Informing policy and investment decisions in Lao agricultural research through data, analysis, and outreach

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ASTI stakeholder webinar Laos
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Why monitor the allocation of agricultural R&D resources?

- Quantitative data are essential for stakeholders to be able to:
  - analyze trends in agricultural R&D capacity, investments, and outputs
  - identify gaps
  - set future investment priorities
  - better coordinate agricultural R&D across institutes, regions, and commodities
- ASTI collects institutional, investment, human resource, and research output data from agricultural R&D agencies in developing countries worldwide.

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DATA	Building comprehensive, high-quality, and internationally comparable data products that are made easily accessible to stakeholders
ANALYSIS	Developing and implementing a demand-driven analytical research agenda through a network of national/regional experts
OUTREACH	Developing communication strategies for regional and national network partners

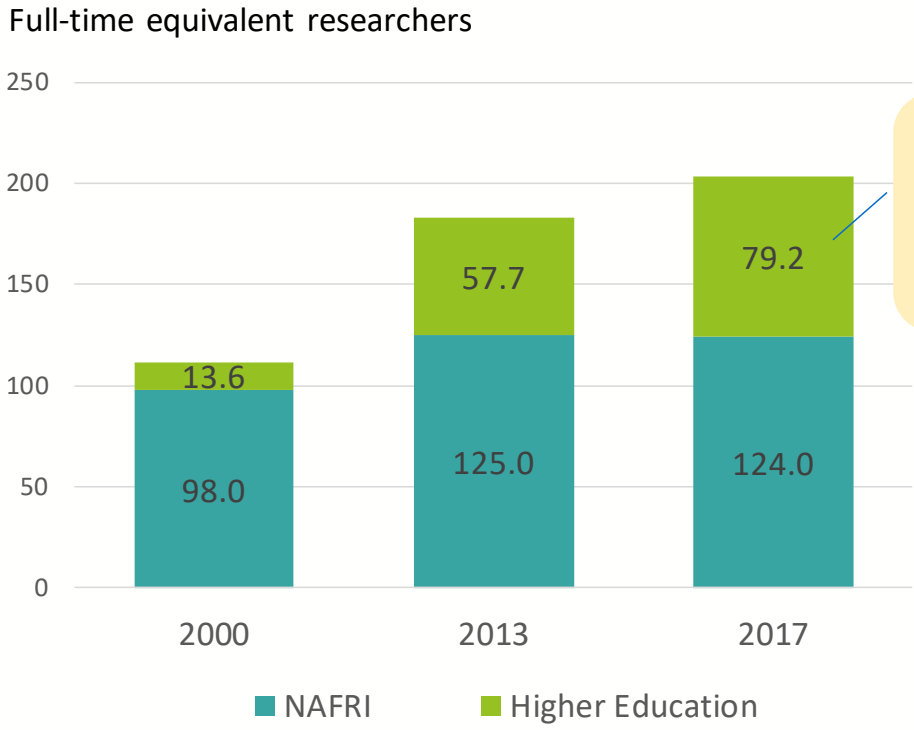
Part 1:

ASTI survey findings in Laos and beyond

INSTITUTIONAL COMPOSITION

- In 2017, 61% of Lao agricultural researchers were employed by NAFRI and 39% by universities.
- Since 2000, the country's agricultural research capacity has grown by roughly 80%.
- The higher education sector is playing an increasingly important role in agricultural research.

FTE agricultural researchers by sector 2000, 2013, and 2017



Breakdown	FTEs
National University of Laos	39.4
Savanakhet University	16.6
Champasack University	11.6
Souphanouvong University	11.6

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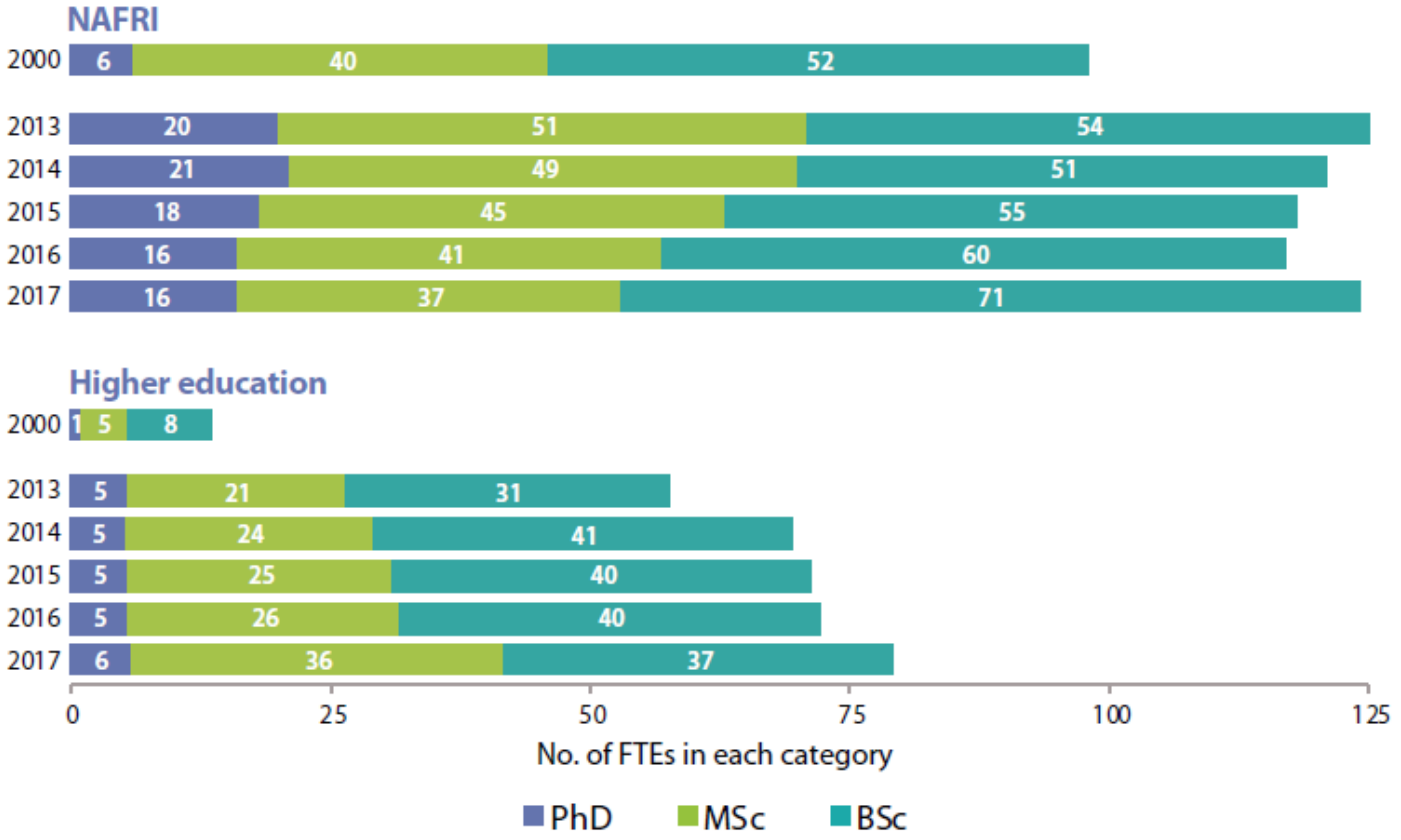
RESEARCHER QUALIFICATIONS

- Most of Laos's 203 FTE agricultural researchers hold BSc and MSc degrees.
- The total number of PhD-qualified scientists has steadily fallen in recent years, mostly due to retirement and the promotion of researchers to (nonresearch) ministerial positions.
- The country lacks a critical mass of PhD-qualified researchers. Capacity is insufficient to address the multitude of challenges of the agricultural sector.

Agricultural researchers by degree, 2000 and 2013–2017



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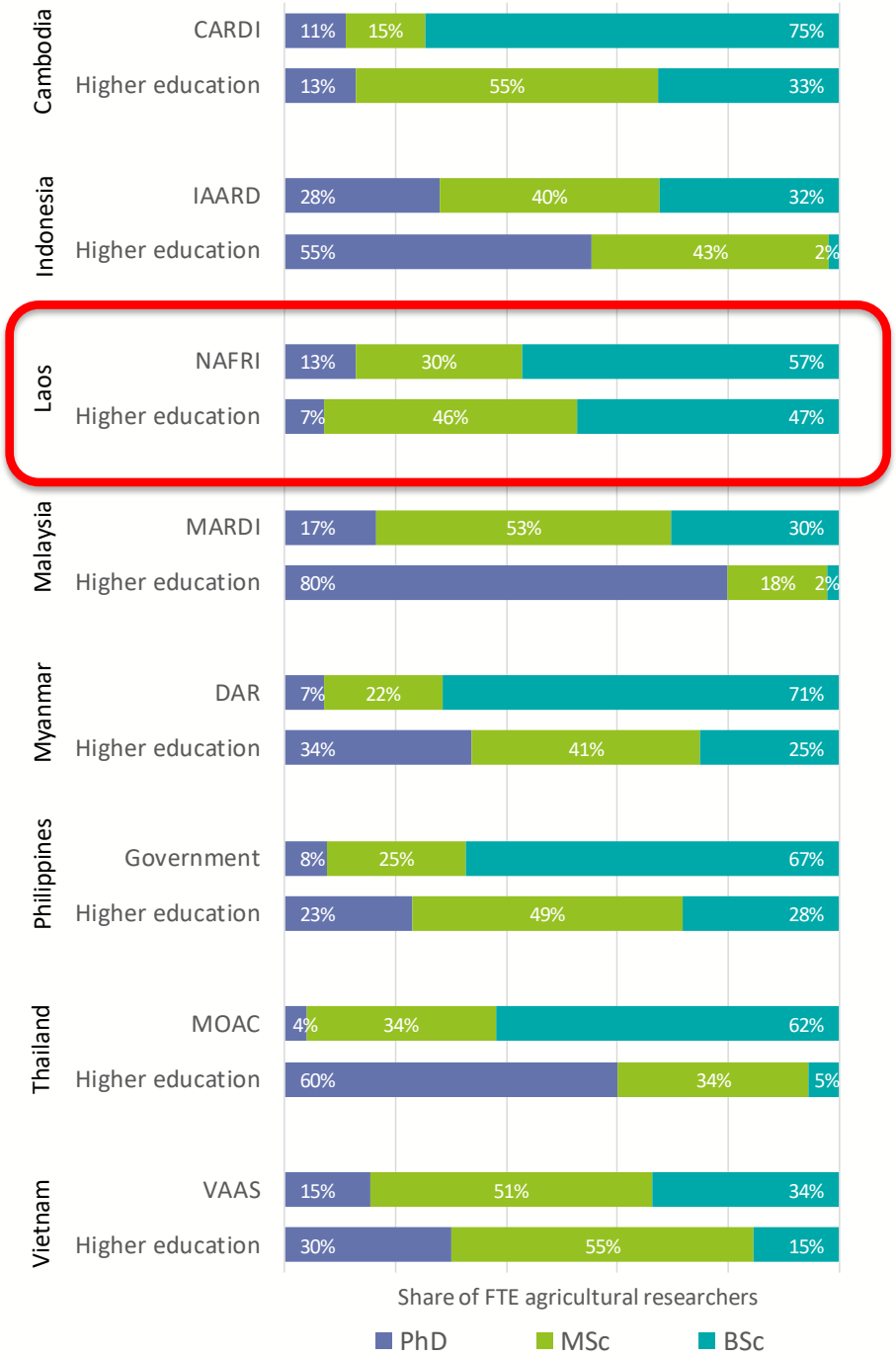
RESEARCHER QUALIFICATIONS

- Average degree qualifications of Lao agricultural researchers are among the lowest in Southeast Asia.
- Laos stands out from its neighbors in that average qualifications of university-based agricultural researchers are lower than those of the main government research agency (i.e. NAFRI).



Distribution of agricultural researchers by degree, 2017

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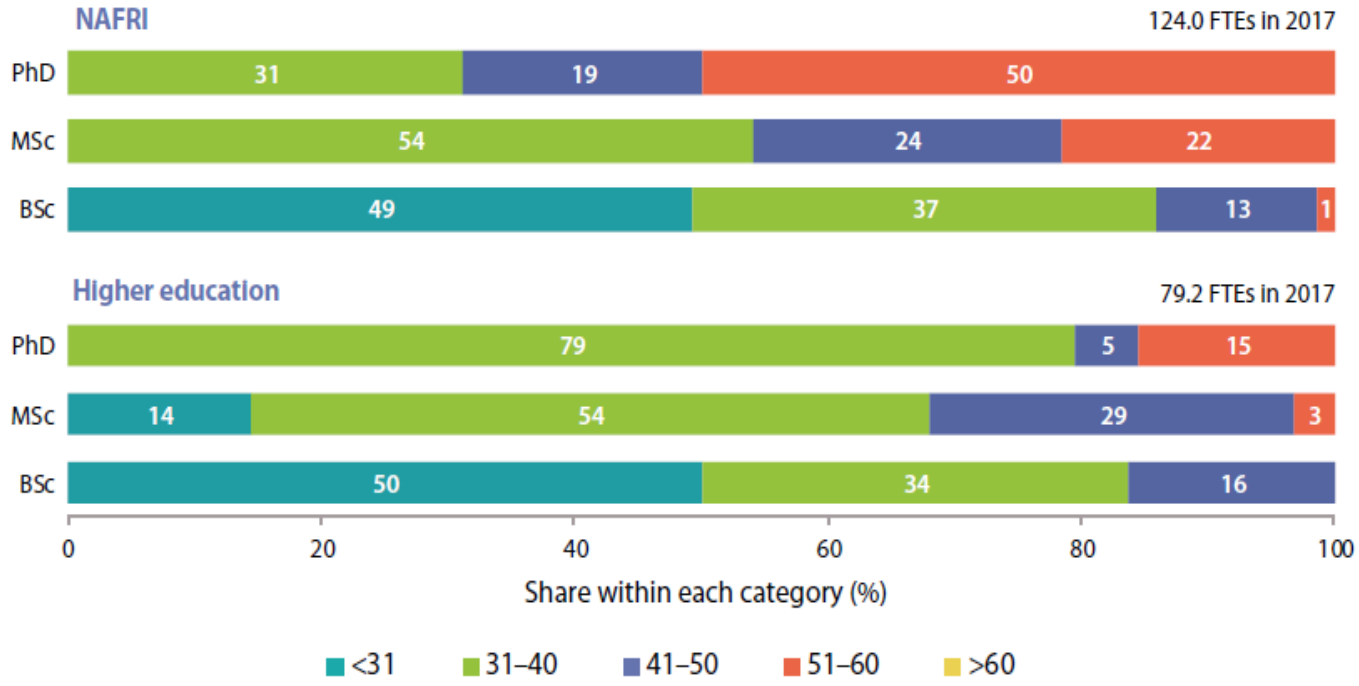
AGE COMPOSITION OF RESEARCHERS

- Laos has a very young pool of agricultural researchers: more than 70 percent are under 40.
- The recently established faculties at Champasack, Savanakhet, and Souphanouvong universities are predominantly staffed by BSc- and MSc-qualified researchers in their twenties or thirties.
- In contrast, half the PhD-qualified researchers employed at NAFRI are over 50 and nearing the official retirement age.

Distribution of agricultural researchers by age bracket, 2017



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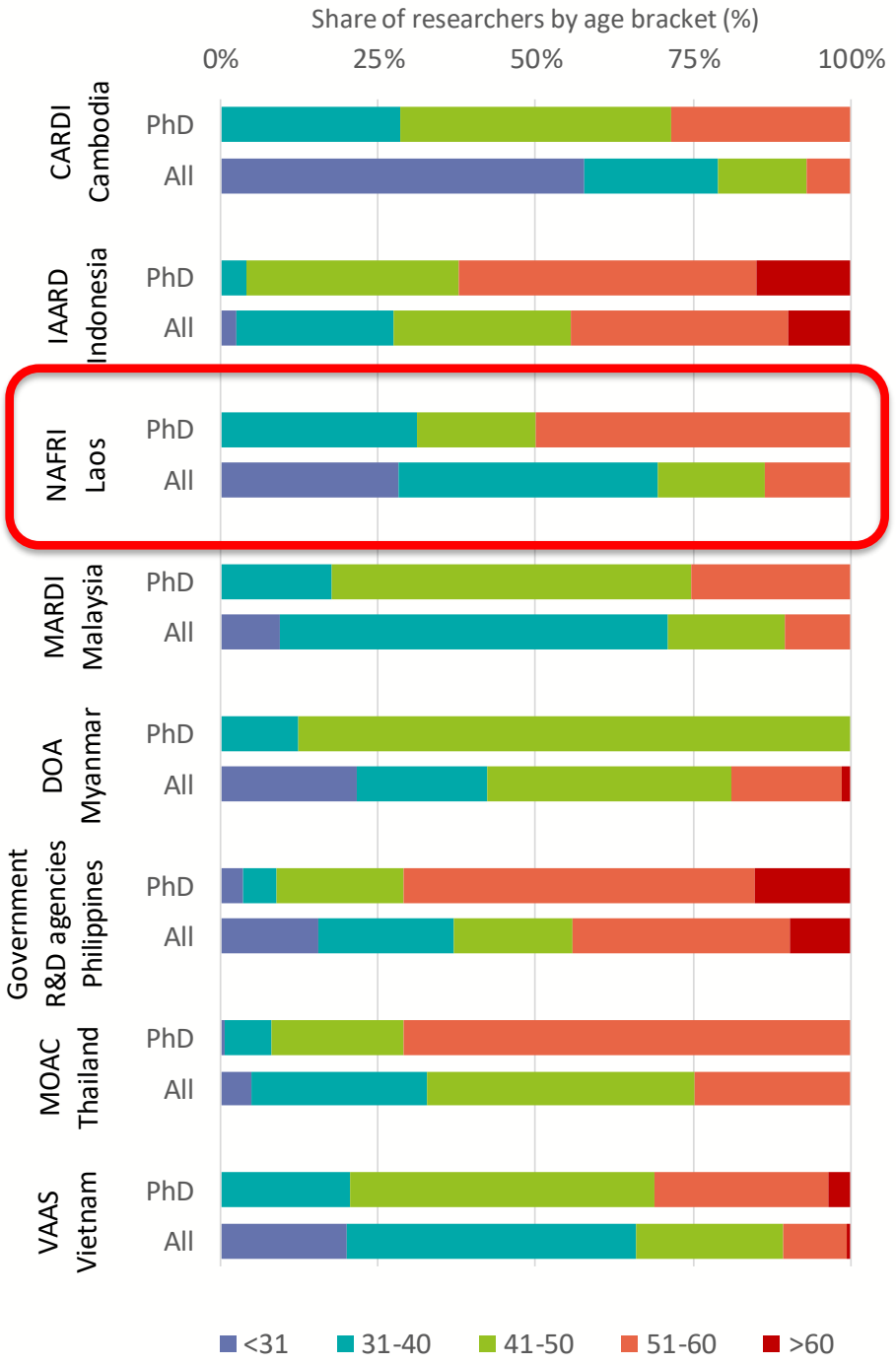
AGE COMPOSITION OF RESEARCHERS

- Laos (and Cambodia) employ a considerably younger pool of agricultural researchers than the other Southeast Asian countries.
- This represents an important opportunity. With well-targeted on-the-job and formal postgraduate training (and funding to match), these countries are strongly positioned to build a highly qualified pool of scientists serving a wide range of domains for decades to come.



Distribution of agricultural researches by age bracket, 2017

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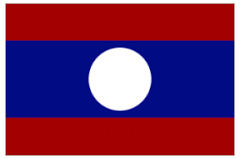
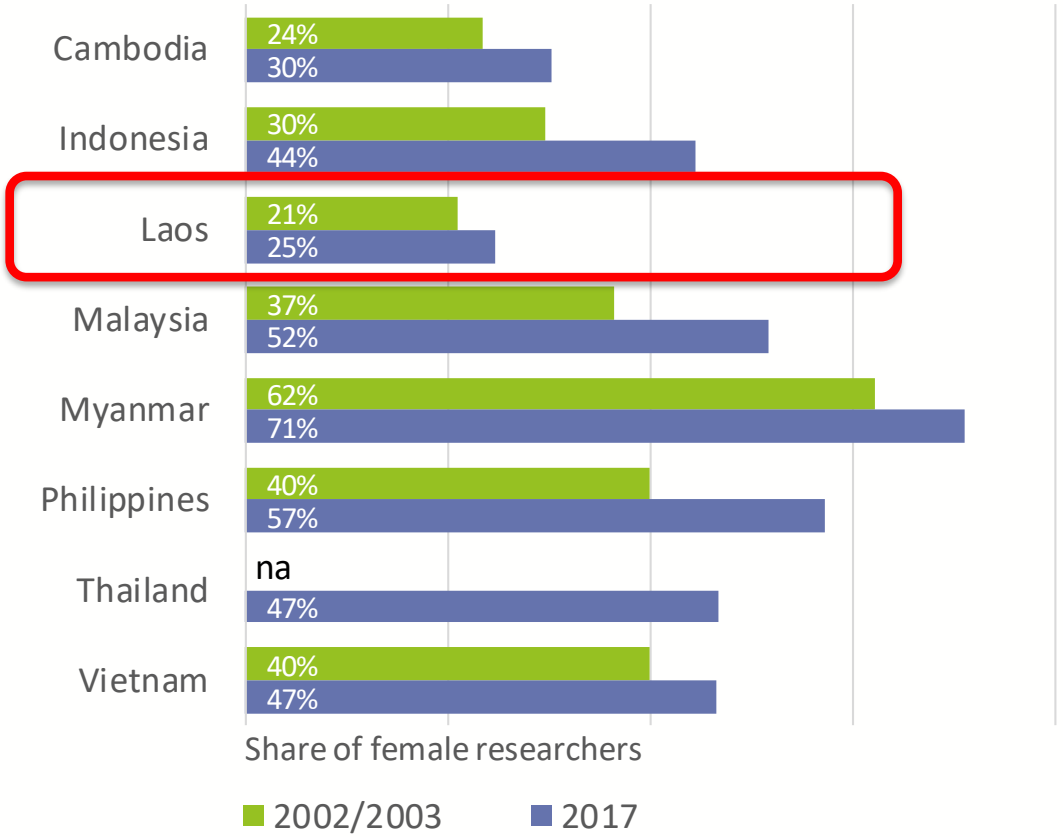
GENDER DISTRIBUTION OF RESEARCHERS

- As of 2017, a quarter of Lao agricultural researchers were women, representing the lowest share in Southeast Asia.
- Female involvement in agricultural research has grown more slowly over time in Laos than in other countries in the region.
- No discernible differences were found in average qualification levels between male and female researchers in Laos.



2017

Share of female agricultural researchers, 2003 and 2017



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RESEARCHER BREAKDOWN BY DISCIPLINE

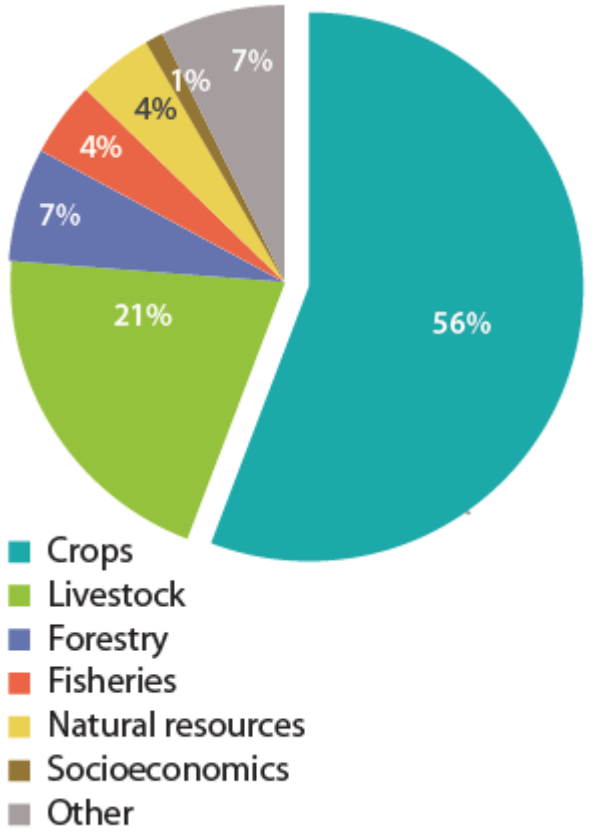
- Laos lacks a critical mass of PhD-qualified researchers in a number of important areas, including plant and animal breeding, plant pathology, agronomy, veterinary medicine, soil science, water management, and socioeconomic research.
- Large-scale training of MSc-qualified researchers to the PhD level is essential to ensure the quality of future research outputs.

	NAFRI		HIGHER EDUCATION SECTOR	
	FTEs		FTEs	
DISCIPLINE	PhD	MSc	PhD	MSc
Plant breeding/genetics (including biotechnology)	–	1.0	0.7	–
Plant pathology	1.0	–	1.4	–
Plant physiology	–	–	0.4	–
Botany	–	–	0.3	0.2
Seed science and technology	4.0	2.0	0.7	–
Other crop sciences	12.0	4.0	2.1	–
Animal breeding/genetics	–	–	–	–
Animal husbandry	–	1.0	2.0	0.6
Animal nutrition	–	1.0	2.0	1.1
Dairy science	–	–	–	–
Poultry science	–	–	0.9	–
Veterinary medicine	–	–	1.7	0.2
Zoology/livestock entomology	–	–	–	–
Other animal and livestock sciences	7.0	2.0	2.2	0.2
Forestry and agroforestry	5.0	1.0	10.0	1.9
Fisheries and aquatic resources	5.0	2.0	1.8	0.3
Soil sciences	–	–	0.8	–
Natural resources management	–	–	–	2.0
Water and irrigation management	–	–	–	–
Ecology	–	–	–	0.2
Biodiversity conservation	–	–	0.3	0.2
Food sciences and nutrition	–	–	0.4	1.7
Socioeconomics (including agricultural economics)	–	–	–	1.5
Extension and education	–	–	–	1.4
Other	3.0	2.0	2.1	0.4
Total	**37.0**	**16.0**	**36.1**	**5.6**

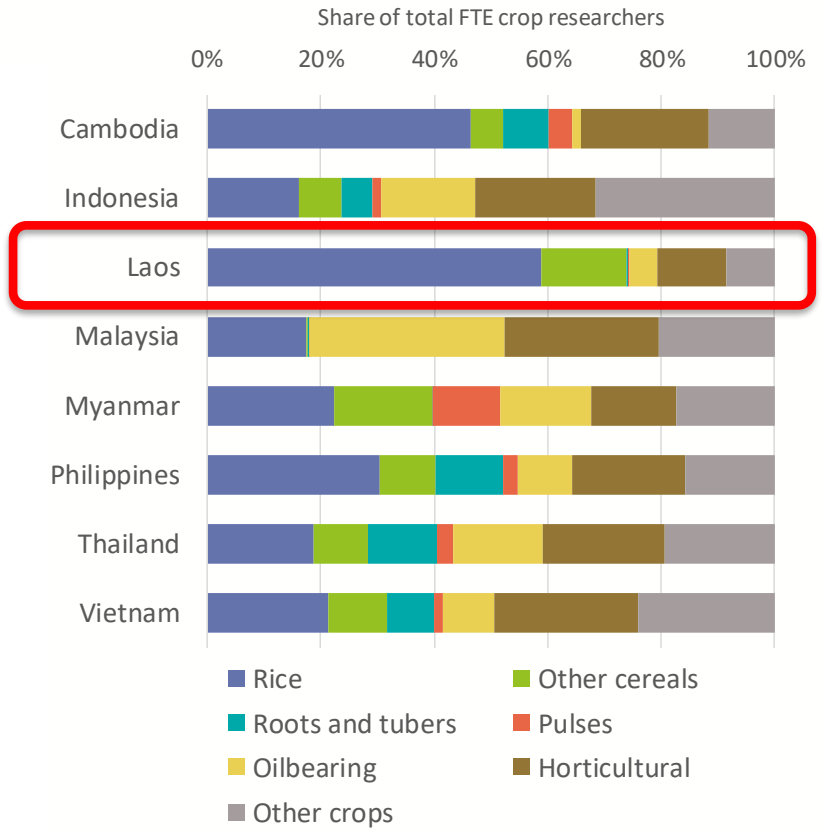
RESEARCH FOCUS

- Roughly three quarters of Lao agricultural researchers focused on crops and livestock.
- Rice is the most researched crop by far, accounting for close to 60 percent of all crop research taking place in Laos.

Laos: Research focus by commodity group, 2017



ASEAN: Research focus by crop category, 2017



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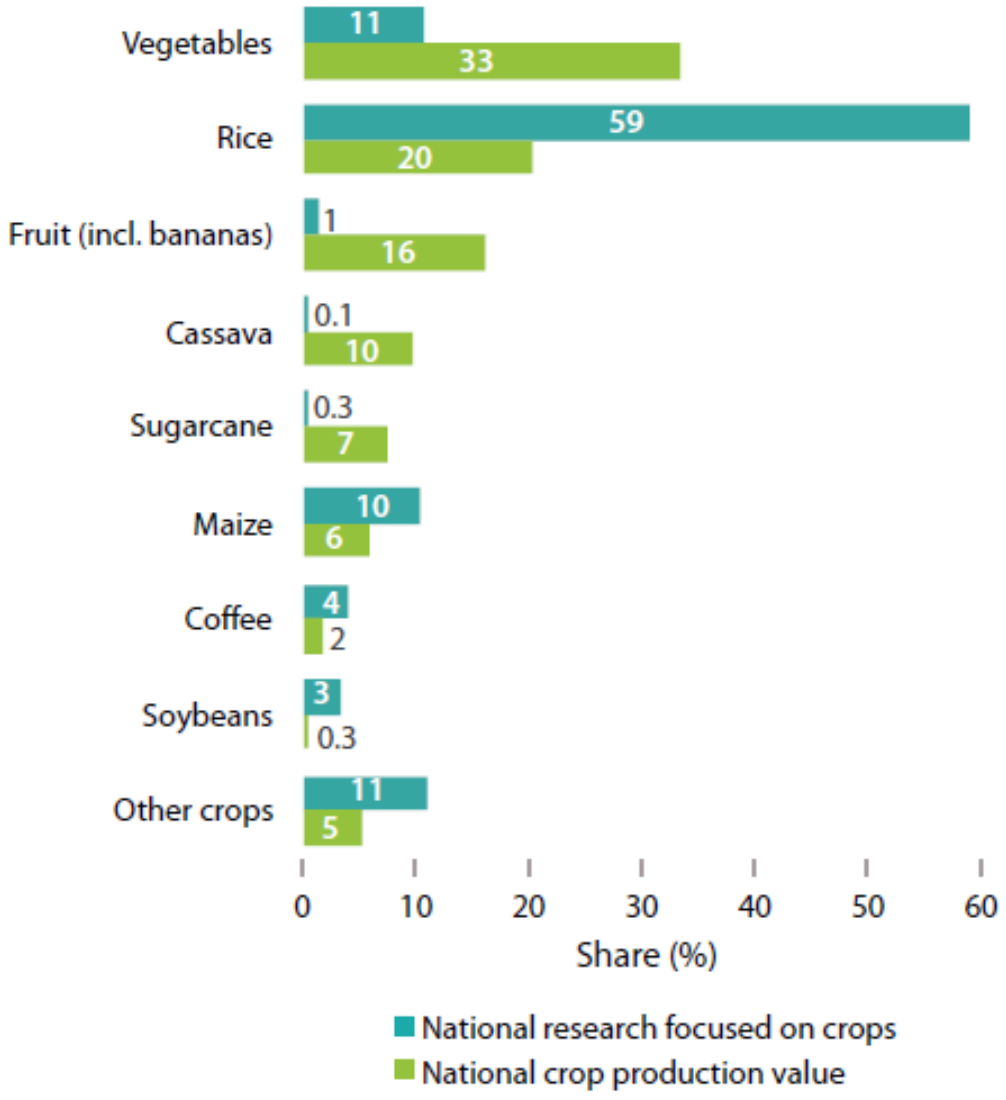
AN IMBALANCED R&D AGENDA?

- Rice accounts for just 20 percent of Laos's total value of crop production, yet nearly 60 percent of crop research is focused on rice.
- Similarly, comparatively more resources are allocated to coffee, maize, and soybean R&D than the production values of these crops would warrant.
- Vegetables, fruit, cassava, and sugarcane, on the other hand, appear to be extremely underresearched based on their production values.

Congruence between agricultural research and production value in Laos for selected crops, 2016/2017



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AGRICULTURAL RESEARCH SPENDING

- In 2017, Laos invested 62.6 billion kip in agricultural research (in current prices).
- Laos's agricultural research spending exhibited an erratic patterns over time (in inflation-adjusted terms).

Agricultural research spending in Laos, 2000–2017

Million kip (current prices)

Million kip (constant 2011 prices)

2017

62.6 billion kip

47.6 billion kip

Note: Spending includes salaries, operating and program costs, and capital investments.

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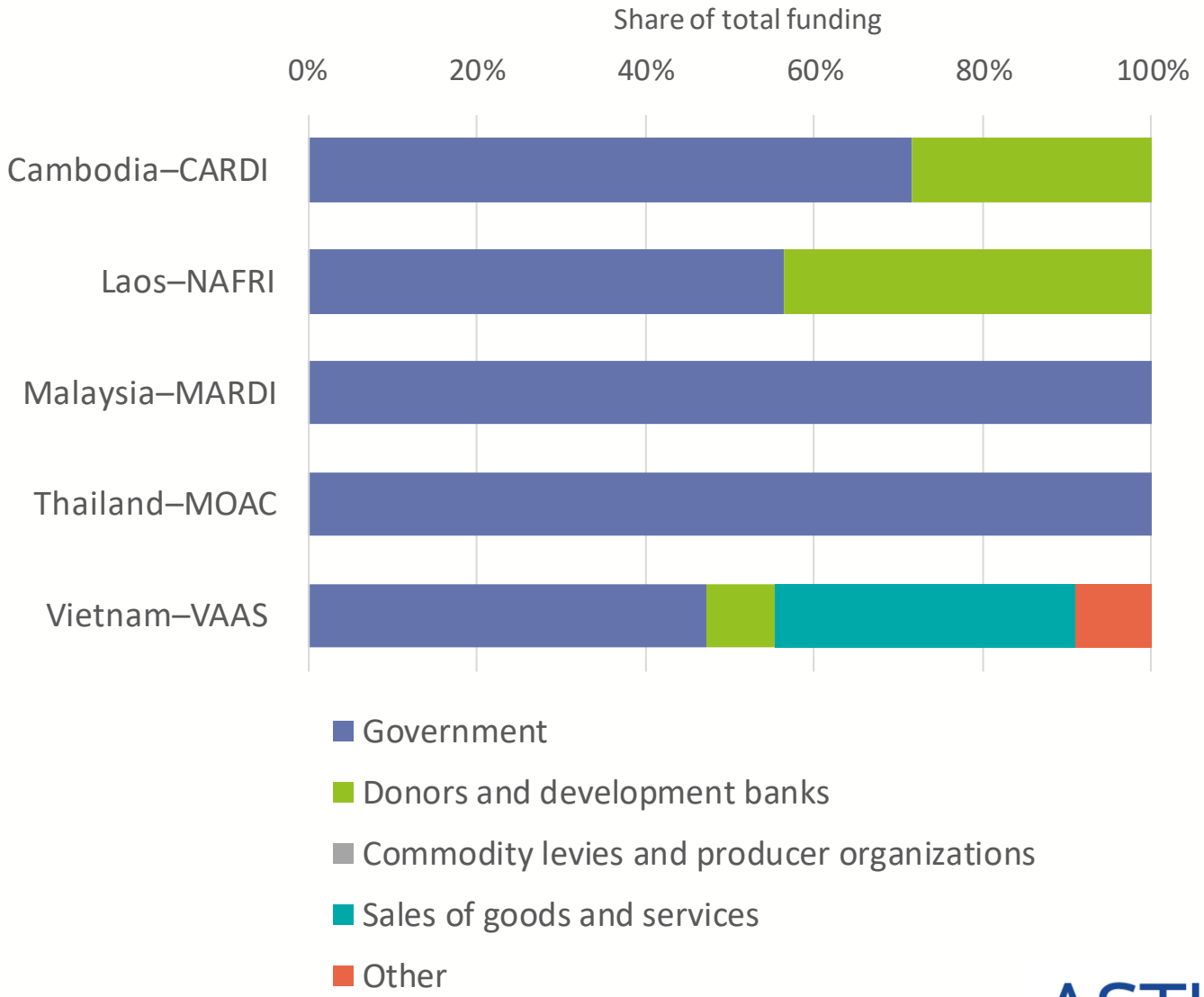
AGRICULTURAL RESEARCH FUNDING

- Agricultural research in Laos is much more dependent on donor funding than elsewhere in Asia.
- Australia, Switzerland, China, and ADB are important donors to Lao agricultural research.
- The short-term project-oriented nature of donor-funded projects has led to the situation where Laos is the most volatile among ASEAN countries in terms of agricultural research funding.

Agricultural research funding, 2013–2017 averages



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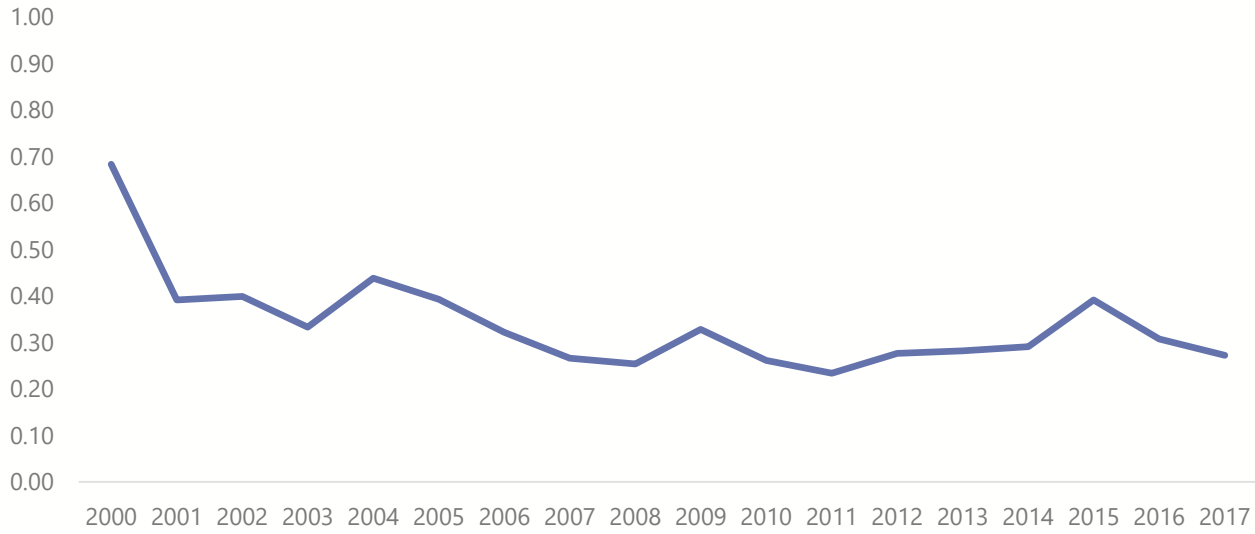
INTENSITY OF RESEARCH SPENDING

- Laos's agricultural research spending as a percentage of agricultural GDP has fallen substantially since 2000.
- In 2017, Laos invested only 0.26% of AgGDP in agricultural R&D, which is lower than the average for ASEAN as a whole (0.33%).

Laos's agricultural research spending as a % of AgGDP



	2017
COUNTRY	
Cambodia	0.22%
Indonesia	0.17%
Laos	0.26%
Malaysia	0.85%
Myanmar	0.06%
Philippines	0.41%
Thailand	0.94%
Vietnam	0.20%
TOTAL ASEAN	**0.33%**

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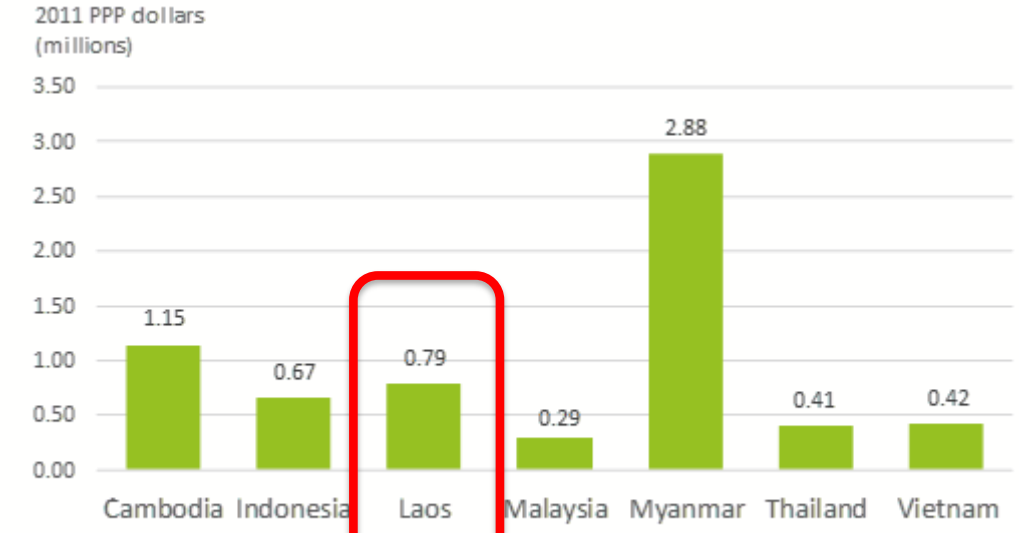
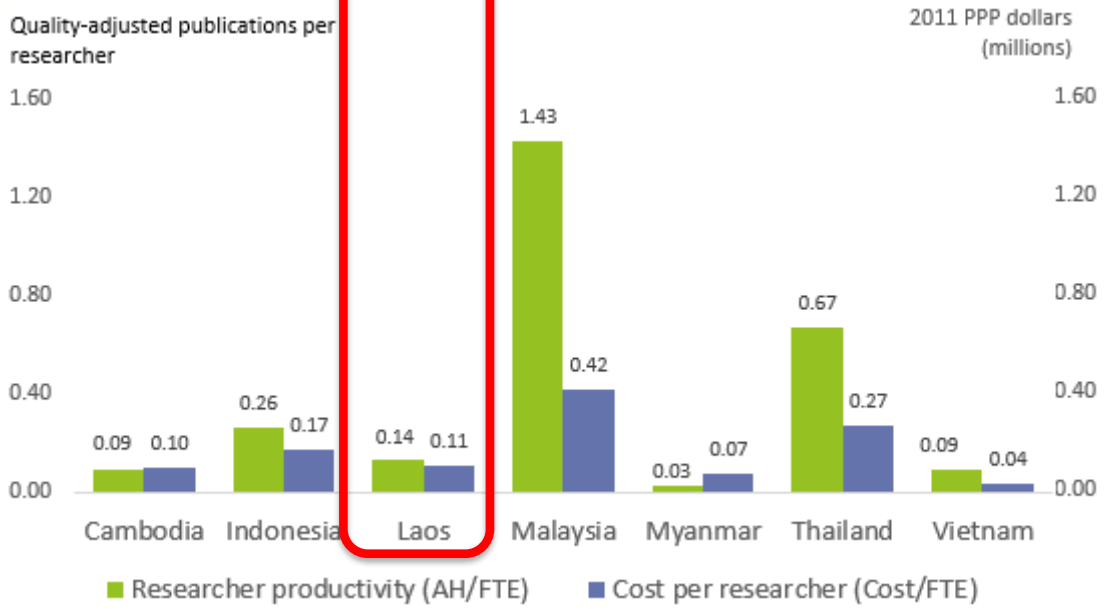
RESEARCHER PRODUCTIVITY

- Malaysia and Thailand are the leading ASEAN countries in agricultural research, based on the size of their scientific output.
- Despite their higher cost per researcher, their cost per unit of output is considerably lower than in countries with less developed research systems.

Research spending per quality-adjusted article



Researcher productivity and cost per researcher compared



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OVERALL SYSTEM PERFORMANCE

- Countries with larger and more developed research systems— Malaysia, Thailand, Indonesia, and Vietnam—perform better than the other countries in nearly all indicators.
- Laos is among the underperforming countries in several critical areas.

Summary of the performance of national agricultural R&D systems

	Cambodia	Indonesia	Laos	Malaysia	Myanmar	Thailand	Vietnam
Cost per unit of output	**--**	**/**	**-**	**+++**	**---**	**++**	**+**
Cost per researcher	+	-	/	---	++	--	+++
Researcher productivity	-	+	/	+++	---	++	-
Qualification of researchers	---	+++	--	++	--	+	/
Cost structure	--	-	/	++	---	/	+++
Intensity	-	+	/	+++	---	++	--
Funding	-	/	--	++	---	+++	/

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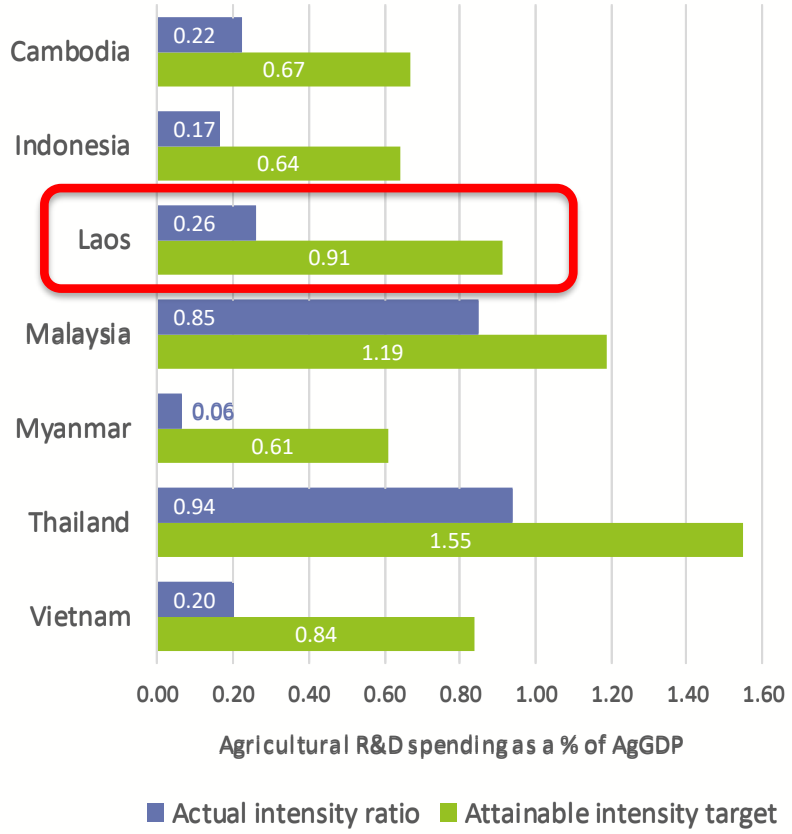
Part 2:

Evidence-based Forecasting

UNDERINVESTMENT IN AGRICULTURAL R&D

- ASTI's weighted indicator of attainable research intensity demonstrates that all Southeast Asian countries are underinvesting in agricultural research.
- A research intensity ratio of 0.91% of AgGDP is thought to be attainable for Laos, which means the country should be able to more than triple its R&D investment.

Actual 2017 intensity ratios and attainable investment targets



Note: ASTI's multi-factored indicator of attainable research intensity comprises a range of weighted criteria: size of the economy, size of the agricultural sector, income level, the level of diversification of agricultural production, and the availability of spillovers from other countries. Countries with the same mix of inputs are expected to require similar minimum levels of research investment, and investment below that level can be interpreted as an indicator that the country is underinvesting based on its particular input mix.

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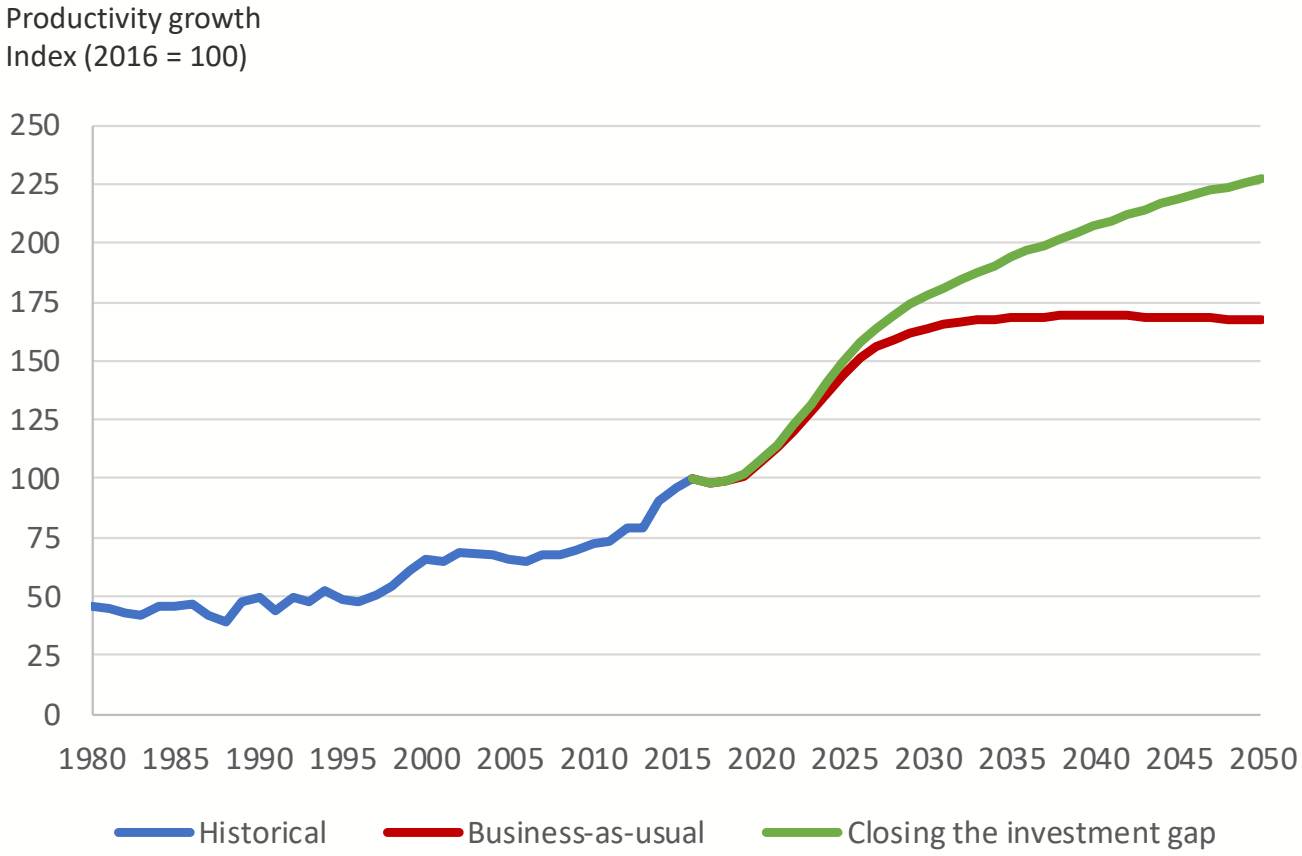
FUTURE PRODUCTIVITY RESPONSE TO HIGHER RESEARCH INVESTMENT TODAY

- If Laos raises its agricultural research spending to levels that will close the investment gap, the country's agricultural productivity growth is forecast to double by 2050.
- Productivity growth will stagnate, however, if Laos continues its historic pace of agricultural R&D investment into the future.

Projected annual productivity growth during 2017–2050 under two investment scenarios: 1) business-as-usual; and 2) closing the R&D investment gap by 2030



Note: The business-as-usual scenario uses average historical growth rates to project future investment, while growth of investment in the "closing the investment gap" scenario is calculated as the annual rate that allows the country to go from the actual to the attainable level of investment between 2016 and 2030

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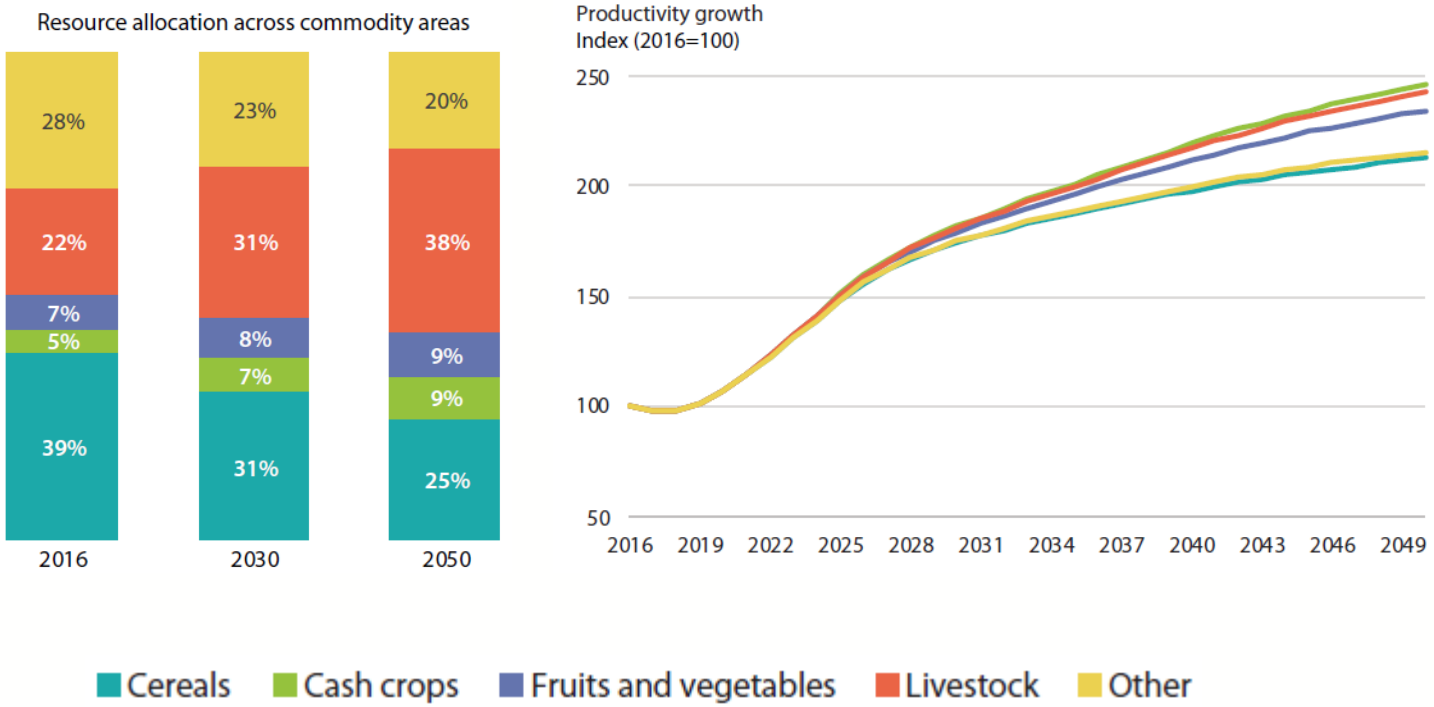
PRODUCTIVITY GROWTH UNDER ALTERNATIVE INVESTMENT SCENARIOS

- ADS2025 and NSEDP8 set forth goals of diversifying agricultural production and increasing exports.
- A gradual shift of R&D investment from cereals into high-value commodities is forecast to trigger faster future productivity growth.

Agricultural productivity projections for selected commodity groups based on attainable rates of research investment, 2016-2050



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Evidence-based policy lessons

More ambitious policy measures are needed:

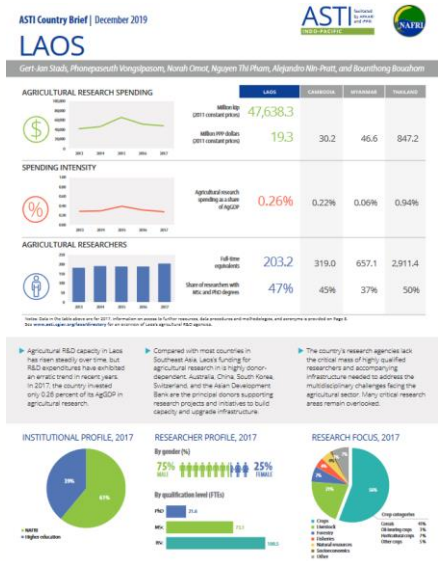
- to ensure that research targets well-defined priority areas
- to ensure that research institutions stay adequately staffed into the future
- to enhance the scope and overall quality of graduate programs
- to tackle Laos's underinvestment in agricultural research
- to ensure more stable long-term R&D funding
- to ensure that donor funding is better aligned with national priorities
- to strengthen the country's extension system

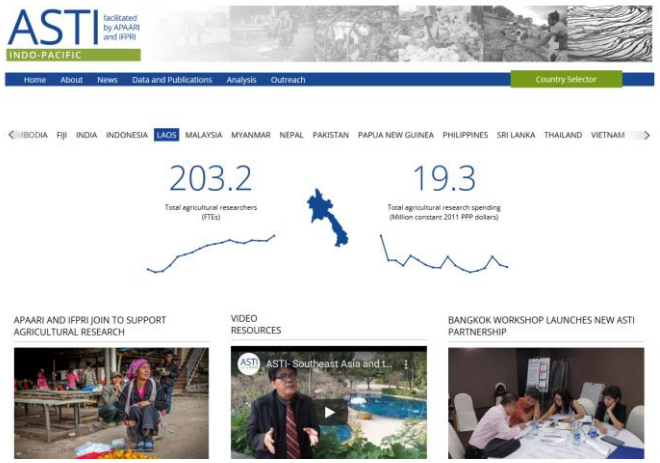
Part 3:

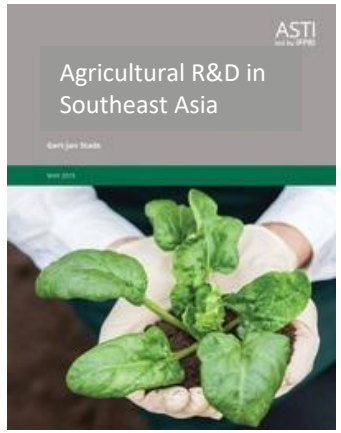
From Evidence to Policy and Practice

Achievements and Outputs

- Laid the foundation in Laos for the long-term monitoring of agricultural R&D resources
- Quantified national levels of agricultural research investment, human resource capacity, and outputs in great detail
- Assessed the performance and efficiency of the Lao agricultural research systems
- Projected long-term agricultural productivity growth based on alternative R&D investment scenarios







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Next Steps

- Facilitate and support effective partnerships between NAFRI, APAARI, and IFPRI for further research and analysis
- Explore avenues through which ASTI evidence can best be channeled into policy- and decision-making processes
- Support the devolution of data collection, processing, and provision for enhanced in-country ownership of ASTI evidence
- Explore what is needed to make ASTI more responsive to Lao stakeholders' needs

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Thank you

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Feedback and discussion

- Q&A
- Your feedback on the relevance and usefulness of ASTI outputs, and areas for future improvement.
- How can we ensure the (policy) uptake of ASTI evidence? How can ASTI evidence be integrated into national R&D decision making and policy processes?
- What additional data collection and analytical activities can ASTI conduct in Laos to ensure that its products and services better support R&D investment decisions?
- What can APAARI and IFPRI do to help institutionalize ASTI data collection and analysis in Laos and enhance in-country ownership on the long run? What are the capacity needs?

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