Summary Report of the APEC Workshop on Improving the Resilience of APEC Vulnerable Coastal Communities to Climate Change

APEC Emergency Preparedness Working Group

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Asia-Pacific
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INTRODUCTION

On 24 – 25 July 2024, the **APEC Workshop on improving the resilience of APEC vulnerable coastal communities to climate change *was held in virtual format***, co-sponsored by Chile and Japan.

The Workshop was held under Emergency Preparedness Working Group (EPWG), aligning with the **APEC Putrajaya Vision 2040** to ensure the Asia-Pacific region was resilient to shocks, crises, pandemics, and other emergencies, and to promote economic policies, cooperation, and growth that supported global efforts to address all environmental challenges comprehensively, including climate change, extreme weather, and natural disasters, for a sustainable planet.

This project also contributed to the implementation of the **Aotearoa Plan of Action**, which aimed to cooperate in relevant APEC fora to develop, encourage, and exchange best practice policies, and promoted capacity-building programs that addressed all environmental challenges—including climate change—and supported sustainable growth to pursue strong, balanced, secure, sustainable, and inclusive growth in APEC. Furthermore, this project aligned with the APEC priority, which reinforced ongoing global efforts on climate change and compounded with those efforts to accelerate the achievement of the Sustainable Development Goals. The direct beneficiaries of the project would be the participants from APEC member economies, including the public, private and academic sectors.

The project was designed to:

- Build the capacity of economies through sharing experiences and best practices among participants (governments, academia, experts, businesses, global and regional organizations) in improving the resilience for coastal communities, a large proportion of many members' economies.
- Promote sustainable and resilient livelihood strategies in the face of climate change.
- Develop a set of best practices and recommendations for coastal communities to mitigate the impacts of climate change.

- Create a regional cooperation network on climate change.

The project supported the APEC Putrajaya Vision 2040's goals to make the Asia-Pacific region resilient to crises and promoted policies for environmental sustainability. It also aided the Aotearoa Plan of Action by sharing best practices for addressing environmental challenges and supporting sustainable growth in APEC. Additionally, it supported The APEC Disaster Risk Reduction Framework, focusing on Prevention, Preparedness, Response, and Rehabilitation.

Recommendations were reported to related sub-foras to contribute to the implementation of EPWG 2020 Work Plan regarding capacity building of disaster resilience.

The Workshop gathered more than 70 participants in an online platform, including representatives of related ministries, agencies, experts, scholars, enterprises from APEC member economies, Co-Chair of APEC (EPWG) - Director, International Affairs Division, Office of Policy and Program Analysis, Federal Emergency Management Agency of the United States of America (FEMA), EPWG Co-Chair - National Director, National Disaster Prevention and Response Service of Chile (SENAPRED), Asian Disaster Reduction Center (ADRC) (Japan), UNDP Viet Nam Office, Department of Foreign Affairs and Trade of Australia, Ministry of the Interior and Safety of the Republic of Korea, UNDRR Regional Office for Asia Pacific, UN Women Asia and the Pacific Regional Office, UNIDO Headquarter, Viet Nam Disaster and Dyke Management Authority, Viet Nam Meteorological and Hydrological Administration, National Science and Technology Center for Disaster Reduction (NCDR) of Chinese Taipei, Food and Agriculture Organization of the United States (FAO) in Viet Nam, National Water Research Institute of Malaysia.

KEY ISSUES DISCUSSED

The Workshop was opened by Nguyen Dang Trung, Deputy Director-General, Department of Multilateral Economic Cooperation, Ministry of Foreign Affairs of Viet Nam. Dr. Kimberly Coleman, EPWG Co-Chair, Director, International Affairs Division, Office of Policy and Program Analysis, Federal Emergency Management Agency of the United States of America (FEMA) and Ms. Alicia Cebrian, EPWG Co-

Chair, National Director, National Disaster Prevention and Response Service of Chile (SENAPRED) delivered the opening remarks.

Coastal zones were home to a significant and growing portion of the world's population, especially in the Asia-Pacific region. Much of the population in this area lived near the coast and relied heavily on coastal resources for food and livelihood. For example, nearly 60% of China's 1.4 billion people lived in 12 coastal provinces, half of Indonesia's population (145 million) resided on the main island of Java, almost 80% of Japan's population lived in coastal areas, and nearly 1 million Americans (one-third of the population) lived in coastal economies. This is understandable given that throughout history, cities have been built around ports, which provided opportunities for trade, jobs, and transportation. Many domestically important assets like ports, highways, tourist attractions, and fishing sites were in coastal regions, and many companies maintained a shoreline presence to facilitate their supply chains.

Climate change affected all regions globally, but different areas experienced its impacts disproportionately, with coastal regions bearing the brunt. Coastal communities worldwide were witnessing and feeling the effects of climate change through increased storm and hurricane intensity and frequency, along with rising sea levels, which were dramatically altering the landscape. These shifting hazards increased risks for people, valuable assets, essential infrastructure, and key economic industries such as energy production, agriculture, fishery and shipping. They also posted significant risks to human security. As climate change threatened the health and productivity of coastal areas, the vulnerability of those who depended on these resources increases.

Addressing or reversing climate change was a complex challenge, but there were immediate steps we could take to mitigate its impacts. This project aimed to reduce the vulnerability of coastal communities through the sharing of knowledge, experiences, and capacity building among APEC members. Empowering coastal community members to build their resilience can deliver benefits for both people and ecosystems. By taking action to adapt and build resilience in these communities, we could significantly contribute to the sustainable and balanced development of the region.

The Workshop was an APEC effort to:

- Identifying risks coastal communities were facing.
- Capturing key lessons learnt and building capacity for APEC economies to improve their coastal communities' resilience.
- Promoting sustainable and resilient livelihood strategies in the face of climate change.

It is an opportunity for participants to share their thoughts on topics such as impacts of climate change on coastal communities, coastal resilience, scaling up APEC's efforts on strengthening resilience of vulnerable coastal communities to climate change, integrated approach with forecast-based action and policy-making suggestions for enhancing resilience of vulnerable coastal communities to climate change.

Dr. Kimberly Coleman, EPWG Co-Chair and Director of the International Affairs Division at the Office of Policy and Program Analysis, Federal Emergency Management Agency of the United States (FEMA) expressed her excitement about discussing how to integrate this project's findings into the EPWG priorities. Currently, the concern of addressing the vulnerability of coastal communities to climate change and natural disasters, which affected millions of lives, were emerging. The vulnerability of coastal communities to the impacts of climate change, natural disasters, and related socio-economic challenges was significant. This workshop united experts, practitioners, policymakers, and community members to enhance APEC economies' coastal resilience and sustainable livelihoods. Dr. Coleman looked forward to a productive 2-day workshop and ongoing discussions.

Ms. Alicia Cebrian, EPWG Co-Chair, National Director, National Disaster Prevention and Response Service of Chile (SENAPRED), expressed gratitude to Viet Nam for hosting this Workshop. Nearly half of the world's population, about 3.5 billion people, resided in coastal areas. Climate change was costing the global economy USD250 billion each year, affecting lives and livelihoods. The Chilean Ministry of the Environment highlighted the increasing risks to their 6,000-kilometer-long coastline's communities. They emphasized the need for better hazard analysis and a shift towards a probabilistic approach to address climate impacts.

Advanced engineering solutions and integrated management of coastal zones were needed to protect the borders. Safe infrastructures conditions and port facilities must be improved to minimize coastal damage. Early warning systems and strong protections for ecosystems were essential. The UN Secretary-General called for urgent action to mitigate and adapt to climate challenges. Cooperation and mutual aid were crucial to developing cost-effective solutions. Developing cost-effective solutions was crucial, as shown by the APEC Putrajaya Vision 2040's initiative. With over 20 million people, it was clear that addressing environmentally challenging behavior was necessary.

SECTION I - RESILIENCE OF VULNERABLE COASTAL COMMUNITIES TO CLIMATE CHANGE IN THE ASIA – PACIFIC: PROSPECTS AND CHALLENGES

This section was Moderated by Dr. Potutan Gerald, Senior Researcher at Asian Disaster Reduction Center (ADRC) (Japan).

The first presentation was “Coastal resilience: Action through strategic partnerships”. **Mr. Richard Bontjer, Director of the Climate and Environmental Diplomacy Branch at the Department of Foreign Affairs and Trade of Australia**, delivered an extensive and insightful presentation on the pressing issue of climate change and Australia's multifaceted efforts to address its far-reaching impacts. In his comprehensive address, he meticulously highlighted the critical and urgent challenge that climate change poses to APEC economies, placing particular emphasis on Viet Nam's acute vulnerability as one of the top 10 climate-vulnerable economies on a global scale.

Mr Bontjer, drawing attention to the severity of the situation, noted that the APEC region bore the brunt of 70% of global natural disasters, with climate change projected to significantly exacerbate these already devastating impacts in the coming years. He underscored the paramount importance of fostering robust collaboration between APEC member economies and climate experts to effectively address the complex and diverse needs of vulnerable coastal communities, which were often at the frontline of climate change impacts. The talk provided a detailed outline

of Australia's unwavering commitment to supporting climate action on multiple fronts.

A cornerstone of this commitment was Australia's substantially increased climate finance pledge of AUD3 billion for the period 2020-2025. This significant financial commitment strategically focused on adaptation measures in the Pacific region and mitigation efforts in Southeast Asia, recognizing the unique challenges faced by each area. Mr Bontjer went on to highlight several specific and innovative initiatives that Australia was actively engaged in. He elaborated on the Pacific Weather and Climate Extremes Preparedness Project, which aimed to enhance early warning systems and build resilience in Pacific Island economies. Additionally, he discussed ongoing research projects on mangrove-based agriculture in Viet Nam's Mekong Delta, an area particularly vulnerable to rising sea levels and saltwater intrusion.

These initiatives exemplified Australia's approach of combining scientific research with practical, on-the-ground solutions. A particularly noteworthy aspect of Bontjer's presentation was the mention of the groundbreaking Australia-Tuvalu Falepili Union treaty. This pioneering agreement represented a new paradigm in international climate diplomacy, aiming to ensure Tuvalu's continued statehood and sovereignty in the face of existential threats posed by climate change. The treaty not only provided adaptation support but also sets a precedent for how economies could collaboratively address the complex geopolitical challenges arising from climate change.

In his concluding remarks, Mr Bontjer eloquently emphasized the pressing need for transformative solutions that truly commensurate with the unprecedented magnitude and complexity of climate impacts. He stressed that these solutions must be firmly grounded in the fundamental principles of respect, dignity, and sovereignty for the region. This approach, he argued, was essential not only for the effectiveness of climate action but also for maintaining the cultural and political integrity of affected economies. Throughout his presentation, Bontjer woved together scientific data, policy initiatives, and ethical considerations, providing a holistic view of the climate challenge and Australia's response. His talk served not only as an informative session but also as a call to action, urging other economies and stakeholders to join in

collaborative and innovative efforts to combat climate change and its myriad impacts.

The second presentation was “Impacts of climate change on coastal communities: Threats to coastal landform and ecosystem”. **Dr. Nguyen Sy Linh, a Senior Researcher at the Institute of Strategy, Policy on Natural Resources and Environment in Viet Nam**, discussed the significant challenges that Viet Nam faced due to climate change. As a rapidly developing economy with over 100 million people and a coastline exceeding 3,200 kilometers, Viet Nam was particularly vulnerable to the impacts of climate change on its coastal infrastructure and economy. Over half of Viet Nam's population resided in 28 coastal cities, contributing about 60% of the economy’s GDP, making these areas crucial for both demographic and economic growth.

Climate change affected Viet Nam through temperature changes, extreme weather events, tropical storms, and sea level rise, with projections suggesting that a one-meter rise could flood 30% of the land in the north and nearly half of the Mekong Delta region by the end of the century. These changes impacted various sectors, including fisheries, tourism, construction, transportation, public health, and ecosystems. Key climate challenges for Viet Nam included temperature increases, flooding, changes in rainfall patterns affecting food production, impacts on a large population in a small economy, and extreme weather events. A study indicated that climate change could result in approximately USD4 billion in economic losses by 2020. Coastal erosion and mangrove forest degradation are two primary threats to coastal areas and ecosystems.

To address these challenges, Viet Nam needed a better understanding of climate impacts on coastal communities, implementation of both adaptation and mitigation strategies, and practical approaches to reduce risks and vulnerabilities. While the government has established economy-wide policies, more action was required at local levels. Recommendations included improving understanding of long-term climate impacts, developing coping strategies, and implementing integrated and resilient urban planning. International cooperation was crucial, particularly for setting up early warning systems, building databases on climate impacts, and sharing best practices. Viet Nam could learn from economies like Australia that had experience with

coastal adaptation programs, combining natural solutions such as mangrove restoration with infrastructure development to protect coastal areas and ecosystems.

Then, the presentation “Urban flood prevention and control in central coastal provinces of Viet Nam”, delivered by **Mr. Nguyen Van Hoang from the Vietnam Disaster and Dyke Management Authority**, delved into the escalating issue of floods in Central Viet Nam. The talk began by highlighting the alarming trend of increasing flood frequency and intensity, with particular emphasis on recent years' extreme events. Mr. Hoang meticulously outlined the wide-ranging impacts of these floods, discussing not only the immediate effects on communities, such as human casualties and property damage, but also the long-term consequences for the environment, including pollution and ecosystem disruption. The presentation then explored the multifaceted causes behind this growing flood risk. It examined natural factors like the region's unique topography and heavy rainfall patterns, as well as human-induced issues such as deforestation, inadequate urban planning, and the effects of climate change.

This comprehensive analysis provided a holistic understanding of the complex interplay of factors contributing to Central Viet Nam's vulnerability to flooding. Despite these challenges, Mr. Hoang highlighted significant achievements in flood prevention and management. He discussed the implementation of advanced early warning systems, substantial infrastructure improvements, and successful community awareness programs. The presentation also showcased several successful flood prevention projects, demonstrating Viet Nam's commitment to addressing this critical issue. Looking forward to the future, the talk proposed a wide array of innovative solutions. These range from technical interventions like upgrading drainage systems and constructing water-absorbing areas, to policy-oriented approaches such as smarter urban planning and improved land management practices. Mr. Hoang emphasized the importance of integrating cutting-edge technologies and sustainable practices in these efforts.

The presentation concluded by underscoring the critical need for collaborative action. It stressed that building a Central Viet Nam flood-resilient requires not just technological and infrastructural solutions, but

also strong coordination between government authorities, organizations, and local communities. This multifaceted approach, combining advanced technology, sustainable practices, and community engagement, was presented as the key to effectively mitigating flood risks and protecting the region's future.

Dr. Hyoung-Seong PARK, a Research Officer from the Ministry of the Interior and Safety of the Republic of Korea, offered a comprehensive overview of Korea's advanced storm surge technology and sophisticated disaster management strategies in the presentation “Introduction on the Support Technology for Storm Surge Situation Management”. This comprehensive presentation delved into Korea's advanced storm surge technology and sophisticated disaster management strategies. The speaker provided an in-depth analysis of the devastating impact of storm surges, which are primarily caused by typhoons. These natural disasters have inflicted substantial damage on Korea, with financial losses amounting to a staggering USD78 billion over the past decade.

To combat these formidable challenges, Korea had implemented a multi-faceted system that encompassed crucial phases: monitoring, warning, and emergency response. At the heart of this system lies a suite of cutting-edge numerical models, which are continuously being enhanced through the integration of deep learning techniques. This innovative approach aimed to significantly improve both the accuracy and speed of predictions, allowing for more timely and effective responses to potential disasters. The system's scope was impressively broad, covering an extensive area that included not only the Korean peninsula but also the South China Sea and the coastal regions of Japan. This wide-ranging coverage enabled the system to provide vital, real-time information on sea levels and wave heights across a vast geographical area. In addition to these predictive models, Korea had taken proactive measures to monitor its coastlines directly. The economy had strategically installed an array of sophisticated video monitoring systems along its eastern coast. These systems served a crucial function in detecting wave overtopping at coastal structures in real-time, providing an additional layer of protection and early warning capabilities.

The presentation concluded on a forward-looking note, emphasizing Korea's ongoing commitment to further enhancing these already advanced systems. These continuous improvement efforts underscored the economy's dedication to developing ever more effective coastal disaster prevention strategies, with the goal of safeguarding lives, protecting infrastructure, and minimizing economic losses in the face of increasingly frequent and severe weather events.

Ms. Diana Patricia Mosquera Calle, Deputy Chief at UNDRR Regional Office for Asia Pacific, presented on enhancing coastal communities' resilience based on the Sendai Framework Midterm Review in Asia Pacific. The Sendai Framework shifted focus from managing disasters to managing risks, emphasizing partnerships and coherence in disaster risk management (DRM) strategies. The comprehensive midterm review process aimed to generate practical recommendations grounded in experiences. Since 2025, there was growing recognition that disaster risk reduction (DRR) required an inclusive, multi-stakeholder approach. Despite progress in policy development, challenges persisted in translating policies into practice, especially at the local level. Inadequate financing for DRR and climate action in Asia Pacific remained a significant barrier to effective implementation.

Ms. Mosquera Calle outlined recommendations aligned with four Sendai Framework priorities: understanding disaster risk by improving data collection, analysis, and dissemination; strengthening disaster risk governance by enhancing coordination and mainstreaming DRR across sectors; investing in DRR for resilience by increasing funding and engaging the private sector; and enhancing disaster preparedness by developing early warning systems and strengthening community-based programs. These interconnected recommendations aimed to support the Sendai Framework's implementation in Asia Pacific, enhancing coastal communities' resilience to climate change impacts and natural disasters. In conclusion, the presentation emphasized the importance of sustained, collaborative efforts in DRR, highlighting progress and ongoing challenges. It provided a roadmap for future action to build resilient communities in the face of increasing disaster risks.

SESSION II – SCALING UP APEC'S EFFORTS ON STRENGTHENING RESILIENCE OF VULNERABLE COASTAL COMMUNITIES TO CLIMATE CHANGE

The presentation "Utilizing climate change impact projection data to strengthen the resilience of coastal communities" by **Dr. Potutan Gerald, a Senior Researcher at the Asian Disaster Reduction Center (ADRC) in Japan**, outlines an innovative project that utilized the climate change impact projection data to enhance the resilience of coastal communities. The presentation provided a comprehensive overview of an innovative project aimed at leveraging climate change impact projection data to enhance the resilience of coastal communities. The speaker emphasized the critical importance of comprehending and quantifying the multifaceted impacts of climate change, with a particular focus on sea level rise and flooding in vulnerable coastal regions.

The project's primary objective was to develop highly localized and detailed climate models that can offer precise projections for specific geographical areas. This ambitious undertaking involved a sophisticated process of downscaling global climate models to regional and economy-wide levels, thereby enabling more accurate and granular impact assessments. By refining the resolution of these models, researchers could better capture the nuanced effects of climate change on local ecosystems, economies, and infrastructure. The ultimate aspiration of this project was to harness this wealth of data to inform and shape robust adaptation strategies. These strategies encompassed a wide range of interventions, including policy reforms and infrastructure projects, all designed to bolster the resilience of coastal communities in the face of escalating climate change impacts. By providing decision-makers with more precise and localized projections, the project aimed to facilitate more targeted and effective adaptation measures. In addition to its primary focus, the presentation delved into the economic dimension of climate adaptation. It highlighted the cost-effectiveness of proactive adaptation measures, underscoring the long-term benefits of investing in resilience-building initiatives.

This economic perspective added a crucial layer to the project's relevance, potentially influencing policy decisions and resource allocation. Furthermore, the talk emphasized the importance of adopting

a holistic approach to climate modeling. It stressed the need to consider a diverse array of factors in the modeling process, with particular emphasis on water-related disasters. This comprehensive approach ensured that the resulting projections and adaptation strategies are robust and capable of addressing the complex, interconnected challenges posed by climate change. By bridging the gap between global climate science and local adaptation needs, this project represented a significant step forward in the collective efforts to build resilient coastal communities in the face of an uncertain climatic future.

The presentation, delivered by **Dr. Hnin Yin CHO from UNIDO HQ**, provided a comprehensive overview of best practices for enhancing resilience against climate change in vulnerable coastal communities. The comprehensive presentation delved into best practices for bolstering resilience against climate change in vulnerable coastal communities. The speaker underscored the critical importance of coastal ecosystems, emphasizing their multifaceted role in environmental sustainability, social well-being, and economic stability.

These ecosystems were highlighted as vital providers of habitats for diverse flora and fauna, natural buffers against disasters, crucial regulators of climate, and significant contributors to local economies through various ecosystem services. The discourse extended to an in-depth exploration of climate change's far-reaching impacts on oceans and coastal areas. It elucidated the consequences of rising ocean temperatures, escalating sea levels, and the increasing frequency and intensity of extreme weather events. These factors were presented as significant challenges that coastal communities must address to ensure their long-term sustainability and resilience. The main content of the presentation was the introduction of a holistic framework for building coastal resilience. This framework was structured around three fundamental pillars: economic resilience, social adaptability, and environmental sustainability. Each pillar was explored in detail, highlighting its unique contribution to overall community resilience and the interconnectedness between these aspects.

To illustrate practical applications of resilience-building strategies, the speaker presented specific case studies of innovative projects. These included integrated mangrove-aquaculture systems, which demonstrated

the potential for synergizing ecosystem restoration with sustainable livelihood development. Another example showcased was sustainable seaweed farming, highlighting how alternative, climate-resilient economic activities could be successfully implemented in coastal areas. The presentation concluded by emphasizing two critical points. Firstly, it stressed the paramount importance of ecosystem-based approaches in developing resilience strategies. This approach recognized the intrinsic link between healthy ecosystems and community well-being. Secondly, it underscored the necessity for transformative changes across various domains - including policy, technology, finance, and social structures - to build truly comprehensive and effective resilience strategies for coastal communities facing the challenges of climate change.

The presentation by **Ms. Thai Minh Huong, an official from the Viet Nam Disaster and Dyke Management Authority**, outlined a comprehensive project funded by the Green Climate Fund to enhance the resilience of vulnerable coastal communities in Viet Nam against climate change impacts. The presentation delved into a comprehensive project aimed at bolstering resilience against climate change in coastal communities of Viet Nam, funded by the Green Climate Fund. This initiative encompassed three crucial components, each addressing a different aspect of climate resilience. Firstly, the project focused on the construction of resilient housing, a vital measure to protect communities from extreme weather events. The success of this component was evident in the construction of over 5,000 resilient homes, which had already demonstrated their effectiveness during severe weather conditions, providing safety and security to vulnerable populations. Secondly, the project emphasized the regeneration of mangrove forests, recognizing their pivotal role in coastal protection and ecosystem services.

The successful regeneration of more than 4,000 hectares of mangrove forests not only contributed to coastal defense against rising sea levels and storm surges but also enhanced local livelihoods through improved fisheries and other ecosystem-based economic activities. This dual benefit of environmental protection and economic improvement underscored the project's holistic approach to resilience-building. The third component centered on improving disaster and climate data management, a critical aspect of long-term resilience planning. This

involved extensive capacity building, with the project conducting comprehensive training programs on disaster risk management.

The reach of these programs was impressive, with over 62,000 local staffs and community members receiving training, significantly enhancing local capacity to understand, prepare for, and response to climate-related risks. Throughout the presentation, the speaker underlined the critical importance of several key factors in ensuring the project's success and sustainability. These included effective policy coordination at various governance levels, active engagement of diverse stakeholders in the planning and implementation processes, and the adoption of sustainable practices that could be maintained beyond the project's duration.

The emphasis on these elements reflected a nuanced understanding of the complex, multifaceted nature of building long-term resilience against the impacts of climate change. By integrating physical infrastructure improvements, ecosystem restoration, and human capacity building, the project demonstrated a comprehensive approach to climate resilience. This multifaceted strategy not only addressed immediate vulnerabilities but also laid the groundwork for sustainable, long-term adaptation to changing climate conditions in coastal communities.

Dr. Nguyen Toan Thang, Director of Hydrology and Meteorology Technology at the Viet Nam Meteorological and Hydrological Administration, presented a comprehensive model for enhancing the adaptation capacity of coastal communities in central Viet Nam, specifically in Ha Tinh and Quang Binh provinces, to extreme flooding and rainfall under climate change conditions. The presentation outlined a community-based approach to disaster response, emphasizing the importance of investing in and building up local resources.

This process involved several key steps: evaluating local awareness and knowledge, assessing community needs, gathering input from various stakeholders including residents, scientists, managers, and experts, and finally implementing the disaster response strategy within the community. To boost community resilience, the model introduced several practical measures. These included the installation of large INOX clean water tanks in each village, designed with float systems and

stabilized by high metal piles to ensure water supply during floods. The provision of lifeboats, managed by the Vietnam Youth Union, served dual purposes of evacuation during emergencies and assisting pupils in crossing rivers during normal times.

Additionally, the model focused on reinforcing houses of poor households to better withstood natural disasters such as storms, floods, and cyclones. This reinforcement included upgrading floors, stabilizing storage rooms for food and safe shelter, and installing ventilation systems to mitigate storm damage. Through these comprehensive strategies, the model aimed to significantly improve the ability of coastal communities in central Viet Nam to adapt to and cope with extreme weather events exacerbated by climate change.

SESSION III - FORECAST-BASED ACTION: AN INTEGRATED APPROACH

The talk, presented by **Ms. Maria Holtsberg from UN Women Asia and the Pacific Regional Office**, focused on regional engagement in anticipatory action (AA) and gendered approaches for forecast-based planning. It highlighted a pilot project in Viet Nam (2017-2021) that integrated Gender Equality and Social Inclusion (GESI) into AA and Community-Based Disaster Risk Management. The presentation discussed a regional programme that mainstreamed GESI in AA for Southeast Asian disaster preparedness and promoted its inclusion in ASEAN agreements.

Additionally, it mentioned an initiative across Bangladesh, Nepal, the Philippines, and Viet Nam aimed at identifying GESI gaps in AA, developing integration recommendations, and supporting Technical Standards on AA in Asia-Pacific. The talk revealed that while there are growing interest in AA, gender inclusion efforts are still in their early stages, emphasizing the need for stronger focus on high-risk groups' participation. It outlined promising practices such as targeting vulnerable households and engaging communities in AA planning but noted that more evidence was needed on AA's support for the most vulnerable. The presentation concluded by stressing the importance of targeting

vulnerable women and households in AA and shock-responsive social protection, emphasizing community involvement in designing and implementing anticipatory actions, and advocating for the integration of GESI in Disaster Risk Reduction into AA approaches.

Mr. Vu Thai Truong, Officer-in-Charge, Climate Change and Environment Unit, UNDP in Viet Nam summarized the efforts of the UNDP's GCF Coastal Resilience Project in Viet Nam, implemented in collaboration with the Ministry of Agriculture and Rural Development. UNDP was supporting the Government of Viet Nam in addressing climate and disaster-related risks by building resilience in vulnerable coastal communities. The GCF Coastal Resilience Project, implemented by UNDP and the Ministry of Agriculture and Rural Development, aimed to improve the resilience of these communities to climate change impacts.

The project focused on three main components: safe housing, mangrove restoration, and enhanced climate risk information. In terms of safe housing, the project has contributed to building 4,966 storm- and flood-resilient houses, benefiting 25,000 people in 125 communes across five coastal provinces. These houses had proved effective during severe weather events, with no reported loss of life or property. The project had also restored 4,260 hectares of mangroves, serving as a natural buffer against storm surges and avoiding over 1 million tCO2eq emissions. To enhance climate risk information, the project implemented early warning systems, developed web-based climate change risk information, and established comprehensive disaster and climate risk databases. Additionally, it introduced sustainable livelihood models to offset any disruptions caused by mangrove regeneration activities. Building on these successes, the project was scaling up interventions.

Plans for the future included setting up advanced hydro-meteorological monitoring systems, establishing Climate Information Groups for localized climate advisories, and implementing gender-responsive grant-finance schemes to support nature-based co-management and business initiatives. These efforts aimed to further strengthen the resilience of coastal communities and promote sustainable, climate-adaptive development in Viet Nam.

Ms. Nguyen Thanh Van, FAO Disaster Risk Management Technical Specialist at FAO in Viet Nam, delivered a presentation on

Climate Vulnerability and Anticipatory Action in Agriculture and Rural Sectors. The presentation discussed Anticipatory Action (AA) initiatives in Viet Nam for climate vulnerability and disaster management in agriculture and rural sectors. It highlighted that Viet Nam had six AA Protocols for various natural disasters, developed by multiple organizations.

Key achievements included successful activations for typhoons and droughts, mainstreaming AA into government programs, developing risk maps and triggers, and creating protocols and standard operating procedures for 12 provinces. The initiative also focused on enhancing awareness, capacity building, and fostering government and multi-partner leadership. Notably, there was an emphasis on linking AA with social protection systems and establishing a technical working group for AA implementation. Lessons learnt from implementing Anticipatory Action (AA) in Viet Nam have been valuable. AA was not a novel concept in the economy, but it should be viewed as a crucial element of disaster risk management, adaptation, and resilience strategies.

This approach effectively complemented long-term disaster risk reduction interventions. Furthermore, simulation exercises have proven to be essential in practicing and refining the process of implementing AA interventions. These exercises, based on near-real disaster scenarios, allowed for the improvement and fine-tuning of AA protocols, ensuring better preparedness and more effective responses to potential climate-related disasters.

The presentation by **Ms. Nguyen Thi Xuan Hong from the Vietnam Disaster and Dyke Management Authority** focused on Viet Nam's effective response to Typhoon Noru in 2024. The typhoon, which occurred from 23-28 September 2024, moved from the East of Luzon, the Philippines, and made landfall in Viet Nam's Central Region. The Vietnamese government demonstrated proactive measures in dealing with the typhoon, including conducting high-level meetings, setting up a Forward Command post, and issuing official commands.

The Disaster Risk Reduction Partnership (DRR-P) played a crucial role by organizing a meeting with international organizations to coordinate relief efforts. Immediate aid was provided by FAO and the United Nations Children's Fund (UNICEF) in the form of plastic tanks and

water filters. The presentation highlighted several key lessons learnt from this experience, which included the importance of mobilizing the entire political system, evacuating people from dangerous areas, developing comprehensive prevention plans, and providing clear information and guidance to the public. This case study showcased Viet Nam's improved disaster management capabilities and the value of coordinated efforts between government agencies and international organizations in mitigating the impact of natural disasters.

Mr. Tran Quang Nang, Deputy Director of the Department of Hydro-Meteorological Forecasting Management at the Viet Nam Meteorological and Hydrological Administration, delivered a presentation on Viet Nam's Climate and Weather Forecasting System: Enhancing Resilience in Vulnerable Coastal Communities. The speaker began by addressing natural hazard issues in Viet Nam, noting that over the past decade, meteorological and hydrological hazards had caused thousands of deaths and billions of USD in direct economic losses annually, equivalent to 1-2% of Viet Nam's GDP. Flash floods and landslides occured frequently, especially after extreme rainfall, while tropical depressions and storms affected coastal communities from the north to the south-central region annually.

About 10 to 12 tropical cyclones (TCs) activated over East Sea, with 40% forming within the sea and 60% from the Northwestern Pacific. Typically, 5 to 6 TCs made landfall or directly affected the land, with the storm season lasting from May to November. Climate change was impacting these patterns, increasing the number of typhoons and strong typhoons, potentially shifting the summer monsoon onset earlier and ending later, and increasing summer monsoon rainfall. The number of cold days were decreasing while hot days were increasing, especially in the southern part, and droughts were becoming more severe.

The Viet Nam Meteorology and Hydrology Administration managed the hydro-meteorological network, forecasting, and data management. Their main functions included issuing daily weather forecasts and warnings for high-impact weather events such as cold surges, heat waves, gales, tropical cyclones, floods, flash floods, and storm surges. They provided services to the Central Government for decision-making,

regional hydro-meteorological centers, the public and external user community.

The National Hydro-meteorological Network consisted of various observation stations, including 186 surface meteorological stations, 2500 rain gauge sites, 14 radiation stations, 232 hydrological stations, 26 marine meteorological stations, 10 weather radars, 179 air and water environment observation stations, and 18 lightning detectors. Innovations in forecasting and dissemination systems included longer-range forecasts, new information dissemination via social media, and a TV studio supported by WMO and the UK Met Office. The economy also hosted regional centers for severe weather forecasting and flash flood guidance.

Future improvements in monitoring and forecasting included increasing the number of automatic weather stations, adding more upper air and radar stations on islands, introducing mobile radars and lidar technology, implementing cloud-resolved numerical weather prediction models with rapid assimilation systems, and developing high-resolution ensembled forecasts.

SESSION IV - AOTEAROA PLAN OF ACTION IMPLEMENTING THE PUTRAJAYA VISION 2040: POLICY RECOMMENDATIONS FOR ENHANCING RESILIENCE OF VULNERABLE COASTAL COMMUNITIES TO CLIMATE CHANGE

Mr. Pham Doan Khanh, Deputy Director of International Cooperation and Science, Technology Department, Viet Nam Disaster and Dyke Management Authority, summarized key documents related to disaster management action plans. The ASEAN Framework on Anticipatory Action in Disaster Management, developed through a participatory process from November 2021 to May 2022, provided guidance for implementing anticipatory action in ASEAN member states and proposed a Plan of Action for 2021-2025. This plan outlined 12 regional target actions and indicators to monitor progress in implementing three building blocks, aligning with existing DRM policies.

Anticipatory Action involved interventions carried out when a hazard posed imminent danger, based on forecasts or early warnings, to

mitigate impacts on people, assets, and infrastructure. The framework focused on hydrometeorological risks in Southeast Asia, including floods, typhoons, droughts, and heat or cold waves. A Drought Plan of Action aimed for sustainable drought management through nine actions and 26 sub-actions. Social protection was considered a promising instrument for delivering anticipatory action, with ASEAN guidelines providing strategic guidance for policymakers.

Currently, Viet Nam had six Anticipatory Action Protocols developed by various organizations. Institutionalization efforts included successful activations for Typhoon Noru and drought, mainstreaming into government programs, and developing risk map methodologies. Capacity strengthening involved adopting the Ha Long Declaration, organizing conferences, developing training materials, and conducting simulations. Government and multi-partner leadership were evident in the planned Implementation Plan, VDDMA's leadership in developing Standard Operating Procedures, and exploring links between Social Protection and Anticipatory Action.

In conclusion, Anticipatory Action was seen as an integral component of disaster risk management in Viet Nam, complementing longer-term interventions, with ongoing efforts to refine methodologies, scale up government interventions, and implementing the Plan of Action over the next years.

Ms. Tran Thi Thu Trang, Vice Director of the Environment and Ecology Institute in Viet Nam, presented on good practices of Viet Nam's climate change adaptation efforts at local level. Viet Nam had implemented various solutions, with a focus on the community-based climate change adaptation approach, which empowered communities in planning responses to climate impacts. Over the past 15 years, provinces and cities in Viet Nam have developed and updated action plans to address climate change in two rounds.

The initial round of Climate Action Plans (CAPs) was implemented from 2010-2013, with 62 out of 63 provinces and cities having approved CAPs by December 2014. A list of 24 specific practices was developed based on international guidelines, focusing on effective planning processes, organization, and management of adaptation planning. Good practices in developing and implementing CAPs in Viet Nam included

using the best available climate data, assessing vulnerabilities, undertaking risk assessments, identifying practical actions, applying local knowledge, and mainstreaming into various plans. Engaging a broad range of stakeholders in developing adaptation plans provided valuable information and fostered shared learning and commitment.

Identifying priorities for adaptation planning should include risk assessment to compare potential climate impacts. Communities had traditionally used local knowledge to predict and prevent natural disasters, but this role has shifted to authorities, leading to a more passive approach. Integrating community knowledge with scientific evidence was essential for sustainable disaster prevention. Recently, almost all provincial CAPs and socio-economic plans for 2021-2030 had mainstreamed climate impact assessments and priority adaptation activities. The Law on Environmental Protection (2020) and Circular 06/2023/TT-BTNMT (2023) outlined the integration of climate change responses into strategies and planning, ensuring unified and effective planning processes for sustainable development.

Mr. Saiful Bahri Hamzah, Research Officer at the National Water Research Institute of Malaysia (NAHRIM), delivered a presentation entitled "Bridging Science and Society: NAHRIM's Research-Driven Initiatives for Enhancing Malaysia's Coastal Resilience". This presentation explored coastal management and sea level rise research in Malaysia, highlighting the economy's approach to these environmental challenges. The speaker outlined their team's work on sea level rise projections, vulnerability assessments, and risk models for Malaysia's coastline. They emphasized the importance of translating complex scientific findings into actionable information for policymakers and the public for informed decision-making and to raise awareness.

The research methodology involved data collection from coastal regions, computer modeling, and creating high-resolution maps for visualized impacts and informed management strategies. The speaker stressed effective communication of research results, using visual representations and public outreach initiatives for different age groups. They also addressed challenges such as data gaps and resource limitations. The presentation concluded by advocating for a multi-faceted approach to coastal management issues. This included increased

collaboration among stakeholders, innovation in coastal protection solutions, and community empowerment in decision-making processes. This holistic strategy aimed to address sea level rise challenges and ensured the resilience of Malaysia's coastal regions.

COMPENDIUM OF RECOMMENDATIONS

Through thoughtful presentations in four sessions in the Workshop, it was a comprehensive background on identifying risks that coastal communities are facing. It emphasized key lessons learnt and building capacity for APEC economies to improve their coastal communities' resilience and promoted sustainable and resilient livelihood strategies in climate change context.

In conclusion, climate change posed significant and multifaceted challenges to coastal communities across the Asia-Pacific region. The impacts were far-reaching and diverse, encompassing rising sea levels, increased frequency and intensity of extreme weather events, substantial economic losses, and severe threats to traditional livelihoods and ways of life. These challenges were not only environmental but also social and economic in nature, affecting millions of people who called these coastal areas home. However, in the face of these daunting obstacles, APEC economies are demonstrating remarkable resilience and innovation. Through collaborative efforts, cutting-edge technologies, and strategic partnerships, these economies are working tirelessly towards enhancing the resilience of these vulnerable coastal communities.

The workshop highlighted several key recommendations for strengthening the resilience of coastal communities. These recommendations were both comprehensive and targeted, addressing various aspects of climate change adaptation:

1. **Developed and implemented localized climate models**: This involved creating and utilizing highly specific, region-focused climate models that could provide more accurate impact assessments. These models would enable communities to develop targeted adaptation strategies that are tailored to their unique geographical and climatic conditions.

2. **Enhanced international cooperation:** There was a strong emphasis on fostering collaboration between economies, particularly in the realm of early warning systems. By sharing best practices and technologies, economies could learn from each other's experiences and implement more effective disaster preparedness measures.

3. Invest in nature-based solutions: The workshop highlighted the importance of combining traditional infrastructure development with nature-based solutions. For instance, mangrove restoration not only helped protect coastlines from erosion and storm surges but also provided valuable habitats for marine life, contributing to biodiversity conservation.

4. Increased climate finance commitments: There was a clear need for greater financial resources to be allocated to climate change adaptation and mitigation efforts. Importantly, the recommendation also emphasized improving access to this funding for vulnerable economies, ensuring that resources reached those who needed them most.

5. Adopted a holistic approach to resilience-building: This recommendation underscored the importance of addressing not just environmental aspects, but also social and economic factors in building resilience. It recognized that true resilience came from strengthening communities across all dimensions.

6. Improved understanding of long-term climate impacts: There was a need for better education and awareness among planners, local communities, and stakeholders about the long-term implications of climate change. This improved understanding would lead to more informed decision-making and policy development.

7. Implemented integrated and resilient urban planning: Given the rapid urbanization in many coastal areas, there was a critical need for urban planning that incorporated climate resilience from the ground up. This involved considering future climate scenarios in all aspects of urban development.

8. Utilized advanced technologies: The workshop highlighted the potential of cutting-edge technologies such as AI-enhanced prediction models and video monitoring systems. These tools could significantly improve disaster management capabilities, allowing for more accurate forecasting and faster response times.

The implementation of these recommendations represented a significant step forward in addressing the climate challenges faced by coastal communities. However, it was important to note that this was an ongoing process that required sustained commitment and effort. By continuing to collaborate on innovative solutions and sharing knowledge

and resources, APEC economies could make substantial contributions to the sustainable development and long-term resilience of coastal communities in the face of climate change. Moreover, these efforts aligned closely with broader global initiatives such as the United Nations Sustainable Development Goals and the Paris Agreement.

By taking proactive steps to protect and empower coastal communities, APEC economies were not only safeguarding their own populations but also contributing to global efforts to combat climate change and its impacts. While the challenges posed by climate change to coastal communities were significant, the workshop demonstrated that through concerted effort, innovation, and collaboration, these challenges could be met head-on. The path forward, though challenging, was clear, and with continued dedication and implementation of these recommendations, APEC economies could pave the way for a more resilient and sustainable future for their coastal regions.