



# National Meteorological and Hydrological Service (NMHS) Financial Planning Tool: User Manual

December 2018



**USAID Cooperative Agreement No: AID-OAAA-A-16-0056**

Prepared for the United States Agency for International Development project entitled Assessing Sustainability and Effectiveness of Climate Information Services (CIS) in Africa Cooperative Agreement.

Cover Photo: Solar powered weather station at Winrock's field office in Guinea

Photo Credit: Robert Foster/Winrock International

Report Authors: Alquier, Remi; Venzac, Pascal; Holthaus, Jennifer; Phiri, Catharine; and O'Sullivan, Robert

Suggested Citation: Alquier, R., Venzac, P., Holthaus, J., Phiri, C., and O'Sullivan, R. (2018), *NMHS Financial Planning Tool: User Manual*, USAID-supported Assessing Sustainability and Effectiveness of Climate Information Services in Africa project. Washington, DC, USA

Prepared by: Winrock International  
2121 Crystal Drive, Suite 500  
Arlington, VA 22202  
Tel: 703-302-6500

Principal Contacts: Robert O'Sullivan  
Robert.OSullivan@winrock.org

# **National Meteorological and Hydrological Service (NMHS) Planning Tool: User Manual**

Assessing Sustainability and Effectiveness of  
Climate Information Services

## **DISCLAIMER**

This report is made possible by the generous support of the American people through the United States Agency for International Development (USAID). The contents of this report are the sole responsibility of its authors and do not necessarily reflect the views of USAID or the United States government.

## TABLE OF CONTENTS

Acronyms and Abbreviations .....	5
Summary: The NMHS Financial Planning Tool.....	6
Background .....	6
Overview of the Tool .....	7
Advantages of the Tool.....	9
Using the NMHS Financial Planning Tool.....	10
Step 1: Convert existing NMHS budget into the NMHS Financial Plan format .....	10
Step 2. Calculate the cost of desired improvements to NMHS capacity .....	12
Step 3. Identify cost-saving public-private partnerships for infrastructure .....	12
Step 4. Estimate possible additional revenue from new public and private end users .....	14
Step 5. Determine an optimal financial plan for achieving NMHS improvements .....	19
Step 6. (Optional) Country Worksheet.....	20
Modifying and Adapting the Tool.....	21
Adding future years .....	21
Adding sub-sectors to a Revenue worksheet .....	21
Resources.....	21

## ACRONYMS AND ABBREVIATIONS

CIS	Climate Information Services
GDP	Gross Domestic Product
GFCS	Global Framework for Climate Services
NMHS	National Meteorological and Hydrological Services
O&M	Operations and Maintenance
PPP	Public Private Partnership
SMS	Short Message Service
USD	United States Dollars
WCIS	Weather and Climate Information Services

## SUMMARY: THE NMHS FINANCIAL PLANNING TOOL

Recent research on weather and climate information services (WCIS) in sub-Saharan Africa<sup>1</sup> highlights the importance of adequate funding for the National Meteorological and Hydrological Service (NMHS), and the challenges NMHSs face to identify and secure funding. NMHSs in sub-Saharan Africa need reliable revenues to build and modernize observation infrastructure, operate and maintain systems, build staff capacity, and purchase the information technology and communications services required for data transmission and analysis. Existing government and donor funding is not sufficient to allow NMHSs to modernize, and very few NMHSs have generated additional revenue by providing services to the private sector.

To address these important gaps, the USAID-funded [Assessing Sustainability and Effectiveness of Climate Information Services](#) (Sustainable CIS) project developed the NMHS Financial Planning Tool to help users:

- (i) understand existing resource gaps,
- (ii) advocate for adequate public sector resources, and
- (iii) create a strategy to earn additional revenue from paying clients.

This manual provides guidance on using the Excel-based NMHS Financial Planning Tool, available for download on the ClimateLinks website.<sup>2</sup> The Tool is designed to be used by staff of NMHSs and the World Meteorological Organization (WMO), government officials, donors, academia, NGOs, and other WCIS stakeholders.

A key feature of the Tool is its process to identify opportunities for public private partnerships or paying clients and estimate possible revenues and cost savings. The NMHS Financial Planning Tool was developed using case studies in Mali and Rwanda, which identified companies in several sectors that benefit from increased WCIS provided by the NMHS. NMHSs can achieve greater financial sustainability by collaborating with the private sector to reduce costs and provide services to an expanded range of public and private customers.

## BACKGROUND

The global market for weather and climate information services (WCIS) is growing rapidly with expenditures increasing by more than 35 percent from 2011-2015, to an estimated total of \$56 billion. Research indicates that the market for WCIS in sub-Saharan Africa, including both public and private expenditures, is approximately \$1.4 billion.<sup>3</sup> Investments in WCIS generate high socio-

---

<sup>1</sup> Usher J., Phiri C., Linacre N, O'Sullivan R, & Qadir U., (2018) *Climate Information Services Market Assessment and Business Model Review*, USAID-supported Assessing Sustainability and Effectiveness of Climate Information Services in Africa project. Washington, DC, USA.

<sup>2</sup> See [www.climatelinks.org/projects/learningagendaonclimateservices](http://www.climatelinks.org/projects/learningagendaonclimateservices)

<sup>3</sup> Georgeson, L., Maslin, M., and M. Poessinow. 2017. Global disparity in the supply of commercial weather and climate information services. *Science Advances*. 3(5):1-9. <http://advances.sciencemag.org/content/3/5/e1602632.full>. Accessed 26 September 2017.

economic returns in lower-income countries, particularly for services associated with disaster risk management.<sup>4</sup>

Currently, NMHSs are the primary source of WCIS in sub-Saharan Africa, but they lack sufficient funding to build, operate and maintain modern observation networks, information technology, and staff. As a result, the region's network of weather observation and communication infrastructure has steadily degraded over time. In 2013, the World Bank estimated that sub-Saharan Africa would need \$1.5 - \$2 billion in funding to make high-priority modernizations to WCIS systems. Funding is also needed to hire and train staff and provide staff time to analyze and develop WCIS end user products. Most sectors of the economy rely on high-quality weather and climate data to build value-added products and services.

However, few NMHSs in sub-Saharan Africa have the information, expertise, and capacity to generate revenue from paying clients, and most NMHSs rely on government and donor funding. Not all NMHSs have financial autonomy or the mandate to raise revenue. Many NMHSs only produce free public information and services, while others may also provide some services to paying clients.

## OVERVIEW OF THE TOOL

To ensure that users comprehensively analyze necessary expenses, the Tool guides users to create separate budgets for the five pillars of a modern NMHS, as defined by the Global Framework for Climate Service (GFCS) Implementation Plan:<sup>5</sup>

1. **Observation and Monitoring:** Ensures that climate observations and other data are collected, managed, disseminated, and supported by relevant metadata;
2. **Research, Modeling and Prediction:** Aims at improving the scientific quality of climate information and providing an evidence base for climate change impacts;
3. **Climate Services Information System:** Allows climate information to be collected, stored and processed to generate products and services;
4. **User Interface Platform:** Provides a structured means for users, climate researchers and climate information providers to interact at all levels; and
5. **Capacity Development:** Addresses the capacity development requirements under the other Pillars.

Winrock's assessment of WCIS markets in Sub-Saharan Africa<sup>6</sup> shows that donor and government support often funds infrastructure and equipment but does not adequately support the associated staffing and user interface costs. For this reason, the **GFCS Capacity Improvements** worksheet in the Tool instructs users to specify expenses in two categories within each Pillar: (i) infrastructure and equipment, and (ii) core operations. Breaking down the budget in this way will ensure all required costs are considered.

---

<sup>4</sup> *Ibid* note 1.

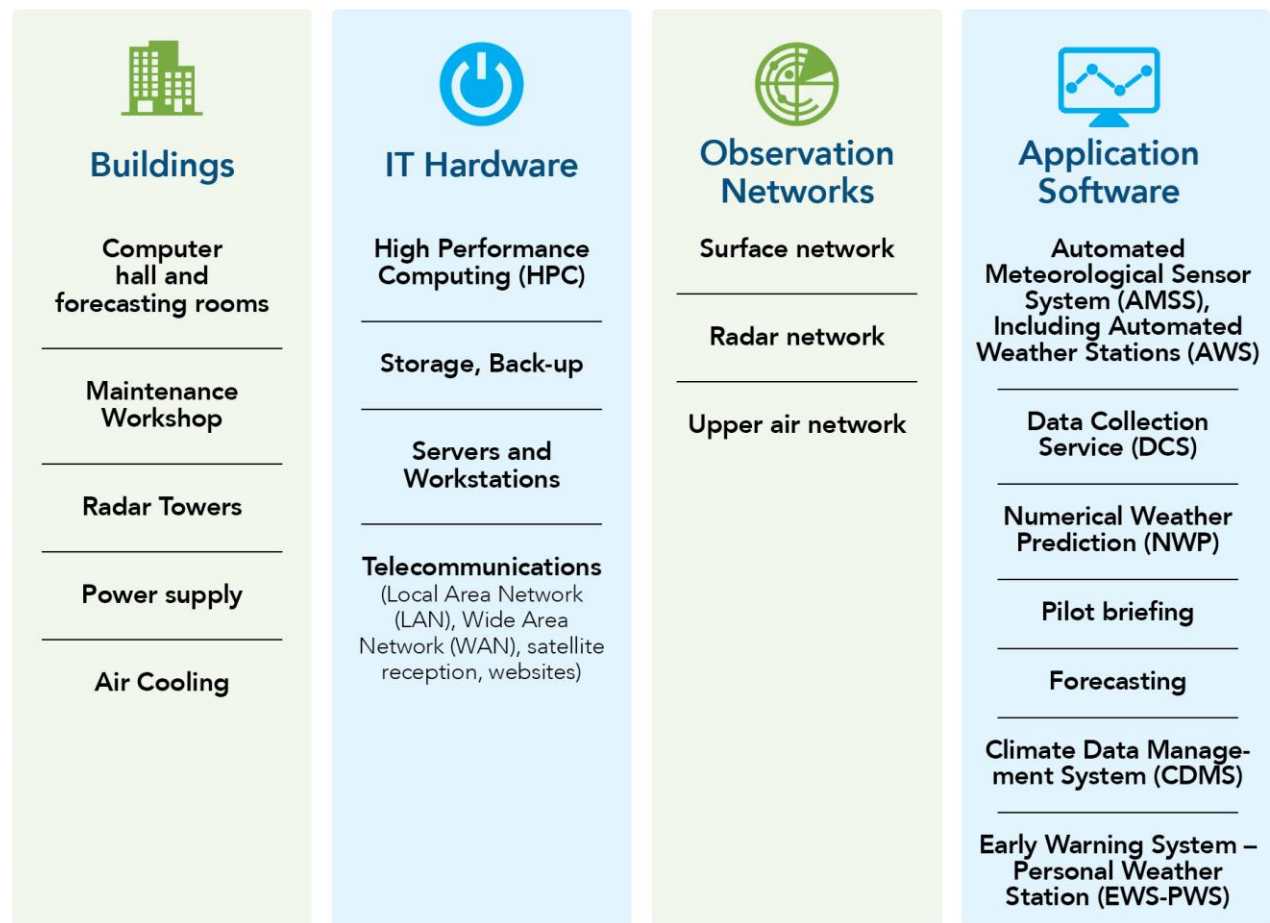
<sup>5</sup> World Meteorological Organization. 2014. Implementation Plan of the Global Framework for Climate Services. Geneva, Switzerland. [https://www.wmo.int/gfcs/sites/default/files/implementation-plan/GFCS-IMPLEMENTATION-PLAN-FINAL-14211\\_en.pdf](https://www.wmo.int/gfcs/sites/default/files/implementation-plan/GFCS-IMPLEMENTATION-PLAN-FINAL-14211_en.pdf). Accessed 5 February 2019.

<sup>6</sup> *Ibid* note 1.

## 1. Infrastructure and Equipment Expenses

The physical structures, equipment, and software used by a modern NMHS fall into the categories of buildings, IT hardware, observation networks, and application software (**Figure 1**). To save costs, some NMHSs sub-contract observation networks to private firms. The budget for infrastructure and equipment under Pillars 1-4 should include hardware and software costs for all relevant elements from **Figure 1**, as well as sub-contracts for installation and/or operation of infrastructure/equipment.

**Figure 1: NMHS infrastructure and equipment**

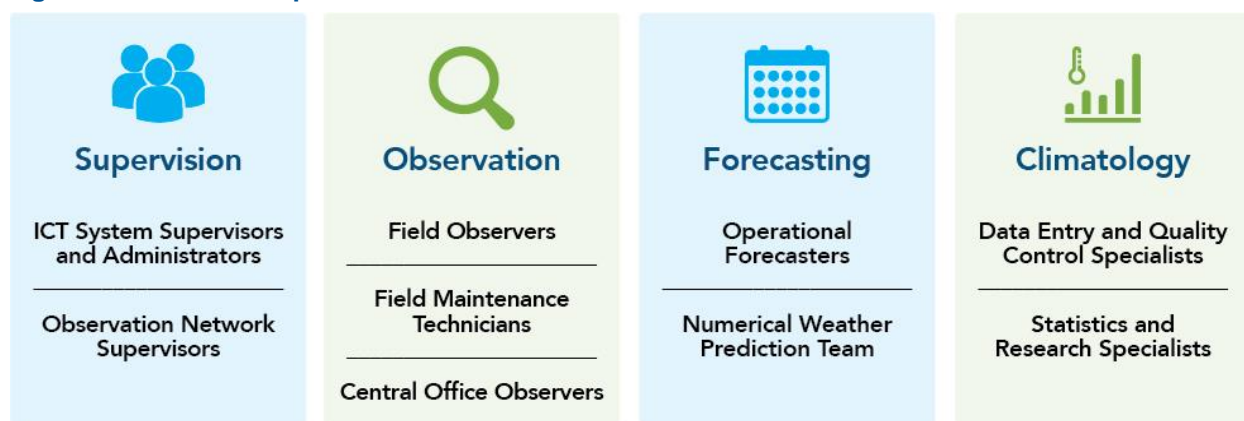


## 2. Core Operations Expenses

The infrastructure and equipment (**Figure 1**) provide the data used for NMHS core operations (**Figure 2**). Observers and forecasters work on general meteorology tasks as well as sector-based applications such as aviation and marine meteorology. The budget for Core Operations under Pillars 1-5 should include expenses for any additional staff needed to support new infrastructure/equipment and private sector clients. Staff expenses include salaries, benefits, severance, bonuses, travel costs, tax payments, and training.



Figure 2: NMHS core operations



Pillar 4 on the GFCS Capacity Improvements worksheet contains an additional budget category called User Interface Platform, which should include expenses for delivering information to end users, such as radio, TV, websites, and SMS messaging, along with sub-contracts to providers of these interface platforms.

### Advantages of the Tool

In most countries, NMHSs use several different financial planning tools: one for internal purposes, one for their work with the government, one for their work with donors, and one for any commercial services they provide. The NMHS Financial Planning Tool offers the following advantages:

- **Comprehensive:** Leads the user through a process of budgeting for all NMHS WCIS services, includes revenue from all sources (government, donor, public and private paying clients), and covers all five GFCS Pillars.
- **Maps potential revenues from key economic sectors:** Helps the user identify potential WCIS customers in key sectors (e.g. agriculture, transportation, construction, extractive industries) and estimate the value of services they could provide to specific customers in these sectors.
- **Allows sensitivity analysis:** Allows the user to consider different budget scenarios for future years to determine the best strategy to ensure sustainable revenues over time.
- **Allows customization:** Users can choose which sectors to consider for paying clients, which services to offer paying clients, and how many years to project into the future.
- **Highlights cost-saving partnerships:** Guides users to consider partnering with private companies to save costs and/or generate revenues from new infrastructure/equipment.

## USING THE NMHS FINANCIAL PLANNING TOOL

Using the NMHS Financial Planning Tool requires Microsoft Excel skills such as managing financial formulae and cross-referencing data across worksheets. Users must understand existing NMHS budgets and the financial rules that guide national accounting. Before using the Tool, the user should collect as much information as possible on existing NMHS expenses and revenues.

The Tool is designed to be customized to meet each user's needs. The Tool does not contain any locked cells, and the user has complete control of how the calculations are done and reported. There are two versions of the Tool – a blank version (**NMHS Financial Planning Tool**) to be completed by users, and a case study example (**Sample NMHS Financial Tool**) that demonstrates how the tool could be completed. The tool guides users through five steps:

- **Step 1: Convert existing NMHS budget into the NMHS Financial Plan format.**
- **Step 2: Calculate the cost of desired improvements to NMHS capacity.**
- **Step 3: Identify cost-saving public-private partnerships.**
- **Step 4: Estimate possible additional revenue from paying clients.**
- **Step 5: Determine an optimal financial plan for achieving NMHS improvements.**

### Step 1: Convert existing NMHS budget into the NMHS Financial Plan format

In the **Source Budget Data** worksheet, insert the exchange rate from local currency to US Dollars in cell C2.

Enter the current year (year N) of the NMHS's expenses and revenues, in local currency, on the left side (**Figure 3**, area 1). Consider entering the most recent three or four years of data, which will allow you to understand how the NMHS's budget has grown or decreased with time, along with general trends for each budget category. This worksheet is suitable for use with any existing budget format a NMHS currently uses.

**Expenditure Data** should include all NMHS expenses, such as salaries and fringe benefits, travel, equipment (hardware and software), office supplies, consultants, subcontracts, staff training, communications, subscriptions, office rent, and financial costs (e.g. bank fees), and any other costs. Depreciation and amortization are also shown, though these may not apply to every NMHS. The **Sample NMHS Financial Tool** shows one way to categorize NMHS expenses, but it can easily be customized for each NMHS (see the Modifying and Adapting the Tool section, p. 20).

**Revenue Data** should include NMHS revenue from all sources, such as commercial revenue (e.g. aviation), government payments, donor payments, separately-funded projects, financial revenues (e.g. interest), and any other revenues. The **Sample NMHS Financial Tool** shows the typical categories of NMHS revenues.

On the right side of the worksheet an identically structured budget is automatically generated in US Dollars (**Figure 3**, area 2). **Do not manually enter data in area 2 of the spreadsheet**, since every cell contains a formula based on the exchange rate provided and the numbers in area 1.

**Figure 3: Source Budget Data worksheet**

After you have completed the Source Budget Data worksheet, go to the **NMHS Financial Plan** worksheet. This worksheet is designed to re-organize your budget so that you can see the cost of desired improvements, and how those costs will be covered by various sources of funding, including private sector clients.

Columns C to F of the NMHS Financial Plan worksheet will be completed automatically based on the data entered in the Source Budget Data worksheet. You should check to ensure that all data from the Source Budget Data worksheet are captured by the NMHS Financial Plan worksheet.

**Expenditures:** Ensure that all expenditure data from the Source Budget Data worksheet are linked to the NMHS Financial Plan worksheet, and that the total expenditures match on both worksheets (NMHS Financial Plan cells C53 to F53 should match Source Budget Data cells I22 to L22).

**Revenues:** Ensure that all revenue data from the Source Budget Data worksheet are linked to the NMHS Financial Plan worksheet, and that the total revenues match on both worksheets (NMHS Financial Plan cells C21 to F21 should match Source Budget Data cells I39 to L39).

As you fill in the Source Budget Data worksheet and all the other worksheets in the tool, be sure to confirm that the NMHS Financial Plan worksheet is correctly linked to the data in the other

worksheets, particularly if you modify any of the worksheets. The NMHS Financial Plan worksheet cells are color coded to show where data is pulled from other worksheets.

## Step 2. Calculate the cost of desired improvements to NMHS capacity

Use the **GFCS Capacity Improvements** worksheet to cost out the desired improvements to NMHS capacity in each GFCS Pillar. This worksheet has been designed to be used with the Baseline Metrics Assessment tool (see **Box 1**) but can also be used independently.

For each of the five Pillars, fill in Columns B, C, D, and E. In Column B, be specific about the staff and infrastructure/equipment needed, and refer to **Figures 1, 2 and 3** to determine which costs belong in the Infrastructure/Equipment and Core Operations categories. In Column C, estimate the cost of each item. In Column D, indicate whether it is a one-time or recurring investment (e.g. annual, monthly, etc.). In Column E, **Current Budget Allocation**, include any funds already budgeted by the NMHS for GFCS capacity improvements under each Pillar.

This step will likely require working in parallel on the **Revenue** worksheets, where you will map out possible new paying clients. Note that the cost estimates, listed under the **user interface costs to NMHS section**, in the Revenue worksheets are only for the **user interface costs** of serving each client (websites, SMS, media, trainings). Any staffing and equipment/infrastructure needed to serve new end user clients should be budgeted in the GFCS Capacity Improvements worksheet. In the GFCS Capacity Improvements worksheet, Pillar 4 should be used to budget for any staff or equipment/infrastructure that will be dedicated to paying clients. The user interface category of Pillar 4 should only be used for user interface platforms for more than one economic sector, as any user interface costs for a particular sector will be budgeted in the Revenue worksheets.

### Box 1: Assessing NMHS capacity needs

One way to plan for NMHS capacity improvements is to determine the current level of service according to the WMO categories (see p. 7, footnote 5) and set a goal for moving up to a higher category in each GFCS pillar. The user may want to use the Baseline Metrics Assessment tool to determine the NMHS's current category under each of the five GFCS pillars (see the Sustainable CIS resources available at: <https://www.climatelinks.org/projects/learningagendaonclimateservices>). The user should decide which category the NMHS aspires to reach and estimate how much the necessary personnel and infrastructure/equipment will cost. The estimates can then be entered into the worksheets for Pillars 1-5.

## Step 3. Identify cost-saving public-private partnerships for infrastructure

In this step you will fill in Columns F, G, H, I, and J of the GFCS Capacity Improvements worksheet. A public-private partnership (PPP) is a long-term contract between a private party and a government entity for the purpose of providing a public asset or service, in which the private party bears risk and management responsibility and payment is linked to performance.<sup>7</sup> **Box 2** (p. 13) presents an example of a cost-saving PPP that may interest an NMHS.

Determine whether the NMHS can achieve revenues or cost savings by using PPPs to invest in or operate/maintain IT hardware, observation networks, and/or a user interface platform. The following resources may help you to understand PPPs in more detail:

---

<sup>7</sup> World Bank. (2017). *PPP Reference Guide*. Retrieved from PPP Knowledge Lab: <https://pppknowledgelab.org/guide/sections/1-introduction>. Accessed January 24, 2019.

- **Weather and climate resilience: effective preparedness through NMHS<sup>8</sup>** describes the structure of PPPs involving NMHSs, benefits, risks, and legal considerations, and gives a detailed example of a PPP between MeteSwiss and Mobiliar, a Swiss insurance company.
- **The Coastal Resilience and Improving Services for Potato Production in Kenya (CRISPP)** project is a PPP between the Kenya Meteorological Department, the Met Office, and the Global Climate Adaptation Partnership, designed to provide WCIS to potato growers and processors.<sup>9</sup>

Once you have filled in Column F, Column G will automatically calculate the budget gap. This helps you identify how much additional funding or revenue is needed to achieve the desired improvements under each Pillar.

The most recent year of Source Budget Data is the present year, or Year N; Columns H, I, and J represent the next three years (N+1, N+2, N+3). Use Columns H, I and J to distribute the budget gap over the future years

in the way that makes the most sense for your financial plan. For example, if a major investment is required, the NMHS may want to schedule it in year N+2 or N+3 to allow time to accumulate the necessary funds. You may want to wait to hire additional staff until infrastructure or equipment are installed. If you want to project out further into the future, add additional columns for out years.

The GFCS Capacity Improvements worksheet includes a chart (**Figure 4**) which shows the total required investment for all desired GFCS capacity improvements (blue), and the budget gap after the current budget allocation (yellow) and partnership cost savings (gray) are accounted for.

**Box 2: PPPs Can Help NMHSs Provide New End User Services While Saving on Costs**

**Existing situation:** An NMHS runs 14 weather stations across the country, but the data from these weather stations is not precise enough to provide early warnings for storms and floods, or to advise the agriculture sector on crop planting and management.

**Desired improvement:** Install an additional 90 weather stations across the country at a cost of US \$1 million.

**PPP terms:** A private weather station provider will install and operate the 90 weather stations. It will use the data from these weather stations to sell to the international market. The NMHS uses the data to provide more accurate Early Warning Services and pays the weather station provider US \$100,000/year in government payments for the data. The NMHS also uses the data to sell WCIS to private agriculture clients and pays the private weather station provider a small percentage of the revenues.

**Benefits:** The new weather stations are installed more quickly. The NMHS does not have to invest US \$1 million in the weather stations or pay ongoing maintenance costs. The NMHS is able to cost-effectively improve its Early Warning Services and acquire new private sector clients for specialized weather data.

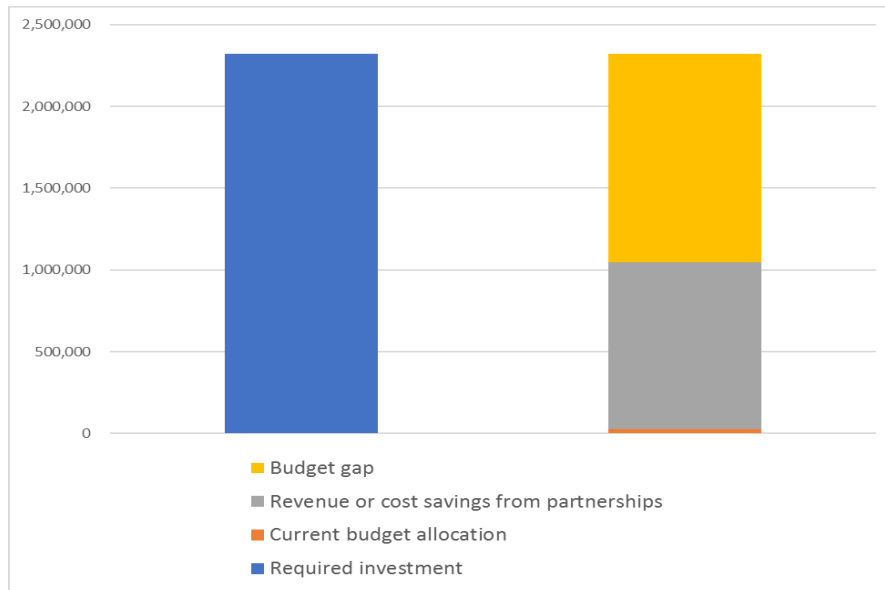
This example is based on an existing PPP in a west African country.

<sup>8</sup> Rogers, D.P. and V.V. Tsirkunov. (2013). Weather and climate resilience effective preparedness through national meteorological and hydrological services.

<http://documents.worldbank.org/curated/en/308581468322487484/Weather-and-climate-resilience-effective-preparedness-through-national-meteorological-and-hydrological-services>. Accessed January 24, 2019.

<sup>9</sup> See <https://www.metoffice.gov.uk/about-us/what/international/projects/wiser/crispp>. Accessed January 24, 2019.

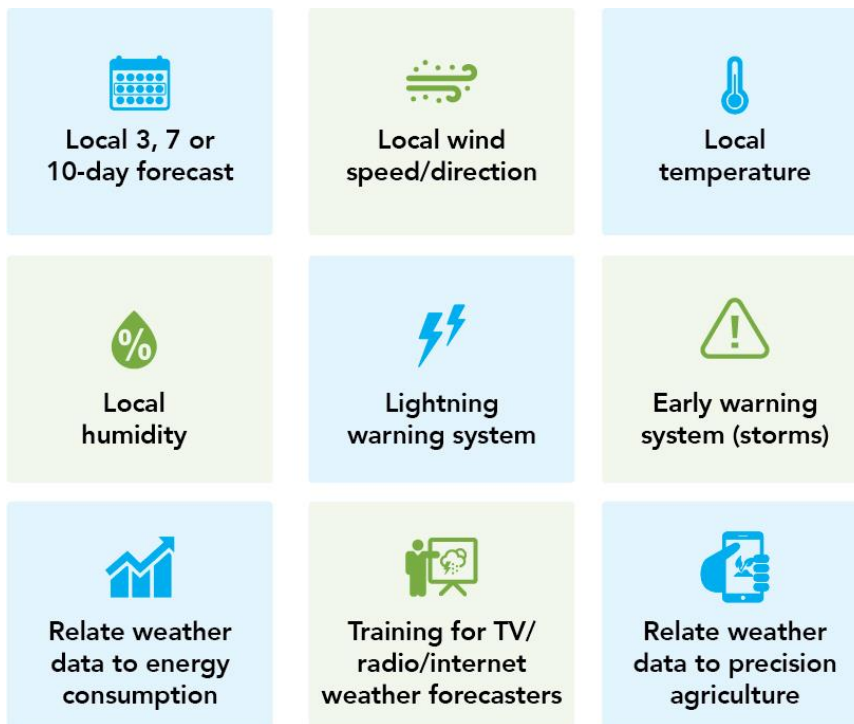
**Figure 4: Required investment and budget gap**



### Step 4. Estimate possible additional revenue from new public and private end users

End user services that NMHSs can provide include near-term forecasts, temperature, wind speed and direction, humidity, warnings for lightning and storms, energy consumption forecasts, training, and precision agriculture information (Figure 5).

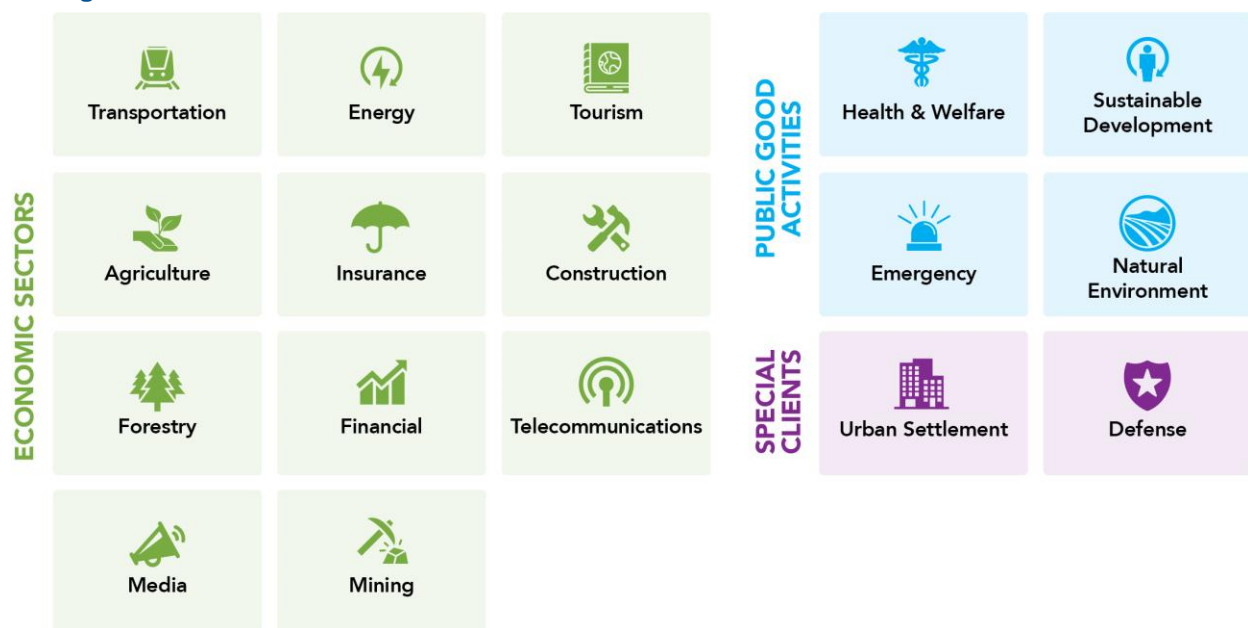
**Figure 5: NMHS end user services**



### Identify possible new clients in key economic sectors

**Figure 6** shows the key economic sectors (at left, in green) that the user should analyze for possible in-country paying clients. These include transportation, energy, tourism, agriculture, insurance, construction, forestry, financial, telecommunications, media and mining. Note that the public good activities and special clients in (at right, in blue and purple) should not be considered paying clients for purposes of this tool. These are health and welfare, sustainable development, emergency, natural environment, urban settlement and defense. Costs for expanding public good activities and special clients should be included in the GFCS Capacity Improvements worksheet.

**Figure 6: End Users of WCIS**



Prioritize sectors that are sensitive to weather conditions and/or climate change. For example, sectors that contribute to the country’s agricultural production, produce significant exports, or have assets that need protection from storms, such as energy utilities, mining, and construction. You should also consider the local media and telecommunications sectors, which need WCIS for their weather broadcasts and alerts.

Evaluate the importance of WCIS from the perspective of major private companies in each sector. To identify specific clients, look at company websites and/or use LinkedIn to identify a contact at one or two major companies in each sector, and request a brief informational phone call to ask questions about how the company might use high-quality WCIS.

### Estimate revenue from private clients

The **Sample NMHS Financial Plan** Excel workbook contains **Revenue** worksheets which show examples of the estimated user interface costs for paying clients in the agriculture, industry, telecommunications, energy, and media sectors. Within the **NMHS Financial Planning Tool**, the user should create a Revenue worksheet for each targeted sector. **Revenue worksheets should be used only to estimate user interface costs for new paying clients.** Any staffing or

infrastructure/equipment costs for new paying clients should be budgeted in the GFCS Capacity Improvements worksheet. To fill in each **Revenue** worksheet, complete the following sections:

- **Sector Structure:** Summarize key data on each sector by creating a table in this section. You may want to include sector contribution to GDP, major companies, major shareholders, annual sales, growth goals, challenges involving weather or climate, assets needing protection.
- **WCIS Offer:** List the services each end user might buy from the NMHS (see the list of end user services in **Figure 6**). If the client requires customized information, be specific about what exactly the service will provide. See **Box 3** for an explanation of the cotton sector example in the **Revenue – Agriculture** worksheet of the **Sample NMHS Financial Plan**.
- **Cost of Services:** Estimate the cost to the NMHS of providing the desired service to each private sector client. See the *Options for providing services to paying clients* section below for further guidance. Ensure that the total cost for each year is linked to the **NMHS Financial Plan** worksheet expenditures in the New User Interface category. For example, in the **Sample Financial Tool**, cell G29 in the **NMHS Financial Plan** worksheet (agriculture user interface costs for year N+1) is linked to cell D35 in the Revenue – Agriculture worksheet.
- **Revenues:** Estimate how much each private client will pay for a specific service. There are two main methods you can use to create an estimate: **value-based** pricing, and **cost plus** pricing. To use value-based pricing, you determine the best available alternative that currently exists, and then estimate how much more the client may be willing to pay for the features of your product that are better than the next best option. To use cost plus pricing, you add together your direct labor, direct material, and overhead costs for a product or service, and then add a mark-up percentage, typically 30%, to set the price. These concepts are explained further in the following articles:
  - **Value-Based Pricing: Two Easy Steps to Implement and Two Common Pitfalls to Avoid**<sup>10</sup>

### **Box 3: Pricing WCIS for smallholder cotton cooperatives**

**Rationale:** In Country A, the cotton sector employs 180,000 smallholder producers who aim to increase their yields, as a neighboring country produces 1.8 times more cotton per hectare. The smallholders sell to two cooperatives that are interested to increase their export sales. Producers require accurate precipitation and temperature forecasts during cotton seeding and harvest. Cooperatives require accurate forecasts to deliver agronomic advice to their members at the right time, and to plan logistics for harvesting (staffing, truck rental, etc.)

**Benefits to End User:** If the improved WCIS leads to a 2% increase in cotton yields, then it has contributed to US \$6 million in additional revenue for the cooperatives.

**Pricing:** We will price our services at the same level as producers and cooperatives are already paying in Country A. Individual producers typically pay \$3-8 per season for an accurate 3-day rain and temperature forecast, delivered daily at 8 am. Coops typically pay \$10,000 - \$20,000 per season for an accurate 7-day rain and temperature forecast, delivered every 6 hours.

<sup>10</sup> Forbes Magazine, <https://www.forbes.com/sites/forbesbusinessdevelopmentcouncil/2017/07/27/value-based-pricing-two-easy-steps-to-implement-and-two-common-pitfalls-to-avoid/#3eebc35c6413>; <https://hbr.org/2016/08/a-quick-guide-to-value-based-pricing>. Accessed 24 January 2019.



- **A Quick Guide to Value-Based Pricing**<sup>11</sup>
- **Cost Plus Pricing Guide**<sup>12</sup>

To generate realistic pricing estimates, see the following resources:

- **Guidelines on the Role, Operation and Management of National Meteorological and Hydrological Services: Operational Hydrology Report No. 49:** Chapter 7 discusses how to market a product, including pricing and budgeting.<sup>13</sup>
- **Revenue-Generating Opportunities Through Tailored Weather Information Products** includes information on the likely price of some WCIS products.<sup>14</sup>

Ensure that the total revenues for each year are linked to the **NMHS Financial Plan** worksheet revenues in the Paying Clients category. For example, in the **Sample NMHS Financial Plan**, cell G7 in the NMHS Financial Plan worksheet (agriculture revenues for year N+1) is linked to cell D44 in the Revenue – Agriculture worksheet.

- **Optional: Benefits to End User:** For each sector you analyze, you may want to estimate the value of benefits that paying clients will derive from the WCIS you will provide. This will help you to market WCIS to clients in each sector. You could estimate the end user benefits quantitatively (see examples in **Boxes 2 and 3**) or qualitatively (see example in **Box 4** below), which may be useful in marketing your WCIS services to paying clients.

### *Options for providing services to paying clients*

Paying clients typically require data to be higher resolution, higher quality, customized and/or delivered faster. It may take several years for paid services to become fully integrated into NMHS systems. Serving paying clients requires preparation in several areas:

- **Legal:** Make sure the NMHS is allowed to serve private clients and sign agreements with private partners;
- **Technology:** Upgrade infrastructure, equipment and software as needed;
- **Policy:** Define policies for providing free and paid services;
- **Product Development and Marketing:** Communicate services and prices and develop user-friendly end user products; and
- **Training:** Staff may need additional skills; some NMHSs create a dedicated commercial unit.

NMHSs can provide services to paying clients in three ways:

- **Generate in-house:** The NMHS generates and packages the desired data and delivers it directly to the client. This option requires the NMHS to undertake product development, marketing and training, and build or sub-contract a user interface platform.

<sup>11</sup> Harvard Business Review, <https://hbr.org/2016/08/a-quick-guide-to-value-based-pricing>. Accessed 24 January 2019.

<sup>12</sup> AccountingTools.com, <https://www.accountingtools.com/articles/2017/5/16/cost-plus-pricing>. Accessed 24 January 2019.

<sup>13</sup> World Meteorological Organization. 2006. Guidelines on the Role, Operation and Management of National Meteorological and Hydrological Services: Operational Hydrology Report No. 49. WMO-No. 1003. Geneva, Switzerland. [https://library.wmo.int/doc\\_num.php?explnum\\_id=4852](https://library.wmo.int/doc_num.php?explnum_id=4852). Accessed 5 February 2019.

<sup>14</sup> Mills, Anthony et al. March 2016. UNDP Market Assessment: Revenue Generating Opportunities Through Tailored Weather Information Products. UNDP. New York, USA. [https://www.adaptation-undp.org/sites/default/files/resources/revenue-generating-opportunities-for-tailored-weather-information-productions-undp-june-2-2016\\_0.pdf](https://www.adaptation-undp.org/sites/default/files/resources/revenue-generating-opportunities-for-tailored-weather-information-productions-undp-june-2-2016_0.pdf). Accessed 5 February 2019.

- **Team:** The NMHS delivers its own data to a client by teaming with a private distribution service, such as a telecom operator with extensive outreach, and shares in the revenues from telecom airtime sales. With this option, the distribution service assists with product development and marketing.
- **Buy:** The NMHS purchases data from a private company (e.g. an observation infrastructure company) and uses this data to improve NMHS climate information services for a particular client or set of clients (e.g. cotton producing companies).

An example of a team structure for providing WCIS to end users is shown in **Box 4**. In this example from the telecommunications sector, we make an assumption that the cost of providing the service is approximately 30% of the revenues. The NMHS could plan for this to be constant over time, or could aim for

a ramp-up scenario, where in Year 1 the cost is 80% of the revenues, and progressively goes down to 30% of the revenues by Year 3, as more mobile phone customers will use the service over time.

**Box 4: Teaming with a telecommunications company to provide WCIS to end users**

**Rationale:** Telecommunications companies are interested in WCIS for two reasons: they have infrastructure that is vulnerable to severe weather, and they are an efficient distributor of weather data to end users through mobile phone messaging. The NMHS in Country A decides to team with Telecom company Z to provide WCIS to company Z's mobile phone users. By partnering, the NMHS can earn revenues without having to invest in an extensive user interface platform.

**Benefits to End Users:** With its GFCS capacity improvements, the NMHS can provide more accurate 3-day and 7-day precipitation and temperature forecasts than are available elsewhere in Country A.

**Projected Revenues:** We assume two out of the three telecom companies in Country A will pay \$10,000/year for a daily 3-day forecast from the NMHS. We assume that 55% of the working population is exposed to weather conditions and that 75% of them have access to SMS coverage. We assume these end users will each make 1.5 requests per week for a 7-day forecast in their specific geographic area from the NMHS, which is updated every 6 hours. This service will cost 5 Francs per request, or \$0.009. In the first year we estimate \$119,459 will be generated from requests for the 7-day forecast.

*Estimating Private Sector Revenues*

Revenues should be estimated by assessing the size of the market for a particular service, the cost of providing the service, and the possibility of expanding the service (by providing more information to existing clients, or by adding additional clients) in future years. In the **Sample NMHS Financial Plan**, the **Revenue – Telecom** worksheet uses statistics on the working population exposed to weather conditions and the percent of mobile phone users who have SMS coverage to estimate potential revenues for accurate 7-day weather forecasts delivered by SMS upon request (see **Box 3**).

**Ramping up revenues over time:** The **Revenue – Media** worksheet in the **Sample NMHS Financial Plan** projects revenues from two end user services: (i) improved WCIS, which may include tailored charts, maps or regional data which makes the WCIS more useful to the audience; and (ii) training for weather presenters or broadcasters. For the improved WCIS, the example shows a simple method of estimating revenues in future years. We assume that revenues in year N+1 will be 20% of possible revenues. As more clients sign on to the service, the revenues grow to 50% of possible revenues in year N+2 and 100% of possible revenues in year N+3.

## Step 5. Determine an optimal financial plan for achieving NMHS improvements

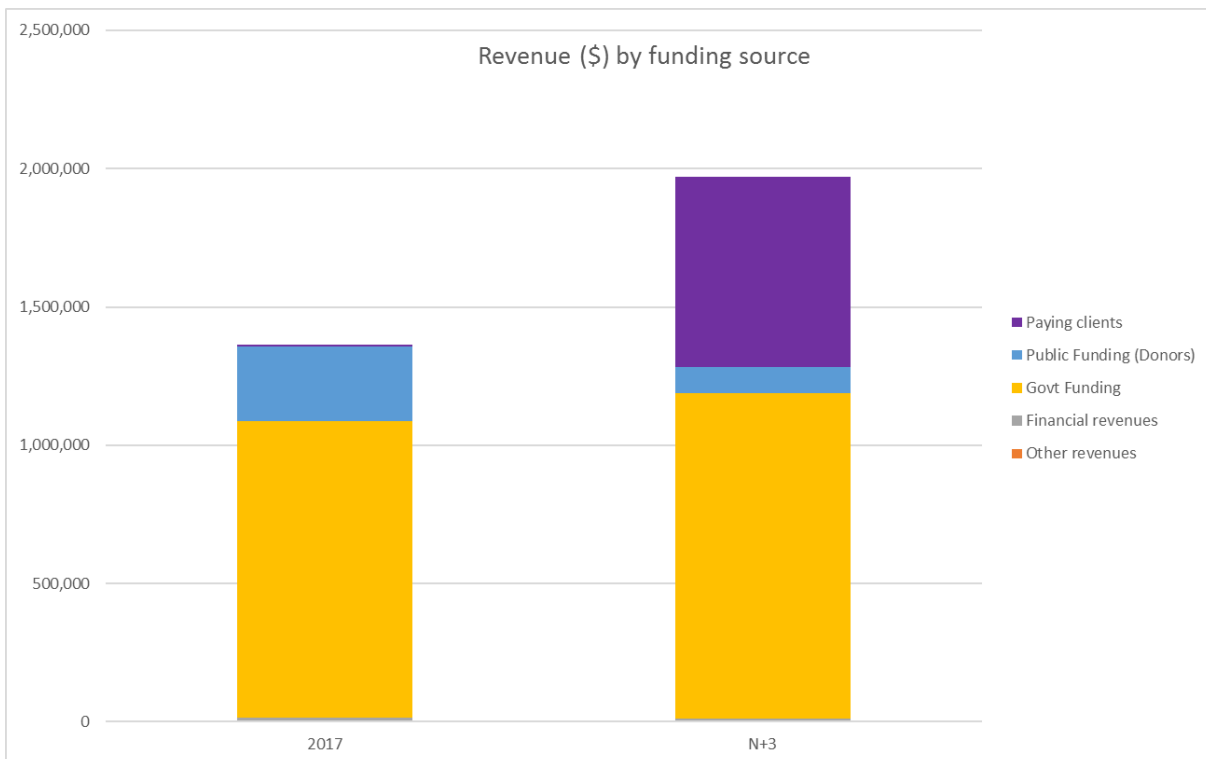
### *Set a revenue target for paying clients*

NMHSs like Météo France or the UK Met Office have long-term private sector clients that cover 5 – 10% of their budgets. You should determine your own target. You may want to start with a small target of 1 to 3% of the NMHS total budget, and aim to increase it over time; this approach has been used successfully by the South African Weather Service. Once you have created an initial estimate of your projected revenues from paying clients in key economic sectors, look at rows 60-62 of the NMHS Financial Plan worksheet to determine the percent of total NMHS revenues from private clients. Note what happens to your percent of revenues from paying clients as you consider different budget scenarios. You may want to target an increasing percentage over time in future years.

### *Explain your financial plan to stakeholders using charts*

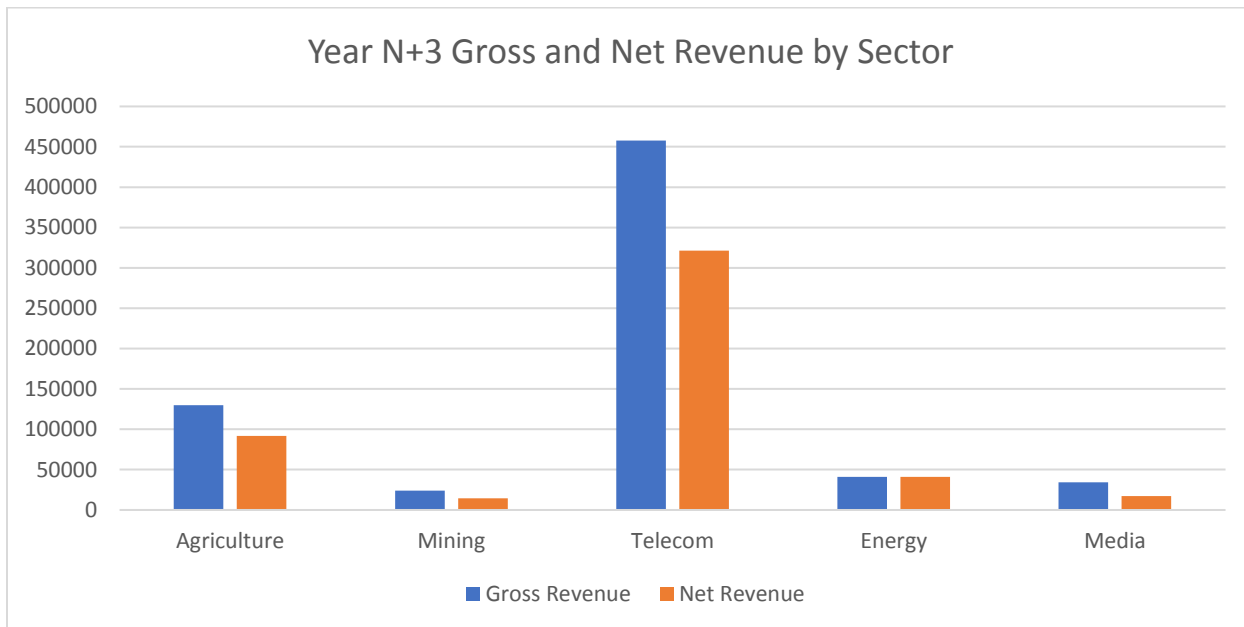
The **Sample NMHS Financial Plan** includes two charts to the right of the budget in the NMHS Financial Plan worksheet. The first chart (**Figure 7**) shows how the sources of NMHS revenue, and the overall total, will change after year N+3 when the GFCS capacity improvements have been made, and new paying clients added. This chart should show an increase in paying clients, and an increase in overall revenues. You can create this chart to show donors and other stakeholders the intended overall result of your NMHS Financial Plan.

**Figure 7: NMHS revenue by funding source before and after implementation of the financial plan**



The second chart (**Figure 8**) shows your projections for gross and net revenue from paying clients in each sector you have chosen to target. This chart should reflect your assumptions about the value of WCIS to clients in each sector, and the relative demand for WCIS in each sector.

**Figure 8: Projected gross and net revenue from paying clients in key economic sectors**



### Step 6. (Optional) Country Worksheet

If desired, use the **Country** worksheet to create a snapshot of the country’s economy and demography, which will help you derive a list of key economic sectors that may be willing to pay for WCIS. You may want to assess whether key economic sectors are increasing their share of GDP over time, which is an indicator that the sector’s demand for WCIS may increase. The Country worksheet can also be used to show donors or other stakeholders your rationale for targeting specific sectors for additional NMHS revenue.

- **Currency** – Fill in the local currency and exchange rate with US Dollars
- **Economy** – Fill in the total GDP and the per cent of GDP contributed by key economic sectors
- **Demographics** – Fill in the total population, average household size, household access to electricity or mobile phones, and per cent of working population in primary, secondary and tertiary sectors where climate information services are delivered or may be considered

## MODIFYING AND ADAPTING THE TOOL

The Tool was designed based on NMHS case studies from sub-Saharan Africa. Many aspects of the tool can be modified to accommodate the situation in a given country. Users are free to modify the tool in any way that is helpful for their own purposes.

### Adding future years

The Tool was built to accommodate financial information for three previous years, the current year (Year N), and three future years (N+1, N+2, N+3). If you want to project the NMHS financial plan further into the future, you can extend the number of projected years (e.g., to include N+4, N+5, etc.) by adding columns within the table. If you add additional future years, the following worksheets should be modified to include the additional years:

- NMHS Financial Plan
- GFCS Capacity Improvements
- Revenues (all sectors)

Be sure to also update the formulae and columns within the NMHS Financial Plan worksheet to ensure that they include the additional future years.

### Adding sub-sectors to a Revenue worksheet

You may want to include more than one sub-sector in a Revenue worksheet. For example, you may pursue agriculture clients in the rice and coffee sub-sectors. If so, you can build the two cases side by side in the same worksheet. Be sure to update the formulae in the NMHS Financial Plan worksheet to include the Revenues, Costs and Benefits from all subsectors.

## RESOURCES

Dinku, T., Madajewicz, M., Curtis, A., Connor, S., O'Sullivan, R., Phiri, C., Steynor, A., Tadross, M., Traore, S., Hauswirth, D., Kloppers, K., Lennard, C., and Allis, E. (2018). **Development of Metrics to Assess National Meteorological Services in Africa**. USAID-Supported Assessing Sustainability and Effectiveness of Climate Information Services in Africa Project. Washington, D.C., USA

Dinku, T., Usher, J., Madajewicz, M., Curtis, A., Connor, S., O'Sullivan, R., Phiri, C., and Steynor, A., (2018). **National Meteorological Service Baseline Assessment Tool**. USAID-Supported Assessing Sustainability and Effectiveness of Climate Information Services in Africa Project. Washington, D.C., USA

Dinku, T., Thomson, M.C., Cousin, R., Del Corral, J., Ceccato, P., Hansen, J., Connor S.J. (2017). **Enhancing National Climate Services (ENACTS) for Development in Africa**. Climate and Development. DOI:10.1080/17565529.2017.1405784.

Global Framework for Climate Services. 2017. **Emerging priorities for climate services investment in Mali**.

Mills, Anthony et al. March 2016. **UNDP Market Assessment: Revenue Generating Opportunities Through Tailored Weather Information Products**. UNDP. New York, USA. License: Creative Commons Attribution CC BY 3.0 IGO.

Usher J., Phiri C., Linacre N, O’Sullivan R, & Qadir U. 2018. **Climate Information Services Market Assessment and Business Model Review**, USAID-supported Assessing Sustainability and Effectiveness of Climate Information Services in Africa project. Washington, DC, USA.

Rogers, D. P., & Tsirkunov, V. V. 2013. **Weather and Climate Resilience: Effective Preparedness Through National Meteorological Services**. Washington, DC: World Bank.

Snow, John T.; Bonizella Biagini, Greg Benchwick, Georgie George, Joost Hoedjes, Alan Miller, Jeremy Usher. 2016. **A New Vision for Weather and Climate Services in Africa**. UNDP, New York, USA, 2016. License: Creative Commons Attribution CC BY 3.0 IGO.

Vaughan, C., Hansen, J., Roudier, P., Watkiss, P., and Carr, E. 2017. **Evaluating Agricultural Weather and Climate Services in Africa: Evidence, Methods, and Learning Agenda**. USAID-Supported Learning Agenda on Climate Information Services in Sub-Saharan Africa Project.

World Meteorological Organization. 2006. **Guidelines on the Role, Operation and Management of National Meteorological and Hydrological Services: Operational Hydrology Report No. 49**. WMO-No. 1003. Geneva, Switzerland.

World Meteorological Organization. 2014. **Implementation Plan of the Global Framework for Climate Services**. Geneva, Switzerland.

World Meteorological Organization. 2017. **Guidelines on the Role, Operation and Management of National Meteorological and Hydrological Services**. WMO-No. 1195. Geneva, Switzerland.

World Meteorological Organization. 2018. **Step-by-step Guidelines for Establishing a National Framework for Climate Services**. WMO-No. 1206. Geneva, Switzerland.

World Meteorological Organization. June 2018. **Policy Framework for Public-Private Engagement** (Approved by the 70<sup>th</sup> Session of the Executive Council, June 2018).

World Meteorological Organization. 2018. **Step-by-step Guidelines for Establishing a National Framework for Climate Services**. WMO-No. 1206. Geneva, Switzerland.