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"Capacity Development" for Climate Change Adaptation in International Cooperation

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Abbreviations

ADB	Asian Development Bank
CPI	Climate Policy Initiative
CTCN	Climate Technology Centre and Network
DAC	Development Assistance Committee
DFID	Department for International Development
DRR	Disaster Risk Reduction
EBPM	Evidence-Based Policymaking
FAO	Food and Agriculture Organization of the United Nations
GCF	Green Climate Fund
GEF	Global Environment Facility
GHG	Green House Gas
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit GmbH (German Agency for International Cooperation)
IPCC	Intergovernmental Panel on Climate Change
JICA	Japan International Cooperation Agency
LLDCs	Least Developed Countries
ODA	Official Development Assistance
OECD	Organisation for Economic Co-operation and Development
PCCB	Paris Commission on Capacity Building
PDCA	Plan-Do-Check-Action
RCP	Representative Concentration Pathway
SIDS	Small Island Developing States
SSP	Shared Socioeconomic Pathway
UNDP	United Nations Development Programme
UNDRR	United Nations Office for Disaster Risk Reduction
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
USAID	United States Agency for International Development

Introduction

Background

Recently, an important issue for developing countries is to strengthen their capacities under international cooperation to adapt appropriately and effectively to the increasingly severe impacts of climate change. Since the sectors impacted by climate change are diverse and depend on the characteristics and conditions of each country and region, adaptation measures need to be planned and implemented according to the circumstances of each country and region. It is also necessary to predict the long-term impacts of climate change and implement adaptation measures in a planned, flexible manner. Therefore, individuals and organizations implementing adaptation measures are required to have different capabilities and skills from those in other policy areas. To effectively strengthen the capacity to adapt to climate change impacts, especially in countries and regions vulnerable to climate change, it is essential to foster a common understanding of "capacity development" for climate change adaptation in the context of international cooperation.

Internationally, under the United Nations Framework Convention on Climate Change (UNFCCC), which was agreed in 1992, there have been discussions on the implementation of adaptation measures and mainstreaming adaptation, as well as on how to support developing countries in strengthening their adaptation capacity. One of the main objectives of the Paris Agreement, which was agreed by governments under the Convention in 2015, is to enhance the adaptive capacity to the adverse effects of climate change as well as to strengthen climate resilience. In accordance with this objective, all countries are expected to step up their adaptation efforts. However, because many countries, especially those vulnerable to climate change, lack the necessary capacities to plan and implement adaptation measures, it is essential to strengthen these capacities through international financial and technical support. The Paris Agreement acknowledges the importance of such support by the Parties, taking into account needs of developing countries.

To effectively and efficiently implement the Paris Agreement provisions on adaptation and capacity building, governments of developing countries, which implement capacity development, and the countries and institutions that support them, first need to have a common understanding of "capacity development" for climate change adaptation through international cooperation. At present, however, such a common understanding has not been developed. Each donor agency defines capacity development in international cooperation in general terms, while the specific capacity development needs in the field of adaptation have not been sufficiently discussed. A clear definition of capacity development for climate change adaptation in international cooperation that can be shared by all parties concerned is needed in order to properly promote international cooperation, to strengthen the capacity of developing countries, and to mainstream and steadily implement climate change adaptation.

Objective and Scope

Considering this background, this publication discusses the definition of capacity development for climate change adaptation in international cooperation. Climate change adaptation is an administrative effort to tackle urgent adaptation issues diffused over different time scales, namely the earth system, anthropogenic climate change, and development, with risk reduction measures that are highly specific to each region and context. This is a "tricky issue" that cannot be eliminated from the uncertainties inherent in the scientific knowledge on which policy decisions are based. With this wide range of challenges in mind, this publication attempts to define the "capacities" required for a local government officer in developing countries in the Asia-Pacific region, ranging from planning to coordination of funds needed to implement adaptation measures, with the aim of providing a framework for the continuing challenges and cooperation needs. For the purpose of this definition, we assume that the local government officers in developing countries in need of capacity development are in charge of climate change and disaster risk management working for autonomous governmental organizations in medium-sized local cities in the least developed countries (LLDCs) of Asia-Pacific, where decentralization has progressed to some extent. The main actors in the design, construction and implementation of specific adaptation measures and projects, as well as the monitoring and evaluation of the results, are generally not government officers, but staff of international aid agencies, consultants employed on a project basis, and engineers of construction companies. For this reason, the technical skills required for the design and implementation of adaptation measures are not included in the scope of this document.

Based on this objective and scope, this publication tries to identify the intrinsic value of international cooperation on climate change adaptation and to suggest some of the ways in which capacity development should be strengthened. Through these efforts, we hope that the approaches summarized in this publication will promote efficient and effective international cooperation and contribute to the steady implementation of adaptation measures in each region.

Structure of Chapters

This publication consists of two chapters. First, Chapter 1 presents six factors that should be taken into account as capacity development for climate change adaptation and provides the debate on capacity development that has developed in the area of international cooperation in general. Based on discussions in Chapter1, Chapter 2 identifies capacities to be considered and defines "capacity development" for climate change adaptation in international cooperation. It is hoped that this publication will promote a better understanding of capacity development in the field of climate change adaptation and help countries and regions to accelerate their efforts to improve their adaptive capacity, reduce their vulnerability, and enhance their resilience.

Table of Contents

Chapter 1
Understanding of Climate Change Adaptation and Capacity Development in International Cooperation

1-1 Key Features of Climate Change Adaptation to be Considered in International Cooperation

1-1-1 Background of International Cooperation for Climate Change Adaptation

The issue of climate change is a transboundary threat, so international cooperation is essential to tackle it. The United Nations Framework Convention on Climate Change (UNFCCC) in 1992 requires the Parties to acknowledge "that the global nature of climate change calls for the widest possible cooperation by all countries and their participation in an effective and appropriate international response, in accordance with their common but differentiated responsibilities and respective capabilities and their social and economic conditions". Developed countries have been called upon under the Convention to provide financial, technical and capacity support to developing countries that are vulnerable to the impacts of climate change so that to they can cope with the impacts of climate change.

Against this background there are the contrasting positions of developed countries, which have historically contributed to climate change by emitting greenhouse gases, and developing countries, which are the most vulnerable to the impacts of climate change. This inequality has long been the basis of the "loss and damage" argument for compensating for losses due to climate change, as it has created the perception that developed countries have an obligation not only to stop climate change but also to have a responsibility to support developing countries so that they can cope with the effects of climate change. Considering the current situation of some developing countries which are increasing their greenhouse gas emissions aiming for economic development at a late stage, developing countries are also required to cope with climate change, depending on the capabilities and circumstances of each country. The Paris Agreement, adopted in 2015, requires all Parties, regardless of their stage of economic development, to enhance their adaptive capacity, strengthen their resilience, and reduce their vulnerability to climate change. The Paris Agreement provided some guidelines for international cooperation on climate change adaptation. Under this guidance, there is a need to intensify efforts to build resilience in the whole world through voluntary adaptation efforts by developing countries and various support by developed countries. International cooperation on climate change adaptation is distinct from efforts to address other development issues in that it is clearly defined by international agreements. It is more complex than most development issues, however, and thus international cooperation is not easy to achieve. This section summarizes the main points that international aid agencies should keep in mind when implementing international cooperation in the field of climate change adaptation, as well as the features of climate change adaptation issues in international cooperation in that local government officials in developing countries, who are facing the urgent issue of climate change adaptation, should be aware of when planning and implementing adaptation measures.

1-1-2 Relationship between Mitigation and Adaptation

There are two approaches to climate change countermeasures: "mitigation" of climate change by reducing greenhouse gas emissions, and "adaptation" to climate change impacts by adjusting social systems, and these are regarded as playing dual, complementary roles. However, planning and implementation of climate change adaptation measures are generally more difficult than those for mitigation projects. As shown in Table 1, mitigation and adaptation measures differ in many ways, including their nature, limitations, who bears the costs and when, and who can benefit from their utility (Wilbanks et al. 2003; Füssel and Klein, 2006; Swart and Raes, 2007). For example, it is not easy to set quantitative targets for adaptation as opposed

to mitigation targets, which can be assessed by the amount of greenhouse gas reductions. Therefore, it is difficult to set clear objectives and achievement indicators for international cooperation on climate change adaptation. In addition, there is no unified scale to measure the expected effect of adaptation measures in each sector to reduce the risks to the social system. Therefore, when measures are being considered for different issues in a region, it is not easy to rank them in order of importance and urgency, and it is difficult to determine which issues should be prioritized for investment of limited funds and human resources to strengthen the resilience of the community. In addition, mitigation measures are generally monetizable and can be expected to mobilize private funds in addition to government subsidies and official development assistance (ODA) for their commercialization. In contrast, many adaptation measures are implemented as public goods through development funds and ODA grant aid from developed country governments. Thus, although mitigation and adaptation are considered to be two wheels of a cart, there are significant differences in the implementing measures and mobilization of funds, while the necessity of adaptation measures is ultimately influenced by the success or failure of mitigation measures.

In addition to these differences between mitigation and adaptation, it is important to understand that mitigation to deter climate change and adaptation to reduce vulnerability are mutually complementary, as they both have the effect of reducing the negative impacts of climate change on social systems. Since anthropogenic climate change is caused by greenhouse gas emissions, long-term changes in the external climatic forces will have a significant impact on the success of climate change mitigation efforts toward a net-zero society with 2050 as the target year. In other words, if the world as a whole is able to achieve a net-zero GHG emissions society, it will be possible to control anthropogenic external climate forces.

Therefore, government officials in charge of policy-making for climate change adaptation need to understand the position of adaptation measures in comparison with mitigation measures. In planning and implementing climate change adaptation, it is necessary to take into account the specific circumstances of adaptation in the implementation of international cooperation, especially in the implementation phase of technical cooperation and capacity development projects. For developing countries to become more resilient to climate change, international aid agencies implementing international cooperation on climate change adaptation need to deepen their understanding of the features of climate change adaptation in international cooperation.

Table 1 Comparison of Mitigation and Adaptation to Climate Change Impacts

	Mitigation Measures	Adaptation Measures
Targeted Issue	Single (greenhouse gas reduction)	Infinite
Unified Units	Exists (greenhouse gas reductions)	Not yet available
Spatial scale of countermeasure effectiveness	Avoiding global change	Preventing local damage
Time scale of countermeasure effectiveness	Long term (benefits from avoided climate change)	Short term to long term (benefit from reduced vulnerability and increased resilience)
Beneficiaries	Entity different from the implementing entity	Implementing entity
Monitoring	Easy	Difficult

Source: based on Wilbanks et al. (2003); Füssel and Klein (2006); Swart and Raes (2007)

1-1-3 Key Features of Climate Change Adaptation

As mentioned in the previous section, appropriate climate change adaptation planning and implementation require an understanding of the features of climate change adaptation as opposed to mitigation. In this section, the features of adaptation are categorized into the following six elements, and each of them is described below.

1. Time frame beyond the project cycle
2. Diversity of needs
3. Inseparability from development issues
4. Need to identify issues based on scientific knowledge
5. Policy decision making under uncertainty
6. Difficulty in readiness for finance

(1) Time frame beyond the project cycle

The time frame to be considered in the implementation of climate change adaptation measures extends considerably longer than for conventional development measures. Climate change adaptation often refers to taking (additional) measures to account for climate change impacts on a longer time frame than for conventional development issues (Klein, R. J. 2011). These longer-term impacts include those that may take decades to become apparent. For example, long-term projections have been made for slowly progressing phenomena such as sea level rise, which is expected to rise by more than one meter by around 2100 (IPCC, 2019). However, addressing long-term impacts is difficult for taxpayers, politicians, and the private sector to commit to (Eisenack et al., 2014). This mismatch between the policy cycle time frame and the long-term process of climate change impacts can be an impediment to decision-making on climate change adaptation measures (Biesbroek et al., 2009). Therefore, in the planning and implementation of climate change adaptation measures, it is a challenge to realize a project cycle that takes into account the long-term manifestation of impacts, such as “adaptive management” (e.g., the introduction of the PCDA cycle), where measures are flexibly revised according to the latest scientific findings from monitoring and evaluation.

(2) Diversity of needs

Since the impacts of climate change are diverse depending on the geographic characteristics, socioeconomic conditions, and the nature of the affected groups, climate change adaptation measures must be designed and implemented according to those characteristics and needs.

First, it should be noted that adaptation needs are dependent on the local context. It is not appropriate to directly apply climate change adaptation measures of a particular country or region directly to another country or region. Understanding adaptive capacity according to regional specificities, identification of priority issues, and consideration of corresponding adaptation measures is required for adaptation planning and implementation entities. For example, in small island developing States (SIDs), sea level rise and storm surges caused by tropical cyclones will increase the risk of coastal flooding, while in landlocked least developed countries (LLDCs), glacial lake outburst floods and depletion of water resources due to temperature rise are of concern. Furthermore, a robust process is needed to select adaptation measures that meet local needs from various perspectives, including the economic structure of each country and social and cultural factors.

Second, since climate change affects all groups, including nations, regions, communities, private companies, individuals and ecosystems, adaptation at these different levels will be necessary, requiring multilayered measures. For example, short-term impacts of climate change include loss of income due to reduced crop yields at the individual level, paralysis of urban functions due to weather-related disasters at the sub-national level, and loss of international competitiveness due to the current state of available natural resources at the national level. In addition, adaptation may include measures to deal with transboundary issues as well as domestic issues, such as the increasing severity of weather-related disasters caused by climate change and the resulting problems of internally displaced persons, and the outbreak of regional conflicts due to depletion of water resources. These multi-sectoral interactions and needs at various policy levels produce institutional fragmentation (Eisenack et al., 2014). Overcoming fragmentation and integrating cross-sectoral and vertical policy processes is key in promoting comprehensive adaptation measures.

(3) Inseparability from development issues

Climate change adaptation needs are cross-cutting and multilayered. As mentioned earlier, the challenges of climate change adaptation are diverse, and climate change adaptation measures should address each potential climate change impact in various sectors, such as disaster prevention, water resource management, agriculture, forestry, fisheries, public health, and infrastructure development. Not only are there diverse needs in each of these areas but also they are interconnected, making the issues that climate change adaptation addresses inordinately complex.

Climate change adaptation can be viewed as a long-term, integrated process from future climate prediction and impact assessment to risk mitigation. In this way, there is a wide range of issues that require adaptation, and international cooperation on climate change adaptation largely overlaps with traditional economic development issues and disaster prevention projects. In addition, to reduce vulnerability to climate change impacts, it is essential to address development issues that are not necessarily related to climate change, such as poverty reduction and governance, and development can be seen as the starting point of the adaptation process (Schipper, 2007). Therefore, it can be seen that climate change adaptation is inseparable from existing development issues, and that there is an infinite number of issues that require implementation of climate change adaptation measures. This is in contrast to mitigation measures, which are implemented solely for the purpose of reducing greenhouse gases. However, in many developing countries with limited financial and human resources, it is difficult to implement adaptation measures for all these diverse issues. Therefore, international cooperation on climate change adaptation requires both recipient countries and international aid agencies to identify urgent and important issues for which adaptation measures should be prioritized, based on a better understanding of the unique aspects of local communities. This will require an understanding of the assumptions described below.

(4) Need to identify issues based on scientific knowledge

Planning of adaptation measures should identify adaptation measures of high importance and urgency for a country or region from among an infinite number of issues. To do this, it is necessary to consider adaptation measures based on future climate projections using scientific knowledge, and to identify realistic adaptation measures based on social science knowledge. The Sixth Assessment Report of the Intergovernmental Panel on Climate Change combines the traditional “Representative Concentration Pathway” (RCP) with the “Shared Socioeconomic Pathways” (SSP), which have a different meaning, to present a future world in five forms. In contrast to the RCP, which intentionally did not include a socioeconomic narrative, the SSP describes a pathway for how the world’s population growth, economic growth, access to education, urbanization, resource availability, and technological development might change over the next 100 years, and how the world might develop in the absence of climate policy. The evolution of scenarios that take into account all these factors can help to more accurately picture the future and promote appropriate adaptation measures based on the need to respond.

In planning climate change adaptation measures, it is impossible to address all climate change impacts, and it is necessary to simultaneously consider the extent to which the risks identified based on future projections should be accepted (Dow et al., 2013). In other words, both international aid agencies and recipient countries need to recognize that there are “adaptation limits”, and the use of social science knowledge plays an important role in this regard. Limits to adaptation refer to the absence or inability to implement climate change adaptation measures due to, for example, compliance with safety standards and other social goals such as ensuring air and water safety, ensuring equity, and maintaining cultural livelihoods, or due to natural system constraints (IPCC, 2014). Limits to adaptation also include the future availability of climate change adaptation measures due to technological innovations and changing values, which are also highly relevant to institutions. For example, when coastal communities facing imminent threats from coastal erosion are faced with the need to relocate, their ability to actually take that option will depend on the availability of political and financial support from competent governments. Therefore, the limits of adaptation are dynamic, dependent on the passage of time and institutional changes, and require assessment by the actors planning adaptation measures (Adger et al., 2009; IPCC, 2014). Social science knowledge can also be effective in understanding the diversity

of needs in different regions, and in applying indigenous knowledge or knowledge gained from past disaster experiences to adaptation.

Therefore, a combination of natural and social sciences, impact assessment, and an understanding of the "adaptation limits" are essential to identify priority adaptation measures, while keeping in mind future climate change impacts. The identification of priority adaptation measures is particularly desirable in developing countries where resources are limited.

(5) Policy decision making under uncertainty

Uncertainty is always involved in the planning and implementation of climate change adaptation (Heal and Kriström, 2002). Uncertainty in this context can be viewed from a variety of aspects. Uncertainty inherent in scientific knowledge can be divided into three categories: uncertainty in future projections that must be divided into scenarios, uncertainty inherent in climate models and impact assessment models, and unresolved uncertainty arising from internal changes in the climate system. Uncertainty involves concepts including volatility, complexity, and ambiguity.

In addition, socioeconomic scenarios must also be considered (Riahi et al., 2017). While natural stochastic uncertainty can be reduced to some extent by scientific and technological advances, our understanding of the various elements of society that are constantly changing is limited. The actors who plan and implement climate change adaptation measures need to recognize that socio-economic uncertainties such as projections of human behavior (e.g., future patterns of consumption and technological change), population dynamics, and changes in distribution will probably affect climate change policy more than natural probabilistic aspects such as data and models (Heal and Millner, 2014).

Another uncertainty is the dependence of global greenhouse gas emissions on human behavior (Dessai & Hulme, 2004). Scenarios that could be taken in the future to reduce greenhouse gas emissions from climate change measures, or mitigation efforts, have traditionally been envisioned through RCPs that describe various levels of greenhouse gases and other radiative forcing. While the RCPs provide a rough set of global pathways, which of these pathways the world will actually follow will depend on national policy mitigation efforts, so there is uncertainty about the degree of adaptation that will be required in future. This implies that climate projections and impact assessments alone are not necessarily sufficient to understand the impacts of climate change or the need for adaptation.

Furthermore, apart from common uncertainties in natural science fields dealing with nonlinear earth systems and ecosystems, uncertainty as a range of value judgments in policy decision making cannot be ignored. The data and information used in policy decision-making are also probably influenced by the capacity of actors in the decision-making process (Koppenjan et al., 2004; Adger et al., 2009). The implementation and interpretation of natural scientific research reflects organizational and political intentions, which are also elements of uncertainty (Sarewitz, 2004).

These multifaceted uncertainties are barriers to planning and implementation, including leading to underestimation of the urgency of adaptation measures (Biesbroek et al., 2009; Woodruff, 2016). Since the complete elimination of such uncertainty is difficult, decision makers must strategically choose adaptation measures based on various uncertainties related to natural stochastic, economic, political, and cultural factors (Adger et al., 2009). However, in future climate projections, we are forced to assume several possible scenarios that can be taken due to the existence of uncertainties. It is useful to use evidence-based policymaking (EBPM), i.e., the policy effects of adaptation measures shown by simulations and past case studies, to correctly interpret them and select strategic adaptation measures. EBPM is the process of clarifying policy objectives and basing them on evidence, rather than relying on ad hoc information. EPBM can be a powerful tool not only for efficiently implementing adaptation measures with limited resources, but also for demonstrating the relevance of proposed adaptation measures when accessing international climate finance.

(6) Difficulty in readiness for finance

Compared to mitigation, financing climate change Compared to mitigation, financing climate change adaptation measures by public organizations and private sectors is more challenging. As mentioned above, it is difficult to separate climate change adaptation from conventional development issues because it involves all sectors, and it is not easy

to grasp the current status of adaptation funding. However, it is clear that more funding is required to meet the global need for climate change adaptation. According to the United Nations Environment Programme (UNEP), the current demand for adaptation funding in developing countries alone is estimated at US$70 billion per year, and is expected to reach US$300 billion by 2030. According to a study by the Climate Policy Initiative (CPI), actual funding for adaptation, including private investment, averaged US$46 billion between 2019 and 2020, accounting for only 7.8% of total climate funding. This reflects the observations above that the benefits of mitigation can be translated into greenhouse gas reductions, whereas the benefits of adaptation are more localized and regional in nature, including avoiding financial losses, saving lives, and avoiding the loss of natural and cultural values, making it difficult to use a single indicator (Klein et al., 2005). In addition, the benefits of adaptation are realized by reducing the damage caused by future climatic hazards, which requires a different perspective from that of mitigation measures, which always provide a return on investment. For this reason, adaptation measures are difficult to be evaluated by the private sector and investors, and public goods are not likely to be funded by private finance. Therefore, the role of public funds in lowering barriers to entry for private investment remains significant (UNEP, 2021). To mobilize funds for adaptation measures whose essential feature is the avoidance of future damage, it is essential to change the mindset toward investment returns

1-1-4 Conclusion of the Section

In summary, adaptation requires policy formulation from a long-term or adaptive management perspective, and the identification and prioritization of issues. The actors who plan and implement climate change adaptation measures must assume a time frame beyond the normal project cycle, dependence of needs on the local context, the need for measures at various levels, and inseparability from traditional development issues. In addition, constraints due to uncertainty and financial barriers need to be understood and appropriately addressed in planning and implementation of adaptation measures. The actors engaged in adaptation, especially international aid agencies that provide support for adaptation measures in developing countries, and central and local governments of developing countries that request support from external organizations, are required to develop their capacity in light of these complex features of adaptation.

1-2 Discussion on Capacity Development in International Cooperation

The purpose of this section is to extract some issues that may be useful in defining capacity development for climate change adaptation in international cooperation from the current debates on capacity development in international cooperation in general. Capacity development in the context of international cooperation has been widely discussed in the 1990s and 2000s, with the concept of ownership at its core. This section examines the background to the debate on capacity development, the views of aid agencies on capacity development, and the practice of capacity development, taking into account the characteristics of international cooperation in the field of climate change adaptation as summarized in the previous section.

1-2-1 Background of the Discussion on Capacity Development

The first reason for the emergence of the debate on capacity development was the self-criticism of the "technical cooperation type" of aid. This criticism was based on the perception that Western aid agencies' technical cooperation type of assistance to Africa was not sufficiently effective due to difficulties in implementation and management, leading to a phenomenon known as "aid fatigue" at the time (UNDP, 2002). This growing interest in capacity development has had a certain impact on non-Western aid agencies and has led them to reconsider their approach to aid. For example, the Japan International Cooperation Agency (JICA) recognized that the debate on capacity development offered a broader perspective than its previous approach of providing technical assistance to administrative organizations in developing countries (JICA, 2006). This perspective has evolved into an emphasis on co-creation of development, which remains highly significant today.

Through these developments, the approach to aid has shifted to one that emphasizes the ownership of developing countries. Matsuoka (2008) explains this change as a shift from the traditional approach of aid agencies bringing in or replacing technology and knowledge to an approach that "builds on the problem-solving capacities that developing countries themselves have historically developed and supports capacity development by developing countries themselves". At the core of this trend is the concept of ownership, or respect for the autonomy of developing countries (Hori, 2014). The importance of this perspective is also relevant to international cooperation in the field of climate change adaptation, which requires a deep understanding of the climate change impacts and socioeconomic and other circumstances of each country and region (Measham et al., 2011; Shaw et al., 2009).

This change has been emphasized through a series of international efforts to improve the quality of aid, from the adoption of the Millennium Declaration in 2000 to the adoption of the Paris Declaration of Aid Effectiveness in 2005. The Paris Declaration, especially, was agreed upon with the participation of 91 governments, international organizations, and civil society organizations, including Japan, as a fundamental document that affirms the ownership of developing countries in aid practice and forms the basis of current capacity development practices. The Paris Declaration enumerates five principles of aid cooperation, along with ownership, coordination with recipient country institutions and policies, harmonization of aid, aid results-based approach, and mutual accountability. The Paris Declaration affirms that ownership means respecting the decisions of recipient countries in development planning and policy formulation. These principles were confirmed in the Accra Agenda for Action in 2008, and are consistent with the Sustainable Development Goals and the Global Partnership for Effective Development Cooperation. Hence, the ownership principle affirmed in the Paris Declaration, which places the recipient country's own development strategy at its core, forms the basis for the following approach to capacity development.

1-2-2 Approaches to Capacity Development of Aid Agencies

Many international aid agencies have uniquely defined "capacity" and "capacity development" in the 2000s and early 2010s as a guideline for implementing technical cooperation (Table 2).

Table 2 Definitions and Features of Capacity Development by International Aid Agencies

Aid agency	Definitions and Features of Capacity Development	Source
JICA	• Defined "capacity development" as the process of improving the ability of developing countries to cope with challenges at multiple levels, including individual, organizational and social levels. • The discussion on capacity development provides a broader perspective than JICA's previous approach of providing technical assistance to administrative organizations in developing countries.	JICA, 2006
GIZ	• Adopted the OECD-DAC definition in 2006. • They prepared "Capacity WORKS" as a model for the management of capacity development programs.	GIZ, 2013
USAID	• USAID does not rely on a single definition. However, as an example, they refer to the OECD-DAC 2006 definition. • They developed a Human and Institutional Capacity Development (HICD) model. The HICD model shows a series of cycles to identify the root causes of performance gaps of partner institutions in recipient countries and to build a monitoring system for cyclical and continuous performance improvement.	USAID, 2017
DFID	• They adopted the OECD-DAC definition in 2006. • They emphasize assistance to research programs as well as discuss individual capacity development for developing countries to enhance their research capabilities.	DFID, 2013
OECD	• "Capacity development" is understood as the process whereby people, organizations and society as a whole unleash, strengthen, create, adapt and maintain capacity over time. • Through the OECD-DAC, standard definitions are developed and the effectiveness of capacity development is measured on a regular basis.	OECD, 2006
UNDP	• They adopted the OECD-DAC definition in 2006. • UNDP plays an important role in shifting the paradigm of aid from a focus on technical assistance to a paradigm of capacity development.	UNDP, 2009
UNDRR	• "Capacity development" is the process by which people, organizations and society systematically stimulate and develop their capacities over time to achieve social and economic goals. • Capacity development specific to the disaster prevention and mitigation sector is discussed, relying on the Sendai Framework for Disaster Reduction.	UNDRR, 2018
FAO	• They adopted the OECD-DAC definition in 2006. • Discussed the introduction of the concept of capacity development in the Agriculture and Rural Development sector from the perspective of FAO, whose main area of focus is food security.	FAO, 2010
World Bank	• Capacity development is the purposeful use of knowledge and information to achieve capacity outcomes. These outcomes enable local agents of change to initiate and drive forward positive change that contributes to the achievement of specific development goals. • The Poverty Reduction Strategies (PRSPs) and Comprehensive Development Frameworks (CDFs) emphasize the importance of ownership by focusing on specific initiatives rather than on the overall development strategies of developing countries.	World Bank Institute, 2012
ADB	• They adopted the OECD-DAC definition in 2006. • They published a report that outlines issues for capacity building based on trends in the Asia Pacific region.	ADB, 2016

Source: prepared by authors

The definition of capacity development that most Western international aid agencies refer to is the one set forth by the OECD Development Assistance Committee (DAC) in 2006. It begins by defining capacity as "the ability of people, organizations and society as a whole to manage their affairs successfully" and capacity development as "the process whereby people, organizations and society as a whole unleash, strengthen, create, adapt and maintain capacity over time". Even international aid organizations that adopt their own definitions share a common focus on supporting the development of capacities of the people and organizations of the recipient country itself, with a view to respecting recipient country ownership and planning and implementing recipient country-driven development (Venner, 2015). The OECD, in the publication on its definition of capacity and capacity development, points out that it is important to focus on individuals, organizations and institutions, with four concrete steps for implementing capacity development programs (OECD, 2006). The first step is to understand the international and national context. Second, identify resources that can be leveraged to help recipient countries take the initiative and make changes. Third, identify constraints on the part of the donor agencies that need to be overcome and local actors and institutions that need to be leveraged to provide adequate support. Fourth, share the lessons learned from the capacity development project and apply them to the next project. By repeating these steps, the OECD believes that the purpose of capacity development projects is to provide appropriate capacity development programs for countries to exercise their independence.

A few examples, in addition to the standard arrangement by the OECD, have important implications for the purposes of this document. First, ADB has organized trends in capacity development in the Asia and Pacific region in its 2016 report (ADB, 2016). ADB pointed out that in the Asia-Pacific region developments related to institutional aspects such as governance and rule of law have been weak compared to the economic and social growth. Based on this broad picture, ADB argues that it is necessary to implement capacity development programs that are tailored to the needs and circumstances of each country. Furthermore, capacity development plans focusing on institutions need to be implemented at the country level, which requires an understanding of each country's position in the region, the actual situation in each region of the country, and the level of economic development. The report categorizes countries into three groups: vulnerable or conflict-affected countries, low-income countries, and middle-income countries, and then identifies the patterns of capacity development assistance needed for each group of countries. The report suggests that even in climate change adaptation, there is a need to be cognizant of the fact that the approach of assistance to the economic and social system can lead to different effects depending on the context of each country.

The efforts of the UNDRR are also instructive. UNDRR published a report titled " Strategic approach to capacity development for implementation of the Sendai Framework for Disaster Risk Reduction" in 2018, based on consultations with stakeholders on capacity development under the Sendai Framework in the area of disaster risk reduction (UNDRR, 2018). In the report, similar to the discussion in international cooperation in general, capacity is organized into three levels: individual, organizational, and system levels, and then four domains of capacity (leadership, institutional strengthening and development, knowledge, and accountability) and four types of capacity (functional capabilities, technical capabilities, hard capabilities, and soft capabilities) required in the area of DRR are presented. These have a common purpose with the present document, which attempts to position capacity development in the field of adaptation, in that it positions capacity development as one of the practices toward the goal of the Sendai Framework for Disaster Reduction, based on the international agreement on the general framework. Chapter 2 continues to discuss the skills needed for local government officers in relation to international cooperation specific to adaptation.

1-2-3 An Example of Capacity Development - Organized by JICA

This section confirms the principles and practices of capacity development that should also be emphasized in climate change adaptation, using JICA's actual approach in applying the principles of capacity development to project design as a case study. There is a consensus in the international aid community that the basic approach to capacity development is to emphasize ownership by developing countries. On the other hand, international consensus has been reached only in the general area of basic aid policy, and the application of capacity development to specific projects is unique to the practice of each aid agency (Miwa, 2008). JICA's capacity development practices, which are introduced below, provide some insights for the climate change adaptation field.

JICA has identified "inclusiveness" and "endogeneity" as key concepts for capacity development. First, inclusiveness means thinking strategically about the target and scope of capacity development by taking a broad perspective that goes beyond individuals and organizations (Figure 1). Second, endogeneity means encouraging developing countries to make their own decisions and take their own actions, and aid is positioned as a "catalyst" for this (Figure 2).

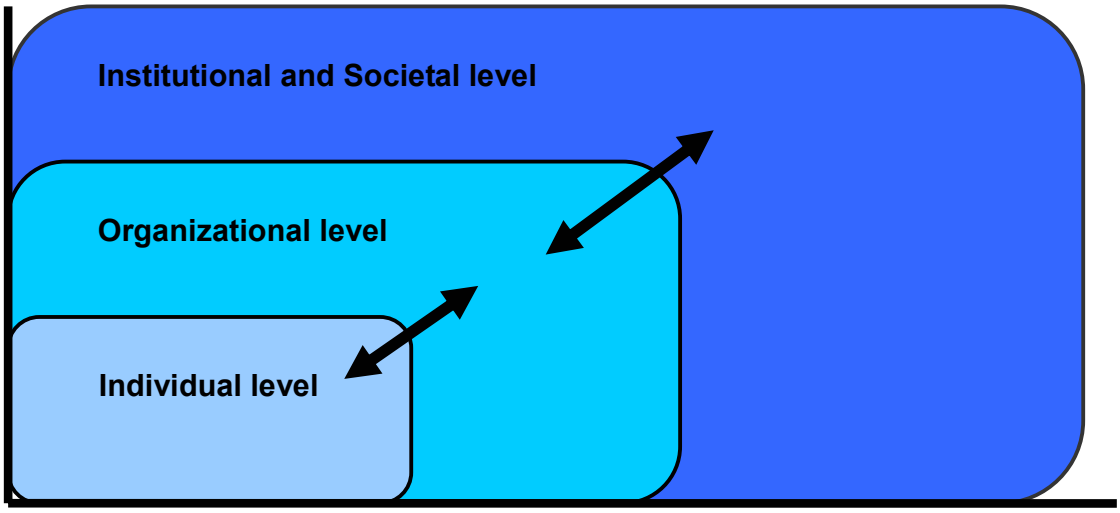

Figure 1 Figure illustrating "Inclusiveness" (JICA, 2006)

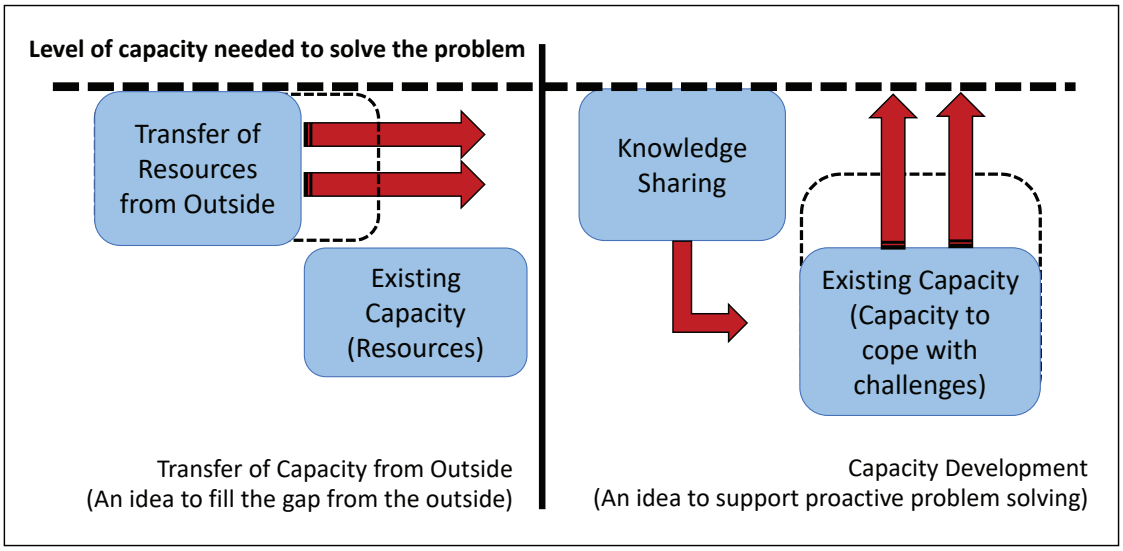

Figure 2 Figure illustrating "Endogeneity" (JICA, 2006)

The above arrangement by JICA relies on the principle of respecting ownership of each developing country. This relies on Japan's ODA charter, which emphasizes support for self-help efforts by developing countries. According to JICA's Capacity Development Handbook, introducing the idea of capacity development into the aid context provides the following guidelines (JICA, 2004). First, as an embodiment of the principle of respecting the ownership of developing countries, the importance of joint work with the participation of stakeholders from the developing country side can be mentioned. It is recommended that such joint work be carried out throughout the entire process of the project, which will enhance the initiatives of developing countries and help to identify local needs. Second, aid requires a long-term commitment. Since capacity development is an intrinsic process that takes time to develop, it will take a reasonable amount of time for its effects to become apparent. Finally, there is the program approach, which means to provide coordinated assistance to the recipient country's own development program. In other words, the approach is conceived flexibly according to the situation and actual conditions of the target country and the status of other international assistance.

JICA, after summarizing the characteristics of capacity development as described above, has proposed three types of assistance, focusing on the target of assistance (or entry point) (Figure 3): individuals, organizations, and institutions. In international cooperation for climate change adaptation, it is possible to use the entry point-based aid typology from the perspective of how to effectively implement vertical and horizontal integration and financial coordination. This point is discussed in more detail in the following chapter.

Schematic diagram of the three approaches of JICA cooperation from the entry point

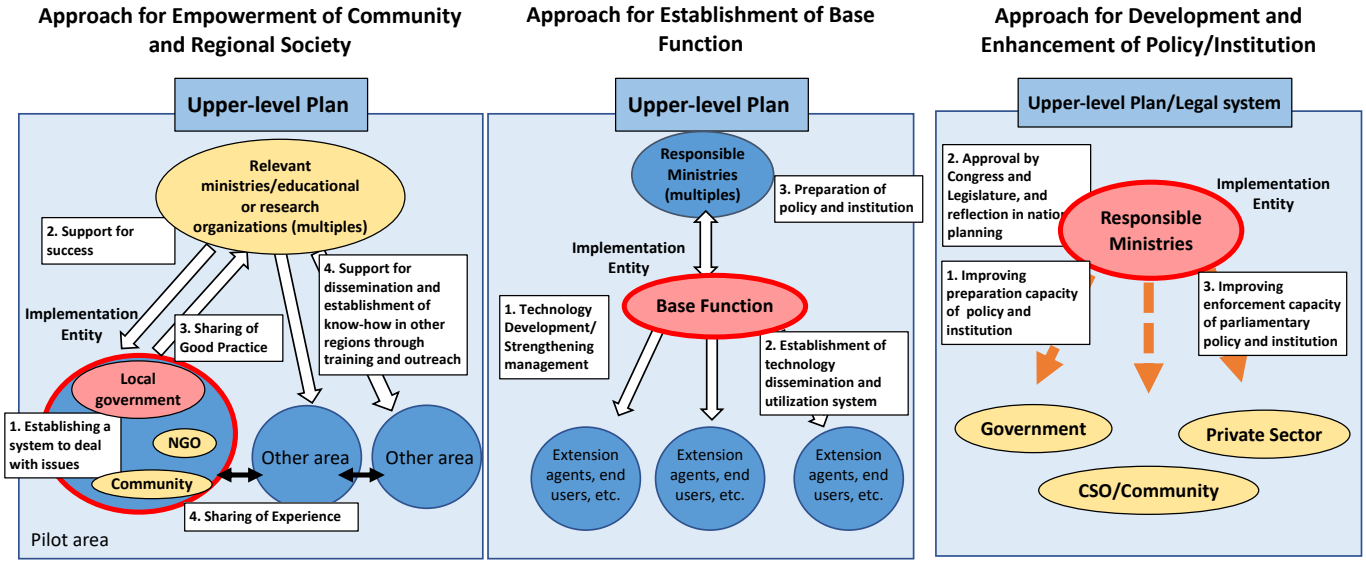

Figure 3 Three Approaches of JICA Cooperation (JICA, 2006)

The above summary of how the concept of capacity development has been put into practice uses JICA's case as an example. In recent years, JICA has emphasized in its capacity-building projects the importance of being an equal partner to the recipient country, based on the concept of co-creation. However, there have been various suggestions for improving the approaches of aid agencies. Matsuoka (2008) points out that while he basically appreciates the direction of capacity development shown by JICA and other aid agencies, there are still many issues that need to be addressed in its implementation. Institutional theory states that an approach to institutions encompasses not only laws and rules but also customs and culture, which are essential for changing the behavior of people and organizations. Institutionalism is a concept that originally appeared in the field of economics, which states that an understanding of institutions that constrain people's behavior is important to explain economic development (North, 2010). Douglas North, one of the leading theorists of institutional theory, argues that people are constrained by institutions but are also agents of institutional

change, and points to the interaction between institutions, organizations, and individuals (North, 1990).

Institutional theory has been accepted in various fields such as political science, organization theory, and sociology (Scott, 2013), and Matsuoka applied this idea to the discussion of capability enhancement. Matsuoka pointed out that for capability enhancement to materialize, changes in people's behavior are necessary, and while relying on a framework that examines the interaction between institutions and individuals and organizations, it is important to position the approach to institutions within the capacity development framework because changes in institutions bring about changes in people's behavior (Matsuoka, 2008). Thus, to make capacity development projects actually operational, it is necessary to focus on the linkages among individuals, organizations, and institutions, rather than viewing them as separate targets for capacity development. This is an important point to consider when discussing capacity development in the context of climate change adaptation, which is characterized by a variety of impacts beyond the environmental and climate change domains.

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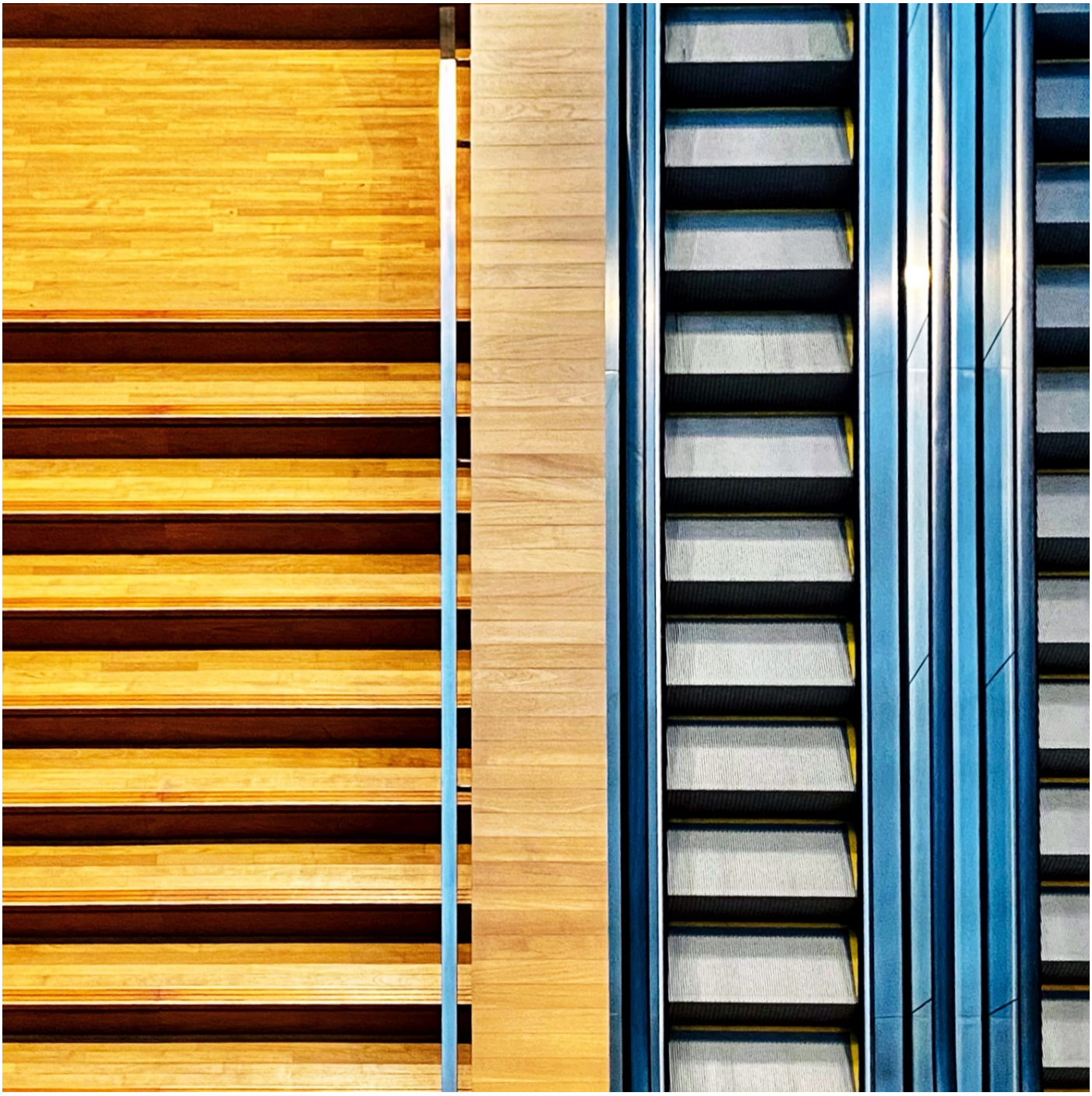
1-2-4 Conclusion of the Section

This section summarized trends in the discussion of capacity development in international cooperation. The Paris Declaration on Aid Effectiveness in 2005 confirmed the importance of ownership as a core concept in capacity development in the field of international cooperation.

The approach of each international aid organization to capacity development was examined. The OECD's definition of capacity development as "the process whereby people, organizations and society as a whole unleash, strengthen, create, adapt and maintain capacity over time " is widely used. In addition, each aid agency has its own distinctive approach to capacity development according to its area of focus. Most relevant for this publication, the ADB, which discussed capacity development in the Asian region, and the UNDRR, which discussed capacity development in the field of prevention and mitigation of disasters, were examined. From this discussion, it was shown that capacity development needs to be implemented in a way that is specific to the region and field it is targeting.

Finally, an example of how the concept of capacity development based on ownership can be applied to actual programs was reviewed, referring to the practice of JICA, a Japanese aid agency. Against the backdrop of institutional thinking, a thought-provoking observation for the field of climate change adaptation is that attention should be paid to the interrelationships among individuals, organizations, and institutions when implementing capacity development.

What are the implications of this discussion of capacity development in international cooperation for the field of climate change adaptation? The next chapter examines the capacity required of local government administrators in developing countries and the capacity development in the field of climate change adaptation, in line with the characteristics of this area of international cooperation.



Chapter 2
Definition of “Capacity Development” for Climate Change Adaptation in International Cooperation

2-1 Background

In Chapter 1, the features of climate change adaptation that should be taken into account in the field of international cooperation are summarized, clarifying the relationship between mitigation and adaptation. In the discussion on capacity development in the field of international cooperation, throughout the 1990s and 2000s, the need for a shift from the traditional aid approach to an approach that "builds on the problem-solving capacities that developing countries themselves have historically developed, and supports capacity development by developing countries themselves" was outlined. Chapter 1 summarizes the trends in the debate on capacity development in international cooperation in general.

In the field of climate change, the Paris Agreement stipulates a clause in Article 11 on "capacity development".[1] Article 11, paragraph 2, states that "capacity development should be country-driven, based on and responsive to the needs, and foster country ownership of Parties, in particular for developing country Parties, including at the national, subnational and local levels".

The same idea can be seen in the capacity development approach of aid agencies in international cooperation, discussed in Chapter 1. According to the OECD DAC definition of capacity development, which many Western aid agencies refer to, capacity development is " the process whereby people, organizations and society as a whole unleash, strengthen, create, adapt and maintain capacity over time" and respects the ownership of the recipient country. It also says that aid agencies should remain in a supporting role. Furthermore, OECD DAC starts by asking, "what is the capacity for?" and focuses on the specific capabilities needed to achieve clearly set goals (OECD DAC, 2006).

In addition, with the conclusion of the Paris Agreement, the Paris Commission on Capacity Building (PCCB), a platform aimed at identifying capacity gaps and needs and potential solutions while enhancing coherence and coordination of developing country capacity development efforts related to climate change, has been established. The PCCB is working to promote cooperation among stakeholders at all levels (local, national, regional, and international), strengthen networks and partnerships to enhance synergies, and facilitate knowledge and experience sharing on capacity building.

Based on the discussion in Chapter 1, Chapter 2 presents the capacities that should be strengthened in governmental officers and in organizations and institutions in the Asia-Pacific region, given the particularities of international cooperation on climate change adaptation. Strengthening of these capacities will facilitate communities in the Asia-Pacific region to take the initiative in implementing adaptation measures in collaboration with relevant organizations such as central governments and business enterprises. Furthermore, "capacity development" for climate change adaptation in international cooperation is defined as encompassing all of the above, and suggests some directions in which the international community should provide support in future.

1 Note that the term "capacity-building" is used in the Paris Agreement, which is different from the term "capacity development" in this document.

2-2 Capacities to be Considered in Defining "Capacity Development" for Climate Change Adaptation in International Cooperation

In this section, necessary elements for defining "capacity development" for climate change adaptation in international cooperation are clarified. Chapter 1 identified the key features of climate change adaptation in international cooperation, and also identified issues that may be useful in defining capacity development in the field of climate change adaptation, based on the discussion on capacity development in international cooperation in general. Based on these considerations, the following six items were identified as particularly important elements. It is suggested that climate change adaptation has unique features and requires discrete capabilities to address them, summarized in Table 3 below.

Table 3 Key Features of Climate Change Adaptation and Capacity to Respond to Them

No.	Key features of climate change adaptation	Capacity expected of government officers
1	Time frame beyond the project cycle	Capacity to correctly handle different time frames in science and policy respectively
2	Diversity of needs	Capacity to respond to community vulnerabilities in an integrated manner
3	Inseparability from development issues	Capacity to mainstream adaptation into relevant policies
4	Need to identify issues based on scientific knowledge	Capacity to understand the implications of the scientific findings underlying the issue identification
5	Policy decision making under uncertainty	Capacity to flexibly introduce adaptation measures in a sequential manner under uncertainty
6	Difficulty in readiness for finance	Capacity to envision and mobilize funding for climate-resilient communities

2-1-1 Capacity to Correctly Handle Different Time Frames in Science and Policy Respectively

The nature of climate change impacts requires a long-term perspective, with climate change impacts projected up to the year 2100 based on socioeconomic scenarios (Figure 4) (Stern, 2006; Malte, 2020). For planning of climate change adaptation, it may be necessary to consider the impact of climate change for a long period of time, such as the end of this century. However, developing countries are not familiar with such long-term planning required for climate change adaptation, as their governments generally progress through a cycle of revising national development plans and sectoral strategy documents of about five years and ten years, respectively. Similarly, many of the adaptation plans, development plans, and sectoral

plans that form the basis for the implementation of climate change adaptation measures, which should take into account medium- and long-term climate change impacts, are designed for the next five to ten years. Therefore, the challenge in implementing climate change adaptation measures is whether the short-term planning and implementation can be carried out with a medium- to long-term perspective. In such cases, while it is beneficial to apply project management methods such as the Plan-Do-Check-Act (PDCA) cycle to adaptation issues for short-term planning and implementation, policy decision-making methods such as the Observe-Orient-Decide-Act (OODA) loop that take into account climate change uncertainties should also be considered for 5- to 10-year policy document revision cycles and adaptation implementation projects with less resilient funding.

In addition, government officials need to prioritize urgent adaptation issues in light of local conditions and climate change projections (see Figure 4 for an example). In other words, government officials need to have the capacity to correctly handle different time frames in science and administration. It should be noted that the importance of a long-term perspective does not negate the importance of addressing urgent short-term issues, as is evident especially in the context of developing countries, where climate change is already having significant adverse impacts.

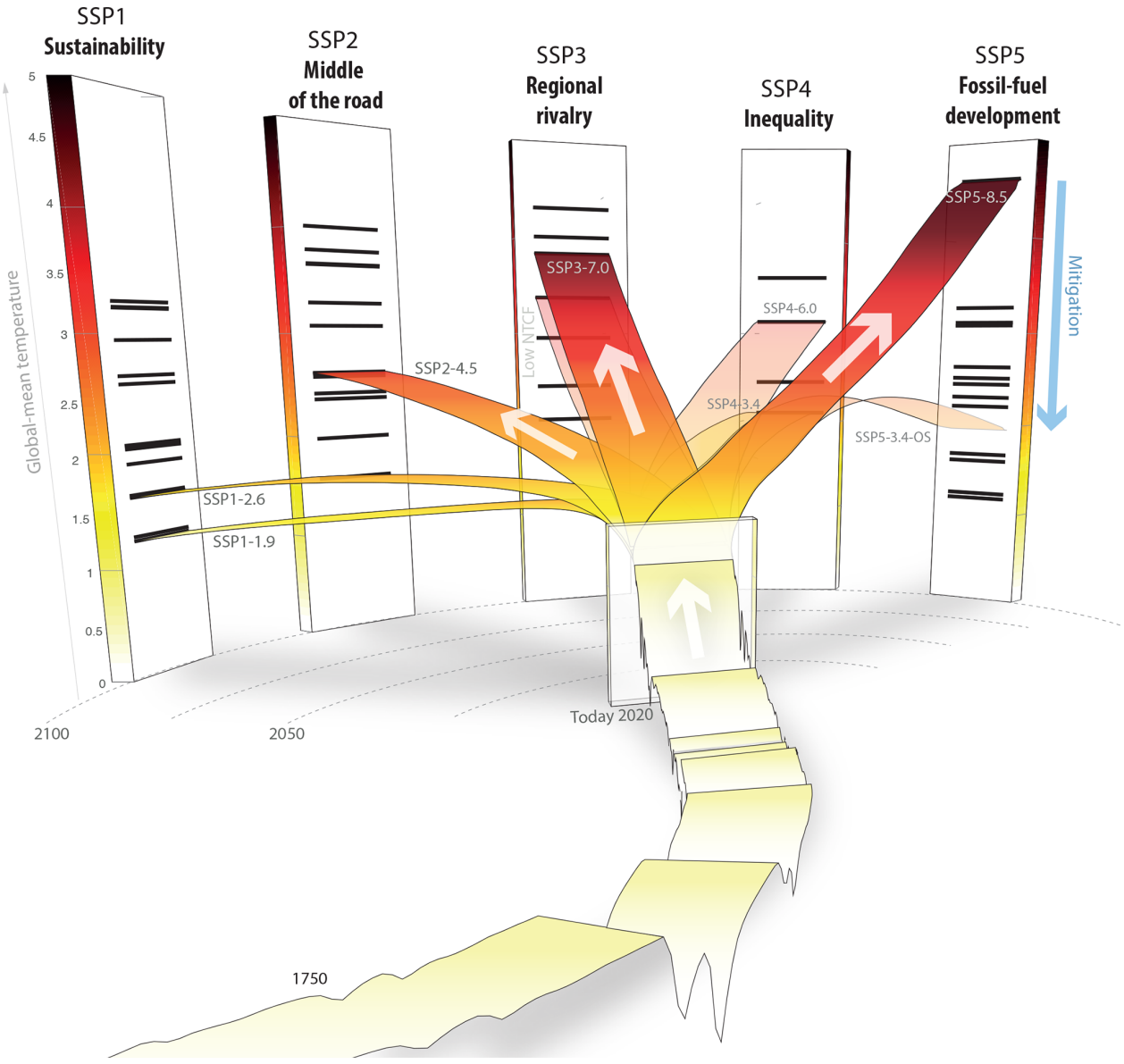


Figure 4 The Result of Prediction of Global Average Temperature Change Based on Socio-economic Scenario (Malte, 2020)

2-2-2 Capacity to Respond to Community Vulnerabilities in an Integrated Manner

For a community to adapt to the impacts of climate change, it is necessary to effectively coordinate responses at the levels of central government, local government, local communities, and the private sector, while addressing the different needs of each level. In identifying vulnerabilities to be addressed by adaptation measures, it is necessary to consider the inclusiveness perspective that takes into account the context of each region as well as identifies vulnerabilities needed to be addressed as a region. Therefore, local government officials need to try to vertically integrate these multilayered relationships while taking into account their own roles. Vertical integration is defined here as "the process of building deliberate and strategic linkages between national and local government adaptation planning, implementation, and monitoring and evaluation (M&E)". At each stage of planning, implementation and M&E, factors that should be considered to facilitate vertical integration include inter-organizational coordination and information sharing. Furthermore, stakeholder involvement is essential for a participatory adaptation process towards integration, and the necessary capacities of stakeholders need to be strengthened through the provision of technical assistance (Dazé, Price-Kelly, and Rass, 2016). To promote vertical integration, it is necessary to have the appropriate institutional structure and the individual capacities to promote vertical integration at the level of local government officials, including their ability to coordinate with officials belonging to different organizations. Promoting integrated measures may also facilitate the readiness for accessing funds, as discussed below. Thus, the capacity to respond to the vulnerability of communities in an integrated manner is required of governmental officials in charge of adaptation policy.

2-2-3 Capacity to Mainstream Adaptation into Relevant Policies

Another element of climate change adaptation that requires a response by organizational and institutional units is to recognize that climate change impacts are interdisciplinary and interconnected, and thus inseparable from development issues. To address this inseparability from the development agenda, horizontal integration is needed. According to Rass (2016), horizontal integration in the field of climate change adaptation means "the integration of new and existing climate change adaptation and development planning processes within all relevant sectors". Multiple agencies need to be involved in the planning and implementation of climate change adaptation measures, and even local government officials assigned to several sections such as environment, development, finance, and aid counterpart departments. For capacity development to be widely disseminated, it will be necessary to have the ability to effectively collaborate with these departments and mainstream adaptation into overall measures to address development issues through horizontal integration. Hence, local government officials are also required to have the ability to mainstream adaptation into related cross-sectoral policies. In this way, it is necessary to ensure adaptation perspectives are appropriately considered in related sectors, such as disaster management and development administration. Furthermore, in recent years, there has been an emphasis on promoting measures for climate change mitigation and adaptation while being aware of their co-benefits, and the capacity to integrate horizontally will be beneficial in promoting such linkages with mitigation. Thus, local government officers also need to be able to mainstream adaptation into relevant policies and organizational capacity to ensure that adaptation to climate change risks is always in the forefront of daily routine operations in various sectors.

2-2-4 Capacity to Understand the Implications of the Scientific fFndings Underlying the Issue Identification

In identifying priority adaptation issues, it is necessary to not only select issues of high importance and urgency to a country or region from among multiple issues, but also to understand the scenarios that provide future climate projections and the various conditions of local communities that may limit adaptation. For example, the SSP scenarios presented by the IPCC's Sixth Assessment Report, unlike the old SRES scenario, allow greenhouse gas emission reduction targets (i.e., mitigation measures) to be considered and combined separately. However, the SSPs do not mention the probability distribution of which scenario outcome is more likely to be realized in the future. They have consistently left the choice of scenarios for climate models and impact assessment models

to the users to decide. In addition, social science knowledge about the institutions and conditions of local communities does not exist in a form that is easy to use for adaptation planning, but exists in a fragmented form in different fields. Therefore, when collecting social science knowledge to determine the limits of adaptation, it will be necessary to select and discard knowledge from various fields from the perspective of whether it is necessary for adaptation measures. In addition, when promoting adaptation measures, it is important to take a community-based bottom-up approach as well as a top-down approach that relies on scientific analysis. From this perspective, social science knowledge is essential to promote a bottom-up approach to adaptation by understanding local needs and utilizing the traditional knowledge of indigenous peoples and different ethnicities. In this way, government officials, who are the end users of risk forecasting information and social science knowledge, are required to select SSP-RCP pathways according to their local adaptation issues and objectives, secure necessary social science knowledge, and request the government to conduct policy-oriented research. In short, government officials need to be able to understand the implications of the scientific knowledge that underpins issue identification.

2-2-5 Capacity to Flexibly Introduce Adaptation Measures in a Sequential Manner under Uncertainty

As discussed in Chapter 1, uncertainty cannot be eliminated from future climate projections, no matter how sophisticated and up-to-date the climate projection models are, because the future average temperature increases will be affected by the success or failure of greenhouse gas emission reductions. Therefore, the structure of the SSP-RCP pathways forces us to use scenarios to deal with uncertainties that have no probability distribution, thus requiring government officials in charge of adaptation planning and implementation to make policy decisions under uncertainty. Uncertainty is the essential element that makes adaptation administration so difficult.

Three approaches to deal with these uncertainties have been identified. The first approach is to assume the worst-case scenario for risk management. Planning and implementing countermeasures based on the worst-case scenario is similar to designing with a high safety factor in engineering, such as probable maximum floods. In this case, it is possible to increase the safety factor and reduce the risk, but it also raises the cost of construction and design, so it is necessary to keep a balance between risk and cost. Next is the “no-regrets approach,” which provides socioeconomic benefits regardless of the degree of future climate change. UNDP introduced the concept of “climate proofing” which uses social infrastructure to reduce the risk of climate change to a level of potential loss that a society or community finds acceptable, rather than reducing the risk to zero (UNDP, 2011). In addition, risk can be further combated by “softer” measures, such as insurance schemes or, as a last resort, evacuation plans. Finally, there is “adaptive management,” which is the flexible review of measures based on the latest scientific findings from monitoring and forecasting. Adaptive management is a concept that was originally introduced for the management of fishery resources and natural ecosystem systems, where there is a great deal of uncertainty about the number of resources, etc. In this case, in addition to the development of an adaptive management system based on forecast information, local government officials are required to have the capacity to collaborate with stakeholders in the design of alternatives and selection of climate change adaptation measures, to record and share information to ensure that adaptive management is inherited even when the officer in charge changes, and to build trust among stakeholders (Shirai et al., 2014). What is required of government officials is the capacity to introduce adaptation measures in a sequential and flexible manner under uncertainty, referring to these approaches

2-2-6 Capacity to Envision and Mobilize Funding for Climate-resilient Communities

The purpose of climate change adaptation is to make society more resilient to climate change through the implementation of adaptation measures, and often public funds are needed to implement adaptation measures that cannot be monetized like mitigation measures. For example, the central and local governments of least developed countries, which have urgent needs to prepare for large-scale natural disaster risks and many socio-economic development issues, need to convince taxpayers through financial authorities and aid agencies that it is appropriate to implement adaptation measures to mitigate the damage caused by man-made weather

disasters that may occur up to 100 years in the future, using their own limited resources. Developing countries that have limited domestic resources to promote climate change adaptation, therefore, must rely to some extent on international funds such as specialized climate funds and ODA funds. Consequently, successful access to these funds is important in planning and implementing adaptation measures. However, to obtain climate funds and/or ODA funds that can be used for adaptation, these countries need to build capacity and approaches that take into account the characteristics of each funding source.

For example, the GCF, GEF, and CTCN provide climate funds that can be used to implement adaptation measures, but their purposes and application procedures are different, so an appropriate approach based on an understanding of their characteristics is required. Japan's ODA, for example, sets priorities in accordance with the "Country Development Cooperation Policy" and "Project Development Plan" established by the Ministry of Foreign Affairs for each recipient country, and achieves effective assistance by concentrating and selecting limited resources. Thus, in bilateral cooperation by developed countries, the strategy of the donor country and the bilateral relationship are strongly reflected in the funds, and the request procedures are unique to each country. When requesting adaptation support from international aid agencies such as UNDP and UNDRR, and multilateral development banks such as the World Bank Group and ADB, an approach that is consistent with each agency's area of interest and the direction of discussion in the international arena will be required.

Due to the nature of adaptation policy, it is difficult to provide a typical list of capacities required of local government officers and local government organizations to coordinate access to funding. In general, the following can be mentioned: (i) improving the adaptation literacy of government officers in the central government's finance and aid offices; (ii) developing adaptation measures and requesting funds in line with trends in the international adaptation debate (e.g., NbS, Eco-DRR, etc.); and (iii) making proposals in line with the strategies of potential donors. Government officials in charge of adaptation need to be able to envision a community that is resilient to climate change and mobilize the funds needed to achieve this objective.

2-2-7 Conclusion of the Section

In this section, before defining capacity development for climate change adaptation in international cooperation, the six elements that constitute the key features of adaptation are summarized, and the capacity required of government officials for each of them is described.

From a practical perspective, it is important to aim to develop the capacity needed to address the specificities of adaptation discussed in the previous section in each of the following steps: (i) scientific understanding of climate change and adaptation; (ii) identification of urgent issues and planning of adaptation measures in the region or sector; (iii) implementation of adaptation measures in collaboration with other departments within the local government, the central government, and various stakeholders; (iv) evaluation and improvement of the effectiveness and challenges of adaptation measures; and (v) coordination for necessary funding. It may not be realistic, however, to expect all the capacities discussed in the previous section to be acquired uniformly by all government officials. In addition to the capacities discussed in previous section, local governments need to be able to follow the adaptation planning, implementation, and evaluation cycle for a given area. For example, planning preparation requires an understanding of the geographic and historical vulnerability of the area in question and the ability to prioritize within limited resources, while impact assessment requires the ability to utilize current scientific knowledge. The more specific skills needed to move forward with this set of efforts are discussed supplementally in the Annexes. First, using the participatory watershed land use management project in the Philippines as a case study, Annex 1 provides examples of skills that local government officials need to acquire in order to develop and implement climate change adaptation plans (in the areas of disaster management and water resources). Annex 2-1 and Annex 2-2 provide examples of skills required from the conception of a project proposal to the acquisition of funds, using the GCF as a case study for financial coordination.

The next section, based on these discussions, defines "capacity development" for climate change adaptation in international cooperation.

2-3 Definition of "Capacity Development" for Climate Change Adaptation in International Cooperation

In Chapter 1, the capacity development characteristics that should be considered in international cooperation on climate change adaptation are summarized under the six key features of climate change adaptation, based on the background of international cooperation on climate change adaptation. In the discussion on capacity development in the field of international cooperation that became active from the 1990s to the 2000s, the definition of "capacity development" by various aid agencies and international organizations, has shifted from the traditional aid approach to an approach that "supports capacity development in developing countries, building on their historically formed problem-solving capacity base". Chapter 2 builds on the discussion in Chapter 1 and organizes the "capacities" expected of local government officers in developing countries for each of the six key features of climate change adaptation that should be considered in international cooperation.

To build the "capacities" expected of local government officers in developing countries who are working on climate change adaptation in the context of international cooperation, it is necessary to provide support based on the foundation of the problem-solving capacities of the government officers themselves. In addition, to develop the problem-solving capacities of local government officers in developing countries, a comprehensive approach that broadens the perspective not only to their individual "capacity" but also to the organizations to which they belong and the institutions and systems above them will be necessary. At this point, international cooperation is expected to play the role of a "catalyst" by sharing the knowledge and expertise of each organization involved in capacity development. Based on the discussion so far, "capacity development" for climate change adaptation in international cooperation is defined as follows.

The "capacity" that local government officers in developing countries should acquire for climate change adaptation in international cooperation is the "capacity" **to solve their uncertain, long-lasting and multiple challenges of climate change adaptation, by understanding the necessary scientific knowledge, identifying urgent issues, and mainstreaming adaptation measures and accessing finance.** "Capacity development" for climate change adaptation in international cooperation can be defined therefore as **a process in which the international community supports not only individuals but also organizations and systems by sharing of knowledge and expertise on climate change so that local government officers can strengthen their own "capacity"**. This definition may help to deepen the discussion on climate change adaptation in international cooperation that the international community should undertake in future.

International cooperation aimed at capacity development for climate change adaptation should be carried out while guiding capacity and capacity development according to this definition. Annex 3 summarizes existing training and training materials on climate change adaptation provided by research institutes and international organizations in the Asia-Pacific region, with the aim of understanding the current status of climate change adaptation capacity development in the region and identifying gaps that should be focused on in the future. Based on these results, it is expected that there will be substantial progress to organically link institutions involved in capacity development for climate change adaptation in the region and improve the regional adaptative capacity.

Annexes

Annex 1: Skills Related to Impact Assessment and Participatory Approaches for Developing Climate-Resilient Development Plans

Introduction

In Chapter 2 of this publication, six key features of climate change adaptation, and discrete capacities to address them, were identified (Table 1). There are different skills to be acquired in each of those capacities, but it is very difficult to organize all of those skills in this document. Therefore, this Annex summarizes the skills that local government officials need to obtain in order to formulate and implement a resilient development plan by using a case of a participatory watershed land use management (PWLM) project in the Philippines. This case study focuses specifically on **flooding (disaster management)** and **water quality (water resources)** as climate change impacts, so we hope it will be helpful in considering the capacities that local government officials should acquire in the fields of disaster management and water resources, as well as capacity development programs to strengthen their capacities.

Table 1 Six Key Features of Climate Change Adaptation, and Discrete Capacities to Address Them

No.	Key features of climate change adaptation	Capacity expected of government officers
1	Time frame beyond the project cycle	Capacity to correctly handle different time frames in science and policy respectively
2	Diversity of needs	Capacity to respond to community vulnerabilities in an integrated manner
3	Inseparability from development issues	Capacity to mainstream adaptation into relevant policies
4	Need to identify issues based on scientific knowledge	Capacity to understand the implications of the scientific findings underlying the issue identification
5	Policy decision making under uncertainty	Capacity to flexibly introduce adaptation measures in a sequential manner under uncertainty
6	Difficulty in readiness for finance	Capacity to envision and mobilize funding for climate-resilient communities

Overview

For the development of climate change adaptation measures and climate resilient land-use planning and implementation, local government staff should have a general understanding of climate change adaptation and disaster risk reduction (e.g. knowledge of appropriate gray and green measures), as well as knowledge of how land-use and zoning can affect exposure to climate-related hazards. If lacking, this can be overcome through training or involvement of a wider range of experts in the countermeasure development and planning/ implementation process (e.g. staff from other departments, other relevant government agencies, scientists from local universities, or consultants).
In the PWLM project, local government officers from several watersheds located in the Laguna de Bay

lake basin learned to utilize different participatory processes and geospatial modeling techniques for climate change (and land-use change) impact assessment and policy development. This was possible due to their partnering with scientists from the Institute for Global Environmental Strategies (IGES) and the University of the Philippines Los Baños (UPLB).

First, the local governments were involved in the four main steps of PWLM shown in Figure 1, by participating in stakeholder consultation meetings and participatory land-use mapping activities to understand the future land-use changes (Step 1), learning about the impacts of climate change and land-use change based on impact assessment models (Step 2), identifying priority climate change adaptation measures through a participatory process (Step 3), and working to improve their land-use plans and policies by incorporating the priority climate change adaptation measures. After completing this process, the local government officers learned more about the basics of climate change impacts, and how to design adaptation measures for their municipality. During the process, local government officers enhanced their capacities for several key features of climate change adaptation, including:

- Key feature #4 "Need to identify issues based on scientific knowledge": Local government staff learned to understand the issues related to scientific findings on climate change and land-use change impacts (Step 2 of PWLM). Notably, we found that some of the local government officers (including the Mayor of one city, The City of Santa Rosa) presented the scientific findings at other meetings for local/national/international stakeholders, which suggests that they understood the key issues and scientific findings very well.
- Key feature #2 "Diversity of needs": Local government staff learned how to respond to community vulnerabilities by developing suitable adaptation measures (Step 3 of PWLM).
- Key feature #3 "Inseparability from development issues": Local government staff learned how to mainstream adaptation into relevant policies (Steps 3-4 of PWLM). As one example, the City of Santa Rosa incorporated the priority climate change adaptation measures that they identified through PWLM into their "Comprehensive Land-Use Plan" and "Climate Change Action Plan".

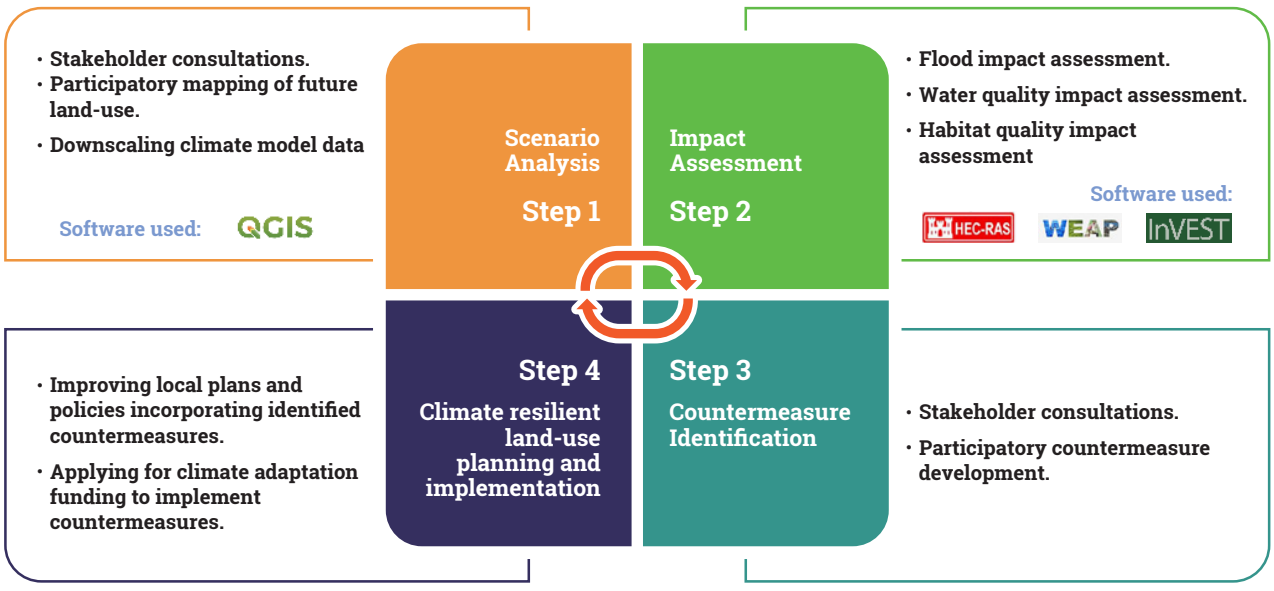


Figure 1 Four Steps of the PWLM Approach and the Different Capacities Required for Local Government Officers in Each Step

Second, the local government staff learned how to conduct different types of impact assessments to understand future climate change and land-use change impacts. Scientists from IGES and UPLB developed the PWLM Guidebook (https://www.iges.or.jp/en/pub/pwlm-guidebook/en), and the local government staff learned how to conduct flood impact assessment, water quality impact assessment, and habitat quality impact assessment by joining a series of in-person and online trainings based on this Guidebook. Through this process, government staff enhanced their capacity for:

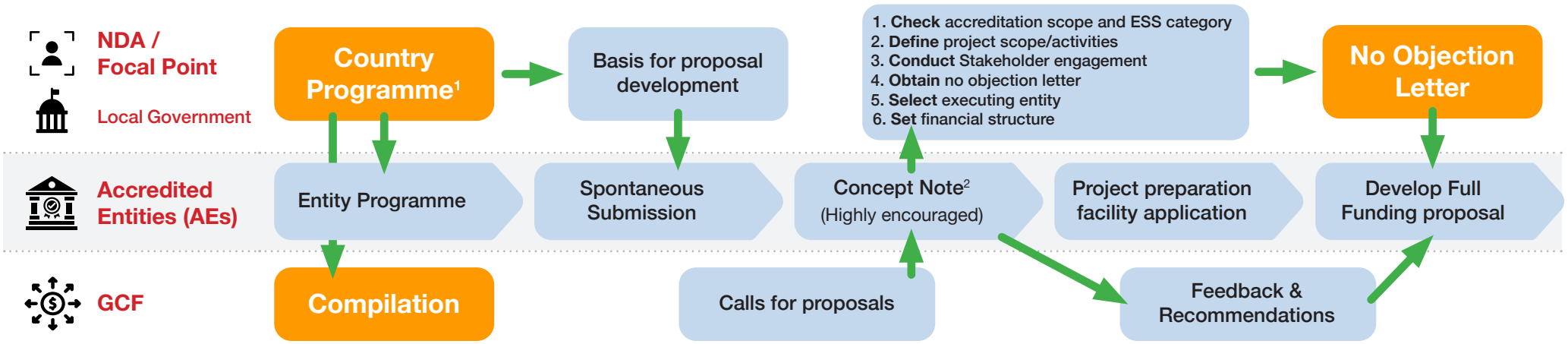
- Key feature #1 "Time frame beyond the project cycle": Government staff learned how to conduct impact assessments on their own, allowing them to potentially modify and continue performing impact assessments after the project in the future based on their policy needs. For example, they can modify the end date of the impact assessments to, e.g., 2030, 2050, or 2100, depending on which policy or plan they are trying to collect relevant information for.

Third, the local government staff learned how to develop a funding proposal to implement some priority climate change adaptation measures identified through the PWLM project (Step 3). Local government officers from the City of Santa Rosa participated in a series of workshops with IGES and UPLB (Figure 2) to jointly develop a proposal for the People's Survival Fund, a climate change adaptation fund provided to local governments by the Philippine national government. Through this process, government staff enhanced their capacity for:

- Key feature #6 "Difficulty in readiness for finance": Government staff learned how to envision activities for external funding and develop a suitable proposal to promote climate resilient development.

In addition to national climate change funds, international climate adaptation funds such as Green Climate Fund (GCF) are also available. Regarding skills or know-how required for preparation of GCF funding will be summarized in the next Annex.

Annex 2-1: Skills Required in GCF Application Process



Country Program Stage:

- Understanding of climate impacts nationwide, on sectors, and on communities;
- Detailed knowledge of national development priorities, strategies and plans;
- Communications with UNFCCC (BUR, NDC, NAP etc.);
- Understanding of GCF investment criteria, priorities and modalities;
- Negotiation with GCF on the contents of the country program;
- Identification of possible project ideas;
- Understanding of priorities and value addition of possible accredited entities and matching of project ideas;
- Understanding of complementarity with other development partner programs and priorities;
- Compilation of the draft country program; response to GCF comments and feedback; endorsement by relevant minister(s)

Concept Note Stage:

- **Validation of project idea;**
- **Defining the problem(s);**
- **Conducting impact chain analysis;**
- **Developing objectives tree including intended project goals and a theory of change;**
- **Developing of logical framework;**
- **Understanding of GCF's criteria in concept note template;**
- **Internal review process with Accredited Entity, executing entities, and NDA;**
- **Drafting of concept note;**
- **Application for Project Preparation Facility (PPF).**
- **During PPF, pre-feasibility and feasibility studies; Skills of project design; environmental, social and gender studies; risk assessments should be included.**

*** Tips for better concept note development are summarized in Annex 2-2**

Full Funding Proposal Stage:

- Alignment with GCF Results Management Framework;
- Alignment with GCF investment criteria;
- Integrated financial model that provides sensitivity analysis of critical elements;
- Preparation of TOR for advisory services on costing and budgeting according to GCF standards;
- Preparation of TOR for advice on legal, financial, tax, regulatory, and governance arrangements;
- Planning details of project implementation and capacity development needs of executing entity;
- Environmental and Social Impact Assessment; and coherence of proposed activities with national sustainable development priorities;
- Financial viability and/or economic analysis;
- Impact assessment, including just transitions;
- Technology identification and selection;
- Planning of monitoring and reporting system

*1 Country Programmes are the cornerstone of each country's pipeline development with GCF. It is the first stage of the updated GCF project and programme cycle, and forms the basis for prioritising the further development of funding proposals for projects and programmes submitted by Accredited Entities on behalf of countries for funding. Country programmes present an overview of a country's national context, policy framework and plans, such as the NDCs, NAPs, and Nationally Appropriate Mitigation Actions (NAMAs), and summarise their respective climate action agendas. They also include a pipeline of projects or programmes that the country would like to undertake with GCF. The country programmes have been developed based on initial drafts of templates prepared by the Secretariat including elements from the initial general guidelines for country programmes. Upstream climate science, country and sector level diagnosis, downscaled climate modeling, climate projections, policies and plans, and a pipeline of projects/programmes should be included in Country Programme, according to the GCF template

*2 Although the submission of CNs is voluntary (except for SAP projects), it is strongly encouraged, as CNs can lead to higher "quality at entry" of funding proposals!

Annex 2-2: Tips for Better GCF Concept Note Preparations

STEP 1

Validate the project idea – source and eligibility

First consult national documentation, like the NAP or NAPA, and analyse which actions have had inadequate attention to date and are now national priorities. Also, make sure the project idea is eligible for funding by engaging with the NDA and the potential Accredited Entity (AE) from the outset. Form a national taskforce for Concept Note (CN) preparation.

STEP 2

Start by defining the problem(s) to be solved – using a problem tree

Start with the problem tree to identify which aspects of the problem may be related to climate change and therefore suitable for climate finance to address. Review similar projects that have already been funded by GCF to see what are the key features. Make sure that the identified problem is related to climate change and not just a development issue.

STEP 3

Conduct an impact Chain Analysis – climate impacts to social benefits

Physical climate changes, hazards and exposure of people, ecosystems, and assets, social, environmental, economic, and gender impacts of those hazards, and finally to the benefits. Begin to identify the project beneficiaries and engage their local knowledge on historic records of climate related impacts.

STEP 4

Objectives Tree – end of project intended goals

Understand how climate change contributes to the observed problem(s), then convert the problem tree into an objectives tree - the opposite of the problem tree. Avoid having too many objectives as the project may end up with a lack of focus. Selection of a focused objective helps to ensure that project aligns with GCF's investment criteria and results-based management framework.

STEP 5

Develop logical framework and theory of change

From the objectives tree, begin populating the project logical framework/results management framework and develop a theory of change diagram. Understand the difference between outcomes and outputs (tangible results or deliverables of the project). Carefully study GCF's definition of a paradigm shift and ensure that project is not only innovative but also sustainable.

STEP 6

Start filling in the Concept Note template

Understand what GCF is looking for in each section of the template and constantly revise to make sure that the concept note will meet the intense scrutiny of the GCF Secretariat. Feedback from the NDA and AE on GCF comments on previous concept notes submitted for the country may identify possible areas of weakness.

STEP 7

Internal review and comment on the draft Concept Note

Discuss the national process for internal review and comment with the Accredited Entity and the Nationally Designated Authority, to pass these internal processes first, seek inputs from national experts, and arrange clearance by relevant senior officials. Ensure consistency in the narrative, budget, and diagrams to help convince the GCF that considerable effort has been devoted to the Concept Note.

STEP 8

Submit CN to GCF for informal review and draft the PPF application

The CN may be submitted for informal review by the GCF, and the Project Preparation Facility (PPF) application prepared for submission with the final CN. Feedback from GCF may require several rounds and will help to identify potential weaknesses that need to be addressed at the PPF stage. Also, don't forget to ensure that the NDA has provided a No Objection Letter before submission to the GCF.

Annex 3: Matrix of Existing Training Programs/Material/Tools for Climate Change Adaptation Capacity Development

1. Objectives

The matrix below (Figure 1) showcases the existing capacity development programs, tools, and materials offered by institutions that provide opportunities for capacity development on climate change adaptation in the Asia-Pacific region. Table 1 lists the 16 selected institutions evaluated. The matrix provides a snapshot of the capacity development available in the region. By organizing the existing programs, materials, and tools, the aim is to identify missing pieces of capacity development and map out the direction of future work to enhance adaptative capacity in the region. The matrix supplements the main text that discusses capacities that local actors are expected to foster. Accordingly, the main target is to identify capacity development training for local government officers who are engaged in climate change adaptation and relevant sectors, while the matrix also covers training for broader targets. The analysis is also intended to provide insights into the future capacity strengthening activities of the Asia Pacific Climate Change Adaptation Information Platform (AP-PLAT).

Table 1 Selected Institutions

No	Names of Institution
1	Commonwealth Scientific and Industrial Research Organisation (CSIRO)
2	World Resources Institute (WRI)
3	Stockholm Environment Institute (SEI)
4	International Centre for Climate Change and Development (ICCCAD)
5	AIT Regional Resource Centre for Asia and the Pacific (AIT RRC.AP)
6	Secretariat of the Pacific Regional Environment Programme (SPREP)
7	International Centre for Integrated Mountain Development (ICIMOD)
8	The Energy and Resources Institute (TERI)
9	Korea Environment Institute (KEI)
10	United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP)
11	United Nations Development Programme Asia-Pacific (UNDP)
12	Global Center on Adaptation (GCA)
13	Asia-Pacific Network for Global Change Research (APN)
14	START
15	Institute for Global Environmental Strategies (IGES)
16	National Institute for Environmental Studies, Japan (NIES)

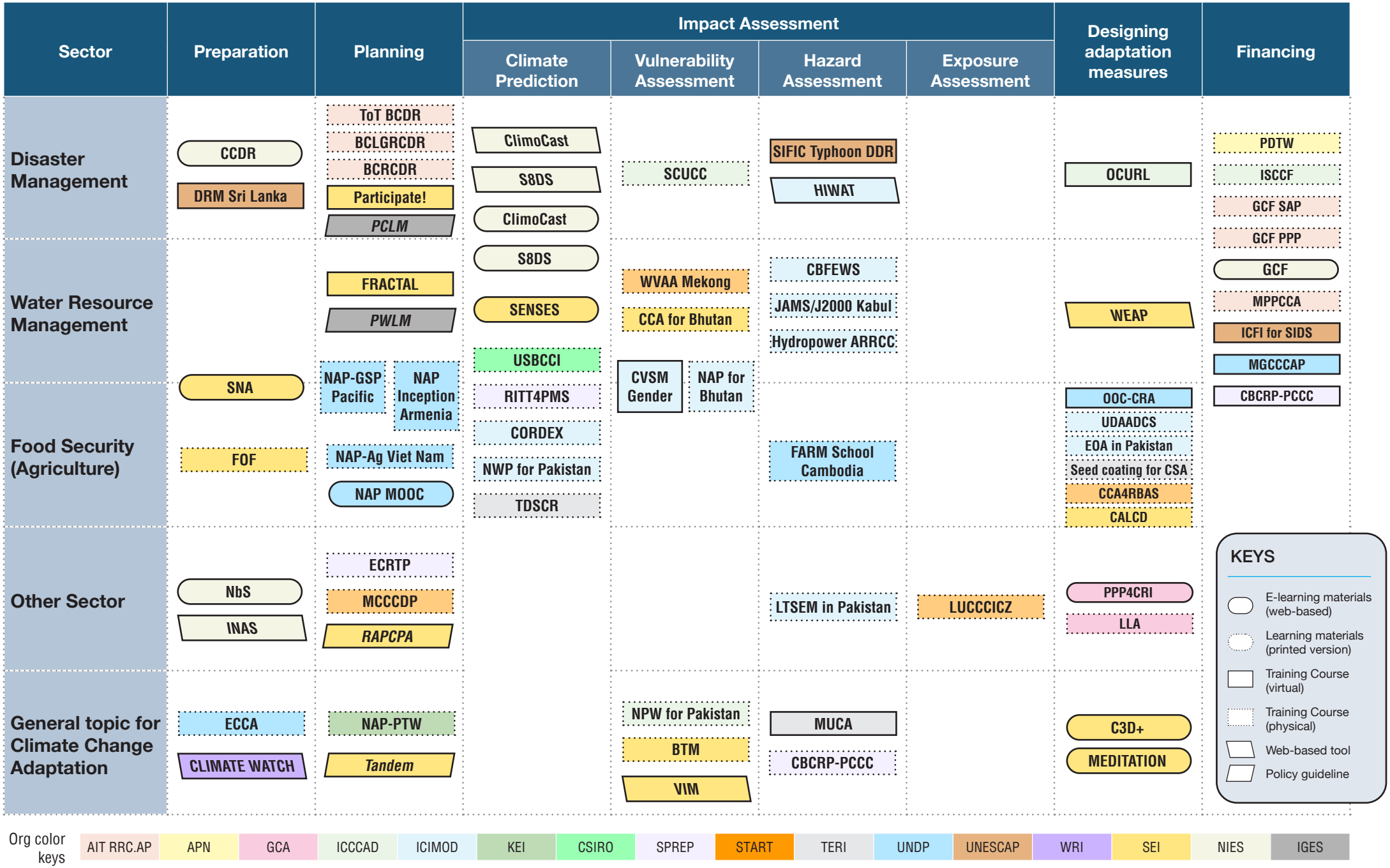


Figure 1 Matrix of Existing Training Programs/Material/Tools for Climate Change Adaptation Capacity Development

2. Matrix Structure

The matrix organizes existing training from three angles (i) phases of adaptation project formulation; (ii) different sectors (disaster risk reduction, water resource management, and food security/ agriculture); and (iii) their modalities. In the vertical columns, the matrix lays out the programs or materials by phases of the adaptation project processes, namely preparation, planning, impact assessment, designing adaptation measures, and financing. Note that implementation and monitoring and evaluation are excluded to focus on project formulation that is typically managed by local government officers. Impact assessment is divided into four categories: prediction of future climate, assessment of vulnerability, hazard, and exposure. Horizontal sections represent different sectors including disaster management, water resource management, food security (agriculture), and others, as well as climate change adaptation in general. Programs, materials, and tools are organized to capture characteristics of modality of capacity development. Programs are distinguished based on accessibility for users, where virtual contents are those accessible for anyone who has internet access, while physical programs or materials provided in person or by some physical means are not available unless the user is present at a specific time and place. Web-based tools or policy guidelines that are available online in most situations are also included. All the abbreviations and acronyms are spelled in the Table 2. Other capacity development practices available at weADAPT, an collaborative platform on climate change adaptation, are also listed in the Table 3 as a reference.

3. Results

(1) Characteristics of each institution

The matrix suggests that each institution distinctively provides relevant capacity development.

- CSIRO offers programs on the science and modelling of climate change through face-to-face training.
- SEI serves as the secretariat of weADAPT and offers a large number of e-learning courses and training programs that cover almost all phases of adaptation activities including assessment, planning, implementation and monitoring, and a huge range of subject areas.
- ICCCAD organizes several training programs both virtually and physically that focus on assessment, planning and financing of adaptation projects, with topics of disaster management and urban planning.
- AIT RRC.AP offers training programs with a strong focus on planning disaster risk reduction and financing climate adaptation projects.
- ICIMOD covers a number of programs with topics including climate projections and modelling and remote sensing of climate change impacts, water resources, ecosystems and the cryosphere, mainly in the form of in-person training.
- SPREP hosted Pacific Climate Change Centre (PCCC) that organizes a number of training programs (mostly classroom based) with a focus on the science and impacts of climate change, and technologies to enhance climate resilience.
- TERI also focuses on data analysis and modelling for climate prediction as well as impact assessment, offering knowledge on the scientific basis of climate change, the use of climate data and information for decision making.
- KEI provides, through its Korea Adaptation Center for Climate Change, a classroom-based training program on National Adaptation Plans (NAPs) for selected countries.
- UNESCAP organizes a broad range of ad hoc training events covering topics including statistics of climate change, climate finance, and disaster risk management.
- UNDP Asia-Pacific does not have dedicated programs for capacity development, but they provide a wealth of capacity development opportunities within their projects that support NAP processes in developing countries.
- GCA mainly focuses on development of adaptation measures, offering e-leaning materials as well as physical training courses on community-based actions and locally-led adaptation.
- START's regional center (SEA-START) has organized training programs which involve the assessment, planning, implementation of adaptation projects over a wide variety of sectors such as water resource management, ecosystems and urban planning etc.
- IGES provides guidelines on participatory approaches for climate-resilient land use planning.

- NIES offers several e-learning and web-based contents that cover almost all climate change processes, while other institutions mainly offer face-to-face training courses.

(2) Project Phase

Overall, the matrix indicates that capacity development opportunities cover each step of the adaptation project cycle. For the planning phase, a wide variety of training, educational materials, and tools are available, although there are a few areas where additional future work could be effective.
First, there are relatively few programs that cover a preparatory phase, i.e., promoting a basic understanding of a particular topic or providing a holistic view of the adaptation management cycle. In particular, few opportunities are provided to learn the basics of climate-resilient water resource management. Second, in terms of impact assessment, there is an overall lack of materials and tools available online. Although diverse training programs are offered for risk assessment, no dedicated educational materials were identified. There is also limited overarching training that covers all vulnerabilities, hazards, and exposures. Finally, for financing, there is a good balance of online and offline training, but materials, guidelines, and web tools open to the public need to be expanded.

(3) Sector

Although many opportunities are provided for adaptation planning and impact assessment, few training programs are provided for the food security/ agricultural sector in the form of guidelines and web-based materials that are easily accessible for users. While there are many programs highlighting how to design adaptation in agriculture, there are relatively few training resources to identify adaptation measures in disaster management and water resource sectors.

Nevertheless, most selected sectors are well covered by existing contents, except for exposure assessment for disaster risk management. In terms of disaster risk reduction, many existing training programs focus on urban resilience. In addition, other topics available include nature-based solutions, locally-led adaptation, tourism, coastal management, gender, and biodiversity. Strangely, regarding capacity development that covers adaptation in general, relatively few opportunities are offered.

(4) Modality

Notably, capacity development on climate prediction is mostly physically based training. There are few e-learning materials and virtual training that can be accessed anywhere by anyone who would like to gain knowledge about climate change adaptation. To date, there seems to be less effort to develop web-based tools and policy guidance in the context of adaptation capacity development, particularly on impact assessment and financing stages.

4. Conclusions

The matrix provides a snapshot of capacity development for climate change adaptation currently available in the Asia-Pacific. It reveals that there are some potential opportunities for enhancing existing efforts expected to be undertaken through partnerships among capacity development players in the region.

Some improvements are relatively easier to address because the enabling conditions are already in place. For example, capacity development on climate prediction is currently offered in a variety of physical training courses and materials but with less virtual programs. Currently, the situation surrounding capacity development has changed dramatically in the wake of COVID 19. Some institutes have shifted from face-to-face training programs into virtual ones. It is expected, therefore, that an increasing number of e-learning materials will be available post-COVID 19. Offering online courses that utilize existing materials and experience would be worthwhile.

Another area for improvement is for the financing step. Although there are adequate opportunities for learning this topic through training courses, associated materials, guidelines, and web tools for the financing stage are relatively limited. While there are emerging provisions of financing tools (e.g., Green Climate Fund's sectoral guidance), it would be worthwhile to develop increased tangible knowledge products about fundraising or financing for adaptation projects.

One observation is that existing programs are mostly sector-specific, targeted training rather than comprehensive learning on each phase of adaptation project formulation. There are fewer training courses or materials that address climate change adaptation in a comprehensive manner. This implies that climate change adaptation is likely to

be understood in the specific context rather than from a general perspective. Although this can be considered an effective and pragmatic approach, a more comprehensive cross-sectoral or integrated approach to promote adaptation remains a challenge.

As a way forward, promoting collaboration among institutions providing capacity development will help to fill in these gaps and boost adaptation in developing countries more efficiently and effectively. This work can be facilitated through connecting the knowledge, tools and experience into existing platforms and networks at multiple levels developed by compiling past work of capacity development. Building on the respective characteristics and strengths as well as a network of capacity development actors, knowledge sharing and collaborative efforts (e.g., joint programs) would greatly contribute to further enhancement of adaptative capacity in the region. AP-PLAT is expected to provide opportunities to facilitate the collaboration among capacity development providers, build a network for sharing their knowledge and assets, and create synergies toward climate resilient development in the region.

Table 2 Glossary of Adaptation Capacity Development Programs/Materials/Tools in the Matrix

Contributing Organization	Abbreviation	Name of Trainings
AIT RRC.AP	MPPCCA	Training Programme on Managing Project Preparation for Climate Change Adaptation
	GCF PPP	Training Programme on GCF Policies, Processes, and Procedures
	ToT BCRD	Training of Trainers Workshop - Building City Resilience to Disasters
	BCLGRCDR	Regional Training Workshop Building Cities and Local Governments' Resilience to Climate and Disaster Risks
	BCRCDR	Regional Training Workshop on Building Cities' Resilience to Climate and Disaster Risks
	GCF SAP	Capacity Building Programme: Developing Concept Notes for the Green Climate Fund
	GCF PPP	Training Programme on GCF Policies, Processes, and Procedures
	MPPCCA	Training Programme on Managing Project Preparation for Climate Change Adaptation
APN	PDTW	Proposal Development Training
GCA	PPP4CRI	Knowledge Module on PPPs for Climate-Resilient Infrastructure
	LLA	Locally-led Action
ICCCAD	OCURL	Online Course on Urban Resilience and Liveability
	ISCCF	International Short Course on Climate Finance
	SCUCC	Short Course on Urban Climate Change

Contributing Organization	Abbreviation	Name of Trainings
ICIMOD	CORDEX	Spatial and Temporal Climate Change Analysis Using CORDEX
	NWP for Pakistan	Numerical Weather Prediction: Interpretation and Application for Pakistan
	HIWAT	High Impact Weather Assessment Toolkit for Bangladesh Meteorological Department
	CVSM Gender	Climate Vulnerability Assessment Methodologies in the Water, Forest, and Agriculture Sectors through a Gendered Lens
	JAMS/J2000 Kabul	Training on the Impact of Climate Change on the Kabul River basin using the JAMS/J2000 Modelling System
	CBFEWS	National Level Hands-on Training: Community Based Flood Early Warning System
	Hydropower	Regional Workshop on Climate Services for Water and Hydropower Sectors in South Asia
	NAP for Bhutan	Training on Climate Change Vulnerability and Risk Assessment
	UDAADCS	Training on Use of the Digital Agromet Advisory Dashboard and Climate Services
	EOA in Pakistan	Crop Mapping and Zoning for Strengthening Sustainable Agricultural Practices and Policy Support through Earth Observation Applications in Pakistan
	LTSEM in Pakistan	Integrated Planning Workshop on LTSEM Research Framework for Pilot Implementation
KEI	NAP-PTW	Asia-Pacific National Adaptation Plans Training Workshop
CSIRO	CPIA	Climate Projections for Impact Assessment
	USBCCI	Using Science-based Climate Change Information
SPREP	ECRTP	Pacific Climate Change Centre Builds Capacity on Climate Resilience and Tourism
	CBCRP-PCCC	Project for Capacity Building on Climate Resilience in the Pacific
	RITT4PMS	IT Training Aims To Build Capacity Of Pacific Met Services
START	WVAA Mekong	Training workshop on Watershed Vulnerability and Adaptation Assessments in the Greater Mekong Subregion
	MCCCDP	Mainstreaming Climate Change into City Development Planning in Thailand
	LUCCCICZ	Land-use/Cover Change and Climate Impacts in Coastal Zones
	CCA4RBAS	Climate Change Adaptation for Rice-based Agricultural Systems in the Central Chao Phraya River Basin

Contributing Organization	Abbreviation	Name of Trainings
TERI	TDSCR	TERI-NORCE Research School on Towards Data Science in Climate Research: Perspectives on Climate Extremes
	Seed coating for CSA	Hands on Training Modules on on Seed coating for Climate Smart Agriculture and Synthesis and Characterization of Nanomaterials
	MUCA	Launch of e-Certificate Course on Mainstreaming Urban Climate Action
UNDP	MGCCCAP	Asia Pacific Training Programme: Mainstreaming Gender Considerations in Climate Change Adaptation Projects
	NAP Inception Armenia	Inception Workshop of Armenia's NAP project
	OOC-CRA	Massive Open Online Course - Building Climate Resilience in Agriculture
	NAP-Ag in Viet Nam	Workshop to Wrap up NAP-Ag Support in Viet Nam
	NAP School Cambodia	FARM School
	ECCA	Training Programme on the Economics of Climate Change Adaptation
UNESCAP	ICFI for Pacific	Workshop on Innovative Climate Financing Instruments: Supporting Post COVID-19 Pandemic Recovery in Asia-Pacific Small Island Developing States
	DRM Sri Lanka	Training on Digital Technologies for Disaster Risk Management for Sri Lanka
	SIFIC Typhoon DRR	Integrated Workshop: Strengthening Impact-based Forecasting for Improving the Capacity of Typhoon-related Disaster Risk Reduction
WRI	CLIMATE WATCH	CLIMATE WATCH

Contributing Organization	Abbreviation	Name of Trainings
SEI	SNA	Social Network Analysis
	FRACTAL	FRACTAL Learning
	WEAP	Water Evaluation and Planning (WEAP)
	RAPCPA	Resilience and Adaptation Planning for Communities in Protected Areas: A step-by-step guide
	VIM	Vulnerability Indicator Mapping
	CALCD	Climate Analysis for Local Communities and Decision-makers in Central Lombok
	BTM	Bahasa Training Modules
	Tandem	Tandem: Online Guidance for the Co-design of Climate Services
	MEDITATION	Mediation Training Modules
	CCA for Bhutan	Capacity-building on Climate Change Adaptation and Mitigation for District and National Environmental Officers of Bhutan
	C3D+	C3D+ Module: Adaptation Planning
	SENSES	SENSES Toolkit for Climate Change Adaptation
	FOF	Food and Our Future: Sustainable Food Systems in Southeast Asia
	Participate!	Participate! – An Online Course on How to Better Facilitate Events on Climate Change Adaptation and Disaster Risk Reduction
NIES	CCDR	Building Resilience to Compound and Cascading Disaster Risks
	INAS	Inspired by Nature-based Actions and Solutions (INAS)
	NbS	Nature-based Solutions for Local Communities
	S8DS	S8DS
	ClimoCast	ClimoCast
	GCF	Accessing the GCF for Adaptation
IGES	PWLM	Participatory Watershed Land-Use Management (PWLM) Guidebook
	PCLM	Participatory Coastal Land-Use Management (PCLM) Guidebook

Table 3 Other Adaptation Capacity Development Training Programs/Materials/Tools Available at weADAPT

Contributing Institutions	Name of Training
Adaptation Learning Network & University of British Columbia	Climatic and Ecological Modelling for Adaptive Forest Applications Online Course
Alexander Ballard Ltd, Climate Sense, and Trioss	PACT
Adaptation Learning Network	Green Infrastructure in Urban Centres: Policy, Design and Practice
Adaptation Learning Network & Royal Roads University	Climate Change Adaptation Fundamentals
CARE International	Increase your knowledge on Climate & Resilience through the CARE Academy
Research Program on Climate Change, Agriculture and Food Security	CSA 101: Online Guide to Climate-Smart Agriculture
Research Program on Climate Change, Agriculture and Food Security & Food and Agriculture Organization	Gender and Climate Change Research in Agriculture and Food Security for Rural Development Training Guide
International Institute for Sustainable Development	Toolkit: Facilitating a Gender-Responsive NAP process
Micronesia Conservation, Conservation International, The Nature Conservancy, Micronesia Conservation Trust, Pacific Islands Managed & Protected Area Community	Adapting to A Changing Climate: Guide to Local Early Action Planning (LEAP) and Management Planning
Oxford University & Global Climate Adaptation Partnership	Oxford Adaptation Academy
	Iterative Risk Management
Swiss NGO DRR Platform	E-learning Course on Disaster Risk Reduction and Climate Change Adaptation
United Nations Environment Programme	A Practical Guide to Climate-resilient Buildings and Communities
U.S. Agency for International Development	E-Learning Course on Disaster Displacement
	Urban Climate Change Adaptation and Resilience – A Training Manual
	Training Guide: Climate Change Adaptation Project Preparation
ZOI Environmental Network, Swiss Church Aid	Participatory Assessment of Climate and Disaster Risk

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Chapter 1: Understanding of Climate Change Adaptation and Capacity Development in International Cooperation

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Chapter 2: Definition of "Capacity Development" for Climate Change Adaptation in International Cooperation

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