EVALUATION

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JOINT EFFORTS FOR A GREEN FUTURE: EVALUATION ON FINLAND'S DEVELOPMENT COOPERATION IN ENVIRONMENT AND SUSTAINABLE USE OF NATURAL RESOURCES, AND PRIVATE SECTOR OPPORTUNITIES

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JOINT EFFORTS FOR A GREEN FUTURE: EVALUATION ON FINLAND'S DEVELOPMENT COOPERATION IN ENVIRONMENT AND SUSTAINABLE USE OF NATURAL RESOURCES, AND PRIVATE SECTOR OPPORTUNITIES

DISASTER RISK REDUCTION AND METEOROLOGY SUB-SECTOR EVALUATION REPORT

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2026/1

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This report incorporates the use of Artificial Intelligence (AI) technologies to enhance and support the identification, analysis, and cross-checking of relevant official documents from key sources. AI tools were used for targeted searches, and for data presentation. The AI tools or techniques utilised in this report adhere to EVA-11's requirements, ensuring ethical and responsible use, transparency, validation of results, and compliance with relevant internal regulations. For details on the specific AI methodologies and tools used and details regarding the validation of AI-generated results, refer to section/Annex 1 of this report.

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Acronyms and Abbreviations

AI	Artificial Intelligence
ARISE	Private Sector Alliance for Disaster Resilient Societies (UNDRR)
CSO	Civil Society Organisation
DFCD	Dutch Fund for Climate and Development
EFSD+	European Fund for Sustainable Development Plus
EQ	Evaluation Question
EU	European Union
EUR	Euro
EVA-11	Development Evaluation Unit
FINKERAT	Finnish-Kenya, Rwanda and Tanzania Meteorological Project
FINKMET	Finnish-Kyrgyz Meteorology Project
FINPAC	Finland Pacific Meteorology Project
FINTAJ	Finnish-Tajikistan Meteorology Project
FMI	Finnish Meteorological Institute
FNEP	Finnish-Nepalese Meteorology Project
FRC	Finnish Red Cross
GTK	Geological Survey of Finland
ICI	Institutional Cooperation Instrument
ICT	Information and Communication Technology
IFRC	International Federation of Red Cross and Red Crescent Societies
INDFIN	The Indonesia-Finland Meteorology Project
KNMI	Royal Netherlands Meteorological Institute (Koninklijk Nederlands Meteorologisch Instituut)
Luke	Natural Resources Institute Finland
MFA	Ministry for Foreign Affairs (Finland)
OCHA	UN Office for the Coordination of Humanitarian Affairs
ODA	Official Development Assistance
OECD	Organisation for Economic Co-operation and Development
PIF	Public Sector Investment Facility
PROMOAIR	Promoting Modernisation of AIR Quality Observation and Management Systems Project
PROMOSERV	Promoting Modernisation of Hydro-meteorological Services in Vietnam Project
REAP	Risk-informed Early Action Partnership
SDG	Sustainable Development Goal
SNV	Netherlands Development Organisation (originally Stichting Nederlandse Vrijwilligers)
SOFF	Systematic Observations Financing Facility
Syke	Finnish Environment Institute
UFIM	Ukraine-Finland Meteorology project
UN	United Nations
UNDP	United Nations Development Programme
UNDRR	United Nations Office for Disaster Risk Reduction
UNFCCC	United Nations Framework Convention on Climate Change
USD	United States Dollar
VNMHA	Vietnam National Meteorological and Hydrological Administration
VTT	Technical Research Centre of Finland
WASH	Water, Hygiene and Sanitation
WMO	World Meteorological Organisation
WWF	World-Wide Fund for Nature

1 Summary

In line with the Terms of Reference of the present evaluation (see synthesis report), the present report provides an in-depth analysis of Finland's international cooperation in the Disaster Risk Reduction and Meteorology sub-sector between 2010-2024. It forms part of the evaluation of the Environment and Natural Resources component of the Climate and Sustainable Use of Natural Resources policy priority area of the Ministry for Foreign Affairs of Finland (MFA) in which four of the five main sub-sectors of this priority area to be reviewed. The four sub-sectors are: (i) Forests, Ecosystems and Biodiversity; (ii) Water as a Natural Resource; (iii) Clean and Sustainably Produced Energy, Circular Economy and Critical Minerals; (iv) Disaster Risk Reduction and Meteorology. An evaluation of results of the fifth sub-sector (Food and nutrition security) is not required in the Terms of Reference. The evaluation's **objectives** respond to recommendations in recent evaluations to strengthen the 'Finnish results narrative' based on the rationale that there is a "shortage of fresh, relevant thematic evaluations and evaluations looking at the relevant sub-sectors in more detail and in an integrated manner". To this end, the objectives in the implementation phase are:

1. To evaluate results, successes and challenges in achieving objectives of Environment and Natural Resources policy and its sub-sectors.
2. To identify and analyse opportunities, means and measures for Finnish private sector engagement in these sub-sectors.

All four sub-sector reports build on previous relevant evaluations conducted by the MFA between 2010-2024, assess Finland's comparative advantages (added value) and the degree to which private sector engagement has contributed to the achievement of results. In accordance with the Terms of Reference, all four sub-sector reports are required to address the following two main **evaluation questions**:

> EQ1: *What results, including any realised or emerging impact, has Finland generated in this sub-sector during the period under evaluation?*
>
> EQ2: *What concrete and context-specific opportunities, entry points and models are there for Finland for partnering with Finnish and local companies and economic actors within the sub-sector topic(s) in the next five years?*

A synthesis phase will follow this phase to identify key findings, conclusions and potential areas of action across all four sub-sector reports to support Finland achieve its objectives in the development policy priority area on climate and sustainable use of natural resources between 2025-2030. In summary these objectives are fully aligned with the Sustainable Development Goals and centre on: (i) create equal opportunities for sustainable and climate-friendly food production and access to safe and nutritious food; (ii) ensure equitable access to safe and affordable drinking water and to adequate sanitation and hygiene; (iii) reduce the vulnerability of people and communities to extreme weather events and natural hazards and increase their resilience; (iv) promote equitable access to affordable, reliable and sustainably produced renewable energy; (v) foster the sustainable management, use and protection of renewable natural resources and ecosystems, such as forests and water systems.

The evaluation applied a mixed-methods, theory-based, macro-level and realist design built around a theory of change for Disaster Risk Reduction and Meteorology sub-sector. Core **methods** included: (i) a portfolio review between 2015-2022; (ii) the realisation of 19 desk studies of a sample of projects and initiatives based on 'light', 'moderate' and 'intensive' assessments using structured proformas; (iii) semi-structured interviews with a total of 25 stakeholders responsible for policy, implementation and private sector engagement; (iv) extensive online research aided by Natural Language Processing to identify sources of information as efficiently and effectively as possible; (v) a like-minded peer country review of the Netherlands to assess how Dutch cooperation has shifted to greater private sector engagement in the Disaster Risk Reduction and Meteorology sub-sector since late 2019, in particular through the Dutch Fund for Climate and Development and with linkages to UNDRR's initiative, the Private Sector Alliance for Disaster Resilient Societies - ARISE; (vi) an intensive investigation of four objects which can be classified as development policy investments/blended finance, private sector instruments or private sector engagement-frameworks (MDBs blended finance, Global Gateway, Finnfund, Finnpartnership) and a review of the private sector engagement instruments of specific relevance to Disaster Risk Reduction and Meteorology, which included the use of the concessional credit facility and the Public sector Investment Facility (PIF) to fund the upgrading of weather observation equipment in Vietnam and Ethiopia respectively; (vi) market analyses to identify opportunities for Finnish private sector engagement in Vietnam's Disaster Risk Reduction and hydro-meteorological services market; (vii) private sector engagement survey, which resulted in 19 Finnish companies providing responses.

Together, these methods enabled the evaluation team to triangulate evidence across a wide range of sources, ensuring that the findings and conclusions in this report are robust and grounded in multiple lines of inquiry. To achieve this, however, the evaluation had to address and mitigate several **limitations** experienced. They included: (i) difficulties retrieving data and information on Finnish commitments to Disaster Risk Reduction and Meteorology cooperation (2010–2024); (ii) inconsistent monitoring frameworks and post-project tracking across initiatives, which was addressed as far as possible through the semi-structured interviewing process and using a broader set of sources to support triangulation; (iii) fewer stakeholder interviews than planned due to staff rotation, unavailability, recent personnel cuts in the MFA, or evaluation overload, which was mitigated by identifying alternative stakeholders as far as possible and online research; (iv) the lack of resources to carry out primary research in selected partner countries to assess the impact of results according to the main direct and indirect beneficiaries of the Finland's support to Disaster Risk Reduction and Meteorology sub-sector, and how far it has cross-cut to enhance climate resilience in the Water as a Natural Resource, Forests, Ecosystems and Biodiversity, and Energy, Circular Economy and Critical Minerals sub-sectors. This was mitigated to some extent by coordinating with the evaluation team responsible for an evaluation of ICI projects (also conducted by Particip GmbH), drawing on findings from the proforma files produced by the evaluation team members responsible for the abovementioned sub-sectors and online interviews with the Finnish private-sector, UNDRR and other relevant stakeholders.

Despite these challenges, the evaluation of the Disaster Risk Reduction and Meteorology sub-sector has been able to produce a coherent and evidence-based assessment of Finland's cooperation in this sub-sector drawing from multiple sources, in particular from the sample of 11 projects and core funding to UNDRR selected for the desk studies. A summary of the key findings is provided in the table below, followed by the main conclusions and potential points of action.

KEY RESULTS	SUSTAINABLE DEVELOPMENT GOALS
Answers to Evaluation Questions 1.1 (a, b, c) and 1.2 on results and impacts, induced changes and benefits/beneficiaries Finland has made important and tangible progress on supporting over 40 partner countries improve their knowledge, institutional capacity, early warnings and Disaster Risk Reduction strategies to deliver more effective and inclusive disaster preparedness and response at the sub-national, national and sub-regional levels. This achievement has been achieved by using four of MFA's aid instruments (civil society organisation programme, voluntary core contributions, Institutional Cooperation Instrument, Public Sector Investment Facility) and deployment of four specialised entities (Finnish Meteorological Institute, Vaisala, Finnish Red Cross and United Nations Office for Disaster Risk Reduction). This result complies with: (i) the main activities and output foreseen for Outcome 3 in the MFA's theory of change for climate and natural resources; (ii) the causal linkages between short, medium and long-range results in the theory of change prepared for the Disaster Risk Reduction and Meteorology sub-sector that relate to improving meteorological data and knowledge sharing, and delivering universal early warning, disaster preparedness, risk mitigation and emergency response measures. Moreover, there is significant evidence to confirm the application of Finland's cross-cutting objectives have enhanced the application of inclusive community-centred disaster preparedness and response measures (i.e. that engage vulnerable groups – women, the elderly, people with disabilities – in Disaster Risk Reduction). Nonetheless, it was far less evident that Disaster Risk Reduction and Meteorology cooperation has resulted in transformative changes at the sub-national and/or national levels, notably long-term investment in resilience building of key sectors through public, non-governmental and private sector initiatives. This has not been aided by the general absence of adequate impact monitoring on relevant SDG targets, nor by the general lack of integration of Disaster Risk Reduction as a cross-cutting theme in the Water as a Natural Resource, Forests, Ecosystems and Biodiversity, renewable energy and other key areas of national and sub-national development planning (agriculture, public works, health, etc.).	       
Answers to Evaluation Question 1.3 on most effective approaches The application of targeted, demand-driven Disaster Risk Reduction and Meteorology cooperation that responds to the needs and aspirations of its direct and indirect beneficiaries and applies Finland's cross-cutting objectives, has proven to be a highly effective approach to deliver results that are inclusive and stimulate positive impact in the partner country (in line with the theory of change). Other effective approaches have been: (i) the training of master trainers and use of synergies with other projects have demonstrated they are an effective approach to strengthen institutional memory and enhance the ownership of results in the National Hydro-Meteorological Services; (ii) support to civil society organisations like Finnish Red Cross, has been an effective approach to reach the most vulnerable groups and communities, because they can rapidly mobilise Red Cross and Red Crescent societies who are already in place the partner countries; (iii) the provision of unearmarked and earmarked core funding to United Nations Office for Disaster Risk Reduction has proven to be a highly effective approach to deliver Finland's commitments to the Sendai Framework for Disaster Risk Reduction as well as promote its cross-cutting objectives as the global level. However, the heavy and bureaucratic processes governing the use of Finland's financial instruments for meteorological cooperation (Institutional Cooperation Instrument, Public Sector Investment Facility) has resulted in unsatisfactory levels of implementation efficiency.	

KEY RESULTS	SUSTAINABLE DEVELOPMENT GOALS
Answers to Evaluation Question 1.4 on Finnish added value Finland's added value in the Disaster Risk Reduction and Meteorology sub-sector is demonstrated through its ability to combine high-level meteorological expertise, modernisation of National Hydro-Meteorological Services observation networks with Finnish technology, forge strategic partnerships with civil society organisations that have global networks in place, and stable core funding to United Nations Office for Disaster Risk Reduction. Moreover, the full integration of Finland's cross-cutting objectives adds significant value by delivering results that are inclusive, rights-based, and equitable. However, Finland's added value cannot be fully optimised while it continues to apply fragmented approaches to meteorological and Disaster Risk Reduction cooperation and not cross-cut other strategic sub-sectors in Environment and Natural Resources, in particular the delivery of inclusive and equitable water and climate action.	
Answer to Evaluation Question 2.1 on market conditions affecting Finnish private sector engagement The demand for Weather and Climate Information Services and Disaster Risk Reduction products and services to combat the effects of climate variability and change is growing in Finland's partner countries, especially in emerging markets like Ethiopia, Indonesia, Kenya and Vietnam. Finland's Disaster Risk Reduction and Meteorology cooperation provides significant evidence that there are direct and indirect revenue opportunities where the Finnish private sector has a competitive advantage to meet this demand. However, only one private sector company (Vaisala Oy) has been actively engaged in commercial activity using the Concessional Credit Scheme and Public Sector Investment Facilities, revealing major gaps exist in Finland's transition to greater private sector engagement to support the delivery of climate resilience (impact in the theory of change for Environment and Natural Resources). The use of the Concessional Credit Scheme and PIF facilities have demonstrated that they are a viable way to derisk private sector engagement, but compliance on the heavy and very long bureaucratic processes required to secure funding confirm that they have are not dynamic financial instruments that have helped speed up Finland's commitments to the Sustainable Development Goals. Meanwhile, the use of MFA's private sector instruments to support Finnish private sector engagement in the Disaster Risk Reduction and Meteorology sub-sector was not evident, although Finnpartnership has supported one company (Temet Oy) engage in two inter-related humanitarian aid-projects in which Disaster Risk Reduction was a field of activity.	
Answer to Evaluation Question 2.2 (a, b) on potential gains for Finnish businesses and development cooperation The potential gains and benefits that could be generated from private sector engagement in the Disaster Risk Reduction and Meteorology sub-sector are likely to remain limited to Public Sector Investment Facility projects and some isolated small-scale Finnpartnership projects, if the sub-sector remains siloed and unable to play a pivotal role in supporting the other sub-sectors in the Environment and Natural Resources Priority Area achieve climate resilience (impact in the theory of change for Environment and Natural Resources). Moreover, the absence of a business strategy, business platform and suitable financial instruments for the Disaster Risk Reduction and Meteorology sub-sector make it very challenging for Finnish companies to exploit direct and indirect revenue generating opportunities where it has capacity (such as data-driven services) and could deliver tangible socio-economic and environmental co-benefits in strategic sectors like Water as a Natural Resource, Forests, Ecosystems and Biodiversity and renewable energy. Despite this situation, opportunities to participate in promising public-private partnerships exist at the multilateral level through the Private Sector Alliance for Disaster Resilient Societies (ARISE), Systematic Observations Financing Facility (SOFF)/Early Warnings for All (EW4All), and Global Gateway/Team Europe Initiative initiatives, all of which are operational in Finland's partner countries in Africa and Asia.	

KEY RESULTS	SUSTAINABLE DEVELOPMENT GOALS
Answer to Evaluation Question 2.3 on promising models for Finnish private sector engagement Using public and private sector instruments like the Public Sector Investment Facility to promote collaboration between the National Hydro-Meteorological Services, Finnish Meteorological Institute and the Finnish private sector is a viable approach that can be replicated to promote private sector engagement in the Disaster Risk Reduction and Meteorology sub-sector. However, certain fundamental gaps in this approach were identified. They include the lack of a private sector engagement strategy to support the delivery of Disaster Risk Reduction and climate resilience across all sub-sectors in the Environment and Natural Resources Priority Area, the absence of a suitable private sector engagement platform to support coordinated action in key areas, (notably water and climate action), and a lack of flexible and coordinated financial instruments to de-risk Finnish private sector engagement and promote complementarity between the sub-sectors under the Environment and Natural Resources Priority Area. The Netherlands and UN Office for Disaster Risk Reduction have shown through their Dutch Fund for Climate and Development and Private Sector Alliance for Disaster Resilient Societies (ARISE) initiatives that feasible models exist to engage the private sector in advancing Disaster Risk Reduction and climate resilience in strategic development sectors. Lessons learned and good practices from these models suggest: (i) the establishment of a private sector engagement strategy for the Environment and Natural Resources Priority Area; (ii) the opportunity to expand the Finnish Water Forum into the Finnish Water and Climate Forum to create a business platform for private sector engagement where demand is growing, especially for tailored weather and climate information services, the modernisation of hydro-meteorological observation networks, climate smart technologies and risk monitoring and management; (iii) the adoption of viable financial instruments and initiatives that can meet that demand, such as through MFA's Private Sector Instruments (Finnpartnership, Finnfund, Public Sector Investment Facility), through the EU's Global Gateway, the Systematic Observations Financing Facility (SOFF, supporting the installation of weather observation equipment and related services), and through the ARISE initiative.	

Conclusions

1. Finland's Disaster Risk Reduction and Meteorology cooperation has made a tangible contribution to reducing disaster-related deaths reported globally, as well as improved monitoring of poor air quality in more than 40 partner countries. However, progress on delivering sustained long-term development resilience is less evident.
2. Targeted, demand-driven Disaster Risk Reduction and Meteorology cooperation has proven to be an effective approach to deliver results through public-public and public-civil society organisation initiatives, but these results still lack a cross-sector focus and system-level coordination to free Disaster Risk Reduction and Meteorology from its relative isolation within the Environment and Natural Resources sector.
3. Implementation efficiency has been lower than planned in the Disaster Risk Reduction and Meteorology sub-sector, resulting in a large number of projects not delivering planned outputs and outcomes on time.

4. Institutional sustainability and capacity to fund the operation, maintenance and expansion of weather and climate services remains a major challenge for Finland's partner countries, despite strong national and community ownership of results.
5. Continuous learning is emphasised at the project level, but adaptiveness and systemic learning has been hampered by inadequate cross-sector collaboration and impact monitoring, thus limiting innovation and integration across key sectors in Finland's Disaster Risk Reduction and Meteorology cooperation.
6. Finnish private sector engagement has significant unrealised potential in advancing Disaster Risk Reduction and climate resilience in the Environment and Natural Resources Priority Area.
7. Private sector engagement in Disaster Risk Reduction and climate resilience has been held back by the lack of a suitable enabling environment that addresses the strategic, institutional and financial barriers that currently exist in the Environment and Natural Resources Priority Area.
8. Private sector engagement in the Disaster Risk Reduction and climate agendas of developing countries is feasible when that engagement aligns with core business interests and incentives exist to de-risk investment in the sub-sector.
9. Finland adds value to its Disaster Risk Reduction and Meteorology cooperation by leveraging specialised public agencies (Finnish Meteorological Institute), private sector leaders in meteorological equipment (Vaisala), civil society organisations that have extensive national networks in place to reach the most vulnerable (Finnish Red Cross) and multilateral institutions (UN Office for Disaster Risk Reduction) who are the guardians of the Sendai Framework.

Potential action points

1. Finland's specialised institutions need to come together to address the global challenges of climate change by establishing a 'Climate Services Partnership for Resilience'.
2. Disaster Risk Reduction and Meteorology needs a Finnish private sector engagement Strategy to enable the Finnish private sector to identify entry points for investment in strategic sectors where demand is high and returns potentially promising (water, agriculture, forestry, aviation, infrastructure, insurance/reinsurance, etc.).
3. Rebrand the Finnish Water Forum to the Finnish Water and Climate Forum as the official multi-stakeholder platform in Finland dedicated to coordinated water and climate action in its partner countries.
4. Seek ways to mainstream Disaster Risk Reduction in the other sub-sectors of Environment and Natural Resources policy priority area.

2 Introduction

2.1 Scope and purpose

The present report provides an evaluation of Finland's cooperation in the Disaster Risk Reduction and Meteorology sub-sector. The Terms of Reference of the evaluation specify its **purpose** is to provide the Ministry for Foreign Affairs of Finland (MFA) and its stakeholders with information on the achievements, merits and worth of implementation of Finland's Environment and Natural Resources policy in the Climate and Natural Resources priority area. The priority area consists of five main sub-sectors, of which four are to be evaluated to assess their achievements in relation to relevant Sustainable Development Goals (SDGs) and targets highlighted in the MFA's updated version of the theory of change for the Climate and Natural Resources priority area (pp. 14-17). These are summarised as follows: (i) Forests, Ecosystems and Biodiversity supporting the achievement of SDG targets 6.5, 12.2, 13.1, 13.3, 15.1, 15.2, 15.3, 15.5 and 15.9; (ii) Water as a Natural Resource supporting the achievement of SDG targets 6.1-6.2, 13.1 and 13.3; (iii) Clean and Sustainably Produced Energy, Circular Economy and Critical Minerals (Energy, Circular Economy and Critical Minerals) supporting the achievement of SDG 7 and SDG 13.1 and 13.3; and (iv) Disaster Risk Reduction and Meteorology (Disaster Risk Reduction and Meteorology) supporting SDG targets 1.5, 11.5, 13.1-13.3.1

The Terms of Reference specify that the **objectives** of the evaluation are fourfold:

1. To harvest and evaluate results (obtained and sustained), successes and challenges in achieving the objectives of the policy priority area and its sub-sectors (summative).
2. Present a synthesis of results and impacts, including early/emerging impacts (summative).
3. To identify and analyse opportunities, means and measures for engaging Finnish private sector actors into this work in the future (formative).
4. To provide realistic evidence-based policy and operational recommendations for the future, with due attention to the limitations in financial and human resources available (formative). This also includes documenting practical lessons on, and any opportunities for, applying georeferencing and geospatial data for future monitoring and evaluation purposes to partly address reporting challenges.

1 The Terms of Reference specify that the outcome area relating to agriculture and food security is to be left out of this evaluation on the grounds it has been covered under other recent evaluations conducted by the MFA (p.10).

The evaluation questions (EQ) addressed in the sub-sector evaluation are:

EQ1: What results, including any realised or emerging impact, has Finland generated in this sub-sector during the period under evaluation? (summative)

1.1 What have been the most notable results and impacts? What relative change(s) resulted in the sub-sector through Finnish support during the period? Were there any unexpected and/or negative effects to the environment (do no harm)?

1.2 Who benefited, in what contexts, how and why (facilitating factors)?

1.3 What approaches have been particularly effective?

1.4 What has been Finland's (context-specific) added value/comparative advantage in generating the results?

EQ2: What concrete and context-specific opportunities, entry points and models are there for Finland for partnering with Finnish and local companies and economic actors within the sub-sector topic(s) in the next five years? (formative)

2.1 What type of markets, level of competition and local demand exists there for Finnish private sector funding, investments and/or solutions (products, services) in the sub-sector topic(s) in the locations assessed?

2.2 What are the foreseen gains to the Finnish companies in the short and long term? What are foreseen benefits/results from such partnerships from the point of view of advancing of Finland's development policy objectives?

2.3 What kind of concrete models/partnerships (e.g. clusters/consortia/coalitions/multi-actor part-nerships) and instruments show best promise and viability, including possible funding sources for sustainable private sector business models, for accelerating private sector engagement for Finnish private sector actors?

The **scope** of the evaluation covers MFA-funded interventions implemented in the period 2010-2024. In a first (implementation) phase, the Terms of Reference state the evaluation is to cover objectives 1 and 3. In a second (synthesis) phase, following approval of the sub-sector reports by the MFA, the evaluation is required to synthesise results in accordance with objectives 2 and 4. In the case of Finland's cross-cutting objectives concerning the application of the human rights-based approach and gender equality and social inclusion, the Terms of Reference specify that they should not be addressed on the grounds that they have been addressed by other evaluations, notably in the external evaluation on climate finance (Savage *et al*., 2023) as mentioned in the Terms of Reference for this evaluation (p.11). However, the climate finance evaluation did not explicitly examine gender equality and social inclusion, or more importantly gender empowerment, disability and social exclusion. For this reason, it was deemed essential to include an assessment on gender empowerment, disability and social exclusion where it has contributed to the results identified in the sub-sector reports, such as in the Disaster Risk Reduction and Meteorology sub-sector, where Finland has provided specific funding to UNDRR to advance disability-inclusive disaster risk reduction globally.

In terms of the main financial instruments used to fund interventions in the Disaster Risk Reduction and Meteorology sub-sector, the present evaluation selected the following instruments as the most relevant: (i) **Bilateral cooperation** at the country/regional level; (ii) **Multilateral cooperation** in the form of unearmarked core funding and project-specific support, in particular through the International Federation of Red Cross and Red Crescent Societies (IFRC), the United Nations Office for Disaster Risk Reduction (UNDRR) and the UN Office for the Coordination of Humanitarian Affairs (UN-OCHA), among others; (iii) **Private Sector Instruments** in particular the Public Sector Investment Facility (PIF), which has been used to support National Hydro-meteorological Services and to invest in Finnish technology and expertise to support developing countries achieve the targets of the abovementioned SDGs; (iv) the **Institutional Cooperation Instrument** (ICI) which has been used extensively to support cooperation between Finnish government agencies such as the Finnish Meteorological Institute (FMI) and their counterpart National Hydro-Meteorological Services in partner countries; and (v) support to CSOs, in particular funding for multi-annual programmes with the Finnish Red Cross (FRC).

Key terms used to refer to Disaster Risk Reduction are provided in Table 1 using definitions exclusively from UNDRR as the official source. This is followed by Table 2 showing the sample of projects and initiatives from the Disaster Risk Reduction and Meteorology portfolio that were selected by the evaluation for assessment, following the agreement of the MFA in the inception phase.

Table 1 Key terms used in relation to Disaster Risk Reduction and their official definition by UNDRR

TERM	UNDRR OR SENDAI FRAMEWORK FOR DISASTER RISK REDUCTION DEFINITION
Disaster risk reduction	The concept and practice of reducing disaster risk through systematic efforts to analyse and manage the causal factors of disasters, including reducing exposure to hazards, lessening vulnerability of people and property, wise management of land and the environment, and improving preparedness for adverse events. See also the Disaster Risk Reduction value chain in Figure 7.
Vulnerability	The conditions determined by physical, social, economic and environmental factors or processes which increase the susceptibility of an individual, a community, assets or systems to the impacts of hazards.
Raw data	The unprocessed factual observations, measurements or records (e.g. of hazards, exposures, losses) that form the basis for disaster risk information, analysis and monitoring
Disaster risk assessment	A qualitative or quantitative approach to determine the nature and extent of disaster risk by analysing potential hazards and evaluating existing conditions of exposure and vulnerability that together could harm people, property, services, livelihoods and the environment on which they depend. Disaster risk assessments include: the identification of hazards; a review of the technical characteristics of hazards such as their location, intensity, frequency and probability; the analysis of exposure and vulnerability, including the physical, social, health, environmental and economic dimensions; and the evaluation of the effectiveness of prevailing and alternative coping capacities with respect to likely risk scenarios.
Early warning system	An integrated system of hazard monitoring, forecasting and prediction, disaster risk assessment, communication and preparedness activities that enables individuals, communities, governments, businesses and others to take timely action to reduce disaster risks in advance of hazardous events.
Multi-hazard early warning system	Multi-hazard early warning systems address several hazards and/or impacts of similar or different type in contexts where hazardous events may occur alone, simultaneously, cascading or cumulatively over time, and taking into account the potential interrelated effects.
Disaster prevention	Activities and measures to avoid existing and new disaster risks.
Disaster mitigation	Structural and nonstructural measures undertaken to limit the adverse impact of natural hazards, environmental degradation or related disasters.
Preparedness	The knowledge and capacities developed by governments, response organisations, communities and individuals to anticipate, respond to and recover from likely, imminent or current disasters.
Early action	Used in the context of the EW4All initiative it refers to the steps taken in advance of hazard events, including anticipatory action.
Readiness	Readiness is a part of disaster preparedness and refers to the state of being ready to respond when warnings are issued or hazards occur. In early warning systems it refers to “Preparedness at all levels”
Disaster response	Actions taken before, during and immediately after a disaster to save lives, reduce health impacts, ensure public safety and meet basic subsistence needs of the people affected. (UNDRR’s formal glossary entry for “Response”)
Disaster recovery and reconstruction	Recovery: restoring or improving livelihoods, health, economic, physical, social, cultural and environmental assets, systems and activities of a disasteraffected community, aligned with sustainable development and “build back better”. Reconstruction: medium to longterm rebuilding and sustainable restoration of resilient critical infrastructure, services, housing, facilities and livelihoods consistent with “build back better” principles.
Build Back Better	The use of recovery, rehabilitation and reconstruction phases after a disaster to increase resilience by integrating Disaster Risk Reduction measures into restoring infrastructure, societal systems, livelihoods and the environment.
Resilience	The ability of a system, community or society exposed to hazards to resist, absorb, accommodate, adapt to, transform and recover from the effects of a hazard in a timely and efficient manner, including through the preservation and restoration of its essential basic structures and functions through risk management.

Source: UNDRR’s Disaster risk glossary (2025)

Table 2 Moderate and intensive studies of MFA-supported projects in the Disaster Risk Reduction and Meteorology sub-sector

INTERVENTION NAME AND ACRONYM	INSTRUMENTS (CATEGORIES FROM TERMS OF REFERENCE)	IMPLEMENTING AGENCY AND MFA FINANCING	GEOGRAPHY	CONTEXT[2]	DEPTH OF STUDY
Promoting Modernisation of Hydro-meteorological Services in Vietnam I-III (PROMOSERV I-III) with the support of concessional credits/Public sector investment facility (Concessional Credit Scheme/PIF)	ICI project/ Private sector instrument	Implementer: Vietnam National Meteorological and Hydrological Administration (VNMHA) Finnish contribution/total value: EUR 21.64 million	Vietnam	Transitional	Intensive study
Developing and Implementing Climate Change Adaptation Measures at Local Level in Vietnam I and II (VIETADAPT I-II)	ICI project	Implementer: SIHYMECC and CEWAFO, (Vietnam) Finnish contribution/total value: EUR 1.00 million	Vietnam	Transitional	
Promoting Modernisation of AIR Quality Observation and Management Systems (PROMOAIR)	ICI project	Implementer: Vietnam Environment Administration, Northern Centre for Environmental Monitoring Finnish contribution/total value: EUR 0.60 million	Vietnam	Transitional	Moderate study
Improving meteorological observation infrastructure and forecasting capabilities of the National Meteorological Agency (NMA) to minimize the impact of frequent weather hazards (Ethiopia PIF Project)	Private sector instrument	Implementer: Ethiopian Meteorological Institute Finnish contribution: EUR 13.00 million Total value: EUR 13.00 million	Ethiopia	Traditional	Moderate study
Finnish-Kyrgyz Meteorology Project I-III (FINKMET I-III)	ICI project	Implementer: Kyrgyzhydromet Finnish contribution/total value: EUR 1.60 million	Kyrgyzstan	Traditional	Moderate study

2 **Context.** The MFA definition of 'transitional' focuses on shifting from a development cooperation-based relationship to a private sector-based relationship, while the World Bank uses per-person Gross Domestic Product and the United Nations takes a wider basket of economic and human development indicators into account. Moreover, the dynamism of national economic systems does not always make for a simple progression, an example being Zambia which the World Bank demoted from the lower-middle to lower income category in 2022. Comparable ambiguity over economic status affects the status of Lao PDR. And the 'conflictual' context is also subject to radical change since, as seen since 2022 in Ukraine and elsewhere, it depends on military and peace-making initiatives by various stakeholders.

INTERVENTION NAME AND ACRONYM	INSTRUMENTS (CATEGORIES FROM TERMS OF REFERENCE)	IMPLEMENTING AGENCY AND MFA FINANCING	GEOGRAPHY	CONTEXT[2]	DEPTH OF STUDY
Finnish-Tajikistan Meteorology Project I-III (FINTAJ I-III)	ICI project	Implementer: Tajikhydromet Finnish contribution/total value: EUR 1.69 million	Tajikistan	-	Moderate study
The Indonesia-Finland Meteorology Project (INDFIN)	ICI project	Implementer: Meteorology, Climatology, and Geophysics Agency Finnish contribution/total value: EUR 0.50 million	Indonesia	Transitional	Moderate study
Ukraine-Finland Meteorology Project (UFIM)	ICI project	Implementer: Ukrainian Hydrometeorological Centre Finnish contribution/total value: EUR 2.35 million	Ukraine	Conflictual	Moderate study
Systematic Observations Financing Facility (SOFF)	Multilateral support	Implementer: UNDP, UNEP, WMO Finnish contribution: EUR 2.50 million Total value: USD 115 million (EUR 98.58 million, 07.10.25)	Global	-	Moderate study
Finnish-Kenya, Rwanda and Tanzania Meteorological Project (FINKERAT)	ICI project	Implementer: Kenya Meteorological Department, Rwanda Environment and Management Authority, Tanzania Meteorological Authority Finnish contribution/total value: EUR 0.58 million	Kenya, Rwanda, Tanzania	Traditional	Moderate study
Core funding (annual) to the United Nations Office for Disaster Risk Reduction (UNDRR)	Multilateral support	Implementer: UNDRR Finnish contribution: EUR 1.00 million	Global	-	Intensive study
Finland-Nepal Meteorological Project (FNEP I-III)	ICI project	Implementer: Department for Hydrology and Meteorology Finnish contribution/total value: EUR 1.62 million	Nepal	Transitional	Moderate study

INTERVENTION NAME AND ACRONYM	INSTRUMENTS (CATEGORIES FROM TERMS OF REFERENCE)	IMPLEMENTING AGENCY AND MFA FINANCING	GEOGRAPHY	CONTEXT[2]	DEPTH OF STUDY
Support to the Finnish Red Cross Development Programme 2022-2025 – funding of the Early Warning, Early Action (EWEA)	CSO support	Implementer: FRC, (Finland) Finnish contribution: EUR 2.01 million Total value: EUR 2.01 million	Global	-	Moderate study
Geological Survey of Finland's Support to Afghanistan Geological Survey (GTK/AGS project)	ICI project	Implementer: Afghanistan Geological Survey Finnish contribution/total value: EUR 4.20 million	Afghanistan	Traditional, conflictual	Moderate study
Capacity Building for Emission Measurements in India (VTT/CPCB project)	ICI project	Implementer: CPCB Finnish contribution/total value: EUR 0.50 million	India	Traditional	Moderate study
FMI/IMD– Climate Modelling and Observations in India (CLIMOB)	ICI project	Implementer: India Meteorological Department Finnish contribution/total value: EUR 0.50 million	India	Traditional	Moderate study
FMI/National Hydro-Meteorological Services – Strengthening hydro-meteorological services for Bhutan (SHSB)	ICI project	Implementer: National Centre for Hydrology and Meteorology Finnish contribution/total value: EUR 0.46 million	Bhutan	Traditional	Moderate study
Promote Sustainable Livelihoods and Responsible Attitude to Environment (UNDP)	Multilateral support	Implementer: UNDP, (Georgia) Finnish contribution: EUR 1.18 million	Georgia	Traditional	Moderate study
Finnish-Pacific project adapting to climate change in Oceania (FINPAC)	ICI project	Implementer: Secretariat of the Pacific Regional Environment Programme, (14 countries in the Pacific) Finnish contribution/total value: EUR 3.70 million	Pacific	Traditional	Moderate study

Source for all project documents: MFA.

2.2 Approach and methods

A theory-based, macro-level, realist evaluation

The methodology is described in detail in Annex 1. It is focused on: (i) exploring beyond the project and programme level to shed light on aggregate and catalytic effects and synergies between actions, actors, instruments and policy-influencing activities within and across the sub-sector; and (ii) establishing how these encourage and enable wider changes at geographic, sectoral and/or institutional scales, including the role of private sector engagement and implications for the portfolio and policy level. It is therefore a 'theory-based', 'macro-level' and 'realist' evaluation:

- **theory-based**, because it is built upon a theory of change for the sub-sector that indicates the logical connections between inputs and instruments, short-range, medium-range and long-range results, and impacts, and hence with an emphasis on the plausibility of assumptions and causal links between steps in the design logic;
- **macro-level**, because it is focused on development cooperation across multiple interventions, locations, and the 15 years 2010-2024; and
- **realist**, because the whole study is embedded within a theory of change that is grounded in the large-scale, long-term development context that applies to those same multiple interventions, locations, and years.

This focus on the macro level differentiates the approach from that of micro-level or intervention-specific evaluation. It rules out applying a detailed understanding of local context to help understand patterns and themes, since contexts cannot be aggregated but only generalised or used in examples. For the same reasons, the key OECD Development Assistance Committee evaluation criteria of effectiveness, impact and sustainability have different meanings compared with their uses in intervention-specific evaluation.3 In the present **macro-level context** they are defined as follows:

- **effectiveness** refers to the specific changes that occurred in a system during and as a result of particular kinds of MFA-supported interventions;
- **impact** refers to the consequences of those specific changes for the system with which particular kinds of MFA-supported interventions were engaged; and
- **sustainability** refers to the development of new outlooks, abilities, laws, budgets or administrative arrangements that are likely to promote the durability of those specific system changes after MFA's eventual departure.

Macro-level effectiveness, impact and sustainability

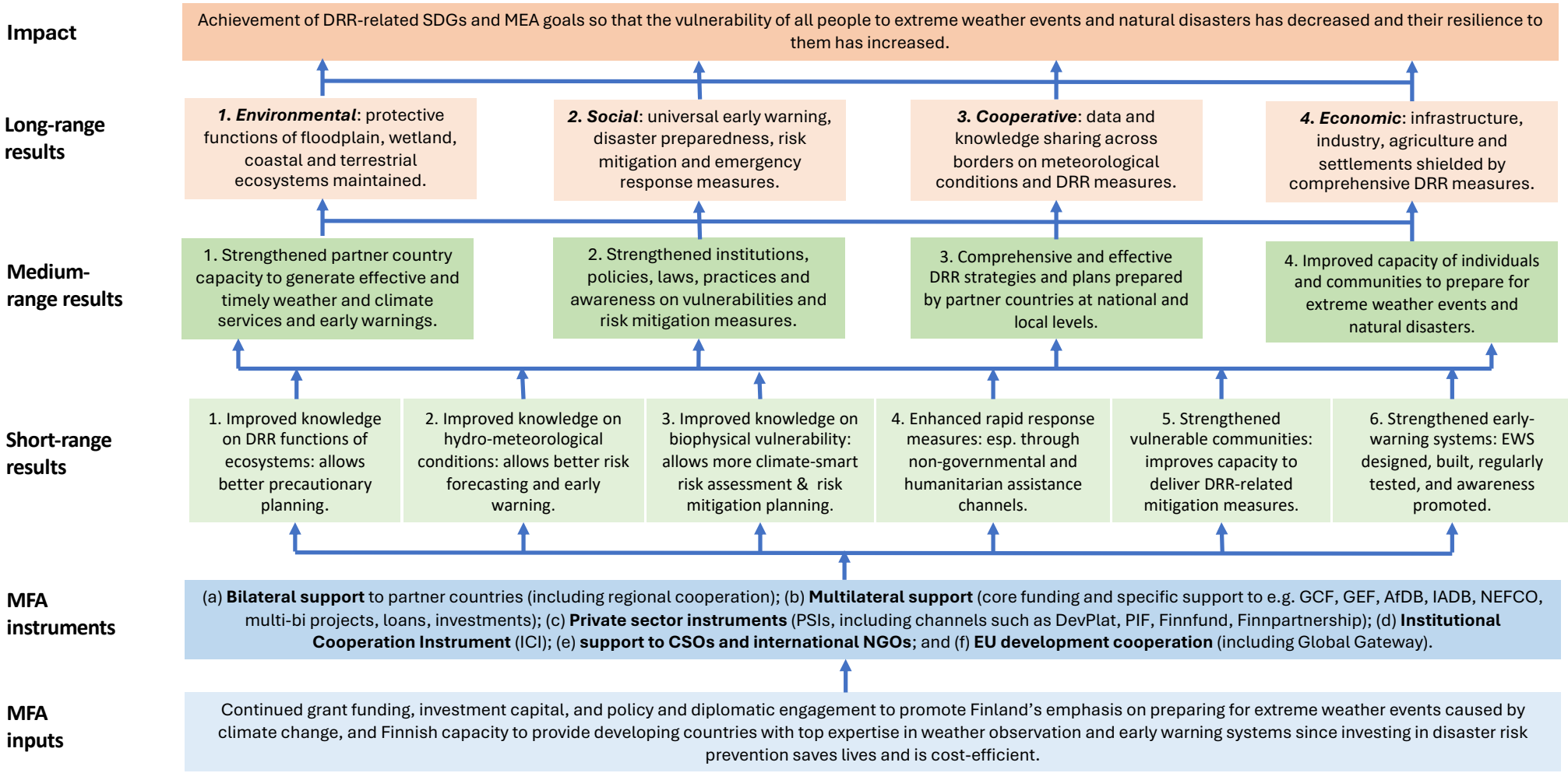
The above makes clear that the sub-sectoral theory of change is of central importance to this evaluation, since performance across the portfolio is to be judged in terms of changes in line with the theory of change and that contribute to the flow of results from short, medium and long-range to

3 At the micro level, effectiveness refers to the delivery of results by an intervention, impact refers to the consequences of the results during the project, and sustainability refers to durable change induced by the project and likely to survive it.

overall effects on achieving the SDGs and related objectives. An early step in the evaluation was therefore to develop a sub-sectoral theory of change for Disaster Risk Reduction and Meteorology (Figure 1) based on MFA's latest theory of change and aggregate indicators for the Climate and Natural Resources priority area (2023), in which Outcome 3 focuses on *"The vulnerability of all people to extreme weather events and natural disasters has decreased and their resilience to them has increased".* The theory of change for the Disaster Risk Reduction and Meteorology sub-sector continues to align with relevant SDG targets highlighted in the MFA's theory of change, namely SDG targets 1.5, 11.5 and 13.1-13.3, as well as other targets found to be relevant in this evaluation (SDG 9.3, 11.b, 16.7, 16.b, 17.3, 17.9 and 17.16-17.17) and which are supported by the theory of change assumptions listed in Annex 1.

Taking into account Outcome 3 and the desired impact established in the MFA's theory of change, which focuses on climate resilience and low-greenhouse-gas emissions through the sustainable use of natural resources, the evaluation considered it important to establish the causal linkages that need to be in place to achieve short-, medium- and long-range results that focus on the delivery of environmental, social, cooperative and economic benefits. As such, the assumptions for the theory of change include that decision-makers at all levels accept that Disaster Risk Reduction and Meteorology should form an integral part of development planning, so that it can also cross-cut key development sectors such as Water as a Natural Resource, Forests, Ecosystems and Biodiversity and Energy, Circular Economy and Critical Minerals, among others, to enhance their resilience to climate variability and change.

Figure 1 Theory of Change for the Disaster Risk Reduction and Meteorology sub-sector



Sources: Finnish Government (2024: 26); MFA (2023). Notes: Key multi-lateral environmental agreements are UNFCCC Paris Agreement 2015, especially Article 7 on Adaptation and Article 8 on Loss and Damage, Global Framework for Climate Services 2023, the UN Office for Disaster Risk Reduction Global Platform for Disaster Risk Reduction, the UN Office for the Coordination of Humanitarian Affairs/European Commission Global Disaster Alert and Coordination System, and the Early Warnings for All initiative 2022.

A mixed-methods evaluation

A mixed-methods design was adopted, tailored to each EQ. The core methods used in each sub-sector evaluation included:

- **Portfolio review:** Mapping and screening of MFA-funded interventions in the Disaster Risk Reduction and Meteorology sub-sector (2015-2022), leading to the pre-selection of a wide sample of projects to be considered for assessment.
- **Development of a sub-sector-specific theory of change:** Building on the updated theory of change for climate and natural resources (MFA, 2023), the theory of change for the Disaster Risk Reduction and Meteorology sub-sector was used throughout the evaluation to assess results in relation to the abovementioned development objectives in particular objective (iii) mentioned in the sub-section 2.1.
- **Desk studies:** A total of 19 interventions were selected for review (see Table 2) and an in-depth analysis of Finland's core funding to UNDRR between 2010-2024 conducted. In addition, an intensive investigation of four objects which can be classified as development policy investments/blended finance, private sector instruments or private sector engagement-frameworks (MDBs blended finance, Global Gateway, Finnfund, Finnpartnership) and a review of the private sector engagement instruments of specific relevance to Disaster Risk Reduction and Meteorology, which included the use of the concessional credit facility and the Public sector Investment Facility (PIF) to fund the upgrading of weather observation equipment in Vietnam and Ethiopia respectively, were conducted.
- **Market analysis:** A brief, general-level business and market opportunity analysis was conducted focusing on the markets with specific country-focus covered by the sampled interventions' intensive studies in each sub-sector. Thus, in the case of Disaster Risk Reduction and Meteorology, the market analysis focused.
- **Interviews and survey:** Conducted with policy-level and intervention-level knowledge-holders. A total of 25 stakeholders responsible for policy (7 informants), project implementation (16) and private sector investment (2) agreed to be interviewed online between May-June 2025. Cutting across the sub-sectors, 19 companies responded to a private sector engagement survey, and approximately half a dozen overall Environment and Natural Resources management interviewees from public and private sectors provided information and insights relevant to Disaster Risk Reduction.
- **Like-minded peer country review:** Following a rapid assessment of potential peer countries listed in the inception report of the present evaluation (Denmark, Sweden, Ireland, the Netherlands, Switzerland), the Netherlands was selected as the most viable for the like-minded peer country given its shift to greater private sector engagement in the Disaster Risk Reduction and Meteorology sub-sector from late 2019. Particular focus of the study was on the Dutch Fund for Climate and Development (DFCD) and its engagement of private sector. Linked to this, the opportunities within the UNDRR's Private Sector Alliance for Disaster Resilient Societies initiative, known as ARISE, were also studied. Finally, cutting across the sub-sectors two like-minded peer country reviews (Danida Green Business Partnership, and Global Gateway in ENRM in Sweden and Denmark) focusing on engaging private sector were included.

- **Natural Language Processing:** Used to identify the most relevant sources of information for the sub-sector from a large volume of evaluation reports and documentation, especially during the inception phase.

Together, these methods enabled the evaluation team to triangulate evidence across a wide range of sources, ensuring that conclusions are robust and grounded in multiple lines of inquiry.

Consistency and comparability

All four sub-sector reports addressed the same EQs and contributed to the preparation of the synthesis report. To ensure comparability and enable aggregation across sub-sectors, all **performance judgements** (i.e. on effectiveness, impact and sustainability) were required to be evidence-based and expressed in a standardised manner by using the following three-point scale as qualifiers where appropriate:

- **Strong performance** – Finnish support was assessed as being successful in achieving most (if not all) of its expected results, made a significant contribution to broader effects or impacts (i.e. through Finnish added value) and benefitted a substantial part of the intended target populations;
- **Moderate performance** – Finnish support was assessed at being successful or at least partially successful in achieving several (but not all) of its expected results, contributed to broader effects or impacts (but only to a limited degree while the contribution of others is likely to have been more significant) and benefitted the intended target populations;
- **Weak performance** – Finnish support only achieved a small proportion of its expected results, did likely not contribute to broader effects or impacts (or only in a very limited and indirect manner) and did not manage to create any wider benefits for the intended target populations.

The adoption of this limited range reflected the nature of the evidence available across the sub-sector portfolio, which did not support more granular distinctions. The same approach was applied across all the sub-sector evaluations to ensure coherence in synthesis. Throughout the reports, these assessments are put into context by a “realist perspective” offering insights on the circumstances and conditions in which Finland carried out its activities. In addition, further explanation is provided where needed to clarify specific cases or examples used as evidence, in particular where those might provide counterexamples and exceptions to the overall assessment, although these additional descriptive terms informed the evidence base rather than the formal findings.

The subject of the evaluation (and of each sub-sector) being particularly complex and broad, there is a wide range of variables and factors that impact on outcomes and broader effects. Therefore, the evaluation aims at providing evidence for **Finnish contribution** to these effects, rather than seeking to establish direct claims of attribution. As a significant amount of Finnish funding is going through multilaterals, international organisations and other partners, it is not possible to claim any effects as direct results of Finnish support. Finland’s share can, in fact, be relatively small, and – wherever feasible – the evaluation attempts to specify the (likely) weight of Finnish contribution in given contexts.

For consistency, **beneficiaries** were defined as individuals who could reasonably be considered to have received some form of direct or indirect benefit from an action funded wholly or in part by the MFA. Benefits and beneficiaries are discussed in the findings in Chapter 4.

3 Context Analysis

3.1 Global policy context and trends

The **global policy context** on Disaster Risk Reduction and Meteorology in the 2010-2024 period has been shaped by the Hyogo Framework for Action 2005-2015, through which lessons learned on resilience building were used to develop the Sendai Framework for Disaster Risk Reduction 2015-2030 , which was adopted by Finland and 186 other UN Member States in 2015, of which 163 Member States are actively monitoring progress on achieving its goal to: "*prevent new and reduce existing disaster risk through the implementation of integrated and inclusive economic, structural, legal, social, health, cultural, educational, environmental, technological, political and institutional measures that prevent and reduce hazard exposure and vulnerability to disaster, increase preparedness for response and recovery, and thus strengthen resilience*". More specifically this requires tracking seven main targets (UNDRR, 2024) as follows: Target A: substantially reduce global disaster mortality by 2030; Target B: substantially reduce the number of affected people globally by 2030; Target C: reduce direct disaster economic loss in relation to global gross domestic product by 2030; Target D: substantially reduce disaster damage to critical infrastructure and disruption of basic services, among them health and educational facilities, including through developing their resilience by 2030; Target E: substantially increase the number of countries with national and local disaster risk reduction strategies by 2020; Target F: substantially increase international cooperation to developing countries; Target G: Substantially increase the availability of and access to multi-hazard early warning systems and disaster risk information and assessments to people by 2030 (Sendai Framework for Disaster Risk Reduction, 2015, p. 36).

The seven global targets of the Sendai Framework for Disaster Risk Reduction align with several Sustainable Development Goals (SDGs) that were adopted in the 2030 Agenda for Sustainable Development in September 2015, a few months after the Sendai Framework for Disaster Risk Reduction. The most relevant are, among others:

- **Target A:** SDG targets: SDG 3.d, (global health risk reduction), and SDG 11.5 (reduction of disaster mortality).
- **Target B:** SDG 1.5 (reduce the vulnerability of the poor to climate-related extreme events and build resilience), SDG 2.4 (food systems resilient to disasters), and SDG 11.5.
- **Target C:** SDG 1.5 and SDG 9.1 (develop resilient infrastructure).
- **Target D:** SDG 3.8 (protect health infrastructure from disasters), SDG 4 (build resilient and safe education facilities), SDG 6.1-6.2 (safe access to clean water and sanitation following a disaster) and SDG 11.5 and 11.b (improved Disaster Risk Reduction governance).
- **Target E:** SDG 11.b and SDG 13.1-13.2 (strengthen resilience and integrate climate action/Disaster Risk Reduction in national policies).

- **Target F:** SDG 16.7 (responsive, inclusive, participatory decision-making at all levels), SDG 16.b (public access to information), SDG 17.3 (mobilise additional resources for developing countries in areas like Disaster Risk Reduction), SDG 17.9 (capacity-building on national Disaster Risk Reduction strategies and plans), SDG 17.16 (enhance multi-stakeholder collaboration), SDG 17.17 (promote public-public, public-CSO and public-private partnerships).
- **Target G:** SDG 1.5 (build the resilience of the poor and reduce exposure/vulnerability to climate-related extreme events), SDG 3.d (strengthen capacity for early warning, risk reduction and management of national and global health risks), SDG 9.c (increase access to information and communication technology (ICT) – an enabler for timely warning dissemination), SDG 11.b (implement integrated disaster risk reduction strategies at national and local levels), SDG 13.1 (strengthen resilience and adaptive capacity to climate-related hazards and natural disasters), and SDG 13.3 (improve education, awareness-raising and institutional capacity on climate change adaptation, impact reduction and early warning).

3.2 Finnish policy and institutional context

The **Finnish policy context** for Disaster Risk Reduction and Meteorology cooperation between 2010-2024 has aligned strongly with the Hyogo Framework for Action to 2015 and with the Sendai Framework for Disaster Risk Reduction and Agenda 2030 between 2016-2024. In particular Disaster Risk Reduction and Meteorology cooperation has been guided by Finland's Development Policy Programme launched in 2012 and its commitments to the **EU policy context** on Disaster Risk Reduction and Meteorology. In the case of the former, climate change and natural resources forms one of the four priority areas, in which strengthening adaptation to and mitigation of climate change, food security, water and Disaster Risk Reduction and Meteorology cooperation are all highlighted. In the case of the latter, Finland's participation in the EU's Action Plan on the Sendai Framework (2016), through which lessons at the Finnish and EU levels have fed into its Disaster Risk Reduction and Meteorology cooperation, notably efforts to expand multi-stakeholder collaboration on disaster preparedness and response and promotion of more inclusive and participatory Disaster Risk Reduction strategies and plans.

Finland's ratification of the Paris Agreement in December 2015, has facilitated the shift to closer alignment between its support to Disaster Risk Reduction and Meteorology and its climate agenda. This was confirmed by the *Accountability Report of the Ministry of Foreign Affairs* (2022), which highlighted a key development since 2015 has been Finland's proactive stance on achieving the targets under SDG 13 on Climate Action. For example, it confirmed that Finland has been a key player in establishing and becoming a prominent member of the Risk-informed Early Action Partnership (REAP) launched at the United Nations (UN) Climate Action Summit in 2019. REAP proved to be instrumental in the decision to scale-up Early Warning System through the Early Warnings for All (EW4All) initiative, launched in 2022 under the co-leadership of the World Meteorological Organisation (WMO) and UNDRR to support national governments, regional bodies and development partners apply the following four pillars of action:

- **Pillar 1: Disaster Risk Knowledge and Management** (UNDRR acting as lead organisation): risk mapping, supported by improved data collection, vulnerability assessments, and risk modelling to support informed decision-making at national and subnational levels.

- **Pillar 2: Detection, Monitoring, Analysis and Forecasting of Hazards,** (WMO acting as lead organisation): strengthen meteorological and hydrological observation systems in order to enhance capacity in real-time monitoring of extreme weather.
- **Pillar 3: Warning Dissemination and Communication,** (the International Telecommunications Union acting as lead organisation): improve the delivery of weather alerts and response measures in a timely manner and which are accessible to the most vulnerable groups.
- **Pillar 4: Preparedness and Response Capabilities,** (IFRC acting as lead organisation): enhance community preparedness and response to extreme weather alerts based on education, simulations, contingency planning, application of standard operating procedures and Early Warning System.

These developments have also helped prompt Finland to become one of the founding members of the Water and Climate Coalition established by the WMO in 2021. The Water and Climate Coalition recognises that a major barrier to providing efficient and sustainable water solutions is the lack of information about water resources, including current and future availability, and water demand for the food and energy sectors. For this reason, the main aim of the Water and Climate Coalition is, "to achieve an integrated global Water and Climate Agenda to support more effective adaptation and resilience and speeding up progress towards Sustainable Development Goals 6 (water and sanitation) and 13 (climate)", (WMO, 2021).

Also significant in 2021, has been the launch of the new initiatives supporting Disaster Risk Reduction and Meteorology cooperation at the EU level. Most significant has been the creation of the Global Gateway initiative in December 2021, which aims to raise up to EUR 300 billion between 2021-2027 to support developing and EU accession countries in digitalisation, climate and energy, transport, health and education and research. As a part of the climate and energy-focus, Global Gateway projects aim to advance Disaster Risk Reduction and climate resilience through public, private and non-governmental initiatives, in particular the design and installation of sustainable and resilient infrastructure, and which support the achievement of Sendai Framework for Disaster Risk Reduction and SDG targets mentioned above. Since 2022, Finland has been contributing to the Global Gateway through its private sector instruments. They include Finnfund, which is supporting the Global Gateway mobilise over EUR 1 billion to upgrade digital infrastructure in Africa (Finnfund, 2023), and Finnpartnership, whose objective between 2023-2024 was to engage at least 15 Finnish companies in Global Gateway infrastructure procurement contracts (Finnpartnership, 2024).

An analysis of the **institutional context** confirms that Finnish bilateral cooperation in the Disaster Risk Reduction and Meteorology sub-sector relied heavily on deploying specialised government institutions and non-government organisations in the 2010-2024 period. Meteorological cooperation mainly involved the services of the FMI, funded primarily through the Institutional Cooperation Instrument (ICI). This enabled the deployment of FMI in relatively small-scale initiatives which averaged EUR 0.5 million over three years up to 2023 to strengthen National Hydro-Meteorological Services' capacity in Finland's partner countries. A key element of FMI's contribution has been to support the National Hydro-Meteorological Services in adopting and applying its SmartMet and SmartAlert open-source software as a prerequisite to providing more accurate and reliable weather forecasting and Early Warning System services to the general public on a daily basis. Where weather and climate observation equipment was inadequate to support the SmartMet and SmartAlert system, however, Finland encouraged a transition from public-public support to public-private partnerships to facilitate Finnish private sector engagement in helping to modernise National Hydro-Meteorological Services observation networks. This led to the National

Hydro-Meteorological Services taking advantage of Finnish concessional credit schemes, currently funded through the MFA's PIF, to procure the products and installation services of the Vaisala Corporation. Where opportunities to do so existed, Finland has implemented this shift through co-ordinated responses with other donors, such as the World Bank, the United Nations Development Programme (UNDP), and bilateral donors among EU member states, or the Japanese International Cooperation Agency (JICA).

At the multilateral level, Finland's meteorological cooperation was mainly channelled through UNDRR and WMO to support global meteorological initiatives. Over the last three years they have been framed by the launch of the EW4All initiative that is supported by: (i) REAP whose main objective is to make 1 billion people safer from disasters by 2025 through improved early warning and early action initiatives that integrate risk information into decision-making at all levels; (ii) the Systematic Observations Financing Facility (SOFF) designed to support the EW4All (Pillar 2) by addressing critical weather data gaps in least-developed countries and small-island developing states in accordance with the WMO's Global Basic Observing Network standards (WMO, 2024); (iii) the Climate Risk and Early Warning Systems initiative, implemented by the WMO, UNDRR and the World Bank's Global Facility for Disaster Reduction and Recovery, and designed to use weather dataflows to support the implementation of Pillars 1, 3 and 4 (CREWS, 2021); (iv) the Green Climate Fund which has been promoting the integration of Disaster Risk Reduction and Early Warning System in its projects promoting since 2015; and (v) EU initiatives supporting the Disaster Risk Reduction and Meteorology sub-sector, in particular the Twinning programmes dedicated to developing meteorological capacity (including air quality forecasting) in Eastern Europe (FMI, 2024).

Finnish cooperation supporting UNDRR and Disaster Risk Reduction activities between 2010-2021 was managed by MFA's Unit for Humanitarian Assistance. However, multilateral cooperation with UNDRR was relocated to the Unit for Climate and Environmental Diplomacy within MFA's Department for Development Policy in 2021 as part of Finland's abovementioned efforts to link Disaster Risk Reduction and Early Warning System with its climate action agenda. In the case of MFA's programme-based support to CSOs supporting Disaster Risk Reduction, such as the Development Programmes of the Finnish Red Cross (FRC) in which Disaster Risk Reduction is a central theme, all funding is administered by the Unit for Civil Society and is sourced from MFA's Development Cooperation funds. Support to these multi-annual programmes has enabled FRC to advance Disaster Risk Reduction initiatives to widen access to Community-Based Early Warning Systems in highly vulnerable communities. These efforts are aligned with the IFRC's mandate under Pillar 4 of the EW4All. In addition, other CSO partnerships where Finland's humanitarian assistance is reported to have supported Disaster Risk Reduction-related action include Finn Church Aid, Caritas Finland, Save the Children Finland and World Vision Finland (MFA, 2024).

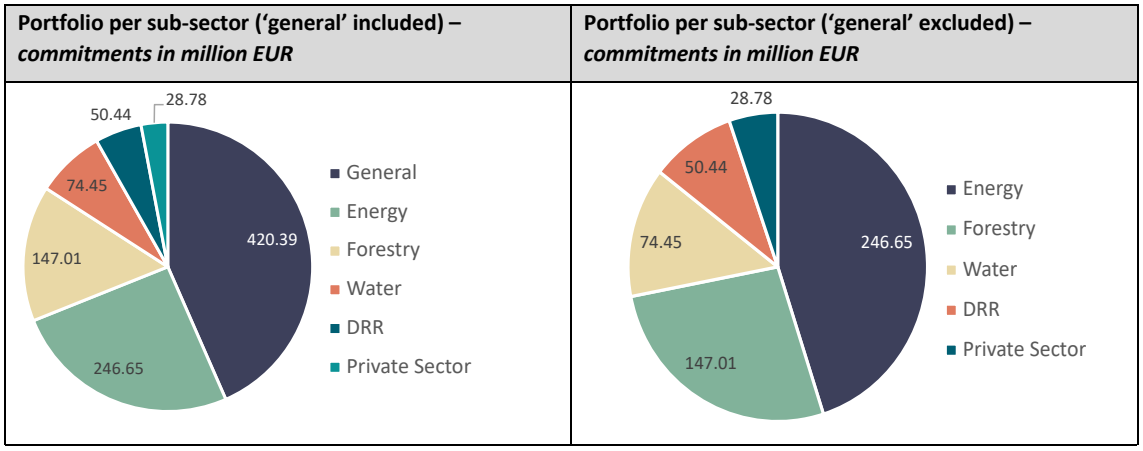
Finland's multilateral humanitarian aid is channelled through a number of UN agencies, including UNDRR, UN-OCHA, the Office of the United Nations High Commissioner for Refugees (UNHCR), the World Food Programme, the United Nations Relief and Works Agency for Palestine Refugees in the Near East (UNRWA) and the Central Emergency Response Fund. Support for Disaster Risk Reduction specifically is channelled through the UNDRR in support of priority initiatives under the Sendai Framework, and in particular Priorities 1 and 2 that concern the understanding of disaster risk and the strengthening of disaster risk governance, and especially the integration of Disaster Risk Reduction in national and subnational planning to build sustainable and resilient communities (UNDRR, 2015).

However, the institutional context for Finland's Disaster Risk Reduction and Meteorology cooperation in 2010-2024 period featured some important barriers. First, both the MFA and its partner countries apply strong sector-based approaches to policy development and its application, which makes it hard to apply Disaster Risk Reduction and Meteorology cooperation to cross-cutting objectives. Second, Finland's main partners in Disaster Risk Reduction and Meteorology cooperation (the National Hydro-Meteorological Services and CSOs) do not have the authority or powers to forge the intra- and inter-institutional coordination needed to achieve the SDGs mentioned in section 2.1. And third, institutional capacity to make informed decisions based on climate information and data, or on Disaster Risk Reduction strategies, remains elusive. This is at least partly because key decision makers may be, unaware of the benefits of coordinating the water and climate action agendas, for example.

3.3 Portfolio review

Quantitative portfolio data of ODA commitments in the Environment and Natural Resources policy priority area in 2015-22, that was made available to the evaluation, indicate a total commitment of EUR 967.72 million.4 A total of EUR 50.44 million was committed to Disaster Risk Reduction and Meteorology cooperation between the period, which is equivalent to 5.2% of the total ODA commitments to Environment and Natural Resources. However, this rises to 10% of the Environment and Natural Resources portfolio when 'General' commitments are excluded. This confirms commitments to the Disaster Risk Reduction and Meteorology sub-sector have been small when compared to other sub-sectors, notably to the Energy, Circular Economy and Critical Minerals and Forests, Ecosystems and Biodiversity sub-sectors (Figure 2).

Figure 2 Disaster Risk Reduction and Meteorology portfolio share from Environment and Natural Resources portfolio (commitments, EUR million)



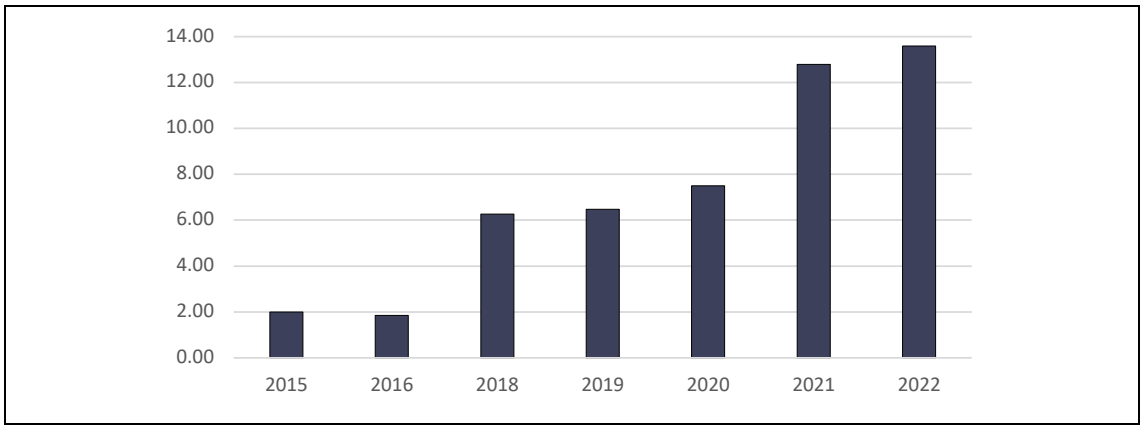
Source: MFA/evaluation team

For the subsequent portfolio analysis, the share of 'general' interventions, i.e. multilateral funding, were excluded and instead interventions explicitly focused on Disaster Risk Reduction and Meteorology were included.

4 Finland's exclusive ODA budget is administered by the MFA and excludes Finnfund investments.

Figure 3 provides a bar graph on annual commitments to the Disaster Risk Reduction and Meteorology sub-sector between 2015-2022, which includes the use of relevant private sector instruments, namely the Public Sector Investment Facility (PIF) and Finnpartnership (with only two Disaster Risk Reduction projects).5 It confirms annual commitments have increased year-on-year throughout this period. Moreover, commitments in years 2021-2022 amount to an increase of well over 600% compared to commitments in 2015-2016. This positive trend indicates that Finland has placed greater emphasis on achieving Outcome 3in its theory of change for the Climate and Natural Resources priority area in this period. However, reference to Figure 6 below indicates that a significant rise in commitments in 2021 was due to the use of the PIF to support Ethiopia establish an automated weather observation network.

Figure 3 Disaster Risk Reduction and Meteorology commitments in 2015-2022 (EUR million)



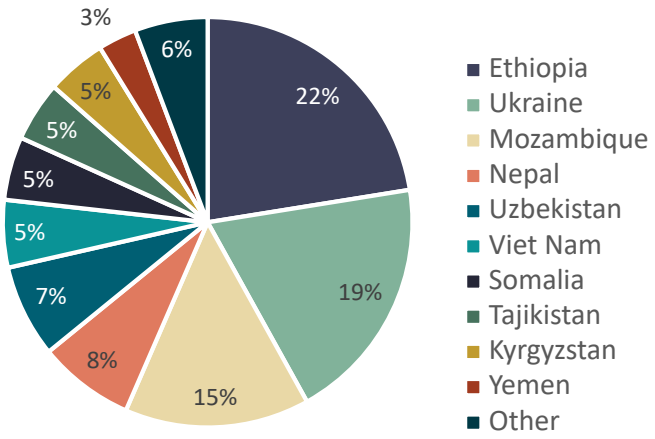
Source: MFA/evaluation team

Reference to Figure 4 shows the percentage of Disaster Risk Reduction and Meteorology commitments allocated to Finland's partner countries, which in the case of meteorological cooperation (including air quality monitoring) is reported by FMI to have covered over 40 countries by 2021.6 Figure 4 confirms the following: (i) Ethiopia received the highest proportion of total commitments in the sub-sector (22%), which was aided by the above-mentioned use of the PIF in 2021; (ii) Ukraine received the second highest proportion of total commitments to Disaster Risk Reduction and Meteorology, thanks to additional funding to support the country enhance its resilience to the Russian war of aggression, which includes funding to support the replacement of war-damaged weather observation equipment; (iii) Mozambique, Nepal and Uzbekistan have all received between 15 and 7% of total commitments to Disaster Risk Reduction and Meteorology. African countries received the highest proportion of commitments to Disaster Risk Reduction and Meteorology sub-sector between 2015-2022.

5 Data for 2017 was not available for the evaluation team.

6 More information on the geographical coverage of Finland's support to air quality monitoring can be found in slide 3 of the following link (2024): https://unece.org/sites/default/files/2024-10/6_Loven_AQ%20Assessment%20in%20the%20EECCA%20region.pdf

Figure 4 Disaster Risk Reduction and Meteorology portfolio per country (%)



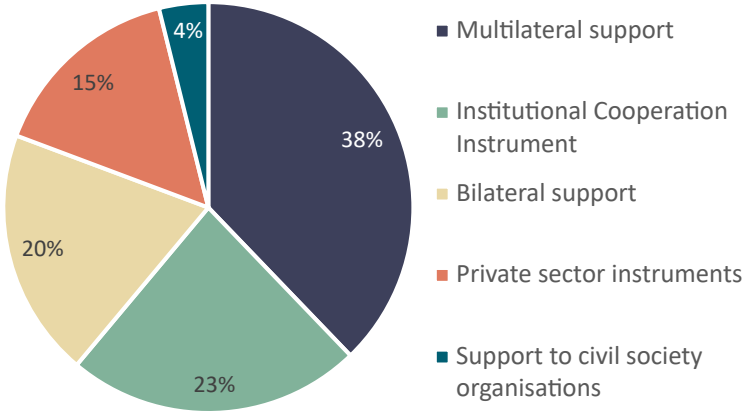
* Category 'Other' includes countries that received less than EUR 1 million in commitments.

** This figure only contains commitments that were directed to specific countries. Hence, regional and unspecified commitments are excluded.

Source: MFA/evaluation team

Reference to Figure 5 provides a breakdown of the percentage share of Disaster Risk Reduction and Meteorology commitments by instrument (see also Table 2). It confirms: (i) multilateral support, such as core funding to UNDRR and contributions to the SOFF, accounted for 38% of all commitments to Disaster Risk Reduction and Meteorology cooperation; (ii) ICI-funded projects, supporting hydro-meteorological cooperation, was the second highest funding instrument used; (iii) private sector instruments, which almost exclusively involved concessional credits/PIF, accounted for 15% of commitments; (iv) programme-based support to CSOs was the least used instrument, accounting for just 4% of all instruments used. This latter observation sheds light on the trend pointed out in the overall Environment and Natural Resources portfolio review in the synthesis report, namely the frontline efforts of CSOs to combat the growing threats of climate variability and change in developing countries have not witnessed a major increase in commitments between 2015-2022. It should be noted that Finland's share of the EU's ODA commitments that supported its Disaster Risk Reduction and Meteorology cooperation in the 2015-2022 period was unavailable. As a result, it was not possible to determine the percentage share of EU commitments compared to other funding instruments used and reported in Figure 5.

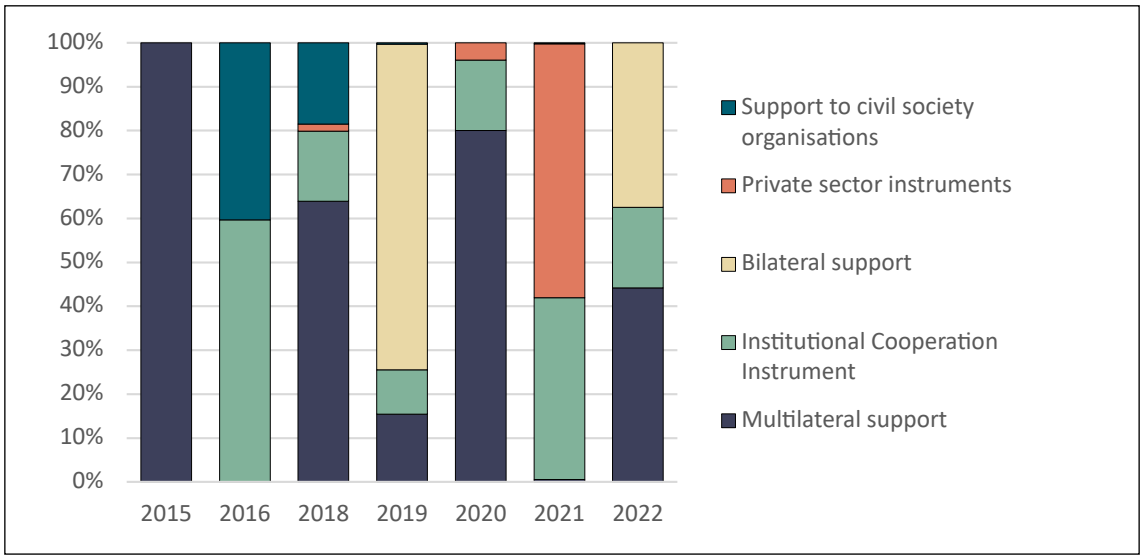
Figure 5 Disaster Risk Reduction and Meteorology per funding instrument (%)



Source: MFA/evaluation team

Figure 6 provides a stacked bar graph to show the use of the funding instruments used for Disaster Risk Reduction and Meteorology cooperation between 2015-2022. Three main trends identified are: (i) multilateral support was used as the main funding instrument for the Disaster Risk Reduction and Meteorology sub-sector every two years (i.e. 2015, 2018, 2020 and 2022); (ii) programme-based support commitments to CSOs were only used in 2016-2018, but then ended completely; (iii) commitments to the ICI instrument are present every year between 2016-2022. Private sector instruments (PIF) were almost exclusively in one specific year to support the above-mentioned development of Ethiopia's weather observation network in 2021, involving the Finnish company, Vaisala Oy.

Figure 6 Use of funding instruments over time in Disaster Risk Reduction and Meteorology (%)



Source: MFA/evaluation team

3.4 Engagement with private sector to date

The potential for private sector engagement in the Disaster Risk Reduction and Meteorology sub-sector can be dated back to the run up to the Rio Earth Summit in 1992 when the WMO recognised the need to develop methodologies and programmes to assess the economic and social benefits of hydro-meteorological services (WMO, 1990). One of the first major studies on the costs and benefits of Disaster Risk Reduction took place in 2007 under the coordination of UN-ISDR (now UNDRR). The study concluded that Disaster Risk Reduction can generate economic returns at least four times more valuable than the costs of post-disaster rehabilitation (UNDRR, 2007). Moreover, it found that these returns are likely to be greatest when there is knowledge of threshold values (e.g. on future flood levels) to support informed decision-making (e.g. on flood risk prevention measures, such as on the necessary height of flood levees). A key message from the study was, therefore, that public and private investment on Disaster Risk Reduction will depend heavily on how well decision-makers understand the economic and social returns of such investments.

The adoption of the Sendai Framework for Disaster Risk Reduction in 2015 reflected a global recognition that, **"It is more effective to strengthen disaster risk reduction through prevention and risk-informed investments than to rely primarily on post-disaster response and recovery, and it contributes to sustainable development."** (Priority 3, para. 29). In addition,

it advocated the importance of engaging all relevant stakeholders, including the private sector, in "disaster risk-informed investments in urban planning, land use and building codes, and in the design and implementation of public and private investments, including those related to critical infrastructure" (Priority 3, para. 30) and to "integrate disaster risk management into business models and practices through risk-informed investments…" (Priority 3, para. 36c). In response, UNDRR launched the ARISE in late 2015. The main objective of ARISE is to "create risk-resilient societies by energising the private sector in collaboration with the public sector and other stakeholders to achieve the outcomes and goals of the Sendai Framework for Disaster Risk Reduction" (UNDRR, 2015). To date the ARISE initiative has over 550 members and more than 30 private sector-led networks worldwide that are actively providing support to the private sector in a variety of ways, which include the development of risk-informed business strategies and plans, the design and construction of resilient infrastructure and supply chains, the application of climate smart technologies, the promotion of public-private engagement and public-private partnerships, the development of early warnings and adaptation to climate change, among others (UNDRR/ARISE, 2025).7

To support the call from its Member States to scale up private sector investment in Disaster Risk Reduction, UNDRR also established the Investment Advisory Board and, more recently in late 2024, the Network of Corporate Chief Resilience Officers to share good practices that enhance business resilience. Information on the Corporate Chief Resilience Officers is still in its infancy, but investment solutions promoted by the Investment Advisory Board include the launch of the roadmap for Disaster Resilience Adaptation Financing in 2024 to promote investment in adaptation to climate change from 2025. This foresees the promotion of insurance-linked securities and the adoptions of resilient technologies (UNDRR, 2024).8 It should be noted that UNDRR underpins its advocacy for private sector investment in Disaster Risk Reduction by regularly reminding stakeholders that every United States Dollar (USD) invested in risk reduction and prevention can save up to USD 15.00 in post disaster recovery (UNDRR, 2015).

Meanwhile, in the case of hydro-meteorological cooperation, the adoption of the Geneva Declaration at the World Meteorological Congress in 2019 marked a new global commitment to strengthen "the entire weather, climate and water services value chain – from acquisition and exchange of observations and information, through to data processing and forecasting, and service delivery – to meet growing societal needs… [and] the engagement of the private sector in contributing to all links of the value chain and accelerating innovation" (WMO, 2019). To support implementation of the Geneva Declaration, 12 multilateral organisations established the Alliance for HydroMet Development at the 25th Conference of the Parties (CoP) to the UN Framework Convention on Climate Change (UNFCCC) in December 2019. Its mission statement is "to unite international development, humanitarian, and financial institutions in mobilizing collective expertise and resources to close the hydromet capacity gap by 2030… and leverage private sector resources to modernise hydromet infrastructure in developing countries." (Alliance for HydroMet Development, 2019). Since 2020, the Alliance has successfully leveraged financial resources and expertise from the private sector to create the SOFF, which – as stated earlier in this report (see sub-section 3.2) – is supporting private sector engagement in the upgrading of hydro-meteorological infrastructure under the Climate Risk and Early Warning Systems and EW4All initiatives (mainly through public-private partnerships). Nonetheless, the *2024 Hydromet Gap Report* stated the development

7 ARISE networks consist of country, or regional platforms engaging private industry/business associations, Chambers of Commerce, private sector companies, insurance providers, information and communication technology providers, etc., and can also include public, non-governmental and academic members.

8 UNDRR confirmed the first adaptation finance agreement was signed in March 2025 to support the transition to resilient solar farming in high-risk areas that are prone to extreme weather events like storms and tornados.

of the weather-climate-water services value chain has been slower than planned in developing countries and called for hydro-meteorological services to crosscut key development sectors to enhance their resilience (WMO-Hydromet, 2024).

At the EU level, moves to engage the private sector in Disaster Risk Reduction and climate resilience have also increased since the adoption of the Sendai Framework for Disaster Risk Reduction and SDGs in 2015. For example, the Disaster Preparedness, European Commission Humanitarian Office programme between 1996-2020 implemented by UN agencies, non-governmental organisations and the IFRC in disaster-prone areas of developing countries was phased out in 2020 and replaced by new approaches designed to increase private sector engagement in Disaster Risk Reduction and resilience-building across development sectors. Two significant developments have been: (i) the launch of Team Europe in 2020 to establish a coordinated response between the EU Member States, the European Commission and European financial institutions like the European Investment Bank to global crises and disasters (linked to health pandemics, the climate crisis, extreme weather events, etc.); (ii) the creation of the Global Gateway in 2021 (see section 3.2) to support private sector engagement take the lead in supporting developing and EU accession countries enhance Disaster Risk Reduction and adaptation to climate change in support of global commitments to the Sendai Framework for Disaster Risk Reduction and SDGs; (iii) creation of the European Fund for Sustainable Development Plus (EFSD+) as the main financial instrument under the Global Gateway to advance climate resilience in key sectors such as public infrastructure, renewable energy, food security, and digital connectivity (including robust weather and hydrological observation networks). To implement the Global Gateway, the EU promotes the development of Team Europe Initiatives, whereby public, private and non-governmental stakeholders are required to develop coordinated approaches and blended investment solutions to de-risk their participation in climate resilience projects in developing countries. For example, to promote and derisk private sector engagement in the application of adapted agricultural systems and development of resilient value chains Team Europe Initiatives could access the Agriculture Financing Initiative (AgriFI) established under the EFSD+.

At the Finnish level, it is evident that Finland has made contributions to the Global Gateway since 2022 through its private sector instruments. These include Finnfund, which is supporting the Global Gateway mobilise over EUR 1 billion to upgrade digital infrastructure in Africa (Finnfund, 2023), and Finnpartnership, whose objective between 2023-2024 was to engage at least 15 Finnish companies in Global Gateway infrastructure procurement contracts (Finnpartnership 2024). However, the evaluation did not identify any evidence that Team Europe Initiatives had been mobilised at the EU or Finnish level between 2021-2024 to specifically support the scaling up of Disaster Risk Reduction and Meteorology initiatives funded by Finland in its partner countries. Instead, Team Europe Initiatives appear to be engaging the Finnish private sector in green initiatives that directly, or indirectly, support development resilience. For example, the Nepal Green Recovery Team Europe Initiative, which has total blended funding of EUR 200 million, includes EUR 60 million from Finland and Germany to support greening initiatives and resilience building in the water, forestry, agriculture and energy sectors (EC/Global Gateway, 2023).

At the Finnish (bilateral) level, Finland has increasingly recognised that private sector engagement should play an increasingly important role in the Disaster Risk Reduction and Meteorology sub-sector. For example, in the case of its meteorological cooperation, the publication of the WMO's *Handbook for Socioeconomic Benefit Assessment of Meteorological and Hydrological Services* (WMO, 2015), inspired the FMI to publish its own version of this handbook in which it states that the National Hydro-Meteorological Services are not only responsible for the production of high-quality weather forecasts, but also "effective communication channels, understandable dissemination of

the information and right timing… beneficial for a wider audience, and not only weather and climate experts" (FMI, 2015, Chapter 9). Moreover, case studies from ICI projects have been included to show how the benefits of hydro-meteorological services depend on the social and economic structures of the country. For example, a case study from Bhutan (involving the SHSB project) demonstrates that the strengthening of the National Hydro-Meteorological Services is important to two very different end-users: (i) the hydro-power sector, where National Hydro-Meteorological Services are crucial to economic viability and; (ii) subsistence farmers, who make up the vast majority of the agriculture sector, but who have very little trust in traditional weather services.

Also significant has been the use of the Concessional Credit Scheme, replaced by the PIF in 2016, to support Finnish private sector engagement in the modernisation of national meteorological infrastructure and networks. Key to these schemes has been the requirement that at least 50% of all goods and services to be procured by a public sector body in the partner country (project owner) and be delivered by a Finnish company or consortium (project contractor). The Concessional Credit Scheme and PIF resulted in two projects being signed by the MFA with the governments of Vietnam (2016) and Ethiopia (2021) to fund the modernisation of their national weather observation networks. In addition, since 2021 Finland has placed greater emphasis on including training and support to produce tailored services for strategic sectors and paying clients in countries where its ICI projects have been running for ten years or more, such as in Kenya, Nepal and Vietnam.

Finally, a comparison of Finland's approach to private sector engagement in the Environment and Natural Resources Priority Area was conducted through a like-minded peer country analysis exercise in the implementation phase of the evaluation (see Annex 2). The like-minded peer country analysis conducted a rapid review of five countries (Denmark, Ireland, Norway, Switzerland, and the Netherlands), before selecting the Netherlands as the most interesting peer country for analysis. This was based on the Netherlands formal adoption of a new development cooperation strategy in late 2019. A key element of the strategy is to prioritises private sector and civil society engagement in its development cooperation supporting climate action, in which public-private engagement and public-private partnerships are to be promoted to advance effective climate adaptation and resilience measures that include Disaster Risk Reduction and Meteorology in its partner countries which, like Finland, are predominantly from Africa and Asia. As such, the evaluation identified through the like-minded peer country analysis that the Netherlands could be a prime candidate for Finland to explore potential Team Europe Initiatives under the Global Gateway through which combined efforts to upscale private sector engagement in Disaster Risk Reduction and Meteorology and wider climate action initiatives could be explored in selected countries where both countries are active in Africa and Asia.

4 Findings

4.1 Results and impacts

Summary answer to EQ 1.1 and 1.2 – Results and impacts

Finland has made important and tangible progress on supporting over 40 partner countries improve their knowledge, institutional capacity, early warnings and Disaster Risk Reduction strategies to deliver more effective and inclusive disaster preparedness and response at the sub-national, national and sub-regional levels. This achievement has been achieved by using four of MFA's aid instruments (civil society organisation programme, voluntary core contributions, Institutional Cooperation Instrument, Public Sector Investment Facility) and deployment of four specialised entities (Finnish Meteorological Institute, Vaisala, Finnish Red Cross and United Nations Office for Disaster Risk Reduction). This result complies with: (i) the main activities and output foreseen for Outcome 3 in the MFA's theory of change for climate and natural resources; (ii) the causal linkages between short, medium and long-range results in the theory of change prepared for the Disaster Risk Reduction and Meteorology sub-sector that relate to improving meteorological data and knowledge sharing, and delivering universal early warning, disaster preparedness, risk mitigation and emergency response measures. Moreover, there is significant evidence to confirm the application of Finland's cross-cutting objectives have enhanced the application of inclusive community-centred disaster preparedness and response measures (i.e. that engage vulnerable groups – women, the elderly, people with disabilities – in Disaster Risk Reduction). Nonetheless, it was far less evident that Disaster Risk Reduction and Meteorology cooperation has resulted in transformative changes at the sub-national and/or national levels, notably long-term investment in resilience building of key sectors through public, non-governmental and private sector initiatives. This has not been aided by the general absence of adequate impact monitoring on relevant SDG targets, nor by the general lack of integration of Disaster Risk Reduction as a cross-cutting theme in the Water as a Natural Resource, Forests, Ecosystems and Biodiversity, renewable energy and other key areas of national and sub-national development planning (agriculture, public works, health, etc.).

Finding 1: Finland has contributed to reducing the vulnerability of over 500 million people to extreme weather events, natural hazards and poor air quality in at least 40 partner countries (Target A of the Sendai Framework).

Finland's Disaster Risk Reduction and Meteorology cooperation has made a positive contribution to achieving Outcome 3 of its theory of change. This is substantiated by the delivery of the following outputs between 2010-2024, which has been cross-checked with the short, medium and long-range results established in the theory of change for the Disaster Risk Reduction and Meteorology sub-sector in Figure 1 (see sub-section 2.2).

The weather and air quality services units of the National Hydro-Meteorological Services have increased their knowledge on meteorological conditions (short-range result 2), leading to the establishment of multi-hazard early warning systems (MHEWS) for the first time (short-range result 6) in the partner countries assessed (see Table 2). Moreover, the adoption and application of FMI's open source SmartMet/SmartAlert software in at least 30 countries has enabled the National Hydro-Meteorological Services to process weather and air quality data in real time to generate alerts and warnings over three days or more, (medium-range result 1). Finland has, therefore, successfully delivered Output 1 in the theory of change for Environment and Natural Resources in the great majority of its partner countries, notably in Ethiopia, Kenya, Kyrgyzstan, Nepal, Rwanda, Tajikistan, Tanzania and Vietnam (see Table 2).

The delivery of improved services from the National Hydro-Meteorological Services in over 40 countries has significantly increased the number of people who have access to early warning systems (long-range social result 2) through which they can take informed decisions in support of disaster preparedness and response. Currently, over 500 million people are reported to have access to early warnings thanks to Finland's Disaster Risk Reduction and Meteorology cooperation (FMI, 2024), which is directly supporting Target A of the Sendai Framework for Disaster Risk Reduction.

The delivery of combined training of National Hydro-Meteorological Services from the same sub-region has stimulated cooperative data and knowledge-sharing to address the need for cross-border weather forecasting and early warnings (long-range result 3). This was identified from FMI's ICI projects implemented in: (i) Central Asia, where the National Hydro-Meteorological Services from Kyrgyzstan, Tajikistan and Uzbekistan have received joint training in areas such as glacial outburst and/or retreat forecasting (FINKMET, FINTAJ, FINUZ); (ii) and East Africa, where Kenya, Rwanda and Tanzania share a common interest in sharing weather forecasting and air quality monitoring data to support priorities in the sub-region, such as aviation safety (FINKERAT).

Finding 2: Finland has contributed to supporting some of the most vulnerable communities and groups to design, adopt and apply more inclusive disaster preparedness and early actions that have saved lives and assets.

Finland's use of the Programme-based support instrument for CSOs and annual core contributions to UNDRR has been highly effective in supporting global efforts to expand disaster preparedness and response, especially in communities and groups that are the most vulnerable to weatherin and climate hazards. This achievement has contributed to delivering Outcome 3 in the theory of change for Environment and Natural Resources, which is substantiated by the following evidence.

Support to CSO's multi-country Disaster Risk Reduction programmes enables Finland to target the most vulnerable to weather and climate hazards by mobilising their extensive networks that operate at the global, regional and country levels. For example, support to FRC's Development Programme 2022-2025 has enabled Finland to develop climate-smart disaster preparedness and risk reduction measures reaching highly vulnerable communities in 15 countries (Focus area 1 of the programme). This has included the funding of initiatives such as Early Warning, Early Action (see Table 2)9, through which its sister Red Cross and Red Crescent societies have used their local networks with grass roots organisations and local government to establish community-based Disaster Risk Reduction strategies and plans. Moreover, through synergies with Finland's meteorological

9 FRC's Early Warning, Early Action programme directly contributes to the objectives of the REAP initiative to promote risk-informed early action in disaster-prone communities in Kenya, Nepal, Rwanda, Tanzania and Zimbabwe.

cooperation in East Africa (FINKERAT) and in Nepal (FNEP III), important advances have been achieved in (i) improving local community knowledge of how weather and climate hazards affect their livelihoods (short-range results 2 and 3); (ii) capturing local knowledge, attitudes and practices linked to disaster risk management (short-range result 5); (iii) developing Community-Based Early Warning Systems tailored to local needs, such as the issuing of early warnings on both floods and the rise in water-borne diseases (short-range result 6); (iv) supporting the adoption of robust community-based Disaster Risk Reduction strategies and plans (medium-range results 3 and 4); and (v) integrating of Disaster Risk Reduction strategies into local practices and government planning (FRC, 2025). Latest figures from FRC's Annual Report for 2024 indicate that FRC and its partners have trained over 313,000 people on disaster preparedness strategies, and contributed to almost 550,000 people having improved access to weather and climate services and/or early warnings (long-range result 2). In the specific case of the Early Warning, Early Action, over 112 communities had Disaster Risk Reduction/Community-Based Early Warning Systems in place by 2024 (FRC, 2024).

Finland's support to UNDRR has contributed to an increase in the number of countries that have national and subnational Disaster Risk Reduction strategies and multi-hazard early warning systems supporting the application of the Sendai Framework and National Adaptation Plans, required under UNFCCC. For example, countries with national Disaster Risk Reduction strategies in place rose from 57 to 131 between 2015-2024, of which 110 countries reported that they also had subnational/local Disaster Risk Reduction strategies in place (UNDRR, 2024). Similarly, the number of countries reporting the application of multi-hazard early warning systems in line with the WMO's standard operating procedures increased from 57 to 108 countries over the same period (mid-range result 1). Moreover, the number of people with access to multi-hazard early warning systems in least developed countries and small island developing states was reported to have grown to over 400 million in 2024 (mid-range result 4). As such, Finland's core funding to UNDRR has directly supported global progress on the achievement: (i) Target E of the Sendai Framework for Disaster Risk Reduction (medium-range result 3); (ii) Target G of the Sendai Framework for Disaster Risk Reduction and Result 4 of the UN Plan of Action on Disaster Risk Reduction for Resilience (long-range result 2); (iii) Target A of the Sendai Framework for Disaster Risk Reduction and SDG Target 11.5, namely the reduction of disaster mortality from 1.62 deaths per 100,000 people in 2005-2014, to 0.82 deaths per 100,000 in 2015-2023 (UNDRR, 2024). In addition, core funding to UNDRR has helped the institution to coordinate more closely with UNFCCC's initiatives to avoid the overlap of functions and resources. For example, UNDRR positioned itself as a technical partner in the Santiago Network created at UNFCCC's COP25 in 2019, thus avoiding a major overlap of functions on the minimisation of loss and damage caused by the adverse weather and climate hazards (mid-range result 2 and long-range result 4).

Finland's meteorological cooperation has directly supported the above-mentioned achievements. Despite the general lack of adequate impact monitoring on Finland's Disaster Risk Reduction and Meteorology cooperation to the Sendai Framework's seven main targets, the evaluation identified evidence from a small number of projects that the introduction of multi-hazard early warning systems has resulted in local communities taking early action to save lives and assets. For example, in the case of FINPAC the introduction of early warning systems supported communities in the Solomon Islands evacuate to safe havens in advance of a tsunami warning (MFA/Danish Management, 2018).

Finding 3: The application of a rights-based approach to Disaster Risk Reduction and Meteorology cooperation has demonstrated that it improves disaster response by ensuring the most vulnerable groups have greater access to basic services like community early warning systems and disaster risk information (Targets E and G of the Sendai Framework).

Finland's strong emphasis on integrating cross-cutting objectives that support the human rights-based approach and greater gender equality has ensured that the above-mentioned support to marginalised communities in Finland's partner countries also focuses on the most vulnerable groups (women, children, the elderly, people with disabilities) in those communities. This has been particularly evident in least developed countries in Africa and Asia since 2016, where both FRC and UNDRR have taken steps to recognise, value and engage with vulnerable groups. In the case of FRC, Finland's support to initiatives like Early Warning, Early Action has enabled the expansion of risk assessments through its national Red Cross and Red Crescent societies and local partners, through which vulnerable groups have voiced their specific needs and aspirations when designing and implementing community-based Disaster Risk Reduction strategies, plans and activities. This has directly supported efforts to meet Target E of the Sendai Framework for Disaster Risk Reduction.

FRC has also supported the incorporation of members from these groups in the development of volunteer groups and Disaster Risk Reduction committees responsible for implementing community-led disaster preparedness and response measures (short-range results 4 and 5). This has helped ensure that members from these groups actively support the application of Community-Based Early Warning Systems and Disaster Risk Reduction strategies responding to their specific needs and capacities in advance of, and in response to, disasters in support of Target G of the Sendai Framework for Disaster Risk Reduction (medium-range results 2 and 3). This was particularly evident in Nepal and East Africa, where coordination between the Early Warning, Early Action project, the Finnish-Nepalese Meteorology Project (FNEP) III and the Finnish-Kenya, Rwanda and Tanzania Meteorological Project (FINKERAT) has been tailored to serve the specific needs of at least 45 Disaster Risk Reduction committees (FMI, 2022). This involved using local risk mapping, volunteer community training and application of effective communication strategies that meet the needs of all vulnerable groups, including alerts in local languages and use of symbols for the illiterate. Despite these achievements, however, more needed to be done to integrate people with disabilities (MFA, 2022).

In the case of UNDRR, Finland's decision to earmark additional core funding to UNDRR in 2023 (see Section 4.1) has raised awareness of the importance of integrating the *Disability Inclusion Annex* in UNDRR's Disaster Resilience Scorecard (applied since 2017). In total, representatives from 139 countries were trained on how to apply this index, resulting in a significant increase in awareness of the benefits of integrating the specific needs of this vulnerable group in Disaster Risk Reduction strategies and plans (medium-range results 3 and 4). Moreover, this led UNDRR to employ a disability inclusion focal point in its Asia Office (Bangkok) to ensure universal early warning and disaster preparedness and response measures fully integrated with this Annex throughout Asia from 2024 (long-range result 2).

Finding 4: The shift to real-time weather monitoring and forecasting in Finland's partner countries has facilitated the development of World Meteorological Organization's regional network of early warning centres dedicated to developing accurate regional and global seasonal forecasting of climatic events (Target G of the Sendai Framework for Disaster Risk Reduction).

The adoption of FMI's SmartMet/SmartAlert software has enabled the National Hydro-Meteorological Services to process real-time data to provide weather forecasting services of three to seven days (based on WMO's standard operating procedures). This has enabled the National Hydro-Meteorological Services: (i) to deliver a wider range of range of services that directly support the needs of ordinary people, the emergency services and local government (short-range results 2-5, and medium-range results 1, 3 and 4 in the theory of change); and (ii) to contribute to the development of WMO's network of Regional Climate Centres, which specialise in the provision of early warnings on climate-related hazards in support Target G of the Sendai Framework for Disaster Risk Reduction. For example, this has supported initiatives like Drought Watch, which is being aided by the FINKERAT project operating in Kenya, Rwanda, Tanzania (and Uganda through the Climate Risk and Early Warning Systems initiative) where FMI's SmartMet/SmartAlert system directly supports the development of WMO's Regional Climate Centre (also known as the IGAD Climate Prediction and Applications Centre), which covers the Greater Horn of Africa region. This enhanced the Centre's ability since 2024 to produce more accurate sub-regional level warnings on climate hazards, preparing the way for the Climate Risk and Early Warning Systems initiative to develop a roadmap on expanding Numerical Weather Prediction capacity throughout the sub-region from 2025 (long-range result 3).

The evaluation was informed that these developments will be supported by a new PIF project, whereby Vaisala will support the expansion of Numerical Weather Prediction and air quality monitoring in Kenya (short-range results 2 and 6), through which FMI will be able to expand the use and interoperability of its SmartMet/SmartAlert in the sub-region (long-range results 2 and 3). In summary, Finland has made a significant contribution to advancing several SDGs in its partner countries, notably SDG 13.1 (*Strengthen resilience and adaptive capacity to climate-related hazards and natural disasters in all countries*) and on promoting water conservation and use in times of drought (SDG 6.4).

Finding 5: There is no tangible evidence to indicate that support to the Disaster Risk Reduction and Meteorology sub-sector has resulted in unexpected and/or negative effects on the environment.

The evaluation found no evidence that Finland's Disaster Risk Reduction and Meteorology cooperation has resulted in unexpected or negative effects that would affect the achievement of Outcome 3 in the theory of change for Environment and Natural Resources, or the long-range results and impact established in Figure 1. For example, the ICI, programme-based support and core funding to UNDRR have all focused on providing training, technical assistance, weather equipment upgrades, Disaster Risk Reduction strategy planning, or administrative funding, none of which was reported to have caused negative effects in the partner countries in the progress, annual and completion reports reviewed. In addition, there is no evidence that the implementation of Disaster Risk Reduction strategies and action plans established under FRC's Development Programmes since 2015 to date have resulted in negative environmental or social impact. For example, in the Early Warning, Early Action programme there is no evidence to indicate the small-scale Disaster Risk Reduction infrastructure installed has caused environmental damage. In fact, the evidence available suggests the promotion of nature-based solutions and minor works were applied to

protect and sustainably manage natural resources (including coastlines, riverbanks and depleted water resources). Similarly, there is no concrete evidence that indicate the Concessional Credit Scheme and PIF projects in Vietnam and Ethiopia have caused adverse effects on the environment. For example, there is no evidence that the installation/improvement of access tracks to the automated weather observation equipment installed has caused any adverse environmental (or social) impact in either country.[10]

Finding 6: Improvements in disaster preparedness and response through improved early warning and Disaster Risk Reduction strategies are resulting in an increase in early action to save lives and assets (Target A of the Sendai Framework), but transformational changes needed to deliver longer-term development resilience (Target B of the Sendai Framework) were less evident in Finland's Disaster Risk Reduction and Meteorology cooperation.

Despite significant evidence from findings 1-5 to confirm Finland has supported a large number of partner countries make positive progress on achieving several Sendai Framework for Disaster Risk Reduction targets (notably Targets A, E, F and G) that support the achievement of Outcome 1 in the theory of change for Environment and Natural Resources, there is far less evidence of major progress on other targets (notably Targets B, C and D). In particular, evidence of systemic change was not identified to determine how far that change is delivering long-term climate resilience based on the sustainable use of natural resources (Impact in the theory of change for Environment and Natural Resources). For example, in the latest evaluation of FRC's Early Warning, Early Action in Nepal (FRC, 2025), a major challenge continues to be "competing livelihood priorities" (p.2) that indicate early action needs to focus not only on disaster preparedness and response, but also action that supports the long-term resilience of people's livelihoods (i.e. human, socio-cultural, environmental, physical and economic capital).

Similarly, data on the number of people whose livelihoods are affected by disasters has increased, even though disaster mortality trends have decreased. For example, the number of people who were affected by disasters totalled 1,187 per 100,000 people between 2005-2014 compared to 2,032 per 100,000 people in 2015-2023 (UNDRR, 2023). This has led international and national CSOs to call for greater support from governments and the private sector to support all aspects of the Disaster Risk Reduction value chain, notably disaster risk prevention through, for example, flood and coastal defences and greater integration of Disaster Risk Reduction in development strategies at the national, sector and subnational levels. For example, one of UNDRR's main civil society partners, the Global Network of Civil Society Organisations for Disaster Reduction, called for increased support in climate finance for local communities most at risk from disasters and climate change at UNFCCC's COP29 in November 2024.

Stakeholder interviews suggest that a major barrier confronting Finland's Disaster Risk Reduction and Meteorology cooperation is that it is largely constrained from cross-cutting important sub-sectors like Water as a Natural Resource, Forests, Ecosystems and Biodiversity or renewable energy within the Energy, Circular Economy and Critical Minerals sub-sector to enhance long-term resilience to extreme weather and climate risks. This has been compounded, according to several stakeholders, by the fact that MFA's financial instruments are not geared to funding multi-sectoral approaches and initiatives. Furthermore, the evaluation found a lack of systematic application of the Finnish Government's *Guidance and Checklist for Climate Sustainability* despite specific

10 The reader is reminded of the limitations listed in Annex 1 that confirm no field visits were conducted to independently verify environmental (or social) impact of Finland's Disaster Risk Reduction and Meteorology cooperation.

guidance for Environment and Natural Resources, infrastructure, planning and international cooperation, among others (Government of Finland, 2019). Consequently, improved knowledge on the role ecosystems play in Disaster Risk Reduction to support precautionary planning (short-range result 1 in the theory of change) has not been achieved, which in turn has prevented progress on improving the enabling environment for Disaster Risk Reduction and Meteorology to ensure early action is mainstreamed in key sectors where their long-term resilience is of strategic importance, notably Water as a Natural Resource, Forests, Ecosystems and Biodiversity, renewable energy, Public Works and Health (middle-range result 2 and long-range results 1 and 4).

Finding 7: The direct beneficiaries consist of stakeholders from 40 developing countries working on weather and air quality forecasting, Vaisala supporting the upgrading of weather observation networks, Finnish Red Cross and its national partners operating in 15 developing countries, and UNDRR at the multilateral level supporting the implementation of the Sendai Framework for Disaster Risk Reduction.

Finland's meteorological cooperation was found to have directly benefitted public staff and consultants from the department/unit responsible for weather forecasting services and/or air quality monitoring in the National Hydro-Meteorological Services from over 40 developing countries across Africa, Asia, Latin America and the Caribbean (short-range results 2-6). More specifically, staff have benefited from training and capacity development to operate and maintain new weather observation equipment and to apply Numerical Weather Prediction tools that support the application of FMI's SmartMet/SmartAlert system through which improved weather forecasts and early warnings have emerged (mid-range result 1). Main beneficiaries have been so-called 'master trainers' who have been targeted through extensive training and technical assistance from FMI to impart their training to staff within their weather services department/unit of the National Hydro-Meteorological Services. Key benefits for the National Hydro-Meteorological Services derived from this approach have been the increase in institutional memory on the delivery of weather forecasting and warning services that comply with WMO's standard operating procedures (medium-range result 1 and long-range results 2 and 3).

The application of the Concessional Credit Scheme and PIF projects in Vietnam and Ethiopia between 2016-2021 has supported Finland's partner countries to establish modern automated weather observation networks that have been instrumental in providing a range of more accurate weather forecasting and early warnings covering up to seven days in advance. In addition, both projects have benefitted the Finnish company Vaisala Oy and its local private company partners through the purchase and installation of its weather observation equipment and air quality sensors by the National Hydro-Meteorological Services in Vietnam and Ethiopia (short-range result 6). This has also benefitted Vaisala by engaging in new PIF projects, notably one that is still in the design phase in Kenya.

The main beneficiary of Finland's Programme-based support to CSOs has been the FRC and its national Red Cross and Red Crescent societies, and IFRC's global climate centre. In addition, municipal and village-level governments and grass roots organisations, including the volunteer networks that participate in community-based Disaster Risk Reduction committees have also benefitted directly from this support (short-range results 2-5).

Finally, Finland's core funding to UNDRR has directly benefitted staff working in UNDRR's headquarters and regional offices. The main beneficiaries within UNDRR were found to be staff who have been directly responsible for the implementation of the Hyogo Framework for Action to 2015, and the achievement of the Sendai Framework's targets thereafter (mid-range results 2 and 3).

Finding 8: The indirect beneficiaries of Finland's Disaster Risk Reduction and Meteorology cooperation include at least 500 million people from over 40 countries who are estimated to have access to improved weather, climate and early warnings of which 313,000 people have adopted a community-based DRR strategy and more than 550,000 people have access to improved early warning systems (Target G of the Sendai Framework).

In accordance with data provided in Finding 2, there is evidence that Finland's Disaster Risk Reduction and Meteorology cooperation has indirectly benefitted more than 313,000 people in terms of terms of training on disaster preparedness and response strategies, while close to 550,000 people have improved access to weather and climate services and/or early warnings (long-range result 2). This includes over 112 communities from the Early Warning, Early Action initiative who are reported to have access to Community-Based Early Warning Systems (short-range result 6 and mid-range result 4), (FRC, 2024). However, indirect beneficiaries are projected to increase to over 700,000 people (22%) by 2027 following completion of FMI's training and support to the Climate Risk and Early Warning Systems and EW4All initiatives, notably in Uganda (Climate Risk and Early Warning Systems East Africa project) and in Indonesia (INDFIN, 2024), (short-range results 2-5).

Indirect beneficiaries of core funding to UNDRR have included the national and subnational governments that have endorsed the Sendai Framework (187 member countries), in particular their representatives who participate in UNDRR's Global Platform for Disaster Risk Reduction, which includes the Global Facility for Disaster Reduction and Recovery. In addition, indirect beneficiaries have been the regional, sub-regional, or national Disaster Risk Reduction platforms that span the Americas and the Caribbean, Arab states, Africa, Asia-Pacific and Europe.

Finding 9: The range of direct beneficiaries at both the intra-and inter-institutional levels has been low due to the narrow bilateral focus of Institutional Cooperation Instrument and Public Sector Investment Facility instruments executed through exclusive partnerships. This has prevented the development of coordinated multi-sectoral approaches that are needed to scale up the long-term development resilience across the Climate and Natural Resources Priority Area.

The vast majority of the ICI PIF and CSO projects reviewed were found to have had limited success in extending their direct benefits beyond weather forecasting staff within the National Hydro-Meteorological Services, or local actors in marginalised communities supported under the Early Warning, Early Action initiative. In the case of ICI projects, this was evident both within the same ministry of the National Hydro-Meteorological Services (usually the Ministry of Environment), and with other ministries who were in need of specific weather and climate services to support their planning and operations. A notable example at the intra-institutional level has been the relatively low levels of engagement of staff responsible for natural resources, in particular hydrology and soils. In the few cases where such engagement was evident, notably in the FINKERAT project, direct beneficiaries included the Rwanda Environment and Management Authority, and the Kenya Water Resources Authority. However, in Tanzania, it was evident that the Water Resources Division was absent, suggesting the Ministry of Water and Irrigation in which it is housed was not included in list of beneficiary stakeholders during the project design.

At the inter-institutional level, only a small number of ICI projects, including FINKERAT in East Africa, FNEP III in Nepal and Promoting Modernisation of Hydrometeorological Services in Vietnam (PROMOSERV III) have explicitly recognised the need to support the National Hydro-Meteorological Services in providing tailored services that would directly benefit government stakeholders from strategic sectors with a role in civil protection, such agriculture, forestry, renewable energy,

and public works. However, even in these cases, the ICI and PIF instruments have revealed weaknesses that limit the amount of inter-institutional cooperation that they can actually leverage. For example, PROMOSERV III did not have the time or resources to establish the Ministry of Agriculture and Rural Development as one of the main beneficiaries as was originally planned (under the component dedicated to developing tailored agro-meteorological services). Likewise, FNEP III was reliant on other projects, notably Rural Village Water Resources Management Project III and FRC's Reducing Impact through Inclusive Preparedness and Anticipatory Action programme implemented under its Early Warning, Early Action initiative to deliver benefits at the local community and municipal levels.

Several factors have contributed to the low level of participation of government departments in Finland's Disaster Risk Reduction and Meteorology cooperation. First, the ICI and PIF instruments have strict rules on providing capacity building to peers (the National Hydro-Meteorological Services) and procurement of products and services that limit their scope to engage with a wider range of public, private and non-governmental actors. For example, all ICI projects implemented by FMI have been signed with the National Hydro-Meteorological Services in the partner country, rather than with the parent ministry (usually the Ministry of Environment). Although this facilitates training within a specialised department/unit responsible for weather services, it limits opportunities to engage in intra- and inter-institutional cooperation that is crucial to promoting climate resilience (Impact in the theory of change for the Environment and Natural Resources Priority Area).

Second, the ICI projects implemented by FMI and the National Hydro-Meteorological Services promote strong ownership of results by the latter (in terms of improved weather forecasting and early warning), but also silo these results from partners responsible for the broader environmental, scientific and social needs of climate action. As a result, ICI projects implemented by FMI and other specialised institutions in Finland appear to be implemented largely in isolation of each other. This is despite the fact: (i) the Geological Survey of Finland (GTK) has supported extensive research into soil and ground water conservation in partner countries like Vietnam, Ethiopia and Central Asia; (ii) the Natural Resources Institute Finland (Luke) has supported assessments of ecosystems and forests including in East Africa and Nepal; (iii) the Finnish Environment Institute (Syke) is responsible for environmental monitoring, that has included water quality monitoring in Central Asia; (iv) the Technical Research Centre of Finland (VTT) and Luke have projects dedicated to wildfire detection using drone technologies in Finland and developing countries.

Third, current ICI rules and regulations until 2023 had major limitations on their scope, because they were restricted to very small budgets (averaging EUR 0.5 until 2023) and short implementation times (2-3 years). As a result, Finnish meteorological cooperation has been largely implemented in a fragmented fashion and without adequate resources to fund a permanent expert in the partner National Hydro-Meteorological Services. Instead, it has had to rely on a series of small projects carried out in several phases and which rely heavily on sporadic technical missions and study visits to Finland. This has resulted in very limited opportunities to engage with and support decision-makers in developing informed dialogue on policy, planning and implementing the transition to resilient and sustainable development.

4.2 Most effective approaches

An 'approach' is a key method or tactic – a portable element of a strategy. To qualify as 'most effective' in this evaluation, an approach must be judged to be: (i) strongly effective, impactful and sustainable;11 (ii) in line with the theory of change; and (iii) strongly cost-effective.

Summary answer to EQ 1.3 – Most effective approaches

The application of targeted, demand-driven Disaster Risk Reduction and Meteorology cooperation that responds to the needs and aspirations of its direct and indirect beneficiaries and applies Finland's cross-cutting objectives, has proven to be a highly effective approach to deliver results that are inclusive and stimulate positive impact in the partner country (in line with the theory of change). Other effective approaches have been: (i) the training of master trainers and use of synergies with other projects have demonstrated they are an effective approach to strengthen institutional memory and enhance the ownership of results in the National Hydro-Meteorological Services; (ii) support to civil society organisations like Finnish Red Cross, has been an effective approach to reach the most vulnerable groups and communities, because they can rapidly mobilise Red Cross and Red Crescent societies who are already in place the partner countries; (iii) the provision of unearmarked and earmarked core funding to United Nations Office for Disaster Risk Reduction has proven to be a highly effective approach to deliver Finland's commitments to the Sendai Framework for Disaster Risk Reduction as well as promote its cross-cutting objectives as the global level. However, the heavy and bureaucratic processes governing the use of Finland's financial instruments for meteorological cooperation (Institutional Cooperation Instrument, Public Sector Investment Facility) has resulted in unsatisfactory levels of implementation efficiency.

Finding 10: Targeted and demand-driven Disaster Risk Reduction and Meteorology cooperation, that identifies needs, forges equal and long-lasting partnerships and builds on lessons learned and good practices from previous projects has proved to be a strongly effective way to deliver results.

The evaluation found that all the ICI and FRC initiatives evaluated have adopted targeted and demand-driven approaches that focus on specialised institutions (ICI) and people-centred approaches. In particular, despite the limitations of the ICI instrument (small budgets and timespans) FMI has successfully expanded Finland's meteorological cooperation to over 40 countries since 2010. The evaluation identified the following key elements to the success of this approach.

- FMI's systematic emphasis on identifying the needs and capacity gaps within the weather forecasting departments/units of the National Hydro-Meteorological Services in order to establish a demand-driven project approach (aligns with the assumptions for inputs/instruments to short-range results in the theory of change). In all ICI projects studied, this approach has put the National Hydro-Meteorological Services in the

11 A strongly **effective approach** is one that reliably delivered valuable outcomes, with clear causal contribution; results were consistent, replicable, and aligned with the theory of change. A strongly **impactful approach** is one that contributed to significant positive change, with evidence of influence on broader systems, policies, or behaviours in line with the theory of change. A strongly **sustainable approach** is one that had consequences that were likely to continue producing results without external support, due to strong local ownership, institutionalisation, financial viability, or policy uptake.

driving seat to enhance project ownership, in particular its results. For example, as mentioned in Finding 1, in the Finnish-Kyrgyz Meteorology Project (FINKMET) I-III and the Finnish-Tajikistan Meteorology Project (FINTAJ) I-III projects in Kyrgyzstan and Tajikistan, the National Hydro-Meteorological Services identified the need to incorporate both glacier and snow monitoring, and air quality monitoring. Similarly, the FINKERAT and INDFIN projects in East Africa and Indonesia also identified the need for air quality monitoring to track the potential impact of forest fires and rapid urbanisation on public health and aviation safety.

- FMI's willingness to use synergies with other projects to customise its open-source SmartMet/SmartAlert system to meet the needs of new National Hydro-Meteorological Services partners (aligns with the assumptions for inputs/instruments to short-range results). For example, in Nepal the FNEP III project provided training to the Department for Hydrology and Meteorology on weather database development and application of the SmartMet/SmartAlert system as part of the initiatives, *Building Resilience to Climate-Related Hazards* funded by the World Bank, and the Hindu Kush Himalayan Regional Flood Information System (HKH-HYCOS) initiative managed by the International Centre for Integrated Mountain Development. Likewise, in Vietnam the PROMOSERV initiative established similar synergies with the World Bank's project *Vietnam Managing Natural Hazards* (VN-Haz), the concessional credit (now PIF) project implemented by Vaisala, and Japan's International Cooperation Agency (JICA). In a third example, synergies between FINKMET III, FINTAJ III, and UZFIN III (Uzbekistan) were effective in stimulating joint training on the establishment of common platforms to develop sub-regional weather forecasting and climate services in Central Asia. All showed how FMI's experience could be tailored to large national hardware modernisation programmes, or interest in developing peer-to-peer collaboration to develop sub-regional weather and climate services. Moreover, important lessons and good practices were taken from these projects to support the design of the FINKERAT project in East Africa, where a new PIF project is foreseen with Kenya.

- FMI's adoption of a phased 'milestone' approach with the National Hydro-Meteorological Services has enabled all ICI projects to apply a clear set of outputs and outcomes to be achieved in each phase (aligns with the assumptions for inputs/instruments to short-range results). As a result, the majority of ICI projects evaluated confirmed that they have spanned three phases, covering a large part of the 2010-2024 period. Examples, include FNEP I-III (in Nepal), FINKMET I-III (Kyrgyzstan), FINTAJ I-III (Tajikistan) and PROMOSERV I-III (Vietnam).

- FMI's strong commitment to developing a strong and equal partnership approach with the weather forecasting departments/units of the National Hydro-Meteorological Services, which has been consolidated through the establishment of 'master trainers' (aligns with the theory of change assumptions for short and medium-range results). In most cases, the master trainers become important focal points to multiply FMI's training in key areas, notably the shift to Numerical Weather Prediction, which requires the use of global and regional weather prediction models to produce the data required for the SmartMet/SmartAlert system to generate weather forecasts and warnings. Moreover, by focusing on National Hydro-Meteorological Services staff, the development of master trainers enhances the institutional memory of the weather forecasting departments/units in the National Hydro-Meteorological Services, which is key to sustaining accurate weather and climate services and early warnings and to reducing dependency on external expertise to operate Numerical Weather Prediction models

such as the HIRLAM–ALADIN R Package (HARP) to assess the accuracy of Numerical Weather Prediction, or the Weather Research and Forecasting system to support Numerical Weather Prediction verification of severe weather events, which has been critical to establish multi-hazard early warning systems in projects such as FINKERAT, FINKMET III, and FNEP III.

- FMI's application of continuous learning through these phases has enabled lessons to be identified and used both in the annual planning process of project implementation and in the design of new phases/projects (aligns with the assumptions for short to medium-range results). For example, the PROMOSERV III project highlighted the importance of establishing a cross-organisational SmartMet team to operate, coordinate and support its application as part of the exit strategy in 2024.
- FMI's strong emphasis on building trustworthiness into its long-term partnerships with the National Hydro-Meteorological Services (aligns with the assumptions for medium to long-term results). Stakeholders interviewed considered this to be crucial to stimulating transformational change, notably the transition to Numerical Weather Prediction, the adoption of FMI's SmartMet/SmartAlert system and commitment to applying WMO's standard operating procedures to produce 72-hour weather forecasting and warning services.

The success of the FRC in delivering results is attributed to a number of key elements of its approach:

- It relies heavily on coordination mechanisms in place with its sister Red Cross and Red Crescent societies that operate in developing countries, such as the five targeted by the Early Warning, Early Action initiative (aligns with the assumptions for inputs/instruments to short-range results in the theory of change). This allows FRC: (i) to directly access the Red Cross and Red Crescent Climate Centre in the Netherlands for advice and; (ii) to tap into the knowledge base possessed by each of its national partner organisations. In the case of the latter, this enables FRC both to rapidly identify the causes of vulnerability, and to access vulnerability assessments that have already been conducted (or that can be prepared at short notice) by its partners. This has enabled the FRC to identify and target the priority needs and gaps of the most vulnerable communities and, more importantly, the most vulnerable groups who usually suffer the most from disasters. Moreover, needs within these groups are disaggregated further. For example, in the case of women's groups needs can be disaggregated into young girls, pregnant women, breast-feeding women, elders and disabled women, among others.
- It is committed to locally-anchored, inclusive project designs and implementation (aligns with short to medium-range results). This approach places significant importance on valuing, recognising and integrating local knowledge, customs, cultures, languages, communication strategies, etc. into the project design, and into the design of community-led Disaster Risk Reduction strategies produced during the implementation phase.
- It emphasises the importance of engaging the active participation of vulnerable communities and groups in all stages of the project cycle, which allows for effective planning, stimulates learning and enhances local ownership of project actions (aligns with assumptions for medium to long-range results). According to FRC, this approach is

critical to securing the relevance of early warning (i.e. Community-Based Early Warning Systems).

- It ensures that early warning communications are inclusive and repeated regularly (aligns with assumptions for medium to long-range results). According to FRC, when local people understand and control their communications they can be nuanced according to local habits and customs to enhance take up, unlike external alerts that may not be understood or trusted (FRC, 2024).
- It advocates the importance and benefits of developing volunteer networks (aligns with assumptions for medium to long-range results and long-range results to impact). A major strength of IFRC in general is that volunteer networks are crucial to building resilience, because they can empower individuals to promote community and solidarity, take on leadership roles and become focal points with local actors and government.

Finding 11: Despite the effectiveness of targeted and demand-driven Disaster Risk Reduction and Meteorology cooperation, this has not been matched by adequate levels of implementation efficiency.

In many cases, results took far longer to be achieved than was originally planned. This suggests a weakness in risk identification and mitigation during design (does not align with the assumptions for inputs/instruments to short-range results in the theory of change). This was mainly the case with the ICI and PIF-funded projects that were examined, where delays in design and/or implementation added between nine and 24 months to the duration of what were typically supposed to be 36-month projects. A large number of no-cost extensions of up to two years resulted, including for FNEP III, PROMOAIR, PROMOSERV III, Finland Pacific Meteorology Project (FINPAC) in the Pacific region, and Climate Modelling and Observations in India. This in turn increased transaction costs, leading in some cases to the need for new cash injections (PROMOSERV III exit), or FMI identifying if funds from the SOFF could be used to cover, for example, staff field missions to cover training inputs (FNEP III, FINKERAT).

Interactions between FMI and other donor-funded projects also revealed design weaknesses (not aligned with the assumptions for inputs/instruments to short-range results). Most significant, insufficient attention was often given to well-known risks, such as the potential bottlenecks that can emerge when one project relies on the outputs of another to deliver results. Another was the work overload that occurred when National Hydro-Meteorological Services with small staff numbers were responsible for several projects at the same time. Thus, for example, potential synergies between PROMOSERV III and the VN-Haz project could not be exploited effectively because the latter lacked adequate protocols to allow the FMI to participate in the review of the dataflow problems from the Central Data Hub installed by the VN-Haz project, which was supposed to provide data feeds to support training on the application of the SmartMet/SmartAlert system. As a result, there was insufficient time to fully operationalise the planned SmartMet/SmartAlert services, which in turn prevented the establishment of the SmartMet team proposed in the exit strategy (see also Finding 9).

Another efficiency issue identified was the general lack of adequate risk analysis and management throughout the project cycle, which the evaluation found is not well developed in the Results Matrix, nor updated in the progress reports (not aligned with the assumptions for inputs/instruments to short-range results). This both prevented a reassessment of risks and restricted the ability to identify and address emerging risks, affecting implementation and contributing to delays in FMI and FRC projects. This, together with the above-mentioned limitations of Finland's funding instruments

(see Finding 9), contributed to the general lack of early and more holistic resilience development planning in ICI, PIF and programme-based support projects. For example, despite the success in developing community-led Disaster Risk Reduction strategies incorporating Community-Based Early Warning Systems in initiatives such as Early Warning, Early Action (Red Cross EU Office, 2024), one of the main challenges is insufficient participation of stakeholders and local communities in the co-design of national early warning systems. As a result, these systems, "*may not be culturally relevant or effective, risking poor performance of donor investments, and potentially failing to provide essential services to those most at risk*" (Risk Informed Early Action Partnership, 2024).

Finding 12: Finland's long-term stable funding of multilateral and civil society partners in Disaster Risk Reduction has created a win-win scenario by reducing administrative burdens on MFA while enabling partners to align resources to Finnish priorities, evolving events, and the SDGs.

Interviewees consistently welcomed Finland's support to Disaster Risk Reduction at the multilateral level through stable annual pledges of around EUR 1 million/year in unearmarked core funding (aligns with the assumptions from inputs/instruments to short-range results). There is strong recognition that this approach has reduced the administrative burden on MFA of supporting global efforts to meet relevant SDG targets. Likewise, injections of earmarked core funding in parallel to unearmarked pledges were also found to be an effective approach since 2010 to promote Finland's cross-cutting objectives globally. For example, earmarked funding to UNDRR in 2023 enabled Finland to expand disability-inclusive Disaster Risk Reduction throughout the developing world, in particular in Asia (see also Finding 2).

Furthermore, Finland provides a significant percentage of all unearmarked core funding received by UNDRR (over 8% in 2024). Interviewees confirm this has cemented Finland as an important strategic partner of UNDRR for several reasons. First, unearmarked core funding enables greater flexibility to UNDRR in fulfilling its mandate under the Sendai Framework, in particular the reallocation of resources to new policy developments or unforeseen disasters. Second, it supports UNDRR to maintain leadership on global initiatives such as the Global Platform for Disaster Risk Reduction, through which knowledge, guidance and support is provided to the regional, sub-regional and national platforms dedicated to implementing the Sendai Framework for Disaster Risk Reduction. Third, it enables UNDRR to hire expertise to support its Member States implement the Sendai Framework for Disaster Risk Reduction, such as the EW4All, Climate Risk and Early Warning Systems and REAP initiative, as well as to promote cross-sectoral coordination in support of longer-term development resilience in support of relevant SDGs (Impact in Finland's theory of change for Environment and Natural Resources).

Finland's support to CSO's multi-country programmes on Disaster Risk Reduction and climate action was also found to be win-win for Finland and its partners and was thus popular among interviewees. In the case of FRC, MFA has again reduced its administrative burden, while at the same time engaging a reliable partner that specialises in reaching the most marginalised and vulnerable communities and groups. This has proved to be an effective way, therefore, to meet and upscale Finland's commitment to the UN's 'leave no one behind' principle, which is a key element in its aim to reduce poverty and inequality. In addition, by concentrating the Early Warning, Early Action initiative in selected partner countries where FMI is also active, FRC has been able to develop a coordinated response between meteorological and Disaster Risk Reduction cooperation in Nepal (FNEP III), and in Kenya, Rwanda and Tanzania (FINKERAT) for the first time.

4.3 Finnish added value in the results

To assess Finland's added value, the evaluation adopted certain criteria to support its findings under this section. They are: (i) the unique or complementary 'strategic' value of Finland's cooperation compared to its peers in this sub-sector that others did not bring (i.e. what was distinctive about Finland's cooperation in the sub-sector); (ii) the 'operational' value of Finland's cooperation (i.e. the way Finland has used its financial instruments available to develop long-term partnerships dedicated to capacity and institutional building at the public, private and non-governmental levels; (iii) the 'normative' value of Finland's cooperation (i.e. capacity to influence policy reform).

Summary answer to EQ 1.4 - Finland's Added Value

Finland's added value in the Disaster Risk Reduction and Meteorology sub-sector is demonstrated through its ability to combine high-level meteorological expertise, modernisation of National Hydro-Meteorological Services observation networks with Finnish technology, forge strategic partnerships with civil society organisations that have global networks in place, and stable core funding to United Nations Office for Disaster Risk Reduction. Moreover, the full integration of Finland's cross-cutting objectives adds significant value by delivering results that are inclusive, rights-based, and equitable. However, Finland's added value cannot be fully optimised while it continues to apply fragmented approaches to meteorological and Disaster Risk Reduction cooperation and not cross-cut other strategic sub-sectors in Environment and Natural Resources, in particular the delivery of inclusive and equitable water and climate action.

Finding 13: Finland's ability to leverage its expertise in meteorology, use the Public Sector Investment Facility to provide unique public access to Finnish technology, commitment to developing long-term partnerships with civil society organisations, apply a mix of unearmarked and earmarked core funding to UNDRR and application of its cross-cutting objectives have demonstrated its ability to add significant strategic, operational and normative value to its cooperation that is not practiced by any other like-minded peer country.

Finland's added value in the Disaster Risk Reduction and Meteorology sub-sector has been exemplified by its ability to draw on a range of expertise, resources, partnerships and policies to deliver results that are inclusive, rights-based and empowering at all levels. This has included the ability to deploy extensive meteorological expertise from FMI, use of the PIF instrument to modernise weather observation equipment, partner with CSOs like FRC/IFRC that have already have extensive networks in place in partner countries and support multilateral efforts to advance Disaster Risk Reduction through UNDRR.

Interviewees confirm Finland adds significant value to its Disaster Risk Reduction and Meteorology cooperation by providing direct access to FMI's globally recognised expertise, state-of-the-art training facilities and advanced open-source software systems that are reliable, accurate and cost effective to operate. This access has repeatedly delivered demanded improvements in weather forecasting, climate data analysis, early warning systems, air quality alerts and aviation meteorology in over 40 countries to date. For example, through the FNEP I-III project, FMI has provided the Department of Hydrology and Meteorology with extensive, hands-on training that has enabled the Department for Hydrology and Meteorology to produce and transmit accurate and timely weather forecasts that have enhanced disaster preparedness to hazards such as floods and landslides.

Similarly, joint training exercises and cross-border forecasting in Central Asia and East Africa respectively has also demonstrated Finland's added value in strengthening cross-border cooperation, which is key to developing sub-regional and seasonal forecasting services for the first time. Finally, in fragile and war-torn countries such as Ukraine, FMI has demonstrated Finland's added value by providing a combination of services and support that has included modernising the country's weather and air quality monitoring network (including replacement of equipment damaged by Russian aggression), supporting Ukraine's participation in EU early warning initiatives and providing solidarity in times of adversity to strengthen morale in the National Hydro-Meteorological Services to ensure strategic interests (especially food security and nutrition) are protected.

Likewise, deployment of Vaisala Oyj, has shown how Finnish development cooperation can leverage high quality, globally acclaimed weather observation equipment - automatic weather stations (dual-polarisation Doppler radars), lightening detection systems and air quality sensors, and other equipment that is crucial to optimising the use of FMI's SmartMet/SmartAlert system and transformative outcomes in partner countries like Ethiopia, Vietnam and Ukraine. Indeed, Vaisala Oyj is one of only a small number of companies globally that can mobilise such a wide range of weather observation and air quality monitoring equipment. That is crucial to forecasting extreme weather events.

Finland's added value in Disaster Risk Reduction has been clearly demonstrated through its partnership with FRC, which harnesses access to IFRC's in-depth expertise and networks of trusted local partners that no other civil society actor has at neither the national, nor sub-national levels. Furthermore, FRC's long track record in community-based Disaster Risk Reduction has enabled Finland to advance ownership of Disaster Risk Reduction initiatives and increased trust local governance structures. For example, in countries like Kenya and Zimbabwe, FRC's presence has helped build institutional systems that are people-centred.

At the multilateral level, Finland's added value lies in its ability to use core funding to leverage strategic influence on the integration of its principles in the global agenda for Disaster Risk Reduction. These centre on integrating its cross-cutting objectives promoting gender equality, human rights, democracy and disability inclusion not only through UNDRR, but in all aspects of Finland's Disaster Risk Reduction and Meteorology cooperation. Finland's added value in this regard is the integration of its cross-cutting objectives from the design phase of projects in the Disaster Risk Reduction and Meteorology sub-sector to ensure results are inclusive, equitable and empowering. This has resulted in Disaster Risk Reduction and Meteorology cooperation that: (i) ensures its expertise and training services are accessible, relevant, and responsive to all groups of society in the interests of enhancing good governance, equality and local ownership of results; (ii) stimulates institutional strengthening and community-based Disaster Risk Reduction strategies that value local knowledge and practices; (iii) delivers alerts and warnings through communications that local people understand and trust to take informed decisions on disaster preparedness and response.

Finding 14: Finland's strategic, operational and normative added value remains constrained by the lack of integrated and multisectoral approaches to disaster risk reduction and meteorological cooperation limiting its ability to scale up its contribution to climate resilience.

Drawing on the findings above an important caveat that is affecting Finland's capacity to add value in the Disaster Risk Reduction and Meteorology sub-sector concerns, first, insufficient levels of coordination between Finland's meteorological and Disaster Risk Reduction initiatives (assumption from inputs/instruments to short-range results in the theory of change). For example, at the civil society level the IFRC and the WWF, as international non-governmental organisations, have an agreement

in place at the global level since 2022, which includes commitments to address longer term resilience and disaster preparedness (IFRC, 2022). This has included advocacy to advance nature-based solutions in disaster risk reduction and climate change adaptation initiatives. Similarly, the FCR confirms collaboration with FMI has resulted in the development of coordinated action in East Africa through the FINKERAT project and in Nepal through the FNEP project. Nonetheless, there is general agreement that more needs to be done to enhance Finland's 'strategic' and 'operational' added value before the fragmented approach in the sub-sector can be fully addressed. This also appears to be a prerequisite to opening up coordinated advocacy to advance policy reforms at all levels approaches though which Finland can demonstrate its 'normative' added value, which is currently lacking in this sub-sector. Second, insufficient levels of effective coordination with strategic sub-sectors like Water as a Natural Resource continues to limit Finland's contribution to scaling up inclusive and equitable water and climate action with its main partners (which includes the Finnish private sector).

4.4 Markets, competition and demand for Finnish private sector

Summary answer to EQ 2.1 - Demand and competition for Finnish private sector

The demand for Weather and Climate Information Services and Disaster Risk Reduction products and services to combat the effects of climate variability and change is growing in Finland's partner countries, especially in emerging markets like Ethiopia, Indonesia, Kenya and Vietnam. Finland's Disaster Risk Reduction and Meteorology cooperation provides significant evidence that there are direct and indirect revenue opportunities where the Finnish private sector has a competitive advantage to meet this demand. However, only one private sector company (Vaisala Oy) has been actively engaged in commercial activity using the Concessional Credit Scheme and Public Sector Investment Facilities, revealing major gaps exist in Finland's transition to greater private sector engagement to support the delivery of climate resilience (impact in the theory of change for Environment and Natural Resources). The use of the Concessional Credit Scheme and PIF facilities have demonstrated that they are a viable way to derisk private sector engagement, but compliance on the heavy and very long bureaucratic processes required to secure funding confirm that they have are not dynamic financial instruments that have helped speed up Finland's commitments to the Sustainable Development Goals. Meanwhile, the use of MFA's private sector instruments to support Finnish private sector engagement in the Disaster Risk Reduction and Meteorology sub-sector was not evident, although Finnpartnership has supported one company (Temet Oy) engage in two inter-related humanitarian aid-projects in which Disaster Risk Reduction was a field of activity.

Finding 15: The use of the Concessional Credit Scheme in Vietnam and the Public Sector Investment Facility in Ethiopia has demonstrated a viable way to de-risk Finnish private sector engagement in the modernisation of weather observation infrastructure, which is an important prerequisite for the delivery of improved weather and climate services using Finnish Meteorological Institution's SmartMet/SmartAlert system.

Finnish private sector engagement in the Disaster Risk Reduction and Meteorology sub-sector has been very low. Apart from one company making use of Finnpartnership's support in two

humanitarian projects that it classifies as support to Disaster Risk Reduction (see private sector engagement Intensive Study on Finnpartnership in the synthesis report), all private sector engagement has been promoted through the Concessional Credit Scheme and PIF facilities involving two countries, Vietnam and Ethiopia respectively. Equally, the evaluation identified no evidence of participation of Finnish companies in the EU's Global Gateway/Team Europe Initiative initiatives in the Disaster Risk Reduction and Meteorology sub-sector to date (see private sector engagement Intensive Study on Global Gateway and private sector engagement like-minded peer country study of the GG in Sweden and Denmark in the synthesis report). In the case of the Nepal Green Recovery Team Europe Initiative (see sub-section 3.5) this project has, however, been designed to support the achievement of Outcomes 1, 2, 4 and 5 in the theory of change for the Environment and Natural Resources Priority Area and which support the achievement of long-range results 1 and 4 in the theory of change in Figure 1.

The moderate and intensive studies conducted on the PIF and Concessional Credit Scheme projects in Ethiopia and Vietnam respectively provide evidence, nonetheless, that the blending of concessional credit and grants has been a highly effective way of procuring Finnish private sector equipment and expertise to support the modernisation of the National Hydro-Meteorological Service's national weather observation networks. In particular, it allows the Finnish private sector to reduce the risks of entering developing countries by sharing up-front costs. Nonetheless, three limitations were identified from the use of the Concessional Credit Scheme and PIF in the Disaster Risk Reduction and Meteorology sub-sector.

First, the Concessional Credit Scheme/PIF have been very slow to conclude, usually taking over 3 years between proposal and the release of funds. Interviewees confirm the regulations governing the loan agreements, national regulatory and legal conditions on procurement of equipment, and project design and coordination requirements involve long and rigid bureaucratic processes to be fulfilled before the project can be approved by MFA for funding. Currently, only one large Finnish company (Vaisala Oy) has successfully secured the know-how to complete these processes and secure funding from the Concessional Credit Scheme/PIF and suggests medium and small-sized companies from Finland would be unlikely to have the financial resources to cover the three or more years required to secure funding.

Second, the Concessional Credit Scheme/PIF require the launch of a call for proposals through which Finnish companies are open to submit a bid. However, in the Disaster Risk Reduction and Meteorology sub-sector this has focused exclusively on the modernisation of national weather observation equipment in the above-mentioned countries, for which only one Finnish company has the capacity and equipment to fulfil the requirements of the call. As a result, the implementation of the Concessional Credit Scheme/PIF projects has relied heavily on one large Finnish company (Vaisala Oyj). Interviews confirm this is primarily because Vaisala is the only Finnish company that has the capacity, range of weather observation equipment required and ability to train government staff on its installation operation and maintenance, as well as provide long-term after sales support.

Third, both the Concessional Credit Scheme and PIF projects have been designed to support FMI's public-public cooperation with the National Hydro-Meteorological Services. This has facilitated the application of FMI's SmartMet/SmartAlert system to generate weather forecasts and warnings in Vietnam and Ethiopia but they have not been used in conjunction with other instruments through which public-private engagements and public-private partnerships could be promoted. For example, there is no evidence that the Concessional Credit Scheme and PIF projects have prompted demand for custom-made weather and climate information services, or products and services that would support climate resilience over the medium to long term in key sectors such as Water

as a Natural Resource, Forests, Ecosystems and Biodiversity, renewable energy, Public Works and Health (impact in the theory of change of the Climate and Natural Resources Priority Area).

Finnpartnership has supported during the evaluation's time period one company, Temet Oy, in two inter-related projects that Finnpartnership classifies as belonging to the sector 'humanitarian aid' and Disaster Risk Reduction as their 'field of activity'. In these projects, Temet Oy has pursued civil shelter solution business growth in India and piloted a civil shelter solution there. Prior to the Finnpartnership project, Temet Oy had been doing business in India for over 10 years but their customers had been from the defence administration. With the Finnpartnership project, they were seeking new customers in fields such as petrochemical production plants and nuclear power plants. Temet had previously worked with a reseller in India, but around the time of the second Finnpartnership project in 2020, the company established a subsidiary in the country. While successful projects both from the perspective of the company and development outcomes (advancing the protection of functions that are vital to the population and society in the event of a crisis or accident), these Finnpartnership projects are not connected to any other Finnish involvements in the market (see private sector engagement Intensive Study on Finnpartnership in the synthesis report, and https://finnpartnership.fi/en/ajankohtaista/the-expertise-and-innovation-of-finnish-housebuilding-and-infrastructure-brings-success-in-african-countries-and-india/).

Finding 16: The demand for Weather and Climate Information Services and climate smart technologies is increasing globally to combat the effects of climate change, air pollution and other hazards. Finnish private sector engagement provides products and services that helps to meet that demand.

Triangulated evidence confirms Vaisala's automated weather observation equipment and air quality sensors are highly popular with the National Hydro-Meteorological Services in Vietnam and Ethiopia. This appears to have promoted a positive image that Finnish businesses are associated with high quality, reliable, low maintenance and long-lived equipment, which in the weather and climate market is crucial to developing and sustaining real-time, data-driven weather forecasting services.

However, the evaluation found no evidence that Finland has capitalised on this development to meet the growing demand for Weather and Climate Information Systems tailored to the needs of the public and private sector in strategic areas like water, agriculture, forestry and energy. This was triangulated through the analysis of several documents. For example, in 2016 the UNDP Market Assessment Report found that tailored weather information products and services provided by private companies were growing rapidly, signifying a growing demand for these products globally among fee-paying businesses and customers (UNDP, 2016). The report also found that this growth had been aided by improvements in the quantity and quality of hydrometeorological data provided by the National Hydro-Meteorological Services, confirming that an important outcome of strengthening the National Hydro-Meteorological Services is the stimulation of private sector weather and climate services that generate high levels of revenue, but which the National Hydro-Meteorological Services do not benefit from. The report concluded, therefore, that the strengthening of the National Hydro-Meteorological Services should include measures to, "collaborate rather than compete with private sector weather companies and embark on phased, slow transitions into entities that derive benefits from the national commercial weather markets."

This UNDP report's conclusion is based on the assumption that the National Hydro-Meteorological Services have the capacity and business skills to develop collaboration and joint ventures with private sector companies engaged in weather and climate products and services. However, the sample of projects and institutions studied provide strong evidence that this is not the case,

confirming some caveats exist in the assumptions underpinning the theory of change in Figure 1. For example, the needs assessments conducted by FMI in the design and implementation phases of the ICI projects are not conducted in association with Finland's other specialised agencies (for example, Luke, VTT, Syke), or private sector platforms (for example the Finnish Water Forum), to identify the business skills that could be deployed to secure the long-term sustainability of the National Hydro-Meteorological Services (and which may include legal reforms where relevant to do so).

Furthermore, where ICI projects have included the development of tailored services within the National Hydro-Meteorological Services (FNEP III, PROMOSERV III, FINKERAT), the evaluation found the training emphasis has retained a strong public-public approach, thus restricting the opportunity for the Finnish private sector to collaborate in the development of niche services, and which could be promoted through synergies with Finnpartnership or Finnfund. As a result, the evaluation found **this to be a major gap in the arrangements for sustaining the development of the National Hydro-Meteorological Services and promoting innovation in the Disaster Risk Reduction and Meteorology sub-sector** (see also Section 3.2.3). In particular, the evaluation found this has largely precluded the National Hydro-Meteorological Services from establishing key services that private weather and climate companies will need to develop their business model. For example, the evaluation identified the need for customised training courses, certification services to ensure the private sector comply with WMO standards, development of risk mapping products, and incubator services, among others.

The evaluation also identified substantial opportunities for Finnish private sector engagement in the ARISE initiative of UNDRR, given its national and sub-regional private sector-led networks (comprising public, private, non-governmental and academic institutions) are growing and supporting the achievement of targets under all seven pillars of the Sendai Framework. However, the evaluation found no evidence to confirm that the Finnish private sector has been involved in these networks to support the implementation of ARISE-funded initiatives. Interviewees confirm that this has not been aided by the current lack of synergies established between Finland private sector support instruments and MFA's core funding to UNDRR, in particular, the provision of earmarked core funding specifically targeting Finnish private sector engagement in the ARISE initiative in countries where FMI is active.

Finding 17: Opportunities for Finnish private sector engagement in Disaster Risk Reduction and Meteorology cooperation have relied heavily on projects that promote proactive commercial private sector engagement (from the design phase). Opportunities for reactive indirect revenue in the sub-sector are, however, not resulting in new business.

An analysis of the current state of Finnish private sector engagement in the sample of projects and initiatives selected for this sub-sector evaluation was conducted, based on a re-assessment of the proformas produced on the project sample (see Table 2), interviews, online analysis and cross-examination with the evaluation team's private sector engagement expert. The results of this analysis are summarised in Table 3.

Table 3 Finnish private sector engagement opportunities that were agreed/missed in the project sample

NAME OF INITIATIVE	INSTRUMENT USED	COUNTRY/ REGION	TYPE OF ENGAGEMENT	PRIVATE SECTOR ENGAGEMENT AGREED/ MISSED	TYPE OF REVENUE OPPORTUNITY	GENERATED REVENUE (Y/N)
1. PROMOSERV I-III Promoting Modernisation of Hydrometeorological Services in Vietnam	ICI and Concessional Credit Scheme	Vietnam	**Proactive**	Agreed	Direct and indirect revenue (equipment and services)	Yes
2. VIETADAPT – Developing and Implementing Climate Change Adaptation Measures at Local Level in Vietnam	ICI	Vietnam	Reactive	Missed	Indirect revenue	No
3. PROMOAIR – Modernisation of Air Quality Systems in Urban Areas	ICI	Vietnam	**Proactive**	Agreed	Direct and indirect revenue (equipment)	Yes
4. PIF Ethiopia - Improving meteorological observation infrastructure and forecasting capabilities of the National Meteorological Agency (NMA)	PIF	Ethiopia	**Proactive**	Agreed	Direct and indirect revenue (equipment and services)	Yes
5. FINKMET - Capacity Building in the Field of Meteorology	ICI	Kyrgyzstan	**Proactive**	Agreed	Direct and indirect revenue	Yes
6. FINTAJ - Capacity Building in the Field of Meteorology	ICI	Tajikistan	**Proactive**	Agreed	Direct and indirect revenue	Yes
7. INDFIN - Enhancing BMKG's Capacity on Weather Climate and Air Quality Forecast and Warnings[12]	ICI	Indonesia	**Proactive**	Agreed	Direct and indirect revenue (equipment)	Yes
8. UFIM - Meteorology cooperation in Ukraine	ICI	Ukraine	**Proactive**	Agreed	Direct and indirect revenue (equipment)	Yes
9. FINKERAT - Towards climate change resilient societies in Kenya, Rwanda and Tanzania	ICI	East Africa	**Proactive**	Agreed	Direct and indirect revenue	Yes
10. UNDRR – Support to the UN Office for Disaster Risk Reduction	Core funding	Unspecified	**Proactive** and reactive	Missed	Direct and indirect (ARISE)	No
11. FNEP – Improved response capability to weather-related natural hazards	ICI	Nepal	**Proactive**	Agreed	Direct and indirect revenue	Yes

12 BMKG a non-ministerial Indonesian government institution responsible for weather, climate, and geophysical monitoring and forecasting, and for early warnings related to these factors, such as floods, droughts, earthquakes and volcanic eruptions.

NAME OF INITIATIVE	INSTRUMENT USED	COUNTRY/ REGION	TYPE OF ENGAGEMENT	PRIVATE SECTOR ENGAGEMENT AGREED/ MISSED	TYPE OF REVENUE OPPORTUNITY	GENERATED REVENUE (Y/N)
12. Systematic Observations Finance Facility (SOFF)	Multilateral funding	Unspecified	**Proactive**	Agreed	Direct and indirect business	Yes
13. FRC – Multi-country Development Programme	Programme-based support	Global	Reactive	Missed	Indirect revenue	No
14. GTK/AGS - Support to Afghanistan Geological Survey	ICI	Afghanistan	Reactive	Missed	Indirect revenue	No
15. VTT/CPCB – Capacity Building for Emission Measurements in India	ICI	India	Reactive	Missed	Indirect revenue	No
16. CLIMOB – Climate Modelling and Observations in India	ICI	India	**Proactive**	Agreed	Direct and indirect revenue	Yes
17. SHSB - Strengthening hydro-meteorological services for Bhutan	ICI	Bhutan	**Proactive**	Agreed	Direct and indirect revenue	Yes
18. Promote Sustainable Livelihoods and Responsible Attitude to Environment (UNDP)	Multilateral support	Georgia	Reactive	Missed	Indirect revenue	No
19. FINPAC – Finnish-Pacific project Climate Change Adaptation (National Meteorological Services) in Oceania	Bilateral institutional	Pacific Islands	**Proactive**	Agreed	Direct and indirect revenue	Yes

Private sector = For-profit Finnish companies.

Proactive = Implementing partners/public sector bodies/multilaterals actively seeking/open to Finnish private sector engagement

Reactive = Unforeseen need for Finnish private sector engagement by the partner country in the implementation/post closure phases

Agreed = Finnish private sector engagement was officially contracted

Missed = Finnish private sector engagement was not identified by the partner country despite a proactive/reactive opportunity

Direct revenue = Primary products and services provided by the Finnish private sector to generate revenue/profits

Indirect revenue = Secondary products and services provided by the Finnish private sector to meet on-demand needs (technical assistance, invoiced products and services, knowledge transfer, research, etc.)

Gained funding = funding from one or more of Finland's financial instruments.

Source: Evaluation team; Project documentation and official websites

The main results identified from Table 3 are summarised as follows:

- A total of 14 projects were identified as providing proactive engagement opportunities for the Finnish private sector. However, only two projects involved a major commercial partnership that generated revenue (projects 1 and 4 in Vietnam and Ethiopia), while other projects involved smaller-scale procurement of equipment and services paid for from ICI funds. Meanwhile, two multilateral initiatives were identified as providing proactive private sector engagement opportunities (initiatives 10 and 12) with evidence of direct and/or indirect revenue from one of these initiatives to Finnish companies to date.
- The remaining of the (5/19) were identified as providing reactive private sector engagement opportunities for the Finnish private sector to generate indirect revenue, particularly in the form of invoiced technical, research and development, or financial services, to support the implementation, sustainability and expansion of Disaster Risk Reduction and Meteorology initiatives. However, there is no evidence that any of these opportunities have generated revenue, indicating gaps remain in coordinating Finland's private sector instruments to promote complementary private sector engagement in the Disaster Risk Reduction and Meteorology sub-sector.

4.5 Foreseen gains and benefits for Finnish companies in development cooperation

Summary answer to EQ 2.2 - Potential gains for Finnish companies and development cooperation

The potential gains and benefits that could be generated from private sector engagement in the Disaster Risk Reduction and Meteorology sub-sector are likely to remain limited to Public Sector Investment Facility projects and some isolated small-scale Finnpartnership projects, if the sub-sector remains siloed and unable to play a pivotal role in supporting the other sub-sectors in the Environment and Natural Resources Priority Area achieve climate resilience (impact in the theory of change for Environment and Natural Resources). Moreover, the absence of a business strategy, business platform and suitable financial instruments for the Disaster Risk Reduction and Meteorology sub-sector make it very challenging for Finnish companies to exploit direct and indirect revenue generating opportunities where it has capacity (such as data-driven services) and could deliver tangible socio-economic and environmental co-benefits in strategic sectors like Water as a Natural Resource, Forests, Ecosystems and Biodiversity and renewable energy. Despite this situation, opportunities to participate in promising public-private partnerships exist at the multilateral level through the Private Sector Alliance for Disaster Resilient Societies (ARISE), Systematic Observations Financing Facility (SOFF)/ Early Warnings for All (EW4All), and Global Gateway/ Team Europe Initiative initiatives, all of which are operational in Finland's partner countries in Africa and Asia.

Finding 18: The potential gains for Finnish private sector engagement in the Disaster Risk Reduction and Meteorology sub-sector are likely to remain limited until the sub-sector breaks out of its silo to support coordinated climate and water action linked especially to the provision of weather and climate-related products and services that support climate resilience.

The findings under Section 4.1and 4.2 confirm Finland's cooperation in Disaster Risk Reduction and Meteorology sub-sector has remained firmly entrenched in highly specialised public-public cooperation and core funding, which stakeholders agree has contributed to maintaining Disaster Risk Reduction and Meteorology cooperation in a silo. As a result, cross-sector dialogue and co-operation in some key areas like climate and water action, or development of tailored weather and climate services for strategic sectors (especially linked to water, agriculture, forestry, renewable energy, public works and health) have not materialised. This has provided a strong message to the Finnish private sector that opportunities to generate revenue in the Disaster Risk Reduction and Meteorology sub-sector are – for other companies than Vaisala – low, especially as there is no private sector engagement strategy in place to guide investment in the Environment and Natural Resources Priority Area (see Finding 17).

Nevertheless, the partnerships established between the National Hydro-Meteorological Services of Vietnam (see Annex 3) and Ethiopia, FMI and Vaisala Oy have demonstrated that the Finnish private sector can generate direct revenue gains in the Disaster Risk Reduction and Meteorology sub-sector (Finding 17). This would suggest public-private partnerships could also be used by FMI's sister agencies (GTK, Luke, Syke, VTT, etc.) to develop Finnish private sector engagement in the delivery of complementary services that are in high demand in Finland's partner countries. These include data analytics and Artificial Intelligence (AI) solutions linked to climate modelling (VTT), climate smart agri-systems and drone monitoring (Luke), groundwater and soil monitoring systems (GTK), flood-risk monitoring and climate insurance (Syke), and are crucial to supporting informed economic investment decisions at all levels.

To assess the viability of stimulating public-private partnerships through multilateral initiatives supporting Disaster Risk Reduction, early warnings and climate resilience online analysis and interviews were carried out by the evaluation. They confirm that public-private partnerships are widely used and/or planned to advance climate resilience in which private sector engagement from countries like Finland is feasible. For example: (i) the Global Gateway/Team Europe Initiative Climate Change Adaptation and Resilience in Africa (EU, 2022) foresees the use of public-private partnerships to deliver a range of products and services linked to data and risk analysis, development of multi-hazard early warning systems, adaptation finance, insurance and resilient infrastructure; (ii) the SOFF secretariat actively promotes and facilitates public-private partnerships to expand weather and climate observational data systems in least developed countries and small island developing states. This includes the launch of the SOFF Impact Bond (SOFF, 2025), which aims to mobilise up to USD 200 million of blended finance to accelerate the coverage of these systems in as many least developed countries and small island developing states as possible by 2030; (iii) The Africa Climate Resilient Investment Facility (AFRI-RES), which has supported a large number of public-private partnerships in Africa to invest in resilient infrastructure initiatives in sectors like water, agriculture, energy and transport.

In the above examples, the evaluation also identified that public-private partnerships offer the FMI the opportunity to outsource some of its services, such as: (i) development of its SmartMet/SmartAlert system following initial installation and training by FMI, thus freeing up resources to support the National Hydro-Meteorological Services on upscaling and out-scaling tailored services in

accordance with the priorities of the partner country, in particular to support implementation of their National Adaptation Programme of Action (in least developed countries), or National Adaptation Plan; (ii) identification of innovative ways to recover the public cost of providing tailored weather and climate services that do not deter users from paying for these services, such as deferring fees until users have received the economic benefits of these services and can pay for them; and (iii) delivery of Finland's cross-cutting objectives, including the integration of Disaster Risk Reduction, to establish inclusive services that meet the needs of vulnerable groups.

Finding 19: The potential economic gains from public-private partnerships are likely to be far higher than Finland's current investment levels in the Disaster Risk Reduction and Meteorology sub-sector, indicating the return on investment could be attractive to the Finnish private sector.

A major disincentive for Finnish companies to engage in public-private partnerships in Disaster Risk Reduction and Meteorology is the general lack of information on the economic benefits that public-private partnerships have generated in this sub-sector. This has helped reinforce the perception within MFA and its main stakeholders that the space for private sector engagement in this sub-sector is low, reinforced by the above-mentioned siloing of Finland's Disaster Risk Reduction and Meteorology cooperation within narrow public-public and public-CSO contexts. Following an online review of market studies on public-private partnerships investing in development resilience in developing countries together with remote interviews, the evaluation found significant evidence to confirm that public-private partnerships promoting climate resilience generate not only financial and economic gains, but also human, social, physical and environmental gains that are crucial to sustaining economic growth and people's livelihoods. For example:

- The IFRC report, *Companies and Climate Resilience – mobilising the power of the private sector to address climate risks*, identified two entry-points where IFRC could partner with the private sector to generate revenue from climate resilience. First, in diagnosing climate risk for their supply chains as well as for the frontline communities that service that supply chain through vulnerability analysis. Second, services that broaden the private sector's understanding of climate resilience, notably on how human, social, environmental, physical, financial and political capital assets form integral parts of a successful enterprise risk management system (i.e. the building blocks to private sector resilience), (IFRC, 2019)
- The World Bank Group study, *Lifelines – The Resilient Infrastructure Opportunity* emphasises the importance of tailored weather and climate information services in helping public-private partnerships to take informed decisions on the design and construction of climate resilient infrastructure, or nature-based solutions to safeguard key development sectors and public services (water, power, transport). The report also determined that climate-resilient infrastructure in developing countries yields a net benefit of at least USD 4 for every USD 1 invested, indicating total net gains of public-private partnerships could amount to USD 4.2 trillion (World Bank, 2019).
- The Swiss Re Foundation reported public-private partnerships are the key to countering severe community losses and narrowing the large protection gap in Asia. For example, by enhancing reinsurance capacity within the Thai National Rice Insurance scheme, over 2 million small and medium-sized rice farmers were protected from crop losses before harvest. In 2019 farmers received a payout of almost USD 50 million to cover flood damage, demonstrating the direct impact of such schemes on maintaining

social and economic stability at the local and national levels. The report concluded, "The assessment of public assets must also take into account the value of natural assets, in terms of both revenue and resilience value - for example, coral reefs provide an estimated USD 36 billion in tourism-related revenue, but deliver more than seven times that value in resilience and protection benefits." (Swiss Re, 2022).

- The World Economic Forum published a White Paper in 2022, entitled *Scaling investments in nature - the next critical frontier for private sector leadership* in which it determined investment in nature-based solutions generates "economic and social benefits that reach far past its ecological imperative." In particular, it found resilience and adaptation are enhanced significantly through investment in the protection and restoration of natural ecosystems, because healthy ecosystems are crucial to delivering multiple benefits (extreme weather mitigation, food security, disease control, climate regulation). It concluded that investing in nature's protection and restoration is one of the soundest investments available globally and calculated over USD 10 trillion in new business opportunities could be created by 2030, with the potential to generate over 395 million jobs (World Economic Forum, 2022).

In addition, to the above, a 2023 Global Facility for Disaster Reduction and Recovery/World Bank report analysed the functioning of international (mainly multinational) private sector actors in Africa within the framework of national and regional hydrometeorological projects. Among its findings was that, "public-private partnerships are now familiar to both public and private actors within the hydrometeorological field, but public-private engagements are still somewhat unknown and sometimes understood as forms of public-private partnership. Important conceptualisation and dissemination of information remains to be done on issues of adherence to values, sustainability of actions undertaken, the various forms of 'co-responsibility' for the realisation and completion of projects and the need for all stakeholders to work towards a common end-user goal objective." In response, it provided recommendations on meteorological cooperation grouped in three categories: (i) create an enabling environment for public-private engagement for improved service provision for hydrometeorological and Early Warning System in sub-Saharan Africa; (ii) promote public-private partnerships and public-private engagements in hydrometeorological and Early Warning System in sub-Saharan Africa and; (iii) foster the development of the private sector and local enterprises (GFDRR, 2023).

Finding 20: The delivery of improved early warning systems has reduced disaster-related mortality, but not the number of people affected by natural hazards, indicating that public and multilateral actors will need greater engagement of private and non-state actors.

The projects that have established partnerships between the National Hydro-Meteorological Services, FMI and FRC have shown that the community-centred approaches to Disaster Risk Reduction deliver tangible socio-economic benefits, which are directly supporting Finland's beneficiary countries make important progress not only on achieving Sendai Framework for Disaster Risk Reduction and SDG targets (Finding 10) but also in terms of advancing knowledge, equality and empowerment to take informed decisions. This aligns with current thinking in the Global Platform for Disaster Risk Reduction that, "communities are not just passive recipients of warnings but active agents in shaping, communicating and responding to risk" (UNDRR/GPDRR, 2025). Consequently, a key element of Weather and Climate Information Systems is that they should be tailored to the needs of the beneficiary (public, private or non-state actors) to deliver change that reduces vulnerability and enhances resilience (impact in the theory of change in Figure 1).

Nonetheless, despite the reduction in the number of disaster-related fatalities, the number of people affected by extreme weather events has increased globally (UNDRR, 2023), indicating that there are gaps in developing the Disaster Risk Reduction value chain (see Figure 7). In particular, these gaps highlight the need for greater private sector and CSO engagement as stated by IFRC in Finding 19, if the benefits of longer-term climate resilience are to be delivered (i.e. more sustainable and inclusive development). Indeed, FRC recognises that even although Early Warning System and community-based Disaster Risk Reduction strategies help communities react faster to extreme weather alerts there is a need for "multi-actor partnerships" to turn warnings into effective and inclusive early action that supports resilient development over the long-term (FRC, 2025).

The evaluation also found evidence that another important gap in the Disaster Risk Reduction value chain is the lack of effective communication to decision-making audiences on the socio-economic benefits of disaster reduction. For example, despite Sendai Framework for Disaster Risk Reduction studies confirming that every USD 1 invested in disaster risk reduction (Disaster Risk Reduction) can save up to USD 15 in disaster recovery and rehabilitation costs (UNDRR, 2015) and expansion of the disaster loss accounting system (DesInventar) across 110 countries (UNDP/WMO/UNDRR, 2023), decision-makers are not capitalising on data-driven communications to ensure that public and private investment decisions factor in the costs of disasters and the benefits of risk mitigation in financial modelling. According to UNDRR, this situation is worsened by the fact that, "not all countries… collect and use disaster data systematically and there are major disparities across countries regarding methods, coverage and system governance, creating barriers to effective risk management." (UNDRR, 2025).

This situation suggests there is considerable scope for Finnish private sector engagement in supporting the development of disaster loss data services for a range of clients at the public, private and non-state actor levels to support the development of the Disaster Risk Reduction value chain, (in line with IFRC's proposal to fully integrate climate risk in the supply chains of these actors). Moreover, this would appear to open up private sector engagement in related areas, such as the design of resilient infrastructure, application of climate smart technologies, community/group-based insurance and reinsurance schemes, and the development of phone applications to advance climate resilience, especially among vulnerable groups like youths and people with disabilities. Indeed, this service could build on existing applications like the Climate-Smart Agriculture Compliant (CSAC) application developed for small island developing states in the Caribbean.

Finding 21: Cutting Finland's bilateral country programmes and ODA in general is likely to further reduce the scope for Finnish private sector to make gains from potential niche markets in the Disaster Risk Reduction and Meteorology sub-sector.

A wide range of interviewees confirm that the ongoing cutbacks in Finland's Development Cooperation since 2024, are likely to produce a number of negative impacts that will have implications as to how far the Finnish private sector will be able to engage at the bilateral level to support advances in climate resilience in Finland's partner countries. These cuts aim at a reduction of over EUR 500 million in Finland's development programme, that include the closure of Finland's bilateral programmes in a number of partner countries such as Kenya, Mozambique and Myanmar and reductions in cooperation in the majority of other partner countries and cooperation instruments (MFA, 2024). This has implications for the capacity of MFA, its embassies and specialised agencies to identify niche markets where demand for Finnish private sector engagement in the Disaster Risk Reduction and Meteorology and other sub-sectors of Environment and Natural Resources is likely to be greatest.

Under these circumstances, the following gaps will need to be addressed by MFA and its partners before Finnish private sector engagement can be justified in Finland's bilateral development cooperation in the Environment and Natural Resources Priority Area and in the Disaster Risk Reduction and Meteorology sub-sectors, in particular, of Environment and Natural Resources. The main gaps identified are:

- **Gap 1:** At the political and policy level, there is a lack of formal integration of Disaster Risk Reduction and Meteorology within Finland's broader development cooperation for the Water as a Natural Resource, Forests, Ecosystems and Biodiversity, and Energy, Circular Economy and Critical Minerals sub-sectors. Disaster Risk Reduction and Meteorology continue to be treated as a standalone "sub-sector" in the theory of change rather than a cross-cutting objective for the Climate and Natural Resources Priority Area. This is despite growing recognition that "the cross-cutting nature of Disaster Risk Reduction fosters collaboration between partners working in a wide range of operational fields" (UNDRR, 2022). As a result, Finland is not fully complying with global commitments to embed Disaster Risk Reduction and Meteorology in strategic planning, budget allocations, and sectoral policies, thus undermining opportunities to advance informed decision making on advancing climate resilience in support of the SDGs.
- **Gap 2:** At the institutional and policy level, there is little evidence of coordinated research between Finland's specialised agencies, academic institutions, the MFA and other relevant government institutions (notably the Ministries responsible for the environment and internal affairs). There is a lack of internal monitoring and research on the human, social, economic, physical, and environmental benefits of Finland's Disaster Risk Reduction and Meteorology cooperation to promote collaborative efforts to advance climate resilience in the Environment and Natural Resources portfolio. This contrasts with EU countries like the Netherlands, which has addressed this gap through the establishment of the Consortium on Climate Change Adaptation (RIVM, 2017), or Switzerland, where the Adaptation at Altitude initiative set up in 2020 brings together academic institutions, research networks, CSOs, and policy bodies to generate knowledge and adaptation capacity for mountain regions that are highly climate-sensitive and where the demand for Weather and Climate Information Systems products and services is growing (WMO, 2021).
- **Gap 3:** At the financial instrument and business development level, there is a lack of strategic linkages between Disaster Risk Reduction and Meteorology cooperation and MFA's private sector instruments, such as Finnfund and Finnpartnership. This gap has prevented Disaster Risk Reduction and Meteorology from being positioned as a viable entry point for blended finance that could engage Finnish companies in public-private engagements and public-private partnerships designed to deliver Weather and Climate Information Systems in a similar way to ICI projects, but which include the provision of tailored products and services for a wider set of clients in Finland's partner countries. Instead, current instruments like the Public Sector Investment Facility (PIF) focus narrowly on funding meteorological equipment upgrades benefiting a single firm and Global Facility for Disaster Reduction and Recovery/World Bank are not designed to develop indirect revenue opportunities and innovation through Finnish small and medium-sized enterprises operating in areas of interest to Disaster Risk Reduction and Meteorology.

4.6 The best approaches and measures to private sector engagement

Summary answer to EQ 2.3 - Most promising approaches for promoting Finnish private sector engagement

Using public and private sector instruments like the Public Sector Investment Facility to promote collaboration between the National Hydro-Meteorological Services, Finnish Meteorological Institute and the Finnish private sector is a viable approach that can be replicated to promote private sector engagement in the Disaster Risk Reduction and Meteorology sub-sector. However, certain fundamental gaps in this approach were identified. They include the lack of a private sector engagement strategy to support the delivery of Disaster Risk Reduction and climate resilience across all sub-sectors in the Environment and Natural Resources Priority Area, the absence of a suitable private sector engagement platform to support coordinated action in key areas, (notably water and climate action), and a lack of flexible and coordinated financial instruments to de-risk Finnish private sector engagement and promote complementarity between the sub-sectors under the Environment and Natural Resources Priority Area. The Netherlands and UN Office for Disaster Risk Reduction have shown through their Dutch Fund for Climate and Development and Private Sector Alliance for Disaster Resilient Societies (ARISE) initiatives that feasible models exist to engage the private sector in advancing Disaster Risk Reduction and climate resilience in strategic development sectors. Lessons learned and good practices from these models suggest: (i) the establishment of a private sector engagement strategy for the Environment and Natural Resources Priority Area; (ii) the opportunity to expand the Finnish Water Forum into the Finnish Water and Climate Forum to create a business platform for private sector engagement where demand is growing, especially for tailored weather and climate information services, the modernisation of hydro-meteorological observation networks, climate smart technologies and risk monitoring and management; (iii) the adoption of viable financial instruments and initiatives that can meet that demand, such as through MFA's Private Sector Instruments (Finnpartnership, Finnfund, Public Sector Investment Facility), through the EU's Global Gateway, the Systematic Observations Financing Facility (SOFF, supporting the installation of weather observation equipment and related services), and through the ARISE initiative.

Finding 22: The Concessional Credit and Public Sector Investment Facilities have successfully funded the installation of new weather observation and air quality monitoring equipment in Vietnam and Ethiopia, but this has involved only one large Finnish company prepared to take on the financial risk of such engagement.

The use of the Concessional Credit Scheme and PIF instruments to engage the Finnish company, Vaisala, in the modernisation of the national weather observation networks of the National Hydro-Meteorological Services in Vietnam and Ethiopia has proved to be an effective approach to developing the Disaster Risk Reduction value chain (see Figure 7 below). In line with findings under section 4.1, this approach has centred on a public-private partnership involving the National Hydro-Meteorological Services, FMI and Vaisala in which the latter had the specific task of delivering raw data through the installation of automated weather and climate observation equipment to facilitate the transition to Numerical Weather Prediction (short-range results 2, 3 and 6 in the theory of change). Meanwhile, through the PROMOSERV (and PROMOAIR) initiatives in Vietnam and through sub-contracting through the PIF in Ethiopia, FMI has supported the National

Hydro-Meteorological Services adopt the SmartMet/SmartAlert system to deliver improved weather forecasts and warnings (mid-range result 1 in the theory of change in Figure 1, which aligns with Output 1 in the theory of change for Climate and Natural Resources Priority Area). As a result, the Concessional Credit Scheme and PIF project approaches have contributed to establishing national early warning systems that have had a tangible effect on reducing vulnerability to severe weather and climatic events in both countries (impact in the theory of change). For example, in Vietnam, the National Centre for Hydrometeorological Forecasting has been providing early warnings to inhabitants to prepare for tropical storms, strong winds and heavy rains throughout 2024 (Vietnam News, 2024).

An assessment of the strengths of the Concessional Credit Scheme and PIF approaches in Disaster Risk Reduction and Meteorology sub-sector indicate the following: (i) the public-private partnership established between Vaisala, the National Hydro-Meteorological Services and FMI is a viable mechanism to promote Finnish private sector engagement, but its success depends on aligning the partnership with the company's core business model (i.e. expanding sales of its weather observation and air quality monitoring equipment); (ii) FMI promotes a long-term partnership with the National Hydro-Meteorological Services to build trust on the modernisation of its services, which may take many years to complete; (iii) FMI places a emphasis on identifying the weather forecasting needs of the National Hydro-Meteorological Services to determine how it and the Finnish private sector can respond to meeting those needs according to the resources available; (iv) FMI and Vaisala have forged a strong partnership that has kindled trust and regular communication to achieve results.

Nevertheless, the evaluation identified some gaps in this public-private partnership approach that have not been identified and addressed to date by FMI or MFA, and which may reduce the scope for scaling up climate resilience in Finland's partner countries. The most significant identified are: (i) the Concessional Credit Scheme and PIF approaches have focused only on financing one specific action (the provision of weather observation equipment and air quality monitoring sensors produced and installed by Vaisala Oy); (ii) the identification of proactive and reactive opportunities for Finnish private sector engagement agreed (see Table 3), such as Weather and Climate Information Systems to improve environmental and economic resilience (long-range results in the theory of change) and support national commitments to the National Adaptation Programme of Action/ National Adaptation Plan, was not evident; (iii) a business platform to analyse markets, establish connections, build partnerships and share information, knowledge, and ideas does not exist to identify viable business cases that are needed to scale up Finnish private sector engagement in the Disaster Risk Reduction and Meteorology sub-sector (see also Finding 24).

Finding 23: The Dutch Fund for Climate and Development, the Private Sector Alliance for Disaster Resilient Societies (ARISE), Systematic Observations Financing Facility (SOFF) and the EU's Global Gateway and Team Europe initiatives (GG/TEI) provide important information and lessons learned on how Finland could engage its private sector in the sub-sector where it has a comparative advantage.

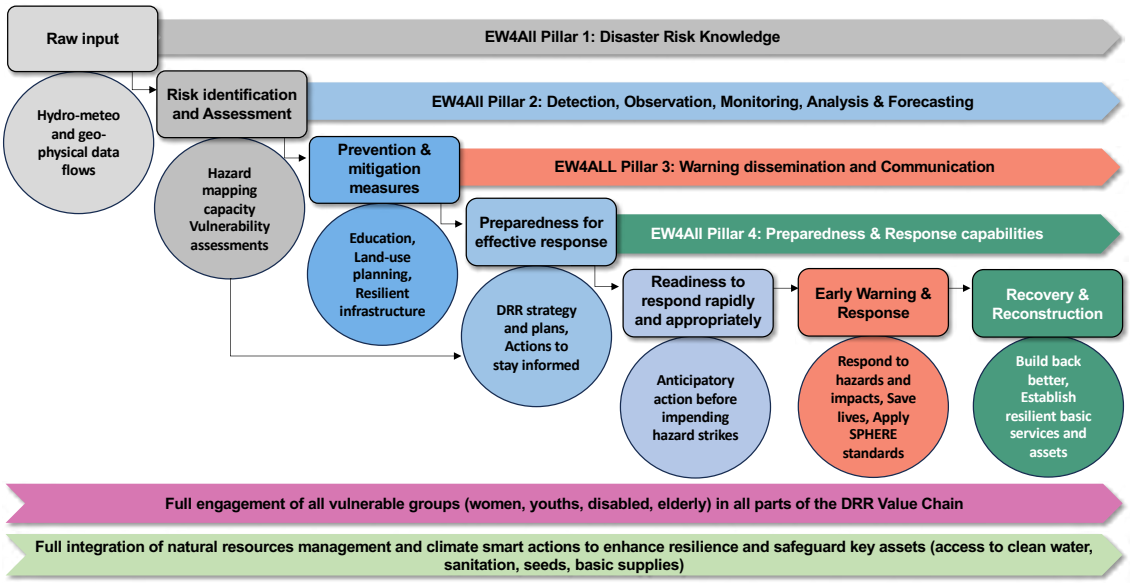
In line with the context analysis (Section 2) and the findings under Section 4.1, Finland's cooperation in the Disaster Risk Reduction and Meteorology sub-sector between 2010-2024 has mainly focused on the following approach:

- Broadening the use of the ICI instrument to encompass societal needs, such as air quality monitoring using FMI's open-source System for Integrated Modelling of Atmospheric Composition (SILAM) in major cities in developing countries.

- Engaging Vaisala Oyj from the private sector to modernise the National Hydro-Meteorological Services's weather observation infrastructure through the Concessional Credit Scheme and PIF projects in Vietnam and Ethiopia (see Table 3 above), plus ongoing design of a similar PIF initiative in Kenya.
- Supporting community-based Disaster Risk Reduction through FRC's Development Programmes, in which initiatives such as the Early Warning, Early Action have been promoted in five countries
- Providing core funding to UNDRR to support its mandate under the Sendai Framework, which includes leading Pillar 1 of the EW4A initiative.
- Providing funding and technical assistance to the SOFF following its creation by the Alliance for HydroMet Development in 2022 to support least developed countries and small island developing states in seeking to comply with the WMO's Global Basic Observing Network standards (see also Section 2).

This approach to the development of the Disaster Risk Reduction value chain (see Figure 7 below), confirms private sector engagement in the Disaster Risk Reduction and Meteorology sub-sector has focused almost entirely on the modernisation of weather observation and air quality monitoring infrastructure. Consequently, this does not amount to a robust, far-reaching private sector engagement strategy designed to engage the Finnish private sector in potential markets where it has a competitive advantage to develop direct and indirect revenue streams that support Disaster Risk Reduction and climate resilience in the Environment and Natural Resources Priority Area. This is despite the fact the demand for climate products and services is growing rapidly in emerging markets like Ethiopia, Kenya, Indonesia and Vietnam where the effects of climate variability and change are a major threat to socio-economic development.

Figure 7 The Disaster Risk Reduction Value Chain incorporating the four Pillars of the Early Warnings for All initiative



Source: Evaluation team (integrating key elements from IFRC's disaster risk continuum chart, 2025)

This finding aligns with key findings in the *Evaluation of Finland's International Climate Finance 2016-2022.* For example, it reported Finland lacks "a clear and overarching strategy for its climate financing" and that private sector engagement "remains a challenge" (p.32). This situation is surprising considering some of Finland's multilateral partners have advocated the socio-economic benefits of Disaster Risk Reduction and Meteorology cooperation and the importance of private sector engagement in delivering these benefits. These include, the launch of WMO's *Handbook for Socioeconomic Benefit Assessment of Meteorological and Hydrological Services* (2015), the adoption of the Geneva Declaration in 201913, the completion of UNDRR's studies in Sub-Saharan Africa on the *Multiple benefits of Disaster Risk Reduction investment* (2020) and creation of the Water and Climate Coalition (2020) to support the development of the weather, climate and water services value chain14.

As a result, the evaluation confirms the Environment and Natural Resources Priority Area continues to lack: (i) a private sector engagement strategy defining business strengths, weaknesses, opportunities and threats in the Disaster Risk Reduction and Meteorology sub-sector; (ii) a suitable private sector engagement platform to identify lucrative business opportunities that would support the advance of climate resilience as set out in the theory of change for the Environment and Natural Resources Priority Area; and (iii) the financial instruments and resources available to derisk private sector engagement in the Disaster Risk Reduction and Meteorology sub-sector.

This situation contrasts with Dutch cooperation, UNDRR's ARISE initiative, the WMO's SOFF initiative and the EU's Global Gateway initiatives, all of which have developed feasible business models to engage the private sector in Disaster Risk Reduction and climate resilience action in developing countries. Reference to the like-minded peer country review of the Netherlands (see Annex 2) reveals the Netherlands has adopted a private sector engagement strategy to support its commitments to climate action in its partner countries. This has resulted in the launch of two major, concrete initiatives providing business opportunities: (i) the Global Programme of the Royal Netherlands Meteorological Institute (KNMI) in 2021, designed to engage private sector engagement in the development of a range of new weather and climate services (including Weather and Climate Information Systems) in its partner countries to guide the planning and development of climate resilience in the water, agriculture and resilient infrastructure sectors; and (ii) the Dutch Fund for Climate and Development (DFCD), created by the Ministry of Foreign Affairs of the Netherlands in 2019 to support climate adaptation and resilience, particularly in vulnerable communities and landscapes. Currently, the DFCD has mobilised EUR 240 million in the form of blended finance.

Unlike MFA's current financial instruments, the DFCD has been designed to de-risk private sector engagement in climate adaptation and resilience building initiatives, (which align with long-range results 1 and 4). This is supported by the Origination Facility (EUR 70 million) managed by SNV and WWF to support technical assistance, and two investment facilities promoting resilience in the water sector (EUR 75 million) and in land use planning and management, managed by the Dutch Entrepreneurial Development Bank and Climate Fund Managers respectively (DFCD, 2025). Moreover, DFCD actively encourages the use of hydro-meteorological data to support climate adaptation and resilience building in water and land use initiatives that relate to the agriculture, infrastructure and energy sectors, among others.

13 The Geneva Declaration was adopted by WMO's Member States in 2019 to accelerate the implementation of the Sendai Framework for Disaster Risk Reduction. Although it is not a legally binding Declaration, it calls on national governments to amplify the space for convergence between the public, private and academic sectors on the development and delivery of weather forecasting, early warnings, communications, finance, etc. to advance climate resilience based on the 'leave no-one behind' principle.

14 The Water and Climate Coalition unites 10 UN organisations (including WMO) and the Global Water Partnership to promote a coordinated water and climate action to achieve SDG 6 and 13 (notably SDG 6.4-6.5 and 13.1-13.3).

The intensive study on Finland's core funding to UNDRR confirms it has also made important steps to support private sector engagement in securing the main objectives and targets of the Sendai Framework for Disaster Risk Reduction through the creation of the ARISE in 2015. The ARISE acts as a platform for private sector engagement and has adopted four main priority areas since 2022. They are: (i) strengthening the resilience of small and medium-sized enterprises; (ii) integrating disaster and climate risks into financial sector investment decisions; (iii) promoting risk reduction measures through informed decision-making, using improved data collection and forecasting application of insurance schemes, etc.; and (iv) supporting the development of resilient infrastructure, (ARISE, 2022).

Also significant is the EU's Global Gateway approach to private sector engagement supported by the creation of Team Europe Initiatives (see also sub-section 3.5). Key to this strategy is the mobilisation of EFSD, through which blended finance and de-risking guarantees are provided to attract European private investment in the EU's partner countries and sub-regions like the European Neighbourhood. This has facilitated the establishment of Team Europe Initiatives engaging in the design and installation of resilient infrastructure, climate-smart water saving technologies in the water, agriculture, forestry and other sectors, expansion of green energy, and development of business fora such as the Business Advisory Group, among others (EU Global Gateway, 2025). This has resulted in a total of 248 Global Gateway projects engaging Team Europe Initiatives to date, of which the majority are in Sub-Saharan Africa.15

It was not possible to identify reliable data on the number of projects funded by the DFCD and ARISE initiatives between 2015-2024. However, through interviews and online research, a selection of private sector engagement initiatives linked directly, or indirectly, to the Disaster Risk Reduction and Meteorology sub-sector were identified. Reference to Table 8 (see Annex 2) reveals the following main findings: (i) the DFCD is de-risking and expanding private sector engagement in a wide range of products and services to advance climate resilience in key sectors such as water, agriculture, forestry and energy sectors, among others; (ii) the DFCD's three main facilities (Origination, Water and Land Use facilities) demonstrate it has the instruments to provide blended finance according to the needs and size of the business initiative (covers small, medium and large business needs); (iii) the ARISE supports a range of climate resilience and adaptation initiatives that are data-driven and promote the uptake of global initiatives, such as the Disaster Resilience Scorecard; (iv) the ARISE supports investment in resilient infrastructure (using low carbon materials), insurance schemes and climate smart technologies to advance climate resilience in key sectors like water, energy, transport, etc.; but (v) there is no evidence of Finnish private sector engagement in the ARISE initiative, even though it is active in sub-regions like East Africa.

Finding 24: Expansion of the Finnish Water Forum into the Finnish Water and Climate Forum could provide Finland a business platform to identify potential markets, partners and customers for its products and services that support Disaster Risk Reduction and climate resilience in all sub-sectors of Environment and Natural Resources.

Finland lacks not only a strategy for Finnish private sector engagement in the Disaster Risk Reduction and Meteorology sub-sector, but also a business platform to identify potential markets, partners and customers for its products and services that support Disaster Risk Reduction and climate resilience in all sub-sectors of the Climate and Natural Resources Priority Area. Triangulated evidence indicates that, despite being considered as one of the five sub-sectors in the theory

15 A map of the latest Global Gateway projects operating at the country and sub-regional levels can be found at: https://international-partnerships.ec.europa.eu/policies/global-gateway_en

of change for Environment and Natural Resources, the Disaster Risk Reduction and Meteorology sub-sector is the only one that lacks a business platform for the Finnish private sector to identify niche markets where there is a demand for their products and services. In the interests of freeing Disaster Risk Reduction and Meteorology from its current silo within MFA and to avoid potential overlaps and duplication of roles that could emerge by setting-up a stand-alone private sector engagement platform for Disaster Risk Reduction and Meteorology projects, a more efficient and effective approach appears to lie in converting the Finnish Water Forum into the Finnish Water and Climate Forum. The Finnish Water Forum has already established a platform that brings together Finnish companies, research institutions, universities, and ministries with expertise in water issues. Its mission is to find solutions for global water challenges using Finnish know-how and technology, thus acting as a useful point of contact for Finland's partner countries who are looking to purchase this know-how and technology. However, in many cases these products and services could also directly support these country's climate action agendas and Disaster Risk Reduction strategies, particularly in Africa where the problems of water stress and flood damage are growing.

Other reasons why the conversion of the Finnish Water Forum into the Finnish Water and Climate Forum is justified are, among others: (i) it has over 130 members from the public, private and non-governmental sectors (including Vaisala) to promote cross-sector collaboration on promoting Finnish water-related technology and services globally (FWF, 2025); (ii) it specialises in forming consortia and public-private partnerships in Finland's development cooperation in the water sector; (iii) it has already coordinated with Finnpartnership to support Finnish companies de-risk their entry in developing markets which, according to GTK, helped Finnish companies to explore business opportunities and promote their technology in its managed aquifer recharge projects in Vietnam and Kenya, among others; (iv) it has helped showcase Finnish water technologies and services to Finnfund in the interests of advancing water saving and storage solutions in Finnish initiatives linked to climate and nature, especially in the agriculture, forestry, energy and public works sectors, but could also specifically target Finnfund's support to digital infrastructure development (Finnfund, 2025); (v) it participates regularly in multilateral events and initiatives linked with the Water Action Agenda that overlap with UNDRR interests and initiatives linked to climate resilience, such as Climate Risk and Early Warning Systems and Disaster Risk Reduction initiatives in river basin management (UNDRR, 2024) and; (vi) the National Hydro-Meteorological Services in Finland's partner countries have a specific department/unit for hydrology through which has synergies with the weather forecasting services department/unit, and the environmental monitoring department/unit, among others, opening opportunities for private sector engagement in areas such as flood and drought risk prevention and monitoring, as well as promoting a more coordinated approach to achieving relevant SDGs.16

Finding 25: Emerging opportunities for Finnish private sector engagement appear to be growing rapidly in a wide range of areas within the climate agenda, covering weather, water, air quality, sudden onset of disaster risk, food security, and the need for innovative climate insurance and disaster loss accounting services.

The combination of market analyses, the like-minded peer country in Annex 2, the review of private sector engagement in Annex 3 and the studies completed on a sample of Finland's Disaster Risk Reduction and Meteorology interventions (see Table 2) confirms there is an abundance of

16 The evaluation identified the following SDG targets to be particularly pertinent: These include, SDG 6.4 (increase water-use efficiency across all sectors), SDG 7.2 (increase hydropower production), SDG 13.1 (strengthen resilience and adaptive capacity); SDG 15.1 (conservation, restoration and sustainable use of terrestrial and inland freshwater ecosystems and their services, and SDG 17.6 (partnerships to enhance North-South, South-South and triangular cooperation and access to science, technology and innovation).

emerging private sector engagement opportunities in terms of sectors, initiatives and instruments. Below, areas of cooperation where opportunities to engage the Finnish private sector appear to be promising enough to attract investment in the Disaster Risk Reduction and Meteorology sub-sector are summarised, followed by a summary of the most viable instruments and initiatives identified to support developing Finnish private sector engagement.

1. Areas of cooperation with emerging opportunities (promise) to engage the Finnish private sector

- Tailored weather and climate information services for public and private sectors (forecasting, climate data analysis, early warning, air quality alerts). Evidence of demand: PROMOSERV, INDFIN, UFIM, PIF Ethiopia, FINKERAT and in possibly in Central Asia.
- Modernising national hydro-meteorological observation networks (upgrades to equipment, sensors, radars etc.). Evidence: PROMOSERV, PIF Ethiopia, INDFIN, UFIM, FINKERAT, and possibly in Central Asia.
- Climatesmart water management and water saving technologies. Evidence: Flootech, Smartvatten, AFRY produce these types of technologies (including water reuse, treatment, efficiency, flood retention, hydropower water management, etc.).
- Air quality monitoring, flood risk assessments, forest fire risk monitoring, food security, glacial outbursts. Evidence INDFIN, Central Asia, UFIM, FINKERAT are in need of drones and geospatial mapping and monitoring, risk mapping, vulnerability assessments, agroecological zoning possibilities, etc. Finnish companies that can meet those needs: AFRY, Flyby Guys, Vaisala.
- Climate Insurance and disaster loss accounting. Evidence: FINKERAT, FRC, UNDRR, UFIM, and possibly Central Asia all need disaster loss database development, and data-driven pricing to support the design of resilient infrastructure, enhance adaptation through the adoption of climate smart agriculture/food security, water conservation, and energy security. Finnish companies that can meet those needs include: Biovoima, Neste, and possibly Spinnova.

2. Areas likely to be promising enough to attract Finnish private sector engagement in Disaster Risk Reduction and Meteorology cooperation

- Weather and climate equipment: direct revenue viability has already been demonstrated.
- Watersaving and treatment technologies: companies like Flootech, Smartvatten, Veolia Finland have commercial models that could be scaled in many waterstressed partner countries.
- Hydropower, water infrastructure and energywater projects: AFRY, Voith, Wärtsilä have products and services that are of significant interest to selected partner countries (East Africa, Nepal, Vietnam)
- Drone data services: companies specialising in drone technology like Flyby Guys can provide contracted services where demand for mapping, monitoring, inspection and surveillance services is growing, especially in countries with logistical challenges (Indonesia, Nepal, Vietnam, Central Asia).

- Climate insurance, loss accounting, vulnerability assessments, readiness training marketing studies, etc.: companies like Sampo Group and LähiTapiola can provide services in these areas given only 110 countries have loss accounting systems in place to date (UNDRR, 2024).

3. Most viable instruments and initiatives to developing Finnish private sector engagement (Finnish, EU and through multilateral initiatives)

- **MFA's Public Sector Investment Facility**
  - PIF: provides funding for private sector engagement in public sector initiatives supporting climate resilience, but would benefit from more flexibility to support Finnish private sector engagement through consortia and joint venture approaches.
- **MFA's Private Sector Instruments (Finnpartnership and Finnfund)**
  - Finnfund: could provide capital investment, equity, debt financing for larger infrastructure and hydropower projects, observation network modernisation.
  - Finnpartnership: could help in matchmaking, advisory/transaction support, feasibility studies for Weather and Climate Information Systems, insurance pilot schemes, or water treatment plants.

A pilot public-private partnership could promote public-private partnerships in modernising observation networks, equipment, maintenance, service contracts, watersmart infrastructure and nature-based solutions (coastal). Finnfund blended finance, Finnpartnership provides support services to the partner country, contractors.

- **EU Global Gateway initiatives**
  - Large infrastructure and climate resilience in Africa and Asia; Finnish companies can supply Weather and Climate Information Systems, sensors, early warning components, watermanagement technology under Global Gateway supported tenders.
  - Using Gateway funds to bundle projects: e.g. observing networks, training contracts, resilient infrastructure.
- **SOFF (Weather Observation Equipment and Related Services)**
  - SOFF's mandate around systematic observations provides direct funding for observation equipment, sensors, radars etc., opening up demand for hardware and software needs, service and maintenance contracts.
  - Also in data analytics, software for weather forecasting tied to SOFF projects, public-private partnerships are feasible.
- **ARISE initiative**
  - ARISE (Industrial Platforms etc.) could be used to anchor more Disaster Risk Reduction and Meteorology components in industrial and infrastructure zones: e.g. climatesmart water, flood retention, early warning for industrial zones.
  - Finnish private sector engagement could engage via ARISE Integrated Industrial Platforms in providing Weather and Climate Information Services, technologies to decarbonise industry, and climate insurance tied to industrial risks such as flooding of machinery or warehouses that would affect supply chains

5 Conclusions

Conclusion 1: Finland's Disaster Risk Reduction and Meteorology cooperation has made a tangible contribution to reducing disaster-related deaths reported globally, as well as improved monitoring of poor air quality in more than 40 partner countries. However, progress on delivering sustained long-term development resilience is less evident.

Findings: 1, 2, 4, 6, 15, 20

Finland's Disaster Risk Reduction and Meteorology cooperation has successfully enhanced inclusive, rights-based and community-centred disaster preparedness and response capacity in its partner countries. Emphasis on improving knowledge, capacity development and infrastructure have led to an expansion of multi-hazard early warning systems that are contributing to a measurable decline in the number of fatalities caused by severe weather events and poor air quality (UNDRR, 2024). Currently, an estimated 500 million people have access to multi-hazard early warning systems thanks to Finland's Disaster Risk Reduction and Meteorology cooperation, a number projected to grow to over 700 million people by 2027 (FMI, 2024). This progress aligns strongly with the causal linkages between assumptions and short-, medium- and long-range results in the theory of change in Figure 1 dedicated to reducing vulnerability to extreme weather events and poor air quality caused by human-induced and natural phenomena. As such, Finland has made an important contribution to developing some key aspects of the Disaster Risk Reduction value chain that support the achievement of several SDGs, notably SDG 11.5, SDG 13.1 and 13.3 and SDG 17.17.

Conversely, Finland's contribution to delivering longer-term development resilience at both the community and development sector levels was less evident. This is in part substantiated by the most recent Sustainable Development Goals Report, which concluded progress on achieving the SDGs linked to the Environment and Natural Resources Priority Area has been lower than expected (UN, 2024). For example, it highlights the global degradation of natural resources coupled with the growing effects of climate variability and change as particular areas of concern. As a result, the evaluation concludes important assumptions and inputs in the theory of change in Figure 1 and in the theory of change for Environment and Natural Resources have not been adequately addressed, especially in the project design phase, to ensure project results align with the short-, medium- and long-range environmental and economic results included in the theory of change in Figure 1. Consequently, progress on achieving SDGs like SDG 13.2 was not evident from the internal monitoring and progress reporting carried out by Finland's projects, or through the stakeholder interviews realised. This situation also has implications on advancing the medium- to long-term needs in the National Adaptation Programme of Action/National Adaptation Plan in Finland's partner countries.

Conclusion 2: Targeted, demand-driven Disaster Risk Reduction and Meteorology cooperation has proven to be an effective approach to deliver results through public-public and public-civil society organisation initiatives, but these results still lack a cross-sector focus and system-level coordination to free Disaster Risk Reduction and Meteorology from its relative isolation within the Environment and Natural Resources sector.

Findings: 2, 6, 9, 10, 22

Finland's targeted, demand-driven approach has provided a satisfactory approach to addressing the needs of the partner and establishing equitable, long-lasting partnerships that are crucial to delivering positive results in the Disaster Risk Reduction and Meteorology sub-sector. Similarly, the provision of stable, long-term funding to multilateral and civil society partners has proved to be an effective way to deliver results in accordance with evolving needs and priorities of direct and indirect beneficiaries. In addition, it has reduced the administrative burdens MFA would otherwise have had to manage to deliver results.

Nonetheless, Disaster Risk Reduction and Meteorology cooperation has not focused on establishing adequate levels of intra-institutional coordination in key areas of Disaster Risk Reduction, such as hydrology, environmental planning and monitoring. Likewise, cross-sector integration with stakeholders responsible for cooperation in other sub-sectors under Environment and Natural Resources, notably Water as a Natural Resource, agriculture, Forests, Ecosystems and Biodiversity, renewable energy, health and public works was found to be low. Consequently, the evaluation concludes this situation has limited opportunities to leverage synergies at the intra- and inter-institutional levels that are crucial to developing system-level collaboration and coordinated responses to Disaster Risk Reduction and enhancing climate resilience in these sub-sectors. As a result, evidence of efficient, scalable, transformative and inclusive approaches to resilience-building that support Finland's 'leave no one behind' principle has not taken place to date.

Conclusion 3: Implementation efficiency has been lower than planned in the Disaster Risk Reduction and Meteorology sub-sector, resulting in a large number of projects not delivering planned outputs and outcomes on time.

Findings: 6, 9, 17, 20

The delivery of results reported in Conclusion 1 has generally not been matched by satisfactory levels of implementation efficiency in the majority of the projects reviewed that have been funded by the ICI, Programme-based support and PIF financial instruments. In the case of ICI projects implemented by FMI, delays and extensions were evident in a large number of projects evaluated, including those involving synergies with other multilateral institutions, such as the World Bank. The evaluation concludes that the assumptions in the theory of change in Figure 1 and for the Environment and Natural Resources have overlooked the importance of integrating adequate levels of risk analysis in project design and planning. In addition, efficiency has also been affected by the fragmented approach applied in the Disaster Risk Reduction and Meteorology sub-sector, which has restricted opportunities to build coordinated approaches between meteorological, hydrological, environmental, and land-use planning institutions to address, for example, the rapid increase in flooding, which has affected an increasing number of people in developing countries as well as globally.

Furthermore, innovation and knowledge generation through the engagement of research and academic partners was not evident, leading the evaluation to conclude opportunities for system-wide

learning and inter-institutional knowledge transfer on Disaster Risk Reduction and Meteorology themes have been limited. Lastly, the absence of a clearly defined results framework with UNDRR has limited MFA's ability to learn about the global-level impact of its core contributions, which has included funding of training exercises to roll-out the Disability Inclusion Annex, thus further undermining efficiency, learning, and adaptive planning.

Conclusion 4: Institutional sustainability and capacity to fund the operation, maintenance and expansion of weather and climate services remains a major challenge for Finland's partner countries, despite strong national and community ownership of results.

Findings: 4, 6, 9, 15, 17, 22

Finland's Disaster Risk Reduction and Meteorology cooperation has successfully developed strong ownership of results by its implementing partners at the national level, which appears to be also the case at the sub-regional level in East Africa through the ongoing FINKERAT initiative. However, there is insufficient evidence that the mechanisms and capacity currently in place are adequate to sustain and upscale these results over time. Key challenges include inadequate mechanisms within the majority of participating National Hydro-Meteorological Services to generate revenues through the introduction of fee-paying services, even though this is common practice by National Hydro-Meteorological Services in Europe (including FMI and KNMI in the Netherlands). Similarly, local Disaster Risk Reduction committees remain dependent on external funding support, despite the establishment of volunteer networks and community focused Disaster Risk Reduction strategies in countries like Nepal, Kenya and Zimbabwe. As a result, it remains unclear who will support these Disaster Risk Reduction committees when Finnish support ends. These gaps indicate that the assumptions in the theory of change for short- to medium-range results regarding improvements in the enabling environment and an increase in public investment for Early Warning System services are not holding true and need to be addressed. Addressing these gaps through, for example, self-financing strategies, capacity building and more effective monitoring remain, therefore, pending issues that to which Finnish Disaster Risk Reduction and Meteorology cooperation still needs to find solutions.

Conclusion 5: Continuous learning is emphasised at the project level, but adaptiveness and systemic learning has been hampered by inadequate cross-sector collaboration and impact monitoring, thus limiting innovation and integration across key sectors in Finland's Disaster Risk Reduction and Meteorology cooperation.

Findings: 17, 18, 22

Although FMI promotes continuous learning and capacity-building within its projects, especially within the weather forecasting departments/units of National Hydro-Meteorological Services partners, or within the community Disaster Risk Reduction committees promoted by FRC, the evaluation found adaptive learning is largely confined within meteorological and Disaster Risk Reduction circles. Similarly, Vaisala and UNDRR provide little or no feedback on learning, focusing instead on administrative feedback and needs. As a result, impact monitoring and knowledge transfer between important national partners at the intra-institutional level (including departments responsible for hydrology, environmental monitoring, land-use planning) and strategic sectors at the inter-institutional level (including Ministries responsible for water use, agriculture, forestry, renewable energy, public works and health) have not materialised sufficiently to guide decision-making. This has not been aided by a general lack of systematic risk management to support project design and implementation planning. Strengthening systemic learning and adaptive management is, therefore,

still largely missing to ensure Finland's cooperation becomes more holistic, and multi-sectoral in its approach and development of the Disaster Risk Reduction value chain.

Conclusion 6: Finnish private sector engagement has significant unrealised potential in advancing Disaster Risk Reduction and climate resilience in the Climate and Natural Resources Priority Area.

Findings: 12, 16, 17, 19, 21, 22

The evaluation concludes there is a wide range of potentially lucrative opportunities for the Finnish private sector to advance Disaster Risk Reduction and climate resilience in Finland's partner countries. This is particularly the case in emerging markets like Ethiopia, Indonesia and Vietnam, where Finland's bilateral cooperation will continue beyond 2025. In these countries, direct and indirect revenue generating opportunities supporting both the public and private sectors advance climate resilience in all four sub-sectors of Environment and Natural Resources were identified and which would support progress on achieving relevant SDGs, in particular SDG 6 (water), SDG 11 (sustainable cities and communities) SDG 13 (climate action), SDG 15 (Life on Land) and SDG 17 (partnerships), among others.

At the bilateral level, the evaluation concludes the Finnish private sector could add significant value to existing Disaster Risk Reduction and Meteorology cooperation by supporting the development of data-driven products and services that are growing in demand to guide informed decision-making on integrating Disaster Risk Reduction and climate resilience in strategic sub-sectors like Water as a Natural Resource, food security and nutrition and Forests, Ecosystems and Biodiversity. In these cases, demand for such services could be met through either expanding the scope of ICI, PIF and Programme-based support, and/or through complementary action funded by MFA's private sector instruments, guided by lessons learned and good practices applied by other EU peer countries like the Netherlands.

At the multilateral level, the evaluation concludes there are significant opportunities for the Finnish private sector to identify and develop direct and indirect revenue streams from both proactive and reactive engagement in the ARISE, SOFF and Global Gateway/Team Europe Initiative initiatives implemented by UNDRR, WMO and the EU respectively. In these cases, the evaluation concludes significant revenue can be generated through the design and construction of resilient infrastructure, the implementation of nature-based solutions to protect coastal areas, rivers, lakes and ground water, the promotion of insurance and reinsurance products, and the expansion of climate smart technologies and renewable energy, among others.

Conclusion 7: Private sector engagement in Disaster Risk Reduction and climate resilience has been held back by the lack of a suitable enabling environment that addresses the strategic, institutional and financial barriers that currently exist in the Environment and Natural Resources Priority Area.

Findings: 12, 17, 18, 20, 22

The evaluation concludes that the opportunities to increase Finnish private sector engagement in Disaster Risk Reduction and climate resilience in the Environment and Natural Resources Priority Area (in line with the intended impact in the theory of change for Environment and Natural Resources) has been held back by Finland's inability to remove three main barriers. First, the absence of a Finnish private sector engagement strategy for the whole of the Environment and Natural

Resources Priority Area has left the Finnish private sector with insufficient strategic guidance on the potential markets, types of customers and partners and the enabling environment (institutional and legislative) in which it should operate.

Second, the lack of a specific business platform to support the Finish private, public, non-governmental and academic sectors has impeded the identification of the business models, information exchange and pooling of resources needed to support the up-scaling of Disaster Risk Reduction and climate resilience in Finland's partner countries.

Third, insufficient access and support from MFA's private sector instruments (notably Finnfund and Finnpartnership) has meant there has been no direct finance supporting the de-risking of Finnish private sector engagement in the above-mentioned areas of business cited under Conclusion 5.

Conclusion 8: Private sector engagement in the Disaster Risk Reduction and climate agendas of developing countries is feasible when that engagement aligns with core business interests and incentives exist to de-risk investment in the sub-sector.

Findings: 15, 16, 18, 20, 21, 22

Peer countries like the Netherlands and Finland's multilateral partners such as the UNDRR, WMO and the EU have all successfully mobilised the private sector in advancing Disaster Risk Reduction and climate resilience in support of relevant SDGs. Key factors behind this success have been the importance of supporting the private sector to engage in accordance with its core business interests and providing incentives to support the de-risking of investment decisions, especially when entering new markets. In all cases, the mobilisation of blended finance, development of advisory services and promotion of networking have been central themes designed to de-risk investment, which in the case of the Global Gateway has resulted in the funding of almost 350 Team Europe Initiatives since its roll-out in 2022.

The evaluation concludes Finland's development cooperation can draw lessons from these initiatives to engage the Finnish private sector more proactively in the Disaster Risk Reduction and climate agenda in two ways. First, at the bilateral level by using its financial instruments to support private sector engagement using the successful, but highly limited, approach developed through the Concessional Credit Scheme and PIF instruments, which have demonstrated the private sector can generate revenue in the Disaster Risk Reduction and Meteorology sub-sector. Second, by identifying ways to engage the Finnish private sector more proactively in the ARISE, SOFF and Global Gateway initiatives

Conclusion 9: Finland adds value to its Disaster Risk Reduction and Meteorology cooperation by leveraging specialised public agencies (Finnish Meteorological Institute), private sector leaders in meteorological equipment (Vaisala), civil society organisations that have extensive national networks in place to reach the most vulnerable (Finnish Red Cross) and multilateral institutions (UN Office for Disaster Risk Reduction) who are the guardians of the Sendai Framework.

Findings: 1, 2, 3, 4, 7

Finland's deployment of a mix of highly specialised and globally acclaimed public, private, non-governmental and multilateral partners in the Disaster Risk Reduction and Meteorology sub-sector, most notably FMI, Vaisala Oyj, FRC and UNDRR, has demonstrated the added value Finland can

bring to global efforts to advance Disaster Risk Reduction and climate resilience. In particular, all four partners have brought innovation to the Disaster Risk Reduction and Meteorology sub-sector that no other Finnish partners could have achieved to the same degree. Moreover, this achievement has been aided by the high level of trustworthiness all four partners have established globally to galvanise stakeholders into innovative Disaster Risk Reduction and climate action. For example, FMI and Vaisala have demonstrated their added value by supporting over 40 partner countries not only to establish Early Warning System, but more importantly in the application of multi-hazard early warning systems. Similarly, by engaging FRC, Finland has demonstrated that the added value of its Programme-based support instrument is that it not only can reach the most vulnerable communities through its network of national Red Cross and Red Crescent societies, but can promote innovation in these communities, notably community-centred Disaster Risk Reduction strategies supported by Community-Based Early Warning Systems. Finally, at the multilateral level, Finland's core-funding to UNDRR has brought new initiatives to the international table like the adoption of the Disability Inclusion Index.

However, the evaluation concludes Finland's added value could be enhanced further through greater synergies between and across its specialised public agencies (GTK, Luke, Syke, VTT, etc.), private company platforms (in particular Finnish Water Forum, but also through European fora such as Water Europe, ClimateKIC, or the European Urban Resilience Forum), CSOs (engaged in Water as a Natural Resource, Forests, Ecosystems and Biodiversity and Energy, Circular Economy and Critical Minerals), and multilateral UN institutions (especially UNFCCC and the UN Convention to Combat Desertification) .

6 Potential Action Points

Action point 1. Finland's specialised institutions need to come together to address the global challenges of climate change by establishing a 'Climate Services Partnership for Resilience'.

All projects should be risk-informed (including awareness of barriers and gaps) and climate-resilient ensuring Disaster Risk Reduction cross-cuts all the main development sectors. This action is also justified by the *Development Cooperation Report 2024: Tackling poverty and inequalities through the Green Transition* (OECD, 2024), which calls for a comprehensive and systematic shift to context-specific, sustainable and climate-smart practices applied across all development sectors. To achieve this, it advocated the adoption of legislative frameworks that fully integrate the effective management of natural resources, in particular citing the opportunity to promote nature-based solutions to stimulate green jobs, and also the need for increased access to carbon finance (i.e. financing for investments that decouple economic activity from greenhouse gas emissions). In addition, interviews with key stakeholders confirm, the possibilities to improve resilience and effectiveness should identify opportunities for engagement across the Disaster Risk Reduction Value Chain and EW4A pillars (see Figure 7), that not only consider expanding stakeholder involvement, but tapping into expertise of existing stakeholders like FMI and FRC. Potential areas of joint collaboration could include, among others:

- Co-production of impact-based forecasts and protocols with national hydrometeorological services, authorities and communities.
- Development of impact tables and call-to-action messages that translate scientific forecasts into clear, sector-specific guidance.
- Strengthening dissemination systems to ensure warnings reach the most vulnerable and remote groups, through multiple communication channels.
- Capacity building for both technical staff and Red Cross volunteers to link forecasts with timely preparedness and anticipatory action.
- Promoting interoperability and data sharing between meteorological, government, and humanitarian systems to increase trust and efficiency.
- Advocacy for the integration of anticipatory action in national DRM and climate frameworks.

Action point 2. Disaster Risk Reduction and Meteorology cooperation should have a Finnish private sector engagement Strategy to support the Finnish private sector identify feasible entry points for investment in products and services where demand is highest and potentially rewarding economically (linked to water, agriculture, forestry, transport, infrastructure, insurance/reinsurance sectors).

The private sector engagement strategy should have both a strategic and operational focus. Key elements to consider in the private sector engagement strategy's **strategic focus** include, among others: (i) the establishment of public-private engagement to identify how public-private

partnerships could take off in the Disaster Risk Reduction and Meteorology sub-sector, especially to support water and climate action initiatives; (ii) the identification of sectors where demand for such partnerships is greatest in each partner country and which can generate most co-benefits; (iii) access to Finnfund and Finnpartnership to fund public-private partnership initiatives in coordination with ICI projects to develop new products and services for key sectors; (iv) the allocation of earmarked funding to engage the Finnish private sector in targeted areas of UNDRR's ARISE initiative where it can add most value (such as scaling up of IFRC's pre-arranged insurance scheme for the most vulnerable), especially in Finland's partner countries where synergies could be developed; (v) the determination of the Finnish national platform that supports the private and public sectors to become partners in the identification of new business opportunities in emerging markets, as opposed to competitors, such as Team Finland and Team Europe initiatives linked to the EU's Global Gateway; (vi) the identification of a parallel policy influence strategy and plan that uses Finnish expertise in the public, private and non-governmental sectors to advance legislative reforms supporting the application of the Disaster Risk Reduction value chain in partner countries and through multilateral channels such as the UNDRR.

At the operational level key elements to consider in the private sector engagement strategy are: (i) a market feasibility study completed in a selection of targeted emerging markets in which the demand for Disaster Risk Reduction and climate resilience products and services (covering all sub-sectors in Environment and Natural Resources), the level of market openness for private sector engagement and the types of potential local private sector companies and services available are all identified to clarify potential entry points for Finnish firms; (ii) the establishment of multi-stakeholder partnerships to fully engage Finnish partners linked to Disaster Risk Reduction and climate resilience (see more on suggested partnerships below; (iii) identification of risks and mitigation measures to ensure private sector engagement engages not only large companies like Vaisala, but also Finnish small and medium-sized enterprises who need greater de-risking support, especially to cover upfront investments). Lessons learned from the DFCD should be considered and integrated into the updating of the Private Sector Instruments, especially Finnfund; (iv) identification of measures to integrate Finland's cross-cutting objectives to establish an inclusive and equitable private sector engagement strategy and which includes application of the Disability Inclusion Annex; (v) all partners agree on an action plan or road map to implement the private sector engagement strategy through a set of pilot projects. It is suggested this carried out by Team Finland initiatives first to identify lessons and good practices to upscale Finnish private sector engagement in the Team Europe Initiatives funded under the EU's Global Gateway initiative; (vi) establishment of an effective communication strategy focusing on the needs of different audiences. This should build on improved impact monitoring of projects and programmes at all levels, and lessons learned and good practices identified by Finnish CSOs who have extensive work experience in Finland's partner countries.

Suggested partnerships to consider to support the implementation of Action point 2:

1. The MFA establishes and leads a private sector engagement Task Force with a strong multi-stakeholder and multi-sector focus (includes all five sub-sectors in Environment and Natural Resources) that includes, among others, Finland's specialised agencies (FMI, GTK, Luke, VTT, Syke), academia, selected CSOs (FRC, WWF, Finnish Forest Industries Federation) the Ministry of Environment and Ministry of Interior and private sector platforms (Finnish

Water Forum) to facilitate dialogue and action on mainstreaming Disaster Risk Reduction and climate resilience in all the sub-sectors of Environment and Natural Resources.17

2. The MFA, with the support of an external consultant and its specialised agencies oversees the establishment of the 'National Weather and Climate Information Systems Research and Innovation Group'. Members of this Group should be composed of research staff from the Finnish Meteorological Institute, the Finnish Environment Institute, the Geological Survey of Finland, the Natural Resources Institute, Aalto University, University of Helsinki, Lappeenranta-Lahti University of Technology, and applied research institutions specialising in hydrology and water efficiency, among others.18 The main function of this group should be to support the Water as a Natural Resource, Forests, Ecosystems and Biodiversity, Energy, Circular Economy and Critical Minerals, and agriculture sub-sectors apply science and research in key areas where there are currently information gaps that could be addressed with the support of the Finnish private sector. These included: (i) risk mapping using geospatial technologies to produce vulnerability assessments, agro-ecological zoning, and nature-based solutions to restore ecosystem services; (ii) fire risk monitoring, (iii) hydro-climatic forecasting to guide infrastructure and urban/land use planning, (iv) climate information to develop insurance and reinsurance schemes; (v) climate services to plan health systems, in particular insect movements associated with mosquito and tick-borne diseases.
3. The MFA supports the Environment and Natural Resources sub-sectors and Finland's private sector instruments to join forces to create the *Blue-Green Finland Private Sector Partnership*. Key prerequisites to establishing this coordinated and mutually reinforcing partnership should include, among others: (i) an agreed percentage of private sector instruments is allocated to developing public-private partnerships and public-private engagements that directly support Disaster Risk Reduction and climate resilience; (ii) an agreed percentage of private sector instruments is allocated as earmarked core funding to UNDRR to support Finnish private sector engagement in global initiatives like ARISE and EW4All in Finland's partner countries in Africa and Asia; (iii) an agreed percentage of private sector instruments is allocated to engage the Finnish private sector in supporting CSOs in reducing vulnerability of highly marginalised communities and groups in Finland's partner countries; (iv) an agreed percentage of the private sector instruments are used to promote Finnish private sector engagement in Disaster Risk Reduction and climate resilience initiatives funded through the EU's Global Gateway; (v) supporting acting on the opportunities presented in Annex 3 are identified agreed upon as an integral part of the private sector engagement strategy proposed above in point 1.

17 The Task Force approach was selected, because it supports a multi-sectoral approach to the mainstreaming of Disaster Risk Reduction in the Environment and Natural Resources cooperation sector, based on joint planning and collaboration, which is key to achieving the long-term outcomes and impact foreseen in the theory of change for the Climate and Natural Resources Priority Area.

18 The evaluation identified the name and potential members of this partnership with the aid of artificial intelligence. This was repeated for the selection of the name of the third partnership below.

Action point 3. Consider rebranding the Finnish Water Forum to the Finnish Water and Climate Forum as the official multi-stakeholder platform in Finland dedicated to coordinated water and climate action in its partner countries.

A new common vision and mission should be established so that commercial development through public-private partnerships are prioritised where they can also maximise human, social, physical and environmental co-benefits (and integrate Finland's cross-cutting objectives).

Action point 4. Seek ways to mainstream Disaster Risk Reduction in the other sub-sectors of Environment and Natural Resources policy priority area.

Promote a five-year pilot initiative to accelerate the mainstreaming of Disaster Risk Reduction in and Weather and Climate Information Services in new Water as a Natural Resource, Energy, Circular Economy and Critical Minerals and Forests, Ecosystems and Biodiversity projects in support of relevant Sustainable Development Goals, namely: (i) water (conservation and sustainable use), agriculture (adaptation and diversification); (ii) forestry (forest fires, slope consolidation, flood retention); (iii) renewable energy (climate assessments, hydropower monitoring, solar and wind energy forecasting); (iv) infrastructure (resilient design, installation and maintenance, nature-based solutions, low impact materials); (v) aviation and other transport (air quality monitoring, storm risk mapping, ice and snow mapping, glacial outbursts and landslides, smart mobility applications) and; (vi) public health (insect and disease forecasting, air quality, nature-based solutions, water, hygiene and sanitation (WASH) planning and heat stress monitoring). These actions should be supported by targeted use of the private finance instruments and earmarked core funding proposed under Recommendation 5.

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In addition, the evaluation team consulted project-specific documentation to complete the moderate and intensive studies, such as: project proposals, project documents, progress reports, annual reports, expert mission reports, workshop reports, study visit reports and completion reports, among others, that were made available during the evaluation process. The evaluation also had access to the draft version of the ongoing evaluation of ICI projects in Asia, managed by Particip GmbH.

Personal communication (interviews): See Annex 4.

Annex 1: Methodology and analytical process

Overall approach and theory of change

The sub-sector evaluation aims: (i) to explore beyond the project and programme level to shed light on aggregate and catalytic effects and synergies between actions, actors, instruments and policy-influencing activities within and across the sub-sector; and (ii) to establish how these encourage and enable wider changes at geographic, sectoral and/or institutional scales, including the role of private sector engagement and implications for the portfolio and policy level. Its design concept is that of a 'theory-based', 'macro-level' and 'realist' evaluation. Being **theory-based**, it is built upon a theory of change embracing the logical connections between inputs and instruments, short-range, medium-range and long-range results, and impacts, and hence emphasising the plausibility of assumptions and causal links between steps in the design logic. Being **macro-level**, it focuses on development cooperation across multiple interventions, locations, and the 15 years of 2010-2024. And being **realist**, it is embedded within a theory of change that is grounded in the large-scale, long-term development context that applies to those same multiple interventions, locations, and years.

As explained in Chapter 2, this approach requires the use of macro-level definitions of OECD/Development Assistance Committee performance criteria such as effectiveness, impact and sustainability, rather than the intervention-level definitions that are applied to individual projects. It also requires a theory of change that robustly reflects current realities of large-scale context, that embodies logic supported by evidence, and that covers all the main pathways of cause and effect by which results can be obtained in the sub-sector. The MFA's existing sub-sectoral theory of change (MFA, 2023) was therefore reviewed during the inception phase (28 Nov 2024 to 11 Mar 2025), and an updated theory of change prepared for the sub-sector that was based on assumptions in Figure 1. Interventions funded wholly or partly by MFA were then assessed against the short-, medium- and long-range results in the theory of change. These results were defined respectively as (i) the initial or 'first generation' results, (ii) the later or 'second generation' results, and (iii) the strategic consequences leading to impact.

Table 4 Assumptions underlying the theory of change for the Disaster Risk Reduction and Meteorology sub-sector

From long-range results to impact:

- The political, societal and economic commitments to applying Disaster Risk Reduction and Meteorology in global, national and subnational policies, strategies and plans to reduce vulnerability, enhance resilience to climate variability and change and support sustainable development are sustained and coordinated.
- Commitments to applying DRR and hydro-meteorological and air quality services at the subnational and national levels continue to focus on empowering local men and women to drive the DRR process forward through human-rights based approaches that deliver local solutions to local problems and needs.
- Human and financial resources remain available to meet national and global goals linked to Disaster Risk Reduction and Meteorology.
- Learning, adaptation and innovation continue to intensify through public-public, public-private and public-civil society partnerships and networks.

From medium-range to long-range results:

- Increased national capacity and commitments to protect, restore and sustainably use natural resources in highly vulnerable areas and ecosystems are based on effective risk management and the delivery of holistic improvements to livelihoods (i.e. strengthening human, social, environmental, physical and economic capital) to increase resilience.
- Collaboration on establishing early warning systems, disaster preparedness, response and rehabilitation is increasingly coordinated and information shared between the public, private and non-governmental sectors.
- Political and societal commitments to adopting, implementing and monitoring DRR strategies and plans at all levels under coordinated approaches continues and expands to all priority areas identified through risk mapping.
- Incentives, access to information and resources and training improve over time to support private and CSO engagement in preventing, preparing and responding to extreme weather and climatic events.

From short-range to medium-range results:

- Political, private and non-governmental partnerships and networking are recognised by decision-makers as key to improving knowledge and research on Disaster Risk Reduction and establishing hydro-meteorological and air quality data to take informed decisions on reducing vulnerability and adaptation to climate variability and change.
- Political willingness to improve the enabling environment governing the transfer of data, knowledge and technology in support of DRR and development of Early Warning Systems increases over time is matched by increased public-private investment in Disaster Risk Reduction and Early Warning Systems.
- The Disaster Risk Reduction plans and early warning systems identified and adopted can be implemented quickly and efficiently according to the risks and vulnerability identified.
- It is recognised by all stakeholders that local communities are key knowledge holders and actors in Disaster Risk Reduction and the application of Early Warning Systems.

From inputs/instruments to short-range results:

- MFA and main partners in Finland establish the necessary coordination mechanisms to ensure Finnish funds and instruments are used in an efficient, effective and sustainable manner.
- Finnish support to funding private sector, institutional cooperation and CSO instruments is not compromised by spending cuts or external events.
- MFA and partners are committed to developing synergies with other donors and programmes funded by the global climate funds to avoid duplication and leverage more support for Disaster Risk Reduction and Meteorology.
    - Risk management forms an integral part of MFA's decision-making processes in the design, implementation and monitoring of DRR/M projects and programmes (includes adequate time and funds are allocated to deliver the expected results selected).

Source: Evaluation team

The evaluation team adopted the EQs outlined in the Terms of Reference (synthesis report), with EQs 1 and 2 being specifically designed for the sub-sector evaluation, and thus are answered in this report. EQs 3 and 4 will be addressed in the synthesis report. To ensure a structured and transparent approach to evidence collection and analysis, the evaluation team developed a matrix that divided each EQ into more manageable sub-EQs and listed the types of evidence required to answer each, the methods used to collect that evidence, and the data sources to be consulted. The matrix thus served as a central tool to guide both data collection and analytical consistency across the evaluation. The following methodology was applied to support the triangulation of findings in Chapter 4 of this report and to support development of the conclusions in Chapter 5.

Mainstreaming private sector engagement

To comprehensively address private sector results, impact and opportunities in the context of Finland's development cooperation in Environment and Natural Resources, the private sector engagement analysis was mainstreamed throughout the evaluation. In addition to mainstreaming, distinctive supplementary private sector engagement analysis methods were also applied, as summarised in the following paragraphs. These private sector engagement -specific analysis methods were required to specifically provide evidence for the largely formative and future-oriented assessment of Finland's private sector engagement in Environment and Natural Resource Management.

Portfolio review

A review of MFA's portfolio was carried out for two purposes: (i) to delineate the four relevant sub-sectors while gaining a better understanding of their characteristics, such as geographic distribution, channels and instruments; and (ii) to lay the groundwork for establishing the evaluation sample (see 'Desk studies and organising evidence' below). For the first purpose, the evaluation team started by 'cleaning' the data in a spreadsheet received from the Development Evaluation Unit (EVA-11) of MFA on 19 November 2024. The dataset spanned the years 2015 to 2022, covered Finland's exclusive ODA budget administered by the MFA and included 2,746 rows of data, representing 2,124 interventions with unique donor project numbers. The first step involved categorising interventions as either 'in scope' or 'out of scope'. All interventions in the natural resources policy priority area (labelled '4' in the spreadsheet) were included in the scope. As not all interventions had such a number, particularly earlier ones, sector codes were used to classify these. Keyword searches were also used to identify individual interventions for inclusion.

Interventions deemed relevant to the evaluation were further assigned to the sub-sectors, mostly guided by sector codes. Those with an identifiable Environment and Natural Resources focus but not clearly linked to any sub-sector were categorised as 'general'. Interventions with explicit objectives in agriculture or exclusive focus on sanitation and/or hygiene were excluded, as specified in the Terms of Reference. The resulting sub-sector portfolios were reviewed and validated by the sub-sector teams, yielding a final Environment and Natural Resources portfolio comprising 286 interventions. Sub-sector specific portfolios were then extracted and provided to the sub-sector teams to inform their work.

Three constraints were applied to the data for analysis. First, only **commitment data** (*myönnöt*) were used, as they were considered more informative than disbursement data. Second, where

interventions had **multiple purposes**, including elements related to other sectors, only the share of resources allocated to one of the Environment and Natural Resources sub-sectors was included in the portfolio. Third, to improve the clarity of graphical presentations of the portfolio's **geographical distribution**, country commitments below EUR 1 million were aggregated under the category of 'Other'. Finally, only ten **delivery channels** were used to characterise the portfolio: Development Funds; Finnish Government and Embassies; International Financial Institutions; Multilateral and Intergovernmental Organisations; Non-Governmental (non-profit) Organisations; Private Sector; Recipient Governments; Research and Academic Institutions; United Nations (UN) Agencies; and Other.

Since the portfolio review used a dataset for the years 2015-22, it includes neither the oldest nor the most recent interventions in the time-scope of the evaluation (2010-24). To correct for this, some of these older and younger interventions were included in the moderate and intensive studies. As interventions initiated in 2023 or later were unlikely to demonstrate measurable results, particularly long-term impacts, their main contribution here was in assessing design relevance. Older interventions presented other challenges, in terms of missing documents and informants, or limited recall of details by knowledge-holders. Even so, these interventions remain relevant for assessing relevance, impact and sustainability and were mostly assessed through existing evaluation evidence and documentary materials.

Since the data received from the MFA covered Finland's exclusive ODA budget, which is administered by the MFA, it excluded Finnfund investments. These investments were, however, considered significant for Finland in the area of Environment and Natural Resources and as a part of the private sector engagement Intensive Study on Finnfund (annexed to the evaluation's synthesis report), a portfolio analysis of Finnfund's investments in the sector was conducted. This was based on data received from Finnfund on 4 April, 2025, which covered their Environment and Natural Resources investments in 2015-2023.

Sampling

A purposive and tiered sampling approach was used to select interventions for moderate and intensive studies, balancing interventions that were mature enough to yield meaningful insights while excluding those too recent to show results and those too distant in time to be effectively analysed. Interventions for moderate and intensive studies were prioritised based on recommendations by the Reference Group and on the interventions' likely ability to provide substantive findings on effectiveness, impact and sustainability, ensuring a focused and methodologically sound assessment. By making it possible to select interventions to ensure balanced coverage of context, instrument and geography, the review allowed the evaluation to proceed with a robust evidence base.

Extensive document analysis

It was agreed with EVA-11 from the outset that the evaluation would rely primarily on secondary data. As there was vast amount of policy papers, evaluation reports and other reports, intervention level documentation, etc., a structured and systematic approach to retaining and storing information was needed. A standard system for consistent collection and organisation of evidence by all evaluators was developed in the inception phase, and further refined in the implementation

phase (12 Mar to early Oct 2025). This structured library resource was then available to support Natural Language Processing (see below) as a way to find and organise dispersed references to relevant topics.

Desk studies and organising evidence

A sample of the Disaster Risk Reduction and Meteorology sub-sector portfolio was explored through 'moderate' and 'intensive' desk studies. The sample was built based on recommendations by EVA-11 and the Reference Group, and supplemented with other interventions to ensure that all key MFA instruments and channels were covered. The main source of information for each of these past and on-going interventions was the most recent of an annual report, a mid-term review, a final report or a final review. In each moderate study the reviewer searched the key document for evidence of: (i) achievements; (ii) connections, synergies and policy-relevant effects; (iii) private sector engagement opportunities; and (iv) Finnish added value, and organised the evidence in a project results framework (proforma; Table 5). Additional documents and other sources (such as informants) were also used to the extent that the reviewer felt necessary to capture useful evidence.

Table 5 Structure of the proforma used to organise evidence in moderate studies

Sub-sector; name of intervention:	
Document(s) reviewed:	Reviewer:
Narrative overview: scale and kind; details on location, duration, modality, budget.	
Development/environment achievements.	
Connected interventions, synergistic and policy-relevant effects.	
Finnish private sector engagement opportunities.	
Finnish added value.	
Other observations.	
References.	
Acronyms and abbreviations used in the proforma.	

Source: Inception Report. The proforma was colour coded to aid data compilation.

A small number of interventions were chosen for **intensive** study because of their clear importance for major policy-relevant themes and future priorities in the Environment and Natural Resources policy area (Table 6). They tended to be complex actions or engaged in complex areas of work, with many implications for policy, practice and partnership, so they needed more thorough investigation than the others in the sample. In these intensive studies, project documents and evaluations provided by MFA were used as a starting point, but multiple interviews with knowledge-holders were also undertaken along with extensive web searches. Evidence obtained from all sources in all intensive studies was organised in a slightly more extensive proforma. A library of proformas was accumulated during the evaluation that was used as a reference for analysis and reporting. Table 2 in Chapter 2 lists all completed studies.

Table 6 Structure of the proforma used to organise evidence in intensive desk studies

Sub-sector; name of intervention:	
Document reviewed:	Reviewer:
Narrative overview: scale and kind of the intervention; details on location, duration, modality, budget.	
Development/environment achievements of MFA in target location.	
General achievements resulting from MFA intervention.	
MFA achievements that involved private sector actors.	
Lessons learned from MFA achievements and failures.	
Finnish private sector engagement in Finland or target location.	
Achievements resulting from Finnish private sector engagement.	
Lessons learned from Finnish private sector engagement achievements and failures.	
Opportunities identified for Finnish private sector engagement in future.	
Finnish added value.	
Other observations.	
References.	
Acronyms and abbreviations used in the proforma.	

Source: Evaluation team. The proforma was colour coded to aid data compilation.

Private sector engagement intensive studies

The private sector engagement dimension of the evaluation was further strengthened by additional intensive investigation of four objects which can be classified as development policy investments/ blended finance, Private Sector Instruments or private sector engagement-frameworks. These cut across the four sub-sectors and operate at the level of the full ENR policy area. Focus of the private sector engagement intensive studies, as of all intensive studies in this evaluation, was on the 'higher level' of analysis, i.e. focusing on synergies, modelling and leveraging. The private sector engagement intensive studies are annexed to the evaluation's synthesis report.

Interviews and survey

Interviews helped to correct information gaps and added depth to an understanding of MFA's intervention logic. Their role was to enrich the proformas (especially those compiled for intensive studies), and to provide additional context on partnerships, implementation experience, programming and policy priorities. Interviewees were conducted with a total of 22 stakeholders at the policy, implementation and private sector agreed to be interviewed online between May-July 2025. In addition, approximately half a dozen overall Environment and Natural Resources interviewees, cross-cutting over the sub-sectors, from public and private sectors provided information and insights relevant to Disaster Risk Reduction. A full list of interviewees with institutional affiliations was submitted to EVA-11, and an anonymised list is given in Annex 4.

Cutting across the sub-sectors, a private sector engagement survey engaged 19 respondents. The first invitation wave for the survey was launched on 21 May 2025, followed by two more invitation waves. The invitation was sent to a total of 212 recipients. By 21 July 2025, the survey received 19

responses. Most of the respondents were private companies, but there was also one association and one public research institution among them. Nearly third of the respondents (32%/6 organizations) were active in water sector, four of them in construction, two in soil and minerals, two in environmental monitoring, and the rest in other industry sectors. A succinct report of the survey's results is annexed to the evaluation's synthesis report.

Like-minded peer country review

A study of comparable actions by like-minded peer countries focused carrying out, first, a rapid assessment of potential peer countries listed in the inception report of the present evaluation (Denmark, Sweden, Ireland, the Netherlands, Switzerland). Following this, the Netherlands was selected as the most viable for the like-minded peer country on the grounds of major developments from 2019 confirming a shift to greater private sector engagement in the Disaster Risk Reduction and Meteorology sub-sector from late 2019. The like-minded peer country analysis is provided in Annex 2. In addition, cutting across the evaluation's four sub-sectors, two like-minded peer country reviews focusing on engaging private sector were included and are annexed to the evaluation synthesis report.

Market analysis

A brief, general-level business and market opportunity analysis was conducted focusing on the markets with specific country-focus covered by the sampled interventions' intensive studies in each sub-sector. It provided information regarding the local context and business environment, demand and competition within the sub-sector, and a description of the Finnish companies' offer relevant to the market demand. Its purpose was to provide evidence and insights with which to support answering EQ 2.1: *What concrete and context-specific opportunities, entry points and models are there for Finland for partnering with Finnish and local companies and economic actors within the sub-sector topic(s) in the next five years?*

The market analysis was based on information gathered as part of the desk review, interviews with representatives of government, business and international organisations from the target location, as well as interviews and survey with Finnish companies with previous experience or interest in the target markets. The market analyses were based on desk review and interviews conducted in Finland. The desk review considered in particular sources such as the Multilateral Development Banks' and the UN's analyses, market location country government reports and key development partners' resources, as well as data and resources from various business-membership organisations and civil society and research organisations.

The market analyses used the following template which indicates the focus of inquiry in the form of its headings:

Summary:
1. Local context and business environment
1.1 Description of the focus area
1.2 Status in the country
1.3 Focus-area development needs and challenges
1.4 General private-sector business environment
2. Demand within the focus area
2.1 Typical client/customer segments
2.2 Scale of demand and 5–10-year outlook
2.3 Regional differences (if any)
3. Competition/Current offering within the focus area
3.1 Key companies active in the sector
3.2 Estimated current market size reached by businesses
4. Finnish companies' offer
5. Conclusions
References/documents reviewed:

Natural language processing

Natural Language Processing was used to search through the over 140 evaluation reports provided by EVA-11 in the inception phase to identify and structure content related to the evaluation's sub-sectors. The approach enabled the evaluation team to explore document content efficiently, going beyond keyword searches to understand the broader thematic coverage. All documents were digitally processed to extract usable text content, accounting for the wide variety of formats and layouts. In cases where the text could not be extracted directly (e.g. scanned or stylised PDFs), automated character recognition tools were applied to retrieve the information. The extracted content was cleaned and standardised to ensure it could be analysed consistently across the corpus.

A modern topic modelling technique was used to classify text segments into pre-identified sub-sectors relevant to the evaluation, such as water, energy, biodiversity, and the private sector. This approach is based on advanced language models that can recognise context and meaning in full sentences, not just individual words. This allowed for a more accurate thematic classification of the content. The method was unsupervised, meaning it did not require pre-labelled training data, and was adapted through iterative testing and expert feedback to improve performance. To ensure reliability, several verification steps were conducted. These included visual checks of common topic terms, targeted reviews of document summaries, and random sampling of sentences to assess thematic consistency. Expert reviewers also participated in validating the topic assignments and refining category definitions where needed. This combination of automated and manual methods helped ensure a balance between coverage and accuracy.

The results were integrated into an interactive dashboard that allowed the evaluation team to filter, combine, and explore document content by sub-sector. This helped identify patterns, gaps, and

areas of emphasis across the portfolio. Importantly, the method was used as a tool to structure the information, not as a substitute for expert judgement. It contributed to better targeting desk reviews and provided a basis for further analysis and triangulation. The technique enhanced efficiency in navigating large volumes of text and provided a structured basis for comparison across documents. It offered a better understanding of themes than conventional keyword searches. However, it required significant testing, validation, and expert involvement to ensure interpretability. Some technical limitations related to document formats and overlapping topics remained, and Natural Language Processing was used as a complementary tool rather than a stand-alone evaluation method.

Use of artificial intelligence

AI has been used in this report as a search tool to identify relevant material for wider contextual research beyond the MFA portfolio, and the development analytical tables and notably Figure 7. AI tools were also occasionally applied for language support, including proof-reading and enhancing the clarity, coherence, and readability of the text. All sources and outputs generated through AI have been fully reviewed, verified, and adapted by the author, ensuring that the final content reflects accurate analysis, aligns with the evaluation findings, and maintains the author's own judgment and conclusions.

Triangulation

The evaluation synthesised evidence through a structured, multi-source approach to ensure the reliability and depth of findings. A comprehensive desk review formed the foundation, covering programme documents, annual reports, evaluations, and strategic guidance. This was complemented by semi-structured interviews with MFA staff, implementing agencies, Finnish embassies, partner-country stakeholders, and private sector representatives, which provided qualitative insights into both successes and bottlenecks. The proformas were used to organise evidence and systematically analysed to capture reported outputs and outcomes, while like-minded peer country comparisons offered a benchmark for understanding Finland's positioning relative to donor peers, highlighting areas of convergence, differentiation, and potential learning. The evidence was then triangulated and synthesised to ensure that findings and conclusions were grounded in multiple perspectives. Insights from proformas and like-minded peer country comparison were cross-referenced with interview evidence to validate reported results and uncover gaps, while contextual factors were incorporated to explain variations in performance. This layered synthesis enabled the evaluation to integrate quantitative data, qualitative findings, and comparative insights into a coherent narrative.

Limitations

Some important limitations were experienced and addressed as follows:

- Data and information retrieval, especially on Finnish commitments to Disaster Risk Reduction and Meteorology cooperation between 2010-2024.
- Inconsistent monitoring frameworks and post-project tracking across projects. This was addressed as far as possible through the semi-structured interviewing process and using a broader set of sources to support triangulation.
- Difficulty to interview the number of stakeholders originally planned due to staff rotation, unavailability, recent cuts in personnel (in MFA), or evaluation overload. This was mitigated by identifying alternative stakeholders where possible and carrying out additional online research.
- The lack of resources to carry out primary research in a selection of Finland's partner countries where Disaster Risk Reduction and Meteorology cooperation has taken place, notably with the National Hydro-meteorological Services supported by the Finnish Meteorological Institute and local communities supported by civil society organisations, in particular the Finnish Red Cross. This was mitigated to some extent by coordinating with the evaluation team responsible for an evaluation of ICI projects (also conducted by Particip GmbH), drawing on findings from the proforma files produced by the evaluation team members responsible for the abovementioned sub-sectors and online interviews with the Finnish private-sector, UNDRR and other relevant stakeholders.

Annex 2: Comparable actions by like-minded peer countries

Introduction

Part of the Terms of Reference of the evaluation of *Joint Efforts for a Green Future: Evaluation on Finland's Development Cooperation in Environment and Sustainable Use of Natural Resources and Private Sector Opportunities* is to conduct like-minded peer country analysis of countries in Europe that are active in one or more of the sub-sectors under evaluation. The countries selected for like-minded peer country analysis are the Nordic countries (Denmark, Sweden, Norway), Ireland, the Netherlands and Switzerland.

The main purpose of the like-minded peer country analysis is to build on Table 7 below to identify successful strategies and tactics used by these peer countries to deliver positive outcomes and impact in the Environment and Natural Resources management sector, which in this piece focuses on the Disaster Risk Reduction and Meteorology and its contribution to advancing climate action. In addition, the like-minded peer country analysis assesses how far peer countries have used private sector engagement and CSOs have contributed to these outcomes and impact. The main findings, conclusions and lessons learned in the present report will also be used to produce the evaluation report for the Disaster Risk Reduction and Meteorology sub-sector in accordance with the abovementioned Terms of Reference.

Methodology

The methodology has focused on the following steps. First, selected meteorology as the main theme for like-minded peer country analysis in line with the desk studies conducted during the inception phase, and which were continued in the initial part of the evaluation's implementation phase when a further nine projects and global initiatives funded by MFA in the Disaster Risk Reduction and Meteorology sub-sector were reviewed. Second, through document analysis and online research, assessed the degree to which Denmark, Norway, Ireland, the Netherlands and Switzerland have strengthened the capacity of National Hydro-Meteorological Services to provide more accurate weather and climate observation, forecasting and alerts in partner countries in Africa and Asia. This included a review of their respective development policies, strategies and plans and identification of the two main instruments they use to support the development of the National Hydro-Meteorological Services.

Third, reviewed how far each country has used private sector engagement and collaboration with non-state actors in the delivery of improved weather and climate services from its National Hydro-Meteorological Services. This process resulted in the selection of the Netherlands as the country that has most successfully combined public, private and civil society partnerships to deliver tangible results in terms of reducing vulnerability and enhancing resilience. Fourth, conducted a case study to identify lessons learned on how this partnership has evolved to deliver long-lasting

benefits. Fifth, compiled the present report, based on the following sections: (i) the main features of the Netherlands policy commitments to Environment and Natural Resources issues and solutions; (ii) the approach and strategy of the Netherlands in supporting its partner countries in the strengthening of weather and climate observation, forecasting and alerts through the development of Early Warning System; (iii) the results achieved by the Netherlands; (iv) a comparative analysis of Finnish actions in the same area of work, aided by the presentation of a comparative table; (v) presentation of lessons learned on how Finland could improve its future cooperation in the Disaster Risk Reduction and Meteorology sub-sector.

Limitations

The limited time and resources available to the evaluation team has restricted the like-minded peer country analysis to: (i) identifying and analysing secondary data from previous evaluations conducted by MFA and the Netherlands; (ii) identification of key documents available online; (iii) email exchanges, or remote interviews if relevant with a small number of staff from government, the private sector and/or non-state actors who are considered as key informants.

Main findings from the like-minded peer country analysis

A rapid review of online material was conducted to compare what the abovementioned peer countries are doing in the Disaster Risk Reduction and Meteorology sub-sector against similar practices conducted by Finland. The Netherlands was identified as the most interesting for the like-minded peer country analysis on the grounds it is the only peer country that has formally adopted a strategy to engage both the private sector and civil society organisations in its development cooperation, which has increasingly focused on **climate action**, in which support to the Disaster Risk Reduction and Meteorology sub-sector is seen as key to supporting Climate Change Adaptation, water and ecosystem management and resilience building in Africa and Asia. Moreover, the Dutch approach was found to be of particular interest to Finland, because it has a strong commitment to developing public-private partnerships to drive the climate action agenda forward in low-income countries in these continents.

Meanwhile, Denmark, Norway, Ireland and Switzerland all support climate action but continue to operate largely through public institutions and/or multilateral channels in their support to Environment and Natural Resources in general, and Disaster Risk Reduction and Meteorology in particular. In Denmark its Strategy for Development Cooperation recognises the importance of strengthening private sector engagement through public-private partnership, but this is mainly focused on supporting the greening of developing economies.19 In Norway the Ministry of Climate and Environment is responsible for Government's environmental policy, which at the international level centres on Norway's International Climate and Forest Initiative (NICFI).20 In the case of Ireland and Switzerland key features of their cooperation policy are strong partnerships with non-governmental organisations (such as the Red Cross movement, Trocaire, Helvetas) and, in the case of Swiss Development Cooperation, partnerships between their universities and local universities to enhance research and knowledge transfer on climate change trends (such as glacier retreat).

19 Ministry of Foreign Affairs of Denmark (2024). The World we Share: Denmark's strategy for development cooperation (p.42). PDF download available at: https://um.dk/en/danida/strategies-and-priorities

20 Government of Norway (2025). Climate and environment – Norway's International Climate and Forest Initiative (NICFI). Available at: https://www.regjeringen.no/en/topics/climate-and-environment/id925/

However, an evaluation of Irish cooperation indicates more needs to be done on improving the linkages between adaptation to climate change and disaster risk reduction (Disaster Risk Reduction) both nationally and internationally.21 Similarly, an evaluation of Swiss cooperation support to adaptation and mitigation to climate change confirms greater institutional coherence (including private sector engagement) and improvements in knowledge management are required.22

Nonetheless, one area where there is scope for greater policy coherence on Disaster Risk Reduction and Meteorology between Finland and the abovementioned peer countries lies with their common support to the Systematic Observations Financing Facility (SOFF), established in 2021 to improving weather and climate services of least developed countries and small island developing states, especially in Africa and Asia. All peer countries (except Switzerland) are founder members of SOFF and in 2024 Denmark, Finland and Norway have all actively provided additional funding to the SOFF through the Nordic Development Fund.23 This is, therefore, assessed in the following sections of the like-minded peer country analysis of the Netherlands.

The main features of the Netherland's commitments to climate action within the context of conserving and sustainably using the Environment And Natural Resources.

The Netherlands international development cooperation policy has a long history of supporting Environment and Natural Resources in developing countries. Between 2016 and 2024 climate action has become one of its main priorities, in line with its commitments to the Sustainable Development Goals (SDGs), the Paris Agreement (2015) under the UN Framework Convention for Climate Change (UNFCCC) and the UN Convention to Combat Desertification (UNCCD), among others. This has resulted in well over 40% of its overseas development assistance (ODA) supporting climate action in two main areas. First, on stimulating Climate Change Adaptation in mainly low-income countries in Africa and Asia. Second, to mobilise public-private partnership whereby ODA is used as a blending mechanism to provide concessional loans to de-risk private investment in Climate Change Adaptation and climate change mitigation projects and programmes in Africa and Asia.24

The main features of Dutch commitments to climate action have included: (i) launching the Partnership Development Facility (PDF) in 2016 under the management of the Dutch Entrepreneurial Development Bank to support climate action especially in the agriculture and water sectors; (ii) establishing the carbon-neutral Global Centre on Adaptation in 2018 to speed up climate resilient development in Africa, Asia and the Pacific;25 (iii) launching the Dutch Fund for Climate and Development (DFCD) in 2019 with an initial commitment of EUR 160 million to be managed by a consortium comprising the Dutch Entrepreneurial Development Bank, the World-Wide Fund for Nature in the Netherlands and Climate Fund Managers. The initial target of the DFCD was the mobilisation of at least EUR 500 million in private sector investment in Climate Change Adaptation by

21 Environmental Protection Agency (2019). Enhancing Integration of Disaster Risk and Climate Change Adaptation into Irish Emergency Planning. Available at: https://www.epa.ie/publications/research/climate- change/Research_Report_419.pdf

22 Caldecott, J. and Olding, W. (2022). Independent Evaluation of SDC's Engagement in Climate Change Adaptation and Mitigation 2015-2020. Particip GmbH. https://www.aramis.admin.ch/Default?DocumentID=69338&Load=true..

23 Nordic Development Fund (2022). Available at: https://www.ndf.int/what-we-finance/projects/project-database/systematic-observations-financing-facility-soff-c139.html?utm

24 Ministry of Foreign Affairs of the Netherlands (2025). Available at: https://english.iob-evaluatie.nl/results/climate-financing

25 GCA Global Centre (2025). Available at: https://gca.org/about-us/

the end of 2022;26 (iv) adoption of the Integrated African Strategy 2023-2032, which marked a shift from fragmented cooperation projects to coordinated action to deliver sustainable development, climate resilience and improved natural resource management in Africa; (v) the establishment of the partnership on climate change and health with the World Health Organisation in 2023, which forms an integral part of the Dutch Global Health Strategy 2023-2030.27

The approach and strategy of the Netherlands to the Disaster Risk Reduction and Meteorology sub-sector in support of climate action.

The Netherlands has developed a comprehensive approach to strengthening Disaster Risk Reduction and meteorological services that emphasises the importance combining technical assistance, training and investment capacity of its public, civil society and private sectors respectively to advance climate action that responds to the specific needs and capacities of partner countries across Africa and Asia. The strategy in the Disaster Risk Reduction and Meteorology sub-sector is to strengthen the National Hydro-Meteorological Services to directly support and guide wider climate resilience, disaster preparedness, and natural resource management efforts. To achieve this, the Netherlands has adopted two main instruments to apply the abovementioned approach and strategy. They are:

- The **KNMI-Global initiative** – a Global Programme of the Royal Netherlands Meteorological Institute (KNMI), which was launched in 2021 in collaboration with the Dutch Ministry of Infrastructure and Water Management.28 The KNMI-Global initiative responds to the WMO's call at the COP26 Climate Summit to ramp up assistance to developing countries affected by the growing effects of climate change and who have difficulties in applying effective Climate Change Adaptation and resilience building.29 Building on lessons learned from Finland, Switzerland and the United Kingdom in the Disaster Risk Reduction and Meteorology sub-sector, the main aim of the KNMI-Global initiative is to provide the National Hydro-Meteorological Services in Africa and Asia (plus some countries in Latin America) with access to its technical expertise, capacity building services and weather and climate data. This access is provided through KNMI-Global's support to multilateral initiatives that include: (i) the development of regional climate centres in support of WMO's mandate to develop its Climate Services Information System (CSIS), for example, the Royal Netherlands Meteorological Institute (KNMI) has supported the development of regional climate centres in Africa (Togo and Uganda) and Asia (Thailand) to guide resilience planning and development (especially in the water, agriculture, health and infrastructure sectors);30 (ii) participation in the Systematic Observations Financing Facility (SOFF), through which KNMI has acted as a peer advisor on improving weather and climate forecasting services

26 Government of the Netherlands (2018). Available at: https://www.government.nl/topics/development/documents/publications/2018/11/19/grant-application-dfcd

27 The World Health Organisation (2024). Available at: https://www.who.int/news/item/10-10-2024-who-and-the-netherlands-renew-their-partnership-on-climate-change-and-health#:~:text=This%20contribution%20builds%20on%20the,climate%2Dresilient%20health%20system%20readiness.

28 The KNMI sources some of its weather observation equipment from Vaisala, Finland. An example, can be found at: https://www.knmi.nl/research/publications/verification-of-the-vaisala-lt31-transmissometer

29 KNMI (2021). Available at: https://www.knmi.nl/research/observations-data-technology/updates/knmi-global-boosts-collaboration-with-developing-countries

30 KNMI (2021). Available at: https://unfccc.int/files/adaptation/application/pdf/1.24_knmi_verver.pdf#:~:text=The%20Climate%20Risk%20and%20Early%20Warning%20(CREWS),risks%20from%20extreme%20events%2C%20such%20as%20heat.

and early warning in low-income countries (includes Cabo Verde, Senegal, Suriname and Uganda) and which directly supports the Early Warnings for All (EW4All) initiative launched in 2022 by the WMO and UNDRR;31 (iii) participation of KNMI as a Steering Committee member in the Climate Risk and Early Warnings initiative, which targets the EW4All initiative in least developed countries and small island developing states; (iv) the International Climate Assessment and Dataset, whereby the KNMI's Climate Explorer system provides data to the European Climate Assessment and Dataset project, which in turn supports the regional climate centres and Climate Risk and Early Warning Systems initiatives, among others.

- **Dutch Fund for Climate and Development** (DFCD), managed by a consortium including the Dutch Entrepreneurial Development Bank, World-Wide Fund for Nature in the Netherlands, and the Netherlands Development Organisation (SNV). The DFCD has actively used meteorological data to support climate adaptation and resilience building in key sectors such as agriculture, water, infrastructure and energy sectors mainly in Africa and Asia.32 Examples, include: (i) developing a climate resilient sustainable shrimp value chain in Bangladesh engaging the private sector and SNV, a Dutch CSO;33 (ii) supporting the Dutch company Climate Fund Managers bring forest restoration to market in Mozambique as a means to enhancing the resilience of local communities and conserving biodiversity;34 (iii) supporting WWF Netherlands and the private implement climate-resilient sugarcane production in Zambia.

In summary, the KNMI-Global and DFCD initiatives have been designed to be mutually reinforcing to support the Netherlands achieve its international commitments on climate action. Furthermore, by blending its resources and know-how on Disaster Risk Reduction and Meteorology to enable private and non-governmental sectors to drive the climate action agenda forward in Africa and Asia, the Netherlands has successfully maintained its added-value in the sectors where it has a competitive advantage on the world stage – water/natural resource management, food security and public health. However, in 2025 this approach and strategy is likely to change under the new government, with a shift from bilateral to multilateral cooperation through which the Dutch government still intends to lead in the abovementioned sectors.

The results obtained by the two main instruments used by the Netherlands to advance Disaster Risk Reduction and Meteorology services in Africa and Asia and the contribution of the Dutch private and non-governmental sectors in delivering these results.

Until the launch of the two abovementioned initiatives, Dutch cooperation in the Disaster Risk Reduction and Meteorology sub-sector centred predominantly on two main initiatives. First, the Dialogue and Dissent Programme, implemented by Partners for Resilience (PfR) and which ran globally over two phases from 2011-2020, (included countries where Finland had ICI projects such as Ethiopia, Indonesia, Kenya, and Uganda)35. The main achievements of the Dialogue and Dissent

31 European Meteorological Society (2024). Available at: https://meetingorganizer.copernicus.org/EMS2024/EMS2024-656.html?utm_source=chatgpt.com

32 DFCD (2025), Where we work. Available at: https://www.thedfcd.com/where-we-work/

33 DFCD (2023). Available at: https://www.thedfcd.com/news/leveraging-local-experiences-for-community-resilience/

34 Climate Fund Managers (2020). Available at: https://climatefundmanagers.com/2020/10/16/dutch-fund-for-climate-and-development-supports-forest-carbon-to-bring-forest-restoration-projects-to-market/?utm_source=chatgpt.com

35 Partners for Resilience (2020).

Programme were twofold. First, it built a global alliance of CSOs to strengthen community-based lobbying and advocacy capacity to secure the incorporation of integrated risk management in relevant policies, investments and practices in participating countries.36 Second, it demonstrated the importance of implementing integrated risk management tailored to community needs and capacities to build resilient development shaped to the local context. Second, Geodata for Agriculture and Water (G4AW) initiative, implemented by the Netherlands Space Office between 2013 and 2022. The main achievement the G4AW was the provision of satellite-based services to support the food security of over 4 million smallholder farmers across 25 projects and 15 countries.37

The Periodic review of the coherence of Dutch policy and the effects on food security, water and climate in developing countries 2016-202338 represents an important transition in the way the Netherlands evaluates the results of its cooperation supporting climate action. In line with the abovementioned approach and strategy, the Netherlands replaced sector-based evaluations on each of the above themes to a broader review on how far these themes have become interconnected to deliver results (linked to relevant SDGs), and how far international cooperation has been working together on delivering these results. In short, besides assessing results, the review paid attention on assessing policy coherence.

Of particular interest to Finland, is the main conclusion from the report that, **policy coherence positively contributes to achieving food security, water and climate objectives**. Overall, the review found a more coordinated approach to Dutch development policy has greatest impact in partner countries where donors have worked together on delivering these objectives within broader long-term strategies. The review also concluded that incoherence between the country's international development policy and its domestic agriculture, trade and value chain development has been reduced in recent years by interventions in value chain sustainability and sustainable production. Nonetheless, the main challenge in Dutch policy going forward is the need to link more effectively sustainable production with sustainable consumption (SDG 12).

The main achievements of the KNMI-Global initiative between 2021 and 2024 are still too early to determine. However, initial indications are positive for two main reasons. First, through the SOFF, KNMI-Global has enhanced coherence between donors on their support to low-income countries and small island developing states, which in the case of the KNMI has led to development of a partnership support to Cabo Verde, Sao Tome and Principe, Uganda, Senegal, and Suriname) identify their hardware, software and capacity gaps in their observations-analysis-communication chains (Readiness Phase of SOFF). Strengthening of these chains has started in Uganda (Investment Phase of SOFF). In the other four countries they are still developing their National Contribution Plans to develop Global Basic Observing Network which aims to facilitate more accurate weather and climate forecasting services globally (in the Compliance Phase of SOFF). Under these circumstances, there are positive signs that all five countries are committed to achieving the main objective of the EW4All initiative, namely that every person on earth is covered by early warning services, but it is unlikely this will be achieved by the 2027 target date of EW4All. Second, in line with Dutch interests to link improved weather and climate services to climate action in the water sector, the Netherlands launched the, *Water at the Heart of Climate Action* initiative in 2023. Building on lessons from previous interventions like the Partners for Resilience Programme

36 Partners for Resilience. Achievements (2021) Flagship Report – Achievements. Available at: https://www.partnersforresilience.nl/en/publications/flagship-report

37 The Netherlands Space Office (2022). Available at: https://www.spaceoffice.nl/en/news/555/g4aw-reaches-4-million-farmers.html?utm

38 Ministry of Foreign Affairs (2024). Available at: https://english.iob-evaluatie.nl/results/policy-coherence-for-food-security-water-climate

(2011-2021), the main aim of the initiative is to take a more integrated approach to strengthening the resilience of the WASH sub-sector through practical, locally-driven action that is coordinated by the International Federation of Red Cross and Red Crescent societies (IFRC). Countries targeted include Ethiopia, Rwanda, South Sudan, Sudan and Uganda.39 **This approach provides Finland with an interesting model on how to link its Disaster Risk Reduction and Meteorology and Water/WASH interventions in least developed countries.**

The overall conclusion of the external evaluation of the DFCD to 2024 is that the DFCD has been most relevant so far in advancing Climate Change Adaptation and that this has been facilitated by its unique approach of engaging the collaboration of investors and non-governmental organisations (Dutch Entrepreneurial Development Bank, Climate Fund Managers, SNV, WWF Netherlands), and the fact that the consortium partners are present in the developing countries supported. However, caveats in the DFCD's effectiveness and efficiency were identified as follows: (i) the DFCD has been less successful in advancing human and economic development of vulnerable groups and gender equality so far. This is largely due to project design faults, notably insufficient clarity on the activities/outputs and outcomes specific to vulnerable groups, which has also hampered effecting monitoring and assessment; (ii) the Origination Facility (OF)40 support on the identification of investment projects to be funded by the DFCD's Land Use Facility (to advance Climate Change Adaptation in mainly the forestry and agriculture sectors), and the Water Facility (to advance Climate Change Adaptation in WASH, natural resource management, etc.) have only engaged large investors due to the risk profile of the projects identified; (iii) the blending instruments (Land Use Facility and Water Facility) are too small to cover the financing needs of the Climate Change Adaptation foreseen in the abovementioned projects/sectors. This is not aided by bankability requirements of projects and a lack of hybrid blending to support de-risking throughout the project cycle; (iv) the graduation from OF to Land Use Facility/Water Facility is not working efficiently to engage small-medium-large enterprises, because the incentives for private sector engagement are skewed in favour of larger projects/investors; (v) the DFCD consortium set-up is too complex with delegated responsibilities to consortium partners that restricts central fund management, including insufficient guidance on project assessment selection and rejection and inefficient monitoring and reporting on investment projects with a results focus and which facilitate decision-makers to assess costs, financial additionality and risks against societal benefits.41

A comparative analysis of Finnish actions, including private sector engagement, in the same area of work.

Table 7 below has been produced to support a comparative analysis of a selection of Finnish and Dutch cooperation in the Disaster Risk Reduction and Meteorology sub-sector, highlighting where relevant how far private sector engagement and CSOs from both countries have been instrumental in strengthening National Hydro-Meteorological Services, regional climate centres and Disaster Risk Reduction capacity at all levels, especially at the local level.

39 UNDRR (2023). "From satellites to sandbags": Putting water at the heart of climate action. Available at: https://www.undrr.org/news/satellites-sandbags-putting-water-heart-climate-action

40 DFCD is divided into three facilities: Origination Facility (OF, managed by WWF Netherlands and SNV), Land Use Facility (managed by Dutch Entrepreneurial Development Bank) and Water Facility (WF, managed by Climate Fund Managers). Source: DFCD evaluation - FMO.

41 Ministry of Foreign Affairs of the Netherlands (2024). External evaluation of the DFCD. Available at: https://www.government.nl/documents/reports/2024/01/31/external-evaluation-of-the-dutch-fund-for-climate-and-development-dfcd

The main results of this analysis are summarised as follows:

- Between 2016-2024 the Finland and the Netherlands have both prioritised climate action in their cooperation policy and both have committed resources to the Disaster Risk Reduction and Meteorology sub-sector. However, Finland has mainly used the ICI instrument to strengthen the internal capacity and of the National Hydro-Meteorological Services to develop and apply Early Warning System in its partner countries in Africa and Asia, and bi-lateral/regional cooperation to promote Disaster Risk Reduction through the IFRC, in particular the FRC. According to FRC, strengthening Early Warning System has generally not led to long-term resilience building. Meanwhile, the Netherlands has increasingly transitioned from project approaches to partnership approaches to deliver climate action that builds resilience in a more integrated way covering its three core areas of expertise – agriculture, water and health. As a result, the Netherlands has been more successful in linking weather and climate information to decision-makers at all levels (especially at the local level), thus empowering them to take informed decisions on developing resilient agriculture, water and health sectors.
- In Finland, the FMI continues to provide technical training and support through its own programmes in support of WMO objectives, but which are generally too short in duration to deliver meaningful results. This has prompted extensions and new phases that have a bearing on effectiveness and efficiency. Since the creation of the SOFF in 2021, Finland has demonstrated its support to a more multilateral approach to strengthening the National Hydro-Meteorological Services in low-income countries and small island developing states. However, the exact role of FMI in the SOFF is not yet backed up by a strategy to clarify the linkages between the SOFF and the ICI projects and the ICI projects and key sectors where resilience building is crucial. Meanwhile, the Netherlands has increasingly shifted its centres of excellence (KNMI, Netherlands Space Office, Global Centre on Adaptation) to providing support through multilateral initiatives like SOFF. This has allowed institutions such as KNMI to engage in more coordinated and sustainable partnerships concerning data sharing, development of regional climate centres and strengthening of the National Hydro-Meteorological Services in low-income countries and small island developing states in order to improve global weather and climate forecasting objectives of the WMO and UNDRR. Moreover, these services represent a crucial part of the Netherlands strategy to use, for example, improved seasonal forecasting services to enhance resilience in the agriculture, water and health sectors.
- Finland's approach to Finnish private sector engagement has been limited by its use of the ICI, which is primarily an instrument to support public-public projects. The ICI has not evolved with a strategy to stimulate private sector engagement in an effective and efficient manner according to the risk profile of each project. Instead, the most successful strategy for private sector engagement has been to use the Public Sector Investment Facility (PIF). However, this has only been used to date in Ethiopia and Vietnam to procure private sector services for the installation, operation and maintenance of new networks of automated weather observation stations, lightening detection equipment and air quality sensors, among others. However, this approach has largely benefitted one company, Vaisala. Although this has expanded the coverage of worldclass weather equipment from Vaisala, the PIF has not been used as a gateway to broadening Finnish private sector engagement in other sub-sectors where the Finns have a long track record of expertise (forestry, renewable energy, water, agriculture). Conversely, the Netherlands has placed a lot of emphasis on private sector

engagement in climate action, especially since the launch of the DFCD in 2019 through which the private sector engagement has been supported to scale up Climate Change Adaptation with CSOs, especially in Africa. For example, Weather Impact, DTN/MeteoGroup, Akvo, Climate Fund Managers and others have all supported resilient development of strategic sectors (agriculture, forestry, water, energy) in which CSOs have ensured it is tailored to the needs of local partners that can scale-up climate action.

- Both Finnish and Dutch support to CSOs has focused on engaging the IFRC in delivering Disaster Risk Reduction at the community level, in particular through the Finnish and Netherlands Red Cross societies. This has facilitated a standardised approach to applying Disaster Risk Reduction that has also enhanced local ownership of Disaster Risk Reduction planning and implementation. The main strength of the FRC and partners has been its capacity to reach and train marginalised communities, which has generally reduced their immediate vulnerability to disasters. The Netherlands Red Cross and partners have, on the other hand, been less successful in this area. Instead, its approach to strengthening bottom-up advocacy for integrated risk management, has been more successful in advancing Climate Change Adaptation and resilience that can be scaled up through private sector engagement. As a result, the evidence so far is that Finland and the Netherlands are saving lives, but the latter has made a more tangible contribution than Finland to developing and applying subnational adaptation plans that directly support the National Adaptation Programme of Action.
- Unlike Finland, the Netherlands has underpinned its support to Climate Change Adaptation through the creation of the Global Centre on Adaptation, which since 2019 has provided significant technical guidance and support to Dutch-funded climate-smart actions to ensure that they are technically sound, grounded in social objectives (human rights and gender equality and women's empowerment) and scalable.
- The Netherlands has built a stronger reputation for advancing climate diplomacy, which has advanced the global case for climate justice, especially in small island developing states and countries that are highly affected by climate shocks. This has proved to be highly important in supporting developing countries improve their understanding and advocacy for greater climate (and water) governance that is key to securing sustainable and resilient development over the long-term. This aspect of Finnish cooperation in the Disaster Risk Reduction and Meteorology sub-sector in support of climate action still needs to be developed to support its commitments to climate action.

Table 8 presents indicative examples of private sector engagement via the DFCD and UNDRR's ARISE network with relevance to the DRR value chain. DFCD entries reflect how Dutch partners combine preparation, TA, blended instruments and investment to enable commercially viable, resilience-oriented projects. ARISE entries illustrate how businesses collaborate in a voluntary UNDRR network to advance risk-informed decision-making, supply-chain resilience and uptake of early-warning and preparedness practices.

Table 7 Comparative analysis of a selection of Finnish and Dutch cooperation in the Disaster Risk Reduction and Meteorology sub-sector

PROGRAMME/INITIATIVE	COUNTRIES	KEY PARTNERS	FOCUS AREA(S)	STRENGTHS/WEAKNESSES
FINLAND				
FINKERAT Project	Kenya, Rwanda, Tanzania	Finnish MFA, FMI, Finnish Red Cross	Capacity building of National Hydro-Meteorological Services, early warning systems (Early Warning System)	Strong technical leadership (FMI); supports sustainability via national ownership. Limited regional visibility; slower private sector scaling.
Climate Risk and Early Warning Systems East Africa	Kenya, Rwanda, Tanzania, Uganda	Finnish MFA, WMO, FMI	Impact-based Early Warning System, forecast verification, training	Aligned with global Climate Risk and Early Warning Systems standards; high relevance. Limited presence in broader Disaster Risk Reduction-CSO networks compared to other donors.
Public Sector Investment Facility (PIF) – Ethiopia	Ethiopia	Finnish MFA, FMI, Vaisala	Meteorological observation infrastructure, forecasting capabilities	Strong public-private synergy. Focused on technical delivery. Low level of collaboration with Disaster Risk Reduction to build resilient sectors
Community-Level Early Warning System Development	Kenya, Rwanda, Tanzania	Finnish MFA, FMI, Finnish Red Cross (FRC), local Red Cross societies	Village-level Early Warning System, communication strategies	Trusted community channels; localised messaging. Scalability dependent on government mainstreaming.
NETHERLANDS				
G4AW Programme	Kenya, Ethiopia, Uganda, Mozambique, Tanzania, Bangladesh, Indonesia, Myanmar, Nepal, Philippines, Sri Lanka, Vietnam	Dutch MFA, Weather Impact, Akvo, MeteoGroup, local non-governmental organisations	Satellite-based weather services for agriculture, water management	Promotes collaboration and private sector engagement. High Dependency on digital infrastructure; some services lacked uptake in poor rural areas
Climate Risk and Early Warning Systems East Africa	Kenya, Rwanda, Tanzania, Uganda	Dutch MFA, WMO, FMI,	Impact-based Early Warning System, forecast verification, training	Long-term non-governmental organisation involvement in advocacy and resilience. Linkages with broader goals on resilience evident. services in some cases
Water at the Heart of Climate Action	Ethiopia, South Sudan, Sudan, Uganda	SOFF-UNDRR-WMO, IFRC, Netherlands Red Cross	Water-related disaster risk management, Early Warning System, community engagement	Strong emphasis on public-private partnership to advance WASH, natural resource management. Sustainability depends on local market maturity and continued public backing
Dialogue and dissent	Ethiopia, Guatemala, Indonesia, Mali, Philippines, Uganda	PfR, CARE Nederland, Netherlands Red Cross, Cordaid, Red Cross/Red Crescent Climate Centre, Wetlands International	Integrated Risk Management, ecosystem-based Disaster Risk Reduction	Strong emphasis on CSO partnerships. Highly relevant at the local level. Lack of private sector engagement to support long-term resilient development
Dutch Fund for Climate and Development (DFCD)	Global	Dutch MFA, Climate Fund Managers, SNV,	Climate resilience, Disaster Risk Reduction, advocacy	Strong emphasis on private sector engagement and CSOs to establish resilient development. Complex funding mechanism; lacks focus on reducing vulnerability.

Table 8 Private sector engagement in the DFCD and ARISE initiatives

ACTION	SECTOR/THEME	NAME OF COMPANY(IES)	MAIN PRODUCTS AND/OR SERVICES PROVIDED BY THE PRIVATE SECTOR	FUNDING TYPE (AGREED/ PROPOSED) AND CONSORTIUM MANAGER (DFCD)
DFCD INITIATIVES				
1. Digital Farmer Management	Digital Agriculture	Various private technology firms	Developing digital platforms for farmers to manage livestock and crops, optimize water use, and increase yields.	Grants and technical assistance from the Origination Facility (SNV/WWF Netherlands)
2. Climate-Resilient Seeds	Climate-smart Agriculture	Ispahani Agro Limited (Bangladesh), Kentegra (Kenya)	Research, production, and distribution of climate-resilient and bio-pesticide-based seeds for smallholder farmers.	Grants and technical assistance from the Origination Facility (SNV/WWF Netherlands)
3. Nature-based Adaptation	Ecosystem Restoration	Camimex (Vietnam), Various small and medium-sized enterprises	Implementing projects that use natural processes, such as mangrove forest restoration, to address environmental challenges.	Grants funded from broader project budgets (SNV/WWF Netherlands)
4. Climate-Resilient Infrastructure	Water and Infrastructure	Private companies	Financing for projects related to water and sanitation infrastructure that are designed to be resilient to climate change impacts.	Blending from the Water Facility (Climate Fund Managers)
5. Forest Carbon Bond	Carbon Finance	Forest Carbon	Preparing an investment proposal for a green bond to fund large-scale forest conservation and carbon sequestration.	Origination and de-risking capital for larger bond issuance (Dutch Entrepreneurial Development Bank).
6. Meteorological Data	Climate and Data Services	Various private meteorological and hydrological services	Using and developing meteorological and hydrological data systems to provide early warnings and inform climate resilience planning.	Grants funded from broader project budgets (SNV/WWF Netherlands)
7. Sustainable Shrimp Farming	Climate-smart Agriculture	Camimex (Vietnam)	Expanding and modernizing sustainable shrimp farming in mangrove forests to enhance climate resilience and biodiversity.	Loan (USD 15 million) (Dutch Entrepreneurial Development Bank)
8. Forestry and Land Use	Sustainable Land Management	Various small and medium-sized enterprises in developing countries	Implementing sustainable forestry and land use practices, including agroforestry and ecosystem restoration.	Loans from USD 1 to 10 million per project (Dutch Entrepreneurial Development Bank)
9. Water Infrastructure	Climate-resilient Water Systems	Private companies in water and sanitation sectors	Developing and financing projects that improve water supply, treatment, and irrigation to adapt to climate change impacts.	Loans from USD 1 to 10 million (Dutch Entrepreneurial Development Bank)

ACTION	SECTOR/THEME	NAME OF COMPANY(IES)	MAIN PRODUCTS AND/OR SERVICES PROVIDED BY THE PRIVATE SECTOR	FUNDING TYPE (AGREED/ PROPOSED) AND CONSORTIUM MANAGER (DFCD)
10. Renewable Energy	Access to Energy and Clean Energy	Small and Medium-sized Enterprises (small and medium-sized enterprises)	Providing financing for clean energy projects, such as solar or wind, to reduce greenhouse gas emissions and enhance energy access.	Loans of USD 1 to 25 million (Dutch Entrepreneurial Development Bank)
UNDRR'S ARISE INITIATIVES				
1. Climate adaptation strategies for small and medium-sized enterprises	Business Development and Finance	Financial institutions, insurance companies	Developing new financial products and services to help small and medium-sized enterprises become more resilient to disasters and climate impacts.	Self-funded by member companies, with the aim of creating new revenue streams and reducing risk.
2. Disaster Risk Reduction-inclusive planning tools (for urban and land use planning)	Urban Planning and Infrastructure	AECOM, IBM, and other engineering and ICT firms	Developing and promoting tools and frameworks to integrate disaster risk reduction into urban and land use planning.	Self-funded by member companies as a public service or part of their corporate social responsibility
3. Integrating disaster/climate risk in finance	Financial Services and Risk Management	Financial institutions, insurance companies, accounting firms	Developing frameworks and tools to integrate disaster and climate risk into investment decisions, lending, and business models.	Self-funded by member companies as part of their voluntary commitment.
4. Public-private partnerships for climate resilient infrastructure	Resilient Infrastructure	AECOM, various engineering and construction firms, financial institutions	Engaging in public-private partnerships to build more resilient infrastructure in developing countries, particularly in Africa.	Varies widely; private sector contribution can be in the millions or billions of dollars for major projects.
5. Geospatial drought and flood monitoring for climate risk insurance	Technology and Financial Services	Geospatial tech firms, insurance companies	Using satellite and geospatial data to create models for drought and flood monitoring to promote and trigger climate risk insurance payouts.	Self-funded by member companies, with a focus on creating new market opportunities and reducing risk.
6. Supply Chain Resilience	Logistics and Risk Management	Various member companies	Mapping and strengthening global supply chains to withstand and recover from natural hazards and other shocks.	Self-funded by member companies; cost-benefit analysis shows that investing in resilience saves billions in potential losses.
7. Digital Transformation	Technology for Disaster Response	monday.com	Partnering with humanitarian organizations to use digital tools for more efficient and effective emergency response.	Self-funded by the company as a corporate social responsibility initiative.
8. Disaster Resilience Tool	Infrastructure and Business Continuity	AECOM, IBM, and others	Developing and promoting tools like the "Disaster Resilience Scorecard" for cities and businesses to assess their disaster preparedness.	Self-funded by member companies as a public service or part of their corporate social responsibility

Lessons learned where improvements could be made to the Finnish approach.

Building on the previous sections, in particular the comparative analysis in the previous section, the following lessons learned from the Netherlands' approach are worthy of internal review by MFA, FMI and other Finnish partners to enhance the added-value of Finland's worldclass expertise in improving weather and climate services globally in the 2025–2030 period and beyond.

Lesson 1: the promotion of decentralised, demand-driven weather and climate services is a crucial element in empowering local communities to shift to resilient practices and development. Finland could learn from the Netherlands that the tailoring of these services to meet stakeholder needs in the agriculture, forestry, water and energy and other key sectors increases service uptake, which in turn enhances ownership and the case that these services should be sustained over the long-term.

Lesson 2: engagement in multilateral initiatives, such as SOFF, offer new opportunities for Finland to shift from a donor to a leader on policy reform and the strengthening of National Hydro-Meteorological Services services in selected low-income countries and small island developing states.

Lesson 3: engagement of FMI in multilateral mechanisms offer new opportunities to not only improve data exchange and use, but to develop climate diplomacy to support the scaling up of Disaster Risk Reduction and Meteorology in support of climate action.

Lesson 4: systematic use of blended finance and climate investment vehicles such as the DFCD provides a viable way to de-risk private sector engagement in climate action, especially when these vehicles are simpler to access and adequately flexible to allow small, medium and large-sized companies to invest in climate action. Finland could channel PIF and other funds supporting private sector engagement to support Finnish companies to engage in areas of climate action where they have in-depth expertise and/or a competitive advantage.

Lesson 5: integrated approaches that enable CSOs and the private sector to work together on climate action appear to be more effective, efficient and sustainable than promoting their participation through isolated projects and facilities. However, these approaches must be identified in the programme/project design phase and reassessed during the implementation phase in order lessons are learned and good practices are scaled-up.

Lesson 6: Dutch cooperation has shown that long-term initiatives spanning 10 or more years enables partnership continuity and growth, stimulates institutional memory, and delivers impact. Finland's ICI projects run on short project cycles that need regular extensions or new phases to build partnerships.

Annex 3: Market analysis

This market analysis reviews Vietnam's Disaster Risk Reduction and hydro-meteorological (hydro-met) services market, links it to the PROMOSERV I–III cooperation, and maps demand to Finnish private-sector capabilities.

1. LOCAL CONTEXT AND BUSINESS ENVIRONMENT	
1.1 Description of the focus area	• Hydro-met services span observing (surface, upper-air, radar, lightning, hydrometric), data management/quality, numerical weather prediction, nowcasting, impact-based warning, hydrological forecasting, climate services, and decision-support and dissemination.
1.2 Status in Vietnam	• Since 2010 Vietnam has invested in nationwide radar and lightning networks, automated weather stations, and forecaster workstations. • Common alerting and service processes have been introduced under PROMOSERV and complementary programmes. • Recent experience with Super Typhoon Yagi (2024) underscores the economic stakes and the need to strengthen end-to-end early warning and hydrological/urban flood services.
1.3 Focus-area development needs and challenges	• Selective densification and calibration of observing networks (radar Quantitative Precipitation Estimation, lightning, hydrometric stations) with spares and local Operation and Maintenance capacity. • Data governance, Quality Assurance/Quality Control, cybersecurity and continuity; open/service data with measured key performance indicators and Service Level Agreements. • Impact-based forecasting and warning: thresholds, exposure/vulnerability layers, decision matrices and user-tested communication. • Urban flood intelligence: city-scale hydrodynamic modelling fused with Earth Observation/ Synthetic Aperture Radar, gauges and crowd/IoT feeds; real-time Decision Support System in control rooms. • Coupled hydro-met–hydrology chains and reservoir operations Decision Support System; landslide/sediment risk. • Capacity development and vendor-agnostic training; sustainable Operation and Maintenance financing and managed-service models.
1.4 General private-sector business environment	• Public procurement follows national investment/ODA rules with localisation and standards compliance • English is common in donor projects but Vietnamese partners and Systems Integrators are essential. • Digital government and climate adaptation strategies support demand growth • Donor portfolios in urban resilience, disaster risk management and water create predictable entry points.

2. DEMAND WITHIN THE FOCUS AREA	
2.1 Typical client/ customer segments	• Core public sector (Vietnam Meteorological and Hydrological Administration/NCHMF; Vietnam Disaster and Dyke Management Authority; provincial disaster-management authorities (provincial DDMAs), line ministries and State-Owned Enterprises (SOEs) (energy, transport, water), city governments • Critical-infrastructure operators (power grid, hydropower, ports/aviation) • Insurers/banks • International partners (World Bank/Asian Development Bank/Japanese International Cooperation Agency/UN, WMO/UN Economic and Social Commission for Asia and the Pacific) act as financiers and standard setters.
2.2 Scale of demand and 5–10-year outlook	• Hydro-met investments will continue, driven by climate variability, urbanisation and economic exposure. • Capital expenditure flow is expected to be stable for network upgrades • Strong growth in Operation and Maintenance and managed services (service performance, Service Level Agreements, cyber, training) is expected by analysts. • Urban flood risk and impact-based forecasting and warning will be priority lines in donor-financed city programmes, complemented by hydrological forecasting improvements in major basins.
2.3 Regional differences (if any)	• High-risk deltas (Red River/North; Mekong/South) and rapidly growing metropolitan areas (Hanoi, Hai Phong, Da Nang, Ho Chi Minh City, Can Tho) show the highest near-term demand for urban flood intelligence, nowcasting and multi-agency decision support system. • Mountain provinces prioritise flash-flood/landslide services and road/energy resilience.

3. COMPETITION/CURRENT OFFERING WITHIN THE FOCUS AREA	
3.1 Key companies active in the sector	• International suppliers cover radar/observations, lightning networks, forecaster workstations, Decision Support System and Earth Observation analytics (EU, Japan, South Korea, United States, China), alongside Vietnamese System Integrator and ICT firms. • Japanese cooperation (e.g. X-band radar pilots) and multilateral programmes continue to shape standards and interoperability.
3.2 Estimated current market size reached by businesses	• Market value fluctuates by programme cycle • Recent national upgrades (radar/lightning/automation), donor hydromet/disaster risk management operations and city-scale flood initiatives imply a multi-year market measured in the tens of millions of euros annually, with Operation and Maintenance shares rising.

4. FINNISH COMPANIES' OFFER: POTENTIAL AREAS FOR FINNISH PRIVATE SECTOR ENGAGEMENT IN THE DISASTER RISK REDUCTION VALUE CHAIN (HIGHLIGHTING COMPANIES ALREADY PARTICIPATING IN THE FINNISH WATER FORUM)	
Finnish firms that can provide products and services that are in high demand in Vietnam.	• Adven – Provides sustainable energy and water solutions as a service for industries and properties. Offerings include district heating/cooling, industrial energy, and water treatment, focusing on energy efficiency and renewable energy. • AFRY – Offers technical and environmental expertise for waterways and hydraulic engineering, involving climate impact assessment and hydrological analyses for infrastructure. Hydropower Water Management: Designs hydropower plants, dams, and pumped storage. Provides expertise in sustainable river management, including biodiversity protection and design of locks, barrages, and fish passages. Water Management and Climate Smart: Solutions for port facilities, coastal protection, flood retention, and sustainable hydraulic construction. • Biovoima – Provides solutions for transforming biomass (including agricultural waste) into energy, such as biogas and solid recovered fuel. Contributes to circular economy, waste reduction, and renewable energy production. • Flootech – Specialises in industrial water treatment, water reuse, and wastewater treatment. Offers technologies like membrane filtration, biological treatment, and advanced oxidation for water recovery and resource efficiency. • Flyby Guys – Provides tailored drone data that can be utilised for mapping, surveying, monitoring, and inspection purposes. • Fortum – Utilises weather and climate data for optimising energy production, demand forecasting, and integrating renewable energy sources. • Hydropower Water Management and Climate Smart Energy – A leading clean energy company. Owns and operates significant hydropower assets, providing services for their optimal operation. Invests in and develops various climate-neutral energy solutions, including renewables, recycling, and nuclear power. Focuses on decarbonising industries. • Kemira – Provides chemicals and expertise for water-intensive industries (pulp and paper, oil and gas, mining, municipal water treatment). Their solutions optimise water use, improve resource efficiency, reduce energy consumption, and treat wastewater. • Neste – Global leader in producing renewable diesel, sustainable aviation fuel, and renewable raw materials for plastics and other applications. These products significantly reduce greenhouse gas emissions and focus on circular economy. • Smartvatten – Provides smart water meters and analytics for real-time water consumption monitoring and leak detection in buildings. Focuses on preventing water waste and property damage. • Spinnova – Produces sustainable textile fibres from wood or agricultural waste without harmful chemicals. Offers an environmentally friendly and circular approach to material production with significantly reduced CO2 emissions and water use. • Sweco Finland – Designs solutions that reduce climate impact and help society adjust to climate change, which would necessitate using climate data for flood planning and stormwater management. Offers comprehensive water management services including design and planning for water supply, sewage, and stormwater networks. Provides capacity examinations, modelling, functional design, and optimisation of water transmission and pumping systems. Designs green infrastructure for stormwater management. • Vaisala –Global leader in environmental and industrial measurement. Offers a wide range of weather and environmental instruments, systems, and services (radars, lightning detection, road weather stations, aviation systems). Provides critical weather data for forecasting and risk management. Involved in developing CO2 sensors for agriculture. Their measurement technologies can support water management by providing accurate data for hydrological models, monitoring water levels, and predicting floods/droughts. Their environmental sensors are crucial for optimizing irrigation in climate-smart agriculture

4. FINNISH COMPANIES' OFFER: POTENTIAL AREAS FOR FINNISH PRIVATE SECTOR ENGAGEMENT IN THE DISASTER RISK REDUCTION VALUE CHAIN (HIGHLIGHTING COMPANIES ALREADY PARTICIPATING IN THE FINNISH WATER FORUM)

	• Valmet – Provides technologies and services for pulp, paper, and energy industries. Their solutions focus on improving water and energy efficiency, reducing emissions, and utilizing biomass for energy production, contributing to climate-smart industrial operations. • Veolia Water Technologies Finland – Specialises in designing and delivering drinking water and wastewater treatment plants. Offers standardised equipment, maintenance, and digital solutions (Hubgrade) for plant management. Aims to preserve water resources through wastewater reuse (Zero Liquid Discharge) and optimise consumption. • Voith (Finnish operations) – Finnish operations primarily focus on core industrial solutions that can include specific weather/climate information products for external clients. A global full-line supplier for hydropower, offering components for large and small hydropower plants as well as pumped storage plants – from generators, turbines, pumps, and automation systems to spare parts, maintenance, and training services. Also provides digital solutions for plant lifecycle. • Wärtsilä – A global leader in technologies and lifecycle solutions for the marine and energy markets. Provides flexible solutions to manage and optimise complex energy systems, including engine power plants, hybrid solutions, and energy storage and optimisation technology. Focuses on decarbonisation.

5. CONCLUSION: Ukraine's energy sector has substantial modernisation and efficiency needs alongside strong renewable and decentralisation momentum. Financing is available from multiple sources. Finnish firms already have a foothold and tailored instruments exist to scale participation, tempered by conflict-related and governance risks.

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Annex 4: List of institutions consulted

ORGANISATION/UNIT	NUMBER OF INFORMANTS
Responsible for Finland's Development Cooperation policy	
MFA - Department for Development Policy/Project Management Unit	2
MFA - Department for Development Policy/Unit for Climate and Environmental Diplomacy	4
MFA - Department for Development Policy/Unit for Civil Society	1
Responsible for implementation of Finland's development cooperation	
Embassy of Finland to Vietnam	1
Finnish Meteorological Institute	1
Finnish Red Cross/ International Aid Department	1
GTK	1
Luke	1
UNDRR/Bangkok	1
UNDRR/Headquarters	8
UNDRR/Nairobi	1
WWF Finland	1
Private sector companies42	
Vaisala	2
TOTAL	25

42 Private sector companies (19) who participated in the online survey, did so anonymously, therefore, they are not included in this list.

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