Highlights from the 2026 Edition of Thailand Climate Finance Tracker

Introducing Maladaptation

July 2026

This brief is produced by Climate Finance Network Thailand (CFNT) with technical inputs from Pakkasem Tongchai, International Union for Conservation of Nature (IUCN)

Abbreviations and Terms

ADB	Asian Development Bank
AIIB	Asian Infrastructure Investment Bank
CFNT	Climate Finance Network Thailand
DCCE	Department of Climate Change and Environment
DFI	Development Financial Institution
DMCR	Department of Marine and Coastal Resources
DNP	Department of National Parks, Wildlife and Plant Conservation
GCF	Green Climate Fund
IBRD	International Bank for Reconstruction and Development
IUCN	The International Union for Conservation of Nature
MDB	Multilateral Development Bank
MNRE	Ministry of Natural Resources and Environment
MOAC	Ministry of Agriculture and Cooperatives
MRV	Monitoring, Reporting and Verification
MSDHS	Ministry of Social Development and Human Security
NAP	National Adaptation Plan
NDC	Nationally Determined Contribution
SFI	Specialized Financial Institution
SME	Small and Medium-sized Enterprise
THB	Thai Baht
Tracker	Thailand Climate Finance Tracker developed by CFNT
UNICEF	United Nations International Children's Emergency Fund
UNECE	United Nations Economic Commission for Europe
WB	World Bank

About Us

Climate Finance Network Thailand

Climate Finance Network Thailand (CFNT) is a think tank and a network of like-minded individuals headquartered in Bangkok, working to accelerate the flow of finance toward climate mitigation and adaptation in Thailand. CFNT conducts research, builds tools and databases such as the Climate Finance Tracker, and advances evidence-based policy recommendations to align Thailand's financial system with the country's net-zero and climate-resilience goals.

Website: climatefinancethai.com Email: info@climatefinancethai.com

Copyright

Cover Photos

Contents

Executive Summary

The 2026 edition of the Thailand Climate Finance Tracker, with climate adaptation data collected in collaboration with the Puey Ungphakorn Institute for Economic Research (PIER), records cumulative adaptation investment of THB 279,540 million (approximately USD 8.4 billion), roughly double the previous 2025 edition, across 1,656 projects. The data shows a significant increase in adaptation finance, yet highlights a critical reliance on rigid grey infrastructure that risks systemic maladaptation. This highlights brief is produced by Climate Finance Network Thailand (CFNT) with technical inputs from Pakkasem Tongchai, International Union for Conservation of Nature (IUCN).

- **Funding sources are more diversified.** Multilateral development bank lending arrives at scale through the THB 37.5 billion Chao Phraya Flood Management Plan 2 project, corporate capital (THB 2.2 billion) and impact investors make their first appearance investing in sustainable agriculture and forest management and restoration. The central government's share of flow declined from 96.8% to 82.57%.

- **Water infrastructure dominates.** Water infrastructure absorbs 73.6% of new (May 2025 through May 2026) flows, share unchanged from the previous edition. The five largest projects, all grey water infrastructure, account for roughly 65% of the tracked climate adaptation finance. Health receives just THB 107 million, or 0.07% of new value, despite Thailand's exposure to heat and vector-borne diseases. Financing for the vulnerable groups, named in a single sentence in Thailand's NDC 3.0, is all but absent precisely as the country becomes a super-aged society.

- **Examples of projects worth THB 56.16 billion, 20.1% of cumulative investment, display maladaptation characteristics.** Several large water infrastructure commitments exhibit maladaptation-prone features such as embedded emissions, downstream risk transfer, lock-in, and the false sense of security that structural protection creates. The July 2025 flooding of Sri Nakhon district by the Yom-Nan diversion shows that these risks are already materializing, and because they are foreseeable, their appropriateness and effectiveness should be assessed before capital is committed rather than discovered after it is spent.

- **Four actions can redirect maladaptation-prone financing before concentration hardens into lock-in.** This brief recommends applying watershed-level cumulative-impact assessment and a structured maladaptation screen to all large-scale commitments before disbursement; rebalancing toward green-grey solutions and soft infrastructure of adaptation; and creating dedicated financing channels for neglected sectors and vulnerable groups anchored in the NAP and NDC 3.0.

1. Introduction

In 2025, Climate Finance Network Thailand (CFNT) launched Thailand Climate Finance Tracker ("Tracker") as the country's first systematic effort to trace climate finance flows directed towards mitigation and adaptation activities. Covering the period from 2018 to May 2025, the dataset offers an evidence base for assessing the scale and composition of climate-related committed investment in Thailand from publicly available sources and is updated by CFNT on an annual basis (see methodology and highlights of 2025 edition at our website: https://climatefinancethai.com/tracker/adaptation/ and data limitation in Appendix A). The climate adaptation data collection is undertaken jointly by CFNT and PIER.

This brief presents highlights of climate adaptation finance from the 2026 edition of the Tracker, covering the period from 2018 to May 2026. It examines the progress of adaptation investment in Thailand over the coverage period, highlighting the sources of funds, sectors, and instruments that have attracted the most significant capital commitments. In addition, this edition marks the first time that we attempt to collect information not in the public domain: we received 5 responses from the questionnaire we distributed to impact investors and non-governmental organizations to gather information that is not publicly disclosed.

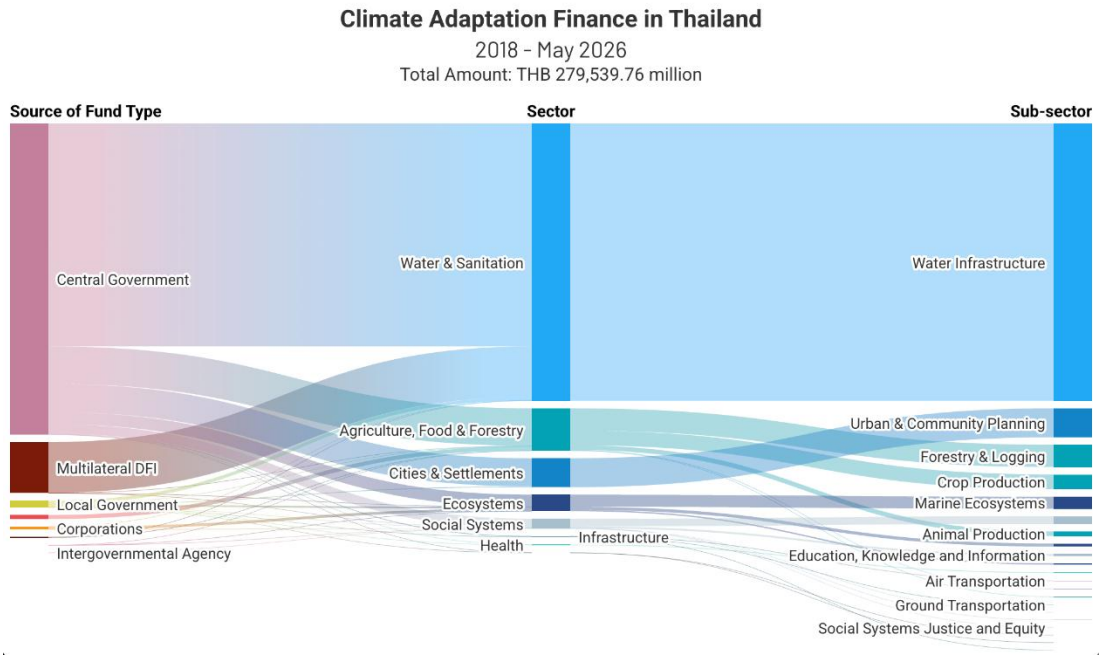
2. State of Climate Adaptation Finance Landscape in Thailand in 2026

Climate finance refers to funding from public, private, or alternative sources, whether local, national, or international, mobilized to support mitigation and adaptation actions (UNFCCC, n.d.). It flows through diverse channels and instruments, from grants and green bonds to equity, guarantees, and concessional loans (UNDP, 2023). Drawing on the OECD-DAC Rio Markers Handbook, the Joint MDB approach, the Climate Bonds Initiative Taxonomy, the EU Taxonomy and the Tailwind Taxonomy, the Tracker defines climate change adaptation as any activity that aims **to reduce the vulnerability of human or natural systems to climate impacts by maintaining or increasing adaptive capacity and resilience.** It must set out its climate vulnerability context through evidence-based analysis, state an explicit intent to address that vulnerability, and link its activities directly to that context.

Overall, adaptation finance has doubled in the 2026 edition of the Tracker, but a third of the rise is backfilled to align with the scope of climate mitigation finance tracker (i.e. shifting base year from 2020 to 2018) while the new additions (May 2025 – May 2026) contributes approximately THB 99 billion. The 2025 edition which covers flows between 2020 – 2024 stands at THB 135,657 million across 548 projects, and the 2026 edition adds THB 143,883 million across 1,108 projects, taking the tracked adaptation cumulative investment to THB 279,540 million (approximately USD 8.4 billion at 33.15 THB/USD) (see Figure 1). Part of the growth reflects improved coverage as 770 projects that were added to the dataset were launched in 2018 and 2019, worth THB 47.92 billion. The more encouraging part is genuinely new capital. Projects committed from 2025 to 2027 account for THB 98.8 billion

(35% of cumulative investment) across 280 entries, evidence that adaptation is beginning to attract fresh commitments as time goes by.

Figure 1 Climate Adaptation Finance in Thailand - 2026 Edition



Source: CFNT (2026). Thailand Climate Finance Tracker 2026 Edition

This year, adaptation funding from multilateral development financial institutions and corporations show up in the Tracker for the first time while the sectoral mix remains concentrated in water infrastructure.

Public capital supplies nearly all of Thailand's adaptation finance. The public sector accounts for 99.2% of total tracked adaptation flows, led by government at THB 235.7 billion (84.3% of cumulative investment) and multilateral development finance institutions at THB 37.8 billion (13.5%). The private sector accounts for the remaining 0.8%, and this edition marks the first appearance of corporate capital in the adaptation series, albeit modest at THB 2.18 billion. Domestic sources remain dominant at 85.4% of cumulative flows, though down from 96.8% in the 2025 edition, reflecting the arrival of multilateral funding at scale.

Water absorbs three-quarters of adaptation finance, while health receives less than 1%. In the 2026 edition, water infrastructure accounts for 73.6% of the additions (THB 105,483 million), unchanged from the 2025 edition and matching its share of the cumulative stock (THB 205.8 billion). Health, by contrast, stands out as the sector most left behind, attracting just THB 107 million, or 0.07% of new value, despite Thailand's exposure to heat and vector-borne diseases such as dengue fever.

Where the Money Goes: Who is Financing, Instruments, and Sectors

2.1 Who is Financing What: The Funding Base Begins to Diversify

In terms of sources of funds, central government remains the backbone, while multilateral development financial institutions arrive at scale for the first time and private capital makes its first appearance. Key highlights are as follows.

The central government remains dominant, but its dominance is easing. Government contributed THB 100.1 billion in the additions, or 69.6% of new value, down from 96% in the 2025 edition (THB 130.7 billion), bringing its share of cumulative investment to 82.6%. The number of projects nearly quintupled from 191 to 892, largely through budget backfill undertaken to align the adaptation series with the mitigation tracker's coverage period. Local government grew modestly, from THB 1.37 billion to THB 3.72 billion.

Multilateral DFI debt arrives at scale, the single largest change from 2025. Multilateral DFI finance rises from THB 384.3 million (0.3% of the 2025 edition) to THB 37.45 billion (26% of the additions), entirely from the Chao Phraya Flood Management Plan 2 project committed to launch in 2027: large-scale financing of IBRD (THB 20.7 billion), World Bank (THB 7.5 billion), ADB (THB 4.8 billion), and AIIB (THB 4.4 billion), financing the Chai Nat-Pasak canal expansion and a new diversion canal. This is the first large-scale multilateral development financial institutions' lending in the Tracker, and it drives the foreign share of flows significantly up from 2.3% to 26.3% of the additions.

Private capital appears for the first time. Two new source categories enter the series: corporations (THB 2.2 billion, 13 projects) and impact investors (THB 22 million, 12 projects). corporate adaptation spending is emerging for their own climate risk management. Hana Microelectronics, Diamond Building Products, and Sri Trang Agro-Industry's investments in water recycling and drought resilience for their plants are early examples of physical-risk-driven corporate adaptation activities, while some public adaptation activities are funded by the private sector as corporate social responsibility (CSR) - for example, PTT Exploration and Production PCL contributed THB 100 million in flood relief for Songkhla, and several private companies fund landslide and flash flood early warning systems.

Unlike mitigation, government leads adaptation finance. Grants account for 85% of cumulative investment (THB 237.64 billion), nearly all (96.67%) from government budgets. They suit public goods such as early warning systems, but their dominance signals the absence of blended-finance instruments and mechanisms that could crowd in non-public capital. Corporate and equity investment appears for the first time, though at token scale at THB 8 billion.

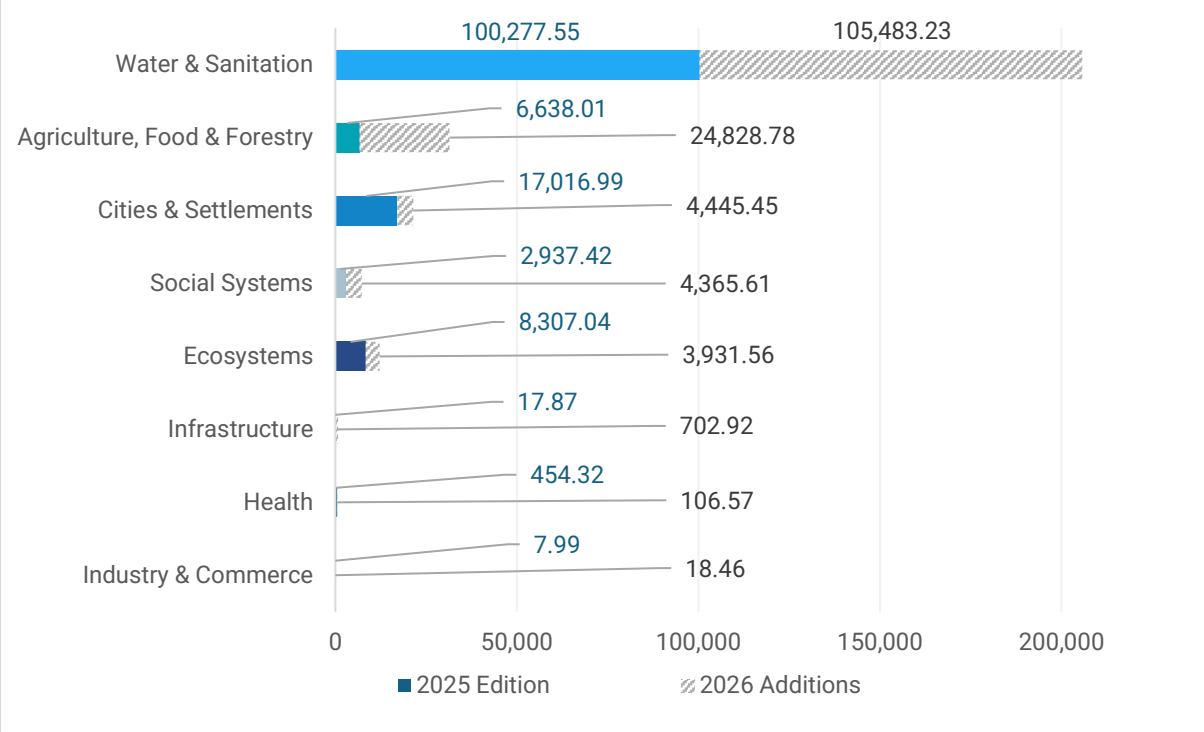
The near absence of catalytic instruments matters more for adaptation than for mitigation. Adaptation investments typically generate returns in the form of avoided losses rather than revenue streams, precisely the circumstance in which blended finance, guarantees, and

insurance-based instruments are designed to bridge the gap between social value and commercial bankability. In Thailand, however, such instruments are virtually absent.

2.2 Sectoral Concentration: Water Dominates, Health Is Left Behind

Similar to climate mitigation finance, climate adaptation finance in Thailand is unevenly distributed across sectors. Figure 2 shows that water and sanitation absorb 74% of cumulative commitments, while agriculture and the cities and settlements sector together account for a further 20%. Health, by contrast, receives only 0.2% of cumulative investment.

Figure 2 Climate Adaptation Finance by Sector



Note: "2025 Edition" refers to the cumulative investment recorded in the 2025 edition of the Thailand Climate Finance Tracker covering data from 2020-2024. "2026 Additions" refers to the new entries collected in the 2026 edition covering data in 2018, 2019, 2025, and 2026.

Source: CFNT (2026). Thailand Climate Finance Tracker 2026 Edition.

Water infrastructure holds three-quarters of adaptation finance. Water accounts for THB 205.76 billion cumulatively (73.61%), anchored in irrigation, flood management projects, and the Chao Phraya flood management package. The concentration shows that Thailand's adaptation strategy is overwhelmingly a flood and drought infrastructure strategy. The top ten adaptation projects together account for roughly THB 51.92 billion, about 40% of cumulative adaptation finance, and every one of them sits in water infrastructure, from the Ministry of Agriculture and Cooperatives flood prevention program (THB 83.52 billion) to the Chao Phraya Flood Management Plan 2 (THB 33.97 billion). Thailand's largest adaptation commitments are therefore hinged on a single theme: managing flood and water risk through grey infrastructure which is an approach that carries maladaptation risk.

Vulnerable sectors such as agriculture and health remain thinly funded. Adaptation finance in agriculture, food, and forestry accounts for THB 31.47 billion cumulatively (11.3%), led by forest management and restoration (THB 16.48 billion) and crop production (THB 10.89 billion), although the 600 projects added in the 2026 edition largely comprise of small crop production grants averaging under THB 10 million each. Health adaptation contributed just THB 107 million in the additions, 0.07% of new value and below even the 2025 edition's modest THB 454 million, despite Thailand's well-documented exposure to heat stress and vector-borne diseases such as dengue fever. Cities and settlements projects that focus on urban flood management also lost ground, falling from THB 17 billion to THB 4.4 billion.

Social protection for climate-vulnerable groups is almost nil. The social systems sector holds THB 7.3 billion cumulatively (2.6%), most of it in disaster risk reduction rather than protection targeted at vulnerable groups. The Ministry of Social Development and Human Security (MSDHS), the agency mandated to protect groups such as children, the elderly, and persons with disabilities, contributes just THB 98 million across four entries, and allocations aimed at these climate-vulnerable groups are nearly absent, with the social systems, justice, and equity sub-sector recording only THB 44 million.

2.3 Key Problems in the Climate Finance Landscape: Vulnerable Groups and Maladaptation

Two problems in the climate adaptation finance landscape deserve closer examination. First, vulnerable groups remain woefully underserved: despite being named in Thailand's NDC 3.0, women, children, persons with disabilities, and the elderly receive almost no tracked finance. Second, the concentration in large grey infrastructure carries the risk of lock-in and, more broadly, maladaptation. The sections below examine each in turn.

2.3.1 Vulnerable groups remain severely underserved

Thailand falls in the lowest child-sensitivity band, Category C (UNICEF, 2022), indicating a national climate strategy that largely overlooks or under-addresses children. Although Thailand's NDC 3.0 explicitly commits to protecting vulnerable groups, naming women, youth, children, and persons with disabilities, the commitment occupies a single sentence, and the Tracker records almost no financing directed to these groups: the social systems, justice, and equity sub-sector holds only THB 44 million, and MSDHS contributes just THB 98 million. This matters because these groups are the most physiologically exposed to impacts from climate change. Excessive heat harms children's health, nutrition, and education, with heat waves linked to lower school attendance, elevated stress, poor sleep, and reduced concentration (UNICEF 2026). The elderly are already more severely affected by climate change due to the risk of cardiovascular disease, respiratory disease, as well as pandemic illnesses and mental disorders (Economics and Environment 2025). The urgency is sharpening when Thailand is becoming a super-aged society, with over 20% of its population projected to be older than 60 years old in 2033 (TDRI 2026). While the most exposed group is growing fastest, the financing to protect it remains near zero.

2.3.2 Maladaptation risks warrant attention

Maladaptation occurs when adaptation initiatives decrease long-term resilience by creating new hazards, displacing risk, or limiting future strategic alternatives. Thailand's adaptation portfolio faces significant exposure to these risks; for instance, the reliance on single-purpose grey infrastructure, exemplified by the Chao Phraya Flood Management Plan 2 (THB 37.45 billion, 18.2% of water and sanitation sector, 13.4% of cumulative investment) and the Bang Ban-Bang Sai Flood Drainage Canal THB 17.90 billion, 8.7% of water and sanitation sector, 6.4% of cumulative investment), risk structural failure under extreme climate events and creates a safe-development paradox, where artificial risk reduction ultimately escalates potential losses. The next section examines maladaptation in more detail, identifies where these maladaptation as risks arise in Thailand's climate adaptation finance, and suggests how they can be mitigated.

3. Recognizing and Avoiding Maladaptation

3.1 What exactly is maladaptation?

Maladaptation refers to actions taken ostensibly to avoid or reduce vulnerability to climate change that instead result in adverse impacts or increased vulnerability for other systems, sectors, or social groups (Schipper, 2020). Maladaptation is not merely failed adaptation, where an intervention falls short of its goal, but a process through which people or systems end up more exposed to climate impacts than before the intervention took place (Schipper, 2020). The definition characterizes maladaptation as a result of an intentional adaptation policy or measure that directly increases vulnerability for targeted or external actors or erodes the preconditions for sustainable development (Juhola et al., 2016).

Juhola et al. (2016) distinguishes three types of maladaptive outcome, according to where the increased vulnerability lands:

- **Rebounding vulnerability:** the intervention increases the vulnerability of the very actors it was meant to protect, for instance where flood defenses encourage settlement in high-risk areas that later prove indefensible.

- **Shifting vulnerability:** the intervention transfers vulnerability to other actors, places, or sectors, such as diversion infrastructure that redirects flood risk onto downstream communities.

- **Eroding sustainable development:** the intervention undermines the ecological, social, or economic preconditions for long-term resilience, for example by degrading ecosystems that provide natural protection or by imposing disproportionate burdens on vulnerable groups.

In practice, an intervention risks becoming maladaptive when it displays one or more of the following characteristics:

- **Risk transfer:** the intervention shifts climate risk onto other communities, places, or future generations rather than reducing it, such as flood defenses that redirect water onto downstream areas.

- **Inequitable outcomes:** the intervention's benefits and burdens fall unevenly, protecting some groups while leaving the most vulnerable worse off.

- **Lock-in:** the intervention commits capital and institutions to rigid infrastructure or pathways that are costly to reverse as climate conditions change.

- **Eroded foundations:** the intervention undermines the ecological, social, or economic preconditions for long-term resilience, for instance by degrading ecosystems that provide natural protection

Successful adaptation, by contrast, is a process of adjustment to actual or expected climate effects that moderates harm or exploits beneficial opportunities, and is generally characterized as equitable, efficient, and legitimate (Schipper, 2020) (Juhola et al., 2016). Transformative adaptation transcends incremental technical interventions by addressing the systemic socio-political and economic drivers of vulnerability, such as power imbalances and gender inequities (Eriksen et al., 2021). As Thailand relies so heavily on large and conventional construction projects (like dams or concrete canals) for flood control, these definitions provide a crucial checklist for evaluating new projects before they are approved for funding.

3.2 Common Forms of Maladaptation

Understanding why well-intentioned adaptation goes wrong requires looking beyond individual project failures to the recurring mechanisms that produce them. The literature suggests that maladaptive outcomes, however varied their contexts, tend to arise through a small number of identifiable pathways. This briefing therefore adopts Bennett and O'Neill's framework of five common forms of maladaptation (Bennet and O'Neill, 2010), which together provide a practical basis for screening the commitments now entering Thailand's adaptation pipeline.

A. Increasing Greenhouse Gas Emissions: This occurs when adaptation measures address a current need but creates a positive feedback loop by increasing emissions, thereby necessitating even more adaptation in the future. The intervention, in effect, accelerates the very warming it was designed to cope with. Familiar examples include the increased use of energy-intensive air conditioning in response to heatwaves, and the construction of desalination plants that consume vast amounts of energy, or rainmaking operations that do not directly benefit agricultural activities.

B. Disproportionately Burdening the Most Vulnerable: Adaptation actions are maladaptive if they meet the needs of one group while increasing the risk for those already most at risk, such as low-income households or minority groups. Rather than address vulnerability, the intervention widens it, deepening the very inequities that make climate impacts unevenly felt in the first place. This pattern appears in infrastructure projects that

raise utility costs, such as water or power tariffs, which fall hardest on poorer households, and in projects built on land significant to indigenous communities.

C. High Opportunity Costs: An approach is maladaptive if its economic, social, or environmental costs are high relative to available alternatives. The harm here is not what the intervention does but what it displaces, absorbing finance that better options, or underfunded sectors, could have put to more productive use. One of notable examples is choosing expensive and large-scale engineering projects like cross basin water transfers when cheaper, more sustainable options, such as rainwater harvesting or wastewater recycling could achieve similar results with fewer negative impacts.

D. Reducing Incentives to Adapt: If an intervention encourages unnecessary dependence on others or penalizes those who took early action, it is considered maladaptive. The damage is behavioral rather than physical: the state ends up crowding out precisely the autonomous adaptation it cannot afford to replace. For example, large government-led infrastructure schemes can transfer responsibility away from individuals, potentially stifling local conservation norms and discouraging households from investing in their own sustainable practices.

E. Path Dependency

Large-scale infrastructural developments often commit institutions and capital to trajectories that are difficult or expensive to change in the future. For instance, committing to expensive engineering responses reduces the portfolio of adaptation options available to future generations, limiting their flexibility to respond to unforeseen climatic or social changes.

3.3 Risks from Maladaptation

Those five characteristics of maladaptation share a common origin. Maladaptation typically results not from malintent but from narrow framing: interventions designed around a single risk, stakeholder, or timeframe harden into rigid outcomes. The consequences for vulnerability run in three directions. Maladaptation entrenches risk by leaving the root causes of a problem in place; it redistributes vulnerability by protecting one group at the expense of another; and it introduces hazards that did not previously exist. Poorly designed adaptation, in short, can leave society and the environment more exposed rather than less (Eriksen et al., 2021).

- **Maladaptation reinforces existing vulnerability.** Maladaptation often strengthens the root causes of vulnerability by flowing through existing power structures. This occurs through "**elite capture**," where well-connected actors convert adaptation funding into political patronage, and "**accumulation by adaptation**," where the wealthy capture the benefits while the marginalized remain excluded (Eriksen et al., 2021).
    - **Elite capture** occurs when influential actors redirect adaptation finance away from the most vulnerable populations during the allocation process. Crucially, this displacement is not always the result of explicit corruption. Often, it is a structural byproduct of project design; when initiatives require participants to

contribute land, labor, or capital as a condition for support, they inadvertently exclude the poorest groups who lack these essential resources.

    - **Accumulation by adaptation** occurs when the design of an intervention disproportionately favors wealthier groups, widening existing socio-economic inequalities. Even when projects reach their intended locations, benefits are often captured by those with higher capital: for instance, protective infrastructure may increase land values while irrigation schemes frequently prioritize large-scale landholders over smallholders. If project fails to account for these distributive effects, it ultimately leaves marginalized groups more exposed than they initially were.

- **Maladaptation redistributes vulnerability.** This type of maladaptation often fails to eliminate risk but displaces it across social and spatial boundaries. Water management interventions demonstrate this clearly: flood defenses protect enclosed areas by diverting excess water elsewhere, disproportionately impacting communities with the least capacity to adapt.

- **Maladaptation introducing new risks and sources of vulnerability.** Unlike the first two channels that reinforce or displace existing vulnerability, the third channel generates entirely new risks. Maladaptation can impose environmental, social, and economic burdens that did not exist prior to the intervention.

3.4 Case Studies of Maladaptation: Insights from the Thailand Climate Adaptation Finance Tracker 2026 Edition

Good intentions are no guarantee of effective adaptation. Evaluated against the five-common-form-of-maladaptation framework established by Barnett and O'Neill (2010), much of Thailand's climate adaptation in water and sanitation exhibits at least one. Table 1 exhibits notable examples of conventional and structural flood-control measures constructed under water infrastructure sub-sector. Most of the initiatives show a tendency to prioritize immediate hazard reduction at the cost of long-term structural resilience. These initiatives account for THB 56.16 billion, representing 27.29% of water and sanitation sector and 20.09% of cumulative investment in climate adaptation. Project details are described below.

Table 1 Example of adaptation initiatives with maladaptation characteristics (n = number of sub-projects under the same project name or project type)

Project	Project Value (THB Million)	Maladaptation Characteristics				
		1. Increasing GHG Emissions	2. Disproportionately Burden	3. High Opportunity Costs	4. Reducing Incentives to Adapt	5. Path Dependency
1. Bang Ban-Bang Sai Flood Drainage Canal	17, 896.73 (n = 7)	●	●	●	●	●
2. Chaophraya Flood Management Plan 2	37,451.68 (n = 4)	●	●	●	●	●
3. Hat Yai City Flood Mitigation	2,217.67 (n = 4)	●	●	●	●	●
4. Nakhon Si Thammarat Flood Mitigation	5,051.65 (n = 7)	●	●	●	●	●
5. Yom – Nan Canal improvement project, Sukhothai province	1,039.96 (n = 3)	●	●	●		
6. Urban Flood Protection System	10,401.82 (n =28)	●	●	●	●	●

Source: Author's own analysis

3.4.1 Structural measure for flood control case studies: Bang Ban – Bang Sai Flood Drainage Canal Project (BBFDC), Chaophraya Flood Management Plan 2, Hat Yai City Flood Mitigation, Nakhon Si Thammarat Flood Mitigation

Thailand's structural flood control portfolio is heavily concentrated in grey infrastructure, especially in Bang Ban – Bang Sai Flood Drainage Canal Project, Chaophraya Flood Management Plan 2, Hat Yai City Flood Mitigation, Nakhon Si Thammarat Flood Mitigation. **The Bang Ban–Bang Sai Flood Drainage Canal (BBFDC) project in Ayutthaya serves as a prominent example of maladaptation**, illustrating the potential for structural flood interventions to exacerbate systemic vulnerability.

Approved by a 2019 cabinet resolution and since extended from a five-year to an eight-year implementation timeline, the project has received consistent annual budget increases. As a core component of the Lower Chao Phraya Flood Mitigation Plan, the BBFDC is designed to enhance drainage efficiency to protect Ayutthaya's industrial and economic zones, while simultaneously aiming to alleviate seasonal water scarcity and support off-season rice cultivation behind its levee systems

From a flood mitigation perspective, this project prioritizes drainage efficiency by diverting river discharge to reduce urban risk. While conceptually straightforward, this approach risks creating several forms of maladaptation. Primarily, the project's design and construction, involving extensive dredging, concrete lining, and heavy machinery for levee construction, are highly carbon intensive. The significant consumption of fossil fuels and raw materials for hard infrastructure construction, such as dredging, concrete lining, road building, flood regulator station construction, and levee heightening, generates substantial greenhouse gas emissions, paradoxically undermining the very climate objectives the project aims to support.

Secondly, the project demonstrates how localized protection can redistribute vulnerability which contributes to maladaptation. Despite warnings from local stakeholders, the BBFDC project's design, specifically the 54-km levee heightening and the construction of flood regulator gates in Bang Ban and Bang Luang canal, prioritizes the protection of Ayutthaya's city and industrial zones. This structural intervention shifts the hydrological burden onto riverbank communities. These populations now face increased flood risks, illustrating a clear pattern where the safety of urban economic centers is achieved by externalizing risk onto the most vulnerable residents living along the river (Chaiya, 2026).

The reliance on massive grey infrastructure in Ayutthaya, as well as Nakhon Si Thammarat and Hat Yai, creates significant opportunity costs by crowding out more resilient alternatives. While global climate adaptation increasingly favors hybrid green-grey solutions, such as restoring floodplains and wetlands to manage risk, current Thai projects appear to overlook these strategies. Furthermore, the lack of transparency in scenario selection and the exclusion of local stakeholders from cost-benefit deliberations suggest a path-dependent decision-making process. By going all in on conventional engineering, policymakers fail to evaluate the potential of nature-based solutions, raising critical questions regarding whether these high-cost interventions are the most effective or equitable path toward long-term flood resilience.

Beyond the unintended displacement of risk, these structural measures actively curtail the adaptation agency of riverine communities. Residents living between the river and the levee find their autonomous adaptation options restricted, often forced into costly individual measures like elevating homes to offset the increased water levels induced by the embankments. Besides, the promotion of off-season rice cultivation behind these levees exemplifies the safe-development paradox. By creating a perceived **safety zone** through flood diversion and levee reinforcement, the project encourages farmers to lock themselves into an intensive, high-input agricultural model. This increases systemic vulnerability: rather than maintaining the flexibility of traditional flood-compatible agricultural practices, these communities become hyper-dependent on the infrastructure and exposed to catastrophic risk during extreme weather events.

The repeated application of **"divert and protect"** strategies across Thailand, seen in Hat Yai, Nakhon Si Thammarat, Chai Nat, and Sukhothai, reveals a significant pattern of path dependency. Rather than a universal solution, this reliance on conventional engineering reflects an institutional lock-in that prioritizes legacy mitigation methods over holistic, root-cause analysis. By marginalizing interdisciplinary perspectives, such as those of geomorphologists, ecologists, and floodplain managers, policymakers treat the symptom of

localized flooding while neglecting the systemic drivers of basin-wide vulnerability. This persistent adherence to grey infrastructure narrows the scope for policy innovation, effectively eroding the opportunity to transition toward more resilient flood governance.

These observations endeavor to inform of the risk that might or had happened from the flood control intervention in major initiatives such as the BBFDC, Chaophraya Flood Management Plan 2 and Hat Yai and Nakhon Si Thammarat. This analysis serves as a foundation for improving future climate adaptation, highlighting the need for more careful integration of environmental, social, and equity-focused considerations to protect vulnerable populations.

3.4.2. Canal Improvement Case Study: Yom-Nan Canal Improvement Project

The Yom-Nan canal project, a part of the big flood diversion scheme of the Yom River, exemplifies the pitfalls of incremental technical fixes in climate adaptation. Intended to protect New Sukhothai from flooding, the canal failed to achieve its primary objective, prompting authorities to pursue further drainage acceleration into the Nan River. This approach illustrates a cycle of maladaptive **path dependency**: instead of re-evaluating the systemic causes of flooding, the intervention focuses on accelerating discharge. This strategy not only perpetuates the city's vulnerability but also risks externalizing flood impacts to downstream areas, demonstrating the limitations of rigid, engineering-heavy solutions in addressing complex hydrological challenges.

According to the project office, the Yom-Nan canal expansion project illustrates the limitations of prioritizing hydraulic efficiency, widening channels and applying concrete lining to increase flow velocity from 250 m^3/s to 500 m^3/s as a flood mitigation strategy. During the monsoon season of 30 July of 2025, the flood water from Yom River has diverted to the Yom-Nan canal where the diversion caused significant flooding in the Sri Nakhon district, confirming that this approach frequently results in the externalization of risk rather than its reduction. By accelerating water discharge, the project merely shifted the hazard from the city center to downstream communities, creating new zones of vulnerability. This case underscores the inherent dangers of engineering-led interventions that ignore basin-wide hydrological dynamics and the social costs of displacing flood risk (Thai PBS, 2025).

3.4.3 Urban Flood Protection System Case Study: Community Flood Protection in Multiple Provinces

While the Thai government's interventions are driven by the intent to enhance public safety and well-being, they often struggle to account for the complex, dynamic nature of fluvial ecosystems. Most major urban centers, including Bangkok, Ayutthaya, and Chiang Mai, sit in low-lying floodplains naturally subject to erosion, deposition, and periodic inundation. Urban flood mitigation projects of this type appear across multiple provinces in the Tracker.

Thailand's flood mitigation strategy relies predominantly on gray infrastructure, such as floodwalls, channel resectioning, revetments, and floodgates, designed to stabilize river channels and prevent overtopping. These measures offer a perceived sense of security by fixing the river in a static state, yet persistent urban flooding shows they have not delivered on

that promise. By suppressing natural flood pulses and geomorphological processes, rigid interventions tend to entrench systemic vulnerability rather than resolve it. **Moving beyond this cycle requires adaptation planning to evolve from a paradigm of control to one that accommodates the river's inherent dynamism**, so that well-intentioned protections do not deepen the vulnerability they are meant to reduce.

The **safe-development paradox** (Ferdous et al., 2020) illustrates how extensive flood protection infrastructure can inadvertently foster a false sense of security in urban flood protection systems. While historically, human settlements in Thailand maintained a prudent distance from river corridors, rapid population growth and urban expansion have increasingly pushed development toward flood-prone lowlands. The construction of structural defenses often acts as a catalyst for further high-value investment in these vulnerable areas. Consequently, when climate change and land-use shifts intensify flood risks, the potential for catastrophic damage is magnified by this increased exposure, creating a cycle where engineering interventions ultimately heighten, rather than mitigate, systemic risk.

Beyond generating a false sense of security, structural defenses such as concrete channels and levees transfer risk by accelerating discharge to downstream communities. This produces a maladaptive cascade in which upstream protection necessitates further downstream intervention, trapping planners in reactive engineering. Global practice is shifting toward resilience-based approaches that accommodate river dynamics instead. The restoration of the Isar River in Munich exemplifies this transition, replacing rigid control with nature-based solutions such as widened floodplains and restored natural morphology. By working with the river's inherent processes, these approaches enhance urban resilience more effectively than static containment (Kondolf et al., 2021).

These initiatives are illustrative rather than exhaustive. The maladaptation risks identified here extend beyond large-scale flood protection into smaller, less visible corners of the budget. Rainmaking operations, a single project of THB 452 million tracked in the 2026 edition of the Tracker, have an unclear link to effective drought relief which could entrench institutional reliance on it while crowding out demand-side water management. In addition, large-scale groundwater pumping, two projects totaling THB 932.5 million, relieve present water stress by drawing down the very reserves that buffer against future droughts.

4. Policy Recommendations to Narrow Down Policy Gaps and Avoid Maladaptation

Among the initiatives exhibiting maladaptation characteristics identified in the previous chapter, the scale of allocation warrants attention: financing directed to these projects is approximately five times the combined adaptation financing for social systems and health, sectors serving vulnerable groups. Addressing these structural challenges requires pre-disbursement screening of proposed projects, adoption of green-gray infrastructure to prevent long-term maladaptive lock-in, and budget allocations that center the most vulnerable populations.

- **To mitigate systemic risk, all large-scale adaptation projects must undergo rigorous pre-disbursement screening.** Currently, adaptation finance is heavily skewed toward debt-financed grey infrastructure, with the five largest projects, including the Chao Phraya Flood Management Plan 2, accounting for approximately 65% of total tracked funding. This concentration is problematic; as demonstrated by the ecological disruption and land-use conflicts associated with the Bang Ban – Bang Sai project, diversion works frequently displace flood risk downstream and create localized social instability. To prevent such outcomes, all major commitments should be subject to a comprehensive watershed-level cumulative impact assessment. This framework must apply a structured maladaptation screen by evaluating effectiveness, equity, durability, and "do-no-harm" principles before funding is released, ensuring that investments foster genuine resilience rather than reinforcing long-term structural vulnerability.

- **Adaptation financing should be rebalanced to favor hybrid and nature-based solutions over single-purpose grey infrastructure.** Unlike static concrete structures, green-grey systems are hybrid infrastructure designs that integrate natural ecological features with conventional engineering to enhance resilience and adapt more effectively to climate-induced environmental stressors. They offer superior performance under the extreme conditions of climate change and exhibit more graceful degradation. Furthermore, financing must extend beyond physical assets to include essential soft infrastructures, such as early warning systems, preparedness planning, and robust maintenance regimes, that determine the actual operational efficacy of protective measures during climate-driven events.

- **Adaptation finance should be diversified beyond water-centric projects to address neglected sectors and vulnerable populations.** Currently, water infrastructure dominates funding, while health and social protection receive negligible support. To bridge this gap, policy must transition from high-level commitments, such as the National Adaptation Plan (NAP), to sector-specific, institutionally owned, and fully budgeted programs. Implementing targeted interventions, such as climate-health investment plans and heat-stress mapping for high-risk groups (e.g. heat-health plan for children at school), is essential to institutionalizing resilience for those most at risk.

5. Conclusion

The 2026 Thailand Climate Finance Tracker highlights a trend toward larger-scale adaptation investment that reveals a critical imbalance: capital remains heavily concentrated in single-purposed grey water infrastructure, which accounts for 73.6% of additions. This narrow strategy risks systemic maladaptation, as large-scale diversion projects often displace flood hazards onto downstream communities and create a safe-development paradox where rigid engineering encourages development in inherently vulnerable areas. Meanwhile, essential sectors for human resilience, such as health and social protection for the elderly and children, remain significantly underfunded at less than 1% of total commitments.

To move beyond reactive single-purpose engineering, policy must prioritize resilience-based paradigms that accommodate natural river dynamics rather than attempting to fix them in a static state. This transition requires the implementation of watershed-level cumulative-impact assessments and structured maladaptation screens to ensure that large commitments are evaluated for equity, durability, and "do-no-harm" principles before funds are disbursed. By shifting support toward hybrid infrastructure, such as early warning systems and comprehensive maintenance regimes, Thailand can institutionalize climate adaptation measures that addresses the root causes of vulnerability.

Ultimately, bridging the gap between national adaptation goals and actionable outcomes depends on diversifying finance channels to reach the most exposed populations. As Thailand’s demographic profile shifts toward a super-aged society, aligning financing with the specific needs of climate-vulnerable groups is a strategic necessity. Future policy must move from high-level commitments to institutionally owned with fully budgeted programs that foster long-term resilience across all sectors.

Appendix

A. Data Limitation

The Tracker represents the most comprehensive effort to date to map climate finance flows across the Thai economy, but its findings should be read in light of the methodological constraints.

- The most fundamental is the uneven landscape of public disclosure. The dataset is constructed primarily from publicly available sources, including regulatory filings, stock exchange disclosures, bond prospectuses, government budget documents, and project announcements. Sources of funds with weaker disclosure norms, including many agricultural enterprises, smaller commercial banks, and subnational government bodies, are therefore structurally underrepresented. SMEs illustrate the problem most clearly. As SMEs face no reporting obligations, they rarely publish their investment activity, so whatever climate-relevant spending they undertake goes untracked.

- A complementary data collection effort through direct questionnaires to impact investors and non-governmental organizations has been undertaken, but responses to date represent a small share of the overall dataset. This limits the Tracker's ability to capture investment not subject to public reporting requirements, including a significant portion of corporate balance sheet spending on energy efficiency, process decarbonization, and supply chain interventions. In addition, the Tracker also does not yet provide a monitoring, reporting, and verification framework. The figures stated publicly represent investment commitments and outstanding balances at the time of data collection, not verified disbursements against specific climate outcomes.

These limitations do not diminish the dataset's analytical value. Rather, they suggest the figures constitute a comprehensive view of climate finance landscape in Thailand.

B. Table 1 Climate Adaptation Finance Landscape in Thailand by Sources of Fund

Source of fund	2025 Edition (m THB)	2026 Addition (m THB)	Cumulative
1. Central Government	130,708.05	100,115.18	230,823.23
2. Multilateral DFI	384.30	37,451.68	37,835.98
3. Local Government	1,367.84	3,715.46	5,083.30
4. Multilateral Climate Funds	2,589.27	396.67	2,985.93
5. Corporations	-	2,181.14	2,181.14
6. National DFI	603.80	-	603.80
7. Impact Investors	-	22.45	22.45
8. Intergovernmental Agency	3.93	-	3.93

Note: “2025 Edition” refers to the cumulative investment recorded in the 2025 edition of the Thailand Climate Finance Tracker with data coverage from 2018 – May 2025. “2026 Addition” refers to the new entries collected in the 2026 edition (from 2018 – May 2026).

Source: CFNT (2026). 2026 Edition of Thailand Climate Finance Tracker.

C. Table 2 Climate Adaptation Finance Landscape in Thailand by Sector

Sector	2025 Edition (m THB)	2026 Addition (m THB)	Cumulative
Water & Sanitation	100,277.55	105,483.23	205,760.78
Agriculture, Food & Forestry	6,638.01	24,828.78	31,466.78
Cities & Settlements	17,016.99	4,445.45	21,462.44
Ecosystems	8,307.04	3,931.56	12,238.60
Social Systems	2,937.42	4,365.61	7,303.03
Infrastructure	17.87	702.92	720.79
Health	454.32	106.57	560.89
Industry & Commerce	7.99	18.46	26.45

Note: “2025 Edition” refers to the cumulative investment recorded in the 2025 edition of the Thailand Climate Finance Tracker with data coverage from 2018 – May 2025. “2026 Addition” refers to the new entries collected in the 2026 edition (from 2018 – May 2026).

Source: CFNT (2026). 2026 Edition of Thailand Climate Finance Tracker.

Bibliography

Eriksen, S., Schipper, E. L. F., Scoville-Simonds, M., Vincent, K., Adam, H. N., Brooks, N., Harding, B., Khatri, D., Lenaerts, L., Liverman, D., Mills-Novoa, M., Mosberg, M., Movik, S., Muok, B., Nightingale, A., Ojha, H., Sygna, L., Taylor, M., Vogel, C., & West, J. J. (2021). Adaptation interventions and their effect on vulnerability in developing countries: Help, hindrance or irrelevance? *World Development*, *141*, 105383. https://doi.org/10.1016/j.worlddev.2020.105383

Juhola, S., Glaas, E., Linnér, B.-O., & Neset, T.-S. (2016). Redefining maladaptation. *Environmental Science & Policy*, *55*, 135–140. https://doi.org/10.1016/j.envsci.2015.09.014

Schipper, E. L. F. (2020). Maladaptation: When Adaptation to Climate Change Goes Very Wrong. *One Earth*, *3*(4), 409–414. https://doi.org/10.1016/j.oneear.2020.09.014

Chiya, K. (2026, July 7). *The Pak Khlong Bang Ban water gate: Infrastructural uncertainty and changing flood conditions in a community area* [Conference presentation]. Anthropology Conference '69, Princess Maha Chakri Sirindhorn Anthropology Centre, Bangkok, Thailand.

Chapman, A. D., Darby, S. E., Hồng, H. M., Tompkins, E. L., & Van, T. P. D. (2016). Adaptation and development trade-offs: Fluvial sediment deposition and the sustainability of rice-cropping in An Giang Province, Mekong Delta. *Climatic Change*, *137*(3), 593–608. https://doi.org/10.1007/s10584-016-1684-3

Eriksen, S., Schipper, E. L. F., Scoville-Simonds, M., Vincent, K., Adam, H. N., Brooks, N., Harding, B., Khatri, D., Lenaerts, L., Liverman, D., Mills-Novoa, M., Mosberg, M., Movik, S., Muok, B., Nightingale, A., Ojha, H., Sygna, L., Taylor, M., Vogel, C., & West, J. J. (2021). Adaptation interventions and their effect on vulnerability in developing countries: Help, hindrance or irrelevance? *World Development*, *141*, 105383. https://doi.org/10.1016/j.worlddev.2020.105383

Ferdous, M. R., Di Baldassarre, G., Brandimarte, L., & Wesselink, A. (2020). The interplay between structural flood protection, population density, and flood mortality along the Jamuna River, Bangladesh. *Regional Environmental Change*, *20*(1), 5. https://doi.org/10.1007/s10113-020-01600-1

Juhola, S., Glaas, E., Linnér, B.-O., & Neset, T.-S. (2016). Redefining maladaptation. *Environmental Science & Policy*, *55*, 135–140. https://doi.org/10.1016/j.envsci.2015.09.014

Kondolf, G. M., Descombes, G., & Zingraff-Hamed, A. (2021). Restoring Dynamic Fluvial Processes in Urban Rivers: Learning from the Aire and Isar Rivers. *Landscape Architecture Frontiers*, *9*, 10–27. https://doi.org/10.15302/J-LAF-1-020051

Ludy, J., & Kondolf, G. M. (2012). Flood risk perception in lands "protected" by 100-year levees. *Natural Hazards*, *61*(2), 829–842. https://doi.org/10.1007/s11069-011-0072-6

Magnan, A. K., Schipper, E. l. f., Burkett, M., Bharwani, S., Burton, I., Eriksen, S., Gemenne, F., Schaar, J., & Ziervogel, G. (2016). Addressing the risk of maladaptation to climate change. *WIREs Climate Change*, *7*(5), 646–665. https://doi.org/10.1002/wcc.409

Schipper, E. L. F. (2020). Maladaptation: When Adaptation to Climate Change Goes Very Wrong. *One Earth*, *3*(4), 409–414. https://doi.org/10.1016/j.oneear.2020.09.014

Thai PBS. (2025, July 30). *น้ำล้นตลิ่งท่วมชุมชน อ.ศรีนคร จ.สุโขทัย | จับตารอบทิศ | 30 ก.ค. 68* [Video]. YouTube. https://www.youtube.com/watch?v=EbOmSe6w2D8

Tran, T. A. (2019). Land use change driven out-migration: Evidence from three flood-prone communities in the Vietnamese Mekong Delta. *Land Use Policy*, *88*, 104157. https://doi.org/10.1016/j.landusepol.2019.104157