



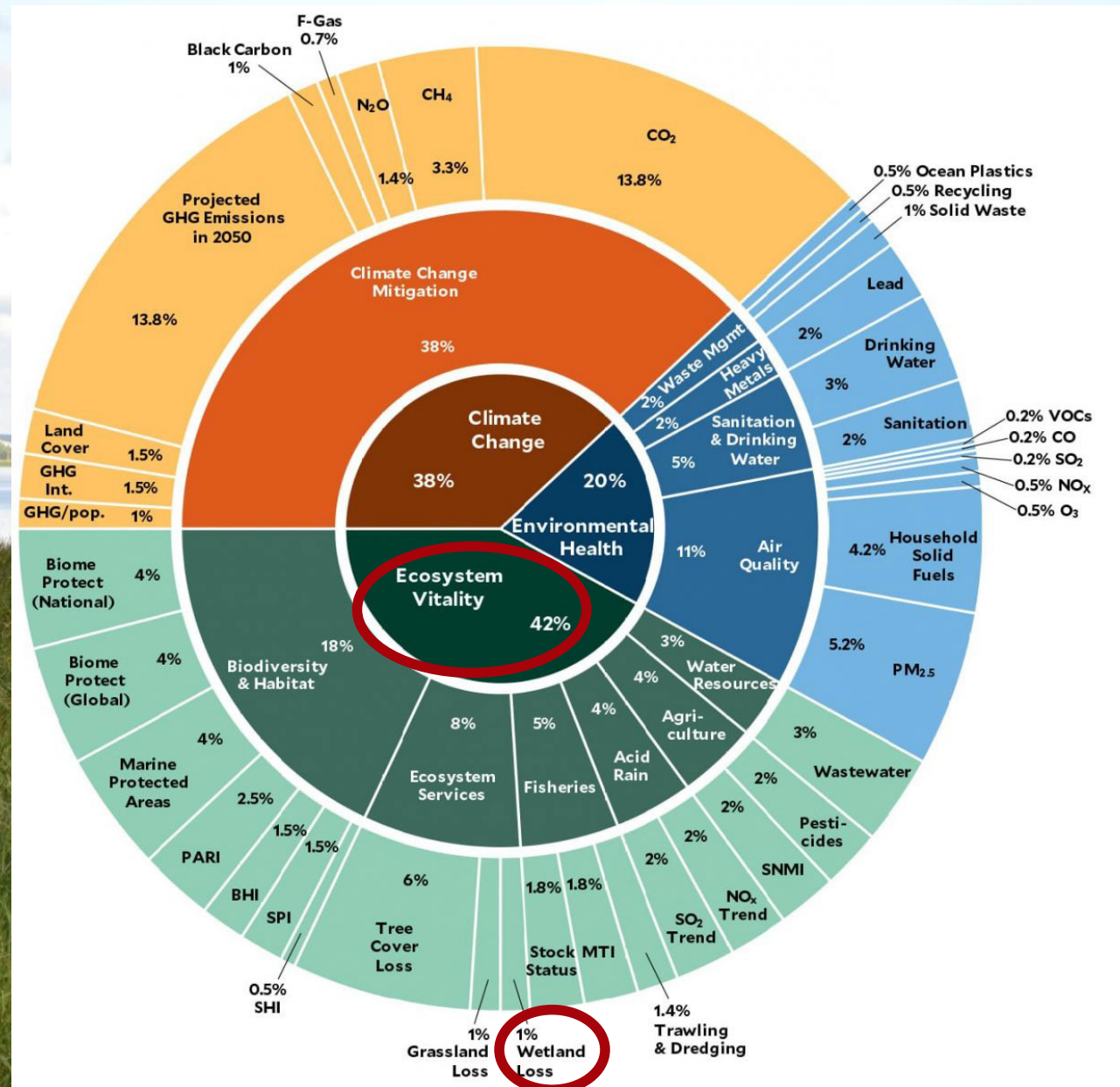
**COLA
KKU**

Restoring Thailand's Kaeng Lawa Wetlands: The Role of Inverse Cost-Benefit and Tolerable Windows Analysis

Bruce Gilley, Portland State University

College of Local Administration, Khon Kaen University
May 2, 2024.

2022 Environmental Performance Index Weightings





Kaeng Lawa

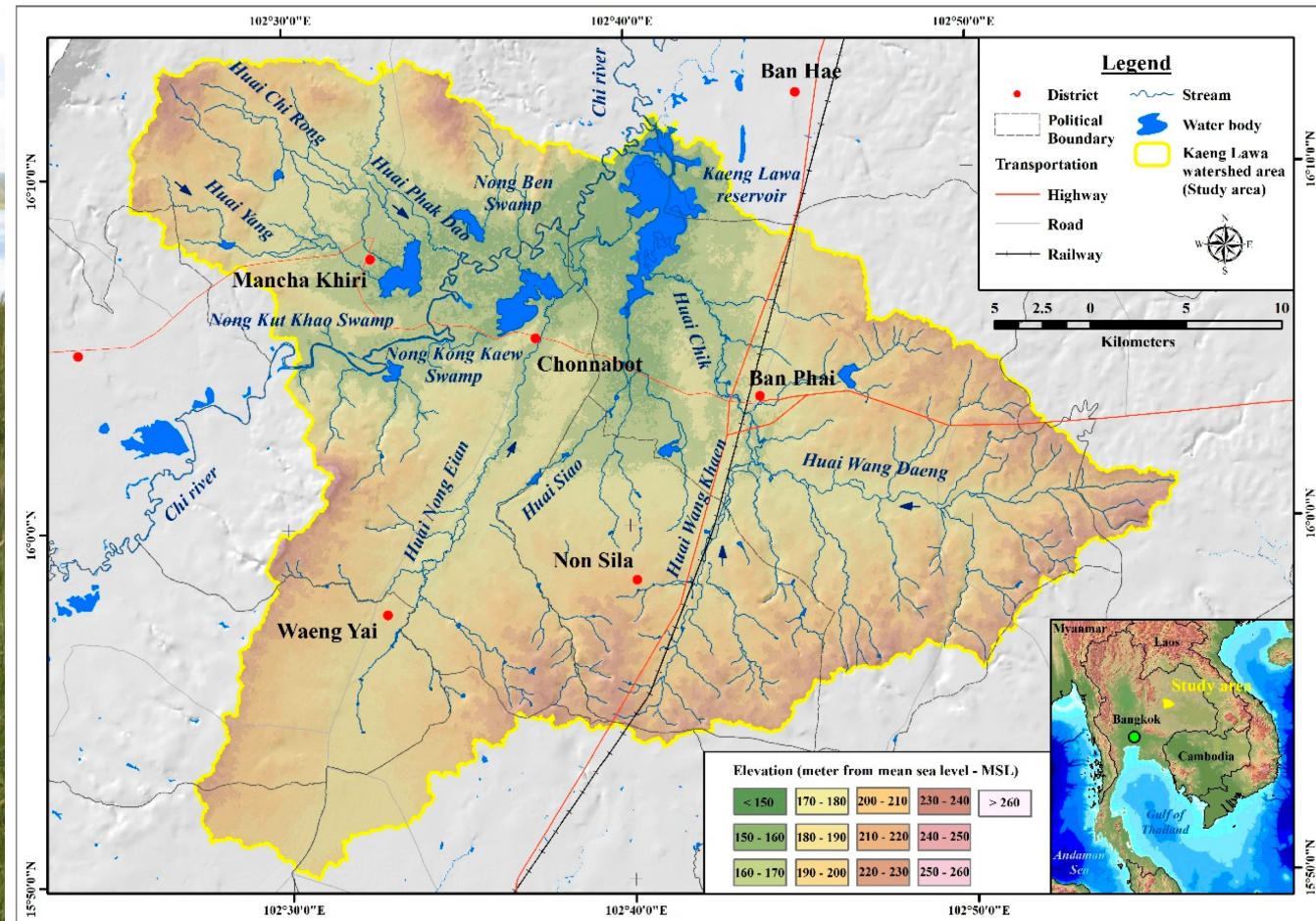
แกงละว้า

Kaeng Lawa National Wetland

Total catchment area: 94,620 ha

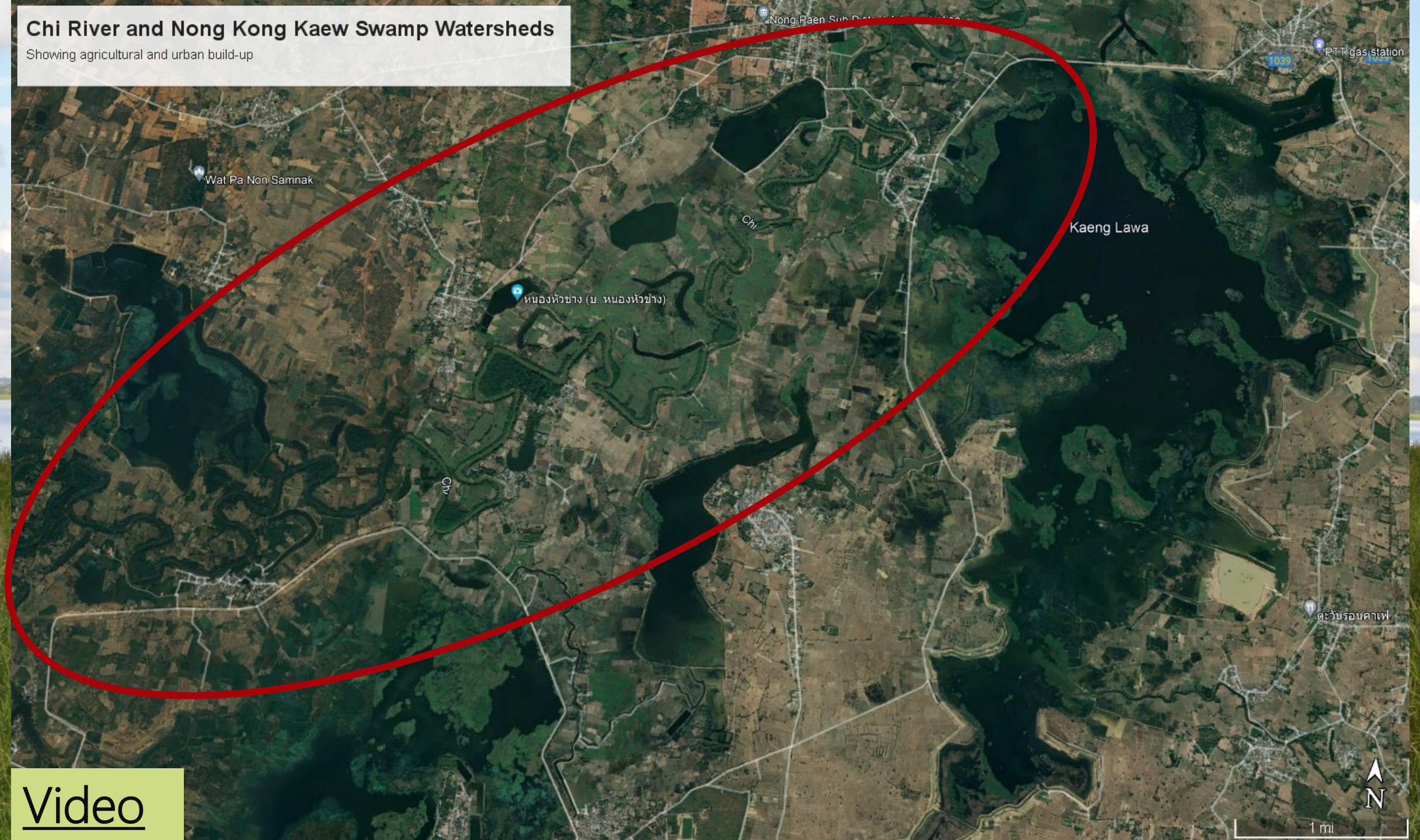
Total wetland eco-system: 5,000 ha

Current wetland boundaries: 1,120 ha

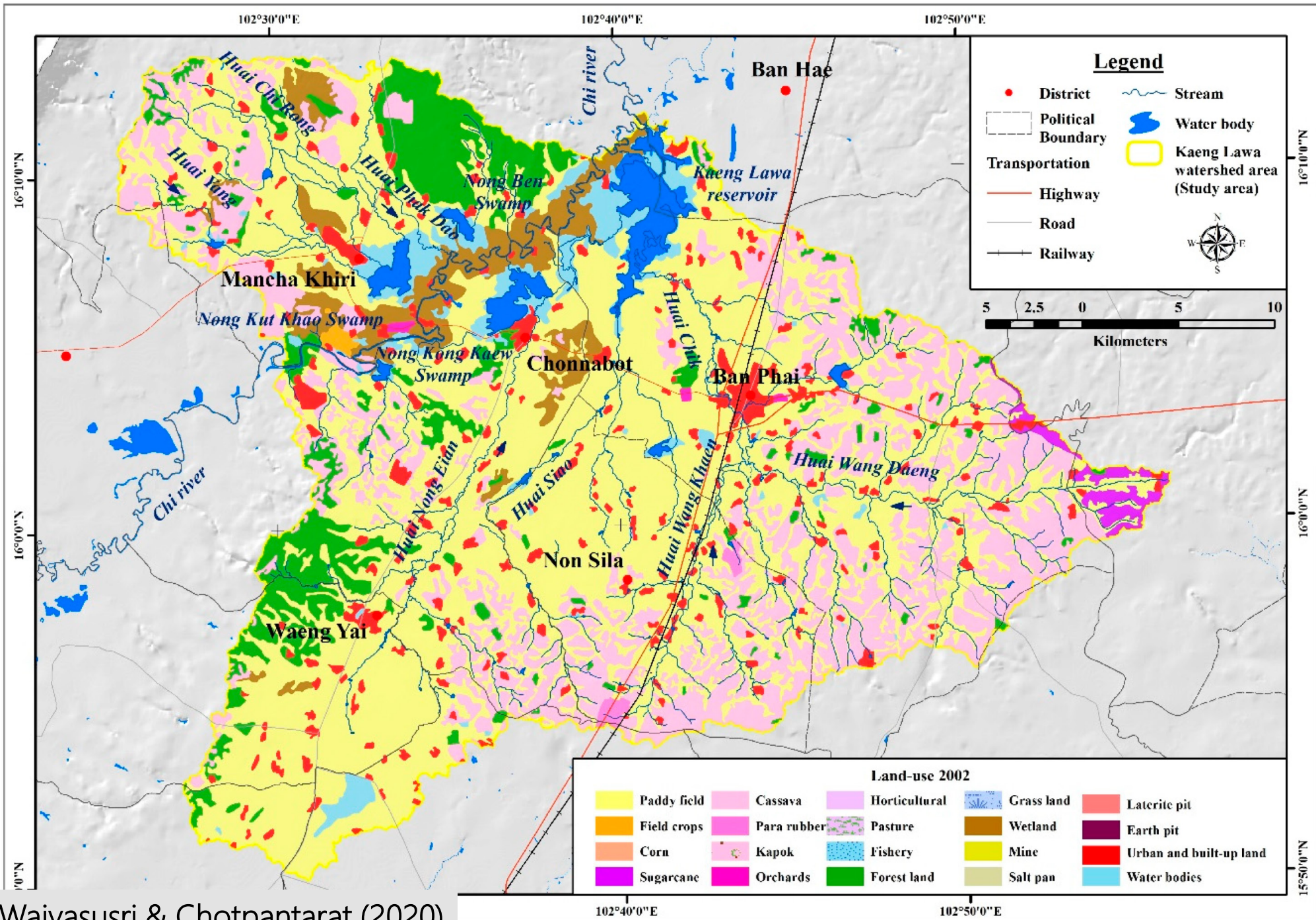


Chi River and Nong Kong Kaew Swamp Watersheds

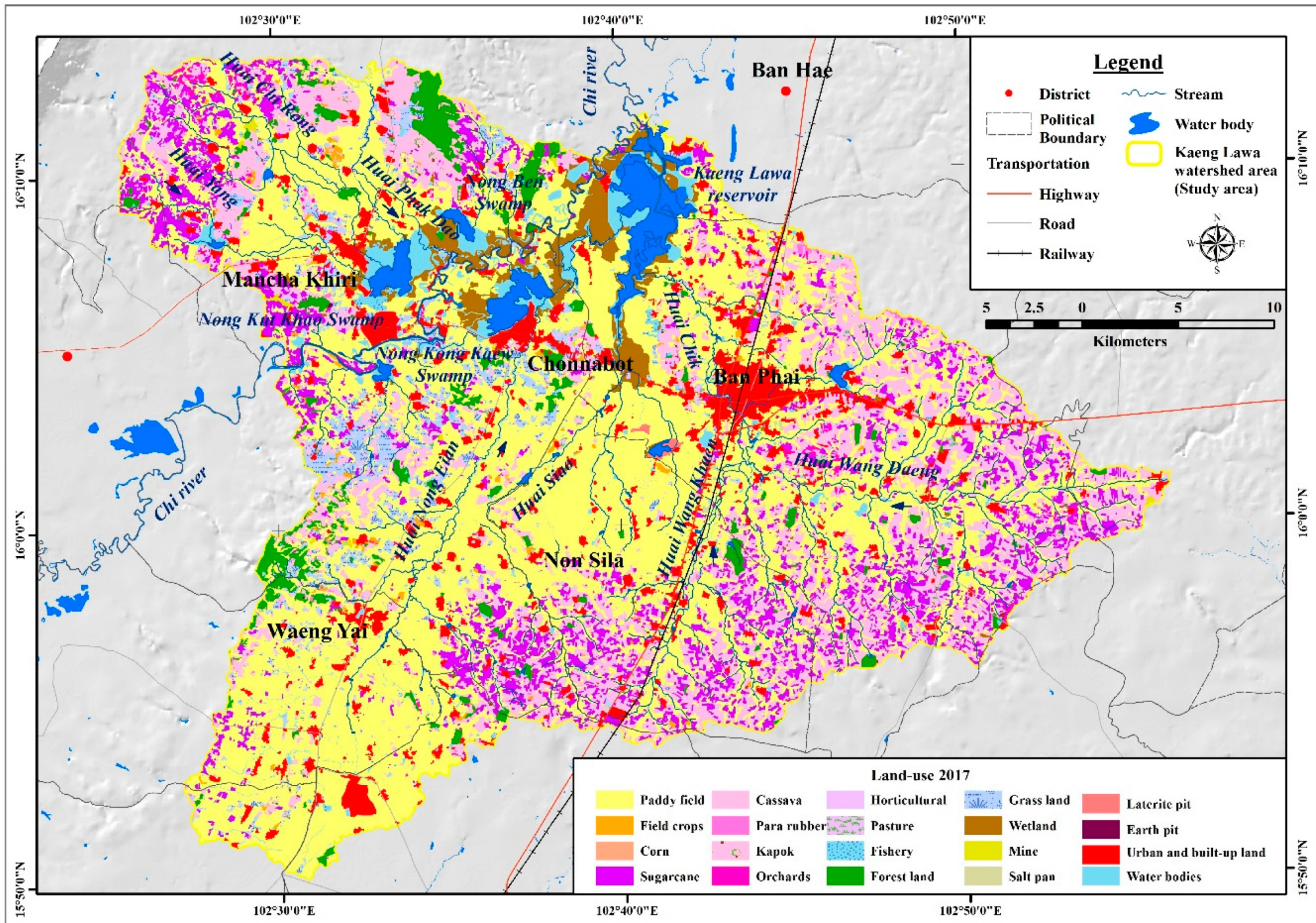
Showing agricultural and urban build-up



Video



Waiyasusri & Chotpantararat (2020)

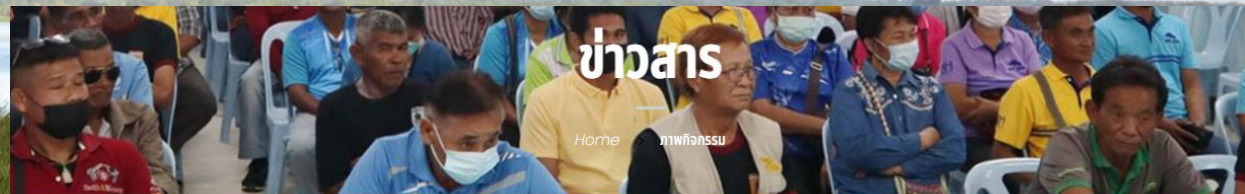


Monkey Creek dredging project

โครงการขุดลอกแก้มลิงแก่งละว้า



"Without an effective development and management plan, these activities may disturb the wetland's ecosystems and biological components, especially bird species...The increasing number of subsistence and small-scale fishers using the wetland, as well as illegal fishing and use of destructive fishing gears, are leading to over-fishing and depletion of fish populations. There are also increasing numbers of people collecting other wetland products, such as typha and lotus." (ICEM, 2013)



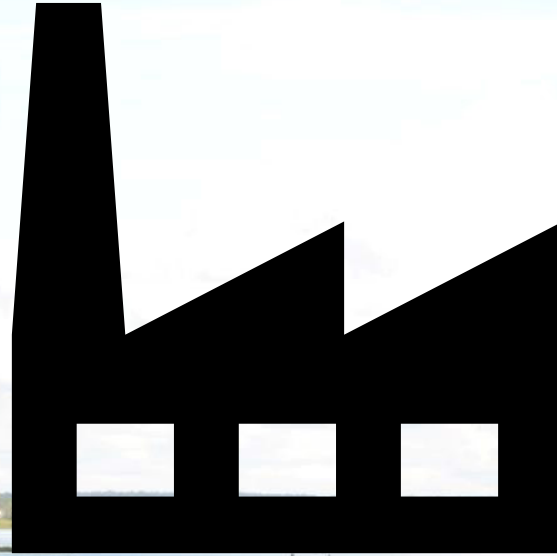
ภาพกิจกรรม

25 ม.ค. 2567: ส่งเสริมการท่องเที่ยว และของดีแก่งละว้าเพื่อขับเคลื่อนให้ชุมชนรอบแก่งละว้า



Isaan Bio-Economic Zone

640 ha





Methods

Costs

Benefits

Development
opportunity costs

Eco-system
maintenance costs

Direct and indirect
economic benefits

Social/cultural
benefits

Environmental
services



Costs

Benefits

Development opportunity costs

Eco-system maintenance costs

Direct and indirect economic benefits

Social/cultural benefits

Environmental services

Water provision and quality

Water flows and release, flood control

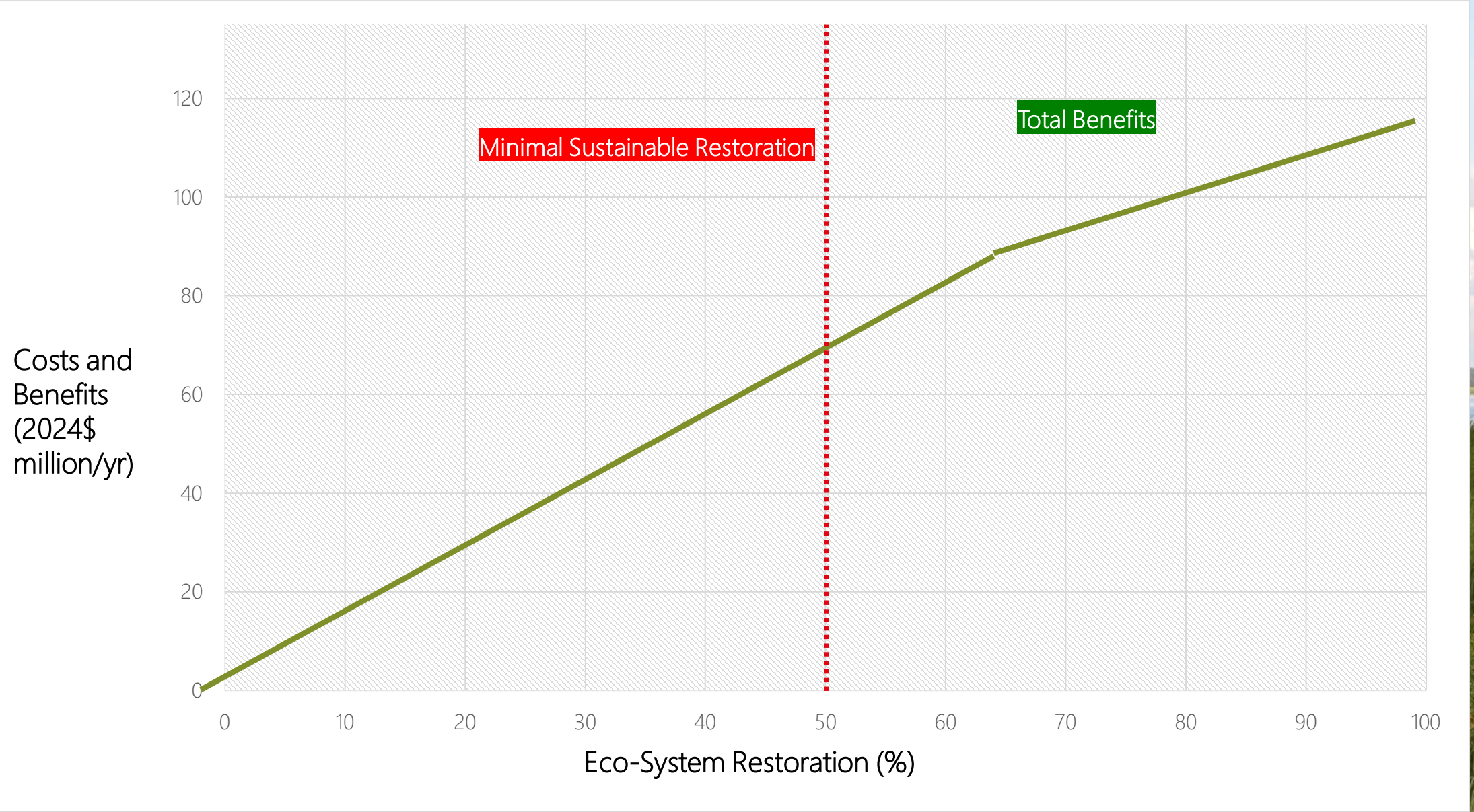
Biodiversity, pollination

Soil nutrients, protection

Climate regulation and carbon sink



Restoration as Benefit/Cost Ratio Maximization



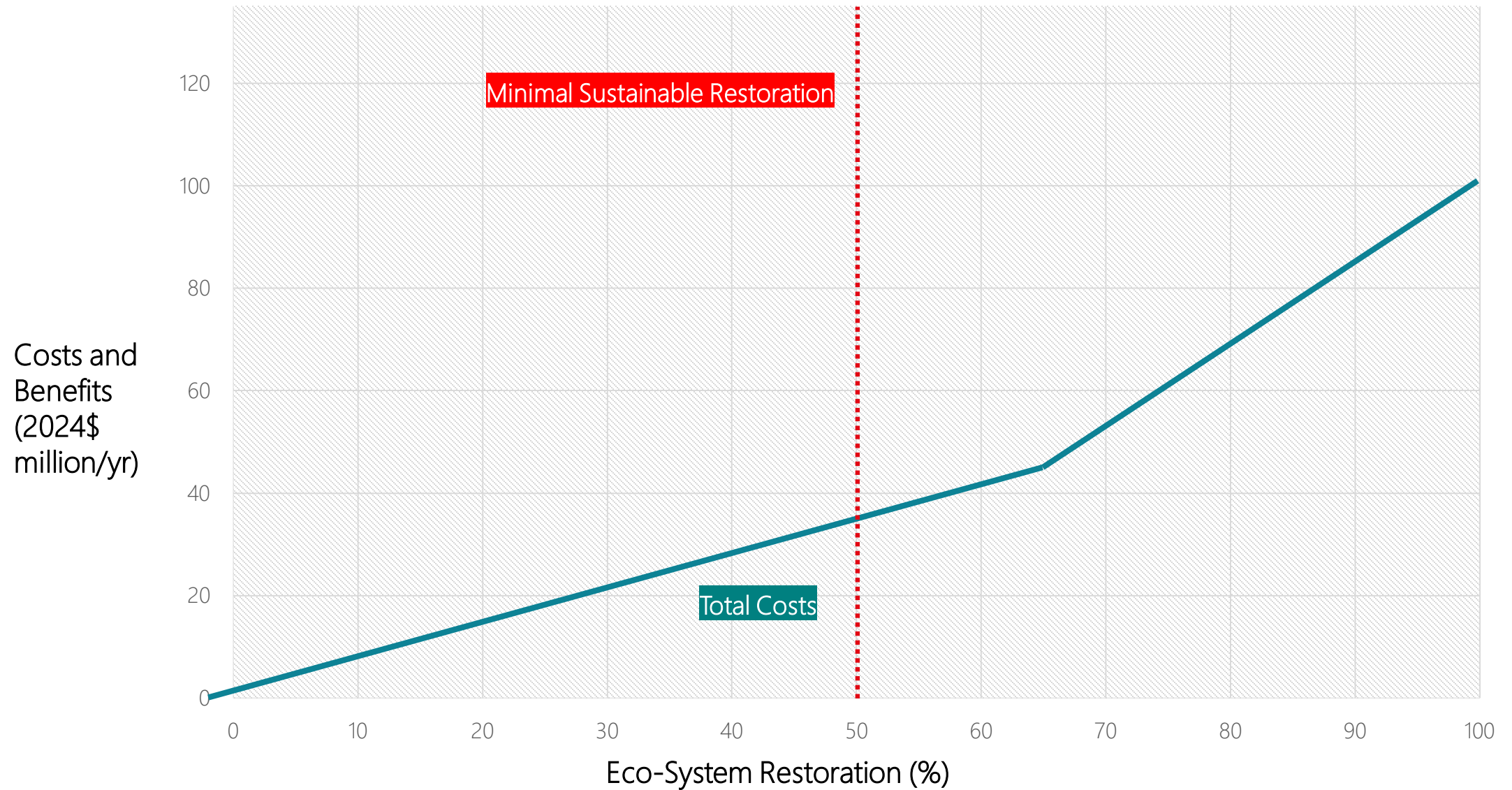
Costs and Benefits (2024\$ million/yr)

Eco-System Restoration (%)

Minimal Sustainable Restoration

Total Benefits

Restoration as Benefit/Cost Ratio Maximization

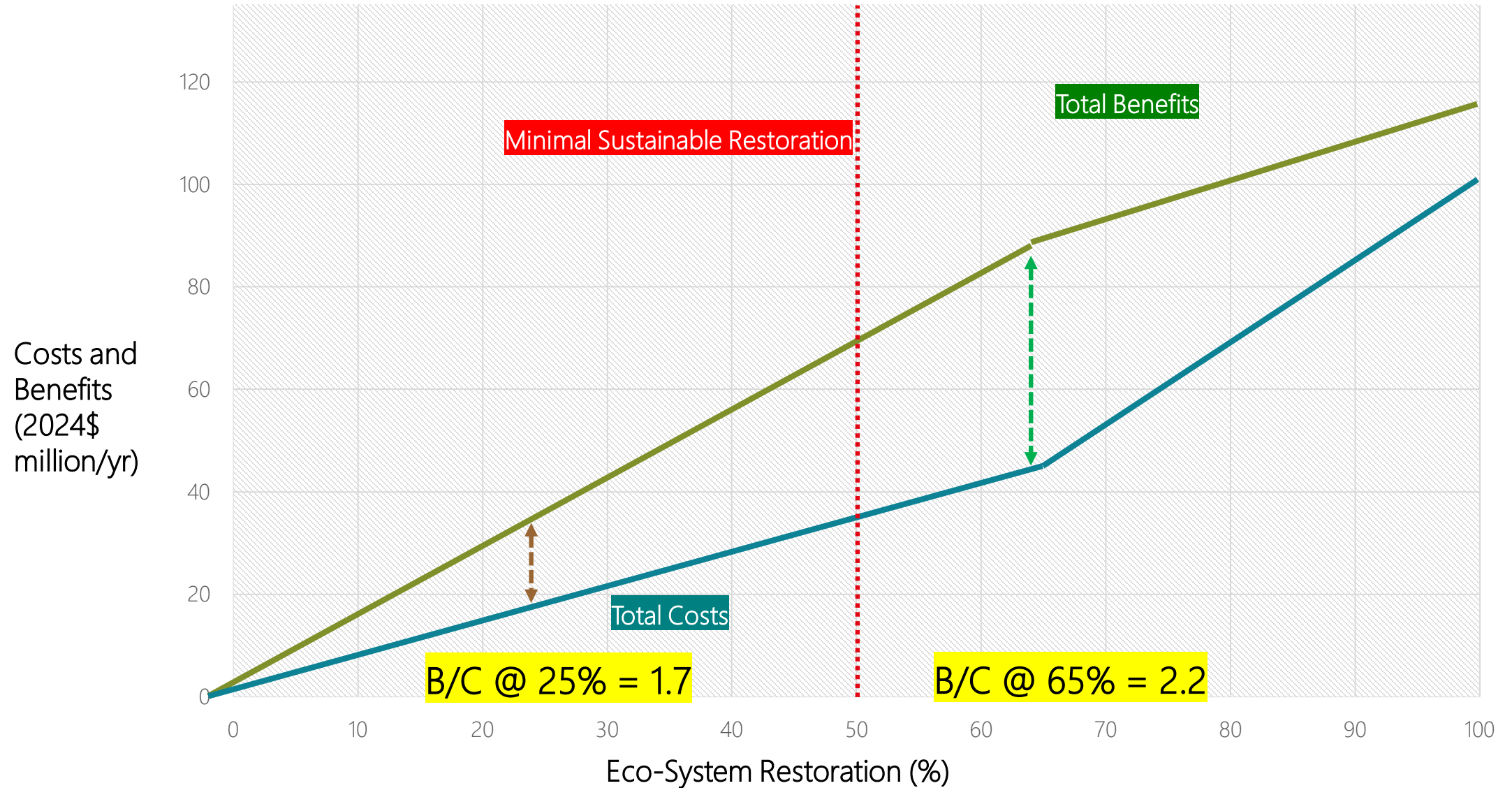


Costs and Benefits
(2024\$ million/yr)

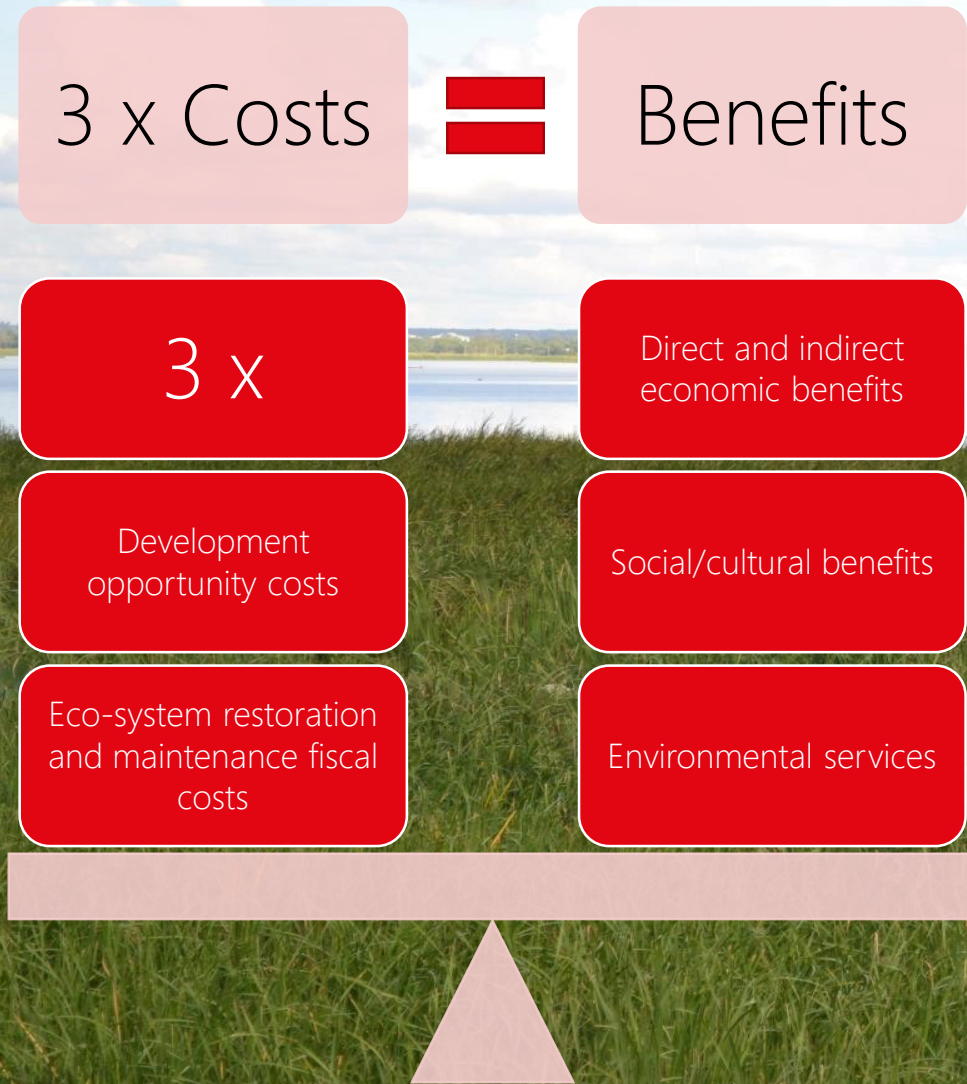
Total Costs

Minimal Sustainable Restoration

Restoration as Benefit/Cost Ratio Maximization



Inverse CBA When Benefits are Uncertain



Benefit/Cost Ratio = Total Benefits/ Total Costs

If BCR=3

then Implied Benefits (IB) = 3 (Total Costs)

Tolerable Windows





Wetland Benefit Estimates

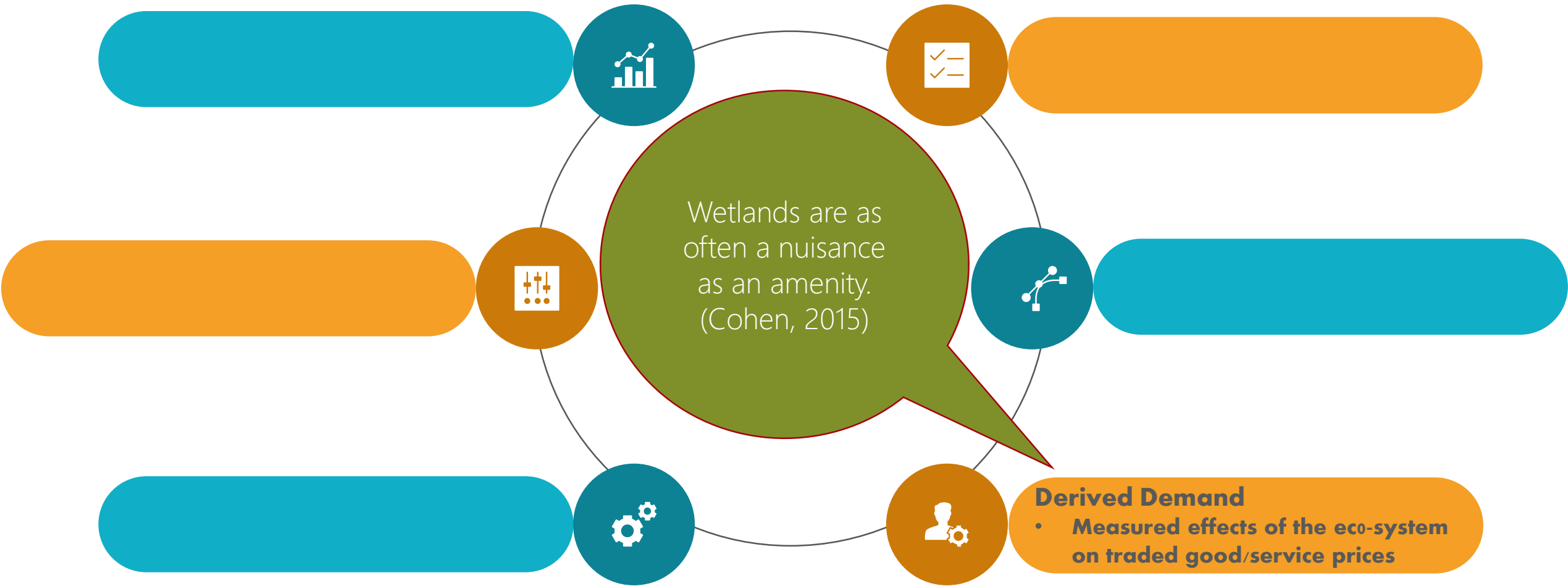
Measuring Benefits



Measuring Benefits



Measuring Benefits



Measuring Benefits



Measuring Benefits

Research Transfer

- Use existing studies from similar eco-systems, adjusting accordingly



Natural Capital Accounting

- Analogous to accounting for a firm's capital assets and cash flows



Cost of Replication/Restoration

- Estimate the cost of replicating/restoring the eco-system services



Natural Capital Accounting



GEF/UNDP Natural Capital Accounting Project for Policy Decision-Making for Sustainable Development

- Integration of natural capital accounting in public/private sector policy and decision-making
- Pilot project in Krabi Province, 2023-2027
- National framework for natural capital accounting established in 2027

Costs of Replication

- Replication is very cheap in countries with plentiful land
- \$500 to \$20,000 per hectare (2024\$) in U.S.
- No estimates for Thailand

Measuring Benefits

Research Transfer

- Use existing studies from similar eco-systems, adjusting accordingly



Research Transfer

Study Site	Total Benefits (\$2024)	Environment Benefits (\$2024)	Reference
Global alluvial marshes and swamps	\$38,400 ha/yr	\$23,000 ha/yr	Davidson et. al. (2019)
168 global inland wetlands	\$16,800 ha/yr	\$10,000 ha/yr	Russi et. al. (2013)
35 coastal China wetlands	\$26,000 to \$45,000 ha/yr	\$15,600 to \$21,000 ha/yr	Li et. al. (2020)
Merbil wetland, India	\$62,000 ha/yr	\$37,000 ha/yr	Lahon et. al (2023)
SUMMARY	\$27,000 ha/yr est. (Range of \$16,800 to \$62,000)	\$17,000 ha/yr est. (Range of \$10,000 to \$37,000)	



Application

Costs of Kaeng Lawa



Inverse CBA and Tolerable Windows

Implied Benefits = 10 x Costs (Bias the results in favor of the status quo)

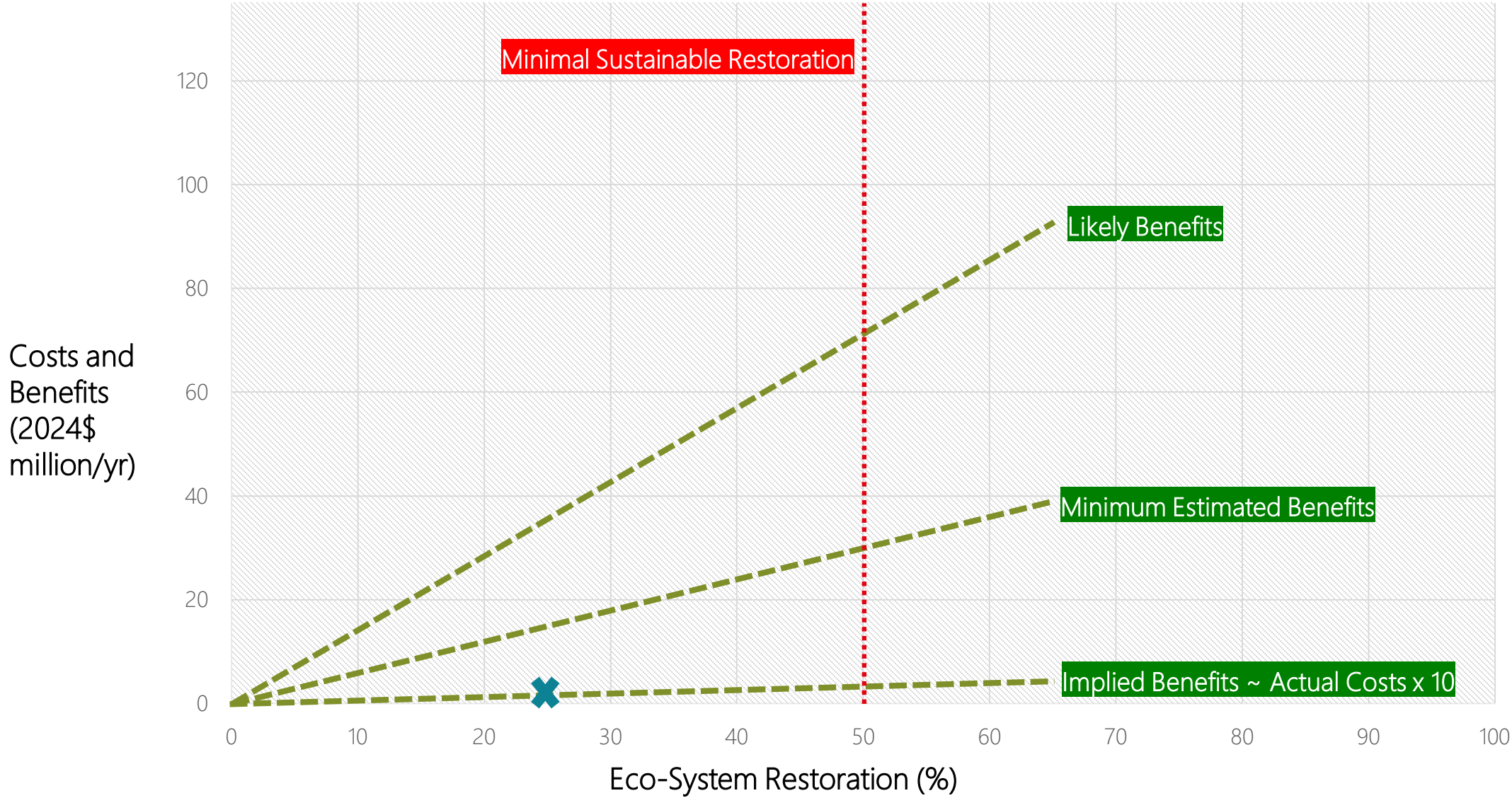
Current Costs for Kaeng Lawa = \$246/ha/year

Then Implied Benefits = 10 x Total Costs = \$2,460/ha/year

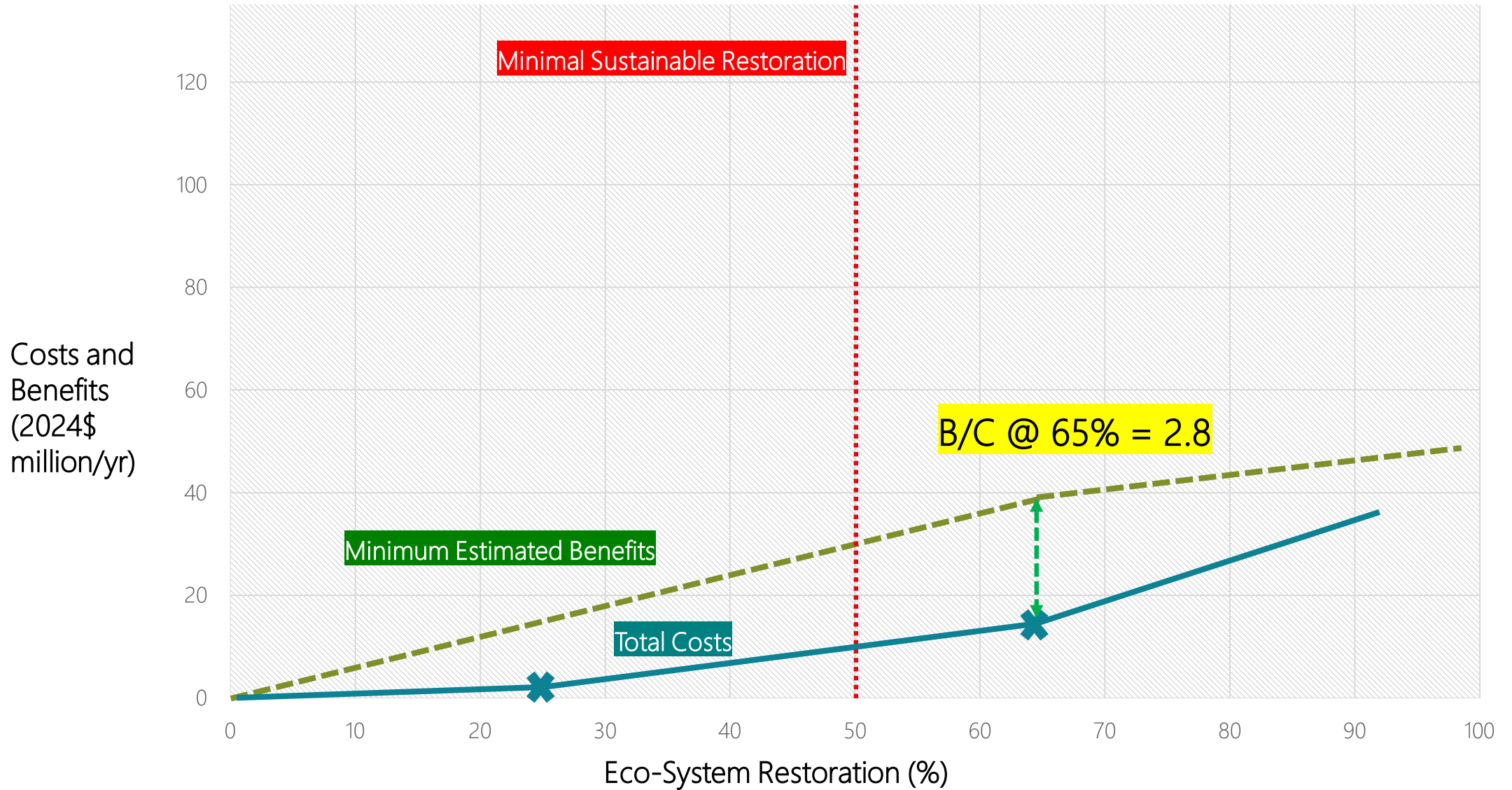
But the minimum value of TB estimates is \$16,800/ha/year

So we are badly underinvested (outside the tolerable window)

The Underinvestment Trap



Increased Investment x 50 for Spending Effectiveness and Efficiency





Action

Policy Tools

Monitoring
Public campaigns
Benchmarking

Land regulation
Ramsar listing
Harvesting laws



Governance structures
Local conservation
corps
Market-based tools
Investment offset trusts

Green budgeting
Private investment
Set aside payments for
reclamation



ก่อน. ขอเชิญส่งข้อเสนอโครงการเกี่ยวกับพื้นที่ชุ่มน้ำ เพื่อรับทุนสนับสนุนจาก “กองทุนพื้นที่ชุ่มน้ำนากาโอ: (Nagao Wetland Fund)” มูลค่าทุนสนับสนุนไม่เกิน **30,000 USD**

- ▶ ให้การสนับสนุน ปีละ 1 ทุนต่อ 1 ประเทศ
- ▶ ผู้สมัครสามารถกรอกข้อมูลเพื่อสมัครออนไลน์ได้ด้วยตนเอง และสามารถอ่านรายละเอียดเพิ่มเติมได้จาก QR code
- ▶ จากนั้นส่งเอกสารตามเงื่อนไขที่ระบุถึงกรมทรัพยากรน้ำ **กำหนดส่ง ภายในวันที่ 30 เมษายน 2567 นี้เท่านั้น**

**** โปรดอ่านรายละเอียดและเงื่อนไขโดยละเอียดก่อนสมัคร ****

ติดต่อสอบถาม : ส่วนอนุรักษ์พื้นที่ชุ่มน้ำ กองอนุรักษ์ทรัพยากรน้ำ
คุณปานจิตรา โทร. 0 2271 6000 ต่อ 6735 Email : ramsamp@dwr.mail.go.th

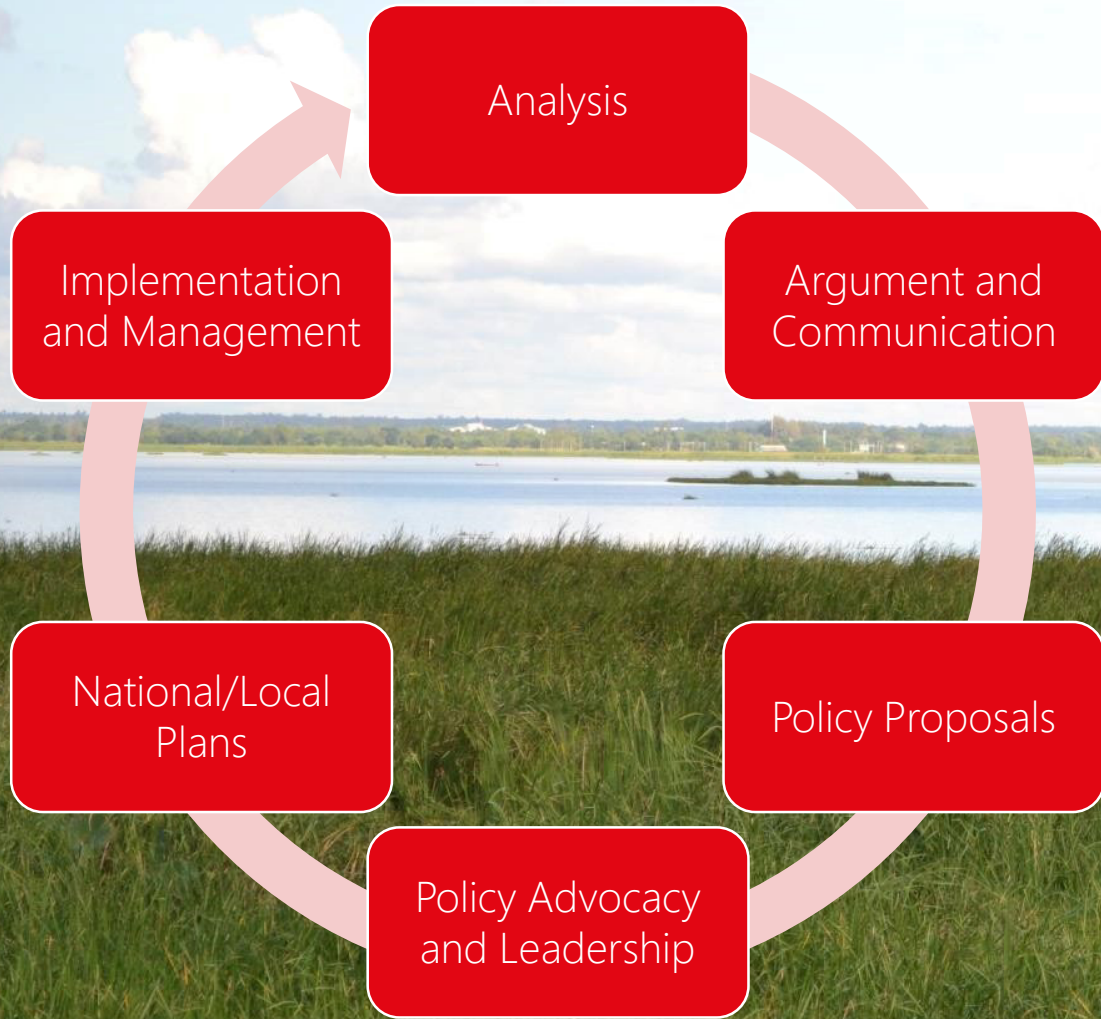

ขอสงวนสิทธิ์ในข้อเสนอ


สำหรับรายละเอียดเพิ่มเติม


WEBSITE FACEBOOK

กองอนุรักษ์ทรัพยากรน้ำ กรมทรัพยากรน้ำ
โทร. 0 2271 6000 ต่อ 6735

Beyond Analysis





UN Wetlands Conventions



Thailand, Ministry of Natural Resources and Environment, Department of Water Resources



Khon Kaen PAO, Office of Natural Resources and Environment



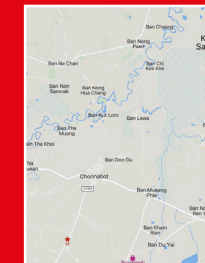
COLA/KKU



Ban Phai TAO



Muang Pia TAO



Khok Samran and other TAOs

Thank You!



References

- Ampai, Thanaphon and Phongsak Suthinon, "Analysis of Thailand's budget regarding water investment under the national strategy. Case study for fiscal year 2023," *Proceedings Of The 28th Thai National Civil Engineering Conference 2023: Civil Engineering Challenges After The Pandemic* (2023).
- Blackwell, Martin and Emma Pilgrim, "Ecosystem Services Delivered By Small-Scale Wetlands," *Hydrological Sciences* (2011)
- Cohen, Jeffrey et. al., "Are Homes Near Water Bodies and Wetlands Worth More or Less? An Analysis of Housing Prices in One Connecticut Town," *Growth and Change* (2015).
- Davidson, Nick et. al., "Worth of Wetlands: Revised Global Monetary Values of Coastal and Inland Wetland Ecosystem Services," *Marine and Freshwater Research* (2019)
- Hansen, LerRoy et. al., *Targeting Investments To Cost Effectively Restore and Protect Wetland Ecosystems: Some Economic Insights*, United States Department of Agriculture Economic Research Service (2015)
- International Centre for Environmental Management (ICEM), *Case Study: Kaeng Lawa Wetlands, Basin-wide Climate Change Impact and Vulnerability Assessment for Wetlands in the Lower Mekong Basin for Adaptation Planning* (2013).
- Koko, Irene et. el., "Valuing Ecosystem Services: Stakeholders' Perceptions and Monetary Values of Ecosystem Services in the Kilombero Wetland Of Tanzania," *Ecosystems and People* (2020).
- Lahon, Durlov et. al., "Assessment of Ecosystem Service Value in Response to LULC Changes Using Geospatial Techniques: A Case Study in the Merbil Wetland of the Brahmaputra Valley, Assam, India," *ISPRS International Journal of Geo-Information* (2023).
- Li, Xiaowei et. al., "Valuation of Wetland Ecosystem Services in National Nature Reserves in China's Coastal Zones," *Sustainability* (2020).
- Millennium Ecosystem Assessment (MEA), *Ecosystems and Human Well-being: Wetlands and Water Synthesis* (2005).
- Russi, Daniela et. al., *The Economics of Ecosystems and Biodiversity for Water and Wetlands* (2013).
- Sirilamduan, Chatrudee, *Wetland Valuation and Sustainable Wetland Resource Management Practices of Swa March Wetlands*, Faculty of Administration, Ubon Ratchathani University (2007).
- Turner, R. Kerry et. al., *Valuing Ecosystem Services: The Case of Multi-Functional Wetlands* (2008)
- Waiyasusri, Katawut and Srilert Chotpantarat, "Watershed Prioritization of Kaeng Lawa Sub-Watershed, Khon Kaen Province, Using the Morphometric and Land-Use Analysis: A Case Study of Heavy Flooding Caused by Tropical Storm Podul," *Water* (2020).