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Climate services to reduce vulnerability in Haiti

External Evaluation – Final Report

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Acronyms and abbreviations

AWOS	<i>Automated Weather Observing System</i>
CIAT	<i>Comité Interministériel d'Aménagement du Territoire</i> (Interministerial committee for land management)
CNIGS	<i>Centre National d'Information Géo-Spatiale</i> (National centre for geospatial information)
CNM	<i>Centre National de Météorologie</i> (National meteorology centre)
CNSA	<i>Coordination Nationale de la Sécurité Alimentaire</i> (National Coordination for Food Security)
DAC	Development Assistance Committee
DPC	<i>Direction de la Protection Civile</i> (Civil protection directorate)
FIC	<i>Frères de l'Instruction Chrétienne</i>
EU	European Union
EWS	Early Warning System
HITAC	Haiti International Technical Advisory Committee
IDB	Inter-American Development Bank
INSMET	<i>Instituto de Meteorología de Cuba</i> (Cuba meteorological institute)
ITAC	International Technical Advisory Committee
MARNDR	<i>Ministère de l'Agriculture, des Ressources Naturelles et du Développement Rural</i> (Ministry for agriculture, natural resources and rural development)
MDE	<i>Ministère de l'Environnement</i> (Ministry of the environment)
MFI	Météo France International
MoU	Memorandum of Understanding
MTPTC	<i>Ministère des Travaux Publics, Transports et Communications</i> (Ministry for public works, transport and communications)
OECD	Organisation for Economic Co-operation and Development
OFNAC	<i>Office National de l'Aviation Civile</i> (National office for civil aviation)
ONEV	<i>Observatoire National de l'Environnement et de la Vulnérabilité</i> (national observatory for the environment and vulnerability)
PNAP	<i>Programme National d'Alerte Précoce</i> (national early warning programme)
SEMANAH	<i>Service Maritime et de Navigation d'Haïti</i> (national maritime and navigation service)
SNRE	<i>Service national des ressources en eau</i> (national water resources service)
TAP	Technical Assistance Package
UHM	<i>Unité Hydrométéorologique d'Haïti</i> (Hydro-meteorological unit of Haiti)
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNOPS	United Nations Office for Project Services
USAID	United States Agency for International Development
WB	World Bank
WFP	World Food Programme
WMO	World Meteorological Organization

Executive summary

This evaluation of the project entitled "Climate services to reduce vulnerability in Haiti" was conducted between February and April 2019. The main aim of this external evaluation is to assess the design, implementation, results, relevance and efficiency of the project.

The project was funded by Environment Canada and implemented by the World Meteorological Organization (WMO), with a budget of Can\$ 6.5 million. It was launched through a financing agreement and subsequent fund disbursement at the end of 2012. The initial project length was five years, ending in October 2017. The project was extended for a further two and a half years, until March 2020, mainly to allow the activities relating to result 2 to be completed. These activities related to the technical assistance package (TAP), which provides support for the improvement and development of the hydro-meteorological unit of Haiti (UHM).¹

The evaluation covered the design and implementation of all project activities that ran from 2 November 2012 to 31 December 2018. Some activities conducted up to March 2019 were added during the evaluation, as they were considered important for evaluating the final results and the project's effectiveness.

This analysis-based evaluation measures the performance and relevance of WMO actions to support the national hydrometeorological service during project execution.

The methodology used for the evaluation was results-based and aimed to produce conclusions and to identify and summarize the lessons learnt that could help to improve the selection, design and implementation of similar projects in the future. The analysis was based on the criteria of the Development Assistance Committee (DAC): relevance, efficiency, effectiveness, impact and sustainability. Two additional criteria (methodological aspects and cross-disciplinary aspects – gender and environment) were also taken into consideration, but these were then set aside at WMO's request, since they were not requested in the evaluation's terms of reference. The evaluation team focused on verifiable evidence (using documents and photos) and on input from stakeholders, which was obtained through interviews and focus groups; the confidentiality of interviewees was maintained.

During its field visit in February 2019, the evaluation team encountered several difficulties caused by the political instability in Haiti. However, the team was able to organize a second visit in March 2019 to complete the visits and interviews.

The field visits focused on the UHM facilities, the AWOS station and the Thiès station at the Port-Au-Prince airport, together with auxiliary facilities and the UHM-OFNAC observation office at the airport.

The project was expected to have three key results: to create an operational work environment (key result 1); to develop the operational forecasting capacities for weather, climate and hydrology services (key result 2); and to set up a pilot service programme for fishermen (key result 3).

The analysis of the project design and planning show that these phases were spread out over a long period of time – more than two years – starting with an identification visit to Haiti in April 2010; the project work plan was drafted in August 2012 but not finalized until April 2014. This final 2014 version was then shared with the ministry of agriculture, natural resources and rural development (MARNDR), the project's partner institution.

The evaluation revealed shortcomings in the project design and planning.

One of the objectives set out in the project work plan was to merge the national meteorological centre (CNM) and the national water resources service (SNRE) into one entity,

¹ Contract signed on 29 September 2017 by Météo France International (MFI) and WMO.

but the logical framework in the work plan included only one governance-strengthening activity, which was activity 2.6. *Strategy to develop and plan the ongoing operations of CNM and SNRE*. Despite this, the governance component subsequently proved essential to ensuring the future running of UHM. When designing and planning the project, no other action to support UHM's new administrative status was foreseen, despite the political instability in Haiti.

Of the three key results, key result 3 was removed upon the recommendation of the fourth session of the International Technical Advisory Committee (ITAC) in June 2016, as no activity relating to this result had been initiated. The report from that session of the ITAC included the following paragraph: "Through a careful analysis of the capacity of UHM and the other state entities such as the *Service maritime et de navigation d'Haïti* (SEMANAH), the project team has suggested to remove key result 3. The dissemination of weather information to fishermen falls under the responsibility of SEMANAH and thus the objectives of key result 3 can be covered through a close cooperation between UHM and SEMANAH. The project will work further to strengthen the capabilities of UHM to issue forecasts for extreme weather events". The budget assigned to key result 3 was reallocated to key result 1.

The role of the project's main stakeholders – MARNDR and OFNAC – was not made sufficiently clear during project planning, which delayed the launch of project activities. The memorandum of understanding with the main partner, MARNDR, was not established until February 2014, and there is still not formal agreement between UHM and OFNAC.

Our DAC criteria analysis allowed us to draw the following conclusions:

- **The relevance of the project is high.** The specific objective of "*strengthening the capacities of the national meteorological and hydrological services of Haiti to deliver weather, climate and hydrology services and to issue early warnings*" was in keeping with the needs of the Haiti Government, the development aims of Environment Canada and the know-how of WMO.
- **The effectiveness was medium to high.** In March 2019, two of the three key results had been achieved, and the third removed.

Unfortunately, no baseline indicators were established in the logical framework, which meant that the execution and monitoring team could not measure any result indicators. As a result, the evaluation was essentially based on direct observation and interviews.

More concretely, the new building is operational and houses the teams (key result 1); new meteorological products have been created, and the information processing chain has been totally updated, from field observation through to production of services, including the strengthening of forecasters' capacities to make full use of their expertise (key result 2).

With regard to the initial plan, the automated issuing of products and services was removed from result 2.

Efficiency is very low. There were major delays relative to the planned timeline. Preparing and launching the bidding process for the TAP took more than two years. It took a third year to negotiate the contract because the only offer received did not meet expectations (activities to be conducted versus available budget). As a result, the contract was not signed until September 2017, which means that area of activity 2 will not be completed until September 2020. In addition, there were significant budget overruns. For instance, the budget line for installing and configuring a system for producing meteorological forecasts (the TAP was included in this budget line) was overrun by 196%.

- **The sustainability of the actions put in place is low.** The structures put in place, the UHM building, the synoptic stations and the AWOS station and the new systems will generate further operational costs, together with an increase in energy and telecom needs, and more staff will need to be recruited. Yet as at March 2019, UHM did not have its own budget and had not established new financing mechanisms. The political instability in Haiti increases the difficulty of sustaining the activities set up through the project.
- **The impact is medium.** The project considerably enhanced the visibility of UHM in Haiti and helped to strengthen staff members' capacities. Overall, UHM products are perceived well by users, especially the civil protection directorate (DPC) and OFNAC. However, the network of users and range of products is still insufficient relative to Haiti's needs and the project's initial objectives.
- **The methodological aspect is weak.** Monitoring was poor. The result indicators included in the logical framework were not measured. And no baseline was established. There is a lack of sources that can be used for verification and reports that can be consulted, such as final reports for the service contracts for the technical advisor.
- **Integration of crosscutting aspects was medium to high.** The gender approach was not integrated into project planning or project management (bids, indicators, etc.). However, efforts were made to ensure equity in the participation of women in training sessions.

The construction of the UHM building did take into consideration the environmental impact study, and the design choices sought to ensure energy efficiency. However, the environmental aspect was not included in the methodology of other actions.

In conclusion, there are some overall points that could be improved for future projects. They included:

- (i) Stakeholders should be more comprehensively involved in project planning;
- (ii) Greater attention should be paid to the institutional context (in this case, UHM still does not have a separate legal status or its own budget to sustain the project);
- (iii) Deadlines should be more rigorously managed, as there were fairly large delays in constructing the building and especially in implementing the TAP (close to three years of delay).

As strong points, the project was able to draw on the WMO network by setting up partnerships so that Haiti could take advantage of the skills of INSMET in Cuba and HRC in San Diego. In addition to the TAP:

- (i) the network of synoptic stations was renovated;
- (ii) training sessions were organized; and
- (iii) the flash flood guidance system (FFGS) was set up.

Finally, for WMO, the main corrective measures for designing, implementing, monitoring and evaluating projects are as follows:

- Establish the organizational structure for implementing the project when the project is being planned, and establish a clear organigram of units and their staff, as well as the functions of each post and their reporting line;
- Take account of the institutions' organizational structure in order to ensure the best possible conditions are in place for the project's sustainability.
- Conduct a mixed, interim evaluation if the project is set to last three or more years;
- Set up a system for monitoring project indicators, strengthen the capacities of the staff responsible for monitoring, and include the gender aspect in that system.

To enhance the results already obtained, UHM should continue with the initial and continuing training of UHM staff, paying particular attention to any new staff who join. UHM should also take advantage of the World Bank's Hydromet project to finalise investments, focusing on the tool for producing automated services and on setting up a platform that is shared with other institutions so that the entire population of Haiti can benefit from such services. UHM should also come up with and implement a medium-term development strategy (3–5 years). This strategy had been rescheduled for 2019–2020, but at the time of writing in March 2019, work had not yet begun.

Finally, the MARNDR should as soon as possible allocate a budget to UHM that covers running costs and the purchase and maintenance of equipment for all services. This will ensure that the steps already taken can be sustained.

1. Introduction

1.1 Evaluation goals

The aim of this final external evaluation is to assess, as systematically and objectively as possible, the project entitled "Climate services to reduce vulnerability in Haiti", including its design, implementation and the results set out in the project description. Based on this analysis, the aim is to measure the performance and relevance of WMO's work to support the national hydrology and meteorology service over the five years of the project, as well as to determine and summarize the lessons that could be used to improve how similar projects are selected, designed and implemented going forward. WMO will then be able to analyse the work done, the challenges identified and the solutions proposed. The evaluation is aimed at enhancing responsibility and transparency and measuring and disclosing the project's achievements.

1.2 Scope of the evaluation

The evaluation covers all aspects of the project: the improvement to the facilities housing meteorological services in Haiti, the strengthening of capacities, and the impacts on end beneficiaries.

The evaluation looks at how the actions converged in order to provide better results for beneficiaries, and the challenges that remain.

It also analyses the effectiveness of the implementation strategy: the relevance and the capacities of the operational team on the ground (technical knowledge, participatory tools, etc.), the internal control system, the internal communication system, and the system for communicating with managers at headquarters and other stakeholders (including the donor).

The evaluation covers only the project implementation period, from October 2012, when the MoU between WMO and Environment Canada was signed, to February 2019.

It covers all stakeholders and beneficiaries of project activities. It takes account of all of the services concerned, including stakeholder coordination mechanisms.

1.3 Methodology

The evaluation used the criteria provided by the OECD's Development Assistance Committee (DAC) and evaluation best practices. The DAC model sets out five criteria for evaluating cooperation and development activities: relevance, efficiency, effectiveness, impact and sustainability. The criteria requested in the evaluation terms of reference are included (see Annex 1).

The DAC model focuses primarily on the project results (rather than the processes). To add to the analysis, we added design-related criteria: methodology and crosscutting aspects (gender and the environment).

Evaluation timetable:

The evaluation was conducted between 1 February and 14 April 2019.

After the initial phase, in which the documents were reviewed, two field visits were conducted, one from 6 to 14 February 2019 and the second from 4 to 9 March.

The list of people interviewed is provided in Annex 4.

Evaluation methods and techniques:

A participatory approach was taken for the evaluation, with various stakeholders, especially direct beneficiaries, taking part, including: UHM staff, project partners, the project implementation team, and project staff at WMO headquarters in Geneva and in the regional office for North America, the Caribbean and Central America.

To ensure that the analyses were of a high quality and reflected the situation in which the project was implemented, the evaluation team drew up a strategy to diversify the sources of information and data used in order to triangulate the information.

Data collection methods were primarily qualitative. Quantitative data were also collected from the project documents and reports, where available, and integrated into the analysis. The data and stakeholders' input were, where possible, crosschecked to enhance the credibility and validity of the results.

An evaluation matrix was created (see Annex 3) to set out the key questions, with indicators, based on the evaluation criteria. This was then used to draw up a protocol for each interview so that the questions could be answered, with some flexibility to allow for other questions while also ensuring that the key information was obtained.

Briefing sessions. The evaluation team held briefing sessions with WMO staff directly involved in the project in Geneva and in Haiti in order to via Skype and in person in order to: (1) agree on how key stakeholders would participate; (2) agree on the timetable; and (3) determine the priority topics for the evaluation.

Data collection methods

The evaluation methods and techniques allowed for both primary and secondary data to be collected. Primary data included information that the evaluation team observed or collected directly from stakeholders based on their direct experiences of the project activities. These data were collected through direct observations, meetings, focus groups and interviews. Interviews and workshops make it possible to gain a better understanding of the project and the project results and helped the evaluators to observe the changes and to identify the factors that contributed to the change, making it possible to review the theory of change. Data from interviews and focus groups was collected confidentially.

During the kick-off phase and after the initial document review, the evaluation team drew up questionnaires for the semi-structured interviews, the most representative of which are provided in Annex 7.

Secondary data include documents directly relating to the evaluation and produced by the WMO project team and other individuals and agencies for purposes other than the evaluation. The main documents used as sources of secondary data are listed in Annex 2.

Document review. Key documents included the full project work plan, the identification mission reports, the result progress reports, the monthly monitoring reports, the annual monitoring reports, and documents from other projects executed or being executed in Haiti and relating to hydro-meteorological services (see Annex 2 for a detailed list of documents).

Field visits. The evaluation conducted an initial field visit from 6 to 14 February and a second visit from 4 to 9 March. During the second visit, the Thies station at the Port-au-Prince airport and the AWOS station were both visited.

Interviews with key informers. The evaluators conducted interviews with the key informers so that the evaluation questions described in the evaluation matrix could be answered. See Annex 4 for a list of the people interviewed.

The evaluators used various interview formats, as summarized below:

- **Semi-structured interviews:** This format was used to collect information on the role played by different stakeholders in designing, implementing and managing the programme, and on their opinions.
- **Focus groups:** Focus groups were mainly used to collect qualitative data on the project's impact. This was because the project monitoring reports did not provide indicators of the impact or even the results.
Focus groups (2) were conducted with direct beneficiaries of the project, observers and forecasters.
- **Targeted interviews:** Where needed, the evaluators held other target interviews in order to explore areas requiring more in-depth inquiry.

The team was able to work autonomously, which helped to guarantee their independence during the field visits and when drawing up the reports.

Determining the project timeline

While it would have been preferable to determine the timeline with the help of the various stakeholders in order to better understand their involvement in the various project phases, constraints caused by the high turnover in staff throughout the project meant that the timeline was determined by the evaluating team based on information taken from the document review.

Outcome harvesting. This tool was useful in the focus groups for evaluating the strengthening of technical capacities and enabled us to evaluate the results attained and the project impact probability.

SWOT analysis. The evaluation team and the team of forecasters conducted a SWOT analysis that helped to highlight the lessons learned and to better evaluate the sustainability of the results attained at the end of the project.

Session to summarize and validate the observations drawn from the visits and interviews. A workshop was held to summarize the information gathered by the evaluators and their observations and to get approval from UHM staff and the WMO project coordinator.

Debriefing. To present and discuss the initial results before leaving Haiti, debriefing sessions were held separately with MARNDR and the Canadian Embassy.

1.4. Constraints and limitations of the evaluation

The evaluation was scheduled to finish before the departure of the project's international coordinator, planned for the end of March 2019. The field visit was meant to take place no later than February 2019. The selected dates, 5 to 16 February, were before the carnival celebration, which brings the country's capital to a standstill. Unfortunately, the socio-political instability in the country and changes in agenda made certain meetings impossible. The visit was finally suspended on 14 February, as United Nations staff had been prohibited from moving within Port-au-Prince and all public authorities in Haiti were at a standstill for the entire week, making visits and in-person interviews impossible. As a result, some interviews scheduled in the work plan had to be conducted by telephone.

Once the Haiti travel ban had been lifted by the United Nations Department of Safety and Security (UNDSS), a second visit to Haiti took place from 5 to 9 March. During these trips, visits and focus groups were organized, as were in-person interviews. In addition, the project's national coordinator, having completed the assignment in March 2017 (the project's initial end date), could only be contacted by phone.

Nevertheless, all of the individual interviews with key informers were conducted, and on the whole, the observations were made based on the information collected in the project

documents and reports and during the interviews with stakeholders and project staff. The accuracy of the evaluation results is determined by the integrity of the information provided to the evaluators by these sources and by the evaluators' capacities to crosscheck that information.

2. Brief description of the project and the development context

2.1. Hydro-meteorology in Haiti and issues to be resolved by the project

Owing to its geographical location, with the Atlantic Ocean to the north, the Caribbean Sea to the south, the Dominican Republic to the east and the Windward Straights to the west, Haiti is prone to a range of natural risks, some of which are of a hydro-meteorological or geodynamic origin.

Haiti is considered to be the world's fifth most exposed country in terms of the risks of natural disaster. Almost 98% of the population is vulnerable to at least two natural disaster risks, which include: earthquakes, hurricanes, landslides, flooding and drought.² The country was hit by more than 100 natural disasters between 1900 and 2016. These disasters, which have on numerous occasions devastated several towns, include: a 7.0-magnitude (MW) earthquake, close to 40 cyclones, more than 50 floods, seven periods of drought, a cholera epidemic and two other epidemics of infectious diseases.

Haiti is particularly vulnerable to cyclones, given its location within the North Atlantic cyclone belt. The cyclone season begins in June and ends in November and is a period that the people of Haiti dread. Several towns in the country, especially towns on the southern peninsula, have on several occasions been flattened by the cyclones or hurricanes that have hit the country. Cyclone Hazel in 1954, Hurricane Flora in 1963 and more recently Hurricane Matthew in 2016 ravaged certain towns across the country.

Since the 2000s, there has been an increase in the number of cyclones and in the frequency and intensity of localized droughts. Extreme and variable weather conditions alternate between a dry season (generally between December and April) and excessive rainfall and strong storms and hurricanes (generally from August to November).

The four successive cyclones in 2008 and Cyclone Jeanne in 2004 caused damage of 15% and 7% of GDP respectively.

Haiti has a population of over 10 million and is the most densely populated country in the region (353 people per km²). It also has the lowest human development index (HDI) value in the western hemisphere (HDI value of 0.471), making it 149th out of 179 countries. Close to three-quarters of the population live below the poverty line on USD 2 per person per day. And over half of the population (59%) are considered poor, with 2.5 million people in absolute poverty or less than USD 1 per person per day.³

Haiti's economy is based primarily on agriculture, which employs 60% of the workforce and accounts for 25% of GDP. The climate and the weather (temperature and rainfall) are key factors affecting the resilience and productivity of the farming sector. It is becoming increasingly difficult to obtain good yields in the farming sector because of meteorological conditions associated with land degradation, flooding, loss of farmland due to deforestation, and erosion. Furthermore, Haiti has a weak capacity to adapt to climate changes and its consequences.

The IPCC's Fourth Assessment Report shows that the percentage of days with very warm temperatures has increased considerably since the 1950s, with a marked decrease in rainfall over the part of the Caribbean occupied by Haiti. Sea-level rise is expected to increase risks

² Transition Action Plan, UNDP 2013, in Country Document, Haiti 2016-2020, ECHO-UNISDR

³ Systematic Country Diagnostic 2015 (WB)| Survey of living conditions in Haiti (ECVMAS) 2012

of floods, storm surges, erosion and other coastal hazards, thus threatening vital infrastructure, settlements and facilities that support livelihoods.

The Government of Haiti is very concerned about climate change and its impacts on food security. Nevertheless, government policies have so far not provided farmers with the support that they so greatly need. Risk and disaster management plans for coastal areas that are vulnerable to hurricanes are not very well developed. The government runs a flood warning system but has not yet produced adequate or precise contingency data and current data collection and extension methods are not enough to strengthen the farming sector's resilience to climate change. It is on this premise that the project to strengthen hydro-meteorological services as part of the Pilot Programme for Climate Resilience (PPCR), funded by the Climate Investment Funds (CIF), aims to strengthen the institutional capacities of the Government of Haiti to provide meteorological, hydrological and climate services tailored to end users in the civil protection and agricultural sectors.

The magnitude-7.0 earthquake that struck Haiti on 12 January 2010 devastated the country. More than 230,000 lost their lives and a further 300,000 were injured. The earthquake crippled Haiti's capital, Port-au-Prince. Damage and economic losses are estimated to have been around US\$7.9 billion – equivalent to over 120% of Haiti's 2009 GDP. Most major infrastructure, including that for weather, climate and water monitoring and prediction and forecasting for early warning of extreme events, was destroyed.

Natural disasters, coupled with political instability in the country have led to the deterioration of weather, climate and water monitoring infrastructure and related institutions and services.

In this context, the aim of the project is to provide essential support to re-establish weather, climate and hydrology forecasting activities in Haiti. The project has four main focus areas that will establish and / or modernize the national meteorological service's main functions of observations, forecasting and service delivery. The four main focus areas are:

1. To construct a net-zero-energy and earthquake- and hurricane-proof building to house the national hydro-meteorological services of Haiti
2. To undertake capacity building including training of both scientific and technical personnel and developing a business plan for the NMHS, taking into account all aspects of developing a functioning and modern weather, climate and hydrology service
3. To re-establish the climatological and hydrological observing networks and implement a data management system
4. To develop a wide-reaching dissemination system, to inform stakeholders and the general population of climate-related risks.

2.2. Objectives and expected outcomes

According to the project work plan, the projects specific objective is to: "strengthen the capacities of the national meteorological and hydrological services of Haiti to deliver early warning, weather, climate and hydrology services in collaboration with WMO Partners and NMHS."

The results expected at the end of the project are:

- Result 1: An operational working environment has been created.
- Result 2: The operational forecasting capacity for weather, climate and hydrology services and their dissemination channels have been strengthened.
- Result 3: A pilot service delivery programme for fishermen has been set up.

2.3. Project length

The project length was initially set at five years following the signing of the financing agreement between Environment Canada and WMO in October 2012.

Can\$6.5 million were disbursed on 2 November 2012.

The project end data was scheduled for October 2017. However, for various reasons, which will be analysed in the document, the project was extended until 31 March 2020, the new end data for the agreement with Environment Canada.⁴

Except for TAP and activity 2.6. to set up a development strategy and business plan for ongoing operations for CNM & SNRE, which will be conducted, according to WMO, in 2019/2020, the other project activities ended on 31 March 2019.

2.4. Main stakeholders

Table 1 below lists the main stakeholders.

Environment Canada		Donor
World Meteorological Organization, WMO		Implementing agency
Ministry of agriculture, natural resources and rural development, MARNDR		Partner in Haiti
UHM	National water resources service, SNRE	Direct beneficiary
	National meteorological centre, CNM	Direct beneficiary
United Nations Development Programme, UNDP		Operational support partner in Haiti
UNOPS		Partner responsible for construction component

TABLE 1: Main stakeholders

Other stakeholders:

- **OFNAC:** Covered the wages of some observers and forecasters and temporary premises for former CNM; uses UHM products.
- **INSMET:** Installed the weather stations donated by Canada and WMO in 2010.
- **Météo France:** Trained forecasters in Toulouse and Martinique.
- **CNIGS:** Shared meteorological data from their stations; member of the steering committee.

2.5. Direct and indirect beneficiaries

The direct beneficiaries are the CNM and the SNRE and their staff. These two services are part of the MARNDR. On 27 August 2015, an internal MARNDR memo announced that the CNM and SNRE were being merged into a new service: the hydro-meteorological unit (UHM).

Initially, fishermen were also included as direct beneficiaries, but the expected outcome of creating an early warning system for fishermen was never achieved. They therefore became indirect beneficiaries.

⁴ Météo France International will continue to provide technical support until October 2020.

The indirect beneficiaries include all end-users that may benefit from reliable hydro-meteorological analyses and climate data in their decision-making, especially civil aviation and the civil protection directorate.

The population of Haiti, and particularly the groups most vulnerable to hydro-meteorological phenomena (women, children, the elderly, those living in slums and poorer neighbourhoods, and rural communities), benefit from the information services provided by the project and the resulting applications.

3. Evaluation observations

3.1. Analysis of project design and planning (methodological aspects)

3.1.1. Design and planning phases

The design and planning phases went on for a long period of more than two years.

According to a report published on 10 May 2010 entitled "Developing meteorological and hydrological services in Haiti – proposed actions for the medium term", a visit to Haiti was organized by WMO for 4 to 10 April 2010 and involved Environment Canada.⁵ The main aim of the visit was to determine the current situation of hydrological and meteorological services in Haiti. One of the recommendations of the report was that there was a need to set up "a medium-term project (three to five years) to overhaul the CNM and SNRE so that those services could effectively provide essential data and information".

Already during the visit, two major problems were highlighted as priorities: the first was the difficulty of housing the CNM services, which were aggravated by the earthquake on 12 January 2010, and the SNRE (to a lesser extent); the second was the lack of a budget and organizational structure for these two government services, which are part of the MARNDR.

The visit sought to come up with proposals for upcoming interventions, based on the assumption that the CNM and SNRE would be merged into a single entity. The visit highlighted two points as priorities: the need to strengthen governance and provide office space for the CNM and SNRE.

During the project's planning phase, which we will discuss in more detail below, the problem of housing the services was addressed within the area of activity called "creating an operating work environment", but the issue of governance was not addressed directly.

During the 2010 visit, the report suggested providing support to the two services through a "project manager" who would be supported by the technical and scientific expertise of two senior consultants on assignment (a hydrologist and a meteorologist) in defining activities, monitoring them and evaluating them periodically. During project implementation, the technical consultations focused on the meteorologist.

Soon after the 2010 visit, Environment Canada donated IT equipment for the CNM and SNRE offices (computers and printers). This was outside of the project. In addition, seven automatic synoptic stations (Thies) were sent to CNM by WMO but were not installed.

⁵ The team was made up of: Harou Abdoulaye, director of Defence Weather Services, Meteorological Service of Canada, Environment Canada (Canada), Serge Pieyys, hydrology consultant, and Jean Noël Degrace, regional director of Météo France Martinique, coordinator for forecasting and warning systems for Antilles Guyane.

The purchase of other stations was not planned as part of the project, and we think that was the correct decision. In 2010, the CNM had three stations (Port-au-Prince, Cap Haïtien and Jérémie), although there was no automatic transmission of data. At the same time several projects had planned to set up stations (e.g. PNAP⁶) for other institutions such as CNIGS. These stations could be put under the responsibility of CNM-SNRE in the future, or at least their data could be included in the CNM-SNRE database.

The initial assessment report suggested a partnership between the upcoming WMO project and the PNAP project, as part of the SNRE's functions. This partnership was not included when planning the project. There are now 81 stations that were set up by the PNAP that are no longer operational.

In 2010, the CNM had only two forecasters and 15 observers paid by OFNAC (two in Jérémie and the rest in Port-au-Prince, even though Jérémie does not have an international airport, unlike Cap Haïtien). The need to train more forecasters – with long-term training of one to two years – outside the country was identified, but this was done outside the project in the end and began before the project.

The initial assessment report put the budget estimate for the project at US\$9,704,600, including US\$3.5 million for the purchase of 500,000 radio receivers to be distributed to people across the country. During the project planning phase, this direct support to ensure the distribution of early weather warnings to the population was ruled out.

During this period of more than two years, several WMO Member States involved in the RA IV Task Team – Canada, Cuba, France, Dominican Republic, UK and USA – provided contributions to Haiti to meet the country's urgent need for assistance. Certain private-sector contributions were also made. They are summarized below. The aid provided by the WMO and the Task Team amounted to more than US\$700,000 by August 2012.

Some of the emergency actions undertaken before the project began:

- The *Mouvement des entreprise de France*, MEDEF, a private-sector entity in Martinique donated two provisional structures in June 2010, which were delivered to Haiti. With the support of UNDP, the two prefabs were installed in November 2010 very close to the building of the National Civil Aviation Office (OFNAC), in order to ensure a secure power supply.
- Internet access was arranged under a contract signed with ACN Telecommunication Company for two and a half years (3 cyclone seasons). The computers and office support systems sent by Canada were set up.
- USAID provided the final furniture for the CNM office.
- France and WMO provided study grants for 11-month internships to train forecasters in Toulouse.
- A "visiting forecaster" programme was initiated to send additional, qualified French-speaking forecasters with access to the dedicated Extranet and real-time workstation for observational and forecasting data, in order to provide 24/7 assistance to forecasting staff in Haiti. The "visiting forecaster" programme saw its first deployment to Martinique from 28 May to the end of December 2010. A roster of six forecasters, from the Meteorological Service of Canada and Met Office UK, was set up, each on a one-month rotation to work with Météo France forecasters in Martinique, dedicated to supporting forecasting for Haiti. At the end of December 2010, this visiting forecaster programme was extended for three more months with the arrival of a forecaster from UK Met Office in Martinique.
- Environment Canada developed a website for the Haiti meteorological service to distribute meteorological information to users.

⁶ Set up jointly by MARNDR and MICT and financed with a IDB loan of US\$5 million, with a further US\$1 million taken from Haiti's budget.

- Five observers were sent to France for a five-month forecaster training course followed by rotational on the job training at Météo France in Martinique. The rotation was continued through 2011 and the 2012 cyclone season.

However, it would seem that WMO sent no other mission to Haiti to plan and update the project, even though the situation had changed in the two years since the earthquake and there had been changes within the Haiti authorities. From 2011 to February 2013, the evaluation team found no paper trail or record of interviews indicating the presence of a WMO mission relating to the project in Haiti.

The first version of the project work plan that we were able to find dated from 14 August 2012 and was produced by WMO based on the May 2010 report. This is the document that includes the pilot programme for 3,000 fishermen in Haiti, entitled "weather radio services for fishermen". Including this early warning system for fishermen supplemented the action areas initially identified: infrastructure for the hydro-meteorological services, governance and strengthening the technical capacities of the hydro-meteorological services. It subsequently turned out that this component was not coherent with the project's other activities and was too optimistic, given the situation in 2012 – and even today, given the management capacities of the hydro-meteorological services and the fishing sector in Haiti.

In this initial work plan from 2012, WMO intended to work in partnership with UN Environment, at least for the logistical and operational parts. This partnership never happened. Instead, a partnership with UNDP was set up, with UNDP providing operational support. This was a more appropriate partnership, since UN Environment does not have a strong presence in Haiti in terms of operations and administration.

Then in October 2012, WMO and Environment Canada signed an agreement for Canada to contribute Can\$6.5 million to finance a project entitled "Haiti weather systems programme – climate services to reduce vulnerability in Haiti", which was to last five years and was to be coordinated and managed by WMO.

A mission to get the project up and running took place in Port-au-Prince from 18 to 22 February 2013, and discussions were held with MARNDR, OFNAC, SEMANAH and CNIGS. Based on the information gathered during this evaluation, it was after this mission that the final project work plan was drafted, in April 2014, at WMO headquarters in Geneva.

In conclusion, WMO based the identification and planning phases on a short-term mission conducted during a crisis situation after the earthquake of 12 January 2010, even though the project had a development aim. These phases should have more actively brought together not only beneficiaries and MARNDR but also other stakeholders such as OFNAC and CNIGS and should have more precisely identified the United Nations agencies that could have provided operational support for the project. Instead, all of this work had to be done after the project agreement had been signed (in October 2012), which caused delays in implementing project activities.

3.1.2. Analysis of the logical framework and results framework (project logic and strategy, indicators)

The general aim of the final project document⁷ is to "Reduce the vulnerability of Haiti to hazardous weather, climate and water events and to the consequences of climate change ", with the specific objective of "strengthening the capacity of the national meteorological and hydrological services of Haiti to deliver weather, climate and hydrology services and to issue early warnings."

⁷ Version of 11 April 2014

The expected results for each project area, based on the logical framework, which can be found in Annex 7, were:

1. **The creation of an operational working environment**
 - R1.1. An operational project management and coordination unit
 - R1.2. Improved working conditions within CNM and SNRE
2. **Technical assistance to strengthen the operational forecasting capacity for weather, climate and hydrology services and their dissemination channels (TAP)**
 - R2.1. Establish a baseline and draft an implementation plan
 - R2.2. Set up a weather, climate and hydrology observation network
 - R2.3. Significantly improve the production and provision of services
 - R2.4. Make weather, climate and hydrology information accessible to the population of Haiti
 - R2.5. Train and build the capacities of human resources to meet the CNM and SNRE's objectives
 - R2.6. Create a strategic plan to support the provision of hydro-meteorological services
3. **Demonstration of a pilot programme to deliver services for fishermen**
 - R3.1 Improve the warning mechanism

In the context in which the project was planned – between 2010 and 2011 – when the fragility of Haiti's hydrometeorological services was identified, and when there were a high number of entities working in that area, we think it would have been a good idea to include a result concerning the governance of services, especially since the project recommended creating a new administrative structure.

The initial idea was to use the radio-weather system that had been successfully tested in Canada in order to set up an early warning mechanism for fishermen in Haiti.

While there is no doubt that an early warning system is needed for the fishing sector, such a system involves more entities than just the entity that issues alerts and must take account of the country's level of development. Yet, the skills and capacities of the CNM when the project was being planned, or UHM now, were limited to drawing up and perhaps issuing the overall alerts covering the whole of the country. Furthermore, result 3 should have involved associations of fishermen, etc. who were not consulted when planning the project.

The indicators in the logical framework were, generally speaking, SMART indicators⁸ (see Annex 7), except that they were not always identified over time (i.e. when they should have been achieved), and quantitatively speaking the target number was not always defined.

Unfortunately, we can see with hindsight that these indicators were not measured throughout the project and that there are no sources available to verify them. There was no plan for following up and monitoring these indicators in order to record the progress made towards each indicator. For example, there is no formal record of the bulletins issued by CNM-UHM, with at least monthly data and the corresponding dates. There is also no record of alerts. It is therefore difficult to verify the quantitative improvements to the products offered by UHM.

⁸ SMART: specific, measurable, acceptable or achievable, realistic, time-based

3.1.3. Assumptions and risks

When planning the project, five risks were identified, two of which were high:

- Insufficient national engagement and institutional risks – low level of inter-ministerial cooperation, ministry priorities different from those of the project.
We think that, aside from a protocol or memorandum of understanding, very few concrete measures were taken regarding these risks, in order to set out the responsibilities and functions of each stakeholder.
When designing the project, the main assumption was that it was in the beneficiaries' interest to merge in one building the CNM and SNRE's services, both of which belonged to MARNDR, given that they were in different locations and did not communicate with each other or share information.
The main risk identified when planning the project was that the government would not take on board the tools created by the project and that the CNM and the SNRE would be forgotten, as they would not be allocated the necessary personnel or funding.
Even though this risk was identified during the project design phase, activities to strengthen governance within the new structure that was to be created were not sufficiently planned. Actions always need to be planned to deal with any risk. According to WMO, the government did not take on its responsibility of strengthening governance.
- Risk of disaster caused by naturally occurring events. The measure taken was that should a significant disaster or chain of disasters happen with impacts on Haiti that cause one or more project activities to be delayed, the project is designed in a way that the activities' timeline can be reviewed and adjusted accordingly.
Other measures were not included in the project work plan but were nonetheless taken, such as ensuring that the building was earthquake-proof and not on floodable land and ensuring the buildings used additional energy sources such as solar panels or generating panels, which could be used if the country's electricity grid was down.

Two moderate risks were identified:

- Project execution and management risks: unclear roles and responsibilities of different stakeholders, weak coordination of project among stakeholders and weak monitoring and reporting on results.
The measures taken were that: WMO would ensure field support and WMO was highly competent in all areas of this project and had performed similar projects in various countries. WMO has extensive experience in successfully planning, implementing, monitoring and evaluating these types of projects. The project management framework would involve: (1) a steering committee, (2) an implementation team, (3) a project coordinator, and (4) WMO Secretariat to address various project management and policy issues.
There would be regular communication with the various project management structures and stakeholders.
We do not think that all of the planned measures were implemented in their entirety, as there was no clear organizational chart of the staff involved in the project, with the management and monitoring hierarchy. The first ITAC meeting was held in April 2013, and the national steering committee met for the first time in July 2014, a year and a half after the project was launched. The role that these entities played was not exactly the same as that set out in the project work plan, which described a directing or supervisory committee.
- Strategic and socio-political risks: Differences in socio-political conditions, political

conflicts and economic atmosphere, national and sectoral policies and planning on disaster risk reduction and climate change adaptation, and gender policy biases that limit women's participation.

Measure taken: The risk to the project from political instability was mitigated by a continued, appropriate high-level engagement to ensure the benefits of the project were understood. Equal opportunities principles and requirements were considered when designing the project and were thoroughly considered during its implementation.

The socio-political environment became complicated at several points during the project, with changes within ministries that had an impact on the project, since the individuals involved changed throughout the project, with, for example, four different agriculture ministers in five years. This meant that the project team had to restart discussions on various key topics several times, and the activities could not progress at the planned pace.

Finally, one low-level risk was identified:

- Financial risks: insufficient funding, shortcomings in financial controls, shortcomings in the purchase and selection of products, exchange rates.

Measure taken: A trust fund was set up and managed by the WMO Project Coordination Unit under the supervision of the WMO Resource Mobilisation Office and Resources Management Department. Management of funds was the responsibility of WMO following transparent and reliable financing procedures. WMO works closely with its network of national agencies and regional partners. It is fully aware of the local financial regulations, practices and procedures of its partners. WMO follows the UN Procedures for Financial Management, Audit and Reporting.

Although it's not reflected in the work plan, WMO set up a partnership with UNDP, which provided operational support and managed local human resources and trips and purchases in the field. This ensured compliance with United Nations financing procedures.

Measures to reallocate the unspent budget for result 3, which was dropped, helped to cover new expenses that arose, for example, when the project was extended.

3.1.4. Lessons learnt from other relevant projects and incorporated into the project design

The most successful projects to modernize meteorological services are systematically implemented in an integrated manner by a team that takes responsibility for all activities (infrastructure, observations systems, information systems and service production). All of these systems must be seamlessly integrated to allow the meteorological service to function efficiently throughout the value chain, with fluid circulation of data from observation to the end products.

The project design cut the project into two bids: one for the building and another for the Hydromet systems. This approach made sense, given that the construction of a building for UHM is far removed from the fields of climatology and hydrometeorology. It would therefore have been difficult to find expert service providers in both fields.

In addition, this project is WMO's first direct execution project in Haiti, where other projects since 2004 have involved hydrometeorology and management of hydrometeorological risks with no sustainability of medium- or long-term impacts. These experiences were not sufficiently analysed during the project identification, design and planning phases in order to better plan actions to ensure the project's sustainability.

Given Haiti's history of socio-political instability, the need to set up a contract with the ministry as early on as possible should be taken into account.

3.1.5. Selection and involvement of stakeholders

The stakeholders identified for the project during planning were of course the two main hydro-meteorological services - CNM and SNRE. These two services are the main beneficiaries of the project. But because there was no legal entity, it was necessary to work more directly with MARNDR when drawing up the project work plan and to draft an implementation protocol specifying the ministry's commitments, in 2012. This protocol was finally signed in February 2014. This caused a delay in appointing a national project director, who took up the position in March 2014.

This protocol between MARNDR and WMO was essential to the project for several reasons, including:

- The decision to merge CNM and SNRE into a single entity could only be taken by MARNDR.
- The building could not be built without MARNDR providing land for the property. As there was no available land, the government had to grant that land.
- The project's sustainability depended on whether the MARNDR took responsibility for the upkeep and maintenance of the buildings and equipment.
- The project's feasibility depended on the MARNDR's decisions regarding human resources, and the agreements that MARNDR had with another public entity, OFNAC.

Having an agreement with MARNDR from the identification and planning phases would have meant that the project activities could have been implemented more quickly. It would also have ensured better understanding between the two partners on the importance of including governance in the project for the present and future viability of UHM.

WMO works through the NMHS in partnership with the UNDP country office in Haiti as part of a standard UN cooperation. The negotiation for the protocol between UNDP in Haiti and WMO was quite quick, but did not happen until October 2013, once the WMO project manager had arrived in Haiti.

Furthermore, given that a large part of the project involved the construction of the building, which is not WMO's area of expertise, and that WMO does not have any experience in monitoring this type of building project, it was essential, once the project had started, to involve another UN partner agency. The process of entering into a partnership agreement with UNOPS, which had a team in Haiti that had been involved in several public building projects, began at the end of 2013, i.e. during the execution phase. A Letter of Agreement between WMO and UNOPS was signed in December 2014, two years after the project had started.

These delays in establishing essential partnership agreements explains the delays in executing the project and in finalizing the building project.

WMO held meetings with the stakeholders in the hydro-meteorological sector in 2010 during the identification phase, but their involvement in the planning phase in 2012 was low, according to the interviews, which had an impact on the effective implementation of the project activities in the field. The partnership protocols with UNDP (October 2013) and with MARNDR (February 2014) were signed a year after WMO signed its agreement with Environment Canada in October 2012. A partnership protocol was never signed with SEMANAH, even though, according to the information collected for the identification report, SEMANAH was meant to be a partner for area of activity 3.

3.1.6. WMO's comparative advantage

Environment Canada chose to work with WMO for this project because of:

- WMO's expertise in the area;
- WMO's presence through its sub-regional office for North America, Central America and the Caribbean in Costa Rica;
- The network of hydrometeorological institutions of Member States;
- The network of experts that could be mobilized within the region.

3.1.7. Links between the project and other disaster risk management interventions

In recent years, the following projects have been conducted or are still being conducted:

Donor/ Haiti partner	Project	Situation	Amount (in US\$ thousands)	Main activities	Links with WMO project
IDB	National Early Warning System Project (PNAP)	Completed	5	<ul style="list-style-type: none"> - Network of 40 hydrological stations - Municipal early warning system for flooding - Capacity building at the national and decentralized levels - Education and warnings for the general public 	What was planned: <ul style="list-style-type: none"> - Integrate the stations into the national network - Renovate the early warning system. The project didn't carry out these actions (Activity 2.2.5 – see Annex 12)
USAID	Haiti and Dominican Republic Flash Flood Guidance System (HDRFFGS)	Completed		<ul style="list-style-type: none"> - To improve the provision of information on flash floods for vulnerable populations - To strengthen national capacities to forecast and warn vulnerable populations of flash floods 	Integrate the FFGS system into UHM's warning procedures
EU /CNIGS	Territorial Information Program for Sustainable Development (PITDD):	Completed in 2014	9,6	<ul style="list-style-type: none"> - Network of 24 weather stations across the country - Data platform 	Integrate the stations into the national network UHM is in the process of integrating data from the CNIGS network
World Bank/ MARNDR (UHM)	Hydromet	In process	5	<ul style="list-style-type: none"> - Institutional strengthening of hydro-meteorological services - Identifying needs of end users and implementing decision-making support services 	<ul style="list-style-type: none"> - Developing a long-term strategy for the hydromet sector - Training and education - Implementing services for users

Donor/ Haiti partner	Project	Situation	Amount (in US\$ thousands)	Main activities	Links with WMO project
EU	Global Climate Change Action (GCCA)	In process	8,2	- AT to assess the environmental impact for the Environment Ministry - Local adaptation through pilot projects	- Strengthening data management and climate services - Integrating climate resilience into public policy
USAID ⁹ / MARNDR- CNSA	WINNER "Feed the Future" Initiative	In process	N/D	- Delivery of five weather stations and two early warning systems for Tabarre and Gonaive - Financial support for the CNSA (ten departmental observatories and around 120 rain gauges)	- Integrate the stations into the national network - Leverage the development of the CNSA's department network. The project and UHM have not yet integrated the data from this network.

TABLE 2: Main projects in progress or recently completed

3.1.8. Analysis of the project design in terms of project management and execution

According to the project work plan, project execution would be conducted by the following entities:

- A project board
- An administrator and team in charge of project execution
- A WMO project coordination unit

However, the project board, which was meant to meet once a year, became two different committees: the national steering committee and the ITAC.

The project design described in the project work plan placed great importance on the project board, which was to guide the work of the project delivery team and approve annual work plans, progress reports, project reports and financial reports. . The board would also approve any major changes to the project work plan. The project delivery manager would serve as the secretary to the project board. The board was to meet once a year in Haiti to approve the project report and the annual work plan for the coming year.

The members of the project board would be:

- The director of CNM
- The director of SNRE
- The director of the WMO regional office for the Americas
- The director of the WMO I
- The deputy resident coordinator for UNDP in Haiti
- The permanent secretary of the MARNDR
- The director of OFNAC
- The director of the Strategic Integration Division, Meteorological Service of Canada

⁹ USAID United States Agency International Development

- The administrator in charge of project execution (the secretary)
- The national project director (co-secretary)

Neither the national steering committee nor the ITAC met with all members present, and their meetings were information and monitoring meetings rather than supervision and decision-making meetings.

The project delivery team was to be comprised of the in-country project delivery administrator (who became the project manager), a national director, a technical advisor and an administrative assistant, with staff from appropriate WMO Departments, identified by the relevant Director as key people responsible for implementation of respective components of the project. This structure was more or less kept but there were changes in the length of each of these positions, as described in [Table 3](#) below.

The WMO project coordination unit within the WMO Resource Mobilization Office was to support project implementation from the WMO side and coordinate all WMO inputs into the project.

The supervisory and technical advisory roles were allocated to different positions, with no monitoring or approval as to whether all the tasks allocated in the terms of references of the service contracts were fulfilled (no reports for consultation purposes, no measures of the indicators in the logical framework).

At first, the project manager was under the responsibility of the sub-regional office for North America, Central America and the Caribbean, then of Geneva except for administrative human resources support for international staff in the field and consultants, which was managed by the office in Costa Rica.

In Geneva, the information collected and the annual reports showed that there were three consecutive project officers between 2013 and March 2019.

Staff included in the project work plan			Comments
International project manager	3 years	Project manager for 5 years (WMO)	Not scheduling a manager for the entire delivery phase was a design error, given the need to coordinate numerous stakeholders and the fact that WMO has no permanent office in Haiti
National director	5 years	National coordinator 3 years MARNDR staff member	Did not directly report to the SNRE or the CNM. This position was not filled until the MARNDR-WMO partnership agreement was signed.
Administrative assistant	5 years	Secretary 5 years Local administrative contract	
Driver	3 years	Driver 5 years Local contract	
	Other consultants for hydrology For TAP bidding process		

TABLE 3: Project field staff in Haiti

3.2. Analysis of project delivery

3.2.1. Management of changes (changes to the project design and results during delivery)

Several major decisions to amend the project were made during the delivery phase:

- Cancellation of the third area of activity and transfer of the corresponding funds to area of activity 1

Other major changes are described below: Management:

- The position of project manager was filled up until 31 March 2019. This was essential given the turnover in the staff within the Haiti administration, with four ministers in five years, then the change in director generals, the death of the CNM director, who had been in the position for many years, etc.
- Management of the construction project by UNOPS. Support for the project's operations in Haiti came from UNDP, which has no expertise in its Haiti office for monitoring construction projects. The United Nations agency that was best placed to manage the construction project was indeed UNOPS.

Technical support:

- INSMET experts were recruited to install the five synoptic automatic weather stations at the country's five airports (Port-au-Prince, Cap Haïtien, Jacmel, Les Cayes and Jérémie).
- Major changes in the content of the TAP for area of activity 2, with the cancellation of the production and delivery system for new projects and services beyond the services for the DPC and OFNAC.
- Training support outside the TAP, with various partners.

Other secondary changes:

- Support for PNAP project development activities cancelled. The stations set up for the PNAP are no longer operational.
- Weather, climate and hydrology observation data rescue cancelled.
- Development of services and products for internet and mobile applications cancelled.

3.2.2. Monitoring and evaluation

Although indicators were included in the logical framework, they were not measured throughout the project, and no baseline was established. The project's technical advisor was meant to be responsible for monitoring the technical indicators, but those data were not available in February 2019.

The other project monitoring mechanisms were the project steering committee and the International Technical Advisory Committee (ITAC).

A national steering committee was set up and included: MARNDR, SNRE, CNM, MDE, CNIGS, CIAT, CNSA, OFNAC, and the Embassy of Canada. In the years that followed, OFNAC, SEMANAH, CNSA, World Bank (Hydromet project), CIAT, DPC and AAN¹⁰ also joined.

These committees met once a year from 2014 to 2017, with a total of four meetings, the last in December 2017. Unfortunately, the minutes of these meetings are not very precise (with the exception of the minutes from the 2016 meeting) and were not signed. No executing decision or monitoring work could therefore be clearly identified. The steering committee meetings were primarily information meetings. There is no trace in the minutes of when the decision to cancel result 3 was made.

¹⁰ National air and port authority

3.2.3. Feedback on M/E activities used to manage changes

The lack of monitoring of the indicators set out in the logical framework or adapted based on the changes made to the project meant that these indicators could not be measured and used for decision-making purposes.

In the technical advisor's terms of reference,¹¹ the advisor's main tasks were: to compile all relevant technical information to measure performance and monitor project indicators (as described in the project work plan); and to provide monthly reports on all of the activities conducted, identifying risks and proposing risk mitigation measures. These reports were to be submitted to the individuals listed in the contract. Unfortunately, this monitoring and the monthly – and even the annual – reports were not completed and the required information was not provided.

The fact that the national steering committee did not systematically draw up meeting minutes for stakeholders, even though there was in some cases considerable turnover in managers, did not facilitate information sharing over the years.

3.2.4. Project funding

At 31 December 2018, 97% of the total budget had been spent to cover costs directly related to the areas of activity (Can\$5,762,453 of Can\$ 5,942,000), and 95% including the monitoring and evaluation costs and overheads.

The fact that area of activity 3, the pilot service delivery for fishermen, was not delivered meant that Can\$ 345,000 was released and used, among other things, to cover the Can\$274,337 in extra costs relating to WMO staff (because the project was extended) and to the national coordinator (compensation higher than had been estimated).

The table in Annex 10, which is based on the budget set out in the project work plan and the financial report at 31 December 2018 provided by WMO, shows the breakdown of expenses by year and by area of activity.

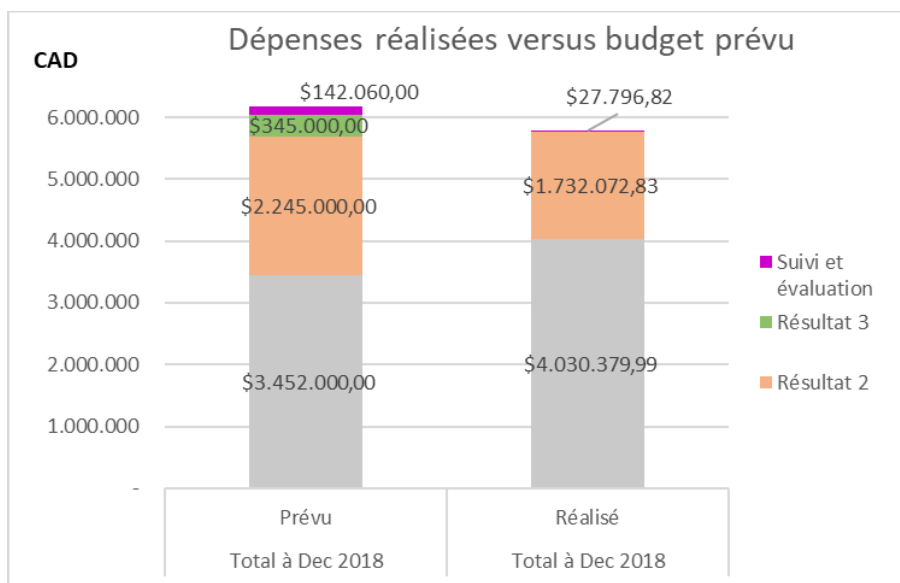


TABLE 4: Actual expenses versus budgeted expenses

¹¹ SSA from 1 April 2015 to 31 December 2015, with two extensions.

Translations for table 4:
 Actual expenses versus budgeted expenses
 Expected
 Actual
 Total as at Dec. 2018
 Monitoring and evaluation
 Result 3
 Result 2

Breakdown of expenses; all management staff costs are included under key result 1 (name used in the budget) or in area of activity 1.

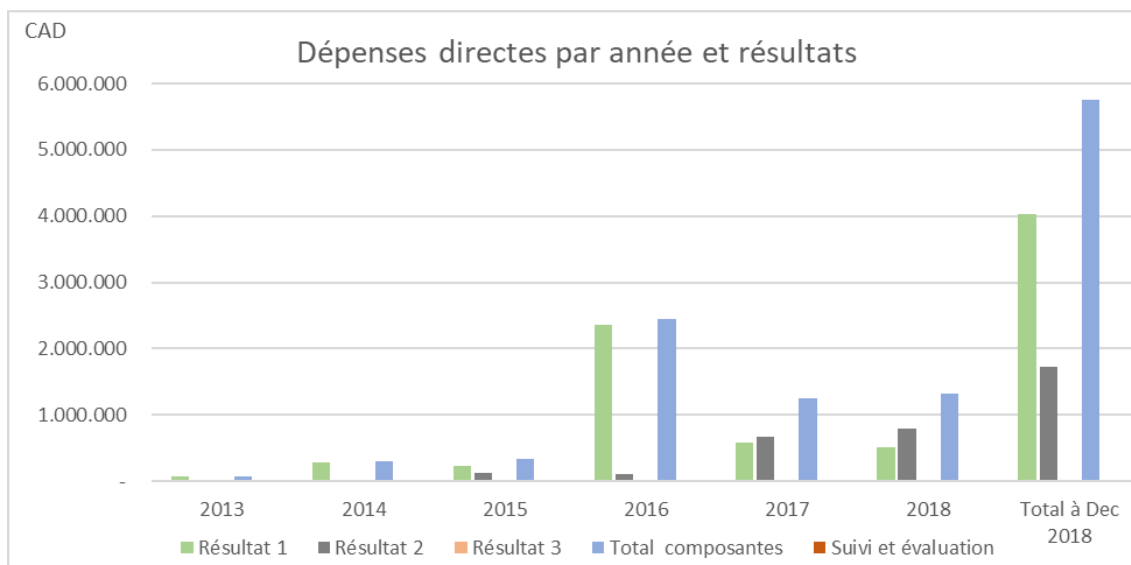


TABLE 5: Spending by year and result

Translations for Table 5
 Result 1
 Result 2
 Result 3
 Total for results
 Monitoring and evaluation
 Total as at Dec. 2018

3.2.5. Coordination of implementation and partners

The project manager coordinated the various partners, the number of which increased throughout the project; the majority of the partners were not sufficiently identified or involved in the project design and planning phases. This meant that the partnership agreements were not signed until after the arrival of the project manager in Haiti.

There were two groups of partners: operational partners (UNDP and UNOPS) and other stakeholders in charge of supporting project delivery. UNDP provided administrative, logistical and procurement support and local human resources to facilitate the operational delivery of the project. UNOPS was the partner for the construction of the building to house UHM.

UNOPS's role was primarily that of a service provider, as, based on the minutes of the four committee meetings held, it was not involved in the national steering committee.

Coordination with other stakeholders in the sector, such as the World Bank's Hydromet project

and MARNDR, made it possible to take decisions concerning the activities initially planned but not executed as part of the project but that would be executed as part of the Hydromet project, such as updating the climate and hydrology database and the service production system for users.

3.2.6. Operational issues

Given that WMO has no permanent office in Haiti and that it is not a development agency, it was clear from the outset that an operational partner in Haiti would be needed. UNDP has a strong presence in Haiti and is used to lending its services to other United Nations agencies. The choice of UNDP as the operational partner was therefore relevant.

The level of satisfaction observed during the interviews, both on the part of WMO and UNDP, was good for both parties.

In 2017, the project coordination unit began using UNOPS premises, since UNDP had left its location in Logbase, near the airport, and most of the coordination work in the field was focused on the construction of the building, as the TAP component was being managed directly at WMO headquarters in Geneva. This seems to have been the right decision.

3.2.7. Technical choices

The technical choices made during the design and delivery phases concerning the weather systems were the right ones, even though their implementation was delayed. One of the major impacts of this delay was the weak appropriation of systems, given the limited time available for training and assistance at launch.

The strong points in terms of the technical choices were the following:

- The top priority systems were the necessary ones implemented in the TAP in order to fulfill the following missions:
 - Concentrating data from observation stations in UHM and CNIGS networks
 - Exchanging data with the weather community in order to improve the upstream chain for digital weather forecasting
 - Wider access to forecasting data (especially Météo France's Arome forecast)
 - Strengthening the expertise of forecasters through the centralized information system, allowing for analysis of observed and forecast weather conditions and better forecasting of phenomena for the existing bulletins
 - Integrating the FFGS to facilitate the forecasting of floods in the event of extreme phenomena
 - Digitizing flight files for pilots through OFNAC
 - Creating and distributing new products for civil protection
 - Creating a product for seafarers
- The work conducted by colleagues at the Cuba meteorological service made it possible to:
 - Put the network of five synoptic weather stations into operation
 - Double the TAP's forecasting data retrieval system by putting the NOAA-connected antenna into operation
- The HDRFFG production system, implemented by the HRC in San Diego, makes it possible to collect data products in real time for monitoring and forecasting floods.

The weak or outstanding points are as follows:

- There was not enough training and assistance when new systems were launched
- A system for producing and distributing products and services for all categories of users is still needed in order to make full use of all of the investments upstream.

3.3. Results of the evaluation

3.3.1. Relevance

The specific objective of "strengthening the capacity of the national meteorological and hydrological services of Haiti to deliver weather, climate and hydrology services and to issue early warnings" was relevant when the project was designed and planned and remains relevant.

The risk of natural disasters relating to hydrometeorological phenomena is high in Haiti.

Various catastrophes have highlighted the extreme vulnerability of the people of Haiti and the country. Disaster risk management is a priority for the country, which is a signatory to the Hyōgo Framework 2005–2015 and the Sendai Framework 2015–2030.

Furthermore, UHM plays a key role in the national risk and disaster management system, especially during the cyclone season, as it issues special bulletins and early warnings. The project helped to equip and train the human resources needed to fulfill this role.

It would also have been relevant to include a governance component. Given the fragility of the Haiti Government, it was necessary to restructure and strengthen UHM to ensure that it could meet all the demands of the sector in areas including civil protection, aviation, agriculture, fishing, food security and climate change.

3.3.2. Effectiveness

Effectiveness describes the extent to which the results were achieved. It involves comparing the results expected during the project planning phase and the results obtained. This is why it is necessary to have results that are clearly defined in the logical framework. The differences then have to be measured and analysed.

It is also important to note that the indicators in the logical framework were not measured throughout the project, and no baseline was established.

Based on the logical framework, we have analysed what was achieved for each result in each area of activity:

- *Area of activity 1.* An operational working environment was created.

Result 1.1. An operational project management and coordination unit.

The project management unit in the field was set up in September 2013 and remained in place until December 2018, with a project manager or project coordinator, a secretary and a driver. A national coordinator was added to the team for three years in 2014. From December 2018 to March 2019, the field management unit included only the project coordinator and the driver.

The workplace in Port-au-Prince changed during the project, depending on needs. To begin with, the management unit was based at Logbase, close to the airport and the provisional offices of the former CNM. It then moved to the UNOPS offices, and then finally to the new UHM building, when that had been built and equipped with the necessary facilities. These changes were made to improve project management, especially the coordination between the main partners.

Result 1.2. Improved working conditions within CNM and SNRE.

A building was constructed on land belonging to the MARNDR, the ministry to which UHM belongs, and was equipped with the necessary facilities.

During the interviews, the level of satisfaction among building users was high. The various stakeholders in the sector also highlighted the construction project, which also helped to increase the visibility of UHM.

This result was attained.

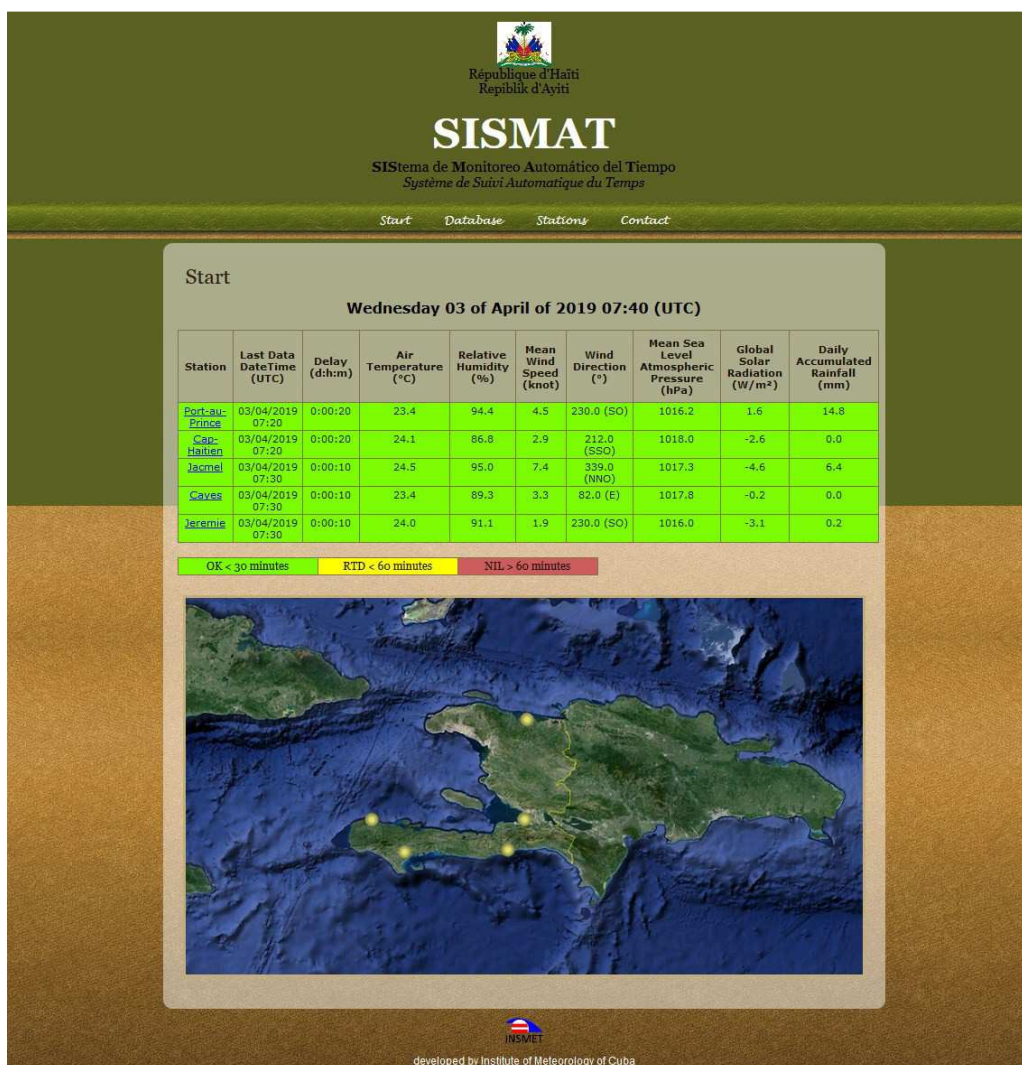
- *Area of activity 2. Strengthened operational forecasting capacity for weather, climate and hydrology services and their dissemination channels.*

Result 2.1. Establish a baseline and draft an implementation plan

No baseline was really established.

Result 2.2. Set up a weather, climate and hydrology observation network

UHM's weather network was improved, but was only connected to the airports (in Port-au-Prince, Cap-Haïtien, Jacmel, Les Cayes and Jérémie); only five Thies stations were set up out of the seven offered by WMO (the two others were used for replacement parts), with the help of INSMET experts.



The hydrology network was not improved within this project.

Result 2.3. Significantly improve the production and provision of services.

As the implementation of the service production system for users through a data and service exchange platform was postponed when the Hydromet project began, there was not significant improvement. However, new products were introduced, in particular through FFGS and the bulletin for civil protection and the special bulletins during cyclones.

Result 2.4. Make weather, climate and hydrology information accessible to the population of Haiti

This information is accessible through TV and radio, especially during high-risk periods such as cyclones. In addition, hydro-meteorological information is provided together with advice drawn up by the national crisis centre (COUN), which UHM is actively involved in.

Result 2.5. Train human resources to meet the CNM and SNRE's objectives.

Concerning the aspects relating to hydro-meteorological forecasting, the human resources initially at CNM have been properly trained through the partnership with Météo France, which began before the project and continued throughout it. The long-term training of five technicians, in Toulouse, took place during the project preparation phase, and Météo France experts visited Haiti to give theme-based training sessions during the project. In addition, training on the FFGS was provided by the HRC in San Diego.

There was very little training for the human resources from SNRE, which only received training on the FFGS.

Result 2.6. Create a strategic plan to support the provision of hydro-meteorological services.

Prior to creating a strategic plan, a lot of work was done to determine the basic functioning of UHM, bringing together its functions in an organization chart based on the situation in 2013.

However, by March 2019, there was no strategic plan setting out the objectives, time lines, necessary resources and provisional budget for UHM. According to the WMO team, the strategic plan had been planned for 2019–2020.

- *Area of activity 3. Set up a pilot programme to deliver services for fishermen.*

This area of activity was never begun.

	Effectiveness	Main achievements
<i>Area of activity 1. The creation of an operational working environment</i>		
<i>Result 1.1. An operational project management and coordination unit.</i>	High to medium	The project management unit was operational in the field from October 2013 to December 2018.
<i>Result 1.2. Improved working conditions within CNM and SNRE.</i>	High	Temporary CNM offices; UHM building constructed.
<i>Area of activity 2. Strengthen the operational forecasting capacity for weather, climate and hydrology services and their dissemination channels.</i>		
<i>Result 2.1. Establish a baseline and draft an implementation plan</i>	Low	No baseline for the indicators in the logical framework
<i>Result 2.2. Set up a weather, climate and hydrology observation network.</i>	Medium	UHM's weather network was improved but only connected to the airports, and there was no improvement in the hydrology network.
<i>Result 2.3. Significantly improve the production and provision of services.</i>	Medium	No service platform was set up, but new bulletins were created.
<i>Result 2.4. Make weather, climate and hydrology information accessible to the population of Haiti</i>	Medium	Availability of information improved through TV and radio.
<i>Result 2.5. Train and build the capacities of human resources to meet the CNM and SNRE's objectives.</i>	High to medium	High for meteorologists and medium for the hydrologists.
<i>Result 2.6. Create a strategic plan to support the provision of hydro-meteorological.</i>	Low	No formal strategic plan had been drawn up by 31 March 2019, but a UHM organization document was produced.
<i>Area of activity 3. Early warning services for fishermen</i>		
<i>Result 3.1. Pilot weather radio project for fishermen</i>	N/A	Result removed

TABLE 6: Effectiveness by result

3.3.3. Efficiency

Efficiency measures the relationship between the outcomes – both qualitative and quantitative – and the resources used to achieve them. In other words, we analyse whether the activities were efficient relative to their costs, whether the results were achieved in a timely manner, and whether the project was executed in the most efficient manner possible. The graphs below show that the direct correlation between expenses and the extent of execution was low in the first three years of the project, when compared with the timeline set out in the project work plan.

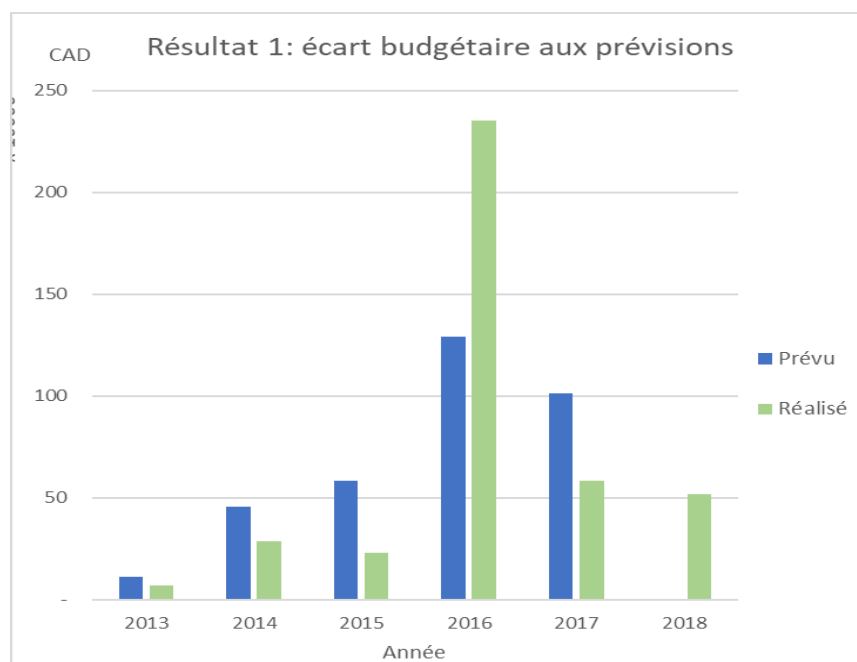


TABLE 7: Budget gap by year for result 1

Translations for table 7	
Budget gap by year for result 1	
Expected	
Actual	
Year	

The expenses for result 1 exceeded the budget. However, the gap was essentially due to personnel expenses, both at the international level (project coordinator's contract was extended, as it was initially planned for 36 months and ended up nearly doubling to 60 months, up to December 2018) and in terms of national coordination (the monthly cost was higher than expected even though it was a part-time role, which had an impact on the contract length, which ended in 2017).

It is also worth highlighting, as we saw in the chapter on financing, that the travel expenses of WMO staff taking part in monitoring meetings, the ITAC and monitoring visits in Haiti were also included under activity 1.1. These expenses should have been included under monitoring and evaluation. For this analysis, we kept the expense breakdown for key results 1, 2 and 3 and for monitoring and evaluation made by the WMO financial monitoring team in Geneva, which is available up to 31 December 2018. This document was used for this analysis.

For the construction of the UHM building, the total costs were close to the budget. There was a budget overrun of 6%. However, given the number of years between when the budget was established (in 2013) and the construction (in 2016) and the price rise in Haiti during that period, this overrun does not seem excessive. It is also worth noting that changes were made to the final building project so as not to exceed the budget.

Area of activity 1 (KR 1)	Expected cost (DAC)	Expenses at 31 Dec. (DAC)	% Expense/budget
Activity 1.1: Local coordination and monitoring office, housed jointly by the UN and the CNM	993.000	1.464.026	147%
Activity 1.2: Operational framework for the CNM and SNRE	209.000	174.585	84%
Activity 1.3: Construction and maintenance of a new zero-emissions, earthquake- and hurricane-proof building for the CNM and SNRE	2.250.000	2.391.770	106%
Sub-total for KR 1	3.452.000	4.030.380	117%

TABLE 8: Budget gap by year for result 1

At the end of March 2019, the activities under area 1 will have been completed, with the closure of the WMO's local coordination and monitoring office.

The activities under area 2 were the least efficient, as shown in the graph below.

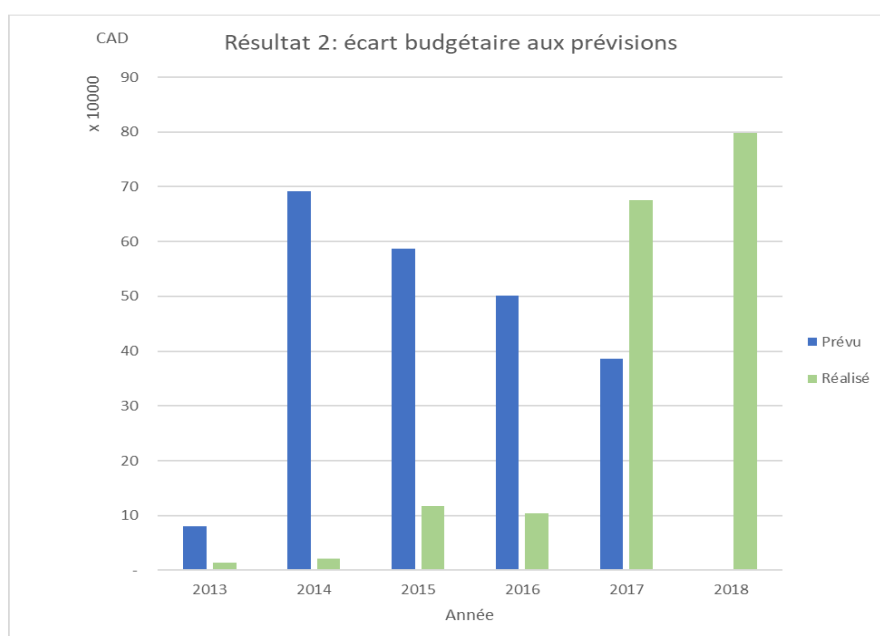


TABLE 9: Budget gap by year for result 2

Translations for table 9 Budget gap by year for result 2 Expected Actual Year

It is worth highlighting the delay in launching the bidding process for the TAP, which was not issued until 17 June 2016, just a year before the project's initial end-date. The outcome of the bidding process was also quite disappointing, as only one offer was submitted, and it exceeded the budget for the TAP.

Area of activity 2 (KR 2)	Expected cost (DAC)	Expenses at 31 Dec. (DAC)	% Expense/budget
Activity 2.1: Basic analysis	90.000	20.129	22%
Activity 2.2: Infrastructure and communications	385.000	87.262	23%
Activity 2.3: Operational service production and delivery system (TAP)	690.000	1.349.632	196%
Activity 2.4: Training	425.000	65.225	15%
Activity 2.5: Project management and involvement of stakeholders	410.000	13.025	3%
Activity 2.6: Development strategy and plan for the ongoing operations of the CNM and SNRE	145.000	196.801	136%
Sub-total for KR 2	2.145.000	1.732.073	81%

TABLE 10: Budget gap by year for result 2

Activity 2.3 generated the largest overrun (196%). It included installing and configuring a system for producing meteorological forecasts as part of the TAP. However, if the costs of activities 2.3 and 2.2 are combined, given that the TAP also includes infrastructure, with the installation of the AWOS at the Port-au-Prince airport, the overrun is 134% $[(A2.2 + A2.3)budget / (A2.2 + A2.3)expenses]$.

The area 2 activities will not be completed until September 2020, since the TAP contract with Météo France International will continue until that date.

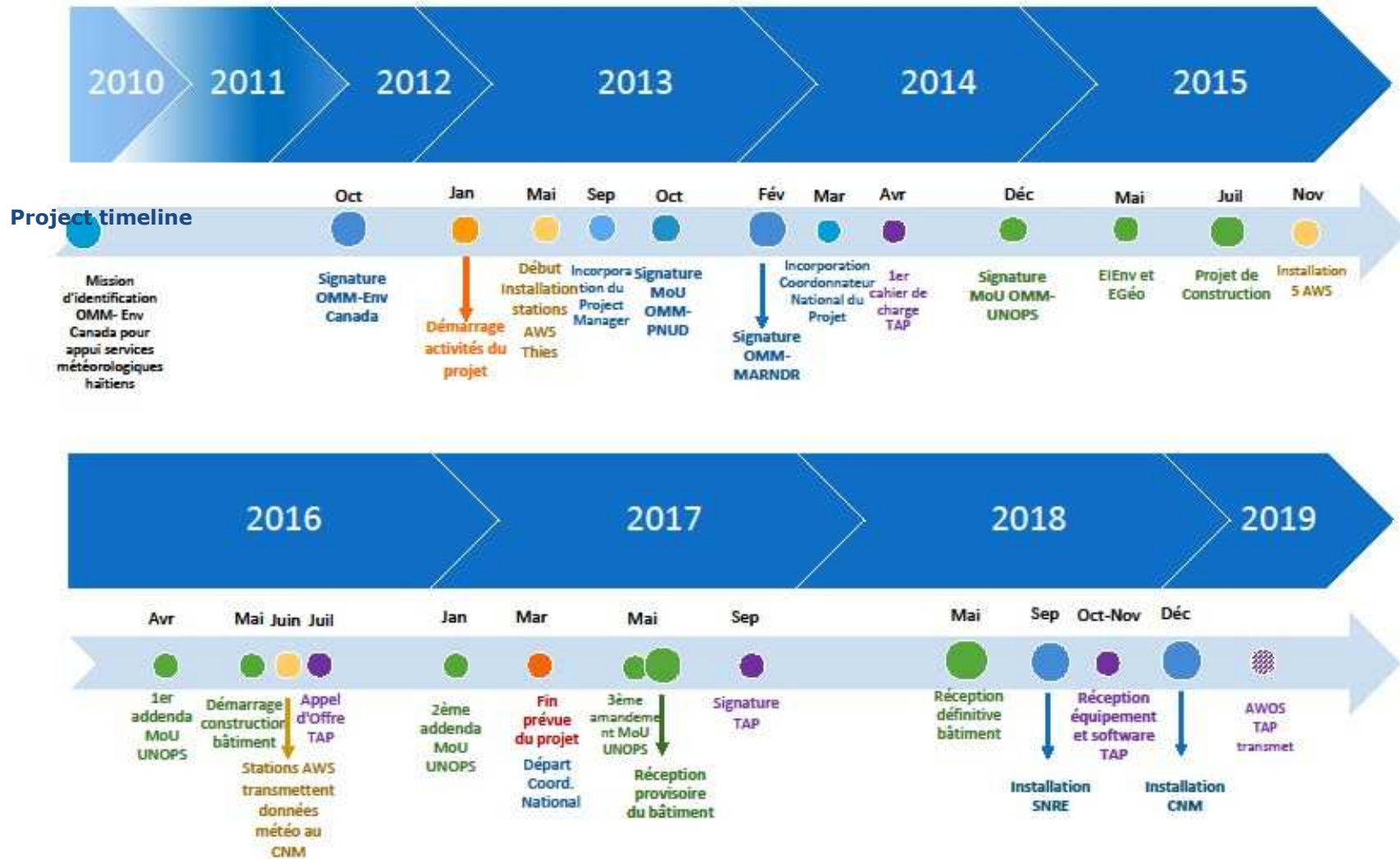
On the timeline of the next page, we can see that the overall inefficiency of the project was a result of:

- The delay in entering into partnership agreements with the main stakeholders, the main partner (MARNDR) and the execution partners (UNDP and UNOPS). The agreements were set up after the arrival of the project manager, at least one year after the project began. We think that more progress should have been made during the project planning phases so that the activities could have been started in the field within six months of signing the financing agreement between WMO and Environment Canada.
- The delay in preparing and launching the bidding process for the TAP, which took more than two years, followed by a third year of contract negotiations, since only one offer was submitted and did not meet expectations (activities versus budget).
- The delay in installing the Thies stations and their connection with the network to transfer data to the UHM offices, since the CNM had had seven stations since 2010 that were not installed or operational until the end of 2015 thanks to assistance from INSMET. An initial attempt was made by the project team between May and September 2013 but without success.

The technical assistance (technical advisor) was not efficient in all the tasks described in the successive terms of reference. Technical assistance was provided to the project manager, and the technical advisor was actively involved in drafting the terms of references for the TAP. However, the technical advisor was meant to support the production of a development strategy

for the CNM and SNRE, which had not been produced by March 2019. The technical advisor was also meant to monitor training and technical indicators, but there was no such monitoring, and there is no measurement of the technical indicators in the project's verification sources. It is therefore very difficult to properly evaluate the quality and quantity of the products created as part of the project.

- In conclusion, the efficiency was: average to weak for area of activity 1, very weak for area of activity 2, and moderately unsatisfactory to unsatisfactory overall.



<p>Translations for the timeline:</p> <p>WMO-Env. Canada identification mission to support Haiti's meteorological services</p> <p>WMO-Env Canada agreement signed</p> <p>Project activities begin</p> <p>Installation of AWS Thies stations begins</p> <p>Project manager starts</p> <p>WMO-UNDP MoU signed</p> <p>WMO-MARNDR agreement signed</p> <p>National project coordinator starts</p> <p>1st specifications for TAP</p> <p>WMO-UNOPS MoU signed</p> <p>EIENV and EGeo</p> <p>Construction project</p> <p>5 AWS installed</p> <p>1st addendum to UNOPS MoU</p> <p>Construction begins</p> <p>First data transmission from AWS stations to CNM</p> <p>2nd addendum to UNOPS MoU</p> <p>Project's initial end date</p> <p>National coordinator leaves</p> <p>3rd addendum to UNOPS MoU</p> <p>Building provisionally opened</p> <p>TAP signed</p> <p>Building opened</p> <p>SNRE moves in</p> <p>TAP equipment and software received</p> <p>CNM moves in</p> <p>AWOS TAP transmission</p>
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3.3.4. Sustainability

Sustainability is the continuation of a development activity's benefits after the activity has ended (i.e. the probability that the positive results of an activity will last after the financing from donors has ended). Projects must be viable both environmentally and financially.¹² At the end of a project, sustainability is probably the biggest challenge.

From the preparation phase through to the end, this project faced major difficulties caused by the chronic governmental instability, which resulted in difficulties in decision-making at MARNDR.

Rather than the building itself, the main concerns are the upkeep and maintenance of the technical equipment, and particularly the stations, including both the Thies AWS and the AWOS.

The availability of trained staff to conduct UHM (SNRE and CNM) tasks could compromise the sustainability of the results achieved, although this is less of a concern. The MARNDR must

¹² OECD-DAC glossary available at: <https://www.oecd.org/fr/cad/evaluation/criteres-cad-evaluation.htm>

consider increasing the staff working for UHM.

The short- and medium-term sustainability (one year or one and a half years) is contingent upon the approval of the parliament's national budget for 2018–2019, which has already been rejected once. But given the political crisis that has been going on since July 2018 until now (March 2019), this approval is not guaranteed.

In the long term, the creation of an administrative entity, based on the CNSA model, but still under the MARNDR, could help UHM to manage its own budget in order to meet its needs more easily.

It is also essential to negotiate and set up a new partnership agreement with OFNAC. This was included in the Memorandum of Understanding between WMO and MARNDR as one of the tasks to be fulfilled by MARNDR. However, there had been very little progress on this point by March 2019. Even though the costs of some of UHM's human resources (the former CNM human resources) have been covered by OFNAC for several years, under the leadership of the MTPTC, there is no compensation for the services produced by UHM for civil aviation, as set out in international agreements.

The investments made (i.e. the new UHM building, the new stations and the new systems) will generate further running costs, together with an increase in energy and telecom needs, and more staff will need to be recruited, especially staff specialized in IT, statistics and databases, climate analysis and hydrology.

Furthermore, in order to continue developing new services and to be able to analyse the needs of future users, the UHM teams will need to continue to receive training. Even if sister institutions in other countries help to provide this training, there will always be travel expenses and other costs to cover.

In conclusion, given the difficulties in improving governance within UHM, the lack of its own budget and the lack of a new partnership agreement between MARNDR-UHM and MTPTC-OFNAC, although some steps were taken during project execution, the project's sustainability is moderately improbable (i.e. there are major risks in terms of sustainability).

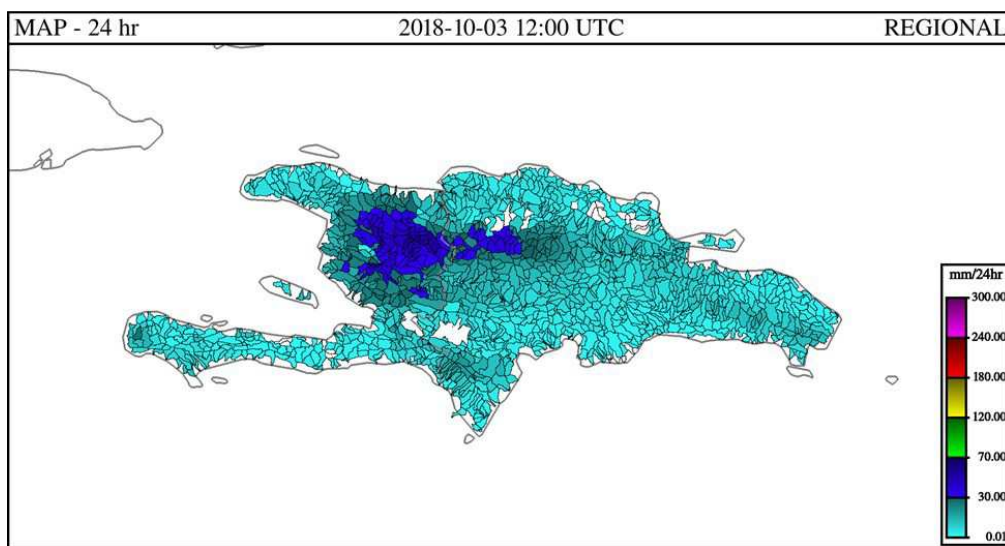
3.3.5. Impact

Based on the specific information provided international partners (National Weather Service, Météo France, ECMWF and the Norwegian Weather Service) on the information systems delivered by the TAP, forecasters analyse the weather situation and draw up forecasts that are recorded manually and presented in the following forms:

- A weather bulletin for the following three days (with no related map) with general information for the Caribbean and the Atlantic and a zoom in text format for Haiti and a detailed forecast for Port-au-Prince
- Warning bulletins are produced and distributed, if there is a threat of dangerous weather
- A five-day technical bulletin for the civil protection department only
- A specific bulletin for the Port-au-Prince airport and messages for aeronautic assistance.
- Digitized flight lists for airline pilots flying to and from Port-au-Prince

These bulletins are issued once a day, seven days a week and sent to the press and radio stations.

All of these products were created after 2010, with the exception of the first two bulletins, which already existed. The new systems provided by the TAP and the HRC make it possible for the forecasts to produce the bulletins using better data and have significantly improved access conditions (the FFGS map is provided as an example below; the other bulletins are provided in the annexes).



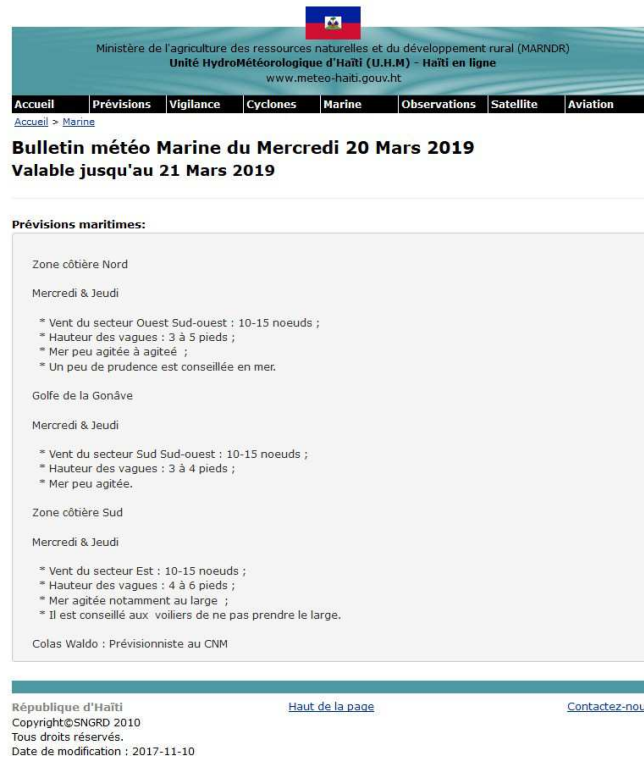
For national television, the forecaster goes to the national television studio every day from Monday to Friday to record the video forecast, outside of any contract with UHM.

This service uses the FFGS system, which is considered a crucial tool for flash floods. This internationally recognized system is used a lot by the forecasters, especially during cyclones.

Finally, a new bulletin for users in coastal areas (coastal BMS) will be added to the list of products generated by UHM.

It should be noted that all UHM products are sent via email from a "private" Google account and not an official institutional address.

Some bulletins are also available on this website: <https://www.meteo-haiti.gouv.ht/>



Ministère de l'Agriculture des ressources naturelles et du développement rural (MARNDR)
Unité HydroMétéorologique d'Haïti (U.H.M) - Haïti en ligne
www.meteo-haiti.gouv.ht

Accueil | Prévisions | Vigilance | Cyclones | Marine | Observations | Satellite | Aviation

Accueil > Marine

Bulletin météo Marine du Mercredi 20 Mars 2019
Valable jusqu'au 21 Mars 2019

Prévisions maritimes:

Zone côtière Nord

Mercredi & Jeudi

- * Vent du secteur Ouest Sud-ouest : 10-15 noeuds ;
- * Hauteur des vagues : 3 à 5 pieds ;
- * Mer peu agitée à agitée ;
- * Un peu de prudence est conseillée en mer.

Golfe de la Gonaïves

Mercredi & Jeudi

- * Vent du secteur Sud Sud-ouest : 10-15 noeuds ;
- * Hauteur des vagues : 3 à 4 pieds ;
- * Mer peu agitée.

Zone côtière Sud

Mercredi & Jeudi

- * Vent du secteur Est : 10-15 noeuds ;
- * Hauteur des vagues : 4 à 6 pieds ;
- * Mer agitée notamment au large ;
- * Il est conseillé aux voiliers de ne pas prendre le large.

Colas Waldo : Prévisionniste au CNM

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3.3.6. Methodological aspects

In terms of the methodology, project planning phase was not participatory enough, which had an impact on project implementation, with very little done in the first year.

The monitoring of project indicators was insufficient. There were also an insufficient number of verifiable sources concerning the training and the technical consultations, with no end-of-contract reports as provided for in the terms of reference.

There were no signed minutes or lists of participants for the four meetings of the national steering committee between July 2014 and February 2019, which means that the project board described in the project work plan had not executive responsibilities. The national steering committee met regularly during the first three years, but there was only one meeting from 2017, in December 2017, and no meeting in 2018.

Summary of evaluation criteria

Below is a summary of the evaluation criteria analysed above

Criterion \ assessment ¹³		Very low	Low	Medium	High	Very high
Relevance						
Design						
Effectiveness						
Efficiency						
Sustainability						
Impact						
Methodological aspects	Procedures and					
	Monitoring					

TABLE 11: Summary of evaluation criteria

¹³ The crosscutting aspects – gender and environment – were not included in the terms of reference for the evaluation and are provided in Annex 6.

4. Conclusions and lessons learnt

- The stakeholders were not properly identified during the project design phase. Their involvement and particularly that of MARNDR, during the planning phase was insufficient. This caused delays in launching a large number of activities, since negotiations for the partnership agreements began a year after the agreement between WMO and Environment Canada was signed. This had an impact on execution during the first two years of the project.
- The project was based on the assumption that a new unit would be created by merging two MARNDR units that did not work closely together. A governance component¹⁴ should therefore have been included in the project design. This would have helped to strengthen the capacities of MARNDR so that it could take steps to create UHM and ensure it had the necessary operational capacities. Although some activities relating to governance were initiated, they were not completed even though their importance was highlighted by the project team in its dealings with MARNDR. At the end of 2018, UHM's legal framework and its operational budget had still not been finalized.
- The project did not have a clear organizational structure or clear technical and financial management and monitoring processes. The roles of each WMO department and staff member were not clearly defined when the project began, and certain changes were made along the way, which caused coordination problems. Certain supervisory roles were not fulfilled. Communication between headquarters and the field and between the technical and financial monitoring staff could have been better.
- At MARNDR, there was a high turnover of staff, which made progress difficult, especially when establishing mechanisms to ensure the sustainability of UHM as a newly created unit within MARNDR.

The meetings of the national steering committee, which replaced the project board (with the participation of staff from WMO headquarters) described in the project work plan, were irregular and mainly informational rather than executive. The last meeting was in December 2017. The International Technical Advisory Committee (ITAC) met four times, with the last meeting in 2017. These meetings were essentially informative, with recommendations issued for the project but with no formal decisions taken.

There was no direct liaison between these two committees, but it seems that the ITAC took on a greater role in the project as an advisory entity, while the national steering committee was meant to be executive.

- From the outset, the project's priority was to construct a building for UHM. However, the necessary studies and the construction did not begin until 2016, as it was first necessary to find MARNDR land and identify and sign a partnership agreement with the United Nations agency that would monitor this component, given that construction is not within WMO or MARNDR's area of expertise.

Area of activity 2 focused on strengthening the capacities of weather services and very little on those of hydrology services. This decision is not clearly reflected in the project work plan or in the minutes of the steering committee meetings. However, this choice is reasonable and relevant, given that the WMO-MARNDR project coincided with the Hydromet project, run by the World Bank and MARNDR, which focused more on hydrology services.

¹⁴ A structure's governance involves describing how it is managed and organized. The aim is to clearly identify the roles and responsibility of those involved to ensure that the activities run smoothly and can be continued over the long term.

- The expertise of the technical advisor, who was initially under the responsibility of the WMO sub-regional office for North America, Central America and the Caribbean, then the Resource Mobilization Department in Geneva, was not sufficiently leveraged.
- Several partnerships were set up along the way, which made it possible to complete the project work plan at a reduced cost for the project (essentially travel costs and accommodation). This was a direct benefit for the project and also meant that an international – and especially interregional – institutional network was established, which will be very useful for ensuring further UHM staff training.
- The station network under the responsibility of UHM went from one station in 2013, at the Port-au-Prince airport, to five stations, at the Port-au-Prince, Cap Haïtien, Jacmel, Jérémie and Les Cayes airports, by the end of the project. This was thanks to the participation of experts from INSMET in Cuba. However, in February 2019, there were still some problems with collecting and transmitting data.
- When the project was launched, a large number of stations across the country, with different characteristics and quality, had already been identified. By the end of the project, progress had only been made in accessing data from the 24 CNIGS stations. There are still data transmission problems to be resolved; in March 2019, transmission was still irregular. The stations are still managed by CNIGS, which has a budget for their maintenance, upkeep and staff training. This agreement works well for UHM, UHM still does not have its own operational budget, since its database can take data from additional stations at no major additional cost.
- The delay in preparing the bidding process for the TAP caused major delays in its implementation. In February 2019, the AWOS was still not operational. The TAP will not be completed until September 2020. It will be necessary to ensure that TAP training meets the needs of UHM staff.
- The fact that UHM does not have its own budget is a critical point affecting its sustainability and the results achieved by the project. Short- medium- and long-term solutions will have to be found to meet needs in terms of technical equipment (stations and auxiliary equipment) and IT equipment. These needs will be large, if recent years are anything to go by, especially since the stations are now spread across a number of towns. These solutions will also have to take account of building upkeep and other related aspects, and the need to ensure ongoing training of staff, and especially qualified staff both within and outside the country.

The need to allocate a budget to UHM has been identified.

On the one hand, MARNDR included in the national budget proposal for 2018/19 a budget line for UHM (of around G15 million, even though the amount needed for that period would be G24 million). But given the socio-political instability in the country, which has increased since July 2018, with parliament initially rejecting the budget, and the change in prime minister in February and March 2019, this short-term solution is not very likely. On the other hand, OFNAC has for several years been supporting the operations of UHM, by covering observation and forecasting staff salaries (except the head of service, now UHM director, who is an MARNDR civil servant). However, pursuant to Annex 3 to the Convention on International Civil Aviation (International Civil Aviation Organization) on Meteorological Service for International Air Navigation, a new agreement is under discussion between MARNDR (UHM) and MTPTC (OFNAC) to ensure financial compensation for the products provided to OFNAC by UHM.

- The visibility of UHM has so far increased considerably, based on the comments made in the interviews. It is therefore important to leverage this to give political and administrative momentum to this entity. This will help to ensure that it can, in future, meet the enormous needs for data, analysis, specialized bulletins of key sectors for Haiti, such as disaster risk management, food security and climate change.

5. Recommendations

As this was a final evaluation, these recommendations are made with a view to improving the future work of the various stakeholders.

For all stakeholders

Corrective measures for designing, implementing, monitoring and evaluating projects.

- Involve all stakeholders actively in the project planning phase. Conduct a workshop for all stakeholders to discuss and approve the project work plan prior to implementation.

For WMO

Corrective measures for designing, implementing, monitoring and evaluating projects

- Establish the organizational structure for implementing the project when the project is being planned, and clearly establish the organizational structure of units and their staff, as well as the functions of each post and their reporting line.
- Conduct a mixed, interim evaluation if the project is set to last three or more years.
- Set up a system for monitoring project indicators, strengthen the capacities of staff responsible for monitoring, and incorporate gender equity into this system.

Actions to monitor and strengthen project results

- Establish mechanisms to monitor the implementation of the TAP and the related training up to September 2020. Ensure direct communication with UHM staff to ensure quality control and appropriation of technical know-how.

Proposals for future steps to strengthen the project's main objectives

- Continue support for initial training and ongoing training of UHM staff. Special attention should be paid to new staff members in both the weather and the hydrology and climate services. These new staff members will have to complete longer training outside the country.

For MARNDR

Actions to monitor and strengthen project results

- Allocate as soon as possible a budget to UHM that covers the costs of running and purchasing equipment and maintenance costs for all services so as not to compromise the sustainability of what has been achieved so far.

Make proposals for future steps to strengthen the project's main objectives.

- Increase the number of UHM staff, particularly in the technical services and provide support for specialized training and training in monitoring and logistics.
- Change the administrative status, based on the model of CNSA, to facilitate the operations of UHM.

For UHM

Actions to monitor and strengthen project results

- Improve quality controls for products and services. Evaluate user satisfaction concerning UHM products, and set up quality control protocols and a monitoring system.

- Create a digital register of all products.
- Put in place communication procedures within UHM.

Proposals for future steps to strengthen the project's main objectives

- Draft a medium-term strategy (3–5 years) for UHM, with an action plan that includes expected results, products, users, a timeline, human resource needs, a training plan, budget, funding sources, a monitoring system, etc.

Based on WMO information in May 2019, a strategic plan for UHM will be drawn up by the project team in 2019/2020.

- Reliable data and their management and analysis are the foundations of good climate services. Based on several of the interviews, there is a demand for such services in Haiti, in various areas. UHM must fill this information gap, particularly concerning critical areas for Haiti, such as food security and climate change.