Eighth Steering Committee
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Mainstreaming scaling initiative: SOFF case study

INF 8.4

Systematic Observations Financing Facility

Weather and climate data for resilience

Purpose of this Document

The Scaling Community of Practice launched an action research initiative with case studies of the efforts to mainstream scaling by selected funder organizations. The present case study reviews SOFF experience of mainstreaming scaling during preparation and early implementation of the facility.

The study finds that SOFF has a clear vision of scale; a well-designed scalable intervention that supports sustainable impact at scale; an array of critical actors coordinated by SOFF acting as an intermediary; a clear strategy for implementing the scaling pathway recognizing systemic constraints and opportunities; appropriate implementation modalities, including technical assistance, incentives and outreach, to create capacity demand and incentives; and an effective approach to monitoring results and evaluating design and implementation. The analysis concludes that SOFF mainstreamed scaling fully into its design.

The study was prepared by Johannes F. Linn, Co-Chair of the Scaling Community of Practice and SOFF Global Facilitator. The preparation of the case study was not financially supported by SOFF.

MAINSTREAMING SCALING INITIATIVE CASE STUDIES

The Systematic Observations Financing Facility (SOFF)

Johannes F. Linn

22 December 2023

SCALING
COMMUNITY OF PRACTICE

MAINSTREAMING SCALING

A Case Study of the Systematic Observations Financing Facility (SOFF)

by

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22 December 2023

A Case Study for the Initiative on
Mainstreaming Scaling in Funder Organizations

For the Scaling Community of Practice
www.scalingcommunityofpractice.com

Preface

The Scaling Community of Practice (CoP) launched an action research initiative on mainstreaming scaling in funder organizations in January 2023. This initiative has three purposes: to inform the CoP members and the wider development community of the current state of support for and operationalization of scaling in a broad range of development funding agencies; to draw lessons for future efforts to mainstream the scaling agenda in the development funding community; and to promote more effective funder support for scaling by stakeholders in developing countries. (For further details about the Mainstreaming Initiative, see the Concept Note on the COP website).

The Mainstreaming Initiative is jointly supported by Agence Française de Développement (AFD) and the Scaling Community of Practice (CoP). The study team consists of Richard Kohl (Lead Consultant and Project Co-Leader), Johannes Linn (Co-Chair of the Scaling CoP and Project Co-Leader), Larry Cooley (Co-Chair of the Scaling CoP), and Ezgi Yilmaz (Junior Consultant). MSI staff provide administrative and communications support, in particular Leah Sly and Gaby Montalvo.

The principal component of this research is a set of case studies of the efforts to mainstream scaling by selected funder organizations. These studies explore the extent and manner in which scaling has been mainstreamed, and the major drivers and obstacles. The case studies also aim to derive lessons to be learned from each donor's experience, and, where they exist, their plans and/or recommendations for further strengthening the scaling focus.

The present case study focuses on the Systematic Observations Financing Facility (SOFF). It was prepared by Johannes F. Linn, Co-Chair of the Scaling Community of Practice and SOFF Global Facilitator. The preparation of this case study was not financially supported by SOFF.

Acknowledgements

The cooperation of Markus Repnik, Lorena Santamaria, Michael Staudinger and Laura Tuck in sharing their insights on the origins and early stages of preparation of SOFF is gratefully acknowledged. They, as well as Mario Peiro Espi, also commented on a draft of this paper. The author is solely responsible for the content of the paper.

Executive Summary

The Systematic Observations Financing Facility (SOFF) started operations in July 2022. It finances improved collection and sharing of the surface-based weather and climate observations in developing countries. These observations are critical for weather and climate analysis and prediction by the global weather centers, which in turn provides the foundation for regional and national weather and climate prediction. Accurate weather and climate prediction are essential for early warnings of natural disasters and have substantial benefits for agriculture, energy, transport, etc. Hence, global collection and sharing of weather data represents an important global public good.

Currently there are major gaps in global weather observations, especially in the developing countries. Investments in closing these gaps are estimated to have a 25:1 benefit-cost ratio. The members of the World Meteorological Organization (WMO) agreed in 2019 to establish a universal minimum standard of basic surface-based weather and climate observations – the Global Basic Observations Network (GBON).

It came into force in January 2023. However, many developing countries, especially the Small Island Developing States (SIDS) Least Developed Countries (LDCs) and many Lower Middle-Income Countries (LMICs), do not have the financial resources or technical capacity to deliver the observations that they are now committed to share. As of June 2023, these 109 countries generate and internationally exchange only 7 percent of the mandated GBON land surface data. Past efforts of international donors to provide financing for improved observation infrastructure was fragmented, one-off and unsustainable.

SOFF was established by WMO, the United Nations Development Program (UNDP) and the United National Environmental Program (UNEP) to provide financing and technical assistance to the developing countries' national meteorological offices so that they can meet their GBON commitments, initially principally to SIDS and LDCs. SOFF is a "vertical fund", which focuses narrowly on closing the GBON gap. At the same time, it is designed to cooperate closely with a great number of partners to ensure effective delivery of investment and advisory services and the effective utilization of observations in the provision of weather and climate-related services (for early warning, agriculture, energy, transport, etc.).

This case study explores whether the preparation of SOFF mainstreamed scaling into the design of this vertical fund, by assessing whether and how SOFF meets the eight scaling principles established by the Scaling Community of Practice. This study finds that SOFF has a clear vision of scale; a well-designed scalable intervention that supports sustainable impact at scale; an array of critical actors coordinated by SOFF acting as an intermediary; a clear strategy for implementing the scaling pathway recognizing systemic constraints and opportunities; appropriate implementation modalities, including technical assistance, incentives and outreach, to create capacity demand and incentives; and an effective approach to monitoring results and evaluating design and implementation. The analysis concludes that SOFF mainstreamed scaling fully into its design, even though it was not prepared on the basis of an explicit scaling approach.

The review finds that SOFF was designed to:

i. contribute to the larger system of the global weather observations and prediction system and linked to a global standard (GBON);

ii. connect with a large number of essential partners and serving as an intermediary to coordinate the provision of finance, technical advice and linkage with downstream weather and climate services;

iii. combined funding with technical assistance at country level for the analysis of observations gaps, for investment in improved observation capacity, and for sustained operations and maintenance indefinitely beyond the investment phase, all with a sense of urgency while containing costs;

iv. monitor results by tracking the actual delivery of observational data by the weather stations and by evaluating the design and delivery of SOFF on an intermittent basis to allow for adjustments in the SOFF design as needed;

v. raise the financial resources needed to finance SOFF activities on a sustained basis and intensively communicate with recipients, partners and other stakeholders to ensure demand and support; and

vi. allow scaling of SOFF beyond its initial principal focus on SIDS and LDCs to also support middle-income countries (MICs) and eventually also expand into other observation domains, including ocean observations, hydrological observations, and cryosphere observations.

The case study draws lessons from the preparation process for SOFF, which is relevant for the preparation of future new funds and for mainstreaming processes in existing funds, including the importance of

i. leaders and champions in the preparation and mainstreaming process;

ii. a convincing narrative of the value added of the scaling initiative;

iii. an effective organizational platform for the preparation of the new scaling initiative;

iv. clear terms of reference and processes and procedures for implementation; and

v. wide and inclusive consultation and outreach to test and promote the initiative.

SOFF is a new facility. Only time will tell how effectively its scaling design will work in practice. This case study notes that there are potential challenges which SOFF may need to address if it is to effectively deliver on its scale goal. They include: successfully coordinating a large number of partners in a complex hydromet system; maintaining the focus of recipients and participating organizations on collecting and sharing observations; ensuring effective compliance with observation collection and sharing requirements after the investment phase; implementation of SOFF in fragile and conflict affected states; and mobilizing the financial resources required to deliver on its promise. An initial independent external review after 15 months of operations credits SOFF with a very effective start. This bodes well for SOFF's future.

Finally, SOFF as a narrowly focused vertical fund aims to improve a particular aspect of a large system. Moreover, it has a limited time horizon (except, importantly, that it is designed to support sustainable functioning of the observations infrastructure in its target countries indefinitely). Its lessons therefore apply most directly to other similar vertical funds and initiatives aimed at improving specific aspects of a large system. But its lessons also carry over more generally into how scaling should be mainstreamed into the design and operation of funding organizations.

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List of Acronyms

AOSIS	Alliance of Small Islands States
CHD	Country Hydromet Diagnostics
COP	Conference of Parties of the UNFCCC
CREWS	Climate Risk and Early Warning Systems Initiative
CSI	Country Support Initiative
DAC	OECD Development Assistance Committee
ECMWF	European Centre for Medium-range Weather Forecasts
EW4All	Early Warning for All Initiative
GBON	Global Basic Observations Network
GNDR	Global Network of Civil Society Organizations for Disaster Reduction
GPG	Global Public Good
HMEI	Association of Hydrological Equipment Industry
IFAD	International Fund for Agricultural Development
LDCs	Least Developed Countries
LMICs	Lower Middle-Income Countries
MDBs	Multilateral Development Banks
MICs	Middle Income Countries
NDF	Nordic Development Fund
OECD	Organisation for Economic Co-operation and Development
O&M	Operations and Maintenance
SIDS	Small Island Developing States
SOFF	Systematic Observations Financing Facility
UK	United Kingdom
UN	United Nations
UNDP	United Nations Development Program
UNEP	United Nations Environment Program
UNFCCC	United Nations Framework Convention on Climate Change
WFP	World Food Program
WMO	World Meteorological Organization
ZAMG	Central Agency for Meteorology and Geodynamics (Austria)

Introduction

This case study reviews the experience of mainstreaming scaling during the preparation and early implementation of the Systematic Observations Financing Facility (SOFF), a new UN climate fund that aims to improve the collection and international exchange of weather and climate observations in developing countries with a focus on Small Island Developing States (SIDS) and Least Developed Countries (LDCs) with the goal to strengthen global weather and climate prediction globally and in the beneficiary countries.

SOFF is not a freestanding innovation that is to be scaled up, but an effort to improve an existing system, the global weather and climate analysis and prediction system, in a very specific and targeted manner over a period of ten years using a scaling approach. Moreover, SOFF is part of the newly established United Nations Early Warnings for All Initiative which aims to improve the entire value chain of early warning interventions, from weather and climate observations gathering (under SOFF) to delivery of early warning services to populations around the globe.

The evidence base for this case study is principally the author's own experience in his capacity as "SOFF Global Facilitator" since October 2020 to the present. He therefore is a participant observer rather than an independent evaluator. This has the advantage of being close to and well informed about the process, but suffers from the obvious limitation of potential bias.[1] In addition to this first-hand experience, the author interviewed four principals[2] who were closely engaged with SOFF from the very beginning about their experience during the initial preparation phase of SOFF (before the author joined the SOFF team).

The case study is structured as follows: Section 2 provides background on SOFF, while Section 3 traces the journey of its creation. It has been a journey of establishing a "vertical" fund with a clear approach to achieving sustainable impact at scale. Section 4 assesses how the design of SOFF stacks up in relation to the eight scaling principles developed by the Scaling Community of Practice. Section 5 summarizes SOFFs implementation experience to date and highlights some potential challenges it will face as it continues its implementation of the scaling pathway. Section 6 concludes the case study with a set of overall lessons from the SOFF experience.

What is SOFF?

Ground-based weather observations are a critical input to global, regional, national and local weather forecasts and climate prediction. For accurate forecasts of weather more than three days ahead anywhere on the globe, weather prediction models need to draw on information on weather conditions from all around the globe. Furthermore, climate trend and impact analysis depends critically on accurate and complete information on current global weather and climate conditions. The collection and international sharing of local weather and climate data is therefore a global public good. There are however large gaps in weather observations in many parts of the world, especially in the Least Developed Countries (LDCs), Small Island Developing States (SIDS) and Lower Middle-Income countries (LMICs). These gaps occur either because data are not collected locally, or data that are collected are not internationally shared with the global weather and climate prediction centers. The resulting reduction

[1] This bias is common to all self-evaluations, which are now standard practice as an input to independent external evaluations.

[2] Markus Repnik, Director of Partnerships at WMO, and subsequently first Director of the SOFF Secretariat; Lorena Santamaria Rojas, WMO Program Officer; Michael Staudinger, former Director of the Austrian Met Office (ZAMG); and Laura Tuck, former Vice President for Sustainable Development of the World Bank.

in the quality of weather and climate prediction undermines the effectiveness of development and climate action and results in significant economic and social losses.[3]

In 2019 the 193 members of the World Meteorological Organization (WMO) agreed to a mandatory common minimum standard for the most essential ground-based weather observations collection and sharing (referred to as "GBON – the Global Basic Observing Network") by all countries. However, it was recognized that LDCs, SIDS and other developing countries are severely constrained in terms of capacity, resources and incentives for achieving and sustaining GBON compliance. This led to the creation of SOFF. According to the WMO Global GBON Gap Analysis of June 2023, LDCs, SIDS and LMICs generate and internationally exchange only 7 percent of the mandatory GBON data.

According to the SOFF Terms of Reference, SOFF has the following main characteristics:[4]

- "A global initiative to address a persistent problem in a global and systematic manner – i.e., missing surface-based weather and climate observations from developing countries.
- "An initiative with an exclusive focus on the initial part of the meteorological value chain that creates the foundation for effective weather and climate information services.
- "A dedicated financing mechanism that provides grants and technical assistance, with a focus on LDCs and SIDS, to enable sustained compliance with the GBON regulations.
- "A mechanism that is built on peer-to-peer collaboration and support among national meteorological services, harnessing their operational experience as providers of peer technical advice.
- A commitment of the Alliance for Hydromet Development, supported by beneficiary countries and multiple stakeholders."[5]

SOFF is a pass-through financing entity established by WMO, UNDP and UNEP as a UN Multi-Partner Trust Fund, to be funded on a voluntary basis primarily by bilateral official donors and relying on 9 implementing entities (IFAD, UNDP, UNEP, WFP and the Multilateral Development Banks – MDBs). Implementing entities are expected to complement and leverage their SOFF activities with their broader and more comprehensive country and regional projects dealing with weather and climate impacts on countries and their populations. With its narrow focus on a very specific set of goals and activities SOFF is a "vertical" fund, similar to the Global Fund for HIV/Aids, Tuberculosis and Malaria (GF), and Gavi (The Vaccination Alliance) and other specialized funds. SOFF also coordinates and pays for technical assistance provided to the meteorological offices of recipient countries by 28 peer advisers from more advanced meteorological centers of OECD countries and selected emerging market economies.

SOFF assistance is provided in three phases: a Readiness phase, during which the observation gaps and capacity needs are assessed by peer advisers and the national GBON contribution plan is established to close the country's basic weather and climate data gaps; an Investment phase, during which needed investments in observation infrastructure and capacity and associated peer advice is funded; and a

[3] For information on all aspects of the SOFF initiative covered in this case study, see WMO, UNDP, UNEP (2021). "Systematic Observations Financing Facility (SOFF): Terms of Reference" https://alliancehydromet.org/wp-content/uploads/2021/10/SOFF-Terms-of-Reference.pdf

[4] Verbatim quote from op. cit., p. 29.

[5] The Alliance is a group of 14 international agencies that convened to support hydromet development in developing countries in a coordinated manner; see https://alliancehydromet.org/about/. According to the Alliance website the scope of "hydromet" is as follows: "High-quality weather, climate, hydrological, and related environmental services ('hydromet' services) provide the foundation for effective climate adaptation and resilience action. While hydromet services provide a foundational role for economic prosperity and resilient development, many countries face substantial challenges in delivering them."

Compliance phase, during which a substantial part of operations and maintenance costs is paid by SOFF as long as observational data are generated and internationally exchanged.

The estimated global benefits of full GBON compliance and of the resulting improvement in weather prediction are about USD 5 billion annually with a cost-benefit ratio of about 1:25.[6] The estimated costs of bringing all SIDS, LDCs and LMICs into GBON compliance were estimated at about USD 400 million over a five-year implementation period and USD 50 million annually in O&M finance to sustain compliance beyond the first five years.[7]

The preparation of SOFF – a serendipitous journey of mainstreaming scaling

The preparation of SOFF involved a deliberate process of ensuring that certain key design elements were systematically reflected in the setup of this new financing initiative. However, the preparation process was not characterized as a scaling exercise by those responsible for it and they did not explicitly aim to match a particular approach to scaling. In this sense, it was serendipitous that the result, as we shall demonstrate in Section 4, turned out to be an organization which effectively mainstreamed the basic principles of effective scaling.[8] This section explores what were the key factors leading to this outcome, even if serendipitously so.

The core idea of SOFF and its key design elements

At the core of SOFF is a simple, but powerful idea that served as a potent driver of the initiative and its quest for sustainable impact at scale: the realization that accurate weather and climate prediction depends on the sustained collection and sharing of a minimum set of weather and climate observations from all over the globe, with effective prediction in turn serving as a foundational ingredient of effective development and climate action in areas where weather and climate play an important role (including agriculture, transport, water resources, renewable energy, tourism, health). This concept is reflected in the concept of the "hydromet value chain" linking upstream observations to downstream hydromet service provision (see Figure 1). The importance of comprehensive quality observations in ensuring effective downstream action is colorfully captured in the words of the WMO Secretary-General at the time: "If you put in junk, you get out junk." For meteorologists this was of course not a new idea, but it was not an idea that had been widely appreciated in non-meteorologist circles. The challenge then was to convince the development and climate-finance community that investment in the upstream stage of the hydromet value chain was worthy of international financial support and that it required a global approach and initiative.

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[6] These benefits arise from the commercial and government use of weather and climate prediction information for economic activities in many sectors, including agriculture, transport, construction, early warning, and other sectors. See Kull,Daniel Werner; Riishojgaard,Lars Peter; Eyre,John; Varley,Robert Andrew. *The Value of Surface-based Meteorological Observation Data (English).* Washington, D.C. : World Bank Group. http://documents.worldbank.org/curated/en/192461614151036836/The-Value-of-Surface-based-Meteorological-Observation-Data

[7] SOFF Steering Committee. "Decision 6.5 Expanding SOFF financial support to Middle Income Countries." https://www.un-soff.org/document/decision-6-5-expanding-soff-financial-support-to-middle-income-countries/

[8] The author of this case study joined the SOFF team as Global Facilitator in October 2020. At that time the main elements of the SOFF design had been well established. He therefore bears no responsibility and deserves no credit for the essential scaling features of SOFF.

Figure 1: The hydromet value chain

Source: SOFF Terms of Reference

A number of factors came together that helped bridge the gap between meteorologists and development and climate finance experts and create an effective case for investing in sustainable observation capacity.

Scientific evidence:

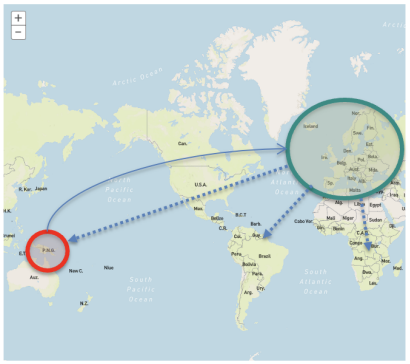
A critical, foundational element was the fact that there is solid scientific evidence demonstrating the impact of better weather and climate observations on better weather and climate prediction. This was an important factor at a time when the international development community focused increasingly on the importance of data for good policy and effective finance, as reflected in the World Development Report 2021.[9] Two simple graphs provided powerful demonstrations (a) of how weather predictions beyond three days depend on global weather observations, and (b) of the gaps in observations in parts of the world, esp. in Africa and among the Caribbean and Pacific island states (see Figures 2 and 3). This meteorological evidence was complemented by an important study by World Bank, WMO and UK experts demonstrating the global socioeconomic benefits of better observations mentioned above.[10]

[9] World Development Report 2021: Data for Better Lives. https://www.worldbank.org/en/publication/wdr2021 This report included a reference to the importance of weather and climate observations.

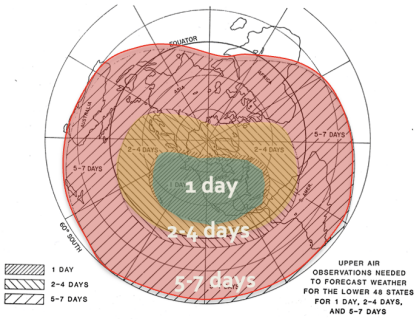
[10] Kull,Daniel Werner; Riishojgaard,Lars Peter; Eyre,John; Varley,Robert Andrew. *The Value of Surface-based Meteorological Observation Data (English).* Washington, D.C. : World Bank Group. http://documents.worldbank.org/curated/en/192461614151036836/The-Value-of-Surface-based-Meteorological-Observation-Data

Figure 2: Lack of data severely impacts the quality of weather forecasts and climate prediction everywhere

Example: Lack of observations in red area limits 7-10 day forecast skill in green area

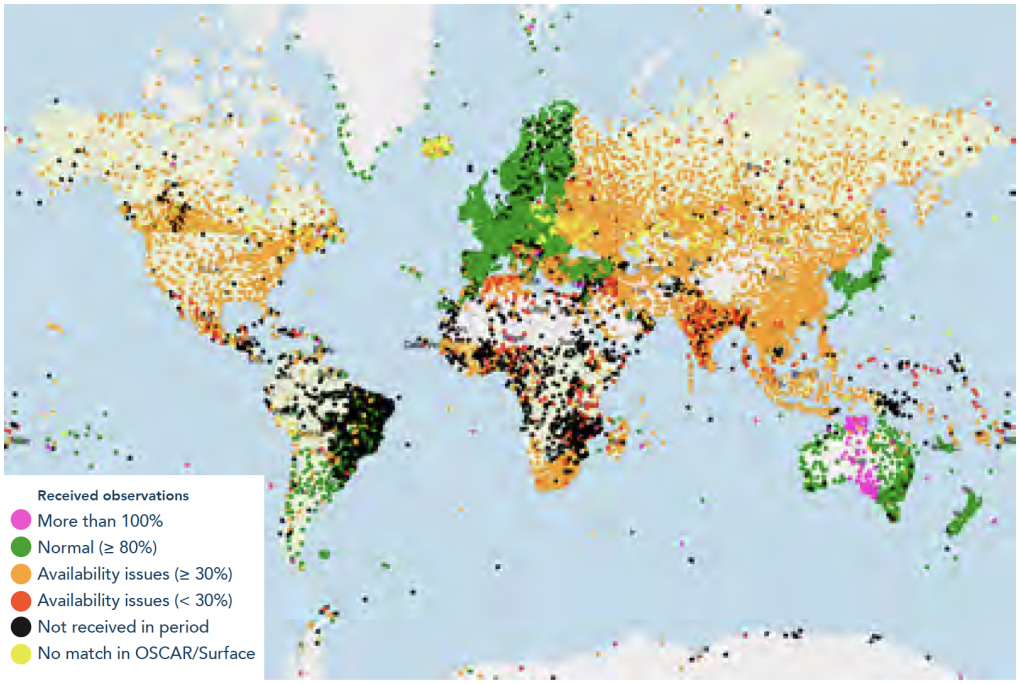


Reliable prediction beyond 3-4 days for any location on the globe requires observations from the whole world



SOFF Systematic Observations Financing Facility | Weather and climate information for the global public good

Figure 3. Surface pressure observations received international weather centers show serious gaps in observations shared (September 2021)



Source: SOFF Terms of Reference

A global standard:

The second key factor was the development by WMO of universally accepted global standards for free access to weather and climate observation data and for the collection of a minimum set of surface-based observations. The former – free access – was enshrined in the WMO Resolutions 40 in 1995 and 42 in 2017, which established observation data as a true global public good. The latter – the standard embodied in the Global Basic Observing Network (GBON)[11] – was agreed by the WMO membership in the Geneva Declaration of 2019[12] and committed all 193 WMO Member countries and territories to collect basic observation data and share them with the global weather centers. The details of the GBON standard were agreed at the 2021 WMO Extraordinary Congress. GBON entered into force and became mandatory for all countries on 1 January 2023.

Need for financing:

The third key factor was the recognition that:

- many developing countries, and especially the SIDS and LDCs, did not have the financial and institutional capacity nor an incentive to deliver on their GBON commitments for the provision of a global public good; and that therefore, in the absence of a WMO enforcement mechanism, an effective financing and technical assistance mechanism was required; and

- the traditional way of delivering financial assistance through a few small one-off projects was insufficient; and although the larger bilateral and multilateral financial agencies had provided financing for hydromet projects in the past, these had proven to be a fragmented and uncoordinated hodgepodge of facilities without adequate technical assistance and longer term financing plans and no requirement of sharing the data actually collected. As a result the capacity created was not maintained and frequently stopped operating and sharing data within a few months or years after project completion.

These three factors combined in turn led to the recognition that a specialized financing facility was required and resulted in the establishment of SOFF with its key design features, including

- the need for an up-front technical analysis of the technical and financial needs of countries in regard to their capacity to collect and share observations during the SOFF Readiness phase;

- grant financing for investment in GBON-compliant observation capacity during the SOFF Investment phase;

- continuing grant financing operations and maintenance (O&M) costs[13] and technical advice during the SOFF Compliance phase (after completion of investment), on the condition that observational data were generated and exchanged with the global weather centers;

- technical peer advice provided by more advanced meteorological centers on an ongoing basis with SOFF reimbursing the costs of assistance; this approach was based on the concept of the Country Support Initiative (CSI) developed by WMO previously for mobilizing hydromet advice to its member countries, but never implemented;

- Efforts to link the creation of observation capacity with improved capacity to utilize the data for delivery of downstream hydromet service; this was reflected in SOFF support for a comprehensive country-level hydromet gap analysis during the Readiness Phase, and in the

[11] https://www.youtube.com/watch?v=5CdJpg8fknM
[12] https://library.wmo.int/viewer/57162/download?file=Geneva_Declaration_2019_en.pdf&type=pdf&navigator=1
[13] Initially, this financing was expected to cover 75 percent of O&M costs.

deliberate efforts to link SOFF activities with those of other agencies providing support for downstream hydromet investments.[14]

- An initial focus on getting SIDS and LDCs to meet the GBON standard, on the grounds that they were the least able to comply with their commitments; however, SOFF is designed to allow for scalability, i.e., the expansion of its mandate, including financial support to middle income countries (MICs) and eventually to other observation domains on land and ocean, as the scope of GBON may be expanded by WMO members over time to include these additional domains.

Key elements of the SOFF preparation pathway

The preparation process for SOFF was compressed into a three year period mid-2019 to mid-2022. A number of key elements characterized the pathway leading to the successful establishment of SOFF.

Parallel and interactive development of GBON and SOFF:

A key feature of this process – and of the pathway it represented – was the close interplay between GBON and SOFF. Progress of these two initiatives in parallel was critically important for both of them: GBON needed SOFF, since the latter provided assurance to developing country members that they would get assistance for meeting their GBON commitments; SOFF needed GBON, since it provided the validation of the global commitment to the basic principle of universal observation sharing and thus the justification for SOFF and for potential funders to support SOFF. Accordingly, the timelines of GBON and SOFF were effectively choreographed by their promoters with the WMO approval of GBON in 2019 coinciding with the start of the SOFF preparation process. This was followed by the WMO endorsement of the detailed SOFF design in 2021 at a time when the SOFF design and fund-raising process was well advanced, and the WMO membership provided a strong endorsement for SOFF. This in turn led to the formal creation of SOFF as a UN Multilateral Partner Trust Fund at COP 26 in November 2021 (jointly sponsored by WMO, UNDP and UNEP) and the official start in June 2022, based on the establishment of its governance structure, operational framework and with sufficient funding pledges to begin operations as of July 2022.

The Country Support Initiative as an antecedent:

This three year process involved a number of antecedents and initiatives that were critical in getting SOFF off the ground. A key antecedent was the development by WMO of the Country Support Initiative (CSI) which established the principle of peer advice by advanced meteorological centers for their less advanced peers in developing countries across the spectrum of hydromet activities under the purview of WMO. While this initiative was approved by the World Meteorological Congress in 2019, WMO executive management did not pursue its implementation until development of SOFF.[15]

The Alliance for Hydromet Development as a collaborative platform for preparing SOFF: In parallel with the development of the CSI approach and its engagement with potential peer advisers, WMO staff also reached out to key international agencies involved in the financing and delivery of hydromet services and prepared the ground for the establishment of Alliance for Hydromet Development. The Alliance brought together multilateral 14 agencies in a partnership for collaboration in support for hydromet development in developing countries. The Alliance was formally established by its member organizations in December 2019 at COP25. During 2020-2021 the work of the Alliance focused on the preparation of the design of SOFF in a number of workshops and based on the inputs from five working groups that focused on specific elements of SOFF design. The Alliance also initiated the development of a common

[14] This included the establishment of the SOFF Advisory Board, in which the other agencies are represented; a cooperation agreement with other multilateral climate funds; and the close engagement with Implementing Entities that provide funding for complementary downstream investments in their hydromet projects.
[15] Another antecedent involved the establishment in 2015 of the Climate Risk and Early Warning Systems (CREWS) initiative, hosted by WMO, which supports principally investments in downstream hydromet services.

hydromet assessment tool, the Country Hydromet Diagnostics (CHD), which covers the entire hydromet value chain and complements the SOFF assessment of upstream hydromet investment and capacity needs.

Establishment of the SOFF team in WMO:

The preparation of SOFF, including the work of the Alliance, was supported by a small team of experts in WMO. In addition to supporting the working groups and workshops during 2020, the team during 2021 explored alternative governance arrangements, and in particular how to integrate SOFF into existing multilateral climate funds or pooled funding mechanisms.. Ultimately it was decided to establish SOFF as an independent UN Multi-Partner Trust Fund, since no suitable climate fund could be found into which to fold SOFF. In parallel, the SOFF team prepared the detailed Terms of Reference of SOFF and the Operational Manual, which represent the foundational documents establishing and guiding the SOFF. They were approved by the SOFF Steering committee at its inaugural meeting in June 2022.

Resource mobilization as a key coalition building instrument:

Starting in late 2020, the SOFF team also began reaching out to potential funders of SOFF, principally the development ministries and agencies in OECD-DAC countries.[16] In March 2021 a first SOFF Funders Forum convened virtually to formally invite potential funders to support the establishment of SOFF, to share information about the emerging design of SOFF and to seek feedback as input into the design process. 32 potential donors attended the first Forum event, with 18 multilateral organizations and partner organizations participating as observers. This first event was followed by four more virtual Forum meetings (July 2021, September 2021, October 2021, and April 2022). This series of events and the documentation prepared for them[17] were central to the SOFF team's effort to widely disseminate information about SOFF and seek buy-in from prospective funders and partners in the official development and climate finance community. A key element of the Funders Forum process were the efficiency, transparency and responsiveness of the SOFF team.

Communication and outreach played an important role:

Since the knowledge and appreciation of the important role of basic weather and climate observations was not widespread in the development and climate finance community, the team engaged in an active communication and outreach effort in addition to the Funder Forums. This involved communication internally in and among the main funder agencies and in partner organizations to get buy-in at all levels, including and especially the top leadership. In parallel, the team reached out to the membership of WMO, both among potential funder and recipient countries; it engaged especially with representatives of potential recipient countries, at leadership and technical levels, to ensure that there was support for SOFF and eventual demand for SOFF funding. During the preparation process the team also established links with key private sector organizations, especially in the insurance industry (through InsuResilience) and in the meteorological equipment industry (HMEI, the Association of Hydrological Equipment Industry) and with an organization representing civil society organizations active in the climate agenda for developing countries (GNDR, the Global Network of Civil Society Organizations for Disaster Reduction). An important component of the outreach effort was a collection of video statements by recognized leaders from across the development and climate community (including prime ministers and senior ministers from potential recipient countries and heads of prospective partner agencies).[18] The SOFF team also endeavored to increase the understanding of the importance of observations among the

[16] The WMO team also reached out PRC, Turkey and a number of potential donors from the Gulf countries, as well as to selected foundations. Some of them attended selected Funder Forum events.

[17] All Funder Forum documents (including summaries of the meetings) are available on the SOFF website: www.un-soff.org

[18] See https://alliancehydromet.org/soff/soff-support-statements/ for a collection of video statements in support of SOFF.

wider expert community with publications and blogs and through reports in the press and through social media.

Leaders and Champions

The GBON and SOFF initiatives were promoted by two thought-leaders and organizational drivers from among the middle management of WMO, one coming from the technical stream of WMO's meteorological work and another from WMO's partnership agenda with a background in development and climate finance. Both recognized the importance of the twin-opportunity that GBON/SOFF represented and developed the key elements that had to be put into place to achieve the vision of universal global surface-based observation collection and sharing. They were able to secure the support of the WMO President and of the WMO Secretary General for the joint initiative and institutional resources to organize the effort by WMO to pursue to dual-track development of detailed GBON technical specifications and SOFF institutional and operational design.

The development of GBON was mainly anchored in the membership of WMO and its governance structure, as the WMO membership had to agree to the proposed GBON standard and its technical monitoring by WMO. The development of SOFF, as previously noted, involved a large number of agencies beyond WMO – potential peer advisers, implementing entities, funders and partners among official, private sector and civil society organizations. This required identifying and getting on board a large number of mid-level managers and senior experts from these organizations, who had to be motivated to convince their top managers that SOFF was a priority worth supporting. Fortunately, such champions emerged in UNDP, UNEP, the World Bank and selected other multilateral development banks (MDBs); they, together with leaders and representatives from key meteorological organizations, including the European Centre for Medium-range Weather Forecasts (ECMWF), the Austrian Central Agency for Meteorology and Geodynamics (ZAMG) and the German Weather Service (DWD) were champions for the establishment of SOFF. The creation of the Alliance for Hydromet Development and its workshops provided an excellent institutional platform for bringing these diverse actors together, creating a team spirit among them, and developing an agreed approach to the main design features of SOFF.

During the second half of 2020, at a time when a broad consensus about key design features had emerged and it was time to initiate an intensive outreach and fund raising effort, the leader of the WMO SOFF team invited two senior "Global Facilitators" to join the SOFF team. With many years of development and climate finance experience at senior management levels in international finance institutions they were asked to provide support for high-level outreach to potential funders and partners and to help guide the further design of SOFF and its communication and resource mobilization efforts.

Among potential funders, Austria, some of the Nordic countries and the Nordic Development Fund (NDF) took a lead in committing early to pledging financial resources, which was critical in mobilizing support also from other funders. For recipient countries, the Alliance of Small Islands States (AOSIS) and the LDC Group provided advice and active support during the preparation phase of SOFF. Ultimately, as previously noted, a large number of recipient country leaders and heads of international agencies provided public testimony to the importance of SOFF and the need for support.

Constraints and obstacles

A number of constraints and obstacles had to be addressed in creating a new initiative that aimed at sustainable impact at scale, especially the lack of appreciation that the prevailing approach to financing observation capacity in developing countries was fundamentally flawed, competing priorities in a resource constrained environment and the fragmented nature of the development and climate finance architecture. These remain challenges for SOFF during its implementation.

Establishing a new approach to supporting and financing observation capacity.

The SOFF team had to convince funders, partners and recipient countries that a new and different approach to supporting and funding the development of observation capacity in developing countries was needed. In particular, it had to promote the understanding of observations as a global public good and hence the need to provide open-ended grant financing for operations and maintenance. It had to mobilize the technically more advanced meteorological centers to provide sustained advisory support for their technically less advanced counterparts. And it had to convince implementing entities that incorporating SOFF-funded components into their hydromet projects is an efficient and effective way of supporting hydromet development in their client countries.

Competing priorities in a resource constrained environment.

Like any new initiative, SOFF had to establish its place among existing priorities in establishing leadership support and attracting the necessary financial resources. Within organizations, the SOFF team and its supporters had to compete with many existing priorities facing the leaderships – in WMO, the Office of the UN Secretary General, the World Bank, and many others. Funders in particular face a crowded development and climate finance agenda, where SOFF has to compete with many other priorities. This has been made more difficult by the calls on funders to channel large resources to war-plagued Ukraine. The financing constraint was reinforced by the fact that some funders considered, contrary to the scientific evidence, that existing observations are good enough and therefore that investments in downstream hydromet activities are the overriding priority. Furthermore, some funder ministries felt constrained by their own limited administrative bandwidth to supervise SOFF as a new fund. In this context, a number of factors were critical for SOFF getting the attention and priority it needed: a strong evidence base of SOFF's added value; strong support from the WMO Congress and recognition in the UNFCCC process; strong partnerships across the hyrdomet value chain; and demonstrating that better observations supported other organizations and funds in achieving their goals.[19]

Fragmentation of the development and climate finance architecture.

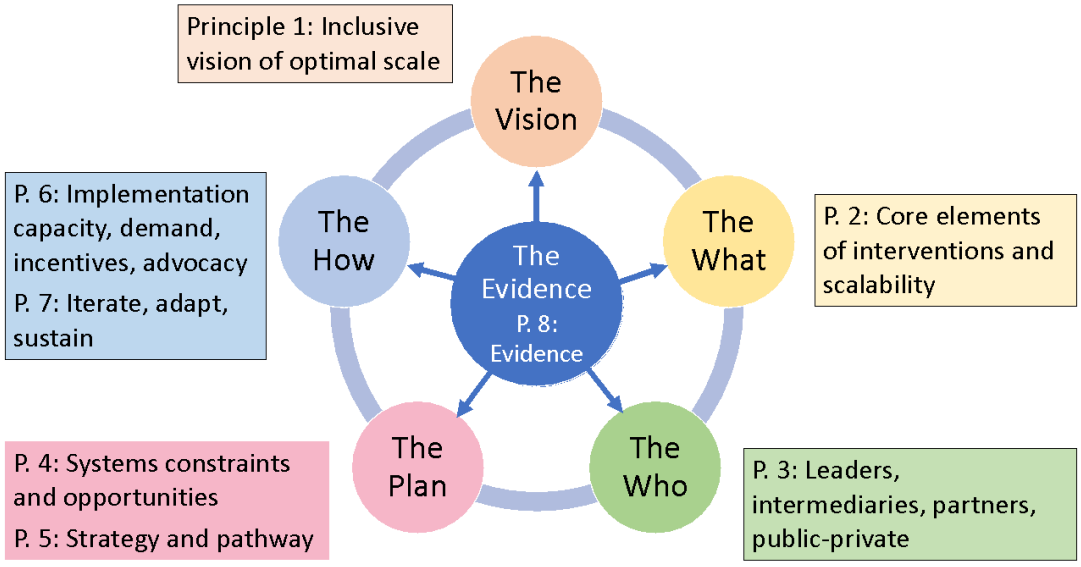
In a context where there are lots of concerns about the proliferation of development and climate finance organizations and funds, the SOFF team had to address the questions on why a new fund was needed and how it would coordinate with a large number of partners. The first question was addressed with a thorough review of the existing funding mechanisms with the explicit goal of integrating SOFF into one of them, rather than setting up a new fund. In this review it became clear that it would be impossible to attach SOFF to any of the existing multilateral climate funds without causing significant challenges to the governance structures of these funds and/or requiring fundamental changes in SOFF's design that would have undermined its effectiveness. Hence the decision was taken to incorporate SOFF under the umbrella of the UN Multi-Partner Trust Funds. The second question – coordination and cooperation with partners – was addressed in multiple ways: inviting key partners to join the SOFF Steering Committee (CREWS) and the SOFF Advisory Board (GCF, GEF, Adaptation Fund, and others); establishing and maintaining close cooperation with the peer adviser organizations and implementing entities; and preparation of a joint statement on collaboration between SOFF and the five main climate funds that was formally signed in December 2023 at COP28. Effective management of these partnership relations required continuous outreach, transparency, and flexibility. Maintaining the mutual trust, effective coordination, and sharing of information will require continued efforts of all partners.

[19] For example, GCF in some of its project documents had noted that the establishment of SOFF would be essential to support sustainability of its projects.

The extent to which scaling is mainstreamed into SOFF design

SOFF is a new organization. As noted earlier, it was not designed deliberately following an explicit scaling approach. However, as this section will demonstrate it ended up in its design reflecting to a great extent the key scaling principles developed by the Scaling Community of Practice.[20] The eight principles of scaling respond to six basic questions that need to be addressed in any scaling effort as summarized in Figure 4: A. What is the vision of scale? B. What to scale? C. Who will scale? D. How to plan for scaling? E. How to implement scaling? E. Based on what evidence?

Figure 4: The eight scaling principles



Source: Scaling Community of Practice

This section assesses SOFF against each of the eight principles. It draws on a more detailed assessment prepare in 2022 by the author for the Scaling Community of Practice.[21] The overall conclusion is that the design of SOFF maps very precisely into the eight scaling principles.

[20] Scaling Community of Practice. "Scaling Principles and Lessons." 2022 https://scalingcommunityofpractice.com/wp-content/uploads/2022/03/Scaling-Principles-and-Lessons_v3.pdf

[21] Johannes F. Linn, "The Case Studies Applying the Scaling Principles of the Scaling Community of Practice." 2022. https://scalingcommunityofpractice.com/three-case-studies-applying-the-scaling-principles-of-the-scaling-community-of-practice/

What is the vision of scale?

Principle 1: Develop from the outset and in a participatory way a context-specific vision of the problem(s) that need(s) to be addressed and the expected pathway and impact of interventions at optimal and sustainable scale.

The problem that SOFF addresses and its vision of sustainable impact at scale – the core idea of universal delivery of weather observations for all SIDS and LDCs – are clearly and inclusively established as noted in the previous section, involving potential funders, peer advisers and implementing entities, and other stakeholders, as well as with recipient country governments, with private sector representatives and civil society organizations. A pathway, or theory of change, has been elaborated, linking operational inputs in three phases (preparedness, investment and compliance) to outputs and outcomes, and to the long term goal of improved climate and weather services. For each recipient country the expected pathway consists of three sequential periods: a 6-month start-up period, a three year implementation period, followed by an indefinite compliance (sustaining) period. For SOFF as a whole, a delivery plan and results framework have been established for the first three-year implementation period 2022-2025, which is seen as a learning and adaptation stage. The governance structure of SOFF is designed for representation by all major stakeholder groups with the Steering Group (esp. funders and co-founders) and Advisory Board (all other main stakeholder groups); they will participate in ongoing decisions involving SOFF strategy, implementation and evaluation.

What to scale?

Principle 2: Define the core elements of the intervention (or intervention package) to be scaled and assess whether it can be sustainably scaled in a particular context.

The technology of surface-based weather observations and data sharing is relatively simple (using ground based and upper-air weather measurement equipment). The innovative aspects of SOFF are found in (a) its link to GBON, the global observations standard, to which all countries are committed and mandated to deliver, (b) the peer advice process twinning recipient countries' met services with more advanced met services on a long-term basis, (c) a systematic upfront analysis of capacity and funding needs, (d) investment and compliance grant funding provided on a results basis as long as observations are shared, and (e) with sustainability assured by compliance funding covering a significant portion of operations and maintenance costs.

While not based on a formal scalability assessment, the preparation of SOFF involved a careful and in-depth process of assessment of needs, priorities, costs and benefits, feasibility, likely funder support, etc., all with a view as to whether and how the initiative could reach an appropriate sustainable scale. Moreover, the basic design of the initiative makes it scalable beyond basic observations in SIDS and LDCs to eventually cover also middle-income countries (MICs) when judged appropriate,[22] to marine and oceanic meteorological observations, as well as to hydrological observations as and when GBON is extended to cover these domains.

During the preparation process various initial design elements of the initiative where adjusted (e.g., moving from a one-off five year implementation period to a three-period phased implementation approach). Further adaptation in the approach is expected as needed, based on ongoing monitoring by the SOFF Steering Committee and the Advisory Board, supported by an external evaluation during the third year of the first implementation period.

[22] A proposal to extend SOFF to lower middle-income countries (LMICs) is under consideration by the SOFF Steering Committee. https://www.un-soff.org/document/decision-6-5-expanding-soff-financial-support-to-middle-income-countries/

Who will scale?

Principle 3: Identify, engage and coordinate leaders, champions, intermediaries, partners and public/private actors to fill key roles in driving, funding and implementing scaling.

A fundamental aspect of SOFF is the careful alignment of the interests and incentives of the many actors that need to cooperate if SOFF is to achieve its scale goal on a sustained basis. SOFF very deliberately and comprehensively reached out to ensure leadership, cement its role as an intermediary, mobilize partners and engage with public, private and CSO stakeholders internationally and in recipient countries.

Leaders and champions

The previous section analyzed the role of various groups of leaders in the creation of SOFF. For the future, the WMO, UNDP and UNEP leadership will have to remain strongly supportive to realize the scaling pathway envisaged for SOFF. The SOFF Steering Committee and Advisory Board, supported by the SOFF Secretariat, create a participatory space to promote ownership and leadership from key institutions and stakeholders in shaping SOFF decisions and their implementation, anchored in and consistent with the climate intergovernmental process and key global climate finance and adaptation decisions, beyond the WMO Membership.

Intermediaries

SOFF as an institution is an intermediary, since its role will be to drive the scaling process forward with its technical, financial and knowledge resources, to support coordination and ensure coordination across the many actors that have to cooperate at the national and international levels to assure effective delivery of ground based observations. SOFF's ability to play this intermediary role on a sustained basis will depend critically on its ability to raise the required donor resources.

Partners

Partnerships have been a core ingredient of SOFF from the start, as noted in the previous section, and will remain so in future. The SOFF founding agencies (WMO, UNDP and UNEP), implementing entities, peer advisers and global weather centers, and other climate funds have a role to play in SOFF implementation and assuring their coordination is a key role of the Secretariat. A key aspect of these partnership arrangements is that they have been designed for long-term engagement, not one-off short-term consultations.

Public and private actors in recipient countries

The national meteorological centers as public sector agencies are the main national implementing agents. However, implementation will also include a business model allowing private sector involvement. Therefore, the preparation process engaged key private sector actors – the equipment supplier association and an insurance industry association, which will also serve on the SOFF Advisory Board. Moreover, consultations with the Global Network of Civil Society Organizations for Disaster Reduction (GNDR) and its participation in the Advisory Board ensures engagement of civil society in the SOFF, with CSO involvement also expected at the national level for specific SOFF projects.

The Early Warnings for All Initiative

As noted earlier, following the establishment of SOFF a new program was started by the UN Secretary General – the Early Warnings for All Initiative (EW4All). SOFF as one of its main pillars is now working with the high-level coordinators of this Initiative to ensure SOFF investments are effectively deployed in EW4All priority countries and that there is effective coordination with other funders in supporting the full range of early warning services based on improved weather and climate observations.

How to plan for scaling?

Principle 4: From the outset, identify systemic opportunities, constraints and risks; plan to align with them or address them through system change along the scaling pathway.

As noted earlier, GBON and SOFF are initiatives designed jointly to improve the functioning of the highly complex global weather and climate analysis and prediction system. It therefore is explicitly linked to this system as an integral element. The SOFF programmatic and operational design reflects careful analysis of decades of experience with trying to develop sustainable meteorological capacity in developing countries, and especially in LDCs and SIDS, which often was not met with success due to a neglect of organizational and political constraints, poorly aligned incentives and a big disparity between the observing requirements and countries' capacity to pay for them. The Readiness Phase of SOFF operational support to a country involves the assessment of the hydromet gap and development of a plan to meet GBON compliance; this includes an assessment of national constraints and opportunities for effective SOFF implementation using the Country Hydromet Diagnostics (CHD) tool.

In addition, the preparation of SOFF took great care to analyze the existing architecture of international development and climate finance to establish how SOFF could best be structured to reflect opportunities and constraints to the establishment of a new mechanism, without adding to the pervasive problem of organizational and financial fragmentation, and to respect the preferences of potential donors and recipients.

The SOFF funding model design focuses on appropriate funding modalities for different phases of SOFF implementation (Readiness, Investment and Compliance phases). And it recognizes that in the absence of a general global public goods (GPG) financing mechanism (e.g., some kind of global public goods tax) sustainability of SOFF as a financing mechanism to provide indefinite support for LDCS and SIDS and potentially other developing countries will require an appropriate capitalization to start with and subsequently regular replenishments of financial resources from donor countries. An active resource mobilization effort was undertaken since the beginning of 2022; it will continue to ensure adequate donor finance for SOFF to reach its scale goal.

During the SOFF preparation process key risks were assessed and mitigation options identified.

Principle 5: Develop in a participatory way a scaling strategy and implementation pathway(s) to achieve the sustainable scaling vision.

The preparation process of SOFF prominently included the development of the SOFF Terms of Reference document prepared for its inception. In effect, this document represents a scaling strategy and pathway as described in this case study. As noted earlier, it was developed in highly participatory manner.

How to implement scaling?

Principle 6: In line with the scaling strategy, mobilize resources and institutional capacity and create demand for the scaling initiative by aligning incentives and pursuing advocacy to enlist stakeholders and change attitudes, mindsets and social norms.

The implementation approach of SOFF is to demonstrate its delivery during the first three years of implementation for subsequent continued expansion, suitably adapted after taking into account lessons learned (including from an external evaluation). Countries and funders will be able to access and monitor in real time the improvements in data sharing achieved in SOFF supported countries. The open access and transparent data exchange monitoring tool (WDQMS) and regular reports produced by WMO will allow to easily and jointly monitor progress and success.

The financing model of SOFF is specifically designed to ensure alignment of incentives with the need to achieve sustainability of delivery of observations from LDCs and SIDS. The results-based financing approach for funding O&M expenses provides clear support for delivery of data, rather than for just creating observation infrastructure. Peer-advisory organizations will have an incentive to provide peer-to-peer advice since their costs will be reimbursed. Similarly, implementing agencies will have access to high quality technical assistance that will ensure the effectiveness of their investments and provide foundational data for the implementation of the other components of the hydromet and climate projects.

As noted in the preceding section, during the preparation of SOFF significant communication and outreach efforts were made to mobilize champions, funders and partners, to ensure national-level ownership and demand for SOFF engagement at country level. Community participation and civil society engagement will be an important element to ensure that local communities understand the importance of observation stations and help precent vandalism or pilferage.

After 18 months of operation, it is clear that demand for SOFF support is even greater than expected; already 101 countries have requested SOFF support. Not only are a great number of SIDS and LDC authorities applying for SOFF funding, but there is also demand for expanding SOFF to cover also middle income countries. SOFF's response is further explored in the next section.

Principle 7: Iterate, learn, adapt and sustain the scaling pathway as long as needed.

This principle is reflected in the basic design of SOFF in two principal ways:

A three-year First Implementation Period will be followed by the 7-year Expansion and Sustaining Period, with an explicit provision for monitoring, evaluation and learning along the way. An external evaluation is planned towards the end of the First Implementation Period based on which the initiative will be adapted as necessary. Moreover, an independent external review of SOFF design and early implementation has been carried out 15 months after operations started to assess the design and implementation and learn lessons for.

Sustainability is a prime concern of SOFF in light of the experience with past failures of maintaining observations capacity once created. As noted, financial sustainability of observation assets in LDCs and SIDS will be supported by O&M grants for observation stations sharing GBON compliant data. Institutional sustainability will be supported by peer-to-peer advisory services. Political sustainability will be supported by the fact that grant funding will be made available to finance investment and O&M expenses and by proactive outreach to recipient countries by SOFF, by WMO, and by the implementing entities. Financial sustainability of SOFF itself is not guaranteed; it will depend either on the introduction of a general GPG financing mechanism – a long shot at best – or on regular donor replenishments.

SOFF is specifically designed to take a long-term approach, initially for at least 10 years, and potentially indefinitely, as long as the problem of sustainability of observation assets in LDCs and SIDS remains (as a result of the GPG nature of observations and the low level of resources and capacity in these countries).

Based on what evidence?

Principle 8: Base all scaling decisions on relevant evidence and continuous learning.

The preparation of SOFF was based on the scientific evidence underpinning GBON and on a thorough assessment of the experience with support of observations in developing countries and the problems with past approaches. It also involved a careful analysis of benefits to be expected from a successful implementation at scale of SOFF. The results framework is a simple input-output framework at this point, but with clear and readily tracked metrics for input and output targets. As SOFF matures and gathers implementation experience additional performance evidence and metrics will likely be added to reflect

the degree to which SOFF is responding effectively to changes in observation technology, to the constraints in recipient countries, and to possible limitations in the capacity of its implementing agencies.

In sum, the eight principles of effective scaling of the Scaling Community of Practice – vision, scalability, appropriate actors and partnerships, scaling strategy, scaling pathway, implementation and evidence –are well reflected in the design of SOFF and thus scaling is fully mainstreamed into SOFF.

Early implementation and potential challenges

At COP28, SOFF issued its 2023 Action Report, showcasing early achievements. This initial period of implementation was characterized by intensive efforts by the SOFF Secretariat with support and guidance from the Steering Committee and Advisory Board, to get started with a sense of urgency and focus on effective implementation. According to the 2023 Action Report, SOFF has substantially increased its ambition level, is already providing Readiness phase support to 60 countries, and Investment phase support for a first group of 6 frontrunner countries has already been approved. The average time it took for the first 60 countries to be programmed by the SOFF Steering Committee to preparing the Readiness phase funding request to funding approval was 3.7 months.

The Independent External Review concluded its assessment with the following observation: **"SOFF is considered highly relevant, with excellent performance so far,** expressed in both the overall **efficiency** with which SOFF has taken off the ground and **effectiveness** in terms of the SOFF Secretariat's and WMO's performance. Transparency and delivery so far have led to high credibility – and also expectations. SOFF is considered foundational to provide beneficiary countries with the basic operative infrastructure to collect and share data compliant within the Global Basic Observing Network (GBON) mandatory requirements. It is acknowledged as the essential pillar at the top of the meteorological value chain to enable downstream investments to work." (p. 14; bolded text as in the original)

Accordingly SOFF is off to a propitious start with the promise of achieving its goal of universal GBON compliance among SIDS and LDCS and potentially other developing countries. From a scaling perspective, key features which have so far been successfully deployed include the combination of the GBON standard with the financing and technical assistance role of SOFF; the effectiveness of the incentives built into SOFF approach in generating demand for SOFF finances and services; the role that SOFF is playing as an intermediary in connecting recipient countries with peer advisers and implementing entities in delivering technical assistance and finance while keeping implementation and overhead costs low;[23] and its role in ensuring that improvement in foundational weather and climate observations are effectively integrated into the Early Warning for All Initiative. SOFF is also demonstrating the scalability of its model beyond the initial target group of countries with its proposal to expand eligibility to include Lower Middle Income Countries. This scalability will prove valuable if and when GBON is further expanded to other observation domains, including ocean observations.

However, from the first-hand engagement of the author, the SOFF experience faced – and will continue to face – a number of challenges and risks which are not atypical for an initiative of its kind and will need to be kept in mind going forward.

Complexity of the hydromet, climate finance and early warning systems

SOFF is placed at an important node of three highly complex systems, where it has a critical intermediary role to play in ensuring the many actors that have to work together actually do so. But with that role comes a huge challenge. The SOFF Secretariat must (a) work within the WMO and its membership in

[23] Total SOFF overhead costs (Implementing Entity fees, trustee fees, administration costs peer advisory services mechanism, SOFF Secretariat costs) are projected to be slightly below 10 percent, significantly lower compared to other multilateral climate funds.

support of implementing and monitoring the GBON agreement; (b) incentivize and organize the more advanced meteorological organizations to provide technical peer support to the meteorological service agencies of SOFF beneficiary countries; (c) prioritize the many SOFF support requests from beneficiary countries in a transparent manner, guided by the SOFF programming criteria adopted by the SOFF Steering Committee; (d) ensure flawless cooperation among WMO, UNDP and UNEP and orchestrate the activities of the implementing agencies that draw on the SOFF funds for improving observational capacity as part of their hydromet projects; (e) engage with a multitude of other actors in the climate and development finance and early warning space to ensure complementarity and effective coordination of support for recipient countries across the hydromet development and early warning value chain; (f) mobilize financial resources from ultimately 25-30 funders; and (g) interact with private sector entities and CSO representatives to ensure appropriate feedback while also managing a general communication and outreach process to educate the wider public on the importance of weather and climate observations. And the Secretariat must do so while keeping total overhead costs below 10 percent of total financing.

Convincing potential funders that improvements in weather and climate observations are of critical importance

The process of resource mobilization during the preparation phase pointed to a number of potential challenges for mobilizing the required resources for SOFF, including these: (a) new multilateral initiatives are always more difficult to fund than ongoing programs; (b) many potential funders are less interested in funding upstream improvements in the hydromet value chain (observations) than down-stream action to improve early warning and resilient adaptation for the "last mile"; and (c) meteorological centers rank low on the totem pole of agency influence compared to other development and climate finance agencies. This challenge puts a premium on SOFF demonstrating its value-for-money in the overall hydromet space and in its contribution to climate and resilient development action. SOFF's intention to carefully monitor its impact and develop improved metrics for socio-economic impact measurement are an appropriate response to this challenge along with continued intensive efforts to reach out to donors. The SOFF's 2023 Action Report made an excellent start with presenting a concise and vivid picture of the Facility's design, implementation and early results.

Competing priorities in the founding agencies

SOFF has to contend with competing priorities not only among funders, but also within the founding agencies – WMO, UNDP and UNEP. The leaderships of these agencies have to foster other initiatives besides SOFF and may not always put SOFF at the top of their institutional list of priorities when seeking funding and reaching out to global stakeholders. Again, this means that the value added of SOFF-supported activities must be clearly demonstrated.

Other risks

There are a number of other challenges and risks which the SOFF team identified as part of the SOFF Terms of Reference (WMO, UNDP, UNEP 2021):

1. There could be a lack of demand for SOFF by recipient countries or, alternatively, excess demand relative to SOFF capacity; experience to date points towards the latter risk with already 101 countries having requested SOFF support.

2. There could be a lack of interest and engagement by implementing and peer advisory agencies due in part to insufficient incentives; so far this has not been a problem. Implementing entities realize that the effectiveness and sustainability of their own programs depends on improved observations, and peer advisor agencies see in SOFF an opportunity to deliver on a WMO foundational principle of member-to-member support in an effective manner.

3. Incentives offered by SOFF for O&M in the form of results-based grants might turn out to be insufficient to get meteorological offices and governments in recipient countries to maintain stations and share observational data; this will have to be monitored and incentives adjusted to assure continued compliance;

4. Significant difficulties of implementation will likely be incurred in fragile and conflict affected states, and as the number of recipient countries falling in this category increases in the coming years, the SOFF Secretariat's capacity to support implementation may not be able to meet the challenge.

5. SOFF foresees a close cooperation with the private sector. The four potential modalities for doing so remain to be tested in practice. Recipient countries' limited experience in regulation and oversight to outsourcing may constrain SOFF's ability to involve the private sector.

Lessons from the SOFF mainstreaming experience

SOFF is a new initiative which was prepared from scratch over a period of three years. Its focus is relatively narrow, in aiming for a specific improvement in the complex system of global weather and climate observation and prediction system. It therefore is a "vertical fund" in a narrow sense of this term and the lessons from its design and implementation will most directly apply to similar initiatives. Nonetheless, the experience is also relevant more generally for new initiatives in the development and climate space, even as any lessons can only be tentative, since implementation has only started recently. And there are also lessons that carry over to already established funder organizations, especially those funding the provision of global public goods (GPGs) and that are aiming to mainstream scaling into their funding operations. Finally, its lessons apply to reform efforts in large systems that target specific, narrowly focused improvements in the way a system works (e.g., introduction of a new policy or law).

The following lessons stand out on mainstreaming scaling into the design and preparation of a new initiative.

Lessons for design

1) Design the new initiative for the critical interplay between **scaling and system change**; central to SOFF design as a scaling initiative is the notion that an improvement in the highly complex global weather and climate prediction system requires a carefully targeted and systematically scaled and sustained intervention.

2) Where possible, link the funding mechanism with a **globally agreed standard** (GBON) that is anchored in scientific evidence and that provides powerful mutual reinforcement for (a) the establishment of a clear long-term scale goal, (b) the mobilization of resources to implement the standard, (c) incentives for countries to deliver on their commitments, and (d) a long-term perspective for sustained implementation (operation at scale) as and when the scale goal has been reached.[24]

3) Put **partnership** at the center of the mission and implementation processes; in the case of SOFF, this ensures that partnership is not only a proforma or transactional goal, but serves a key instrument to achieve the long-term transformational goal.

4) Recognize that the funding agency needs to function as **an intermediary**: not only as a financial intermediary, but also as an intermediary that helps to motivate, organize and inform the many

[24] In this regard, SOFF is similar to other global funds that are linked to global standards, especially the Multilateral Fund for the Implementation of the Montreal Protocol. http://www.multilateralfund.org/default.aspx

partner organizations (in the case of SOFF, recipient met centers, peer reviewers, implementing entities, and other the climate funds), private and public stakeholders, and initiatives (in the case of SOFF this include Early Warning for All, Global Shield,[25] the newly established Loss and Damages Fund, etc.) that have to work together.

5) Deliver a **combination of technical advice and financing** on a sustained and predictable basis, in the case of SOFF by technically proficient peer advisers and by experienced implementing entities; this is essential, especially for low income and low capacity environments.

6) Commit to **indefinite financing of O&M costs**; this and the commitment to ongoing provision of peer advice during the compliance phase is critical for the sustainability of infrastructure supported by SOFF.

7) Focus on **speed and costs** with the goal to achieve the greatest possible speed in delivery while containing costs – this has been one of the strengths of SOFF's early implementation effort.

8) Carefully **monitor results** to ensure that impact is achieved in terms of progress with implementation; in the case of SOFF this means monitoring the outputs of three phases for each country, as well as progress in the projected increases in observation data shared with global weather centers.

9) Use **external evaluation** to help with identifying areas of strength, weaknesses, opportunities and risks and with adaptation of the initiative over time; the SOFF Independent External Review of 2023 and the external evaluation of SOFF in 2025 represent important opportunities for learning and adaptation.

10) Place **resource mobilization** at the core of any funding initiative that aims to achieve sustainable impact at scale; SOFF will be able to achieve its scale goal only if it manages to raise the targeted resources (currently pitched at USD 400 million for the first five years and USD 50 million annually for sustained support during the compliance phase after the first five years.

11) Develop **communication and outreach** based on demonstrated value added of the initiative; in the case of SOFF, the deployment of a high-quality website and outreach on social media, proactive engagement with partners and stakeholders, and high-level events at the COPs have been designed to maximize understanding and ownership at a global scale and with global impact.

12) Finally, design the initiative for **scalability** not only in terms of its current scale goal but, if it is successful, for potential expansion to other areas; in the case of SOFF, its scalability for potential expansion beyond GBON compliance by SIDS and LDCs – to middle-income countries and possibly to other domains of earth observation, including ocean observations, hydrological observations, and cryosphere observations, represents a strong potential. Ultimately, SOFF could become the financing mechanism for all essential global weather and climate observations.

Preparation process

1) Give room to and support **leadership on scalable** new ideas that address key development and climate issues; SOFF is a case where intellectual and organizational leadership was located in mid-level managerial and expert capacity in WMO, which successfully mobilized the senior leadership in WMO and leaders from across many other organizations to support the creation of SOFF and its implementation.

[25] Brief explanation and reference

2) Develop a convincing **narrative of the value added** of the scaling initiative is critical; in SOFF's case this was based in the scientific evidence underpinning GBON and in estimates of high socio-economic benefits and rates of return, and drawing on the experience with previous financing initiatives that failed to deliver.

3) Establish an effective **organizational platform** for the preparation of the new scaling initiative, which can then carry over into the implementation process, modified as may be appropriate; SOFF has a small team established in WMO to spearhead the preparation of SOFF; this was transformed into the SOFF Secretariat when SOFF operations started.

4) Develop clear **terms of reference and processes and procedures** for implementation; the SOFF Terms of Reference and Operational Manual represent the relevant documents.

5) **Consult and communicate widely**, get champions to promote the initiative and stand ready to adjust aspects of design in response to relevant input without giving up on its core concept; the SOFF team was effective in developing an inclusive consultation process during the preparation of SOFF, communicating with stake holders and mobilizing high-level champions.