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Criteria for monitoring and evaluation of climate change adaptation measures

Technical Note

**Project “Construction of schemes of monitoring and evaluation
of adaptation in Mexico for the formulation of evidence-based
public policies” (INECC-CONACYT)**

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1. Background

The Intergovernmental Panel on Climate Change (IPCC) Special Report on the impacts of global warming of 1.5 ° C (IPCC, 2018) estimates, with a high level of confidence, that human activities have caused approximately 1.0 °C of global warming, above pre-industrial levels, with a likely range of 0.8 °C to 1.2 °C. Global warming is considered likely to reach 1.5 °C between 2030 and 2052.

The answers to climate change are grouped into mitigation and adaptation measures. For the United Nations Framework Convention on Climate Change (UNFCCC), adaptation is defined as “adjustments in ecological, social and economic systems, in response to actual or expected climate stimuli and their effects or impacts, refers to changes in processes, practices, and structures to moderate potential damages or to benefit from opportunities associated with climate change” (UNFCCC, 2019a).

In Mexico, the General Law of Climate Change (LGCC, for its acronym in Spanish) understands adaptation as “adjustments in human or natural systems, in response to climatic stimuli, projected or real, or their effects, which can moderate damage, or take advantage of its beneficial aspects” (DOF, 2012). For this document, the definition of adaptation established in the LGCC will be used as the starting point for the adaptation planning process.

Mexico is a particularly vulnerable country to the impacts of climate change due to its geographical location, topography and socioeconomic characteristics (SEMARNAT-INECC, 2018), which differentially affects the population, as well as productive activities and natural systems, through water scarcity, loss of crop yields, presence of vector-borne diseases, damages on human settlements and infrastructure as a result of flooding, loss of biodiversity and ecosystem services, among others (DOF, 2014). In the face of this scenario, it is important to promote adaptation to climate change as a way to address impacts and reduce the vulnerability of natural and social systems.

In Mexico, the formalization of the climate change topic in the public agenda started from the publication in 2012 of the LGCC, which sets a precedent in the institutional arrangements for the formulation of public climate change policy and establish the concurrence of powers of the federation, federative entities and municipalities. As part of this route for the attention of different policies, mechanisms, strategies and interventions in mitigation and adaptation have been implemented as the main pillars that support government action to tackle climate change.

To support the generation of scientific and technical knowledge for decision-making, the National Institute of Ecology and Climate Change (INECC, for its acronym in Spanish) through the General Coordination of Climate Change Adaptation and Ecology (CGACCE, for its acronym in Spanish), develops scientific research related to adaptation to climate change, through the characterization of the conditions of vulnerability to climate change, the identification of adaptation

needs and the adaptation planning that promote the reduction of vulnerability to climate change of social and natural systems.

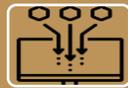
Adverse effects due to changes in the current and future climate system are inevitable, so adaptation actions and strategies in the country's socio-ecosystems are necessary and urgent. Faced with a context with high uncertainty and scarce financial resources, it is urgent to identify, implement, monitor and evaluate actions, processes, and capacities developed for adaptation to climate change, based on the environmental, economic, social, cultural and institutional conditions.

Based on that, the INECC develops the project “Construction of schemes of monitoring and evaluation of adaptation in Mexico for the formulation of evidence-based public policies” with the financial support of the National Council of Science and Technology (CONACYT, for its acronym in Spanish), which seeks to identify and develop quantitative and qualitative tools that contribute to monitor and evaluate adaptation actions to climate change, promoted by the public, private and civil society sectors in different regions of the country.

The project has 5 lines of work that include the compilation of adaptation measures developed in the country, methodologies for its monitoring and evaluation, a proposal for its economic analysis, the identification of financing flows, and their articulation with the National Atlas of Vulnerability to Climate Change (ANVCC, for its acronym in Spanish) (Figure 1).

Figure 1. Project lines of work.

Lines of work



Collection and mapping of adaptation measures to climate change in Mexico



Development of methodology for Monitoring and Evaluation of adaptation measures implemented in the territory



Methodological proposal for Measurement, Report and Verification of climate finance for adaptation



Monitoring of the recommendations of the National Atlas of Vulnerability to Climate Change, for the municipalities of the country



Development of methodologies for the economic analysis of adaptation measures

Source: own elaboration.

From these lines of work, the following products are expected:

1. General criteria for monitoring and evaluation (M&E) of the design of climate change adaptation measures, strengthened and validated through collective dialogue with key stakeholders.
2. Criteria, tools, and indicators for the M&E of adaptation measures implemented in situ.
3. Mapping of adaptation actions and generation of a database.
4. Measurement, report and verification guideline for climate finance for adaptation.
5. Follow-up tool of the recommendations of the National Atlas of Vulnerability to Climate Change.
6. Methodology for the economic analysis of adaptation measures.

1.1. Objective

This document aims to contribute to the first line of work, which refers to the criteria for the evaluation of the design of climate change adaptation measures, built from the collective dialogue with key stakeholders, to move forward with the proposal of M&E schemes.

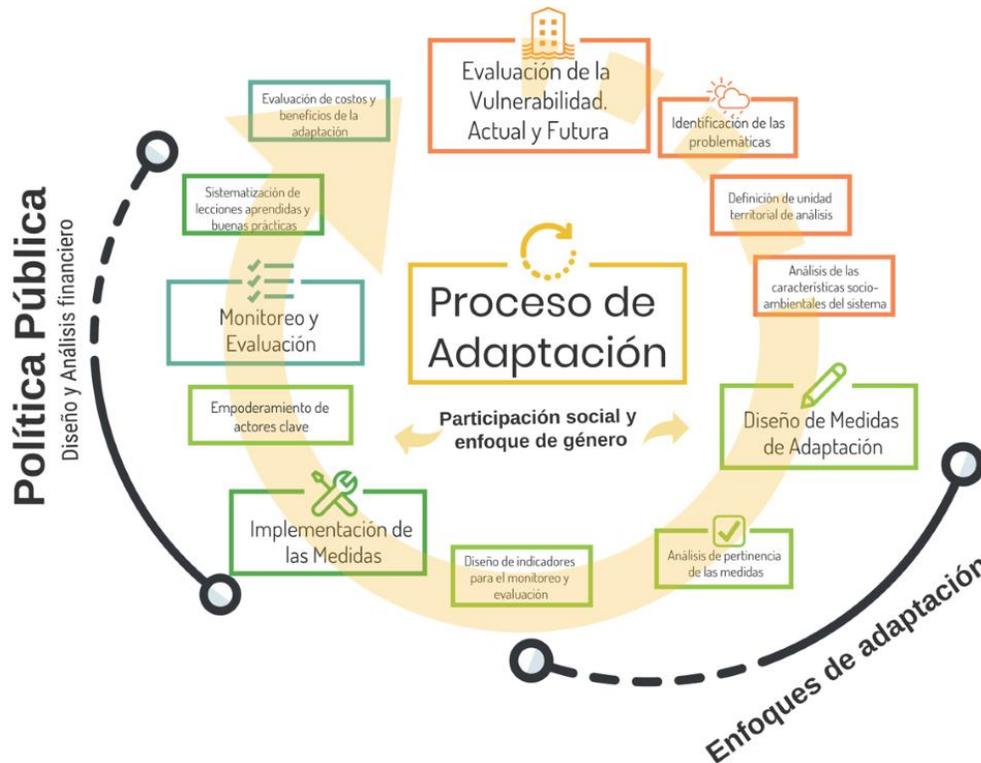
2. Conceptual framework of the project

2.1. Climate Change Adaptation Process

Mexico recognizes that adaptation is a fundamental component to face the impacts of climate change, for which it is necessary to include strategies and actions in territorial planning, management of natural resources, development of productive practices, water and food assurance and disaster risk management.

There is no single solution For adaptation to climate change, due to adaptation depends on the context of a community, organization or region. To strengthening the conceptual and methodological basis in terms of adaptation, the CGACCE-INECC developed a conceptual framework for the Climate Change Adaptation Process, which considers four general phases (Figure 2).

Figure 2. Climate Change Adaptation Process in Mexico (available only in Spanish).



SEMARNAT-INECC (2018).

The phases of the Adaptation Process are:

1. *Assessment of current and future vulnerability*¹: the process begins with the identification of climate-related problematics, territorial unit definition, socio-environmental characteristics of the system analysis, as well as an analysis of the adaptive capacity of institutions and communities.
2. *Design of adaptation measures*: Adaptation measures are actions or strategies whose main objective is to reduce the vulnerability identified in the first phase of the process, by reducing sensitivity or increasing adaptive capacity. Mexico has adopted three approaches² to reduce vulnerability: Ecosystem-based Adaptation (EbA), Community-based Adaptation (CbA) and Adaptation based on Disaster Risk Reduction (AbRRD). The measures are designed in the context of local socio-environmental and financial conditions.

¹ The vulnerability of a system is a function of the exposure, sensitivity and adaptive capacity of that system (IPCC, 2007). To have an adequate characterization of vulnerability, it is important to consider the observed climate and future climate projections.

² These three adaptation approaches have been promoted internationally for several years and are not exclusive to each other, they are often complementary.



- Ecosystem-based Adaptation (EbA). Refers to the use of biodiversity and ecosystem services, as part of an overall adaptation strategy, to help people to adapt to the adverse effects of climate change (CBD, 2009).
 - Community-based Adaptation (CbA). Seeks to improve the capacities of local communities to adapt to the impacts of climate change. It requires an approach that combines community and traditional knowledge with innovative strategies to reduce vulnerability to climate change (CARE, 2010).
 - Adaptation based on Disaster Risk Reduction (AbRRD). It focuses on disaster risk management related to climate variability, extreme events, and preparedness for risks related to climate change (ADPC, 2013).
3. *Implementation of adaptation measures:* Focuses on implementing adaptation measures designed to reduce the vulnerability identified in phase one of the process. During this stage, it is important to generate agreements between the different stakeholders, to promote the sustainability of the actions implemented and strengthen the capacities of the population.
 4. *Monitoring and Evaluation of adaptation measures:* It consists in identifying the impact on the reduction of the vulnerability of the system and the sustainability of the measures implemented, as well as in documenting and systematizing lessons learned.

The importance of social participation with a gender approach throughout the entire Climate Change Adaptation Process is highlighted. The involvement of local key stakeholders, public servants of the different government orders, representatives of the academy, non-governmental organizations and the private sector, is essential during each stage of the process since the success of adaptation projects depends on it.

2.2. The concept of an adaptation measure

In addition to the general definition of adaptation, it is relevant to mention that an adaptation to climate change measure seeks to generate the necessary adjustments to respond to actual or expected impacts of climate change, by reducing vulnerability. The scope of these measures will depend on various such as economic and capacities.

These adjustments include modifications in the legal or regulatory framework, institutional development, infrastructure development and technology, public awareness, knowledge dissemination, as well as in social practices, financial support, distribution of public services before a climatic emergency, prevention

campaigns, in addition to the practices that promote ecosystem services. (IPCC, 2014a; INECC, 2018; Lesnikowski et. al 2011).

2.3. Theory of Change of the Adaptation Process

Climate change adaptation is a dynamic process that cuts across scales and sectors of intervention, and extends long past any normal project cycle (Bours et al., 2014a). In addition to the complexity of adaptation, due to the heterogeneity of solutions, given a multiplicity of local circumstances and problems, the uncertainty of climate change and its effects on natural and human systems are added.

Likewise, adaptation interventions occur against the background of evolving baselines: climate, environmental and economic, posing challenges for attribution and evaluation, including the relative lack of examples for comparative purposes (STAP, 2017). In that sense, there is a relative consensus among M&E experts that Theory of Change (ToC) is one of the more robust approaches to designing and evaluating climate change adaptation and other programs with complex problems (Bours, et al., 2013), and considering that donors and international financial mechanisms recommend their use to support adaptation measures and projects susceptible to climate financing.

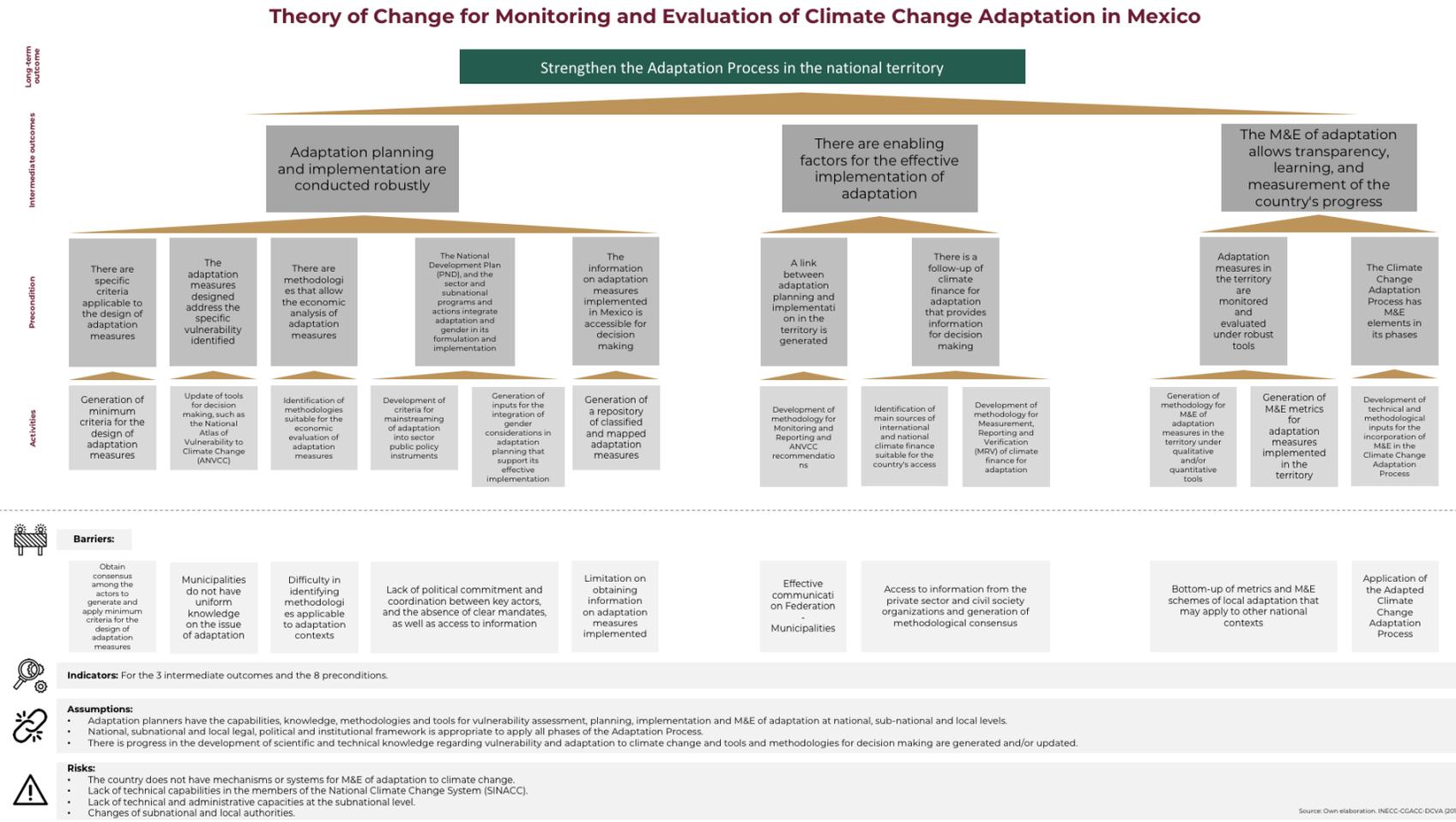
The ToC approach is a process of project planning and evaluation which maps the relationship between a long-term goal of a project and the intermediate and early changes that are required to bring it about (International Conservation, 2013). Indicators (usually called "outcomes" or "preconditions") are identified for each step along the pathway, together with thresholds that would signify that an overall objective has been met (Bours et al., 2014b).

In Mexico since 2014, the ToC has been one of the conceptual basis for the periodic and systematic evaluation of the National Climate Change Policy (PNCC, for its acronym in Spanish), which explains, in a given context the process by which a series of Conditions, Preconditions and specific Preconditions generate a long-term goal, whose causal relationship is reflected in a results framework (INECC, 2017).

The ToC of the PNCC has as its ultimate goal the transition to a sustainable, resilient and low-carbon national development to reduce the negative effects of climate change, and establishes as a Condition (fundamental axis) in matters of adaptation the strengthen of the process of adaptation in the national territory (Idem).

Based on the PNCC, this project proposes, through a ToC approach, a results framework scheme for M&E of climate change adaptation, which establishes as a long-term goal to strengthen the Adaptation Process in the national territory, for which three strategic objectives are contemplated: a) the planning and implementation of adaptation are conducted robustly; b) there are enabling factors for the effective implementation of the adaptation; and c) the M&E of adaptation allows transparency, learning, and measurement of the country's progress. Likewise, the intermediate results or preconditions necessary for the achievement of the goal are listed, as well as the activities, barriers, assumptions, risks contemplated and it denotes where indicators should be generated (Figure 3).

Figure 3. Theory of Change for Monitoring and Evaluation of Climate Change Adaptation in Mexico.



Source: own elaboration.

3. Monitoring and evaluation schemes for adaptation

The 2015 Paris Agreement includes several provisions that help countries to communicate their adaptation priorities, assess progress and provide reliable information on the actions they have taken, including the support received, to advance their adaptation priorities and objectives (Smith et al., 2019).

The Paris Agreement put forward a new "Enhanced Transparency Framework" (ETF) to monitor, report, and review information relevant to the implementation of the UNFCCC. This includes information related to impacts, risks and vulnerabilities, adaptation priorities and barriers, policies, measures taken to adapt, and monitoring and evaluation of adaptation (including the establishment or use of national systems for M&E of the implementation of adaptation measures), in order to build mutual trust and confidence between countries (ECBI, 2019; Smith et al., 2019; UNFCCC, 2019b).

The ETF aims to provide a clear understanding of climate change actions undertaken by countries, including information on good practices, priorities, needs, and gaps. This is to serve as a basis for the preparation of the Global Stocktake, which will assess the collective progress towards achieving the purpose and objectives of the Paris Agreement, which the first one will be presented in 2023 and every five years thereafter (UNFCCC, 2015).

Monitoring is a continuous process of management and implementation of an ongoing measure. Monitoring focuses on inputs, activities and intermediate products. In this sense, monitoring is the collection of data, represented in quantitative or qualitative metrics, that provide information on the progress and performance of an intervention against the planned measure. The monitoring collects information, in the short term to have evidence of the long-term benefits, it also allows identifying and correcting possible deviations from the proposed goals (OECD, 2002; Zall-Kusek, J and RC Rist, 2005; Gertler, et. al. 2011; Dinshaw, et. al, 2014; Price-Kelly, et. al. 2015).

The evaluation, meanwhile, is an objective assessment at a specific point in time, used to determine the worth or utility of a measure, in addition to the contribution to the fulfillment of established objectives, as well as the identification of success or failure factors (OECD, 2002; Zall-Kusek, J and RC Rist, 2005; Gertler, et. al. 2011; Dinshaw, et. al, 2014; Price-Kelly, et. al. 2015).

The evaluation, complemented with monitoring information, makes it possible to obtain a comprehensive analysis of the relevance, efficiency, effectiveness, and expected impacts, as well as the lessons learned during its formulation and implementation (OECD, 2002). An evaluation can be carried out at various times during the adaptation process, in the design, commissioning or from the analysis of the results once completed. Monitoring and Evaluation (M&E) are complementary tools applicable throughout the life cycle of a measure, considering the purpose, the definition of the object and the scale of analysis.

Likewise, the M&E of adaptation aims to track the progress of adaptation interventions and analyze how these interventions are reducing vulnerability to climate change (Price-Kelly, et. al. 2015).

In this sense, adaptation M&E schemes allow:

✓ *Improve informed decision making in a context of uncertainty.*

✓ *Increase the success rate of adaptation investments considering limited resources, which is important due to the urgency of addressing the impacts of climate change.*

✓ *Strengthen transparency and accountability mechanisms on financial and human resources, in addition to improving aspects of effectiveness and efficiency.*

✓ *Generate learning of the Climate Change Adaptation Process (good practices and lessons learned).*

✓ *Provide evidence on changes in practices, processes, and structures that affect climate change adaptation.*

✓ *Check if the measure is on its way and, where appropriate, correct its course of action.*

✓ *Inform the progress of the country in terms of climate change adaptation in international and national contexts.*

The conceptual approach used for the project is based on an Evaluation-Monitoring-Evaluation scheme of the Climate Change Adaptation Process, that is, the adaptation measures are evaluated during its design, monitored along with their implementation and progress and finally evaluated at their conclusion (Figure 4).

Figure 4. Scheme of the M&E of adaptation conceptual approach to adaptation (available only in Spanish).



Source: own elaboration.

This document will focus on the first step of the conceptual approach of the project, which consists of the evaluation of the design of adaptation measures. For which, a series of “minimum criteria” is proposed to consider for the design of adaptation measures.

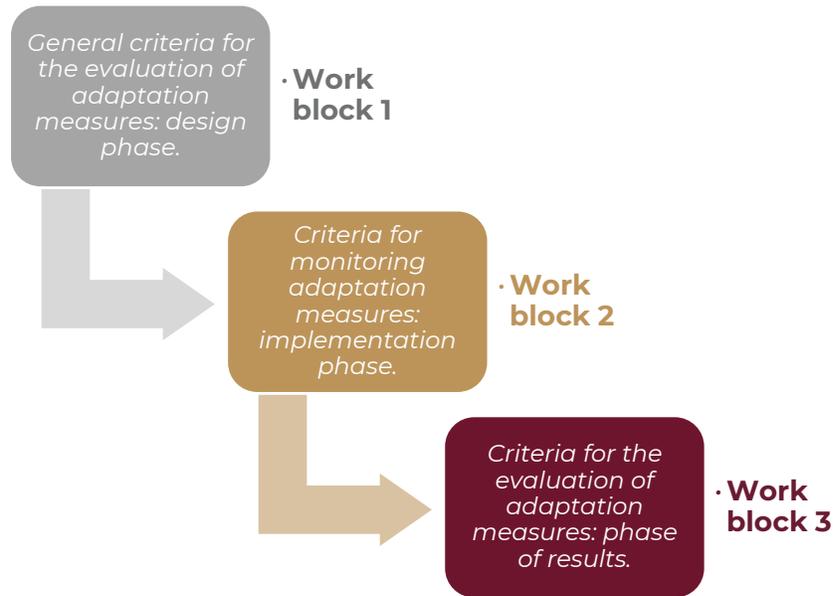
4. Climate change adaptation criteria: contributions to evaluate the design of an adaptation measure

The criteria for design adaptation measures allow planners and decision-makers to formulate measures with a greater probability of success, and to maximize their impact, in terms of reducing vulnerability to climate change, by considering enabling factors and barriers to their implementation.

Based on the document “Minimum elements for the elaboration of the Climate Change Programs of the Federative Entities” (SEMARNAT-INECC, 2015), the section “Criteria for the prioritization of adaptation measures” of the National Climate Change Strategy, Vision 10-20-40 (Gobierno de la Republica, 2013) and own technical contributions, INECC established a list of criteria for the evaluation of adaptation measures, which was strengthened and validated with key stakeholders, in the “Workshop on general adaptation criteria” in July 2019 (INECC, 2019).

The workshop convened 92 participants from more than 24 government institutions, civil society, and academia and was structured based on the review of initial criteria and definitions contained in three work blocks (Figure 5).

Figure 5. Work blocks of the workshop.



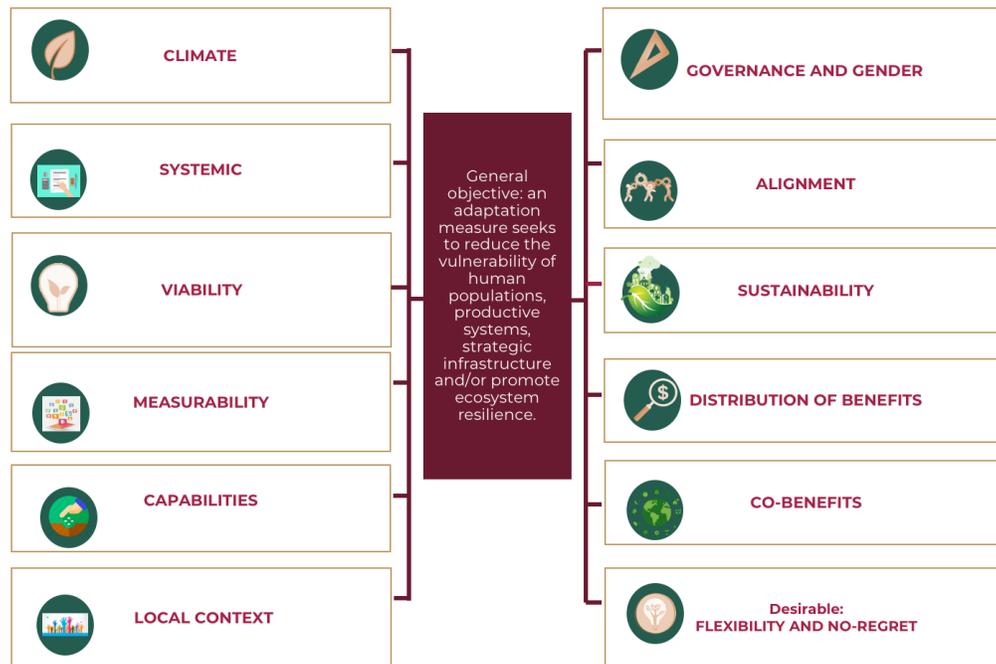
INECC (2019).

These criteria were defined through narratives and descriptions that provide a guide for a qualitative assessment of adaptation.

4.1. Minimum criteria for the design of adaptation measures

Any adaptation measure must consider as fundamental and essential criterion, to seek the reduction of vulnerability to climate change of human populations, productive systems, strategic infrastructure and/or promote the resilience of ecosystems; for this reason, this objective is considered as the guiding axis for the design of any adaptation measure (Figure 6).

Figure 6. Validated criteria for the evaluation of the design of climate change adaptation measures.



Source: own elaboration (See annex 1).

The climate criterion refers to a measure addressing current and/or projected conditions and problematics related, directly or indirectly, to climate change, climate variability, and extreme events, based on available information. This criterion guides adaptation measures since it refers to the condition that is changing and that has adverse effects on the population, strategic infrastructure and ecosystems.

It is important that climate change adaptation measures explicitly state in their objectives the adverse effects of climate change, climate variability and extreme events they intend to address. These adverse effects can be analyzed with scientific-technical information as well as with the knowledge of the local population.

The systemic criterion refers to the fact that the site for which a measure is designed is a system in which the elements are interrelated. Considering a “socio-ecosystem” approach allows identifying the positive and negative effects that the implementation of the measure can have on the rest of the system.

The systemic approach allows integrated management that considers land, water, climate, biodiversity, as well as the management of environmental services provided by ecosystems. The term socio-ecosystem is used to emphasize that human communities are explicitly considered.

Viability refers to the possibility that an adaptation measure can be carried out based on its technical, economic and social attributes, as well as the context in

which it is promoted. This element includes the analysis of limitations and opportunities, considering economic, technical or technological, social, cultural, institutional, regulatory and political variables for its implementation, as well as social and environmental safeguards.

The measurability criterion establishes that an adaptation measure must consider a baseline (e.g. assessment of vulnerability to climate change), explicit goals and metrics that facilitate its monitoring and evaluation.

The capacities represent the skills, resources, and competencies that people, institutions and communities possess to solve problems and propose strategies in an innovative way that facilitate the modification of unfavorable conditions, in a sustainable way (PNUD, 2009). This criterion seeks that the adaptation measure strengthens the technical, financial, organizational and/or human resources capacities at the community and institutional level.

The local context considers those social, economic, cultural, political and environmental characteristics that are present in a specific territory. An adaptation measure is expected to consider that vulnerability is differentiated among social groups of a community.

Governance is a broad notion of participation for decision-making, which is not restricted to the work of the public sector but transcends the generation of networks with different actors and their dynamics of collaboration. Specifically, climate governance requires the articulation of actions and participation of actors in a multi-scalar and transversal way (Adapt Chile, 2016).

In the case of an adaptation measure, the population, civil society, and government should be actively involved, with a human rights approach, incorporating their knowledge and experience in all phases of the Adaptation Process and promoting local ownership of the measure. This criterion considers gender, age groups, intergenerational justice, indigenous intercultural communities, and populations particularly vulnerable to climate change.

Additionally, it is important that an adaptation measure, to be effective, contributes to reducing inequality gaps, particularly gender.

Alignment refers to the articulation and congruence that adaptation measures have with territorial planning instruments and international, national and subnational public policy, in order to contribute to the fulfillment of commitments in the matter.

Sustainability represents the continuation of benefits from an adaptation measure after completion, considering the probability that they will be continued in the long term. In this sense, they are the net benefits that are likely to withstand risks over time (OECD, 2002). A sustainable measure over time can be considered as one in which its benefits continue after the implementation period, based on the availability of economic, social and institutional resources to continue it.

The distribution of benefits focuses on ensuring that the positive effects are distributed in a fair, equitable, inclusive and transparent manner. It is recommended that these benefits include a greater number of people who are in

conditions of vulnerability to climate change, so that the gaps in social inequality are not exacerbated and, if possible, reduce them.

Co-benefits are all those positive effects both anticipated and not expected in the initial objectives of the implementation of the adaptation measure and that affects the improvement of other objectives related to well-being. These positive effects depend on local circumstances, so they may present high uncertainty when replicating adaptation measures (IPCC, 2014b).

These positive effects can be reflected in environmental, social or economic variables, as well as in synergies with mitigation. On the other hand, negative externalities must be identified and consider their effect on the viability of the project.

4.2. Desirable criteria for the design of adaptation measures

In addition to these criteria considered as a minimum for the design of adaptation measures, others that are desirable, and not always present in all the alternatives proposed, and refer to flexibility and no-regret, which stands for the dynamic nature of adaptation based on changing social and environmental conditions.

The flexibility allows reversibility in the measures, in case if they do not respond to the climatic, environmental and social conditions with which they were planned, thereby reducing the social and economic costs of unforeseen circumstances.

The no-regret criterion refers to measures that can have positive effects regardless of the climate scenario in question, being commonly win-win actions (Hallegatte, 2009).

In this sense, the adaptation measure would have the capacity to modify its structure, design, goals or implementation procedure, if any failure or change in climate pathways and socio-environmental and economic characteristics is identified.

5. Conclusions

This document identifies important criteria for the design of adaptation measures that focus on reducing the vulnerability of human populations, productive systems, strategic infrastructure and/or promoting ecosystem resilience.

The criteria proposed seek to highlight the elements that must be included in the design of an intervention to promote its success, to specify which attributes characterize an adaptation measure, within the diversity of environmental and development interventions.

Likewise, the ultimate goal of these minimum criteria for adaptation measures is to establish the conceptual basis and elements to assess their quality, feasibility, and sustainability, which provide inputs for the development of monitoring and

evaluation schemes and recommend improvements in these measures in the face of changing contexts and scarce resources and favoring a sustainable development model.

The appropriate design of adaptation measures not only allows the objective of reducing vulnerability to climate change to be fulfilled but also encourages them to be carried out at the lowest possible cost, in order to drive financial flows towards new interventions and serve a greater number of communities.

In addition, by laying the groundwork for monitoring and evaluation of adaptation measures, the contribution of each intervention to the country's goals can be made visible and will help focus actions in priority regions, as well as avoid duplication of efforts. Starting from the premise that robust adaptation planning will lead to effective implementation in the territory.

The following step to be work on are:

- ✓ Analyze and develop criteria for monitoring the implementation and evaluation of the results.
- ✓ Develop the metrics that must accompany these criteria.
- ✓ The formulation of information gathering and M&E of adaptation tools.
- ✓ Field validation of these tools.



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7. Annex. General criteria – Design phase

| Criteria for the evaluation of an adaptation measure – Design phase. | |
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| General objective: an adaptation measure seeks to reduce the vulnerability of human populations, productive systems, strategic infrastructure and/or promote ecosystem resilience. | |
| <i>Criterion</i> | <i>Description</i> |
| <i>The measure...</i> | |
| CLIMATE | Addresses current and/or projected conditions and problematics related, directly or indirectly, to climate change, climate variability, and extreme events, based on available information. |
| SYSTEMIC | Must consider the different components of the socio-ecosystem in which it is implemented and the relationships between them. |
| VIABILITY | Includes an analysis of limitations and opportunities, which considers economic, technical or technological, social, cultural, institutional, regulatory and/or political variables for its implementation, as well as social and environmental safeguards. |
| MENSURABILITY | Considers a baseline (assessment of vulnerability to climate change), as well as explicit goals and metrics of its progress, which allow its monitoring and evaluation. |
| CAPABILITIES | Strengthens the technical, financial, organizational and/or human resources capacities at the community and institutional level. |
| LOCAL CONTEXT | Parts of a participatory diagnosis, and addresses specific problematics and considers the environmental, social, economic and cultural characteristics of the territory. |
| GOVERNANCE AND GENDER | Actively involves the population and civil society, based on a human rights approach, incorporating their knowledge and experience in all phases of the Adaptation Process and promoting local ownership of the measure. It includes gender, age groups, intergenerational justice, indigenous communities, and populations particularly vulnerable to climate change. |
| ALIGNMENT | Is consistent and articulated in the territory with development and climate change policy instruments at the international, national and sub-national level. |
| SUSTAINABILITY | Benefits continue after the implementation period, based on the availability of economic, social and institutional resources to continue it. |
| DISTRIBUTION OF BENEFITS | Seeks that the benefits are distributed in a fair, equitable, inclusive and transparent manner. |
| CO-BENEFITS | Favors additional positive effects in environmental, social and/or economic variables. May include synergies with mitigation. |
| Desirable: FLEXIBILITY AND NO-REGRET | Can modify its structure, design, goals or implementation procedure, if any failure or change in climate pathways and socio-environmental and economic characteristics is identified. |

Source: own elaboration.