

1                                   **Demand-Driven Capacity Building for**  
2                                   **Public Health Nutrition Research in Lao PDR**

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6                                   Shively, Gerald<sup>1,\*</sup>

7                                   Ambikapathi, Ramya<sup>2</sup>

8                                   Eddens, Kate<sup>3</sup>

9                                   Ghosh, Susmita<sup>1</sup>

10                                  Gunaratna, Nilupa S.<sup>1</sup>

11                                  Khamphouxay, Kelley<sup>4</sup>

12                                  Oula, Ratthiphone<sup>4</sup>

13                                  Ratsavong, Kethmany<sup>5</sup>

14                                  Saylath, Thippakesone<sup>4</sup>

15                                  Siengsounthone, Latsamy<sup>5</sup>

16                                  Sipes, Patricia<sup>1</sup>

17                                  Sychareun, Vanphanom<sup>5</sup>

18                                  Tekwe, Carmen<sup>3</sup>

19                                  Thompson, Leah<sup>1</sup>

20                                  Thongmixay, Souksamone<sup>6</sup>

21                                  Vongxay, Maikho<sup>7</sup>

22                                  Vongxay, Viengnakhone<sup>5</sup>

23                                  Zoh, Roger<sup>3</sup>

24 <sup>1</sup> Purdue University, USA

25 <sup>2</sup> Cornell University, USA

26 <sup>3</sup> Indiana University, USA

27 <sup>4</sup> Catholic Relief Services, Lao PDR

28 <sup>5</sup> Lao Tropical and Public Health Institute, Lao PDR

29 <sup>6</sup> University of Health Sciences, Lao PDR

30 <sup>7</sup> Nutrition Center, Lao PDR

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32 \* Corresponding author, 615 West State St., West Lafayette, IN 47907; [shivelyg@purdue.edu](mailto:shivelyg@purdue.edu)

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34 Forthcoming (2024) in [Global Health Research and Policy](#).

35

36 **Abstract**

37 In Laos, rates of undernutrition, especially among children under five years of age, remain high.  
38 In response, a large multidisciplinary team embarked on a multi-year project in Laos beginning  
39 in 2019 with the purpose of institutional strengthening around public health nutrition research.  
40 This paper summarizes the Applied Nutrition Research Capacity Building (ANRCB) project's  
41 activities, immediate project results, and prospects for sustaining impacts into the future. Eight  
42 primary activities were undertaken, including back-office strengthening, mentored research,  
43 and curriculum review and development. Requested training and skill development in areas  
44 related to public health nutrition, anthropometry, and research methods reached more than  
45 1000 professionals. The first edition of a Lao-English Nutrition Glossary was produced, as was  
46 the country's first National Nutrition Research Agenda, a document which sets locally-identified  
47 priorities for future research. Project success was achieved by focusing on the priorities of  
48 project partners and the Lao government, as articulated in the Lao National Nutrition Strategy  
49 and Action Plan (NNSAP). Project design elements that could guide similar efforts undertaken  
50 elsewhere include multi-year engagement, an emphasis on sustained peer mentorship, and the  
51 use of an extended period of pre-planning in collaboration with project stakeholders prior to  
52 the start of activities.

53

54 **Keywords:** institutional strengthening, higher education, nutrition, public health, research

55 **Declarations**

56 *Competing interests:* The authors declare that they have no competing interests.

57 *Funding:* This work was made possible through support from the Innovation, Technology and  
58 Research Hub of the U.S. Agency for International Development (USAID), through the LASER  
59 PULSE Program led by Purdue University under the terms of Cooperative Agreement  
60 #7200AA18CA00009. The contents reflect the views of the authors and do not necessarily  
61 reflect those of USAID.

62 *Authors contributions:* GS, PS, KK, and TS implemented and managed the project; GS, RA, NSG,  
63 KE, CT, RZ, LT, and SG designed and implemented training activities, which were undertaken in  
64 collaboration and partnership with KR, LS, VS, ST, MV and VV. RO served as a technical advisor;  
65 GS had major responsibility for writing the manuscript. All authors read and approved the final  
66 manuscript.

67 *Acknowledgements:* For their valuable contributions to and support of the work described in  
68 this paper, we thank Teshome Alemneh, Betty Bugusu, Rana Chehab, Suzi Cyr, Michele Forman,  
69 Clare Gooding, Robert Green, Jarek Harezlak, Josh Poole, Vathsana Somphet, Somohone  
70 Soukhavong, Viladeth Souksavatd and Brent Wells.

## 71 **1. Background**

72 Despite sustained international efforts to eradicate undernutrition, it remains the primary  
73 health threat to young children [1, 2]. In 2022, 149 million children below age five worldwide  
74 were stunted (low height-for-age) and 45 million were wasted (low weight-for-height), only  
75 slightly fewer than in 2018 [1, 3]. Undernutrition is disproportionately prevalent and has the  
76 greatest disease burden in low- and middle-income countries [4]. Undernourished children are  
77 at a higher risk of death from common illnesses such as diarrhea, pneumonia and malaria [5],  
78 and face greater risk of impairments in intellectual performance, work capacity and lifetime  
79 health and earnings—critical impediments for a country’s economic growth and development.  
80 Undernourishment in childhood also perpetuates a cycle of malnutrition, as malnourished  
81 women face greater odds of giving birth to malnourished, low-birth-weight infants when they  
82 reach reproductive age [1].

83 In the Lao People’s Democratic Republic (henceforth, Laos), rates of malnutrition,  
84 especially among children under five years of age, remain high. The most recent data reveal  
85 that 33% of Lao children below age five are stunted, 11% are wasted and 24% are underweight,  
86 with higher percentages among some sub-groups and relatively little improvement over the  
87 past five years [6, 7]. In response to ongoing concerns about these undesirably high rates of  
88 child malnutrition, the Lao government has identified as a long-term objective the  
89 establishment of a National Institute of Nutrition (NIN). Such an institute would, ideally, provide  
90 a nationwide and interdisciplinary focus on public health nutrition, and effectively channel  
91 investments by the Lao government and the donor community into building the nation’s  
92 capacity to conduct local and culturally-sensitive research, translate research findings into

93 action, and communicate goals and activities to a diverse set of stakeholders in the Lao  
94 community and beyond.

95 In 2019, with support from the U.S. Agency for International Development (USAID), a  
96 multidisciplinary team implemented a multi-year project to support institutional strengthening  
97 for public health nutrition research in Laos. This paper describes the Applied Nutrition Research  
98 Capacity Building (ANRCB) project’s activities, which were undertaken to strengthen capacity to  
99 conduct and utilize nutrition research. We review immediate results achieved by the project as  
100 well as prospects for sustained impacts. The project incorporated design elements that can  
101 inform and guide similar and future efforts undertaken in other countries.

102

## 103 **2. Project Objectives**

### 104 **2.1 Identifying Capacity Building as the Primary Project Goal**

105 *Capacity building* refers to efforts targeted at strengthening and enhancing the ability of an  
106 individual, organization or community to perform effectively in a particular domain. Capacity  
107 building tends to address specialized management issues, and often involves developing the  
108 knowledge, skills, resources and infrastructure necessary to achieve specific goals and  
109 objectives [8]. For low- and middle-income countries facing significant food and nutrition  
110 security challenges, specifically-targeted capacity building combined with effective nutrition  
111 governance can be fundamental to achieving improved nutrition outcomes [9]. As in other  
112 countries, building this capacity in Laos has been difficult given competing demands for  
113 government resources and shifting donor priorities. As a result, constraints on research capacity  
114 have produced a cascade of effects in which the local production and application of

115 contextually-relevant problem-solving research is difficult. As in many settings, this dynamic  
116 presents a major challenge to improving public health.

117           The overarching goal of the ANRCB project was to improve capacity to conduct and  
118 utilize nutrition research, incorporating four key components of capacity building: (i) human  
119 resources development; (ii) infrastructure enhancement; (iii) knowledge and skill transfer  
120 through targeted training, mentoring and “hands-on” experiential learning; and (iv) institutional  
121 collaboration and strengthening. The project targeted three key Lao institutions with  
122 responsibility for public health nutrition programming and training: the Ministry of Health’s  
123 Nutrition Center (henceforth referred to as the Center), the University of Health Sciences (UHS),  
124 and the Lao Tropical and Public Health Institute (Lao TPHI). Two US-based academic institutions  
125 – Purdue University and Indiana University – provided technical support, and Catholic Relief  
126 Services (CRS), which has sustained a strong physical presence in Laos and the South East Asian  
127 region generally, served as the in-country implementing partner. Purdue University is home to a  
128 highly-regarded College of Agriculture and Department of Nutrition Science. Indiana University  
129 has a global reputation in public health education. Importantly, both institutions have  
130 researchers who are internationally known for their global field work and training in nutrition  
131 and epidemiology, agricultural economics and food policy, and public health. CRS brought a  
132 track record of working successfully with the Lao government and engaging in capacity building  
133 activities with multiple stakeholder groups in Laos. The core team consisted of individuals with  
134 many years of international project experience in South East Asia, Africa and Latin America,  
135 which contributed to project success. Past experiences often informed not only project design,

136 but the ability to continually and adaptively manage the project, incorporating local knowledge  
137 and needs along the way, a hallmark of effective project management [10].

138

## 139 2.2 Implementing a Results-Oriented Framework

140 To begin, the project identified a set of fundamental requirements for success: (i) a clear  
141 understanding regarding the individuals and institutions with which we would work, including  
142 their roles and responsibilities; (ii) a well-articulated problem/solution analysis; (iii) an  
143 appreciation of the needs of partners and stakeholders as articulated by them and those with  
144 whom they were interacting; (iv) a desire for sustainable change among partners; and (v)  
145 feasibility of activities within the Lao operating context and implementation period.

146

## 147 3. Project Design and Implementation

### 148 3.1 Phased Implementation

149 The project was designed and implemented in three phases, as illustrated in Figure 1. Phase 1  
150 began in September 2019 and consisted of eight months of discovery and pre-planning,  
151 including a site visit by US-based investigators, who conducted key informant interviews with  
152 more than 100 government and international non-governmental organization (INGO)  
153 stakeholders in Laos, and an assessment (through structured interviews and surveys) of basic  
154 knowledge, skill gaps, and training needs among those with whom we would work, including  
155 government staff, university faculty, students, and recent graduates. These activities were  
156 designed to orient the team to the existing environment for nutrition activities in Laos and the  
157 priorities of the government within the context of the Lao National Nutrition Strategy and



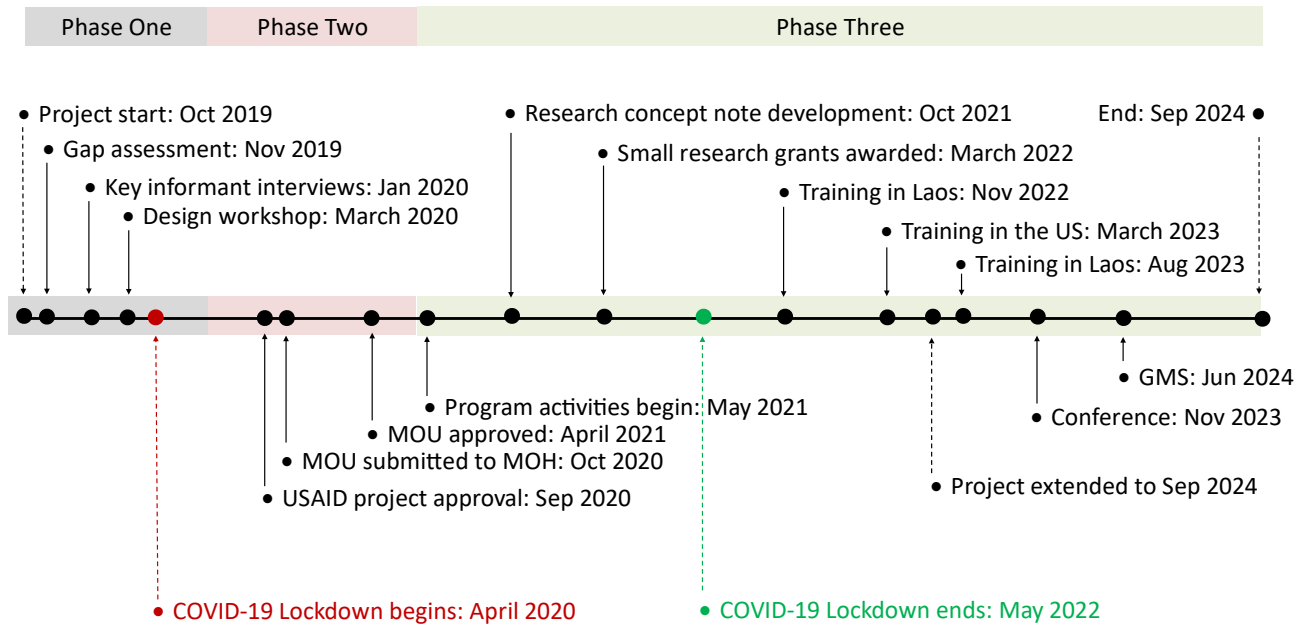
158 Action Plan (NNSAP) [11]. The potential receptiveness of Ministry of Health (MoH) leadership  
159 and staff to training and capacity building was also assessed.

160 Phase 2 consisted of twelve months of activities undertaken in the US and Laos to (i)  
161 design, develop and translate research and training materials; (ii) work with stakeholder  
162 audiences to position the project for wide visibility; and (iii) work with Center staff to increase  
163 basic institutional capacity in areas such as office operations, communication and financial  
164 management. This long project runway was both necessary and useful because we were also  
165 developing a Memorandum of Understanding (MOU) with the government of Laos and seeking  
166 government approval for project implementation. Phase 3, consisting of both remote and in-  
167 country activities, began once the MOU was approved and signed. These activities took place  
168 over twenty-six months from May 2021 through September 2024.<sup>1</sup>

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<sup>1</sup> Although planned as a four-year project, the COVID-19 global pandemic delayed and interrupted some Phase 2 and Phase 3 activities. A one-year no-cost extension from the sponsor and an extension of the MOU by the government of Laos allowed the project to extend work through September 2024..



170

171 Figure 1. Timeline of Project Phases, Activities and Events

172

### 173 3.2 Using Data and Information to Drive Project Design

174 Before identifying, defining, and budgeting for a set of project activities, we engaged in a gap  
 175 assessment and co-creation process during Phase 1.<sup>2</sup> Criteria for identifying gaps that could be  
 176 relevant for the project’s focus included: (i) need for attention; (ii) government openness to  
 177 receiving outside assistance; (iii) lack of redundancy or competition with other ongoing donor-  
 178 led interventions; (iv) feasibility to introduce activities and achieve results and short-term  
 179 impacts within the project life; and (v) reasonable likelihood of sustained post-project efforts.  
 180 Motivated by the interdisciplinary nature of public health nutrition, activities included building  
 181 institutional infrastructure and mentorship support; strengthening research capacity in an

<sup>2</sup> For reasons related to the MOU, project activities were confined to Vientiane and the nearby capital region, and institutions under the purview of the Ministry of Health.

182 interdisciplinary way; and establishing and maintaining communication toolkits to rapidly  
183 disseminate results to a range of stakeholders.

184 To design project activities, we used information from a range of assessments to better  
185 understand core needs and potential constraints and challenges to implementation. Among the  
186 assessment methodologies and tools used were structured conversations with stakeholders,  
187 literature reviews, key informant interviews, and online and face-to-face structured surveys.

188 Specifically, we engaged in the following:

- 189 ● A scoping visit by the US team to identify potential activities. This visit included a full  
190 week of meetings with sponsor staff, representatives of the Lao government,  
191 university representatives and staff of various INGOs working in the nutrition space.  
192
- 193 ● A literature review to understand the institutional and programmatic context of  
194 nutrition in Laos, as well as local research and scientific capacity. Materials reviewed  
195 included data (such as Lao Multi-Indicator Cluster Survey data), Lao and external  
196 agency reports, various unpublished INGO/donor research reports, and literature  
197 covering government policy, strategy, and organization. The latter included the Lao  
198 National Nutrition Strategy to 2025 and Action Plan 2016-2020 [12], an unpublished  
199 midterm Review of the Nutrition Action Plan, and unpublished documents from the  
200 2019 National Nutrition Forum, including the National Progress Report of 2019 [13].  
201
- 202 ● Key Informant interviews with more than 45 individuals, including both Lao and  
203 external stakeholders, which was synthesized to maintain confidentiality of  
204 participants. Sensitivity was regarded as important to ensure candid responses on  
205 topics that could be construed as critical of current practices, in recognition that  
206 community involvement in study design and implementation would be essential for  
207 project success [14, 15, 16].  
208

209 Building on findings from the scoping work listed above, structured survey instruments  
210 were developed and anonymous surveys were conducted to collect information specific to  
211 individuals' nutrition knowledge, training, and work responsibilities. Information included both  
212 quantitative and qualitative data. Surveys were developed in English and then translated into

213 Lao.<sup>3</sup> Surveys were administered in Lao using both on-line and face-to-face methods, and  
214 responses were collected from 27 university faculty and students and 22 members of  
215 leadership and staff of the Center. Characteristics of survey respondents are summarized in the  
216 Appendix. As we developed training activities and materials in Phase 2 of the project, we used  
217 information obtained through the survey to help ensure materials were sensitive to the gender,  
218 backgrounds, and needs of participants.

219         Once survey data had been reviewed, the team met over two days to map findings to  
220 key themes, summarize answers to key questions, build a problem/solution tree, determine  
221 which problems/solutions were already being addressed by other stakeholders and which  
222 problems/solutions would be feasible for the project to address, and, finally, brainstorm  
223 possible project points of entry. Organizational charts were developed and vetted with partners  
224 and stakeholders to better understand institutional staffing structures and relations among  
225 government offices. Led by these insights, we identified five key areas in which the project  
226 could provide support to our partners.

227         *Area 1: Emphasizing the role of research in policy design.* At project inception, a  
228 relatively small number of professionals in Laos, university faculty included, had had the  
229 opportunity to receive formal research training or develop skills related to publishing research  
230 in international outlets or competing for grants. As a result, efforts to conduct public health and  
231 nutrition research had been severely hampered. We identified a desire to better coordinate

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<sup>3</sup> Prior to administering the surveys, they were submitted for approval to Purdue University's Institutional Review Board (IRB) and judged, on the basis of their focus on training needs assessment, to be exempt from requirements of formal research review.

232 and communicate with governmental and non-governmental stakeholders, and a desire on the  
233 part of university staff to better link their research to policy needs.

234 *Area 2: Upgrading technical skills.* Many academics and professional staff expressed a  
235 strong desire to upgrade their skills through formal training in technical nutrition and research  
236 topics. The limited number of Lao researchers who had received formal training on public  
237 health nutrition research was seen as undermining mentoring of the next generation of Lao  
238 researchers. We identified strengthening of the local research community as a way to reinforce  
239 interest in pursuing and maintaining research careers.

240 *Area 3: Improving institutional infrastructure.* The Nutrition Center had been established  
241 relatively recently in relation to the project, in 2012. Research infrastructure and management  
242 systems in place at the Center were still evolving, which provided the project with an  
243 opportunity to help support their desire to be a convener of research, work more efficiently  
244 across ministries, and help translate research findings into policy guidance for the government.  
245 Cross-ministerial cooperation was identified as a challenge. Leadership expressed an  
246 understanding of the importance of collaboration and convening relevant ministries but had  
247 not functioned as a convener or developed ways to gather research and then translate findings  
248 into evidence-based policies. The Center also asked for assistance to support day-to-day  
249 management and financial systems to work more efficiently and collaboratively, and to ensure  
250 quality standards were being met.

251 *Area 4: Meeting international norms.* Providing support for training and tools for  
252 nutrition researchers and staff at the Center and UHS was seen as a way to help these groups to  
253 improve the quality of their work and help them to meet international norms, with the

254 understanding that such norms are not often clearly articulated. Attention focused on research  
255 ethics, professional writing, and the use of citation management software. The project also  
256 sought to identify and fill gaps in the nutrition curriculum at the university level and improve  
257 research methods in university and government settings. Whenever possible and appropriate,  
258 the project emphasized hands-on training to allow learners to put new skills into practice, with  
259 mentorship and follow-up to track quality of learning.

260 *Area 5: Enhancing communication and dissemination of information to the community and*  
261 *policymakers.* The project developed approaches to assist and support communication of  
262 nutrition research information and findings. Coordination was encouraged between various  
263 actors involved in nutrition across the health, education and agriculture sectors to help reduce  
264 information silos. The project worked to support new avenues (for Laos) of research  
265 communication, for example monthly webinars, a quarterly newsletter, research posters, and  
266 participation in national and regional conferences. To engage the small and nascent Lao private  
267 sector the project worked with the [SUN Business Network](#) in Laos in four ways. One, we invited  
268 private companies to respond to our nutrition stakeholder survey. Two, we put these  
269 companies on our newsletter distribution list. Three, we made sure the national health IRB  
270 committee invited private sector research firms to a seminar on how to apply for ethical  
271 approval. And four, we consistently shared all relevant project materials with the SUN Business  
272 focal point and invited them to project training activities

### 273 **3.3 Developing a Strategy for Capacity Building**

274 The conclusion of Phase 1 resulted in our planned strategy for building capacity, which focused  
275 on undertaking two sets of activities: (i) training and capacity building for the Center to conduct

276 research, with particular focus on helping to create a sub-unit “Center of Excellence” in  
277 anthropometrics within the Center; and (ii) training and research experiences within UHS and  
278 Lao TPHI to support and foster curriculum improvements and updates, and to promote an  
279 overall research-friendly environment and evidence-based approach to addressing nutrition  
280 challenges. In addition, a cross-cutting theme was to work continually with the Center, the  
281 MoH, allied ministries, and other nutrition stakeholders to create institutional and  
282 communication structures that could be sustained after the conclusion of the project.

283         The project design was informed by the Lao National Nutrition Strategy and Action Plan  
284 (NNSAP) [11], as well as a draft Action Plan for 2021-2025. In designing the project, the team  
285 studied the NNSAP in detail and discussed likely points of collaboration with government and  
286 non-government stakeholders. The design was also informed by an Organizational Capacity  
287 Development Plan for the Center prepared before the project by an outside consultant.  
288 Because many Center staff were appointees who had not had opportunities to receive formal  
289 training in nutrition or public health research, the project aimed to provide basic nutrition  
290 knowledge, skills related to nutrition assessment (especially anthropometric measurement) and  
291 field research, interpretation of research findings, and capacity to inform policy. Key  
292 stakeholders identified at the start included specific groups within university and INGO  
293 communities.<sup>4</sup> In developing a capacity building plan, we paid particular attention to the  
294 following questions: (1) What are the key issues and problems facing the nutrition sector? (2)

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<sup>4</sup> The project worked most directly with the MoH, but in a way that left open the possibility of working with other members of the Lao Nutrition Secretariat, including the Ministry of Agriculture and Forestry (MAF), the Ministry of Planning and Investment (MPI), and the Ministry of Education and Sports (MoES). The MPI was viewed at the start as a potentially important allied ministry, as it houses the Lao Statistics Bureau (LSB), but our actual interactions with LSB proved to be limited.

295 What critical assumptions underpin our approach, and how are these (e.g., budgets, language)  
296 linked to factors that would influence our design choices? (3) What proof of concept might lead  
297 the GoL to sustain project activities? And (4) What might be the exit/phase-over preferences of  
298 the government?

299 After considering these questions and assessment information, we identified activities  
300 the project could feasibly undertake based on several criteria, including: Is the activity feasible  
301 based on institutional and political features in Laos? Can the project influence the outcome?  
302 Are any other groups or organizations engaged in the activity? Is the project likely to achieve  
303 results and foster improvements given the time and resources available?

304

### 305 3.4 Ensuring Collaborative and Participatory Design

306 In March 2020, roughly four months after the start of the project, the team conducted a week-  
307 long design workshop in Vientiane. The intent was to conduct the workshop with all project  
308 participants present in Vientiane but due to the pandemic, the workshop was held in a hybrid  
309 format, with those from Purdue and IU participating remotely from the US and those from CRS  
310 (and occasional invited guests) participating in Laos. The aim was to (i) establish project goals;  
311 (ii) identify and refine proposed activities and sub-activities; (iii) identify responsible parties;  
312 and (iv) develop an implementation plan, timeline and budget for activities. The workshop was  
313 informed by the November site visit and the extensive efforts undertaken during the ensuing  
314 period to identify and meet with as many Center stakeholders as possible. Key individuals with  
315 in-depth experience working in Laos were brought in to discuss context and to answer clarifying  
316 questions. Daily notes were logged and, in some cases, individuals external to the project were



317 asked to review these notes and provide reactions. This “closed loop” approach was used to  
318 brainstorm strategies for mapping from areas expressed by stakeholders as critically in need of  
319 support to strategic objectives that could guide the design of project activities.

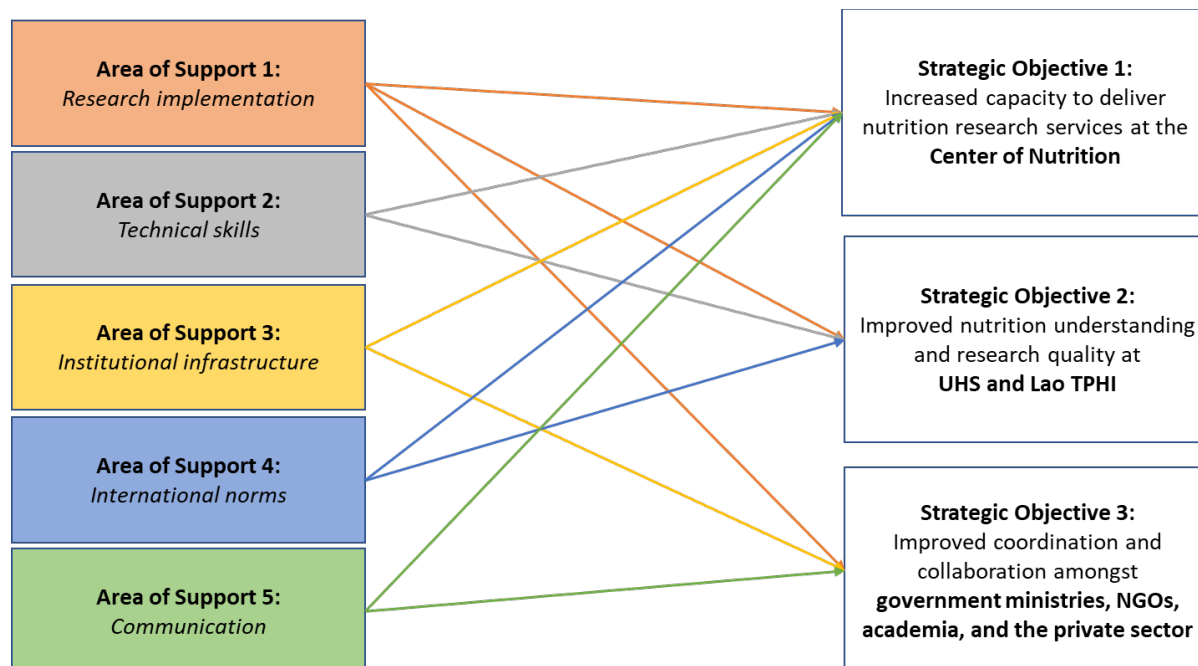
320 A primary conclusion reached during the design workshop was that among all possible  
321 strategic partners for the project, the MoH and the Center were the best candidates. The MoH,  
322 as the convener of the Lao Nutrition Secretariat, provided a natural and formal connection to  
323 other ministries represented in the Secretariat (i.e., Ministry of Agriculture and Forestry,  
324 Ministry of Planning and Investment, and Ministry of Education and Sports). We also identified  
325 UHS and Lao TPHI as strategic higher education institution (HEI) partners. As a risk-management  
326 strategy, we deliberately identified a set of independent activities to be pursued separately  
327 with the Center and the HEIs, to guard against unforeseen barriers or constraints that might  
328 limit progress with any particular group and thereby jeopardize overall project momentum and  
329 success. That said, the plan involved coordinating training activities to include Center, UHS and  
330 Lao TPHI staff and students. The idea was that this would not only economize on team efforts  
331 but also help enhance the working relationship between government and universities, which  
332 was a strategic aim for the project.

333

### 334 3.5 Mapping Needs to Implementation

335 A primary outcome of the design workshop was a proposed implementation plan. During the  
336 workshop, the five key Areas of Support were mapped to three Strategic Objectives, i.e., the  
337 most ambitious results the project could hope to achieve (see Figure 2).

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Figure 2. Primary Mapping from Areas of Support to Strategic Objectives

From the Strategic Objectives, nine domains for project activities were identified. These constituted the practical steps to be undertaken by the project to generate the desired changes in target knowledge, behaviors, and actions. Table 1 lists the five areas of support, along with the project response and examples of specific activities undertaken by the project. Strategic Objective 3 was largely treated as a cross-cutting issue and was supported through efforts to include all groups and stakeholders in project activities whenever possible.

351 Table 1 Key areas of support

Area of Support	Project Response	Embedding Demand from Lao scientists	Examples of Activities
1) Implementing research and emphasizing the value of empirical research	Joint activities involving university researchers and Ministry of Health staff	UHS and Lao TPHI scientists identified and prioritized research and training topics	Monthly webinars, regional study exchanges, collaborative research and training, development of a National Nutrition Research Agenda
2) Upgrading technical skills	In-person and on-line short courses	Lao team identified child malnutrition as a key priority	Training in anthropometry, basic and advanced statistics, survey design, data handling, etc.
3) Improving institutional infrastructure	Back-office training and mentoring at the Center	Targeted training was provided on budgeting for project proposals	Financial reporting, facilities and human resources management, scheduling systems
4) Adhering to international norms and benchmarks for research	Short-term training and peer-to-peer mentoring as part of small research grants	Project support for participation in regional and international conferences and training in Thailand and the United States	Research ethics, institutional review board (IRB) approval, citation management, writing workshops, participation in regional and international conferences
5) Enhancing communication and dissemination of activities and findings to the community and policymakers	Printed and online materials and collaboration with dissemination networks such as SUN business network	The team identified a lack of consistency when translating nutrition terms from English to Lao	Dual-language nutrition glossary, dual-language quarterly newsletter, monthly webinars with simultaneous translation

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355 After identifying key indicators, the project established a system for monitoring,  
356 evaluation, adaptation, and improvement based on results and feedback [17]. The system  
357 prioritized collection of feedback and data, as well as listening to the voices of the partners and  
358 stakeholders. The monitoring and evaluation system allowed rapid adaptive management to  
359 address any signs of ineffectiveness or misplaced effort.

360

## 361 4. Project Achievements<sup>5</sup>

### 362 Activity 1: “Back Office” System Strengthening

363 CRS worked closely with the Center from the start of the project to provide training and  
364 coaching on financial management, gender and social inclusion (GESI) integration, project  
365 management, and staff onboarding. These key areas responded to an institutional needs  
366 assessment conducted before the project. This type of institutional accompaniment is  
367 frequently neglected in projects, but is essential to support operational effectiveness and  
368 increase program quality, which in turn increases the sustainability of all other programming  
369 and provides value to all stakeholders who rely on institutional strength to support program-  
370 critical activities. To facilitate, a formal hosting agreement was signed, which allowed project  
371 staff to sit across the hall from Center staff, promoting daily interaction to build relationships of  
372 trust and support. Quarterly partnership meetings with the Center were used to provide regular  
373 opportunities to assess knowledge and behavior change, celebrate success, and engage Center

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<sup>5</sup> Project achievements are grouped into a set of eight activities and briefly described. A project [website](#) provides an archive of the activities and outputs described here.

374 leadership in supporting system strengthening changes.

375

### 376 [Activity 2: Developing Physical Space for Training](#)

377 A prior project constructed a complex of buildings as a development assistance package to the

378 MoH. Our team assisted in transforming empty space into a facility for group training and co-

379 working, including large and small training rooms for multiple uses and a small library. In

380 September 2021, the Center held an opening ceremony attended by the Lao Minister of Health

381 and the US Ambassador. In addition to equipping the physical space, the project worked with

382 the Center to establish protocols for maintenance and upkeep of facilities and equipment.

383

### 384 [Activity 3: Strengthening Capacity and Skills for Anthropometric Assessment](#)

385 Given the Lao government's stated interest in addressing child malnutrition, and the strong

386 interest in anthropometry among Center leadership, the project engaged in extensive training

387 for anthropometric data collection and assessment, as well as oversight to create and maintain

388 facilities, equipment, and expertise to sustain accurate anthropometric measurement. The

389 training modalities being employed at the Center were not fully known at the start of the

390 project, but our conversations during Phase 1 with a wide range and large number of

391 stakeholders, including Center staff, suggested room and desire for improvement. We also

392 recognized that once data collection modalities had been strengthened, capacity building in

393 data entry and analysis would be essential for staff to analyze and accurately interpret Lao

394 indicators.

395

#### 396 Activity 4: Curricula Review at the Lao University of Health Sciences (UHS)

397 Anticipating that many project training activities would be undertaken at UHS, early in the  
398 project we asked university leaders to identify interests and needs, and to provide a  
399 comprehensive review of programs and existing curricula. Prior to the project, UHS had a track  
400 record of training students in a Masters of Public Health (MPH) program. During early project  
401 scoping, it became clear that the MPH program placed little emphasis on nutrition. Developing  
402 in students a more holistic understanding of nutrition across the life course was seen as  
403 beneficial by university leadership. Course program descriptions and syllabi (some available in  
404 English and some translated from Lao) were reviewed for content and teaching methods. This  
405 resulted in a review report containing suggested additions and examples of program designs at  
406 other institutions. It also guided the development of project training modules which were later  
407 used to augment existing course materials to fill gaps in teaching materials.

408

#### 409 Activity 5: Short-term Training

410 Short-term training was a centerpiece of the project. Over the course of the project, subject  
411 matter experts worked with Lao partners to develop twelve, multi-part video lessons, consisting  
412 of more than 40 hours of content. These modules, and their intended audiences, are listed in  
413 Table 2. Some modules were specifically developed for staff at the Center and some were  
414 developed with UHS and Lao TPHI staff and students in mind. Nearly all included pre- and post-  
415 training assessments and teaching guides in both English and Lao.

416

417 **Table 2 Training modules and target audiences**

Topic	Target audience
Basic nutrition concepts and terms	Nutrition Center staff; undergraduate students
Nutrition assessment methods	Nutrition Center staff; UHS and Lao TPHI faculty and graduate students
Research concepts	UHS and Lao TPHI faculty and graduate students
Anthropometry - children	Nutrition Center staff; UHS and Lao TPHI faculty and graduate students
Anthropometry - adults	Nutrition Center staff; UHS and Lao TPHI faculty and graduate students
Anthropometry - advanced topics	Nutrition Center staff; UHS and Lao TPHI faculty and graduate students
Food Environments	Nutrition Center staff; UHS and Lao TPHI faculty and graduate students
Food safety	Nutrition Center staff; UHS and Lao TPHI faculty and graduate students
Behavior change	Nutrition Center staff; UHS and Lao TPHI faculty and graduate students
Research design and planning	UHS and Lao TPHI faculty and graduate students
Statistical analysis	UHS and Lao TPHI faculty and graduate students
Academic writing	UHS and Lao TPHI faculty and graduate students

418  
 419 Training topics directly targeted at university instructors and students included modules  
 420 on research design, research methods, research coordination and priority setting. Modules  
 421 focused on practical activities and strategies for converting knowledge to action. The project

422 worked with UHS and Lao TPHI faculty to support uptake and classroom use of modules in  
423 degree programs, and to identify training needs and gaps. For example, to identify gaps in  
424 current scientific knowledge and strengthen a basic understanding of food safety concepts, the  
425 Purdue team completed a background review on food safety issues in Laos to inform the  
426 development of a training module. Training sessions frequently combined participants from  
427 the Center, UHS and Lao TPHI, enhancing interaction and networking between these groups.

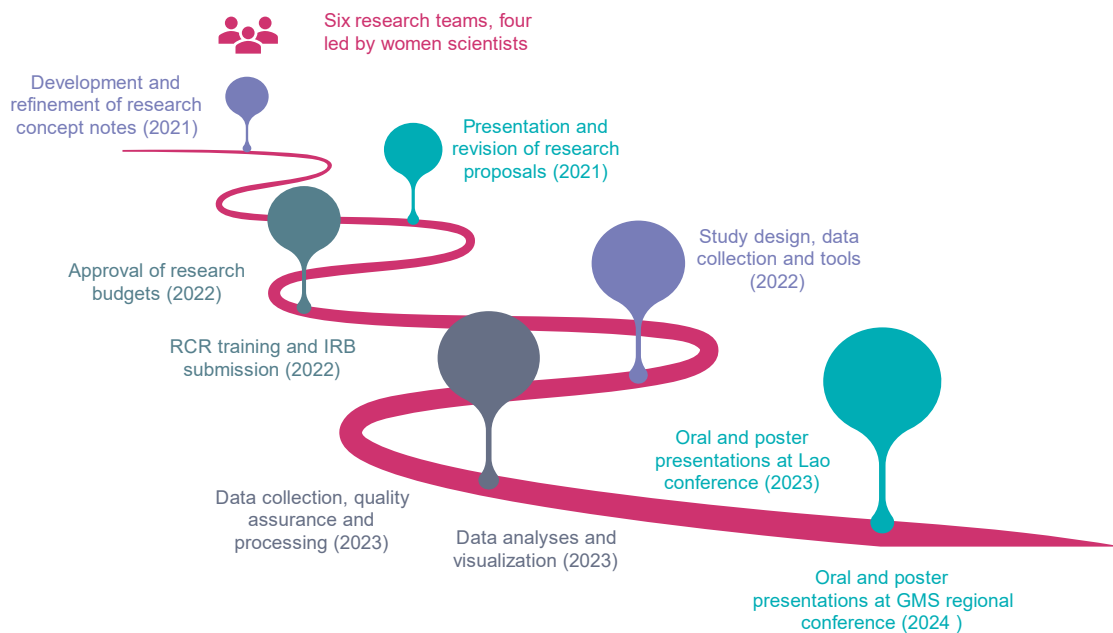
428         Throughout the project, more than 60 group training sessions were conducted with  
429 more than 1,000 participants. Certificates of completion were issued to those who completed  
430 trainings. Many in the target audience participated in single trainings, while others participated  
431 in nearly all. In total, the project reached more than 400 unique individuals, including  
432 professional staff, university faculty, and students. A general working principle when developing  
433 training modules was to begin by assessing Lao institutional demand as a driver, emphasizing  
434 the importance of examples, especially Lao examples, and promoting group-based exercises  
435 and activities to capitalize on local learning styles and modalities. Wherever possible and  
436 appropriate, modules were developed in collaboration with Lao partners, first in English and  
437 then translated into Lao. Group discussions and activities facilitated learning among  
438 participants with varying proficiency in English. Content was disseminated through local  
439 partners and a project YouTube channel. Modules were used in a number of ways, including  
440 synchronous in-person and on-line sessions, as well as asynchronous self-guided sessions.

441         In addition to topic-based training, the project incorporated team-based research  
442 activities. During Phases 2, a “Small Research Grant” (SRG) program was introduced. The goal  
443 was to provide a guided, funded, and mentored research experience through the sequence of



444 steps outlined in Figure 3. Each team consisted of 4-6 researchers from the Center, UHS or Lao  
445 TPHI, and each team was paired at the start of the process with mentors from Purdue, Indiana  
446 or Cornell universities. Teams worked with their mentors by email and through virtual  
447 meetings, and also benefited from multiple reciprocal visits to each other’s institutions,  
448 including 4-6 week stays in the U.S. by SRG leaders during the final writing stage. Laptops and  
449 statistical software were provided to each team. Sequencing of the SRG steps was scaffolded to  
450 relevant training modules, for example assessment methods, research study design, statistical  
451 analysis, and academic writing. Whenever possible, these hands-on, closely monitored and  
452 mentored research collaborations targeted junior faculty and young researchers in Laos,  
453 thereby helping to enhance capacity within the respective Lao institutions to provide and  
454 sustain mentoring and scientific good practices into the future.

455



456

457 Figure 3. Sequence of Steps Used for the Small Research Grants (SRGs)

458

#### 459 Activity 6: Lao-English Nutrition Glossary

460 The team identified a lack of consistency when translating nutrition terms from English to Lao.  
461 Many terms, especially technical terms, could only be translated with difficulty, and resources  
462 such as Google’s translate feature were often unreliable in rendering correct translations. In  
463 response, the team worked with the Center and university researchers to identify key terms,  
464 develop the most accurate and appropriate translations, and generate a glossary to ensure  
465 proper and consistent translation across stakeholders of nutrition and nutrition research in Lao.  
466 This activity was used as a practicum to support the Center in putting into practice project  
467 management skills, and the MoH fully embraced the project, eventually producing 4,000 copies  
468 of the glossary for distribution in schools, clinics and health facilities throughout the country.

469

#### 470 Activity 7: Enhanced Communication

471 To increase multi-sectoral cooperation and awareness of nutrition research in Laos, a  
472 communication strategy was developed that centered around outputs that were new, and  
473 hence innovative, for our Lao colleagues: a quarterly newsletter highlighting nutrition research  
474 being conducted in-country, and a locally-led seminar/webinar series. Both channels were  
475 designed to highlight recent and ongoing research. The newsletter included links to key  
476 resources, advice, and opportunities, as well as meeting announcements. It was produced in  
477 both Lao and English and distributed via email, WhatsApp, and various social media channels to  
478 key stakeholders in government, INGOs, civil society organizations, and academia. Webinars,  
479 which included real-time translation, were launched with research presentations from project  
480 staff but evolved to include non-project researchers. Because both activities were new in the

481 Lao context, assigning Center staff in leadership positions provided an opportunity to build  
482 Center capacity in multi-sectoral communication and convening. Although these functioned as  
483 one-way forms of communication, topics were chosen based on feedback from our Lao  
484 partners and, over time, local experts played a greater role in providing the content.

485

#### 486 [Activity 8: National Nutrition Research Agenda](#)

487 An over-reliance on donor-led research can reduce in-country agency for evidence-based  
488 policy-making, creating unpredictable research cycles and fragmentations in the health system  
489 [18]. In 2016, Lao TPHI produced a summary of nutrition and health research topics and, in  
490 2018, developed a National Health Research Agenda with 11 priority topics. However, at the  
491 start of the project, Laos did not have a research agenda for nutrition. To address the need for  
492 such a document, the project engaged with researchers at Lao TPHI to design a process to  
493 identify research gaps and needs for nutrition research in Laos, and prioritize research needs.  
494 From the start, the goal was to ensure local ownership and control of identifying and  
495 prioritizing nutrition research gaps in Laos. The priority-setting exercise included national-level  
496 policymakers (e.g., from the MoH), the National Nutrition Committee (representing multiple  
497 sectors), the Mother and Child Health Center (MCHC), and local members of the NGO and INGO  
498 communities. Interviews were conducted with more than 30 policymakers from a range of  
499 sectors, including nutrition and health researchers and practitioners. The aim was to explore  
500 perceived research needs using these key informant interviews. Simultaneous to this, a  
501 literature review was conducted to collect published findings of relevance to the nutrition  
502 situation in the country. Subsequent review and listening sessions narrowed the list of topics to

503 eight primary themes and 68 sub-themes. These were then incorporated into a survey  
504 administered to 160 stakeholders, including district and provincial health officers, provincial  
505 hospital staff, and members of the Ministry of Health’s National Nutrition Committee.  
506 Participants ranked topics in terms of importance, and the resulting ranking was used to  
507 develop a prioritized list of 60 research questions. These were further vetted with senior  
508 stakeholders and published in early 2024 as the *National Nutrition Research Agenda 2023-2026*  
509 (NNRA). The NNRA now serves as the first guiding document for nutrition research in Laos.

510

## 511 5. Policy Implications and Lessons Learned

512 5.1 Addressing the Need for Local Ownership In many nutrition policy discussions, there is a  
513 well-recognized need for local, context-specific evidence, as well as development and  
514 coherence across local institutions and stakeholders. This project provides an example of how  
515 to address this need, in a demand-driven way that enables local ownership and does not erode  
516 agency in setting the research agenda. True capacity building takes time, resources, and human  
517 leadership. Emphasizing quality over quantity as well as consistency of engagement over time is  
518 essential to building capacity. Despite being classified as a low-middle-income country, Laos still  
519 grapples with a weak health system, both in terms of physical infrastructure and human capital  
520 [17]. Going forward, understanding the national context of needs and developing local  
521 ownership of challenges and their solutions will be critical for setting priorities (for example, as  
522 seen in the development of the NNRA) which can then be targeted for improvement across  
523 various dimensions of work. Three specific aspects of local ownership stand out.

524 First, empowering individuals and embracing a diversity of experiences is key. To sustain  
525 impact from capacity building efforts, researchers need to be equipped to work in  
526 multidisciplinary teams to collaborate effectively. This requires strong research teams and  
527 partnerships with institutions that share similar goals, philosophies, and a willingness to  
528 embrace local empowerment. For this project, our target training audience represented  
529 multiple disciplines, which required our team to sometimes rethink our approach to nutrition  
530 research and adjust trainings accordingly, especially to cover areas of knowledge not previously  
531 encountered. For example, many professionals in our target audience had been trained in  
532 medicine, not nutrition or research. In this project's context, however, diversity of experience  
533 and training often deepened conversations and created shared understanding among those  
534 with different perspectives. Fostering community among researchers through training across  
535 institutions, creating opportunities for networking, and supporting engagement in national,  
536 regional and international scientific conferences help individuals to benefit from diverse  
537 perspectives and experiences.

538 Second, given the large number of Lao ethnicities and languages, wherever possible,  
539 tools and materials used should be adapted to and validated to local contexts and languages.  
540 This ensures relevance and effectiveness in training activities and also ensures knowledge  
541 translation through effective communication and dissemination of research findings among  
542 stakeholders, including policymakers, researchers, and communities. An acknowledged  
543 shortcoming of our project is that while “local ownership” of activities means Lao ownership,  
544 not all groups were represented in the project and many areas of indigenous knowledge and  
545 practice were not included. In the future, as the Lao community of public health nutrition

546 researchers continues to grow in number and capacity, it will be important to ensure that  
547 research findings are translated into actionable policies and interventions to achieve  
548 sustainable improvement in local systems. For example, Laos still lacks country-specific dietary  
549 guidelines, food-based recommendation guidelines, laboratories for nutrient analysis, and  
550 national food composition tables. So long as the country relies on resources borrowed or  
551 adapted from neighboring countries, it will be difficult to ensure that the country's nutrition  
552 challenges are being fully embraced and "owned." Local ownership is especially important in  
553 higher education, where curriculum improvements and teaching enhancements require  
554 absolute sensitivity to local norms and practices. Interventions using evidence from research  
555 must be responsive to local needs, as the use of appropriate tools, materials and methods can  
556 improve knowledge and enhance the skills of professional staff [19]. Closing the loop on local  
557 adaptation and validation requires a monitoring and evaluation system that supports adaptive  
558 management so that feedback from end-users can be used to adjust programs and practices.

559         Third, independent governance and funding of research teams can help provide a  
560 greater sense of ownership and encourage young researchers to build research careers in-  
561 country. This can be achieved when governments allocate specific budgets for research and  
562 implementation with transparency and using methods that reward effectiveness and  
563 accountability. When activities are supported in ways that encourage collaboration among a  
564 range of stakeholders, including researchers, implementation teams, and policymakers, the  
565 process of translating research findings into actionable policies can be accelerated.

566

## 567 5.2 Challenges to Local Ownership

568 Multiple challenges to fostering local ownership exist, especially in the realm of addressing  
569 nutrition and food security challenges, not least because addressing malnutrition  
570 comprehensively requires navigating the co-existence of different forms of malnutrition,  
571 including undernutrition and—increasingly--overnutrition. Stakeholder groups may have  
572 sometimes opposing or conflicting goals or perspectives. In a country like Laos, with  
573 considerable ethnic diversity, linguistic and geographic barriers pose challenges to reaching  
574 vulnerable populations, especially in remote areas. Infrastructure limitations, such as poor road  
575 conditions and lack of basic amenities, further exacerbate challenges. Limited English  
576 proficiency can hamper access to information and undermine collaboration, which means  
577 effective communication strategies are needed to bridge the gap between researchers,  
578 policymakers, and communities. A project such as the ANRCB, constrained by institutional  
579 forces in its geographic reach and focusing by necessity on capacity building in key institutions,  
580 was limited in its ability to work beyond the capital region and the Lao-English language nexus.

581 Often, dependency on foreign funding undermines local budget allocations for health  
582 and nutrition research. This can exacerbate weaknesses in monitoring and evaluation within  
583 the health system. In addition, where various entities, including NGOs, universities, and various  
584 government agencies operate independently and in an uncoordinated fashion, efforts can  
585 overlap, sharing of findings can be difficult, and assigning ownership as well as monitoring and  
586 evaluation can be difficult. A project design that intentionally brings these groups together can  
587 help to build better working relationships.

588 Finally, “brain drain” is a significant and recognized challenge. It takes two forms. The  
589 familiar one arises when trained and highly-skilled individuals leave the country. But an equally

590 pernicious version arises when trained individuals leave their positions, e.g., in government or  
591 higher education, for local jobs in unrelated but more remunerative settings. Both types of  
592 brain drain undermine capacity building efforts. Engaging in joint-research (see, e.g., [20]) can  
593 help strengthen the credentials, not just the skills, of local researchers, and reinforce  
594 commitment to a career path. The ANRCB project provides an example of ways that local talent  
595 can be provided with opportunities for personal and professional growth, which can help  
596 strengthen career commitment and open doors to professional opportunities.

597

### 598 [5.3 Potential Strategies to Achieve Local Ownership](#)

599 As with most externally-funded and externally-led projects, achieving local ownership has been  
600 a central goal as well as an ongoing challenge for the ANRCB project. Local ownership of project  
601 activities and outputs can occur through multiple approaches, some of which have gained more  
602 traction than others. Important aspects that allowed us to promote some degree of local  
603 ownership include first and foremost having government entities as primary partners and  
604 signing our MOU with the Ministry of Health, which ensured high-level attention, regular  
605 feedback, and project accountability to government priorities. Strategies employed to engage  
606 stakeholder audiences and involve them in project design and implementation include the use  
607 of various modes and methods of interaction, including online and in-person trainings and  
608 learning labs; in-person and hybrid seminars, webinars, and workshops; direct collaboration  
609 with universities to build capacity effectively and prioritize university needs surrounding  
610 curriculum development and training needs; and working with Lao partners to draw lessons  
611 from research conducted in different countries but similar contexts to inform Lao approaches.



612 Helping to support scientific research conducted in Laos has meant that classroom examples  
613 can be more relevant and engaging for students, reflect local contexts, and meet the needs of  
614 end-users, which should help enhance ownership over project resources.

615           Incentivizing professional growth was a central aim of the project, and was achieved by  
616 providing paired, long-term mentorship and goal setting for staff through initiatives such as  
617 financial support for research and short-term residencies as visiting scholars, English language  
618 training and training certification. The project organized an in-person “watch party” for the  
619 2023 [Agriculture, Nutrition, and Health \(ANH\) Academy](#), the first of its kind for Laos. The project  
620 also co-sponsored a major Lao public health conference in November 2023, at which a panel  
621 discussion and poster session were used to highlight and disseminate the work of the project  
622 and Lao project partners. Major involvement in and sponsorship of the 14<sup>th</sup> Greater Mekong  
623 Subregion (GMS) Public Health Conference in June 2024 also provided an opportunity to  
624 showcase project output and promote regional research networking with academics and  
625 practitioners from more than 20 academic institutions from Cambodia, China, Laos, Myanmar,  
626 Thailand, Vietnam, the United States, the Netherlands and Australia. As an innovation for the  
627 conference, the project team worked with the conference organizers to identify topics and  
628 conduct a series of eight, half-day pre-conference “learning lab” workshops, which attracted  
629 the participation of more than 400 conference attendees.

630           Such immersive approaches not only encourage personal development but also enhance  
631 overall capacity within the research workforce and public health community. Whether such  
632 efforts help to stem “brain drain” is perhaps unknowable. What is clear is that the project has  
633 strengthened scientific partnerships, enhanced knowledge, skills and confidence among young

634 researchers, and helped position them and their institutions to be more effective partners in  
635 future collaborations. The project also achieved considerable success in building connections  
636 between Lao institutions, including the Nutrition Center, the University of Health Sciences, and  
637 the Lao Tropical and Public Health Institute. Interaction among these groups was part of the  
638 project design, and the opportunity to study together, engage in research together, and travel  
639 together resulted in new professional in-country connections and relationships that are  
640 mutually reinforcing. Fostering collaboration among multiple stakeholders (multi-sectoral and  
641 interdisciplinary) and creating efficient working systems or research ecosystems facilitates  
642 knowledge updating, and the sharing of frameworks, results, strategies and lessons learned  
643 among stakeholders. Such collaboration can help ensure that various areas of work remain  
644 distinct but are shared, responsive to the country's needs, and beneficial to all partners.

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708 **Appendix. Characteristics of survey respondents**

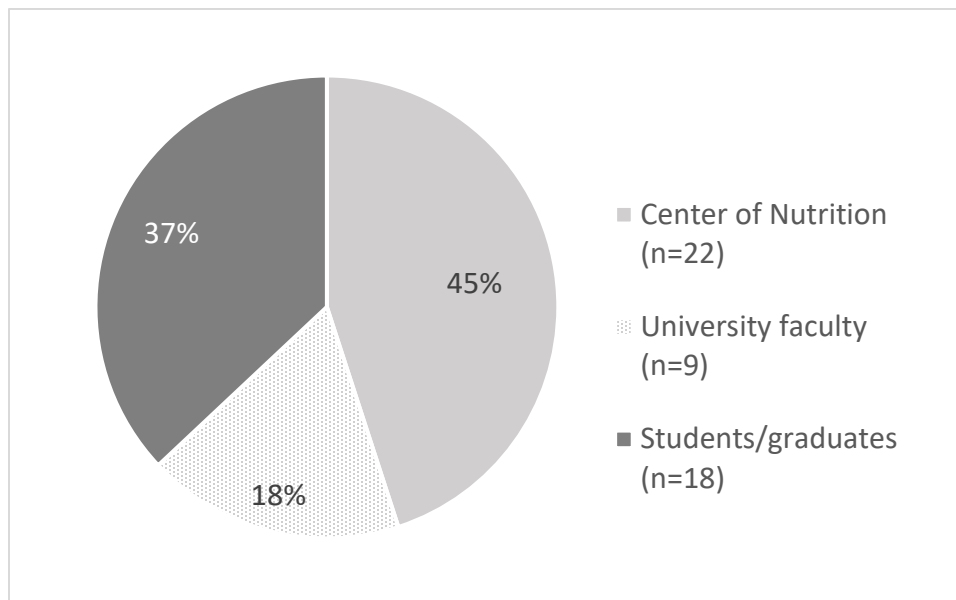
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710 Figures A1-A4 display characteristics of respondents to the formal surveys conducted among  
711 staff at the Nutrition Center, Lao TPHI and UHS in 2019 and 2020, and with recent graduates of  
712 a Netherlands-based training program. These provide context for activities and help to better  
713 understand the audience for project training activities. Of 49 participants, 45% were members  
714 of the Center staff, 37% were students or recent graduates of the universities included, and  
715 18% were university faculty (Figure A1).

716

717 **Figure A1. Institutional Affiliation of Survey Respondents**

718



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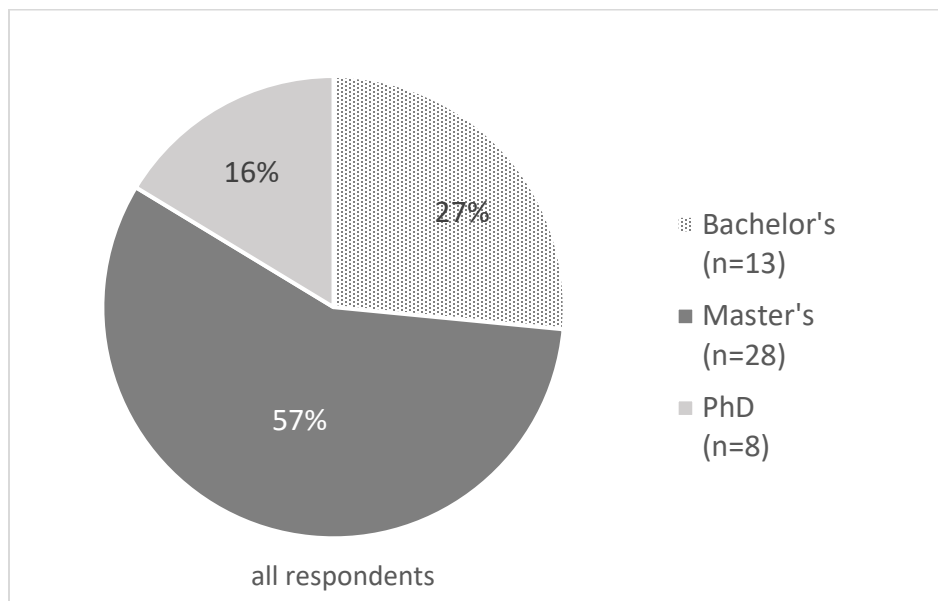
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721 The most frequent level of formal degree training among respondents (Figure A2) was a  
722 Master's Degree (57%), followed by a Bachelor's Degree (27%) and a PhD (16%). PhDs were

723 often found among university faculty, a large proportion of whom received their degree  
724 training in Laos.

725

726 Figure A2. Highest Degree Earned by Survey Respondents



727

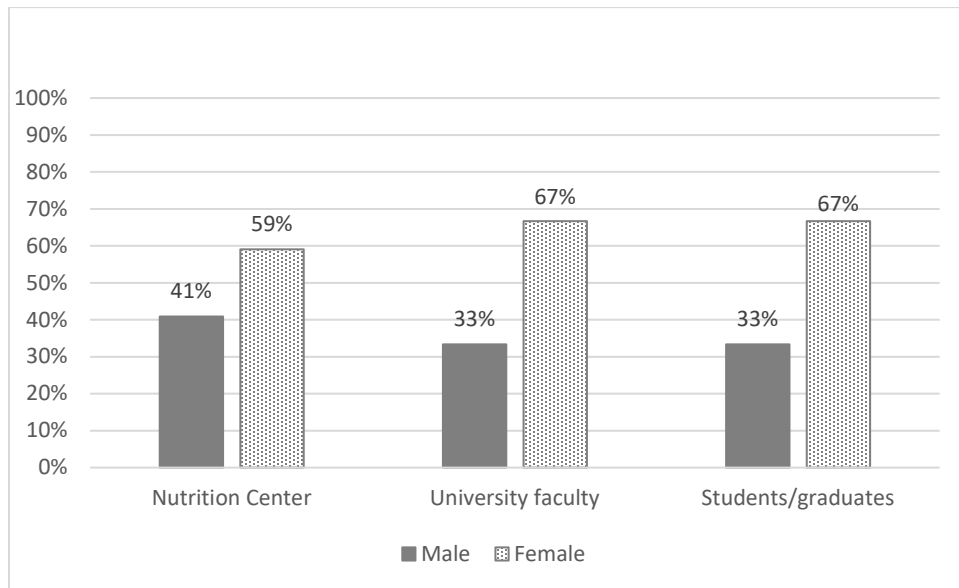
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729

730 Roughly two-thirds of respondents were female, with a slightly larger proportion of males at  
731 the Center (Figure A3).

732

733 Figure A3. Proportion of Survey Respondents Based on Affiliation and Gender



734

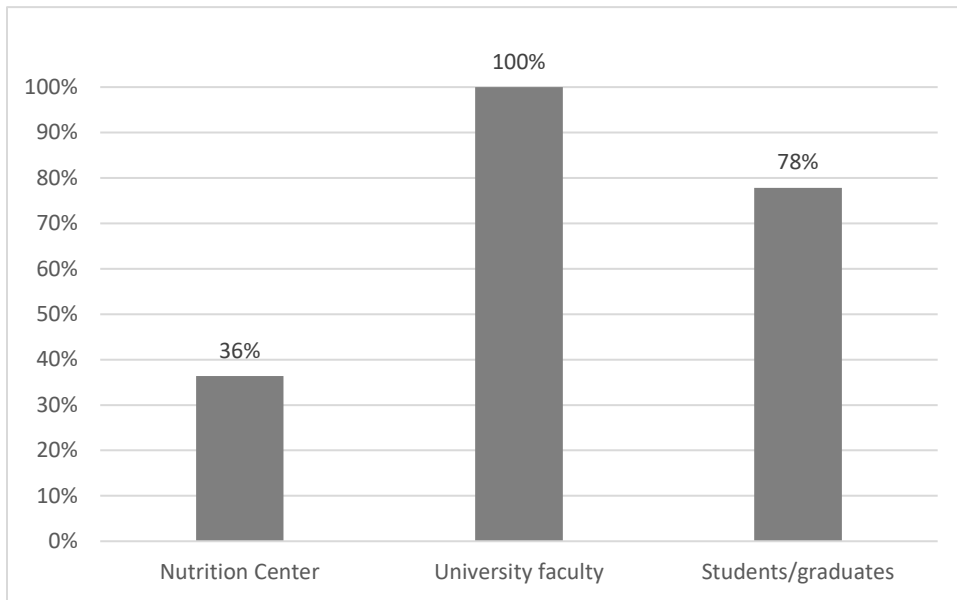
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736 All university faculty reported some prior training in research (Figure A4), but only one-third of  
737 Center staff reported such training. Turning to exposure to nutrition topics, the proportions  
738 were reversed: while three-quarters of Center staff reported having taken at least one course in  
739 nutrition, only one-third of public health university faculty reported formal training in  
740 nutrition—in some cases many years ago and therefore perhaps not providing current  
741 knowledge and methods (Figure A5).

742



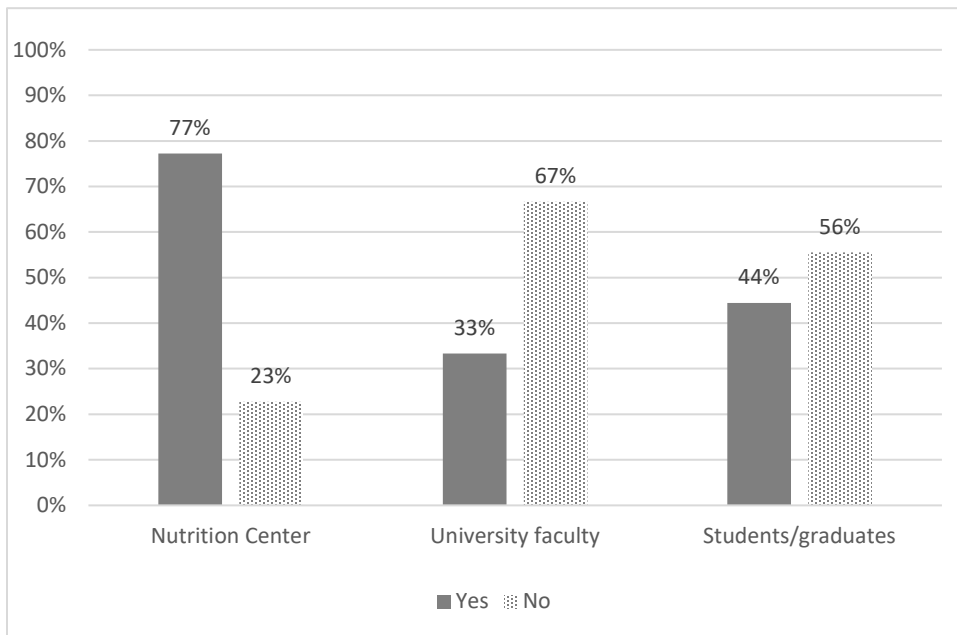
743 Figure A4. Previous Research Training of Survey Respondents



744

745

746 Figure A5. Previous Formal Courses in Nutrition of Survey Respondents



747

748

749