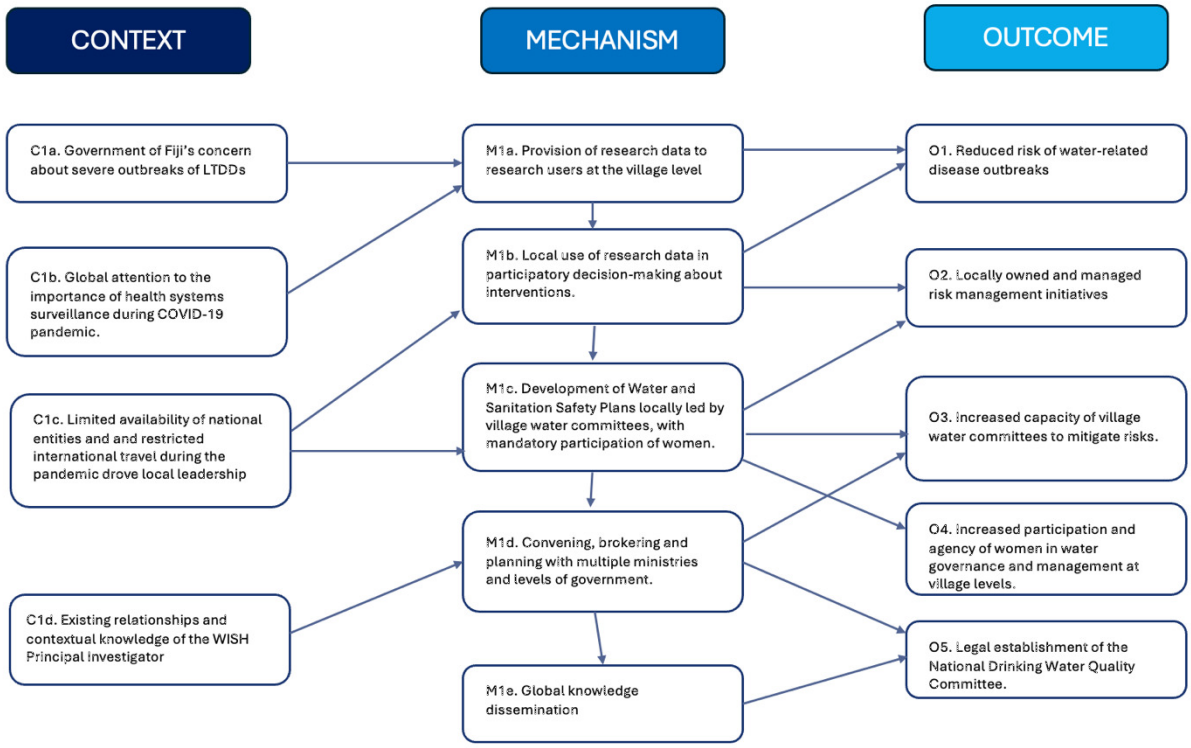
The research team shared with the communities that the project activities would have a disproportionate impact on women given the important role of women especially with water and sanitation matters, food production, household chores, storage. This led to the mandatory involvement of women in the Village Water Committees which were traditionally male dominated. This shifted the power balance giving voice to women's concerns and increased women's agency. With installation of water pipes, women no longer had to go down to the river which was very difficult. Women became actively involved and were able to feel agency and had access to resources. Previously women's issues were left to "any other business", with this project, health became an agenda including women's priorities and became part of the main discussion points for the communities. One of the villages applied for a grant from the ministry of Women for fencing off animals which was a priority identified by women and implemented with the support of men.

O5 Policy influence – Legal establishment of the National Drinking Water Quality Committee

Through the collaboration with government ministries, a cross-sectoral National Drinking Water Quality Committee has been established through cabinet approval in 2021 providing a legal platform

to provide safe drinking water and ensure better preparedness and response to water-related diseases. Although it has not met, the committee comprises of the heads of the key water resources agencies of government. It is tasked with providing evidence of safe drinking water, even in rural areas, through sanitation surveys, water safety plans, and drinking water quality monitoring and surveillance programs and integrating it with water-related disease surveillance.

1.3 Outcome pathway



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CASE STUDY 2: **Supporting Fijian health and agricultural authorities implement the National Antimicrobial Resistance (AMR) Action Plan & Enhancing the Management of Microbial Resistance (EMR)**

2.1 Summary of the (2) ROHSS Projects

Antimicrobial-resistance (AMR) is one of the greatest threats facing humanity. It is a global public health issue increasingly gaining traction in governments worldwide and mostly occur due to inappropriate use of antimicrobials. Antibiotic resistant diseases already cause at least 700,000 deaths globally a year and is set to increase to 10million by 2025(CSIRO, 2024).

In Fiji, in 2019, there were 147 deaths directly attributable to AMR and 565 deaths associated with AMR (other factors involved) (GRAM, 2019). The number of AMR deaths in Fiji is higher than deaths from chronic respiratory diseases, respiratory infections and tuberculosis, unintentional injuries, digestive diseases, and maternal and neonatal disorders (GRAM, 2019).

Fiji has one of the highest bacterial infections in the world. Studies confirm that Fiji has one of the highest rates of *Staphylococcus aureus* infections in the world (50,000 per 100,000 persons) and that methicillin resistant *Staphylococcus aureus* is present in hospitals and neonatal intensive care units (Jenny et al 2014; Kumar et al 2015; Sridharan et al. 2016). Cases of diabetic amputations occur at a rate of 1 every 12 hours, and cases of tuberculosis (both human and animal) are some of the highest in the world - this increases the risk of AMR because of a greater need for antibiotics (CSIRO, 2020).

Despite these challenges, Fiji was the first country in the Pacific to develop a National Action Plan on Antimicrobial Resistance (NAP on AMR) in response to the WHO call for Action at 68th Global Health Assembly in Geneva which focused on the growing threat of AMR. (KII) The Fiji government's Ministry of Health and Medical Services (MOHMS) established the multi-sectoral National Antimicrobial Resistance Committee (NARC) comprising key ministries, research institutes, private sector and regional organisations. Through NARC, the first NAP on AMR was developed in 2015 but NARC faced significant implementation challenges including lack of funding, lack of adequate legislation to enhance its role or monitor AMR, limited outreach capacity, lack of research on AMR, and difficulties in operationalising One Health. (CSIRO, 2020).

In collaboration with the government of Fiji, a scoping study was conducted between February 2019 and July 2020 by CSIRO (the lead organisation), University of Technology Sydney, and University of South Australia with DFAT funding. The research '*Supporting Fijian health and agricultural authorities implement the National Antimicrobial Resistance (AMR) Action Plan'* referred to here as AMR investigated the challenges and opportunities in managing AMR in Fiji. The study used interdisciplinary research to conduct 1) situational analysis, 2) synthesis data to identify needs/gaps, and 3) co-design of an AMR management program. Data collection included literature review, in-depth interviews, focus group discussions and workshops; 69 participants were interviewed as part of this scope of work. Part of the information was also used to develop a full project proposal for the next phase to guide the new NAP on AMR beyond 2020 (CSIRO,2020).

The scoping study assessed that AMR is moving from being sporadic to endemic in Fiji and further research is required on the risk factors as well as AMR trends across human, animal and environment domains. The study recommended i) strengthening of the NARC, ii) inclusion of ministry of economy and local community representatives in NARC, iii) collaborative research between FNU's college of medicine and agriculture, iv) increased research on AMR to inform

evidence-based policies, v) laboratory capacity building, vi) increased partnerships between Pacific countries (including Australia) to tackle AMR, and vii) use of AMR management as a platform for overall integrated/ One Health systems strengthening (human, animal and environment) (CSIRO, 2020)

Following on from the scoping study, the second phase '*Enhancing the Management of Antimicrobial Resistance*' (EMAR) 2020-2023 (2.5 years) aimed to reduce the risk of antibiotic-resistant infections by enhancing the integrated management of AMR in Fiji across human, animal and environmental health to establish baseline knowledge of occurrence of drug resistance, its economic impact, risk factors and governance. The collaboration expanded to include the Fiji National University (FNU) (CSIRO, 2023).

In human health, the project utilised data from the Central War Memorial (CWM) hospital to visually determine the prevalence of AMR. The AMR dashboard was developed putting Fiji at the forefront of using visualization tools for AMR decision making; the only other country with this capacity is the US, making Fiji the only developing country to achieve this. The project team developed and conducted a knowledge, attitude, and practices (KAP) questionnaire with 1,220 participants which showed community knowledge on AMR is low.

In agriculture, collection and analysis of samples from chicken revealed the most prevalent bacterial species. KAP questionnaires completed by 255 poultry farmers also revealed low knowledge of farmers on AMR and antimicrobial use. In environment, genomic analysis of samples collected from various sites (e.g. dumpsites, river, farm runoffs etc.) identified the most common pathogenic genera. The estimated excess cost of AMR was calculated at US$70,629,288 (CSIRO, 2023).

The project has contributed to increased knowledge of the occurrence of AMR in the Fiji context. As stated by the former Chair of NARC "*Prior to 2018, we were pulling things internationally, we didn't have local research to feed our communication people and consumer council. We have a small group that works on communication, we have a special day every year. Even publication - calendars. It's a very hard topic for the public to grasp - what is antimicrobial resistance, how it affects them, how it affects the health system, how it affects agriculture and the environment*" (KII).

As described through KII conducted for this evaluation, the research has supported NARC to fulfill its international obligations with the development of the new policy and revised National Plan of Action on Antimicrobial Resistance, 2022, which includes a strengthened focus on five pillars 1) Awareness of the public 2) Health Surveillance - going out, actively looking and checking every possible avenue for these pathogens, 3) Reduce AMR in humans and animals 4) Use antibiotics more judiciously in an evidenced based manner; and 5) Establish good governance for AMR use - regulations and law in place, use One Health approach (inclusive of animal, human, environment health).

Apart from training and laboratory capacity building, the project organised a National Microbiology Sympossium in May 2023 and a Pharmacist Sympossium in June 2023 as other forms of learning and networking.

With the knowledge acquired from the research findings, NARC wanted all the papers to be presented to all stakeholders, to have active discussions on the research papers and issues raised. This led to the first Pacific One Health conference in August 2023, with participation from all the sectors and from nine other Pacific Islands countries where all the papers from the research were presented. The next conference will be held in Samoa in 2025.

2.2 Context, mechanisms and related outcomes of the project

CONTEXT

C1a – Relevance to local context - Increased prevalence of AMR and high burden of Infectious diseases

The presence of AMR in hospitals raised Fiji government concern on its potential to spread to the community and livestock and vice versa. Other factors contributing to this high prevalence such as climatic impacts like cyclones having a long recovery phase resulting in diverting resources from other Ministries such as Health and Agriculture and technology influencing health seeking behaviour with people buying antimicrobials online without prescription. High risk factors leading to the spread of AMR include over the counter sale of antimicrobials, mixing of human and veterinary drugs in pharmacies, high prevalence of diabetes leading to surgical prophylactic use of antimicrobial, long antimicrobial supply chain compounded with hot and humid weather that could affect drug efficacy, importation of drugs. (CSIRO, 2020)

C1b Fiji government commitment - National Plan of Action –2015

By way of showing its commitment to the increasing threat of AMR, the Fiji government, through the MOHMS, developed the first National Action Plan. The MOHMS had identified antimicrobial resistance as one of the priority agendas. In May 2015 the Global Action Plan on Antimicrobial Resistance was endorsed at the Sixty-eighth session of the World Health Assembly, where Member States were urged to develop National Plans on antimicrobial resistance within the next two years following endorsement. To develop the national plan, the MHMS held two national workshops to develop the national plan. The first national workshop on antimicrobial resistance was held in August 2015 and the second in October 2015 to finalise the national action plan (MOHMS, 2015)

C1c Lack of awareness and knowledge of AMR

From research conducted through KAP questionnaires with 1,220 participants and 255 poultry farmers, there are low levels of knowledge on AMR and antimicrobial use.

C1d– Redefining One Health approach

Apart from various challenges facing Fiji in managing AMR and other diseases, there were other general issues that were identified during the scoping study including the development of a One Health network and a master's program. The study found that the development of the Pacific One Health network One Health was highly valued by Fiji key stakeholders because of the frequent occurrence of zoonotic diseases such as leptospirosis and tuberculosis. Also, at the regional level there is appreciation how wellbeing and climate change strongly influence some of the key health policies. This contributed to discussions with the Ministries of Health, Agriculture, FNU, SPC and other stakeholders on how to redefine One Health within the Pacific community cultural context.

MECHANISM

M1a – Establishment of the cross-sectoral National Antimicrobial Resistance Committee (NARC) to implement NAP on AMR

NARC was formed in 2016. The purpose of the NARC is to champion the implementation of the Fiji National Antimicrobial Resistance Plan. It is legally mandated as a technical committee under the Fiji Medicinal Products Board as per the Medicinal Products Act 2011. (NARC, 2022). It is a muti-sectoral

body comprising of government ministries from the public sector human health, animal health and non-health agencies., private sector -animal and human health professionals - Pharmaceutical Society, Veterinary Association College of General Practitioners, Consumers and Agricultural industry, Border security and tertiary academic institutes.

M1b Scoping study to identify challenges to implementing the first National Plan on AMR

NARC faced significant implementation challenges including lack of funding, lack of adequate legislation to enhance its role or monitor AMR, limited outreach capacity, lack of research on AMR, and difficulties in operationalising One Health. (CSIRO, 2020). The scoping study recommended the strengthening of NARC and the follow-on EMAR project supported NARC with the development of the 2022 NAP on AMR.

M1c - Capacity building and systems strengthening

The EMAR project capacity building strategy focused on capacity building in three areas – namely laboratory, research and technical. On laboratory training, EMAR provided in person practical training on Antimicrobial Susceptibility Testing (AST) to a total 52 delegates from academic and government clinical, veterinary, and environmental laboratories as well as laboratory technicians from five different hospitals in Fiji. Antimicrobial stewardship training was conducted in six hospitals with 53 participants.

M1d Knowledge disseminated and shared

In recognition of competency-based learning and networking as a complimentary approach to build technical capacity the project organised a National Microbiology Symposium in May 2023 which was attended by 55 participants. Pharmacist symposium was also organised in June 2023 with 49 participants attending and the first regional One Health symposium held in August 2023.

OUTCOME

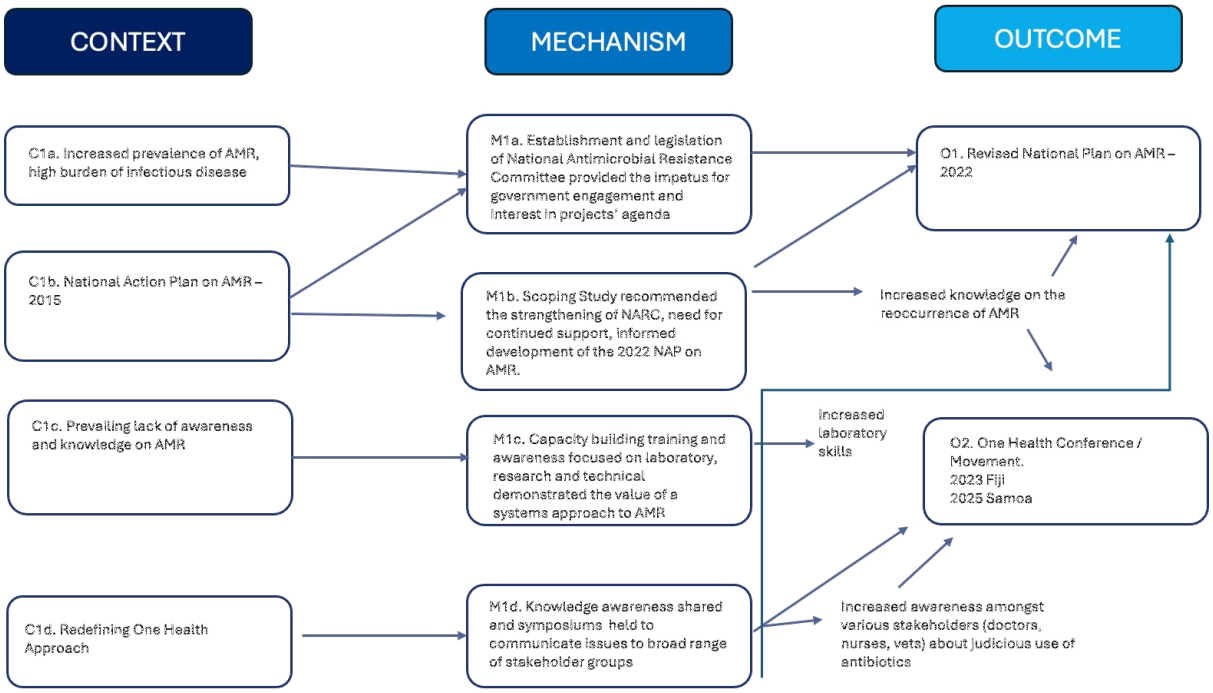
O1 Policy influence –Launch of National Action Plan 2022-2025

In 2022, the NARC established its second National Action Plan with an increased focus on cross-sectoral partnerships and collaboration by taking on a One Health approach. This plan included the call for better legislation around the control of antimicrobials and better governance measures pertaining to their usage. The role of key role Pharmacists in promoting the judicious, safe and effective use of these medications and are at the forefront of the mission.

O2 ***Regional movement on One Health***

The research projects reported to NARC and with the knowledge received from the research findings, NARC initially planned a symposium, but which expanded and led to the first regional conference on One Health. This has developed into a movement with the next conference to be held in Samoa. (KII).

2.3 Outcome pathway



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CASE STUDY 3: Improving understanding on zoonotic malaria in Indonesian context with One Health approach

3.1 Summary of the ZOOMAL project

Since the sudden increase in malaria infections in 2004 in Sarawak, Malaysia, malaria cases attributed to zoonotic *Plasmodium knowlesi* (*P. knowlesi*)[30] have continued to attract interest from development and research communities, especially in Malaysia, Thailand and Indonesia. According to the World Health Organisation (WHO's) World Malaria Report 2023, a total of 2,682 people were infected with *P. knowlesi* in 2022 with the disease claiming 10 lives (9 in Malaysia, 1 in Thailand). About 90.5% (2,505 cases) of cases were found in Malaysia, followed by Thailand (3.1%, 176 cases) and Indonesia (0.1%, 87 cases). Despite the very low number of cases compared to other species of *Plasmodium* causing malaria cases[31] (249 million people contracted with 608,000 deaths), *P. knowlesi* was regarded a "notable concern" by the WHO.[32]

In Indonesia, one systematic literature review reported that 545 *P. knowlesi* malaria cases were documented between 2010-2021, with 95% of incidences occurring between 2017-2021. Most of the cases were recorded in Aceh and North Sumatra provinces, in addition to Jambi, Central Kalimantan and South Kalimantan.[33] It is likely that the increase in reporting was the result of better detection using molecular methods, demonstrating prior under-reporting of case numbers. The relocation of Indonesia's capital city to East Kalimantan, along with deforestation and decreased biodiversity, also poses an increased risk of zoonotic infections, including from *P. knowlesi*.[34] That said, few data are available about *P. knowlesi* in Indonesia until recent years.

To date, Indonesia remains one of the malaria endemic countries with highest cases and deaths in South-East Asia Region. Between 2014-2022, the trend in case numbers fluctuated from 1.16 million in 2014 with lowest tally in 2018 (662,497), before it steadily increased to 1.15 million in 2022. The disease caused 2,036 deaths that same year.[35] To put into perspective, it was responsible for 25.5% of malaria deaths in South Asia and South-East Asia countries, behind only India (65.7%).[36] Indonesia has set the goal of malaria elimination by 2030, a challenging target to achieve considering the current pace of interventions and financing.[37]

From 2019, the Australian Government's Department of Foreign Affairs and Trade (DFAT) funded the ZOOMAL research project (Evaluating zoonotic malaria transmission and agricultural land use in Indonesia) which is the first large, multi-disciplinary study on *P. knowlesi* malaria in Indonesia. The

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[30] *Plasmodium knowlesi* is a malaria parasite found in long-tailed and pig-tailed macaques and is non-human primate. For more readings about the early studies on *P. knowlesi*, see Singh B, Daneshvar C. Human infections and detection of Plasmodium knowlesi. Clin Microbiol Rev. 2013 Apr;26(2):165-84. doi: 10.1128/CMR.00079-12. PMID: 23554413; PMCID: PMC3623376. Accessed 4 April 2024.

[31] WHO recognise four species of malaria *Plasmodium,* i.e., *P. vivax, P. falciparum, P. malariae,* and *P. ovale.*

[32] World malaria report 2023. Geneva: World Health Organization; 2023. See page 34-35.

[33] Bin Said, I., Kouakou, Y.I., Omorou, R. et al. Systematic review of Plasmodium knowlesi in Indonesia: a risk of emergence in the context of capital relocation to Borneo?. Parasites Vectors 15, 258 (2022). https://doi.org/10.1186/s13071-022-05375-8. Accessed 4 April 2024.

[34] Ibid.

[35] World malaria report 2023. Geneva: World Health Organization; 2023. Annex 4 page 222.

[36] World malaria report 2023. Geneva: World Health Organization; 2023. See page 14.

[37] https://www.who.int/indonesia/news/detail/24-07-2023-accelerating-malaria-elimination-in-indonesia--revised-action-plan-and-bridging-the-gap. Accessed 30 March 2024.

study objective is to help reduce zoonotic malaria cases through improved surveillance and understanding of agricultural and forestry land use. Specifically, it aims to promote the use of gold-standard detection methods to enable evaluation of zoonotic malaria disease burden; provide knowledge of underlying drivers of malaria transmission related to agricultural and forestry land-use; and improve understanding of mosquito vectors transmitting zoonotic malaria. It is expected that the ZOOMAL results will inform the Indonesian National Malaria Control Program strategies.

As part of the ZOOMAL Project, infrastructure investments for laboratories were made to enable molecular plasmodium species detection, in addition to capacity building training for lab workers and researchers. Over 45 researchers from 13 institutions across Australia, Indonesia and England are participating in the project. It applies advanced methods for data collection, including geospatial risk mapping that will feed into *P. knowlesi* regional occurrence database generation and analysis. The project will continue until June 2026, after a 3-year major cost extension was granted by DFAT.

As of June 2023, ZOOMAL findings were presented 52 times at conferences, workshops, short-courses and seminars to about 2,500 individuals from multiple institutions and countries. In project sites in North Sumatra, molecular or PCR detection tests were conducted with approximately 4,600 individuals, with confirmed malaria infections in 60 individuals, of which five *P. knowlesi* cases were found. In North Kalimantan, 2,447 individuals participated in the study, with 14 cases of *P. knowlesi* detected from the initial samples. Various data were collected by the study, including demographic, clinical and epidemiological data.

3.2 Context, mechanism and outcomes of the project

Based on the evaluation findings, the current achievements of ZOOMAL could be grouped into two: (1) Emergent national policy influence; and (2) Influence to research capacity.

1.2.1 Emergent national policy influence

At present, this group of outcomes is very much still an emerging achievement, with a future contribution still to be made building on the progress of past and current phases of work. The evaluation team noted there is still the live agenda to develop the national zoonotic malaria surveillance guideline and ensure effective implementation. There is a clear gap in government funding to fill. Last but not least, there is also the need to produce more evidence for policy. That said, this emerging outcome is considered important to document by the evaluation team, considering the contexts and strong mechanisms that were in in place, with lessons to learn from the research to policy influence point of view.

CONTEXT

C1a – Human health focus in malaria control

The Indonesian National Malaria Control Program is primarily organized by the Ministry of Health (MOH) and focused on human health. The National Malaria Control Team is under a different directorate from the National Zoonosis Disease Team and does not engage in policy-making using a One Health approach. One informant noted the relationship between government stakeholders is not as strong as the One Health approach requires to be effective. .

C1b – Lack of data and information on zoonotic malaria for end-users

To date, the Government of Indonesia (GOI) does not have a policy or regulation specific to *P. knowlesi* malaria control, due to a lack of data and evidence for policy making. Four informants noted ZOOMAL is a comprehensive study evaluating the country dynamic transmission of zoonotic malaria.

C1c – Government have a lot of other priorities with resources spread

With the number of cases very low compared to other species of *Plasmodium* incidences, it is understandble that *P. knowlesi* malaria is not of a high priority for the GOI policy planning and resource allocation. Two informants noted the national mid-term malaria control program for 2024-2029 will remain focused on (1) malaria elimination in Papua; (2) control of high endemic malaria regions near the new capital city; (3) malaria control for migrant mobile populations.

MECHANISM

M1a – Provision of evidence from multi-disciplinary methods of data collection

The ZOOMAL team has a unique advantage in its multi-disciplinary approach and hence its ability to produce multiple data from diversed fields of work on zoonotic malaria, as well as to use advanced methods and tools for the disease detection that is of interest to GOI officials. For example, two researchers noted the high interest shown by the government counterparts on the ZOOMAL use of geospatial mapping and database. The case detection procedures and interim findings of ZOOMAL were some of the first multi-disciplinary field work based evidences made available for policy makers at national and provincial levels on Indonesian context zoonotic malaria transmission.

M1b – Presence of Indonesian researchers

Two researchers and one government official suggested senior, highly respected Indonesian malaria experts presenting the project findings, core message and implication to policy, instead of people only receiving advice from foreign experts, is one of the strong aspects of ZOOMAL to date. A right mix of national experts and international counterparts, with the national experts gracefully leading the policy influencing process, could be a key ingredient for strong team profile and successful project.

M1c – Sustained long-term partnerships between Indonesian researchers and key policy makers

ZOOMAL Indonesian researchers are very active contributors in the Indonesian malaria research and control program, long before the project commencement. This enabled a trusted, familiar partnership with the key government officials from which the Project benefitted in terms of preparation, implementation and emergent policy influence. The funded project achieved its influence when it utilized existing policy networks and was managed by very strong advocates who explained the study results to key end user groups.

M1d – Investments in iterative capacity building

The Project offered opportunities for the MoH Provincial Public Health Laboratories (*Balai Laboratorium Kesehatan Masyarakat* or BLKM, previously was BTKL) staff to participate in relevant trainings and learn from some of the best minds in the field. Two of the ZOOMAL team researchers suggested recurring communication between ZOOMAL researchers and laboratory workers might have also created another layer of capacity building opportunities, post-training.

M1e – Multiple stages of DFAT funding support enabling continuity of work

The ZOOMAL Project has received three stages of funding to date. The first round of funding was for a smaller pilot scale project (ZOOMAL 1) that resulted in a larger scope ZOOMAL 2. The Project was granted a 3-year project cost extension to June 2026 by DFAT that will enable it to further expand its work.

OUTCOME

O1a – Contributed to the development of national zoonotic malaria surveillance guideline

At least three of the ZOOMAL Indonesian team members, representing different fields of expertises, were invited by the National Malaria Control Team at the Ministry of Health, to participate in the meetings for the preparation of a national guideline for zoonotic malaria surveillance. It remains to be seen what is the overall level of contribution of ZOOMAL team members in the process, let alone if this guideline is be appropriately developed and applied.

Two researchers and one government official noted the application of One Health approach is especially challenging since the current malaria control program has limited involvement of stakeholders outside the human health sector and actors within the government realm. This evaluation team also noted that the meeting attended by the ZOOMAL team members was held some time ago in 2019, showing the level of difficulty faced to come into agreement for the guideline, although this has also been greatly affected by the COVID-19 disruption.

O1b – Increased surveillance and detection of* P. knowlesi *malaria

Two key members of ZOOMAL team noted that the Provincial Health Offices and participating laboratories in North Sumatra and North Kalimantan are increasingly more aware of potential threat of *P.knowlesi* and the suspected cases. Cases found were reported to the MOH, but also shared with the study team, which helped improve the surveillance system because the system will detect cases more frequently and quickly. However, it is not necessarily relevant to say that this result represents a better overall structure, outside of the ZOOMAL project areas. It is also difficult to assess if this outcome will endure beyond the ZOOMAL Project timeline.

O1c – Increased capacity of MOH laboratories for malaria detection

Several staff from two of the MOH's Public Health Laboratories (BLKM) in North Sumatra and North Kalimantan were invited and participated in the ZOOMAL lab capacity building activities. They are now able to perform early detection of *P. knowlesi* malaria, before sending samples to the MOH lab in Jakarta. This result is important because there was a government plan for the BLKM throughout Indonesia to be responsible for zoonotic malaria detection work, but this is still very much a work in progress.

O1d – Maintained ability to make further contribution to relevant policy

Three Indonesian based researchers and one Australian based researcher noted the difficulties faced by the research community of malaria or zoonotic disease to have a multi-disciplinary, longer term study like ZOOMAL, due to the current national research funding structure. At least until June 2026, opportunities remain for ZOOMAL to further contribute to policy discourse and influence with the ongoing support for the study is now being secured from DFAT.

1.2.2 Influence to research capacity

CONTEXT

C2a Lack of opportunities and funding for multi-disciplinary research and regional cross learning for Indonesian researchers

Three researchers noted it is very difficult for a multi-disciplinary study to get funded with the current government funding structure and research environment in Indonesia, with less opportunies as well for young researchers to build their capacity and experience. Most scientific studies, including about malaria, were for one year and very limited in scope. That is also why a lot of good Indonesian researchers choose to join institutions abroad or work with private institutions, instead of staying at the local universities or government agencies.

C2b Connections between Australia graduates

The major collaboration with Indonesian researchers was built on previous relationships between Australian universities graduates – long before the current ZOOMAL project, especially from Menzies and the Eijkman Institute. This enabled both sides to build and expand new collaboration, for example between Menzies and the University of Sumatra Utara, hence helped to setting up the ZOOMAL team.

C2c Disruption from COVID-19 pandemic

When COVID-19 hit with the first cases reported on March 2020, the ZOOMAL lab at the North Sumatra University (University of Sumatra Utara or USU), North Sumatra, was the only lab with the capability for PCR testing method. The lab was quickly converted into a COVID-19 lab and ZOOMAL team members provided support to the government to set up more labs in the areas.

MECHANISM

M2a Relevant and iterative capacity building, including for young researchers and assistants

Training and mentoring activities were carried out for research team members from USU and Eijkman Institute for Molecular Biology/Exeins Health Initiatve) (EIMB/EHI) in zoonotic malaria molecular research data collection and lab workflow and procedures. The overall process took place over a period of one year, with Menzies researchers visiting both USU and EIMB/EHI. Specific trainings were held in August 2019 (face-to-face), November 2019 (refresher training) and December 2020 (by video teleconference). As of June 2023, a total of 7913 samples had been screened using the trained methods. In total 42 staff members in 13 sites were trained, comprising 38 females (90%). The same trained people were working in upgraded labs between training and thus had opportunities throughout the project to learn and re-learn.

M2b Investment in laboratory hardware capacity and surveillance system

Along with capacity building for human resources (researchers, staff), investments in laboratory diagnostic infrastructure and surveillance system were also made to improve overall capacity at project sites. The laboratory at USU had PCR infrastructure (including storage refrigerator) purchased and molecular lab workflow and procedure improvements were provided by the ZOOMAL project. This enabled the lab to unexpectedly contribute to PCR testing capacity for COVID-19 response. Data collection tools, electronic real-time database and research SOPs were developed. This was supported with lab quality assurance and ongoing training activities.

A new molecular malaria surveillance protocol encompassing blood collection in field optimal DNA/RNA shield media, an ultra-sensitive P. genus screening RT-PCR targeting the 18S rRNA gene, and nested PCR for *P. knowlesi*, human and simian malaria species was implemented for sample collection.

M2c Opportunities for cross-learning between different fields of expertise

Four Australian and Indonesian researchers noted the ZOOMAL project provided important opportunities to work in a multi-disciplinary and international setting, supporting with the use of advanced technology and modelling approaches. Team calls or meetings were held regularly between researchers, where sharing and request for data, information and insight between different groups helped refine their own thinking. i

"Really does [strengthen] local capacity to have future project in this area and start to bring some regional experts from other countries with zoonotic disease expertise." (ZOOMAL team member)

"It was more about getting external exposures for Indonesian researchers, some of the cultural communication areas, this is still a learning curve for the team." (ZOOMAL team member)

M2d Participation in regional research discourse

Two Indonesian based researchers noted there was information sharing with researchers doing malaria studies in neighbouring countries, particularly Malaysia. There were also opportunities to participate in relevant research workshops and courses. For example, the One Health Summer Course titled "Understanding One Health issues in Southeast Asia" on 5-13 September 2022, inviting 237 participants and 39 speakers (including 23 of ZOOMAL researchers) from Indonesia, Australia and several Southeast Asian countries. Zoomal has been included as a case study in annual One Health intensive University field programs and for ASEAN policy makers.

OUTCOME

O2a Increased capacity in lab work, research skills, and project management

Two Indonesian based researchers noted the university partner laboratory in North Sumatra has increased its capacity, i.e. staff and infrastructure, for molecular *Plasmodium* species detection, as a result of ZOOMAL. USU and the previous Eijckman Institute developed the laboratory protocols, the informed consent, enrolment and blood sample processing standard operating procedure and database management system. The trained staff have now trained other MOH lab workers to implement the same standardised protocol.

Three Indonesian and Australian based researchers noted a lot of ZOOMAL young researchers, including women, also acquired important opportunities to upgrade their research skills and have unique experience in terms of the project's multi-disciplinary approach. ZOOMAL's senior team members were also able to improve their project management skills and experience, having to work with different institutions and donor requirements.

Two Indonesian based researchers reported that with the experience from ZOOMAL and COVID-19, the project laboratories are now in the contact list of the Provincial Health Office and MOH provincial laboratories regarding suspected *P. knowlesi* cases in North Sumatra and North Kalimantan, demonstrating their increased presence and trust from the government stakeholders.

O2b Strengthened network and new research partnerships

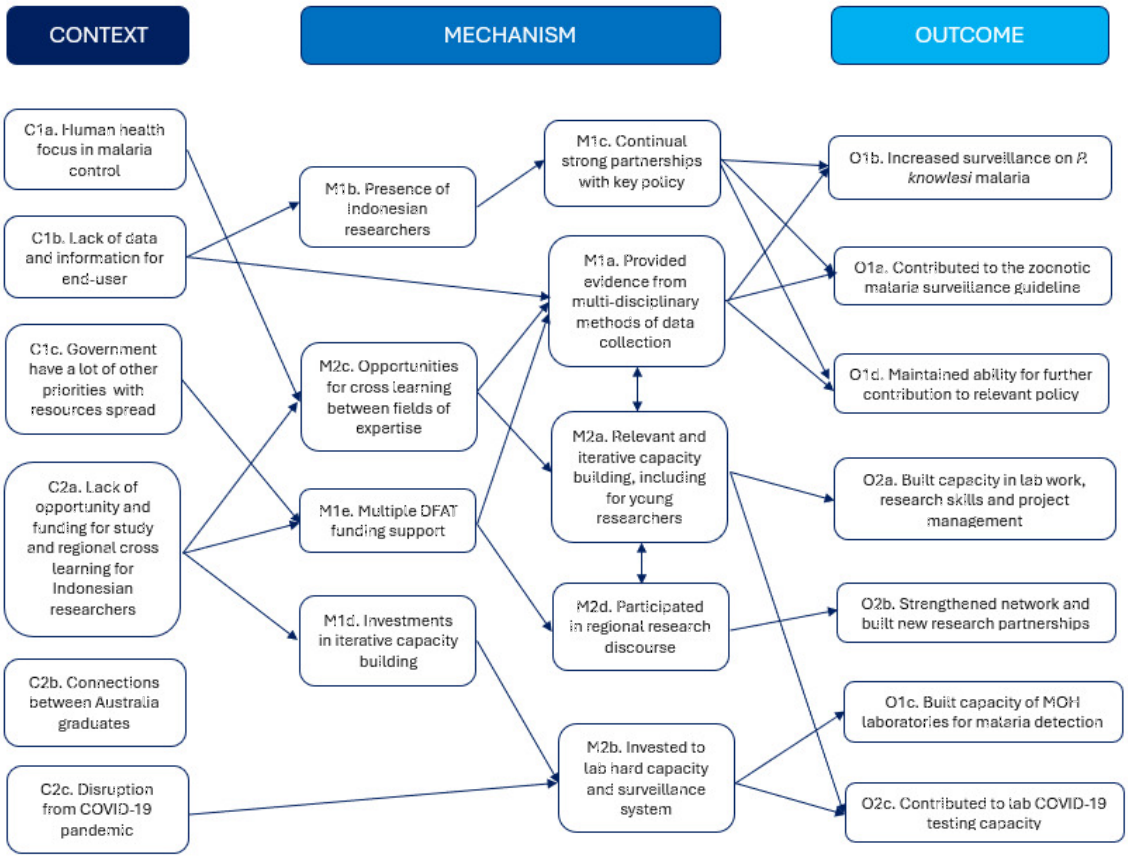
Four Indonesian and Australian based researchers suggested network between zoonotic malaria researchers and institutions in Indonesia, Australia, Malaysia and UK has strengthened as a result of more frequent meetings and sharing of information during ZOOMAL implementation. One researcher noted a lot can still be done to further promote research discourse across countries in the region through targeted conferences and publications, especially to support regional learning and partnerships on zoonotic malaria control and the gold standard of One Health approach.

ZOOMAL partners have also made new research partnerships. In February 2023, the USU, Indonesia, and Oxford University signed a Memorandum of Agreement (MoA(for a Rickettsia surveillance project in North Sumatera. The EHI , one of the key partners of ZOOMAL in Indonesia, have also further built its institutional portfolio in health and molecular medicine by seeking new partnerships. EHI was established in August 2022 with a team of former researchers from the Eijkman Institute, Jakarta, after the latter institution was merged into the government's National Research and Innovation Agency (BRIN).

O2c Contributed to laboratory testing capacity during COVID-19 response

At least 250,000 COVID-19 samples from all over North Sumatra were tested in the ZOOMAL laboratories during the early and peak of COVID-19 pandemic, the ZOOMAL team members contributed to set-up five government PCR-capable labs and training of about 55 lab assistants assigned for COVID-19 testing in North Sumatra and Nias Island.

ZO3.3 Outcome pathway



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CASE STUDY 4: Advancing roles of pharmacies for control of inappropriate antibiotic dispensing in Indonesia

4.1 Summary of the PINTAR project

In 2019, there were 1.27 million deaths attributable to antimicrobial resistance (AMR)[38] worldwide, making it the third highest cause of death, according to a report by the University of Oxford's Global Research on AntiMicrobial resistance (GRAM). That same year, in Indonesia there were 34,500 AMR deaths, with another 133,800 deaths associated with AMR. AMR deaths were the fourth highest in Indonesia, exceeding the number of deaths from digestive diseases, respiratory infections and tuberculosis, chronic respiratory diseases, enteric infections, and maternal and neonatal disorders.[39]

Among other causes, inappropriate use of antibiotics or antimicrobials in the healthcare services and livestock and fisheries sector have been identified as one of the main drivers of AMR threat. People have easy access to antibiotics without prescriptions in community pharmacies and drug stores and could use these for common diseases that do not need antimicrobial therapy.[40]

In Indonesia, at least since 2011, there were government regulations and guidelines administering health practitioners in antibiotics prescriptions and use.[41] The AMR Control Committee (Komite Pengendalian AMR) under the MOH was established in 2020 to develop plans, support implementation and monitor antimicrobial use in health care facilities and the public. There were also policies in the livestock and fisheries sectors, by the Ministry of Agriculture and the Ministry of Marine Affairs and Fisheries, aimed at protecting consumers from misuse of antibiotics in agriculture and fisheries products.[42] Little is known about the effectiveness of these AMR policies and interventions so far, especially regarding antibiotic dispensing.

In 2018, the four-year **"Improving the dispensing of antibiotics by private drug sellers in Indonesia"** (PINTAR) project commenced with DFAT funding. The PINTAR mixed-method study aimed to determine the extent and determinants of inappropriate dispensing of antibiotics by licensed private drug retail outlets in Indonesia, and pilot community behaviour change interventions among community pharmacies and drug stores.

As a result of the project interventions, 93 pharmacists from 80 pharmacies in the City of Semarang in Indonesia completed an education session and reported increased knowledge of the relevant topics. All of these pharmacies involved in the educational campaign had over 80% adherence to using the campaign materials provided (leaflets, flyers, flip charts, notepads, and banners). There were also 80 pharmacies who participated in the peer visit activities by trained facilitators. The

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[38] Antimicrobial resistance, in simple terms, is the ability of microbes to survive against antimicrobial therapy so it is not effective in clinical use.

[39] https://www.healthdata.org/sites/default/files/files/Projects/GRAM/Indonesia_0.pdf. Accessed 2 April 2024.

[40] Siahaan S, Herman MJ, Fitri N. Antimicrobial Resistance Situation in Indonesia: A Challenge of Multisector and Global Coordination. J Trop Med. 2022 Feb 7;2022:2783300. doi: 10.1155/2022/2783300. PMID: 35145554; PMCID: PMC8822317. Accessed 7 April 2024.

[41] For example, the Minister of Health's regulations on General Guidelines for the Use of Antibiotics, Antimicrobial Resistance Control Programs in Hospitals, and AMR Control Committee.

[42] Siahaan S, Herman MJ, Fitri N. Antimicrobial Resistance Situation in Indonesia: A Challenge of Multisector and Global Coordination. J Trop Med. 2022 Feb 7;2022:2783300. doi: 10.1155/2022/2783300. PMID: 35145554; PMCID: PMC8822317. Accessed 7 April 2024.

interventions resulted in a significant reduction in antibiotic dispensing among participating pharmacies, compared to those who did not participate in project activities.

Four papers discussing the methods, interventions and findings of PINTAR have been published and disseminated to stakeholders at the national, provincial, and local levels in Indonesia, consisting of the MOH, the AMR Control Committee, and Indonesian Pharmacy and Pharmacy Technician Associations. Some of the project methods and interventions have been continued to be used by key stakeholders, especially the pharmacies association at project sites.

4.2 Context, mechanism and outcomes of the project

CONTEXT

C1a Increased concerns on the impact of antibiotic dispensing

All informants (100%) interviewed for this evaluation noted their concern had increased on antibiotic dispensing impact on AMR in recent years. The interviewees, including the government official are aware of the inability of the current system to monitor and control the sale and use of antibiotic. While cases of AMR are more frequently reported, there is little available data on the scale of the emergency.

C1b Lack of non-clinical interventions to AMR

The focus of a lot of the existing AMR research is on other clinical aspects or health professionals, especially those working in hospitals, rather than community pharmacies. Prior to PINTAR, there were few published studies or interventions aimed at involving the community pharmacy and drug stores or specifically looking at community behaviour in antibiotic dispensing in Indonesia.

MECHANISM

M1a Initiated antibiotic dispensing survey among private pharmacies to reveal scale of issue

The PINTAR team undertook a standardized patient/client survey prior to the main study of PINTAR. The study revealed 76% of antibiotic dispensing without prescriptions at community pharmacies and drug stores.[43] That means more than three-quarters of sampled pharmacies sold antibiotics without prescriptions. According to two researchers, the survey helped to demonstrate the urgency of intervention in community pharmacies and drug stores and to better understand what were the challenges and barriers to behavior change.

M1b Involving end users in the study design and implementation

The PINTAR team invited leaders of the local pharmacies association and District Health Office (DHO) to provide their inputs into the research design and field data collection plan during design meetings. There was a stakeholder group, consisting of government officials, pharmacists and researchers that the PINTAR team engaged with for feedback and supports during project implementation. This engagement promoted the relevance of poject interventions for the key audiences.

M1c Use of behavior change approaches that are simple and easy to apply and replicate

[43] The Kirby Institute, UNSW, 2022. SSHS01 - Improving the dispensing of antibiotics by private drug sellers in Indonesia: a missing ingredient in the fight against antimicrobial resistance (Project Report)

The PINTAR interventions consisting of different components of training, supervision visits, accreditation branding and campaigns are simple and easy to apply and replicate in other settings. They also have a clear rationale and target groups (community pharmacies), with a focus on delivery of specific practices, aimed at improving understanding on AMR and antibiotic dispensing, as well as patient/client counseling skills. One researcher and one pharmacist noted the PINTAR team efforts to provide easy to access and easy to use learning platforms, as in the case of the training module and website.

M1d A structured training with embedded evaluation to inform professional development

One researcher and one pharmacist suggested PINTAR trainings were well-prepared with regard to training approaches and modules. The embedded training evaluation (pre- and post-tests) to inform professional development was beneficial, as demonstrated in the follow-on communication training held by the pharmacies association to respond to the lower participants' patient counseling scores.

M1e Provision of quality, easy to access education materials and tools

PINTAR education materials were designed to be highly adaptable to how busy people work and still be able to utilised as part of day-to-day practice. They are also are available online in a dedicated website. The materials were considered as quality and useful by two end-user informants. In some of the past events of the pharmacies association, PINTAR slides and materials were used.

OUTCOME

O1a Practice influence – reduced antibiotic dispensing at participating private pharmacies

The PINTAR project helped to reduce antibiotic dispensing among trained pharmacies that participated in the intervention, from 76% at baseline to around 50% at endline, according to the project standardized patient survey. For this survey, a number of enumerators were trained as mystery shoppers to come to the pharmacy and buy antibiotics but without bringing a prescription. There was a statistically significant difference as well in reduction in antibiotic dispensing among participating pharmacies, compared with those that did not.

While the project has realised significant change, this is within a relatively small cohort of pharmacists in Indonesia and more specifically in the City of Semarang. Four informants including pharmacists noted during the evaluation the relatively small number of participating pharmacies (93), which represents only about 20% of total private drug stores in the City of Semarang. The project invited all pharmacies in the city to participate in the intervention, but there were many who chose not to be part of the intervention, including because the owners of pharmacies did not allow them to do so. There were also pharmacies that did not change their behavior, dispensing antibiotics without prescriptions. That said, four informants including government officials noted the project successfully demonstrated the merit of the approach, in contributing to the reduction in inappropriate antibiotic dispensing. It remains to be seen if changes will endure, with the PINTAR team members seeking new funding to roll-out a post-project evaluation study.

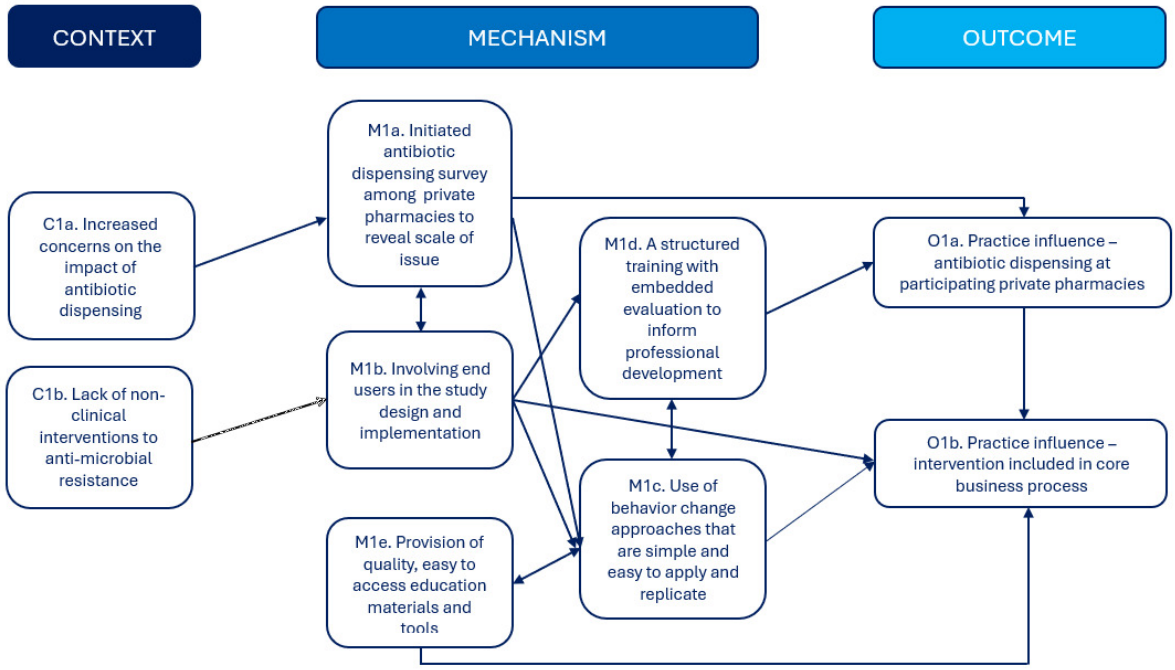
"It is still a proof of concept, at one study site. However, it shows that the intervention changes pharmacy behaviour (in antibiotic dispensing)" (PINTAR researcher)

O1b Practice influence – intervention included in core business process

Four informants including pharmacists noted PINTAR led to the pharmacies association at the project site (Semarang) to integrate some of the key interventions into its own program of activities, including standardized patient survey, training module, and credit award for participating in antibiotic dispensing intervention that could be used for pharmacies to extend their professional licenses.

One informant reported the patient survey was underway, the result will be used by the association to assess the current extent of antibiotic dispensing practice among its members' pharmacies. The PINTAR team provided the training module for the association to use in their training practices, but no training similar to PINTAR's has been held to date. Two informants noted the association and the District Health Office remain adamant to use every opportunity available in their activities to remind people about responsible antibiotic dispensing. A workshop was also conducted by the pharmacies association in Semarang for improvements in patient counselling and communication skills for pharmacists.

4.3 Outcome pathway



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Annex 7: Written Version of Images

Annex 2 – CHS Applied Research Program Logic

1. **Broader Goals: Regional Health Security (specifically IPCHS broader goal)**

- Reduction in disease (outbreaks) and its impacts in the Indo-Pacific region

2. **End of Program outcomes by mid-2022***

- EOPO1: Target countries have more collaborative and strengthened systems and practices to improve Health Security
- EOPO2: Decision-makers have increased understanding, access to evidence for informed decisions around Health Security
- EOPO3: Improved regional capacity (experience and expertise) in Health Security

3. **As a result:**

- R1: National Surveillance systems are enhanced
- R2: National diagnostic systems are enhanced
- R3: National actors** have greater understanding, commitment to and tools available for disease control

4. **What the researchers will do/influence activities:**

EOPO1; R1

- Establish sentinel or broad-scale surveillance
- Improve understanding and empowerment of staff within the surveillance system
- Enhance and strengthen data management systems (e.g. using data integration technologies)

EOPO2; R2

- Increase validation of clinical diagnoses by laboratory confirmation
- Develop diagnostic capability for specific pathogens in specific contexts
- Support laboratory management to ensure throughput and supplies

EOPO3; R3

- Explore social, ecological, health-care systems and market-based mechanisms for disease control

5. **Foundational activities**

- Previous research of grantees
- In-country health programs
- In-country established partnerships
- IPCHS foundational reviews

6. **Indicators**

- EOPO1 Indicators
    - Incidence of increased collaboration/partnerships (National and regional level)

- Explanation: cross-disciplinary workshops/meetings/policy discussions are the how but also need to look for changes that these result in e.g. action plans and funding, newly established reporting and response arrangements, leadership shown etc. i.e. the 'so what'

- **EOPO2 Indicators:**
  - Examples of communications materials shared with decision makers
  - Case studies describing to what extent policy discussions based on the research have been initiated and actioned or leaders that are prepared to champion the process have emerged
- **EOPO 3 Indicators:**
  - Relevant Australian and regional organisation experience and expertise at the beginning and the end of the program
  - Examples of stakeholders that initiate other projects (and access funding) focused on Health Security themes
- **R1 Indicators**
  - Information (e.g. improved knowledge of geographic distribution of disease, and disease burden among specific populations) is available and used for needs analysis
  - Examples of how information has been used
- **R2 Indicators**
  - Laboratory and clinical information is available for assessing and evaluating
  - Examples of how information has been used
- **R3 Indicators**
  - National actors are joint or lead investigators and/or are contributing in-kind to research
  - Research outcomes e.g. tools and information are in use by National actors
- **Activity Indicators**
  - Research outputs e.g. papers, systems, information
  - Diagnostics
  - Sens/specificity for diagnostics
  - Tools developed and tested
  - Veterinary services supply and demand data (new data)

Definition: Health security capacity includes in this instance – Health Literacy and One Health including ecological determinants of health and other capabilities that result in risk reduction, early warning, appropriate treatment and outbreak management. What we are most interested in is what change happened and what contributed to this.

*Adapted from Research objectives in the SSHS call for proposals

**National actors include researchers, animal, human and environmental health workers

***Risk reduction includes ecosystem management

Annex 6 – Case Study 1 – Outcome Pathway 1.3

Context:

- C1a: Government of Fiji's concern about severe outbreaks of LTDDs
- C1b: Global attention to the importance of health systems surveillance during COVID-19 pandemic
- C1c: Limited availability of national entities and restricted international travel during the pandemic drove local leadership
- C1d: Existing relationships and contextual knowledge of the WISH Principal investigator

Mechanism

- M1a: Provision of research data to research user at the village level
- M1b: Local use of research data in participatory decision-making about interventions
- M1c: Development of Water and Sanitation Safety Plans locally led by village water committees, with mandatory participation of women
- M1d: Convening, brokering and planning with multiple ministries and levels of government
- M1e. Global knowledge dissemination

Outcome

- O1: Reduced risk of water-related disease outbreaks
- O2: Locally owned and managed risk management initiatives
- O3: Increased capacity of village water committees to mitigate risks
- O4: Increased participation and agency of women in water governance and management at village levels
- O5: Legal establishment of the National Drinking Water Quality Committee

Annex 6 – Case Study 2 – Outcome Pathway 2.3

Context

- C1a: Increased prevalence of AMR, high burden of infectious disease
- C1b: National Action Plan on AMR - 2015
- C1c: Prevailing lack of awareness and knowledge of AMR
- C1d: Redefining One Health Approach

Mechanism

- M1a:Establishment and legislation of National Antimicrobial Resistance Committee provided the impetus for government engagement and interest in projects' agenda
- M1b. Scoping Study recommended the strengthening of NARC, need for continued support, informed development of the 2022 NAP on AMR
- M1c: Capacity building training and awareness focused on laboratory, research and technical demonstrated the value of a systems approach to AMR

- M1d: Knowledge awareness shared and symposiums held to communicate issues to broad range of stakeholder groups

Outcome

- O1: Revised National Plan on AMR - 2022
- Increased knowledge on the recurrence of AMR
- One Health Conference/Movement – 2023 Fiji; 2025 Samoa
- Increased awareness amongst various stakeholders (doctors, nurses, vets) about judicious use of antibiotics

Annex 6 – Case Study 3 – Outcome Pathway 3.3

Context

- C1a: Human health focus in malaria control
- C1b. Lack of data and information for end-user
- C1c: Government have a lot of other priorities with resources spread
- C2a: Lack of opportunity and funding for study and regional cross learning for Indonesian researchers
- C2b: Connections between Australian graduates
- C2c: Disruption from COVID-19 pandemic

Mechanism

- M1a: Provided evidence from multi-disciplinary methods of data collection
- M1b: Presence of Indonesian researchers
- M1c: Continual partnerships with key policy
- M1d: Investments in iterative capacity building
- M1e: Multiple DFAT funding support
- M2a: Relevant and iterative capacity building including for young researchers
- M2b: Invested in capacity and surveillance system
- M2c: Opportunities for cross learning between fields of expertise
- M2d: Participated in regional research discourse

Outcome

- O1a: Contributed to zoonotic malaria surveillance guideline
- O1b: Increased surveillance on R knowlasi malaria
- O1c: Maintained ability for further contribution to relevant policy
- O2a: Built capacity in lab work research skills and project management
- O2b: Strengthened network and built new research partnerships
- O2c: Contributed to lab COVID-19 testing capacity

Annex 6 – Case Study 4 – Outcome Pathway 4.3

Context

- C1a: Increased concerns on the impact of antibiotic dispensing
- C1b: Lack of clinical interventions to anti-microbial resistance

Mechanism

- M1a: Initiated antibiotic dispensing survey among private pharmacies to reveal scale of issue
- M1b: Involving end users in the study design and implementation
- M1c: Use of behaviour change approaches that are simple and easy to apply and replicate
- M1d: A structured training with embedded evaluation to inform professional development
- M1e: Provision of quality, easy to access education materials and tools

Outcome

- O1a: Practice influence – antibiotic dispensing at participating private pharmacies
- O1b: Practice influence: intervention included in core business process