



# CEC BASED APPROACH, METHODOLOGY AND PROCESS (CECBA)



**Pacific Ecosystem-based Adaptation to Climate Change  
(PEBACC) Solomon Islands component inception workshop.**

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## WHAT IS A **CEC** BASED APPROACH, METHODOLOGY AND PROCESS

The CEC Based Approach, Methodology and Process or CECBA is developed locally in response to increasing climate change issues in the country.

CECBA has three fundamental pillars, they are: Community, Ecosystem and Climate.

A **community** is a social unit of any size that shares common values.

An **ecosystem** is a community of living organisms (plants, animals and microbes) in conjunction with the non-living components of their environment (things like air, water and mineral soil), interacting as a system.

**Climate** is a measure of the average pattern of variation in temperature, humidity, atmospheric pressure, wind, precipitation, atmospheric particle count and other meteorological variables in a given region over long periods of time.

## WHAT IS CECBA?

CECBA is designed to enhance the resilience of **Community** and **Ecosystem**, and reduce their vulnerability to **Climate Change** threats or hazards.

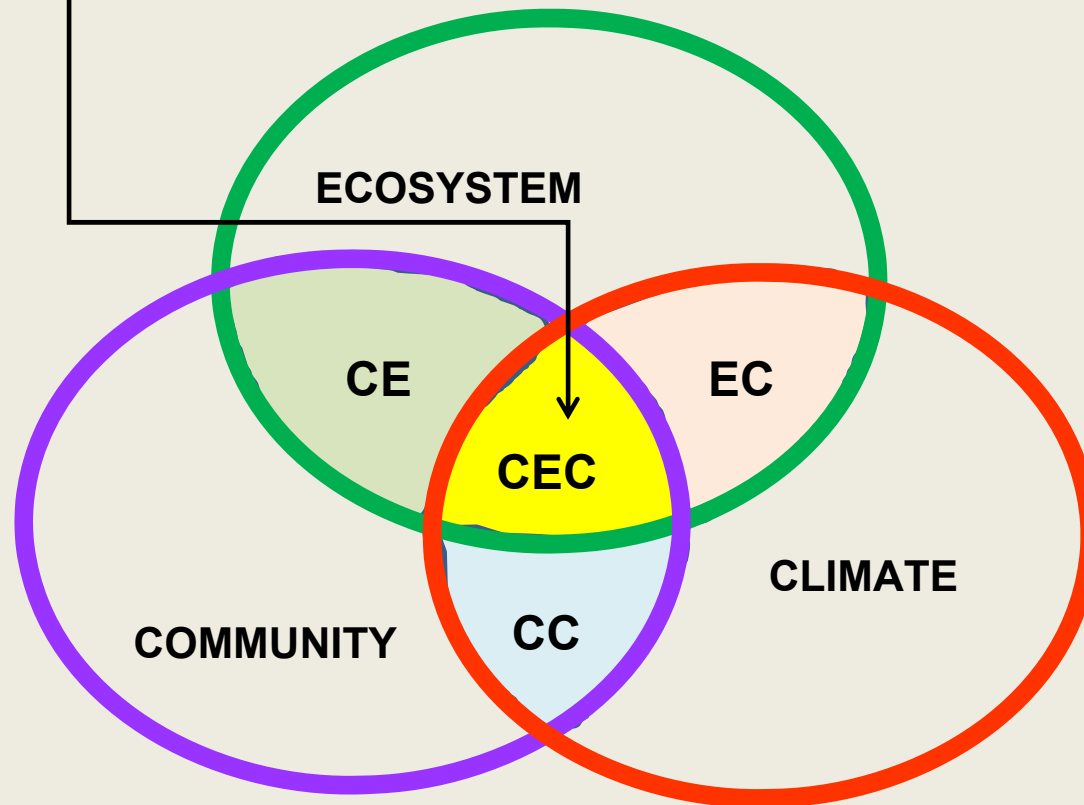
CECBA has a central focus on the interaction between its three pillars and the influence of such interaction on Community **Participation**, Ecosystem **Health** and the **Impacts** of Climate Change threats or hazards.

CECBA underlying value in addressing the impacts or influence of interaction between its three fundamental pillars is **INTEGRATION**.

# WHAT IS CECBA?

## CEC Interaction

(Central focus and the basis for reasoning, investigation and interpretation)



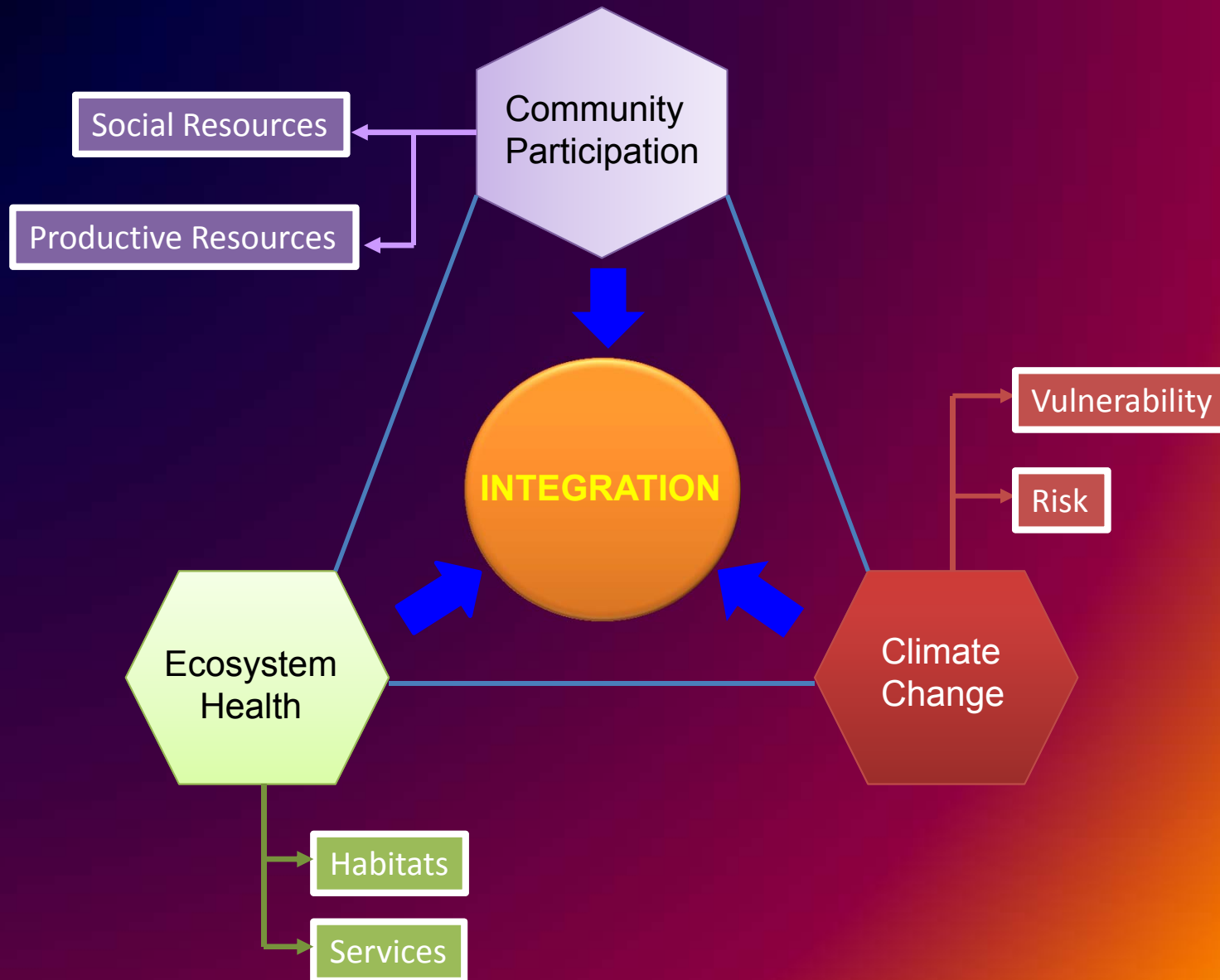
## OBJECTIVES OF CECBA

- ⇒ Reducing risk level and vulnerability of systems, sectors and assets through better understanding of the exposure, sensitivity and adaptive capacity of these resources.
- ⇒ Enhancing resilience of systems, sectors and assets to respond and live through climate change impacts and other extreme events.
- ⇒ Promote options that enhances functional life, co-existence, resilience, synergy and sustainability of systems, sectors and assets.

## UNDERPINNING PRINCIPLES OF CECBA

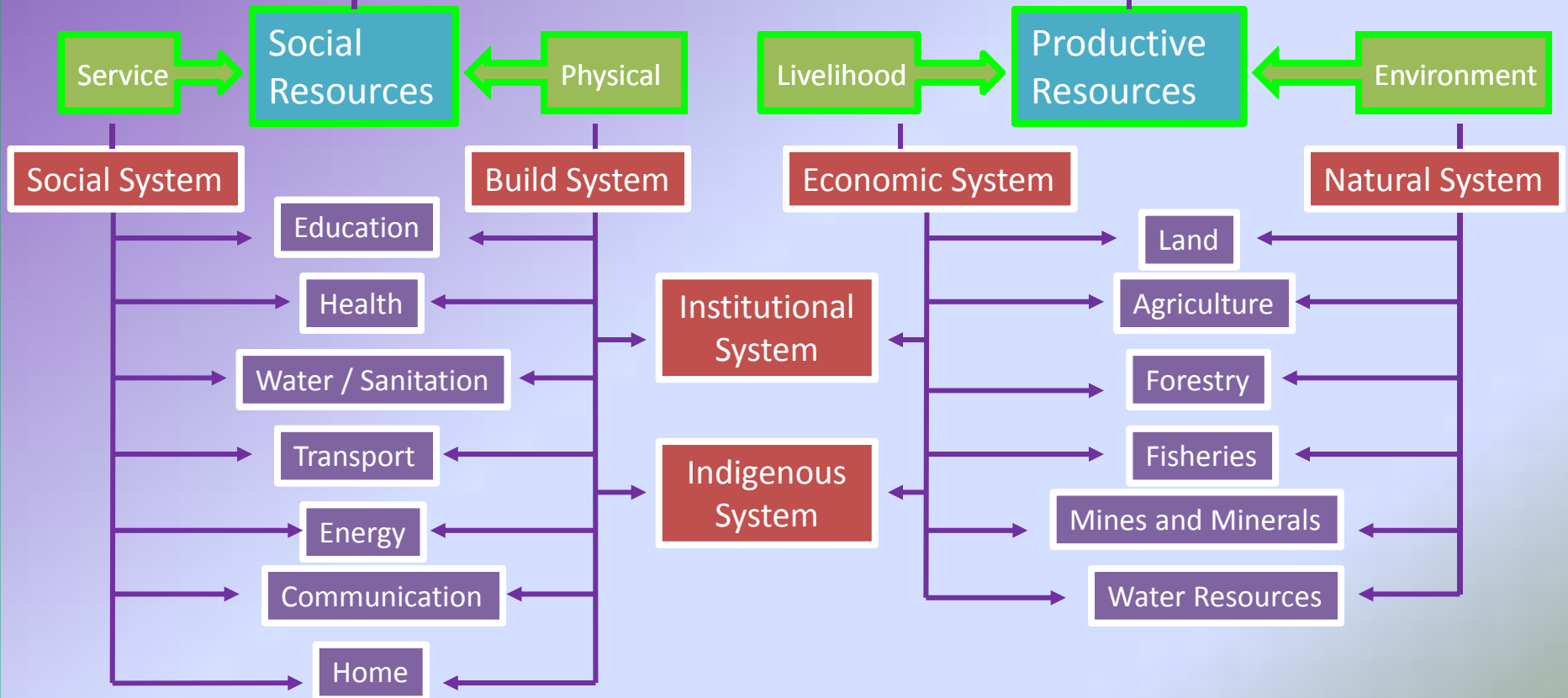
- ⇒ **Functional Life:** That life of different systems, sectors or assets do continue to function as they recreate, evolve and progress through by natural means or artificial processes.
- ⇒ **Co-existence:** That the interactive and inter-dependent lifestyle of different systems, sectors or assets is fundamental to their co-existence and advancement.
- ⇒ **Resilience:** That the enhancement and building of resilience of different systems, sectors or assets is a priority development.
- ⇒ **Synergy:** That the synergy between different systems, sectors or assets is promoted and analyzed to identify win-win options that have more than one benefit.
- ⇒ **Sustainability:** That the co-existence and advancement of different systems, sectors or assets are supported through and by an approach that is inclusive and sustainable.

# CECBA Approach



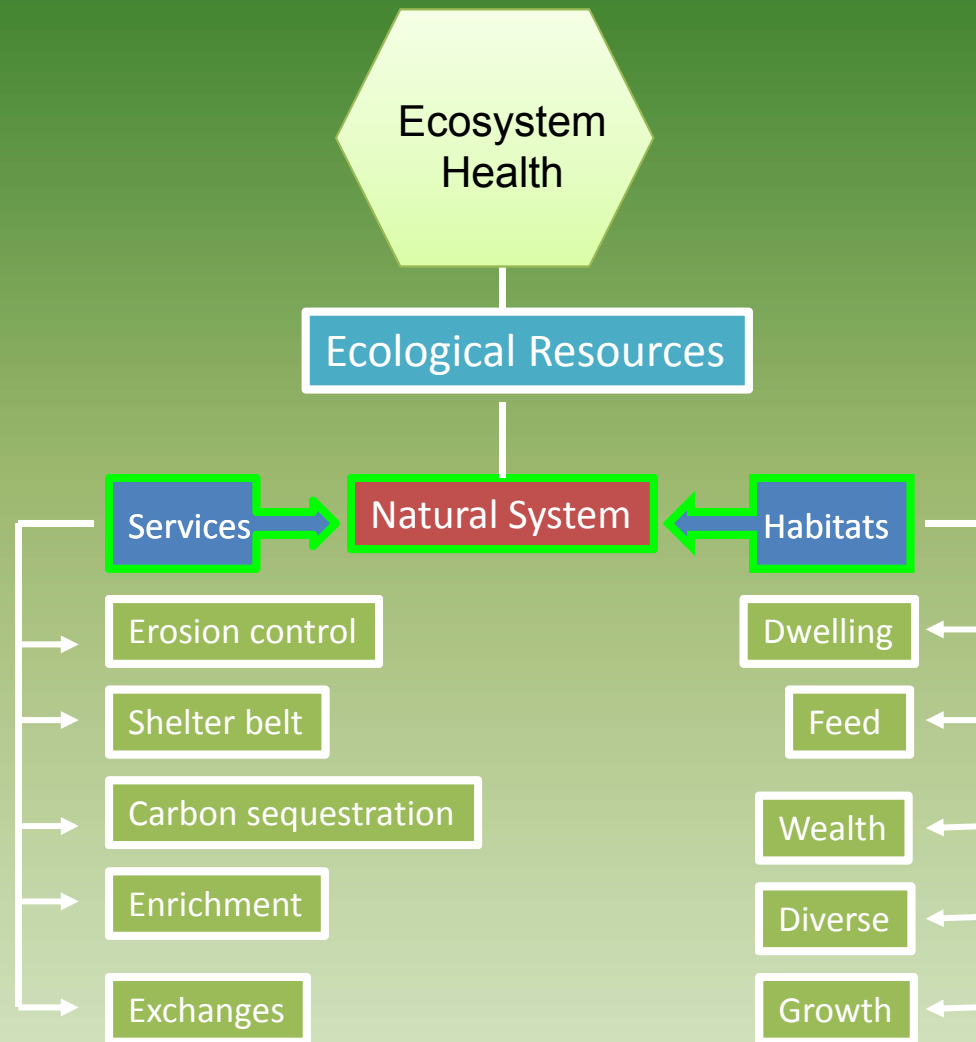
# CECBA Approach

Community Participation

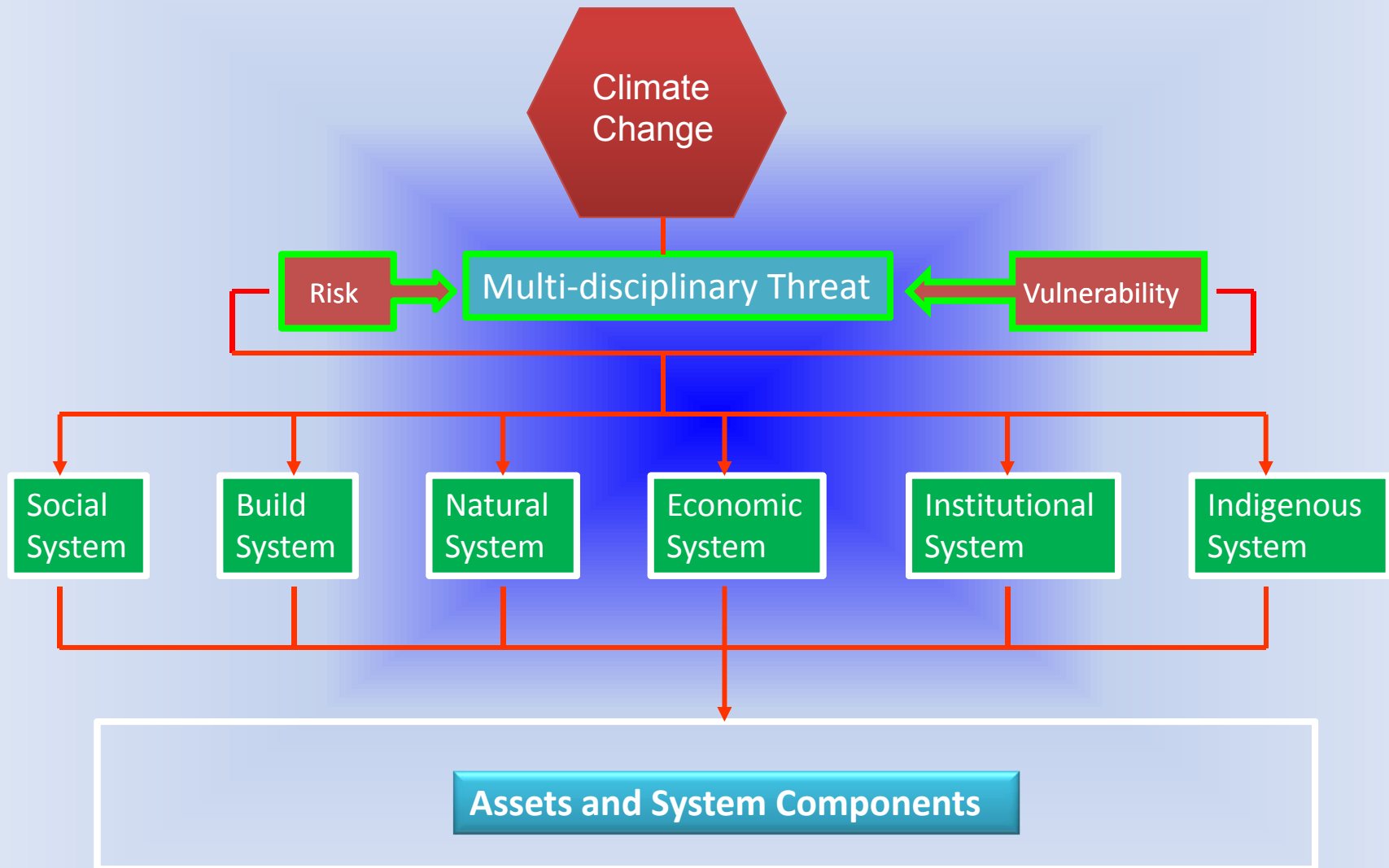




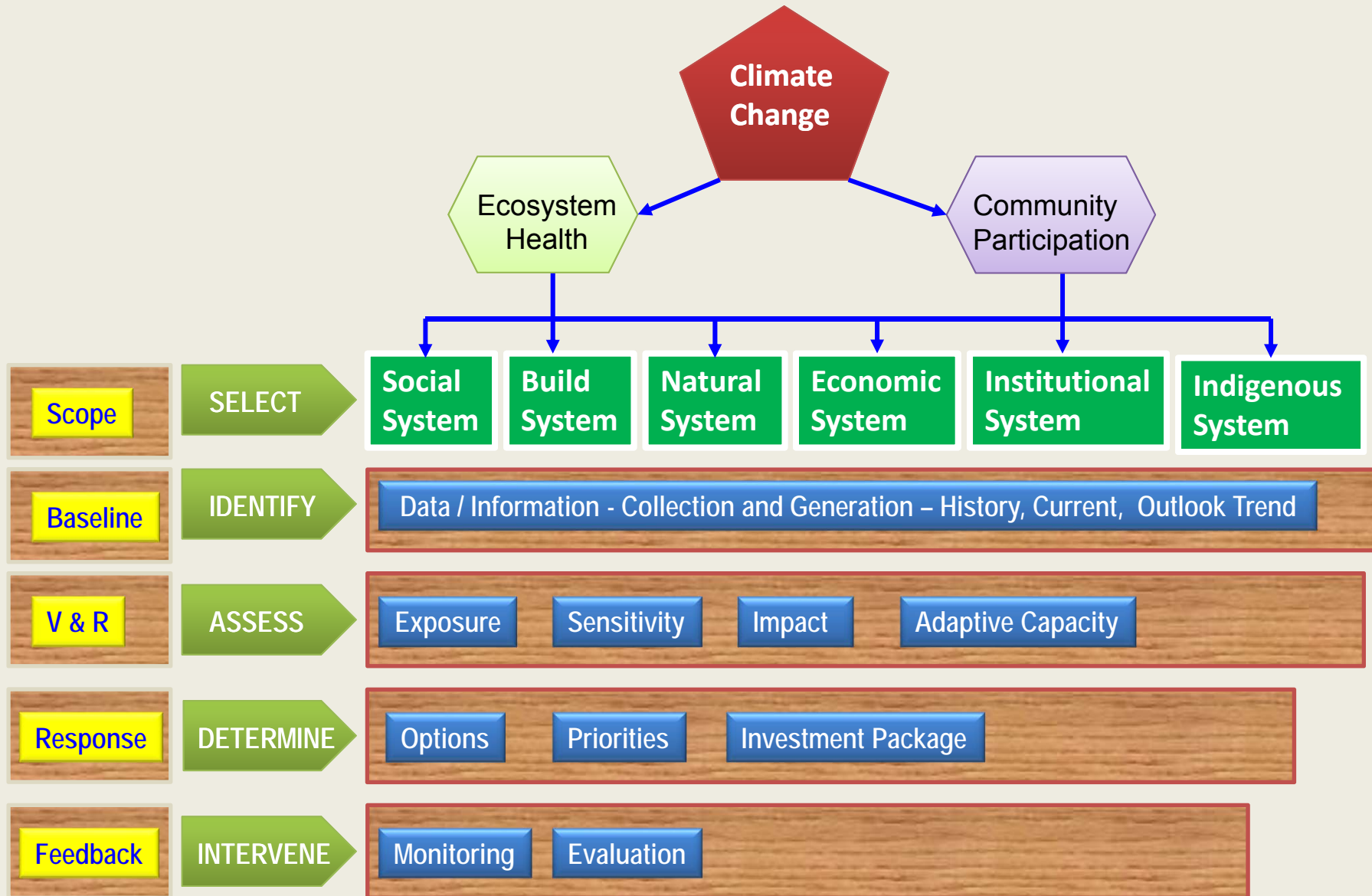
# CECBA Approach



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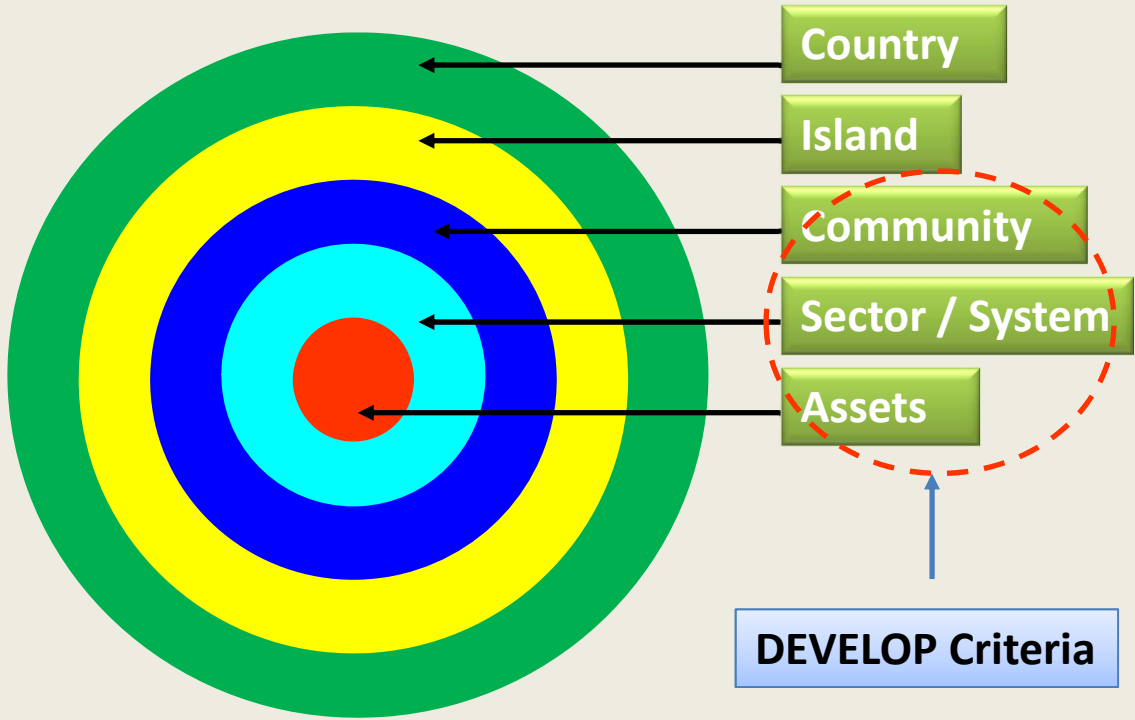


# CECBA Methodology and Process



1 **Scope**  
SELECTION

Develop sets of criteria to select target communities, sector, system components, assets, project area and its zoning (if required).



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SELECTION

Develop sets of criteria to select target communities, sector, system components, assets, project area and its zoning (if required).

## **Criteria for selecting target communities, sectors / systems and assets:**

⇒ *Most vulnerable to Climate Change Impacts:* Based on past events, such communities, sectors / systems and assets have been observed or assessed to be vulnerable to impacts of climate change, e.g. community experienced extreme flooding, water system including catchment damaged, and water storage destroyed.

⇒ *Food shortage:* Community experienced frequent food shortage due to continuous pest and disease outbreak, saltwater intrusion, soil degradation and infertility, water deficit, invasive weed infestation following flooding or other natural disasters.

⇒ *Decline and deteriorating water quality:* Community faced with on-going water quality problem due to saltwater intrusion, damage and destruction of catchment, water source dries up easily, inappropriate subsistent activities.

**Cont.**

## **Criteria for selecting target communities, sectors / systems and assets:**

⇒ *Increase malnutrition:* based on previous health assessment, young population of such community recorded increased malnutrition due to unbalance diets, experience difficulties in accessing a variety of food types, good water source for drinking.

⇒ *Prone to cyclone:* based on expert judgment, observed and / or technical information, such communities are within the pathway or route of the cyclone.

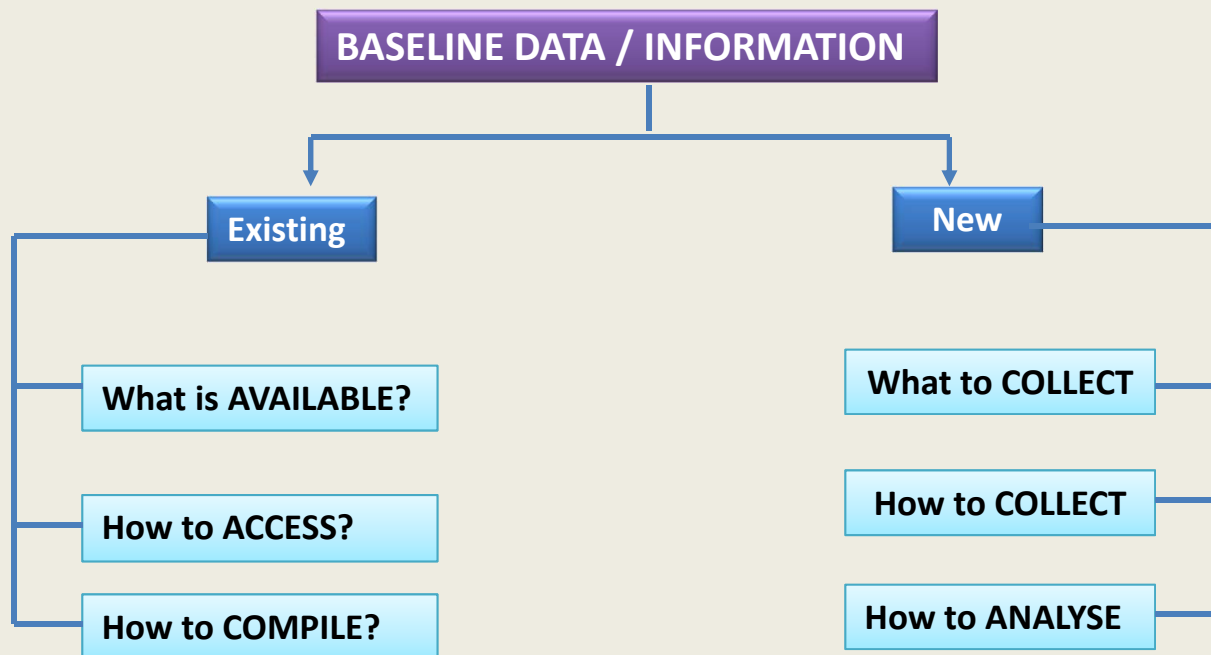
⇒ *Prone to drought:* based on expert judgment, observed and / or technical information, such communities water resources are scarce and underground water or catchment easily dries up within weeks of no rain,

⇒ *Peoples' attitude:* observed changes in peoples attitude towards a number of community initiatives, due to prevailing increase population, unemployment, illiteracy.

## 2 **Baseline Data / Information**

### IDENTIFICATION

Collect and collate existing data and information through Empirical Analogue Studies. Generate new set of data / information based on community consultation (e.g. HH Survey, PRA) and Expert Judgement. Map areas / issues of interest through application of spatial and trend analysis.



## 2 Baseline Data / Information

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Collect and collate existing data and information through Empirical Analogue Studies. Generate new set of data / information based on community consultation (e.g. HH Survey, PRA) and Expert Judgement. Map areas / issues of interest through application of spatial and trend analysis.

### (a) Existing data / information

Sector	Source	Type
Demography	Statistics Office, MFT	Population data / information
All economic sectors	Statistics Office, MFT	Income / Expenditure
Health / Medical	MHMS / MUP	All health related data and information
Education	MEHRD / MUP	All education related data and information
Environment	MECDM / CCD & MD	Weather, climate change, and environment related data and information
Disaster	MECDM / NDMO	Disaster events and related data and information
Agriculture	MAL / MUP	All education related data and information
Fisheries	MFMR / MUP	All education related data and information
Legislation	MUP	Related provincial by-laws and ordinances
NGO	SIWV	Climate change report in South Starharbour, Santa Anna, Aorigi
NGO	KGA	Extreme needs and Extreme living ( Agriculture potential to agriculture ) Weather coast of Makira
CBO	CBOs	Biodiversity / conservation
Indigenous	Chiefs / Elders	Historical events, norms and practices.



**Cont.**

**(b) Additional socio-economic data collected through HH survey questionnaires**

<b>Sector</b>	<b>Source</b>	<b>Type</b>
Demography	Statistics Office, MFT	Population data / information
?	?	?
?	?	?
?	?	?

**(c) Field survey for specific climate hazard mapping**

<b>Hazard</b>	<b>Source</b>	<b>Type</b>	<b>Key Partners</b>
Flooding	MECDM / GIS	Field survey / secondary data	MECDM / NDMO
Coastal erosion	MECDM / GIS	Field survey / secondary data	MECDM
Sea level rise	MECDM / GIS	Field survey / secondary data	MECDM
Landslide	MECDM / GIS	Field survey / secondary data	MECD / NDMO / MFR
Soil degradation	MECDM / GIS	Field survey / secondary data	MECD / NDMO / MAL
?	?	?	?
?	?	?	?

**Cont.**

**Different toolkits and instruments to use for data / information collection:**

- ⇒ personal interview through a household survey;
- ⇒ focus group discussions
- ⇒ key informant interviews
- ⇒ Community history (Time lines)
- ⇒ Trend analysis
- ⇒ Seasonal analysis
- ⇒ Map of community
- ⇒ Livelihood analysis, income and expenditure
- ⇒ Community and farm transects
- ⇒ Farm sketch
- ⇒ Listing, ranking and scoring problems
- ⇒ Feasibility analysis (SWOT)

### 3 Vulnerability / Risk

#### ASSESSMENT

Through expert judgment and community consultation, determine level of Vulnerability and Risk using appropriate tools. Define exposure, sensitivity, adaptive capacity and risk, and develop a set of criteria for their application.

WHAT  
threats?

Community  
Sector / System  
Assets

**DEFINE and RANK** Climate Change threats as:

- Severity of potential impacts
- Level of risk
- Degree of vulnerability

**Define terms:**

- Exposure
- Sensitivity
- Adaptive capacity

Develop a Toolkit



**Cont.**

**(b) Vulnerability Assessment Tool**

**IMPACT = Expert assessment of Exposure and Sensitivity**

	<i>Exposure of system to climate threat</i>					
		<i>Very Low</i>	<i>Low</i>	<i>Medium</i>	<i>High</i>	<i>Very High</i>
<i>Sensitivity of system to climate threat</i>	<i>Very High</i>	<i>Medium</i>	<i>Medium</i>	<i>High</i>	<i>Very High</i>	<i>Very High</i>
	<i>High</i>	<i>Low</i>	<i>Medium</i>	<i>Medium</i>	<i>High</i>	<i>Very High</i>
	<i>Medium</i>	<i>Low</i>	<i>Medium</i>	<i>Medium</i>	<i>High</i>	<i>Very High</i>
	<i>Low</i>	<i>Low</i>	<i>Low</i>	<i>Medium</i>	<i>Medium</i>	<i>High</i>
	<i>Very Low</i>	<i>Very Low</i>	<i>Low</i>	<i>Low</i>	<i>Medium</i>	<i>High</i>

**Cont.**

**VULNERABILITY = Impact x Adaptive Capacity**

		<i>Impact</i>				
		<i>Very Low Inconvenience (days)</i>	<i>Low Short disruption to system function (weeks)</i>	<i>Medium Medium term disruption to system function (months)</i>	<i>High Long term damage to system property or function (years)</i>	<i>Very High Loss of life, livelihood or system integrity</i>
<i>Adaptive Capacity</i>	<i>Very Low Very limited institutional capacity and no access to technical or financial resources</i>	Medium	Medium	High	Very High	Very High
	<i>Low Limited institutional capacity and limited access to technical and financial resources</i>	Low	Medium	Medium	High	Very High
	<i>Medium Growing institutional capacity and access to technical or financial resources</i>	Low	Medium	Medium	High	Very High
	<i>High Sound institutional capacity and good access to technical and financial resources</i>	Low	Low	Medium	Medium	High
	<i>Very High Exceptional institutional capacity and abundant access to technical and financial resources</i>	Very Low	Low	Low	Medium	High

Cont.

(c) Risk Assessment Tool

$$\text{RISK} = \frac{\text{Hazard (Threat)} \times \text{Vulnerability}}{\text{Capacity}}$$

Capacity

	1 Insignificant	2 Minor	3 Moderate	4 Major	5 Catastrophic
A-(Almost certain)	H	H	E	E	E
B-(Likely)	M	H	H	E	E
C-(Possible)	L	M	H	E	E
D-(Unlikely)	L	L	M	H	E
E-(Rare)	L	L	M	H	H

**Risk Levels**

**E:** Extreme Risk

**H:** High Risk

**M:** Moderate Risk

**L:** Low Risk

**Cont.**

## **(b) Criteria for Exposure**

Exposure is the influences or stimuli that impact on the systems. Systems may also be exposed to secondary changes as a result of climate changes – e.g. reduced income due to rainfall reductions / drought, or an increase in weed or pest pressure.

- ⇒ Duration (e.g. hours or days of flooding)
- ⇒ Location (e.g. distance from flood)
- ⇒ Intensity (e.g. strength of rainfall, speed of flood)
- ⇒ Volume or Flow (e.g. size of event)
- ⇒ Aspect (orientation to the threat)



**Cont.**

### **(c) Criteria for Sensitivity**

Sensitivity is the degree to which systems respond to the changes, and the systems are differ in their sensitivity.

*Social system sensitivity criteria:*

- ⇒ Education level
- ⇒ Income level
- ⇒ Access to government support
- ⇒ Mobility
- ⇒ Health
- ⇒ Social networks and support structures
- ⇒ Ownership of property

**Cont.**

*Natural system sensitivity criteria:*

- ⇒ Biological response to temperature change
- ⇒ Tolerance of drought conditions
- ⇒ Capacity for regeneration
- ⇒ Degree of connectivity

*Built (Infrastructure) system criteria:*

- ⇒ Materials
- ⇒ Construction quality
- ⇒ Levels of maintenance
- ⇒ Protective system (e.g. river wall protecting the water transmission pipe)
- ⇒ Location
- ⇒ Design

**Cont.**

**(d) Determinants of Adaptive Capacity**

Adaptive capacity is the ability of the system to adjust, adapt or modify to CC in order to cope with the consequences. When the adaptive capacity of a system is reduced, it is deemed to be more vulnerable to the impacts of climate change. For example:-

<b>System</b>	<b>Determinants</b>	<b>Adaptive Capacity Rating</b>	<b>Consequences</b>
Natural	Gene pool and species and habitat tolerance level	Low	Limited capacity to evolve
	Capacity of ecosystem to adapt to excessive land clearing; over-extraction, soil erosion, salinity, etc.	Low	Limited capacity to regenerate thus, changes may become permanent.
Economic	Opportunities to increase income; available and distribution of financial resources.	Low	Inability to fund adaptation options and support livelihood interventions
Social	Law and order, communication network, insurance, social networks.	Low	Limited capacity to adapt

## ***Cont.***

<b>System</b>	<b>Determinants</b>	<b>Adaptive Capacity Rating</b>	<b>Consequences</b>
Built (Infrastructure)	Availability of physical resources	Low	Limited capacity to construct and maintain or repair.
Institutional	Skills and knowledge; political will; range of available adaptation technologies, management and response systems.	Low	Limited capacity for effective and efficient response.
Indigenous	Knowledge / wisdom; worthy customs, norms and practices.	Low	Limited capacity for integration and synergies.

**Cont.**

### **(e) Definition of Threats or Hazards**

Hazards or threats are events that are endangering the survival, stability and sustainability of the people and their resources. With climate change, there will also be changes in the frequency and severity of weather-related hazards. Examples of hazards or threats are:-

⇒ *Flash flooding*: intensive rainfall on steep slopes in a confined area, leading to intensive runoff. Flash flooding is normally associated with upland areas but will occur in lower and middle catchment areas where requisite topographical conditions occur.

⇒ *Localised pooling/flooding*: intensive rainfall on flat areas or areas where runoff and drainage is impeded.

⇒ *Storm surge and coastal flooding*: wind and wave action often linked to high tides and sea level rise causing flooding of coastal land. Tropical cyclones also intensify the these effects.

## **Cont.**

⇒ *Large scale extreme flooding:* a combination of intensive rainfall, storm surge, flash flooding and localised pooling. This scale of flood is illustrated by cyclone Namu (1986).

⇒ *Extreme drought:* periods of unusually low rainfall in all areas of a catchment. Projections suggest that there will be less rainfall during the dry season increasing the likelihood of drought. The last major drought was in 1997.

⇒ *Temperature Increase:* temperature is projected to increase by 2°C by 2050.

**Cont.**

**(f) Ranking criteria for hazards or threats:**

All hazards or threats are potentially harmful and capable of causing extensive damage and severe destruction to systems, assets and people. Thus, the following criteria is based on expert judgment and the context under study in relation to the potential consequences or impacts:-

⇒ *Insignificant*: very low inconvenience (a couple of days), no injuries, little damage, low financial loss.

⇒ *Minor*: short disruption to system function (weeks); medical treatment required, possible deaths, minor building and infrastructure damage, minimal or moderate local financial loss.

## **Cont.**

⇒ *Moderate*: medium term disruption to system function (months); medical treatment required, possible deaths, moderate building and infrastructure damage, high financial loss.

⇒ *Major*: long term damage to system property or function (years); extensive injuries, number of deaths, high level of building and infrastructure damage, major financial loss.

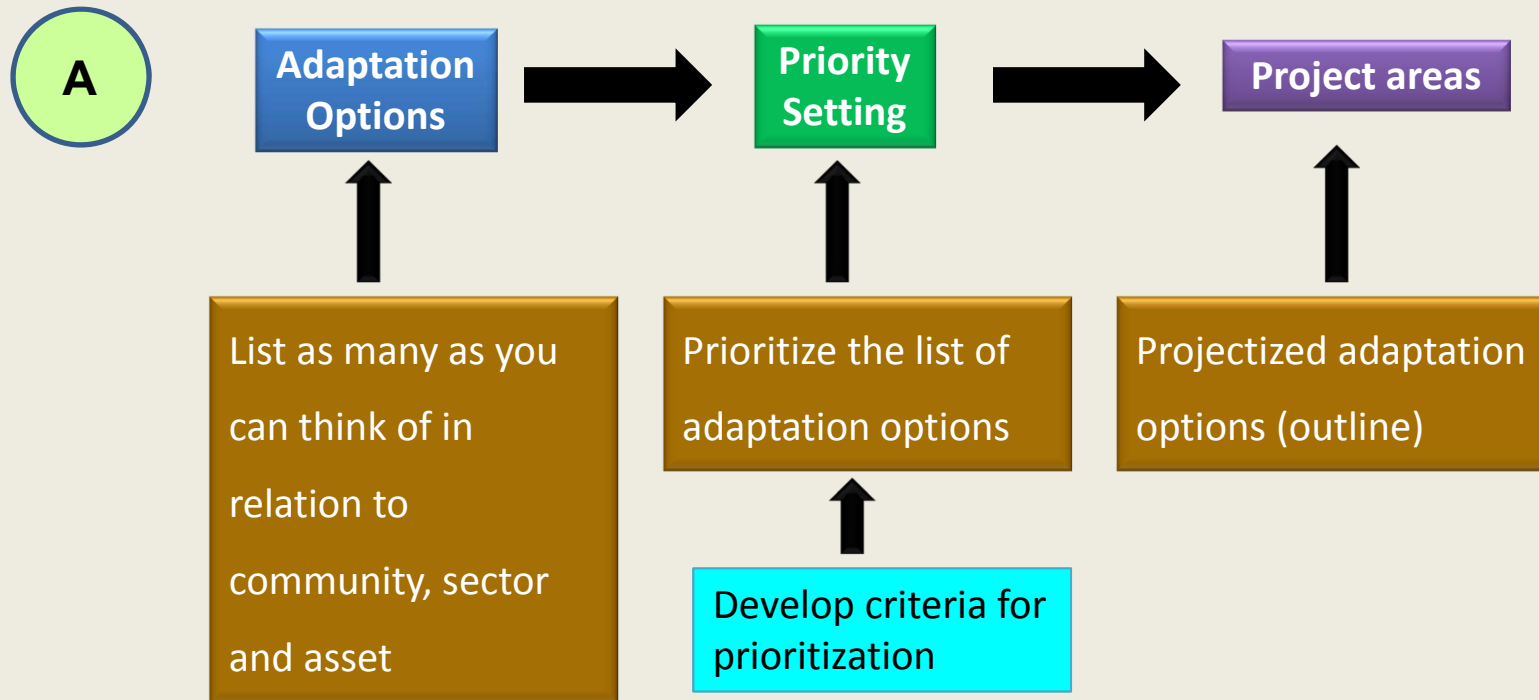
⇒ *Catastrophic*: loss of life, livelihood or system integrity; massive injuries & deaths, displaced people, comprehensive building and infrastructure damage, huge financial loss



4 **Response**

DETERMINATION

Through expert judgment and community consultation determine adaptation options, and prioritize, and design investment package to build resilient capacity of the sector / system components and assets.



## 4 Response

### DETERMINATION

Through expert judgment and community consultation determine adaptation options, and prioritize, and design investment package to build resilient capacity of the sector / system components and assets.

#### **(a) Determination for adaptation response:**

Adaptation builds climate change resilience in communities, sectors and areas across. Opportunities for increasing adaptive capacity can be found in natural, built, social, economic and institutional systems, for example:

- ⇒ Engineering options (e.g. flood protection dykes, sea walls and drainage systems)
- ⇒ Traditional local strategies (e.g. terracing and selection of crops)
- ⇒ Social responses (e.g. resettlement and migration)
- ⇒ Land use planning (e.g. zoning and development controls)
- ⇒ Economic instruments (e.g. subsidies and tax incentives)
- ⇒ Natural systems management (e.g. rehabilitation, conservation, watershed management)
- ⇒ Sector specific adaptation practices (e.g. agriculture - species, cropping patterns)
- ⇒ Institutional options: associated institutional and administrative innovations

***Cont.***

**(b) Prioritization criteria for adaptation options:**

A wish list of adaptation options will be generated from observation and people through consultation processes (examples given in appendix 4a above). These adaptation options must be prioritized to allow for determining project areas and investment package. The important question to ask is, 'What adaptation actions are most important?' The following criteria must be used in conjunction with expert opinion:-

- ⇒ Direct and effective impacts in addressing CCI
- ⇒ Multiple effects and range of socio-economic beneficial impacts
- ⇒ Replicable to other concern areas
- ⇒ Availability of technology and expertise
- ⇒ Have synergic impacts with other existing adaptation interventions

**Cont.**

- ⇒ Government commitment through:
  - Government policy, e.g. National Climate change policy
  - Government strategies and plans, e.g. NAPA, NBSAP, MUP Development Plan
  - Government guidelines and procedures, e.g. code of logging practice
- ⇒ Effectiveness in addressing the impacts of climate change
- ⇒ Urgency of action in addressing the impact
- ⇒ Number of people benefiting
- ⇒ Community support
- ⇒ Available resources for implementation
- ⇒ Commitment or interest from Government and development partners

**Cont.**

**(c) Ranking criteria for livelihood resources and opportunities:**

There are many resources supporting peoples' survival and livelihood, and there are also available livelihood opportunities which may be explored or pursued to enhance resilience of people and systems. These criteria will be used to rank in order of **importance** the livelihood resources and opportunities identified:-

- ⇒ Life-saving resources or opportunities
- ⇒ Most common income generation resources or food security resources
- ⇒ Under-or undeveloped resources or opportunities with potential for income generation or food security
- ⇒ Unique and rare resources or opportunities worth developing.

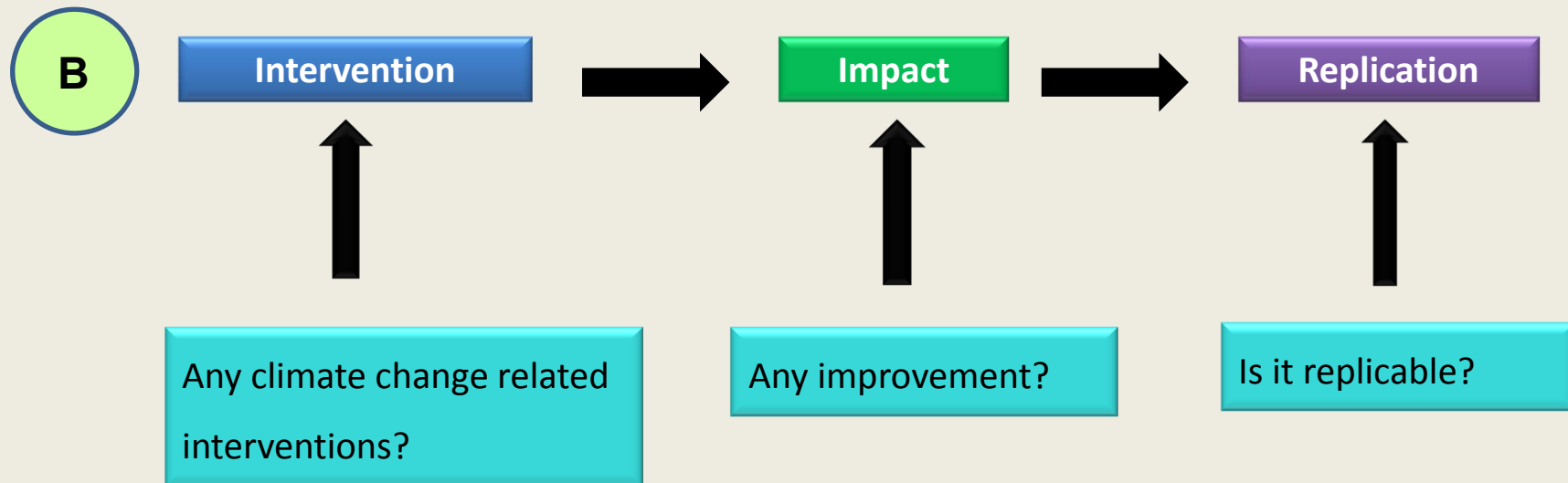
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**(d) Ranking criteria for livelihood resources and opportunities:**

The identified livelihood resources and opportunities are not free from many challenges created by climate change. These criteria will be used to rank in order of most **vulnerable** livelihood resources and opportunities identified:-

- ⇒ Geographical location of resources or opportunities
- ⇒ Historical accounts of the resources or opportunities in relation to past extreme events
- ⇒ Peoples' observation / perception on track of events affecting the resources or opportunities
- ⇒ Cross-cutting nature of the resources or opportunities

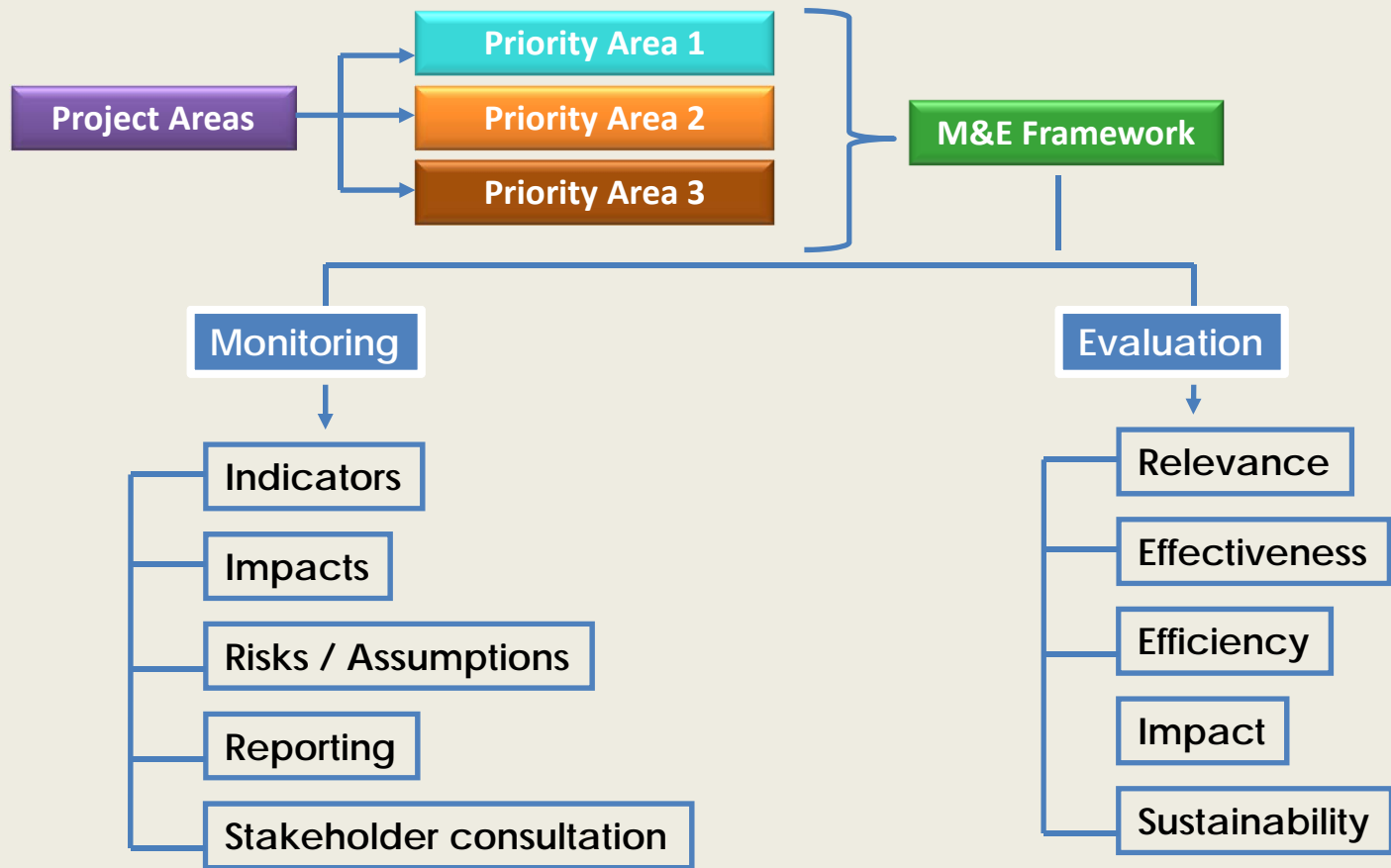
## LEARNING FROM OTHER STAKEHOLDERS INTERVENTIONS



5 **Feedback**

**INTERVENTION**

Monitor and evaluate impacts of adaptation interventions through a M&E Framework developed for the implemented projects or investments.





5

**Feedback**

INTERVENTION

Monitor and evaluate impacts of adaptation interventions through a M&E Framework developed for the implemented projects or investments.

### **(a) Monitoring and Evaluation Framework:**

The application of M&E system is vital to determine the progress, and verify the benefits from the improvements of the current situation. Without M&E, there would be no means of knowing the status and performance of the intervention undertaken.

#### **(i) Variables for monitoring:**

⇒ *Indicators:* A list of measurable indicators must be identified for monitoring purposes. For, an indicator would be the length of graveled road and stabilized river and creek within Kirakira.

⇒ *Reporting:* Overall reports on the progress of each project output, and to ensure the implementable activities are monitored on regular basis.

## **Cont.**

⇒ *Stakeholder consultation / Participation*: Periodic workshops to report back on the progress of the project will be monitored to ensure relevant stakeholders are consulted and participated in the implementation process.

⇒ *Impact*: The monitoring of the impact of the project to ascertain the achievement of its objectives will be conducted through an independent evaluation, but there will be an internal evaluation and monitoring as part of an overall operational strategy.

⇒ *Risk*: The monitoring of the level of risks affecting the project to ensure safeguards are implemented to reduce risk level.

⇒ *Assumptions*: The monitoring of the assumptions made for the project to ascertain any changes which may adversely affect the intervention.

**Cont.**

**(ii) Variables for Evaluation:**

- ⇒ *Relevance*: examines the extent to which the intervention is suited to the priorities and policies of the MUP and target communities.
- ⇒ *effectiveness*: measures the extent to which a intervention attains its objectives.
- ⇒ *Efficiency*: measures the outputs in relation to the inputs to determine whether the intervention uses the least costly resources possible to achieve the desired results.
- ⇒ *Impact*: examines positive and negative changes as a result of the project. This includes direct and indirect effects and expected and unexpected effects.
- ⇒ *Sustainability*: relates to whether the benefits of the project are likely to continue after the closure of the intervention.

**Cont.**

**(iii) Matrix for M&E to assess different adaptation interventions:**

IMPACT EVALUATION							IMPACT MONITORING		
Intervention	Relev	Effectiv.	Efficin.	Impact	Sustain	Evaluatn respons	Parameters to monitor	Frequency & means of verification	Monitoring responsibility
Catchment Conservation							Indicators		
Coastal Protection							Impacts		
Soil Improvement							Risk		
							Assumptions		
							Reporting		
							Stakeholder Participation		

## SUMMARY

The characteristics of the **CECBA**:

⇒ Three fundamental pillars include: Community, Ecosystem and Climate

⇒ The interaction of Community, Ecosystem and Climate is the central focus and the basis of reasoning, investigation and interpretation.

⇒ Integration is the underlying value of CEC approach, methodology and process in addressing the impacts of interaction between the three fundamental pillars - Community, Ecosystem and Climate.

⇒ CEC based approach and methodology has five steps in the process. Under each of the five steps are tasks to perform. A number of activities are listed under these five tasks.

**Thank You**