Policy Brief:

For a climate-resilient infrastructure in Viet Nam

From climate risk assessment services to climate-informed investment decisions

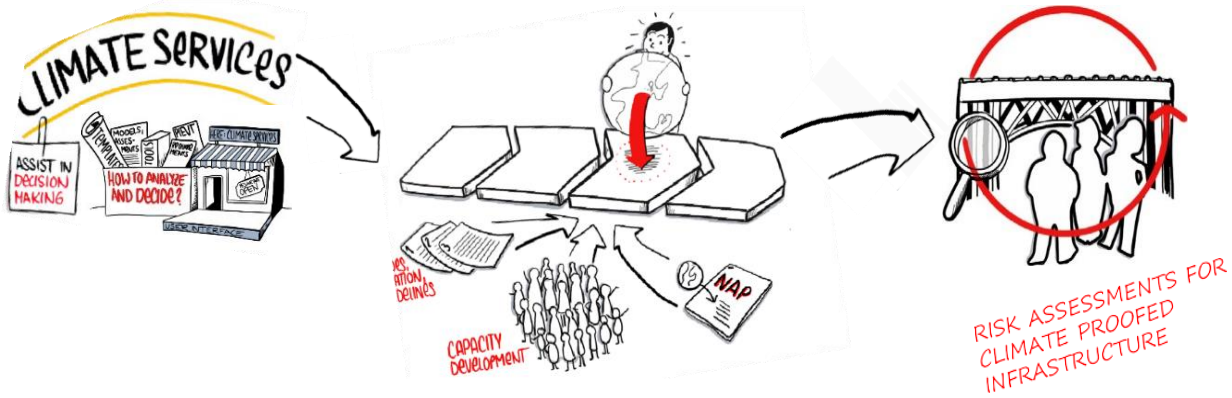

Fig.1 - Making infrastructure investments climate proof - Climate risk assessment as a means of National Adaptation Plan and Policy (NAP) implementation

The challenge

Viet Nam is identified by IPCC as one among the top ten countries likely to be most affected by climate change *(IPCC 2017)* due to its extensive coastline, vast deltas and floodplains, location on the path of typhoons as well as its large population in poverty. In response to the climate change crisis, Viet Nam has invested millions of dollars into long-lived infrastructures but like all countries around the world, Viet Nam is still facing an infrastructure gap. Following the Medium-term public investment plan *(Resolution No. 26/2016/QH14)*, 2million billion VND of the state budget is available for infrastructure investment between 2016 – 2020, equivalent to 400,000 billion VND or USD 20 billion per year or around 9% of GDP. Though already considerable, this funding will only meet 30 % of the investment needs of ministries and localities *(MoF Report, 2018)*. At the same time, natural disasters and extreme events caused direct losses of around 0.625% of GDP each year *(ICPP, 2017)*.

In addition, climate change is often not taken into account in the planning and management of infrastructure due to a lack of access and usability of climate information, lacking regulatory incentives and guidance as well as short- term orientation in planning *(OECD, 2017)*. At the UN General Assembly September 2018, the UN Secretary General Guterres emphasized the urgency and necessity to stop investments in unsustainable infrastructures, as climate change is moving faster.

Because spending on disaster recovery is almost nine times higher than on prevention *(World Risk Report 2019)*, it is essential that climate risks are comprehensively considered and systematically managed from the beginning of the planning stage of infrastructure investment projects. Thus, climate proofing of infrastructure, management and planning bear a lot of potential in terms of benefitting society and economy to:

- Reduce costs due to disaster response and recovery as well as contingencies;
- Apply efficient life-cycle management approaches that save money over the whole lifespan of infrastructure and at the same time ensure its continuous service ability;
- Guarantee business continuity and continuous supply of public services to the population as a whole;
- Utilise co-benefits offered, among other things, by Ecosystem-based Adaptation (EbA), higher reductions of GHG emission, increased biodiversity and benefits for societal well-being.

Climate-informed decisions for resilient infrastructures is one factor that is key for the sustainable development of the country. Cooperation and joint-efforts by climatologists, civil engineers and operators support policy-makers investors and the identification of financing sources for adaptation measures.

giz Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH

On behalf of
Federal Ministry for the Environment, Nature Conservation and Nuclear Safety
of the Federal Republic of Germany

Our approach

The Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH is assisting the Government of Viet Nam (GoV) in an effort aiming at making infrastructure more resilient by:

- Enhancing the provision and use of Climate Information and Services, which are essential for evidence-based adaptation planning;
- Testing and developing tools for climate proofing infrastructures, such as climate risk assessment and management, cost-benefit analyses for climate proofing measures and digital solutions;
- Integrating climate-proofing into regulatory frameworks, thereby mainstreaming Climate Risk Assessments (CRA) and Cost-Benefit analysis, creating incentives for infrastructure planners and operators.

Supporting for climate service providers: database, tools, and practices in climate service development

In order to enhance the provision and use of climate information and services, a baseline study was conducted to address the current state of national climate service for the water infrastructure investment needs, based on the concept and structure of World Meteorological Organization's (WMO) Global Framework of Climate Services (GFCS). The assessment report encompasses currently available Climate Service capacities and specific products (of Viet Nam Meteorological and Hydrological Administration - VNMHA and the Southern Regional Hydro-Meteorological Centre - SRHMC) and also reflects the current use and demands of Climate Services from key actors of the water infrastructure sector (i.e. Ministry of Agriculture and Rural Development – MARD and provincial departments of Agriculture and Rural Development in the Mekong Delta). The report provides a comprehensive baseline for development orientation of the climate service sector of Viet Nam, from the dataset aspect to tools, capacity for climate service development to the market and demand of the users from various sectors, visioning a pathway towards a climate-resilient future. To deal with the climate information gaps in the database of the Mekong Delta, GIZ supported climatologists of the Southern Regional Hydro-Meteorological Centre in data entry and data digitalization for climate database of Mekong Delta in a time series of the past 32 years, trained on climate services and provider-user interaction, and practiced to use climate information for applied infrastructure risk assessments.

Supporting the demonstration of climate risk assessment for infrastructure investments:

Comprehensive Climate Risk Assessments (CRA) are a decision support tool for infrastructure investors and planners to understand the risk from climate change and related natural hazards posing on the infrastructure[1]. These enable climate-informed decisions on financial planning for adaptation measures as well as necessary adjustments in technical design, structure or operation and maintenance of the system. An assessment team of Vietnamese hydro-meteorologist, climatologist, water infrastructure engineers and planners, and civil experts was formed and practiced the climate risk assessment according to the PIEVC Protocol (Public Infrastructure and Engineering Vulnerability Committee), under direct coaching by experts from Engineers Canada, the German Meteorological Service (DWD), and GIZ. Based on the 32 years databases, updated as of 2021, of the Southern Regional Hydro-Meteorological Centre and the Climate Change Hazards Information Portal (CCHIP) tool (https://go.cchip.ca) provided by Engineers Canada and Risk Sciences International (RSI), the assessment team supported climate and hydrological data analysis for both, deriving historical trends and future projections. Climate data was then analysed on the basis of defined thresholds of impact on the water infrastructure system's breakdown, and calculated on historical and future probability scores. The risk matrix was then calculated based on the probability and severity of each climate parameter on each infrastructure component, before coming to a professional judgment on the climate risk and further identification of potential adaptation measures. Upscaled for the Kien Giang province, 84 sluice systems have been classified and assessed the climate risks according to a quick and general approach, by the assessment team in frequent technical exchanges with experts from Canada's Climate Change Adaptation Community of Practice (CCACoP) of the Canadian Climate Risk Institute (CRI).

The study results proved that the PIEVC Protocol has a high potential to be applied for climate risk assessments of infrastructures (both planned projects and existing infrastructure) in Viet Nam. Furthermore, portfolio scan approach for climate risk assessment for infrastructures have also shown its advance in supporting decision makers identify climate vulnerable projects, thereby making decisions on prioritizing projects or requiring further climate risk assessment steps for important but highly vulnerable projects under impacts of climate change.

Supporting the demonstration of cost-benefit analysis for climate proofing measures

The comprehensive approach, tools and practical experience of climate risk assessment, once supplemented by cost-benefit analysis, have the potential to give evidence-based advices for the investors on which technical and operational design of infrastructure should be applied, which and when climate-proofing measures should be used to avoid future risk from climate change. Economic experts' calculations, piloted on the climate-risk based climate-proofing recommendations for the Cai Lon - Cai Be project, show that the gained material and social benefits would be much higher than the costs spent for application of those adaptation measures. For example, considering one proposed measure to upgrade the concrete used for the sluice pillars from 300 to 400, to ensure corrosion reduction in the condition of increased humidity and salinity due to climate change, each US dollar spent for the measure would save $1.53 of maintenance cost for the infrastructure itself and $22.03 of avoided loss for the society, and $2.76 of willingness to pay, over the life of the building. Thus, every US dollar of cost spent for this adaptation solution would help to earn a monetary benefit of 26.32 USD in total. With the proven effectiveness of climate risk assessment and cost benefit analysis tools, capacity development for both managers and technicians will therefore be able to serve best for the resilient and adaptive decision-making process of infrastructure planners and investors across the country.

Supporting for capacity development and networking:

Since networking and collaboration among the stakeholders in the decision-making process are among the key success factors for climate proofing in the infrastructure investment planning process, national multi- stakeholder dialogues and global forums to exchange with international peers have been organized. These events were to exchange and share climate risk management lessons learnt and experiences among countries of common concern such as Viet Nam, Costa Rica, Brazil and experts from Nile Basin Initiative

[1] According to the IPCC definition, risks are based on the combination of exposure, vulnerability and occurring hazards or in other words the severity and probability of climate extremes.

organization in Africa and to connect their expertise with relevant advanced professional organizations such as Canada Engineers and the German Meteorological Service (DWD). These events were also combined with thematic training courses to gather into one common interaction platform with key actors in various roles of the climate service value chain, from climate information provider to users such as engineers or decision-makers. The know-how on the climate risk assessment tool has been supplemented by skills on training of trainers throughout the training courses for these key actors, to reach-out and up-scale the flow of information and the transfer of knowledge. The messages on necessity and approach to climate-proof the infrastructures as well as the obtained results on demonstrated tools of climate risk assessment were shared and disseminated at national and international, technical and political events such as: LEDS and RCAP in 2017 (the 3rd Asia-Pacific Forum on Urban Resilience and Adaptation), VACI in 2018 (Vietnam wAter Cooperation Initiative), Ha Noi forum in 2018 (Hanoi Forum 2018: Toward sustainable development: Climate change response for sustainability and security), VSF in 2019 (Vietnam Sustainability Forum), Mekong Delta Forum in 2019, Lower Mekong Research symposium

Vietnams in 2018 and 2019, International Conference on Water Resource Security, Disaster prevention and Climate change in 2019, etc. For the dissemination and spiral dynamics in action, perspectives and main findings on demonstration of the climate risk assessment in Viet Nam were also jointly published with the mentioned key stakeholders in the *Journal of Irrigation Science and Technology*, *Oceans and Coasts Newsletter*, *MDCP – Decision support tool for coastal protection in the Mekong Delta*, and the *VCCI's Book: The Mekong Delta - an emerging investment destination in Viet Nam.*

Supporting for planning procedures and policy framework:

A climate proof policy framework is the backbone for the implementation of adaptation measures for the infrastructures under the climate risk, whereas climate-informed planning process may secure the required climate finance for adaptation measures. In the context that Vietnam revise, update and develop regulation framework on planning, environment and climate change, disaster prevention, GIZ has been supporting for completion of the regulations and mainstreaming of climate risk consideration into investment planning process by sectors, including Decree No. 37/2019/ND-CP, Law on Environment Protection 2020, the decrees in 2021 guiding the amended Law on Disaster Prevention, Scheme for Infrastructure Investment in Vietnam 2021-2030.

The socio-economic development plans of provinces in the Mekong Delta such as An Giang, Kien Giang, Ca Mau, Soc Trang, Bac Lieu in 2019 and 2020 has been mainstreaming consideration of climate change and related natural hazards through sectoral development indicators. These indicators are being developed in a comprehensive manner at the national level, for a systematical application nationwide. Consideration of climate change risk and adaptation measures for water infrastructures has also been mainstreamed in the Irrigation Plan for the Mekong Delta within the framework of the 5-year plan (2021-2025) for the agriculture and rural development sector in Viet Nam, and in the *Coastal Protection for the Mekong Delta (CPMD) - a digital Decision Support Tool* developed by the Viet Nam Disaster Management Authority (VNDMA) in collaboration with GIZ. In a future outlook, once the climate risk assessment is institutionalized in the planning process, technically guided and ready to be in service to infrastructure investors, planners, and technical contractors, adaptation measures would have a firm basis and incentive to approach the required climate finance. Hence, the overarching goal of climate resilience of infrastructures can be feasibly realized.

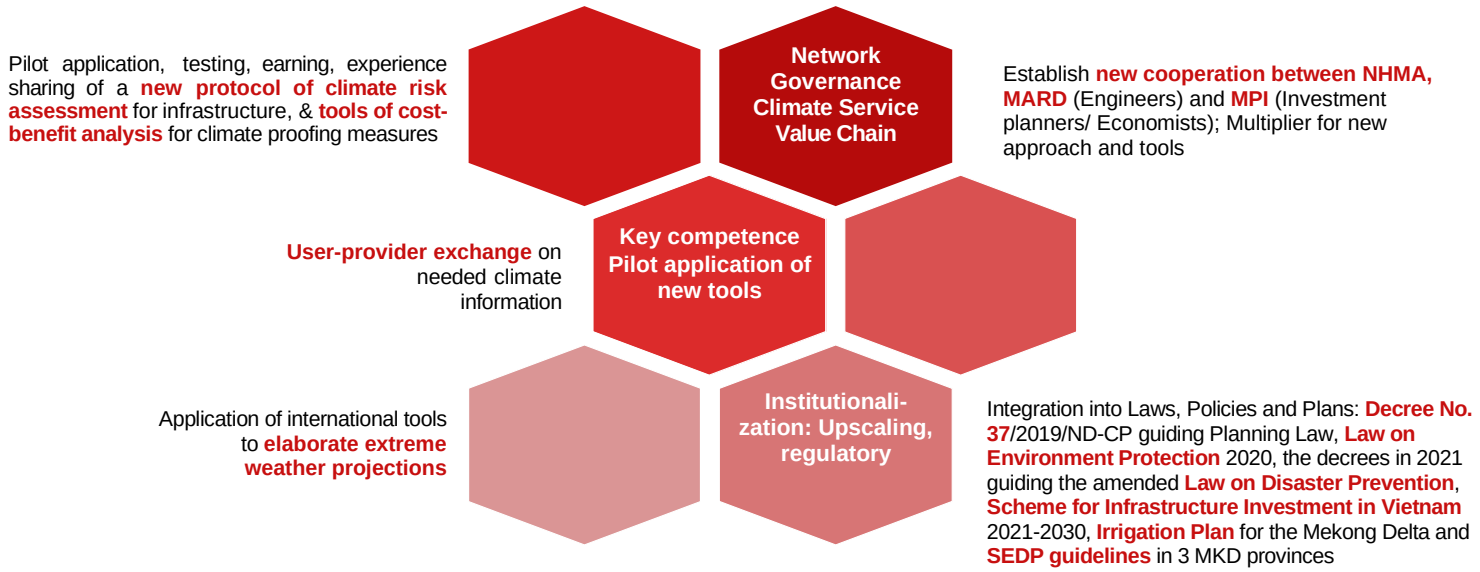

Fig. 2 - Success Factors and Results so far

Results in figures...

- CSI contributed to enhancing awareness, policy frameworks and the use of Climate Service (CS). Users are mature in the sense that they know what climate information they need for the climate-proofing of infrastructure and how to obtain the necessary information and services. Providers know the process of how to develop the necessary CS and potential ways to streamline the process of climate risk assessments in the future
- CSI contributed to capacity development on climate risk assessment
  - ✓ 20 experts have been trained how to apply climate risk assessments for infrastructure.
  - ✓ 25 civil engineers, hydrologists and climatologists and investment planners practiced climate-proofing approaches for infrastructure, 6 of them have become trainers and knowledge brokers on the topic that can pass on the knowledge to others
  - ✓ 54 participants from the HydroMet Services learned about good user-provider interactions in the context of Climate Service development
  - ✓ 35 investment planners have been trained in cost-benefit analysis, no-regret investments, stepwise process for mainstreaming climate risk considerations into investment planning process.
- CSI carried out CRA and CBA studies which serve as direct preparation for the Cai Lon – Cai Be sluice gate investments proposed in the order of approximately USD 145 million.
- International, cross-national and cross-sectoral cooperation for CRA and CBA.

...and in stories

For the first time ever, a comprehensive visualisation and assessment of climate risks was piloted upon an important infrastructure investment project in Vietnam's Mekong Delta. Approaches for climate risk assessment through the PIEVC tool, portfolio scanner for rapid climate assessment, cost-benefit analysis have been demonstrated under collaboration among MPI, MONRE, and MARD with comprehensive support from GIZ. This was a joint effort by climate service providers, technical engineers, economists, infrastructure investors and international experts from Engineers Canada, Climate Risk Institute (CRI) and German Meteorological Service (DWD).

The climate risk assessment and cost-benefit analysis approach have been substantially adapted to the local conditions of the Mekong Delta, giving rise to comprehensive recommendations on technical design and operation of water infrastructures, which were then used by the infrastructure project owners for adjusting the detailed design and TORs with relevant construction contractors. These climate-informed decisions helped to make the infrastructure and the entire delta area under the water regulation of this infrastructure become more resilient to changing climate conditions.

By mainstreaming climate risk management strategies and cost-benefit considerations into regional planning and policy frameworks, and developing the capacity of officials to dedicated to providing climate risk assessment information and services, the CSI project and its partners believe that an increasing number of infrastructure planners and investors can access and benefit from having cost-efficient solutions for resilient infrastructures against the risk of climate change.

In Viet Nam's current context, where the effects of climate change are threatening the infrastructures with further negative impacts on social, economic and environmental conditions climate smart decisions must be made today. Services for climate risk management, with tools ready to be applied or further customized offer the opportunity to realize a higher climate resilience in the sooner future.

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