



1. Project Data

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| Project ID P127676 | Project Name HYDROMET 2 | |
| Country Russian Federation | Practice Area(Lead) Environment, Natural Resources & the Blue Economy | |
| L/C/TF Number(s) IBRD-82910 | Closing Date (Original) 31-Dec-2018 | Total Project Cost (USD) 54,851,673.11 |
| Bank Approval Date 17-Sep-2013 | Closing Date (Actual) 31-Dec-2022 | |
| | IBRD/IDA (USD) | Grants (USD) |
| Original Commitment | 60,000,000.00 | 0.00 |
| Revised Commitment | 54,851,673.11 | 0.00 |
| Actual | 54,851,673.11 | 0.00 |

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2. Project Objectives and Components

a. Objectives

The Project Development Objective (PDO) was “to assist the Borrower to further enhance its national capacity to deliver reliable and timely weather, hydrological and climate information to the Russian public and economic sector and to enhance its capacity to integrate into the global system of meteorological services” (Loan Agreement, page 6). The PDO was stated in the PAD with a slight modification in its wording, as follows: “to further enhance national capacity to deliver reliable and timely weather, hydrological and climate



information to the Russian public and economic sector and enhance Russia's capacity to integrate in the global system of meteorological services" (PAD, page 19)

For the purposes of this Implementation Completion and Results Report (ICR) review, the objective will be assessed as follows:

PDO 1: To assist the Borrower to further enhance its national capacity to deliver reliable and timely weather, hydrological and climate information to the Russian public and economic sector.

PDO 2: To assist the Borrower to enhance its capacity to integrate into the global system of meteorological services.

b. Were the project objectives/key associated outcome targets revised during implementation?

No

c. Will a split evaluation be undertaken?

No

d. Components

1. Original components

Component A. *Strengthening Information Communication Technology (ICT) infrastructure and systems delivering weather, climate and hydrological data and information* (cost at appraisal: US\$45.40 million; actual cost: US\$56.84 million) was to strengthen the ICT infrastructure, hydrometeorological products, climate change studies, and data access. There were three sub-components:

Sub-component A1. *Strengthening technical capacity for operational hydrometeorological forecasting and for research on climate change* financed a supercomputer for the *Russian Federal Service for Hydrometeorology and Environmental Monitoring* (Roshydromet), enabling access to data and the analysis for weather forecasting and climate studies.

Sub-component A2. *Development of regional data storage and archive systems for improved operational user access to Roshydromet information resources* financed servers and communication infrastructure, databases, and equipment in Roshydromet offices.

Sub-component A.3. *Improvement of Roshydromet's integrated information and telecommunication system* aimed at facilitating access to data and would cover modernized communication system, unified data collection and dissemination; and improved access to data.

Component B. *Modernization of observation networks* (cost at appraisal: US\$73.60 million; actual cost: US\$90.46 million) was to modernize the Roshydromet's observation networks, overall and specifically in the Volga river basin. There were four sub-components:



Sub-component B1. *Improvement of meteorological observation networks* was to finance: (i) the installation of modern automatic weather stations (AWSs) and laboratories for meteorological networks; (ii) modernization of agro and marine hydrometeorological networks.

Sub-component B2. *Improvement of upper air observation network* was to finance the installation of upper air stations in remote locations and strengthen the remote sensing.

Sub-component B3. *Upgrading of regional operational forecasting units* was to strengthen satellite data reception capacity to obtain meteorological data.

Sub-component B4. *Modernization of hydrological network* was to support the improvement of hydrological services in the Volga river basin.

Component C. *Institutional and regulatory strengthening, improvement of service delivery to clients, and better preparedness for emergencies* (cost at appraisal: US\$13.95 million; actual cost: US\$18.30 million) aimed at improved performance of Roshydromet service. There were four sub-components:

Sub-component C1. *Roshydromet's institutional strengthening* was to update regulatory and technical documents and procedures; develop new costing, budgeting, and asset management; and upgrade regional training centers, train staff, and finance study tours.

Sub-component C2. *Improvement of service delivery to clients* was to reduce the gap between the needs and service provision. The activities would include sociological surveys evaluating Roshydromet performance, interaction with mass media, and marketing of the Roshydromet activities.

Sub-component C3. *Improvement of emergency preparedness system* would support improved interaction with the Ministry of Emergency Situations and other bodies responsible for early warning of extreme events. Financing would cover emergency information products and deployment of hydrometeorological situational centers.

Sub-component C4. *Strengthening operational capacity, research and development of Roshydromet system* would support Roshydromet's scientific potential and include training.

Component D: *Project Management* cost at appraisal: US\$6.55 million; actual cost: US\$9.29 million) would finance consultants' services, equipment, and operating costs.

Revised Components:

The components remained unchanged.

e. Comments on Project Cost, Financing, Borrower Contribution, and Dates

Project Cost: The appraisal estimate was US\$139.5 million, and the actual disbursement was US\$174.89 million.

Project Financing: The Project was financed by an IBRD loan. The appraisal estimate was US\$60.0 million, and the actual disbursement at closure was US\$54.85 million.



Borrower/Recipient contribution: The appraisal amount was US\$79.50 million, and the actual disbursement at closure was US\$120.04 million.

Project Dates: The Project was approved on September 17, 2013, and became effective on May 8, 2014. The MTR review was on December 7, 2016. The Project was restructured twice: (i) on February 21, 2018, and (ii) on December 16, 2020. The original closing date was December 31, 2018. The Project was extended twice, in total for forty-eight months (or four years), to December 31, 2022, which was the date of the Project's actual closure.

Restructurings: The project had two restructurings:

Restructuring 1 (February 2018) involved the following main changes: (i) increase in costs due to the Borrower's additional funding of US\$40 million to strengthen activities with costs overruns and implement new activities; (ii) a 36-month extension of the closing date from December 31, 2018, to December 31, 2021; and (iii) related changes to the Results Framework (RF).

The extension was required for two main reasons:

- i. To complete the implementation of complex and strategic activities under Subcomponent B4 *Modernization of Hydrological Network on Volga River Basin*. The technical concept had to be revised to minimize the O&M costs and account for new regulations on software acquisition.
- ii. To prepare and implement new activities suggested by Roshydromet as part of the Project's scale-up, including modernization of remote stations in the Arctic region.

Restructuring 2 (December 2020) involved a Loan Agreement amendment and the following main changes: (i) Borrower's additional funding of US\$0.37 million; (ii) a 12-month extension of the closing date from December 31, 2021, to December 31, 2022, due to the impact of COVID-19; and (iii) related changes to the RF.

Other changes. On March 19, 2022, the World Bank suspended, and later cancelled, loan disbursements of US\$5.15 million (or 8.6 percent of the loan), as per Section 7.02(e) of the General Conditions Applicable to the Loan Agreements, considering the deteriorating operational environment. As a result, two contracts (under Subcomponents A3 and B1) were not signed. However, the work under ongoing contracts continued, and savings in counterpart funding were redirected to offset the resulting funding gaps. Also, to finalize the activities, the Borrower provided additional funding in the amount of US\$0.17 million.

3. Relevance of Objectives

Rationale

Country and Sector Context, and Government Strategies. At Project appraisal, considering the expected climate change impact on the economy and population, Russia strived to increase national preparedness for weather, hydrological and climate change events. The 2009 *Climate Doctrine of the Russian Federation* stressed that global warming poses a significant challenge to national security. The 2010 *Government's Hydrometeorology and Climate Change Action Strategy to 2030 (Strategy 2030)* and the 10-year plan of its implementation aimed to improve hydrometeorological safety and support greater



international cooperation on climate change, requiring modernization of the national weather, hydrological, and environmental monitoring systems. At the same time, the capacity of Roshydromet to provide services in Russia and globally was negatively affected by years of underfunding: during the 1990s and early 2000s, annual funding covered up to 40 percent of the needs. Investment needs for the priority hydromet observation infrastructure were estimated at above US\$500 million. Bridging the investment needs gap called for a series of projects. The reviewed Project was to continue the efforts made by the World Bank's *Russia First National Hydromet Modernization Project (RHM-1)*.

At closure, the Project remained aligned with *Strategy 2030* and with recent decisions on strengthening hydromet services and environmental monitoring, including the following: the 2018, 2020, and 2021 Amendments to the Federal Law *On Hydrometeorological Service*; the February 8, 2021 Presidential Decree #76 *On Implementation of the State Science and Technology Policy in Ecological Development of the Russian Federation and Climate Change*; and the December 25, 2019 National Plan of Actions of the 1st Stage of Adaptation to Climate Change to 2022. The Government commitment to climate change action was evidenced by its participation in the 2027 Conference of the Parties (COP27) of the United Nations Framework Convention on Climate Change (UNFCCC).

Relevance to the WBG's Assistance Strategies at closure. There was no updated WBG Country Strategy at Project closure. The World Bank's 2016 Russia Systematic Country Diagnostic (SCD) highlighted the need to address environmental challenges and climate change, thus reaffirming Project's alignment with the WBG's strategic view. It stated that climate-related hazards could generate public damage and losses costing US\$32 billion, an equivalent of 2.1 percent of Russia's gross domestic product (GDP). The World Bank's most recent strategic document, the 2021–2024 Russia Knowledge Exchange Program, stressed Russia's critical role in global weather and climate modeling and stated that Russia's largest potential contribution to the global public goods agenda, by far, was on climate change.

Previous sector experience. The reviewed Project was prepared as a follow-up operation on the World Bank's RHM-1 project (P082239, approved in FY2005, completed in FY2013) (ICR, page 7).

The objectives were pitched at the correct level considering the country needs and capacity. Based on the above, relevance of objectives is rated high.

Due to the deteriorating operational environment in February-March 2022, the World Bank suspended access to the loan on the basis of Section 7.02(e) of the General Conditions Applicable to the Loan Agreements (the 'extraordinary situation' clause).

Rating

High

4. Achievement of Objectives (Efficacy)

OBJECTIVE 1



Objective

PDO 1: To assist the Borrower to further enhance its national capacity to deliver reliable and timely weather, hydrological and climate information to the Russian public and economic sector.

Rationale

There was no theory of change (ToC) in the Project's PAD because it was not required at that time. Project's ToC was prepared for the ICR; it was sound, listed issues to be addressed, as well as constraints, and linked Project activities, outputs, and intermediate results to the short-term and PDO outcomes. To achieve the two PDO objectives, the Project supported the following activities: (i) strengthening ICT infrastructure and systems to deliver weather, climate, and hydrological data; (ii) modernizing observation networks; and (iii) strengthening institutions and regulations, and improving service delivery and preparedness for emergencies. The intermediate outcomes were as follows: (i) improved computational power and operational access to data; (ii) increased density and coverage of observation sites and devices to measure soil moisture and heat; and (iii) developed and updated regulations and procedures, retraining, improved interface for external users, and improved quality of service. The achievement of the intermediate outcomes would result in the following short-term outcomes: (i) increased accuracy and timeliness of weather forecasts; (ii) increased accuracy of seasonal river flow forecasts; (iii) increased number of users of hydromet data; and (iv) increased satisfaction of users of hydromet data. The short-term outcomes would support the achievement of the following two PDO outcomes: (i) enhanced capacity to deliver reliable and timely weather, hydrological, and climate information; and (ii) enhanced capacity to integrate in the global system of meteorological services.

The ICR's ToC provided an excellent description of the logic of Project interventions: a clear summary of activities and outputs; a comprehensive yet succinct description of intermediate results (reflecting how outputs would be applied to solve the problem); and well-structured short-term outcomes, linked to the PDO outcomes. The critical assumptions were listed and mapped on the ToC chart; they covered all main risks and included the following: (i) flexibility of technical solutions to keep up with evolving technologies; (ii) sufficiency of government funding to sustain O&M costs and retain talent; and (iii) willingness of users to employ improved data services.

Project efficacy under Objective 1 is assessed using the following indicators (this is the full indicator list):

Outputs/Intermediate Outcomes:

1. "Accuracy of warnings on natural hazards, %". The achievement at closure was 95.8 percent, against the target of 93 percent and the baseline of 88 percent. The target was exceeded.
2. "Increased level of spatial resolution of weather forecasts with the lead time of up to three days (for large cities), km". The achievement at closure was 5 kilometers, against the target of 5 kilometers and the baseline of 15 kilometers. The target was achieved.
3. "Number of oblast and territorial Roshydromet Centers providing remote client access to archived data". The achievement at closure was 10 centers, against the target of 10 centers and the baseline of zero centers. The target was achieved.
4. "Roshydromet centers providing operational access to observational data and products for internal and external Roshydromet clients, %". The achievement at closure was 100 percent, against the target of 100 percent and the baseline of zero. The target was achieved.



5. "Increased number of automated observation sites in pilot regions of the North-West of Russia, %". The achievement at closure was 92 percent, against the target of 92 percent and the baseline of 83 percent. The target was achieved.

6. "Availability of modern devices for measurement of soil moisture and heat regime of agricultural lands in the pilot regions (North Caucasus, West Siberia), % of the total # of stations". The achievement at closure was 100 percent, against the target of 80 percent and the baseline of zero. The target was exceeded.

7. "Modernization of upper air observation network, % of the total # of stations". The achievement at closure was 100 percent, against the target of 87 percent and the baseline of 64 percent. The target was exceeded.

8. "Reduction of error of water flow data in the Volga River basin, %". The achievement at closure was 15 percent, against the target of 15 percent and the baseline of 20 percent. The target was reached.

9. "Percentage of the Volga River basin territory corresponding to the minimum required number of hydrological observation sites, %". The achievement at closure was 100 percent, against the target of 100 percent and the baseline of 81 percent. The target was reached.

10. "Developed (updated) regulatory, organizational and administrative documents aimed at improving the organizational, methodological, financial and economic activities of Roshydromet, Number of documents". The achievement at closure was 10 documents, against the target of 9 documents and the baseline of zero documents. The target was exceeded.

11. "Re-training and professional upgrading of specialists from the Roshydromet's organizations, Number of people". The achievement at closure was 11,910 people, against the target of 9,300 people and the baseline of 169 people. The target was exceeded. *Note:* the original target for this indicator was 3,550 people; it was increased to 9,300 people at Restructuring 1 of February 2018.

12. "Number of scientists and specialists who participated in internships in leading universities and agencies outside Russia, persons per year" (this indicator measured the number of specialists from Roshydromet who completed internships or secondments in leading institutions of the WMO system). The achievement at closure was 10 people, against the target of 28 people and the baseline of zero. The target was not reached.

Note: This indicator was dropped at Restructuring 2 in December 2020 due to low achievement: despite a proactive and repeated outreach by the Roshydromet to relevant institutions, only two specialists had been able to obtain internships. Therefore, Roshydromet focused on targeted technical training for its staff. (Restructuring Paper, December 2020, page 7).

13. "Accuracy of warnings on hazardous hydrometeorological events delivered to regional authorities and the Ministry of Emergency Situations, %". The achievement at closure was 91 percent, against the target of 89 percent and the baseline of 81 percent. The target was exceeded.

14. "Number of Roshydromet institutions where situation centers are deployed, # of centers". The achievement at closure was 126 institutions, against the target of 102 institutions and the baseline of 25 institutions. The target was exceeded.

PDO outcomes:



1. “Increased lead times of basic weather forecasts for major Russian administrative centers with reliability over 70%, hours”. The achievement at closure was 168 hours, against the target of 168 hours and the baseline of 120 hours. The target was reached.

2. “Increased reliability of forecasts of seasonal water inflow to reservoirs in the Volga River basin, %”. The achievement at closure was 92 percent, against the target of 85 percent and the baseline of 75 percent. The target was exceeded.

Note: Based on the Project’s experience, PDO indicators 1 and 2 (above) have been included in the system of national statistical accounts as official measures of Roshydromet’s performance. (ICR, page 18)

3. “Increased number of Roshydromet sectoral data users, annual increase, %”. The achievement at closure was 129.1 percent, against the target of 123 percent and the baseline of 100 percent. The target was exceeded.

4. “Increased satisfaction of users with Roshydromet services, composite index, % from 0 (unsatisfied) to 100 (fully satisfied)”. The achievement at closure was 83 percent, against the target of 80 percent and the baseline of 65 percent. The target was exceeded.

Rating. The Project achieved or exceeded all its intended Objective 1 results except one IRI (on participation in internships/secondments in leading WMO institutions), and its efficacy rating is Substantial. The ICR stated (ICR, page 18) that the achievement of Objective 1 was contingent on improved accuracy of forecasts, which was to be accomplished through modernization of Roshydromet’s technical and institutional base and improved access to information. This was comprehensively monitored by the RF at the levels of PDO and intermediate outcomes, as well as outputs. The validity and sufficiency of the RF indicators measuring the achievement of Objective 1 was adequate, and the outcomes were attributable to the Project.

Rating
Substantial

OBJECTIVE 2

Objective

PDO 2: To assist the Borrower to enhance its capacity to integrate into the global system of meteorological services.

Rationale

Please see the discussion of the ToC under Objective 1.

The ICR reported that at approval, no indicators were included in the RF to measure Objective 2 because it was deemed impossible “to measure Russia’s global hydromet integration that would be truly independent of its specific hydromet capacity improvements” (ICR, page 18). The ICR measured the achievement of Objective 2 through the key dimensions of Russia’s hydromet services of high regional and global value (following the approach in the PAD) (ICR, page 21), specifically:



- i. **The operation of one global and two regional centers charged with producing daily forecasts for global and regional weather models and developing global forecasting techniques.** This work was supported by the Project-financed installation of a supercomputer in Roshydromet (Component A). As a result, a new sub-seasonal version of the global atmosphere model for long-range predictions was developed, and the first outputs were made public in September 2022 under a WMO project. In addition, Project-financed hardware and software allowed to produce new global forecasting models for the Polar Prediction Project (WMO) and other WMO programs, as well as to provide contributions to the eight-country Consortium on Small-scale Modeling (COSMO) for non-hydrostatic limited-area atmospheric models. Supported by the Project, Roshydromet's Moscow hub met the 2021 WMO members' compliance criteria.
- ii. **The functioning of the observations networks (reference and upper-air stations in the Global Climate Observing System (GCOS)), critical for global and regional weather forecasts.** Project-financed modernization of the observation networks and remote weather stations network (Component B) allowed Roshydromet to establish in 2018, and update in 2022, Russia's official list of the Regional Basic Observing Network stations for WMO Regions VI (Europe) and II (Asia), which were important contributions to regional and global forecasting capabilities.
- iii. **The quality of hydromet services in Central Asia.** Project's investments in new hardware and software (Component A) strengthened technical capacity of the North EurAsia Climate Center (NEACC), thereby significantly improving the quality of weather forecast for the region, especially in the Central Asian countries.

The ICR concluded that the Project-financed improvements supported Russia's enhanced capacity to integrate into the global hydromet system (ICR, page 21).

While the RF did not include indicators to measure Objective 2 PDO outcomes, the achievement of several RF targets under Objective 1 effectively constituted pre-requisites for reaching Objective 2. The discussion of the achievement of Objective 2 in the ICR (summarized above) was based on both the achievement of specific RF targets (described as pre-requisites for reaching Objective 2) and the PDO outcome level evidence outside of the RF, triangulating information from these two sources. The evidence was presented clearly, and the arguments were valid.

Rating. The Project substantially achieved its intended Objective 2 results, and its efficacy rating is Substantial. The Project-financed installation of the supercomputer, as well as other hardware and software, and modernization of the observation networks enhanced Roshydromet's modeling capacity and its contribution to global forecasting, thus supporting Roshydromet's compliance with the WMO requirements and Russia's integration into the global system of meteorological services.

Rating
Substantial

OVERALL EFFICACY

Rationale



For Objective 1, the rating for efficacy is Substantial. The Project achieved or exceeded all its intended results except one IRI (on participation in internships/secondments in leading WMO institutions).

For Objective 2, the rating for efficacy is Substantial. Project investments enhanced Roshydromet's modeling capacity, supporting Russia's integration into the global system of meteorological services.

Thus, the overall efficacy is rated as Substantial.

Overall Efficacy Rating

Substantial

5. Efficiency

a. Economic Analysis:

At appraisal. The economic analysis conducted at appraisal used cost-benefit analysis (CBA) approach and produced estimates for three scenarios: low, medium, and high. All benefit-cost ratios (BCRs) showed that the Project was economically viable; they were as follows: 2.5 for low scenario; 4.0 for medium scenario; and 32-39 for high scenario. The main characteristics of each scenario were as follows: (i) low: discount rate was five percent, time horizon was 20 years, and the benefit considered was reduced economic losses; (ii) medium: discount rate was eight percent, time horizon was 30 years, and the benefits considered were reduced economic losses and productivity gains; and (iii) high: discount rate was 12 percent, time horizon was 40 years, and the benefits considered were reduced economic losses, productivity gains, and benefits to general public. (ICR, page 22)

At closure. Two sets of calculations were conducted at closure. *First*, the appraisal CBA approach was replicated. The BCRs showed that the Project was economically viable; the BCR estimates were as follows: 2.5 for low scenario; 3.9 for medium scenario; and 7-11 for high scenario. The three scenarios were defined the same way as at appraisal, however, the three types of benefits were slightly different, as follows: (i) reduced economic losses in the weather-sensitive sectors, such as agriculture and energy; (b) productivity gains resulting from improved hydromet services; and (c) benefits to the general public, arising from better daily decisions due to improved weather forecasts. *Second*, a new CBA analysis was conducted, resulting in the BCR of eight (pointing to an economically viable project) and using one scenario only, with the time horizon of 20 years (based on stakeholders' views) and the World Bank's 2016 guidelines regarding the discount rate (six percent). The BCR of eight is consistent with similar World Bank projects in other countries (Bangladesh, Sri Lanka, and Nepal). (ICR, pages 22-23)

The main reason for having similar BCRs at appraisal and closure despite the increased cost of the Project was the following: (i) the ex-ante analysis assumed that the benefits only occur in the first five project years, and (ii) the ex-post analysis assumed a gradual take-up of the benefits due to the late installation of new equipment and a longer time horizon. (ICR, page 23)

Since all BCRs, both at appraisal and at closure, were above one, the Project was economically viable.



b. Administrative Efficiency

The ICR reported that the Project used implementation arrangements of RHM-1, including the implementation agency (Roshydromet), the project implementation unit (PIU), and the Project Management Committee (PMC). Project preparation was funded by RHM-1, and the PIU was fully staffed and directly involved in Project preparation. The leadership of Roshydromet and the PMC was strong and efficient. The Project was supported by highly skilled Roshydromet specialists. Legislation and regulatory environment were generally conducive to the Project. Counterpart funding was reliable. Monitoring and Evaluation (M&E) and financial management were consistently satisfactory.

However, there were delays in Project implementation, resulting in the extension of its closing for forty-eight months. The internal reasons included shortcomings in the review and approval of technical reports and procurement documents, leading to delays in decision-making by the PMC. This was reflected in the Moderately Unsatisfactory Project performance ratings in 2015–2016 and 2019–2020. In 2017, the decision-making process was revised, allowing for a significantly accelerated implementation.

External circumstances outside of Project control caused additional delays. The international sanctions imposed on Russia since 2014 led to prolonged procurement of critical contracts, including a 15-month delay in the hiring of the systems integrator consultant, whose role was essential due to the adaptive design of the Project and included coordination of large IT contracts, which were delayed in turn. The new international sanctions imposed on Russia in 2022 also caused inefficiencies, although procurement was mostly completed at that time. Separately, COVID-19 caused supply chains’ disruptions and lockdowns, leading to the second project extension.

On balance, considering the economic viability of the Project, mostly efficient implementation, and proactive mitigation of the delays, which were mostly caused by external circumstances outside of Project control, Project’s efficiency rating is Substantial.

Efficiency Rating

Substantial

a. If available, enter the Economic Rate of Return (ERR) and/or Financial Rate of Return (FRR) at appraisal and the re-estimated value at evaluation:

| | Rate Available? | Point value (%) | *Coverage/Scope (%) |
|--------------|-----------------|-----------------|--|
| Appraisal | | 0 | 0 <input type="checkbox"/> Not Applicable |
| ICR Estimate | | 0 | 0 <input type="checkbox"/> Not Applicable |

* Refers to percent of total project cost for which ERR/FRR was calculated.

6. Outcome



The overall Relevance of Objectives is rated as High. Efficacy is Substantial, while Efficiency is Substantial. Thus, the overall outcome is rated as Satisfactory.

a. Outcome Rating
Satisfactory

7. Risk to Development Outcome

Political. The sanctions imposed on Russia since February-March 2022 created two main risks to Project outcomes. *First*, the exit of global vendors and related disruption of supply chains puts the provision of warranty services and maintenance of the high-value equipment, financed by the Project, at risk. *Second*, the sanctions involved a suspension of bilateral and multilateral mechanisms for hydromet data exchange with Russia, creating constraints for the country to contribute to the global hydromet system.

Financial. Based on past experience, there is a risk that funding of the hydromet services and the O&M costs of maintaining Project-financed assets by Roshydromet will not be sufficient. This risk was exacerbated by the sanctions imposed on Russia. (ICR, page 33).

8. Assessment of Bank Performance

a. Quality-at-Entry

The ICR reported that the Project benefited from the design based on a successful precursor operation, RHM-1, including its strategic and robust technical approach; a logical RF; reliable economic justification; and strong environmental, social, and fiduciary arrangements. Due to the technical complexity of the Project, adaptive design in IT procurement was critically important (as the precursor project demonstrated), and a systems integrator was hired for this task, as per a dated covenant. The World Bank team was adequately staffed and resourced. The absence of a clearly measurable target for PDO2 was a methodological shortcoming, however, due to the logical link between PDO1 and PDO2, it was possible to use the PDO1 indicators, combined with evidence outside of the RF, to evaluate the achievement of PDO2. Project design also benefited from knowledge engagement with global leaders in the hydromet sector, including the WMO and the weather services of the United States and United Kingdom. (ICR, pages 31-32)

Quality-at-Entry Rating
Satisfactory

b. Quality of supervision



The ICR reported that Project supervision was continuous, comprehensive, and proactive. Implementation support missions were carried out every six months and included visits to key Project sites across the country: in Moscow, Rostov, Vladivostok, Khabarovsk, and St. Petersburg. There were also virtual checkups and communication on specific issues. The COVID travel restrictions in 2020–2021 did not have a significant impact on Project performance because regular virtual missions and checkups proved to be efficient. The team was proactive in identifying activities to accelerate procurement. Supervision benefitted from continuity: the task team leaders (TTLs) changed only twice, both times smoothly; and most of the team was based in Moscow and maintained good working relationships with the counterparts. The team included a lead hydromet specialist, who was in contact with the borrower, enabling timely response on complex technical matters. The suspension of disbursements in March 2022 and subsequent suspension of missions affected the team’s ability to support the Project, however, the activities necessary to achieve the Project objectives were completed. During the final two years of Project implementation, the ISRs’ Project performance ratings were Moderately Satisfactory, however, they were to be upgraded to Satisfactory based on the last mission of October 2021. However, due to the suspension of disbursements, the team could not file ISRs or carry out further missions. As a result, the final project performance ratings remained Moderately Satisfactory (ICR, page 29 and 32-33).

Quality of Supervision Rating

Satisfactory

Overall Bank Performance Rating

Satisfactory

9. M&E Design, Implementation, & Utilization

a. M&E Design

The RF reflected the logic of Project interventions in the PAD, was linked to the PDO and the ToC, and was complex yet manageable. The indicators were technical and measured objective results; there was also a beneficiary satisfaction indicator. All of the RF indicators were quantitative, time-bound, and attributable to the Project. The ICR reported that the PDOs were clearly stated, and the logic behind the theory of change was clear and valid. The system of intermediate results indicators adequately captured the contribution of project outputs toward outcomes. Monitoring arrangements and data collection methods were integrated with Roshydromet’s institutional reporting requirements. The absence of direct indicators for PDO2 was a methodological shortcoming; however, it did not hinder the analysis of the achievement of outcomes under PDO2 because they were contingent on reaching the PDO1 targets, and evidence outside of the RF was available, enabling triangulation of information. (ICR, page 30)

b. M&E Implementation

The ICR noted that data management is at the core of Roshydromet’s institutional mandate and that Project’s M&E implementation used the experience of the precursor project RHM-1, which had demonstrated high level capacity for data collection and analysis. Such capacity was reaffirmed during by the reviewed Project and is likely to be sustained after its closing. The RF remained largely unchanged,



except for the following: (i) seven indicator targets were increased at Restructuring 1 in February 2018 to reflect the scale-up of activities; and (ii) one nonessential IRI, on participation in internships in leading WMO institutions, was dropped at Restructuring 2 in December 2020 due to difficulties with obtaining internships. M&E data were collected from the start of the Project, analyzed in a sound manner, as per the M&E design and Roshydromet's data quality standards, and reported in all ISRs. The M&E implementation was rated as Satisfactory throughout the Project, except for one supervision cycle in 2018 when it was Moderately Satisfactory. (ICR, page 30)

c. M&E Utilization

The ICR reported that the utilization of the Project's M&E system was high, as it was fully embedded into the Roshydromet's own public reporting system. The Project's M&E results were made public through the agency's annual reports presented on its website. M&E data successfully supported Restructuring 1 in February 2018. Data from the user satisfaction surveys of 2017 and 2019 were used to inform the scale-up of project activities, and the 2022 final survey results were utilized by Roshydromet for strategic planning after Project closing. In consultation with the Ministry of Economic Development, two Project's PDO indicators (lead time of weather forecasts and reliability of forecasts of seasonal water flows) were adopted as official key performance indicators (KPIs) for Roshydromet. (ICR, page 30)

Based on the above, the M&E Quality is rated Substantial.

M&E Quality Rating

Substantial

10. Other Issues

a. Safeguards

Environmental and Social Safeguards. At appraisal, the Project was classified as Environmental Category C, with no Environmental Assessment required. This did not change during implementation. As a mitigation measure against the unlikely negative environmental impacts related to the installation of observation and monitoring infrastructure, the Project Operational Manual required that standard environmental and safety provisions be applied to all bidding documents for installation of new equipment and disposal of obsolete equipment. The Project closed fully meeting the World Bank's safeguards policies and national environmental, occupational, and labor requirements. (ICR, page 31)

b. Fiduciary Compliance

Financial management (FM). The Project had Satisfactory FM ratings during the last two years of implementation. There were no pending FM actions at closing. Throughout Project implementation, the project implementation unit (PIU) carried out the FM and disbursement functions in a satisfactory manner. The PIU was well staffed and employed experienced FM and accounting employees. Quarterly interim unaudited financial reports and annual audit reports were submitted on time and were satisfactory to the



World Bank. The auditors issued unmodified audit opinions, noting no significant internal control issues. (ICR, page 31)

Procurement. Procurement performance was consistently rated Satisfactory throughout Project implementation. Procurement risk was Moderate to Low. There were no cases of mis-procurement. Post reviews identified no violations of policy. Complaints were resolved by the PIU in due time. However, there had been significant procurement delays caused by slow approvals of specifications/terms of references and by multiple cases of re-bidding due to the following: (i) the noncompliance of bids and bidders with requirements of bidding documents; (ii) challenges to deliver equipment in the required time, and (iii) price above the planned budget. The delays were mitigated by proactive revision of Procurement Plans and close monitoring of contract implementation.

c. Unintended impacts (Positive or Negative)

d. Other

11. Ratings

| Ratings | ICR | IEG | Reason for Disagreements/Comment |
|------------------|--------------|--------------|----------------------------------|
| Outcome | Satisfactory | Satisfactory | |
| Bank Performance | Satisfactory | Satisfactory | |
| Quality of M&E | Substantial | Substantial | |
| Quality of ICR | --- | Substantial | |

12. Lessons

The following lessons were derived from the ICR (ICR, pages 28-29):

1. Follow-up projects, anchored in the precursor operations’ M&E framework, offer a valuable opportunity to measure longer-term outcomes and validate the theory of change. The reviewed Project followed the component structure and Results Framework of its predecessor, including the same key outcome indicator (lead time of weather forecasts) over a cumulative time of 17 years. A long and consistent time series of data provided evidence of investment impacts and justified the mid-course activity corrections (including changes in the specifications and scope of supercomputer procurement). This indicator was institutionalized by the borrower as an official sectoral KPI to help guide the agency’s further operations and development.

2. An adaptive management approach is beneficial for the procurement of high-value ICT assets, with the systems integration taking precedence over the pre-identified individual



procurement packages, even if it leads to delays in implementation. In the procurement of high-value ICT systems (hardware and software), systems integration requirements are key, and an adjustment of individual procurement packages to make sure system requirements are satisfied is often required, calling for adaptive procurement management approach. This is because the rapidly evolving technology and changes in sectoral regulations make it difficult to lock in large ICT procurement packages at start, and it may be preferential to revise and possibly delay the planned ICT procurement if an associated systems integration solution is not yet ready. In such cases, postponed procurement can deliver higher-performing ICT assets (for example, supercomputers with more than double capacity) and help to avoid a premature installation of high-value ICT assets before the system's full operational readiness. The reviewed Project benefited from adaptive procurement management and from hiring a systems integrator expert to supervise it, based on the lessons learned from the predecessor project.

3. In technically complex projects involving multiple reviews and revisions of the proposed solutions, clear guidelines and timelines for decision-making processes are critical for their efficient implementation. An up-front agreement with the borrower on the terms of reference for the project management body, such as a steering committee, can be beneficial. The reviewed Project experienced delays because such guidelines were not prepared: the PMC's terms of reference did not spell out its performance standards, which allowed for delays in decision-making. Once the agency's senior leadership instituted clear and tight decision-making standards, the implementation sped up.

13. Assessment Recommended?

No

14. Comments on Quality of ICR

The ICR provides rich technical details to understand the value-added of the activities and the outcomes of the Project; a good justification of the PDO relevance; comprehensive and robust evidence on all aspects of Project's evaluation; and a clear linking of evidence to findings. The ICR is technical, analytical, and has internal consistency. The lessons learned are closely linked to the information presented in the previous report sections and are useful for future lending operations. The ICR is written very logically and clearly, despite the complex nature of the discussed issues. The arguments about Project's efficacy are valid, based on deep technical knowledge, well-articulated, and supported by facts.

A minor shortcoming is that the length of the main text is double the OPCS recommended length of 15 pages.

The ICR quality is rated as Substantial.

- a. Quality of ICR Rating**
Substantial

