CLIMATE CHANGE GROUP

Reference Guide on ADAPTATION CO-BENEFITS

A Comprehensive Guide to Capturing Climate Change Adaptation Co-Benefits Generated by World Bank Projects

WORLD BANK GROUP
Climate Change

Acknowledgements

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Contents

I. Climate Co-Benefits Overview

Tracking Climate Finance: What Are Climate Co-Benefits and How Are They Relevant for World Bank Operations?

"Climate Co-Benefits" are the financial resources committed by the World Bank to development operations, which deliver positive benefits associated with the reduction of greenhouse gas (GHG) emissions (climate change mitigation) and/or enable project/program[1] beneficiaries to adapt to impacts of climate change (climate change adaptation). As part of the World Bank's commitment to increase the climate-related share of its portfolio from 21 to 28 percent by 2020, all projects with International Bank for Reconstruction and Development (IBRD) or International Development Association (IDA) financing are assessed for climate (adaptation and mitigation) co-benefits.

How Are Climate Co-Benefits Tracked at the World Bank?

Task teams are required to articulate climate change considerations incorporated in their project design in the project documents. However, they are not required nor encouraged to perform climate co-benefits calculations, as this function is the responsibility of the Climate Change Group (CCG) and Operations Policy and Country Services (OPCS). The CCG uses the Joint Multilateral Development Bank (MDB) Methodology for Tracking Climate Finance to assess all IBRD/IDA lending projects prior to three project milestones: Concept Review, Decision Review, and Board Approval, based on information available in project documents prepared for each stage. The assessment data is published on the Climate Co-Benefits Dashboard (updated each month). Projects' climate co-benefits are finalized at Board Approval through the OPCS Sector & Theme Coding Validation process.

What Are Adaptation Co-Benefits?

Climate change adaptation is undertaken to lower the current and expected risks or vulnerabilities posed by climate change. A project's climate change adaptation co-benefits are determined by counting the financing dedicated to components, sub-components, prior actions (PAs), or disbursement-linked indicators (DLIs) that address, or are designed as adaptation measures to, climate change risks, and that increase the overall climate resilience of the project, project sector, and/or project beneficiaries.

1 The reference to 'Project/s' throughout this document implies project/s and/or program/s.

II. Calculating Adaptation Co-Benefits at the World Bank

The World Bank calculates adaptation co-benefits for its lending operations using the Joint MDB Methodology, which stipulates a context- and location-specific approach to capture financing directly linked to addressing climate change vulnerability in projects (illustrated in Figure 1). Under this approach, adaptation co-benefits can be assigned to projects/programs only if their documents[2] **(i) provide the project's Climate Change Vulnerability Context, (ii) articulate an Intent to Address Vulnerability, and (iii) establish a Link to Project Activities.** This approach, referred to as the **"three steps,"** has been refined over time in discussions with other MDBs, but the basic steps remain as they were originally published in 2012.

Guiding Principles for Applying the Joint MDB Methodology for Adaptation

Context and Location-Specific Focus

For a project to be considered as one that contributes to adaptation, the project document must clearly provide **three steps specific to its location and context.** These are discussed in detail on pages 4 to 7.

Granularity

Climate adaptation finance, as defined by the methodology, is not intended to capture the value of the entire project or investment that may increase resilience because of specific adaptation activities within the project. Only the incremental cost or proportion of the project component that addresses climate change vulnerability can be counted toward adaptation co-benefits.

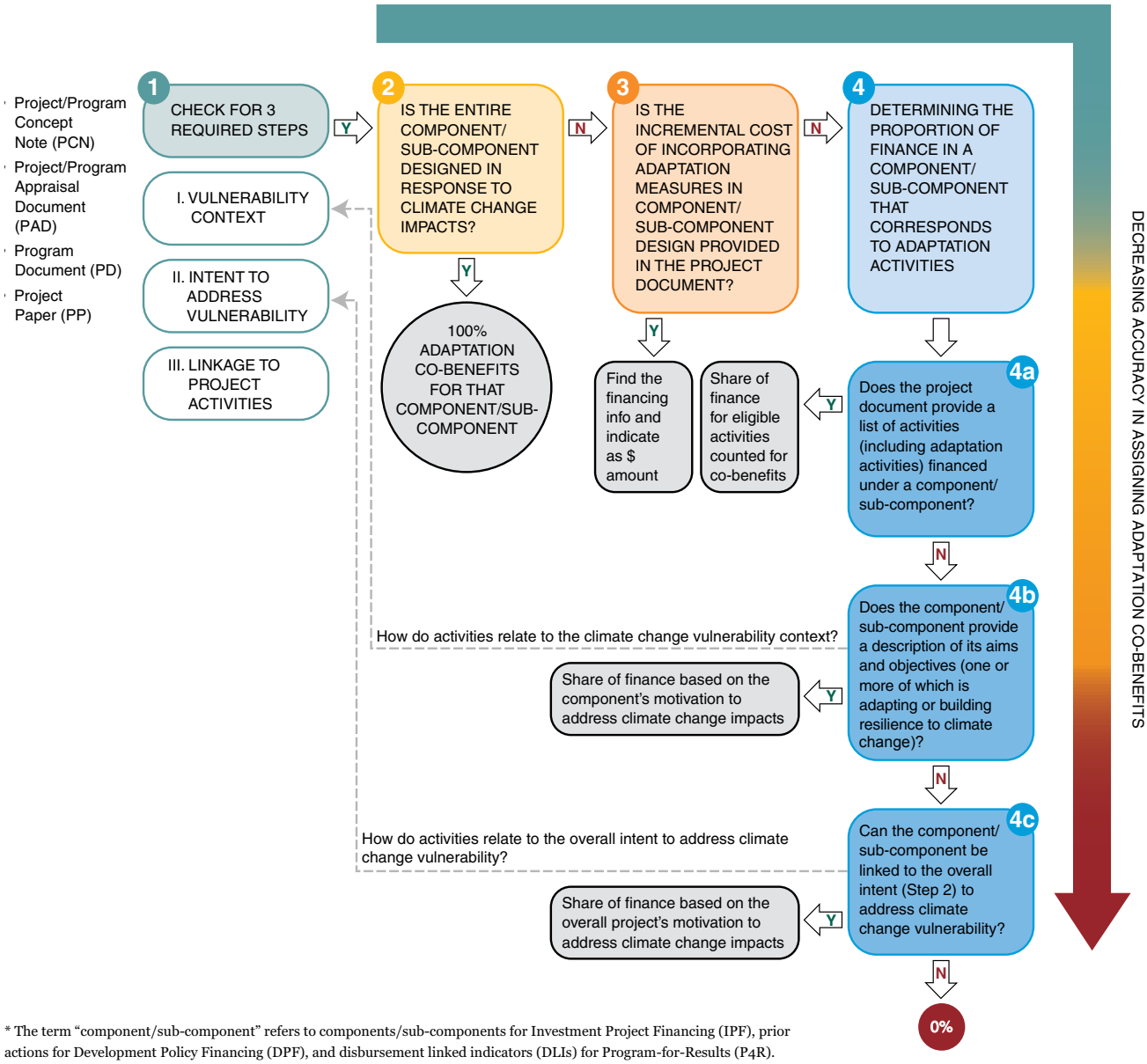
Conservativeness

When an estimate of the incremental cost for adaptation is not available, co-benefits will be assigned by taking a conservative percentage of the total financing for a component/activity, since it is preferable to underreport climate co-benefits rather than to overreport them.

Information included in the three steps is crucial in determining adaptation co-benefits in projects, especially since it is often difficult to separate adaptation activities from development activities. While calculating adaptation co-benefits, the World Bank uses a series of questions to determine if the three steps are correctly articulated in project documents. The accuracy of assigning adaptation co-benefits decreases in tandem with the amount of relevant information available. This section

2 PCN: Project or Program Concept Note; PAD: Project or Program Appraisal Document; PD: Program Document; PP: Project Paper.

aims to specify the type and extent of information that project documents need to incorporate to ensure that climate co-benefits assessments fully capture adaptation co-benefits generated by project activities.



* The term "component/sub-component" refers to components/sub-components for Investment Project Financing (IPF), prior actions for Development Policy Financing (DPF), and disbursement linked indicators (DLIs) for Program-for-Results (P4R).

Figure 1: The World Bank's approach to calculating adaptation co-benefits, as per the Joint MDB Methodology

The Three Steps: Developing and Strengthening the Narrative for Climate Change Adaptation

This sub-section provides a series of guiding questions and resources to aid task teams in developing a strong narrative that showcases the project's contribution to climate change adaptation by adequately articulating the three steps as required by the Joint MDB methodology.

STEP 1. CLIMATE CHANGE VULNERABILITY CONTEXT: Setting out the climate change vulnerability context of the project.

This is usually included in the Country Context, Strategic Context, or Climate and Disaster Risk Screening sections of Project Documents, or as a separate annex.

The climate change vulnerability context sets out the current and anticipated impacts of climate change on a project's location, sector, and/or beneficiaries. It is necessary to include this information to ensure that climate adaptation measures within a project are addressing the context- and location-specific climate change vulnerabilities. Useful resources for developing the climate change vulnerability context are: Climate Change Knowledge Portal, Country Climate Briefs, and Think Hazard. Task teams may use one or more of these resources, or others, to develop a climate change vulnerability context. Also, it is good practice to summarize and incorporate the results from Climate and Disaster Risk Screening, which is mandatory for all IBRD/IDA operations, into the project document to provide a robust climate change vulnerability context. A strong vulnerability context can span across several paragraphs or be as short as 4–5 lines. Regardless of the length, it should contain sufficient information on current/projected impacts of climate change, including the types of risks that are attributable to climate change.

Guiding Questions for Task Teams

General questions for formulating a Climate Change Vulnerability Context
(For Examples, go to Annex A)

- Are the project/project location/project beneficiaries currently affected by climate change?
  - » If yes, please provide a brief description (e.g., exposure to high temperatures, decreasing rainfall, increased flooding, rising sea levels, etc.)
- Are impacts of climate change expected to affect the project/project sector/project location/project beneficiaries in the future?
  - » If yes, please describe anticipated impacts and provide estimates using a robust evidence base (with sources cited) (e.g., 1.5 degree rise in temperature between 2012 and 2030, 100 mm decrease in annual rainfall, 20 m rise in sea level between 2015 and 2050), etc.

Activity-specific questions

Infrastructure development

- Does your project incorporate climate resilient design strategies in the construction of new infrastructure (e.g., drainage systems, storm resistant structures, heat resistant materials, etc.) in anticipation of climate change risks?

» If yes, please describe the anticipated climate change impacts that these measures are addressing *(e.g., if your project is adding drainage systems to roads to adapt to future flooding scenarios, describe how climate change affects rainfall patterns in the area).*

Disaster risk management

- Does your project include measures to manage disaster risks exacerbated by climate change?
  - » If yes, please describe how climate change will impact or increase the risk of the specific natural disasters *(e.g., if your project is implementing an early warning system for cyclones, describe how climate change affects the intensity and frequency of cyclones).*

Landscape management/modification

- Does your project include modifications to landscapes in order to adapt to climate change (e.g., canal lining, coastal management, soil protection, landslide prevention, etc.)?
  - » If yes, please describe the anticipated climate change impacts that these modifications are addressing *(e.g., if your project is planting mangroves to counteract coastal erosion, describe how sea-level rise and other impacts of climate change in the project location, are exacerbating coastal erosion).*

Livelihood improvements

- Does your project include measures to protect vulnerable livelihoods from adverse effects of climate change (e.g., improved agricultural practices, water or vector-borne disease prevention, livestock/crop diversification, etc.)?
  - » If yes, please describe the anticipated climate change impacts that these measures are addressing *(e.g., if your project is using improved irrigation techniques to adapt to droughts, describe how climate change affects the frequency of droughts).*

Capacity building

- Does your project include training, education, or capacity building activities that increase the capacity of institutions/people/systems to deal with climate change impacts?
  - » If yes, please describe the anticipated climate change impacts that these activities are addressing.

Policy development

- Does your project finance the development, reform and/or implementation of policies that help institutions/people/systems/sectors adapt to climate change?
  - » If yes, please describe the anticipated climate change impacts that these policies are addressing.

Follow-up questions once the Vulnerability Context is formulated

- After reading the project's climate change vulnerability context, would the reader understand why the project's adaptation measures are necessary?
- Does the climate change vulnerability context include sector-specific information; e.g., how will climate change impact infrastructure, agriculture practices, water availability, etc.?
- Does the climate change vulnerability context provide estimates of future impacts using a robust evidence base?

STEP 2. INTENT TO ADDRESS VULNERABILITY: Making an explicit statement of intent to address climate change vulnerability as part of the project.

This is usually included in the Strategic Context, Project Development Objectives (PDOs) and/or Higher-level Objectives, or Project Description sections of project documents.

To credit a project for its adaptation co-benefits, the Joint MDB Methodology requires project documents to provide a strong and clear intent to address the project's climate change vulnerability context. This is the second of the three required steps, and is usually articulated in a sentence or two.

Guiding Questions for Task Teams

General questions for formulating Intent (For Examples, go to Annex B)

- Is this project primarily motivated by the need to adapt to the impacts of climate change?
  - » If yes, please include a clear statement articulating this intent in the project document. It can be included under the specific components with adaptation measures, or more generally in the strategic context/PDOs section.
- If not primarily motivated by the need to adapt to impacts of climate change, does this project integrate adaptation measures in its design to address the climate change vulnerability of the project/project location/project beneficiaries?
  - » If yes, please include a clear statement of such intent in the project document.

Follow-up questions once the Intent is formulated

- Is it clear that the project is contributing to climate adaptation in anticipation of the climate change risks the project is facing?
- Does the stated intent address the context- and location-specific climate change vulnerabilities outlined in Step 1?

STEP 3. LINK TO PROJECT ACTIVITIES: Articulating a clear and direct link between the climate change vulnerability context and specific project activities.

This is usually included in the Project Description section of project documents.

For Investment Project Financing (IPF) projects, linkage to project activities is established at the component/sub-component level; for Development Policy Financing (DPFs), at the prior action (PA) level; and for Program-for-Results (P4Rs), at the disbursement linked indicator (DLI) level.

Guiding Questions for Task Teams

General questions for formulating the Link to Project Activities (For Examples, go to Annex C)

- Has the entire project been designed to directly address the climate change vulnerability outlined in Step 1?
  - » If yes, please outline how the project as a whole has been (re-)designed to address the climate change vulnerability (e.g., in the case of natural disasters: buildup of early-warning systems; in the case of water shortage: improved water supply and water use efficiency, etc.)
- If not the entire project, are specific project components/activities designed differently to enable the project/project location/project beneficiaries to adapt to current and/or future impacts of climate change?
  - » If yes, please outline for each of the components/sub-components/prior actions/DLIs, how the climate change vulnerability has been addressed (e.g., in the case of droughts: crop diversification to drought-resistant crops; in the case of flooding: improved drainage structures, etc.)

Follow-up questions once the Link to Project Activities is formulated

- Is it clear how the project as a whole or through specific activities is addressing the climate change vulnerabilities outlined in Step 1?
- Is it possible to estimate the incremental cost or portion of each activity/component that is adapting to climate change?

Applying the Joint MDB Methodology to Calculate Adaptation Co-Benefits

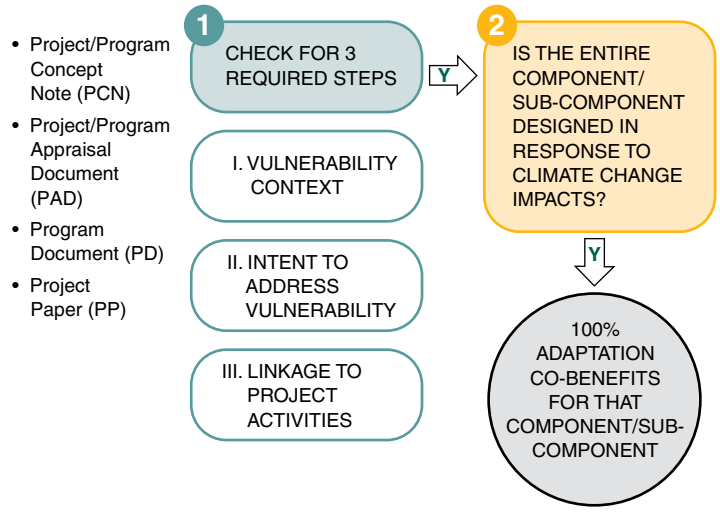
This sub-section provides an in-depth explanation on the calculation of adaptation co-benefits.

STAGE 1: CHECKING FOR THE THREE REQUIRED STEPS

Before calculating adaptation co-benefits for projects, project documents are reviewed for the three steps described in the previous section. Adaptation co-benefits CANNOT be assigned if any of the three steps are missing or are deemed inadequate. Please note, the three steps can be integrated into various sections of the document and do not need to be listed in sequence or as a separate section.

STAGE 2: DETERMINE IF THE ENTIRE COMPONENT/SUB-COMPONENT/PRIOR ACTION/ DLI HAS BEEN DESIGNED IN RESPONSE TO CLIMATE CHANGE

A project component, sub-component, prior action, or DLI may be undertaken entirely in response to the identified climate change vulnerability. In other words, the component/sub-component/prior action/DLI would not exist in absence of climate change. In such cases, the entire financing amount dedicated to such components/sub-components/prior actions/DLIs is counted toward adaptation finance (i.e., 100% adaptation co-benefits are assigned).



* The term "component/sub-component" refers to components/sub-components for IPFs, prior actions for DPFs, and DLIs for PforRs.

Figure 2: Entire component/sub-component/prior action/DLI designed for climate change adaptation

IPF: Component/Sub-Component Example

In a country in the Europe and Central Asia Region, climate change is expected to have important implications for the rural poor, who are more dependent on natural resources for their livelihood. Agriculture, water resources, and forestry are among the sectors considered most at risk from climate change impacts.

One project component finances climate adaptation grants for agriculture to enable farmers to invest in climate-smart measures and technologies such as anti-hale protection, rainwater/surface water harvesting, drip irrigation, and so on. Another project component aims to enhance the climate resilience of forest and pasturelands through restoration of degraded lands at the community and village level and improved management of forest reproductive material.

Since both of these components entirely address climate change impacts, the full financing amount of the components can be assigned adaptation co-benefits (100% adaptation).

DPF: Prior Action Example

In a country susceptible to sea-level rise due to climate change, the government has developed and adopted a coastal zone management strategy to address tidal erosion and destruction of wetlands.

Since this prior action fully contributes to climate change adaptation, it can be assigned 100% adaptation co-benefits.

STAGE 3: LOOK FOR THE INCREMENTAL COST OF INCORPORATING CLIMATE CHANGE ADAPTATION MEASURES

If only part of the component is designed in response to climate change impacts.

As per the Joint MDB Methodology, only the financing dedicated to specific project activities undertaken through components/sub-components/DLIs, that are designed as adaptation measures to address climate change impacts, or directly contribute to climate change adaptation (i.e., the associated incremental cost of incorporating climate change adaptation measures in projects) can be counted as adaptation co-benefits. In such cases, if an estimate of the incremental cost of incorporating climate change adaptation in that component/sub-component/DLI is provided in the project document, the same is used to calculate adaptation finance. This step is not applicable to prior actions, since incremental costs of policy or regulatory reforms cannot be calculated.

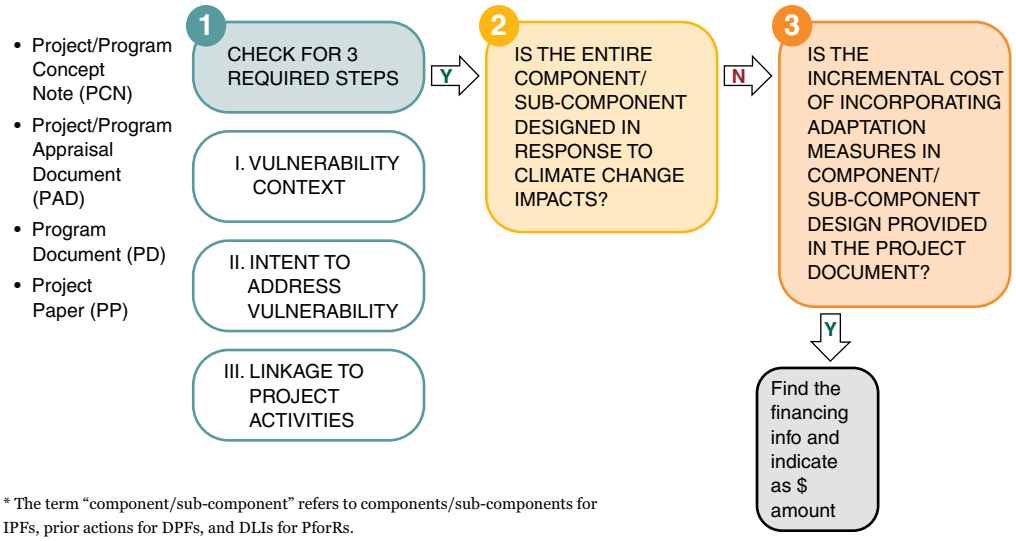


Figure 3: The incremental cost of incorporating climate change adaptation in a component/sub-component or DLI

Note that the estimate of the incremental cost must be informed by project design. If such information is unavailable, task teams may refer to literature on the subject relevant to their sectors and provide references on how the incremental cost for climate change adaptation has been determined for the specific component, sub-component, or DLI activities. For this reason, detailed information on climate adaptation-related activities should be included in the project documents.

IPF: Component/Sub-Component Example

One of the components in a roadways project finances the construction of new roads at a cost of US$50 million. The project location is susceptible to high temperature fluctuations, and flooding due to heavy rainfall that is expected to increase in frequency and intensity due to climate change. The road design incorporated climate resilience measures that consist of the use of specific surface materials that can withstand temperature fluctuations and larger culverts to drain the increased surface run-off from excessive rainfall. The project document specifies that as per industry experience, the additional cost of using climate-resilient material for the road surface is US$2 million, and that for constructing larger culverts is US$5 million.

In this case, the incremental cost of the component that can be considered adaptation finance amounts to US$2 + US$5 = US$7 million. Therefore, 14% adaptation co-benefits can be assigned to this component.

STAGE 4: DETERMINE THE PROPORTION OF FINANCE IN A COMPONENT/SUB-COMPONENT/PRIOR ACTION/DLI CORRESPONDING TO CLIMATE CHANGE ADAPTATION

If it is difficult to estimate or provide an informed estimate of the incremental cost of climate change adaptation.

If the incremental cost of incorporating climate change adaptation in the design of a component/sub-component or DLI cannot be easily estimated, adaptation co-benefits are calculated by determining the proportion of finance corresponding to climate change adaptation activities. Proportionality is always applied conservatively to prevent 'over-counting' of adaptation finance. For DPFs, the proportion of a prior action may be assigned adaptation co-benefits if the prior action supports multiple reforms and only some of them directly contribute to climate change adaptation.

STAGE 4a: Count the number of climate change adaptation activities/reforms financed under a component/sub-component/prior action/DLI

In the absence of information on incremental costs, adaptation co-benefits are calculated by counting the number of adaptation activities/measures financed through a component/sub-component/prior action/DLI and determining the proportion of finance dedicated to them. If activity-level financing details are not provided, the financing is equally split by total number of activities. This approach is only a rough estimate of the cost of adaptation since different activities can have varying costs; (if a component finances road works, technical assistance, and feasibility studies, the cost of

IPF: Component/Sub-Component Example

A coastal city has low lying areas susceptible to flooding, which is expected to worsen with impacts of climate change. One of the components of an urban upgrading project, amounting to US$25 million, finances the following activities for neighborhood improvement:

a. Constructing parks to increase rainwater retention.
b. Provision of street furniture in public squares and waterfront promenades.
c. Reinforcing and increasing heights of retaining walls along the waterfront.
d. Permeable paver blocks for sidewalks.
e. Restoration of four historic public buildings.

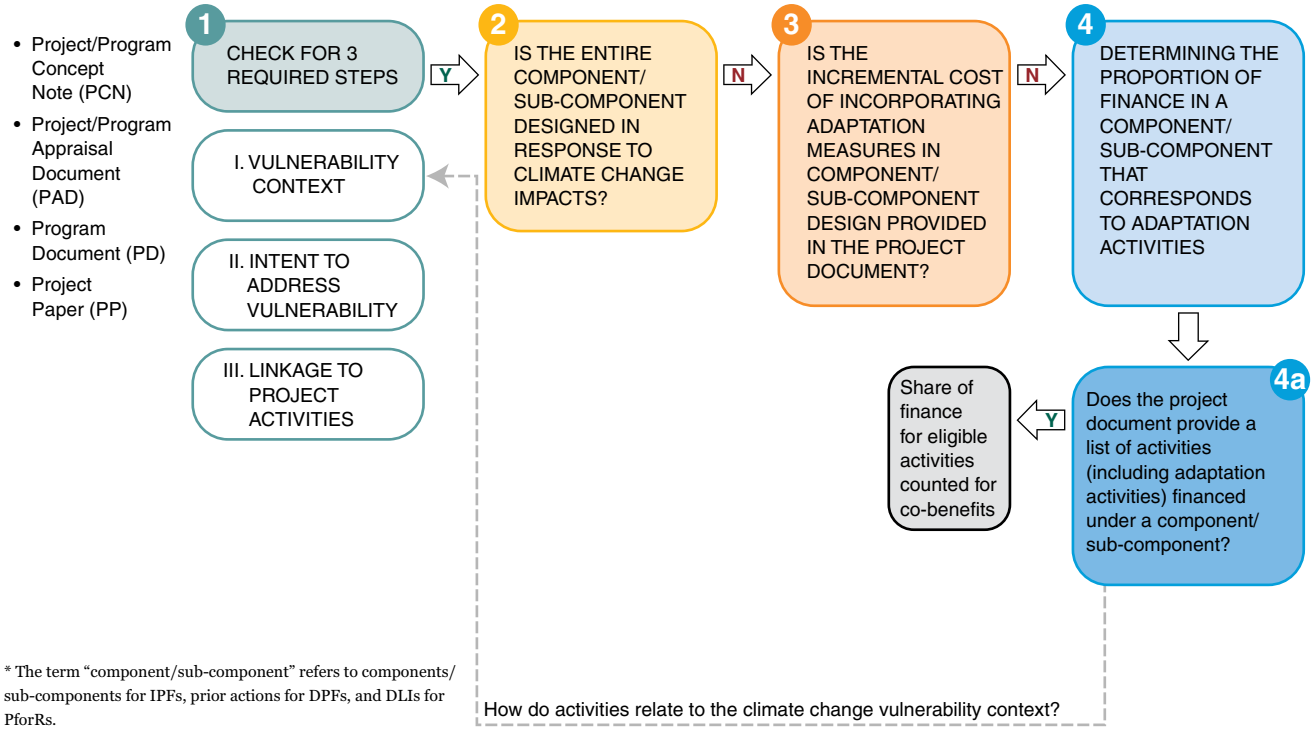
Since activities (a), (c), and (d) are adaptation measures to address the climate change vulnerability, the adaptation co-benefits in this component are 3/5 of US$25 million = US$15 million (60%).

DPF: Prior Action Example

In a delta country vulnerable to climate change, the Ministry of Environment has passed a decree that: (a) specifies pollution standards for industries; and (b) prohibits construction within 50 m of high flood lines of rivers and estuaries.

100% adaptation co-benefits can be assigned to this prior action's part (b) for addressing the climate change vulnerability, amounting to 50% of the prior action.

road works would be much higher than that of the other two activities). Lastly, if such activities are motivated by other objectives in addition to climate change adaptation, adaptation co-benefits are calculated by relating them to the climate change vulnerability context.[3]



* The term "component/sub-component" refers to components/ sub-components for IPFs, prior actions for DPFs, and DLIs for PforRs.

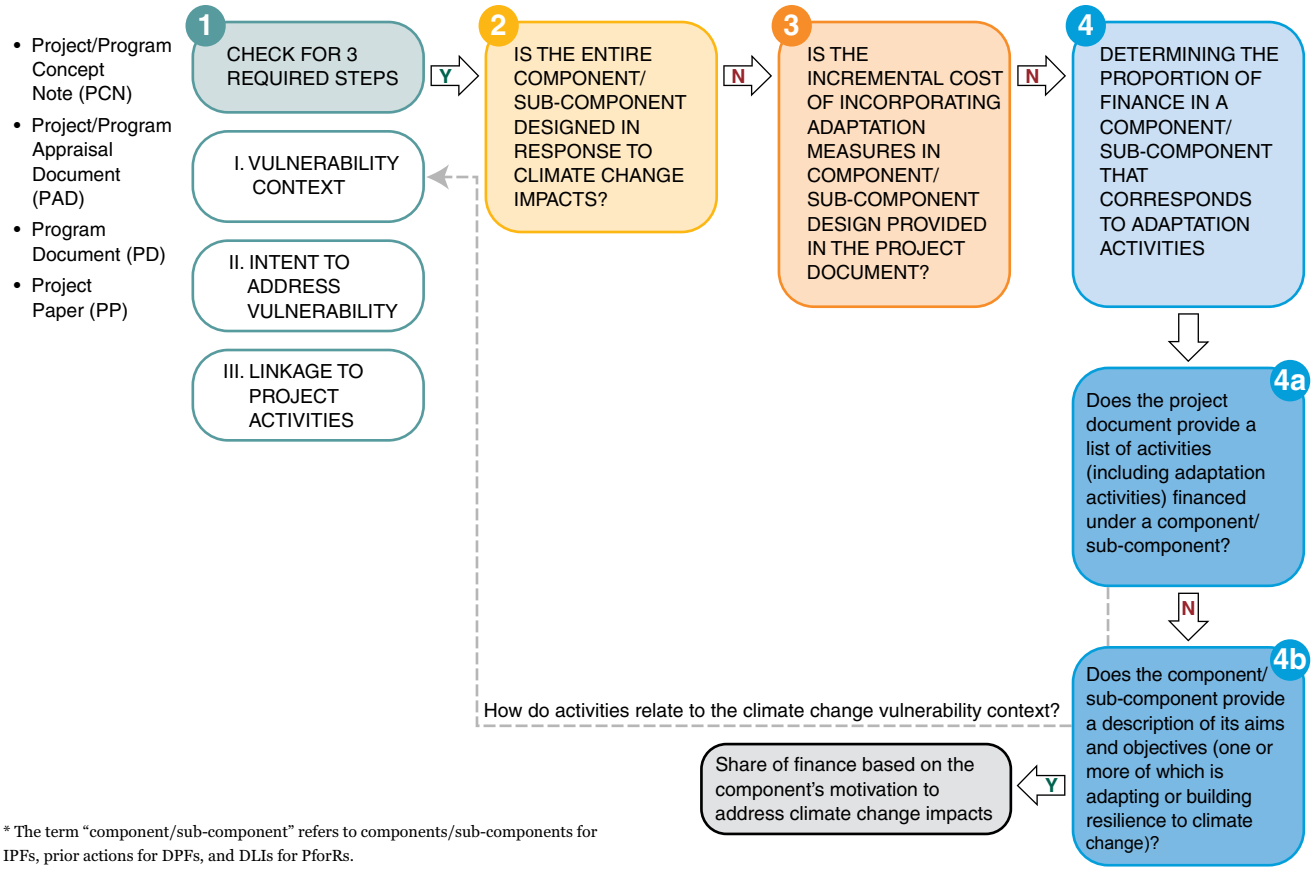
Figure 4: Counting climate change adaptation activities within components/ sub-components

STAGE 4b: Calculate adaptation co-benefits based on the aims and objectives behind a component/sub-component/prior action/DLI

In case project documents do not list specific activities financed under each of their components/ sub-components/DLIs, or if it is difficult to discern specific activities financed under a component/ sub-component/DLI based on its description (or to link the reform supported by a prior action) to climate change adaptation, adaptation co-benefits for that component can be calculated based on the overall motivation behind the component/sub-component/prior action or DLI, or a description of objectives that will be achieved through its implementation. Similar to Stage 4a, in cases where such activities are motivated by other objectives in addition to climate change adaptation, adaptation co-benefits are calculated by relating them to the climate change vulnerability context.[4]

3 A percentage of the financing amount dedicated to linked activities can be counted, based on the description of risks in the vulnerability context.

4 If a component/sub-component/prior action/DLI is designed to adapt to climate change-induced natural disasters and earthquakes, only 50% of its financing amount or incremental cost for adaptation to climate change can be counted.



* The term "component/sub-component" refers to components/sub-components for IPFs, prior actions for DPFs, and DLIs for PforRs.

Figure 5: Calculating adaptation finance based on activity objectives

IPF: Component/Sub-Component Example

i) In a project focused on developing rural growth opportunities in a country grappling with climate change impacts such as droughts and high temperatures, one component is dedicated to diversifying rural livelihoods. One of the sub-components under it, amounting to US$75 million is dedicated to high-value agriculture development, with the aim of: (a) improving food and nutrition security, (b) enhancing productivity, and (c) reducing drought risk of rural communities.

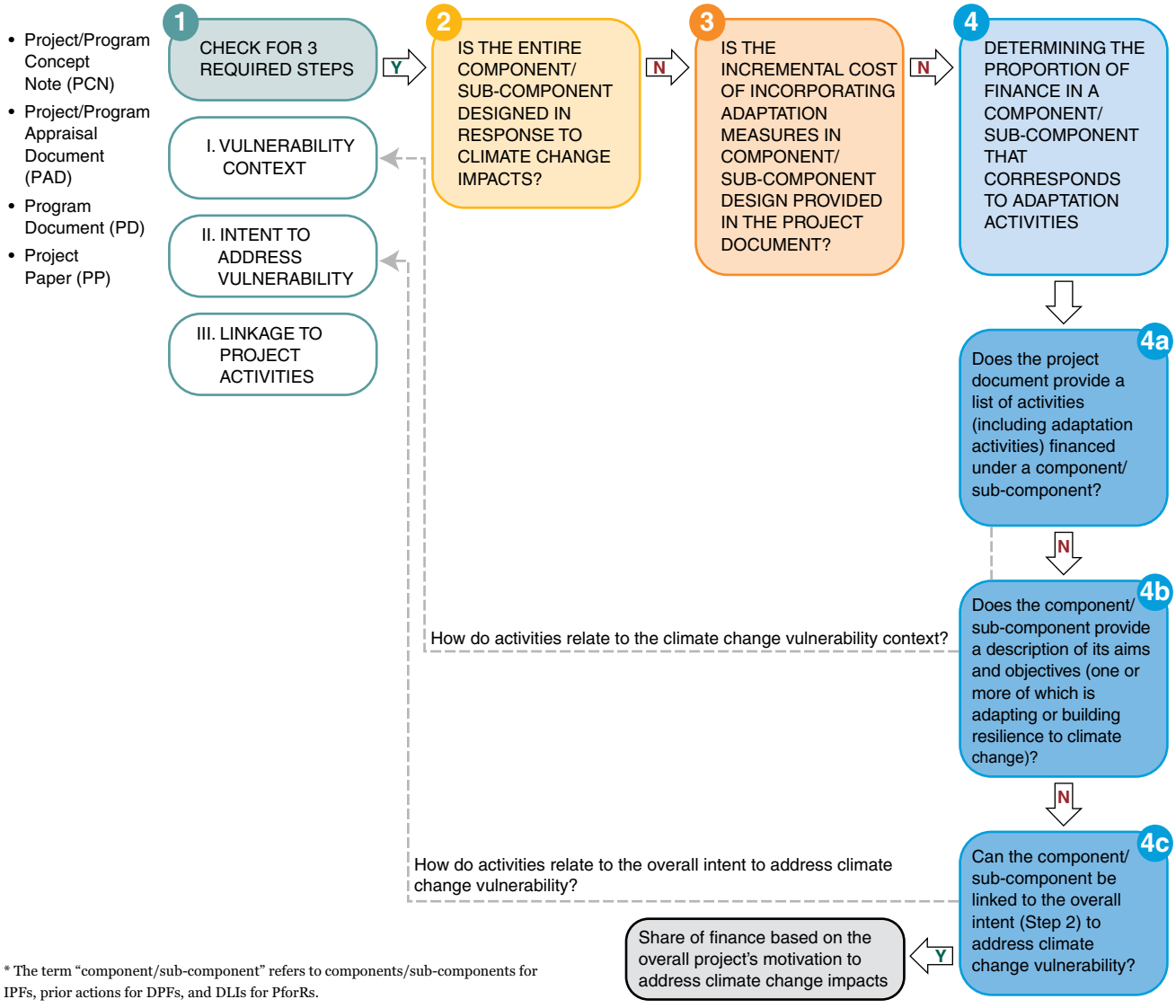
Since adapting to climate change is one of three motivations behind this sub-component (the other two being improving food security and enhancing productivity), 1/3 of its finance (US$25 million) can be counted as adaptation co-benefits (33.33% of US$ 75 million).

ii) A project component is financing Technical Assistance (TA) to enable a city in revising its building codes to make new buildings resilient to seismic and climate change-related risks, and to stimulate the real estate market.

Here, addressing climate and seismic risks is only half of the TA's motivation, while the other 50% is meant to stimulate the real estate market. Also, since only 50% of the finance associated with mitigating risks can be linked to addressing climate vulnerability (the other half addresses seismic risks) only 25% of the component's finance can be counted toward adaptation co-benefits.

STAGE 4c: Calculate adaptation finance by linking the component/sub-component/prior action/DLI to the overall intent to address climate change vulnerability

Project documents may not always provide a detailed description of activities that can be directly attributed to adaptation under its components/sub-components/prior actions/DLIs. In cases where it is difficult to tease out these details, adaptation co-benefits are calculated by establishing a linkage between the component/sub-component/prior action/DLI and overall intent of the project to address climate change vulnerability. This is *the last and the least-preferred approach* for calculating adaptation co-benefits in a project, since it is the least accurate in capturing the proportion of finance dedicated to climate change adaptation activities.



* The term "component/sub-component" refers to components/sub-components for IPFs, prior actions for DPFs, and DLIs for PforRs.

Figure 6: Calculating adaptation finance based on the project's overall intent to address climate change vulnerability

IPF: Component/Sub-Component Example

An agriculture project in an area vulnerable to frequent droughts, which are expected to intensify due to climate change, aims to increase and diversify incomes of the targeted beneficiaries through a component that implements profitable and resilient production systems.

The four PDOs are:

1. Income increase
2. Income diversification
3. Production profitability
4. Climate change adaptation

Based on the project's overall motivation, 1/4 of the finance dedicated to this component (25%) can be counted towards adaptation co-benefits.

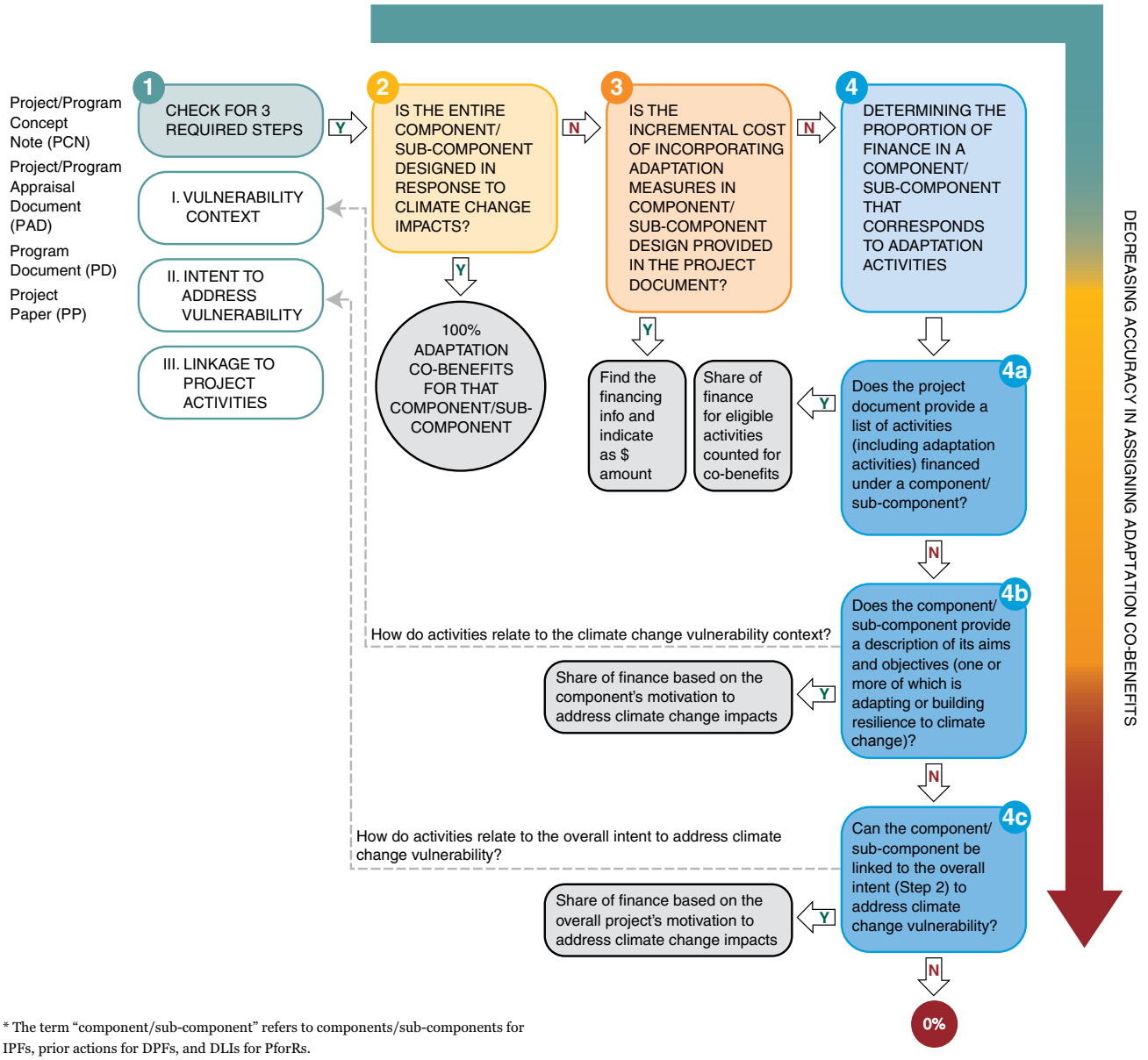
DPF: Prior Action Example

A project supports a series of reforms in the agricultural sector and has PDOs to: (a) strengthen production chains; and (b) scale up climate resilient agriculture in the client country.

Prior Action: The government has formulated an agriculture sector development plan.

Since this reform is motivated by the dual objective of strengthening production chains, and scaling up climate resilient agriculture, 50% adaptation co-benefits can be assigned for addressing vulnerability to climate change.

If none of these four stages (stage 2, 3, 4a, 4b, & 4c) can be used to calculate co-benefits, then the project is not assigned adaptation co-benefits.



* The term "component/sub-component" refers to components/sub-components for IPFs, prior actions for DPFs, and DLIs for PforRs.

Figure 7: The World Bank's approach to calculating adaptation co-benefits, as per the Joint MDB Methodology

Annexes

ANNEX A
Vulnerability Context: Examples

Back to guiding questions

Robust Vulnerability Context

- Explains how the country/region/project location is affected or will be affected by climate change.
- Explains how the targeted sector is affected or will be affected by climate change.
- Uses a robust evidence base to describe the current or anticipated impacts of climate change over the project's lifetime.
- Explains why climate change adaptation measures are necessary.

EXAMPLE 1

In Belize, climate change is likely to exacerbate the impacts of extreme weather. This is primarily due to: (a) a long, low-lying coastline; (b) over 1,060 small islands; (c) second-longest barrier reef in the world and 17,276 km² of forest cover supporting fragile ecosystems; and (d) exposure to natural disasters, especially hurricanes.[5] The major risks posed by climate change are rising sea levels, increased intensity of tropical storms and hurricanes, greater flooding, extended droughts, rapid shoreline erosion, saltwater intrusion, and changes in temperature.

There are several risks posed by extreme weather that create vulnerabilities in the energy sector. A high-level analysis was carried out to map major climate-related risks that are likely to impact Belize and that will expose the vulnerabilities in the energy sector. A total of 23 risks were identified with 14 categorized as being 'very high' or 'high'.[6]

a) **Rise in sea levels** that results in storms surges and inundation makes energy infrastructure such as transmission lines, substations, fuel storage, and some generation vulnerable, particularly those in coastal areas of various islands and Belize City. A World Bank study[7] concluded that there could be more than a 40% increase in Belize's storm surge zone and that the related inundation risk could cover 2/3 of the country's wetlands.

5 United Nations Environmental Programme. 2011. National Environmental Summary.
6 Acclimatize. 2016. "Building Climate Resilience in Belize's Energy Sector."
7 Dasgupta, S., et al. 2009. "Sea-Level Rise and Storm Surges: a Comparative Analysis of Impacts." World Bank.

b) **Increasing intensity of hurricanes and tropical storms** can significantly damage energy infrastructure throughout the country, with high winds, storm surges, and inundation. This will result in damages to infrastructure such as ports, storage depots, and roads that facilitate the supply of fuel; faults in transmission and distribution lines that disrupt electricity services due to fallen trees, damaged poles, and other operational challenges; and constrained access to critical energy facilities to carry out repairs and reconstruction. Climate models are predicting that hurricanes and storms impacting the Caribbean region will intensify in the future.

c) **Significant volatility in rainfall patterns** makes the availability of hydropower unpredictable, while periods of intense rainfall coupled with deforestation will result in increased sedimentation in reservoirs.

d) **Increase in temperature and severity of droughts** can lead to stresses on energy operations, gradual increases in demand, wildfires that damage energy infrastructure, and limited options that can be reliably cultivated for biomass/biofuels.

EXAMPLE 2

Climate change represents an additional important risk for Tanzania's natural resource-based economy. Tanzania is already experiencing changes in its climate. However, as precipitation becomes more unpredictable with studies showing a shift in the onset of the rainy season(s),[8] timing and quantity of rainfall are also predicted to change. Water security, which is already under threat from current climate variability and social, economic, and environmental change, is likely to be under greater threat. These patterns will have multidimensional effects on the Tanzanian economy, affecting agricultural productivity, energy use, water dynamics, and the wildlife upon which the tourism sector is dependent. Efforts to promote climate resilience in these key natural asset-based sectors will have important longer-term effects on food security and livelihoods. For the specific case of the Ruaha National Park, most of the wet season flows are being captured by irrigation, which seems to be the main cause for the seasonal dry up of the Great Ruaha River. However, as precipitations become more erratic and as extreme events such as droughts become more intense, there is an even greater need to implement concerted, multi-sectoral solutions in the basin area in an integrated manner.

Potentially Acceptable Vulnerability Context

- Explains how a given country is affected by climate change, but could be more specific with estimating impacts.
- Mentions the impacts on the project sector, but could include more details.

8 World Bank Group (2015). *Financing Climate-Resilient Growth in Tanzania*. Dar es Salaam: Environment and Natural Resources Global Practice.

EXAMPLE 1

Guyana is one of the most vulnerable countries to global climate change. Parts of the country, which are the main agricultural regions, are low lying, with some coastal areas below mean sea level and with a high percentage of the population and critical infrastructure located along the coast. Rising sea levels threaten to accelerate coastal erosion, increase flood risk, and lead to permanent loss of land in some areas. These adverse developments would be exacerbated by any increase in the destructiveness of tropical storms, the impacts of which will be greater because of rising sea levels.

EXAMPLE 2

The project was screened for climate and disaster risk. Bangladesh, in general, faces several natural disasters which can pose risk to water, sanitation, and hygiene interventions in the schools supported by the program. Frequent and recurring natural disasters, such as floods and cyclones, can trigger outbreaks of waterborne diseases, destroy existing sanitation facilities, and compromise safe water supplies, compounding existing health issues. The program mitigates these risks through ensuring proper operational procedures for installing tubewells and sanitation facilities as well as their operation and maintenance. Hence, the overall risk to the intended program outcome is low to moderate.

Weak Vulnerability Context

- Does not include information on location- (country or region) specific climate change impacts; impact of climate change on project sector not mentioned.
- Does not include sources.
- A weak vulnerability context is not accepted, and adaptation co-benefits are not assigned.

EXAMPLE 1

The project was assessed to determine its potential exposure to the effects of climate change. The results show that proposed project locations are exposed to hazards of volcanic eruption and extreme precipitation and flooding.

EXAMPLE 2

Climate change screening was done for this project. The results show that drought and extreme temperature, precipitation, and flooding pose moderate challenges as future drivers of risk in the country context.

ANNEX B
Intent to Address Vulnerability: Examples

Back to guiding questions

The Intent can be stated or incorporated within various sections of the project documents. Some examples are given below.

Articulated as: Project Development Objective

"The PDO is to demonstrate solutions that enhance the resilience of the energy system to adverse weather and climate change impacts".

Articulated as: Higher-Level Objectives to which the project contributes

"Building resilience to climate change and geophysical hazards is also a vital step in the fight against poverty and for sustainable development. To that end, the building constructed under the project will consider the vulnerability to climate change and disaster risks for its design and construction (for instance, using a suspended slab to locate the building above water lines in case of flood, and/or using specific material so the roof can sustain strong winds and rains)".

Articulated in: Country Context

"Going forward, to achieve the 4% annual growth target set by the government of India for agriculture and transform the sector into a modern food system requires five inter-related and strategic shifts, in line with the emerging mega-trends on both the demand and supply sides: [. . .]. The proposed project is designed to directly contribute to this structural transformation process by supporting several of those strategic shifts with a focus on **building climate resilience** in the agriculture sector in the state of Maharashtra".

Articulated in: Project Description

"While climate resilience may not be taking center stage in the government program, it is intended that the rural roads constructed under this program will be designed with climate resilience in mind. It is envisaged that actions related to making assets more resilient to climate change will be part of the Program Action Plan (PAP)".

ANNEX C
Link to Project Activities: Examples

Back to guiding questions

Climate Resilient Agriculture Project

Component A-2: Scaling up climate-resilient agricultural technologies and practices for a sustainable management of soil and water resources

To build climate resilience in the agricultural systems in the project area and to increase crop productivity, the component will scale up climate-resilient technologies and practices that combine:

(i) micro irrigation systems to enhance water productivity and water-use efficiency, within a broader project strategy to promote the use of "green water" over "blue water" for agriculture;

(ii) soil management practices aimed at improving on-farm soil fertility and micronutrient management; and

(iii) climate-adapted seeds (that have a short duration cycle to maturity, and are drought resistant, heat stress resistant, and/or saline tolerant).

This sub-component directly addresses the climate change vulnerabilities to the agriculture sector, as set out in the project's vulnerability context.

Climate Change and Green Growth Development Policy Operation

DPF 1 Prior Action: The government has developed and adopted the National Action Plan (NAP) setting priorities for the integrated management of coastal zones

The objective of the NAP is to improve Vietnam's adaptation to the anticipated impacts of climate change on socioeconomic development by (a) developing a national approach to Integrated Coastal Zone Management (ICZM) that sets the parameters under which decisions will be made at all levels, from the national to the provincial, and (b) facilitating trade-offs between, sometimes, conflicting sectors.

This prior action directly addresses the climate change vulnerabilities to coastal zones, as set out in the project's vulnerability context.

Rural Road Improvement Project (P4R, PCN Stage)

To enable Anhui, a province in China, to meet the current and future challenges of climate change, the program will adopt the concept of 'build back better', with focus on:

(i) raising the roadbed in floodplains;
(ii) constructing/retrofitting drainage structures to handle more intense and frequent storms; (iii) protecting road cuts, embankments, and drainage structures from erosion and scour with appropriate geotechnical and soil bioengineering technologies;
(iv) dust control on unpaved roads through built-up areas.

The project document describes the specific project activities that will incorporate climate resilient design to address extreme rainfall events, as set out in the project's vulnerability context.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