**(1) Summary page**

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| **C:\Users\Administrator\Desktop\New_MKCF LOGO.png** | **Mekong-ROK Cooperation Fund (MKCF)**  **Project Proposal** | |
| **Project Classification (check all that applies)** | | |
| ▣ Infrastructure  ▣ Information Communication Technology (ICT)  ▣ Green Growth  ▣ Water Resource Development  ▣ Agriculture and Rural Development  ▣ Human Resource Development | | |
| **Project Title** | | |
| * Master Plan Establishment and Capacity Building for the Modernization and Advancement of Hydro-meteorological Infrastructure at Mekong River Basin in Lao PDR | | |
| **Brief Description of the Project** | | |
| * Establishment of a Master Plan for modernization and advancement of national hydro-meteorological infrastructure and services in Lao PDR * Capacity building (Invitational training program in Korea): Management, Analysis, ICT courses | | |
| **Country / Region** | | |
| * Lao PDR / Lower Mekong Basin | | |
| **Estimated Budget** | | |
| **350,000.00 USD** | | |
| **Proponent** | | |
| Name | | Mr. Khanmany Khounphonh |
| Address | | Ministry of Natural Resources and Environment (MoNRE)  Department of Meteorology and Hydrology (DMH)  Souphanouvong Avenue, Ban Akat, P.O.Box 2903, Vientiane, Lao PDR |
| **Date of Submission** | | 12/06/2017 |

**(2) Proposal**

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| **C:\Users\Administrator\Desktop\New_MKCF LOGO.png** | | **Mekong-ROK Cooperation Fund (MKCF)**  **Project Proposal** | | | | | | |
| **Brief Project Information** | | | | | | | | |
| 1.1. Project Title | | | Master Plan Establishment and Capacity Building for the Modernization and Advancement of Hydro-meteorological Infrastructure at Mekong River Basin in Lao PDR | | | | | |
| 1.2. Country (ies) / Region | | | Lao PDR / Lower Mekong River Basin | | | | | |
| 1.3. Date of Submission | | | 12/06/2017 | | | | | |
| 1.4. Proponent Contact Details | | | | | | | | |
| Contact person, position  Organization  Email address  Telephone number  Mailing address | | | Mr. Khanmany Khounphonh / Director General  Ministry of Natural Resources and Environment (MoNRE) Department of Meteorology and Hydrology (DMH)  [k.khanmany@gmail.com](mailto:k.khanmany@gmail.com)  Office : (+856 21) 215010 / Fax : (+856 21) 223446  Souphanouvong Avenue, Ban Akat, P.O.Box 2903, Vientiane, Lao PDR | | | | | |
| 1.5. Project Area (check all that applies) | | | | | | | | |
| ▣ Infrastructure  ▣ Information Communication Technology (ICT)  ▣ Green Growth  ▣ Water Resource Development  ▣ Agriculture and Rural Development  ▣ Human Resource Development | | | | | | | | |
| **Project Milestone** | | | | | | | | |
| Estimated implementation start date  Estimated implementation end date  Project lifespan | | | | 01/08/2017  31/01/2019  \_\_1\_\_ years \_\_6\_\_ months | | | | |
| **Description of Financial Elements** | | | | | | | | |
| *Estimated cost* | | | | **350,000.00 USD** | | | | |
| **Background / Justification** | | | | | | | | |
| Weather phenomena affect all different areas of human activity. The use of climate and weather information towards everyday life not only protects life and reduce property losses but also contributes towards all aspects of life by reducing vulnerability to such environmental conditions. The initiation of disaster prevention is to mitigate damage through preparation. This can be achieved by producing precise weather information and delivering it to all citizens promptly through a variety of ways.  <Table 1. Territory of the six Mekong River Basin (MRB) countries within the catchment>[[1]](#footnote-1)   |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | | **Description** | **China** | **Myanmar** | **Lao PDR** | **Thailand** | **Cambodia** | **Vietnam** | **Total MRB** | | **Area (km2)** | 165,000 | 24,000 | **202,000** | 184,000 | 155,000 | 65,000 | 795,000 | | **Catchment**  **as % of MRB** | 21 | 3 | **25** | 23 | 20 | 8 | 100 | | **Flow**  **as % of MRB** | 16 | 2 | **35** | 18 | 18 | 11 | 100 |   As it shown in the Table 1, Lao PDR makes up the vast majority of the lower Mekong basin, and its economic activities as well as lives of people are mostly affected by the Mekong River. The river provides abundant resources for prosperous life of people, but it does not provide a permanent prosperity as it causes natural disasters that result in many people suffering damage to their property and overall lifestyle.  Especially, the overexposure to climate and disaster risks is the main reason that disproportionately affects the poor of Lao PDR. Floods, storms, and droughts are the most prevalent hazards of them all, and according to the World Bank report, these hazards are expected to become more severe in the upcoming years under the influence of climate change. A preliminary financial risk assessment [[2]](#footnote-2)estimated annual losses of GDP (0.7 percent) for Lao PDR that result from these natural disasters. In detail, flood disasters can put Lao PDR into facing annual emergency costs of nearly US$10 million. To put that into a longer timeframe, these costs could surpass US$36 million once every decade with a 10 percent annual probability. [[3]](#footnote-3)  The poor have been suffering the brunt of the consequences in the aftermath of disasters, due to their overexposure, higher vulnerability and reduced ability to recover. Disasters impoverish the poor and entrap them in the poverty cycle.[[4]](#footnote-4)   |  |  | | --- | --- | | Image result for natural disaster in laos | Image result for natural disaster in laos |   <Figure 1. Natural Disasters in Lao PDR (Drought, Flood)>  With this situation, enhancing capacity on Disaster Risk Management (DRM) of Lao PDR is essential. The Department of Hydrology and Meteorology (DMH) of Ministry of Natural Resources and Environment (MONRE) is responsible for providing early warning alerts as well as overall hydrological and meteorological services. However, DMH is highly limited with an annual budget of only US$ 300,000, restricted number of staffs on board (245), and a limited observation network as compared to its land size. While DMH provides a general level of meteorological and hydrological services to its country, a technological gap exists between Lao PDR and other Southeast Asian countries, especially core capacities and forecasting levels. In addition, several issues are present in data quality assurance, maintenance upgrades, and the demand for improved services and products. Therefore, the overall modernization and advancement in national hydro-meteorological services of Lao PDR is absolutely vital for the protection of people, the environment, and assets.  Improving the meteorological and hydrological services will provide better means to monitor and predict the atmospheric activities occurring in the lower Mekong area. Some upgrades for an effective DRM includes but not limited to: observation networks, capacity building, real-time data collection, and dissemination of reliable forecasts, and weather information to different end users.  Ultimately, this project will help mitigate natural disaster damages, improve economic activity in the lower Mekong river basin and contribute towards improving the quality of life of residents living near the lower Mekong River as they will see the most benefits. | | | | | | | | |
| **Problems (to be addressed)** | | | | | | | | |
| As described in the background section above, Lao PDR is inevitable to natural disasters and based on its vulnerable location, it is highly essential to enhance DRM capacity. Several problems and challenges that need to be solved to enhance DRM capacity are the following.   1. **Lack of observation network**   - Compared to its large territory, they lack number of observation stations and observation method is not continuous and done manually. Observation coverage needs to be expanded.  - DMH has only one (1) C-band radar in the HQ, and it is not able to cover the entire territory.   1. **Non-real-time and manual observation and data collection**   - Since hydro-meteorological phenomena occurs and changes continuously, it is very important to monitor it in real-time. But most of observation stations of Lao PDR is conducting its observation in non-real-time.   1. **Non-existence of integrated hydro-meteorological information system**   - There are several hydro-meteorological systems that DMH has been utilizing. But because they are separated system, manual data collection is needed to collect observation data for forecast. In order to integrate and manage observation data, an integrated or combined information system is needed.   1. **Human resources**   - There is a shortage of DMH staff members. There are only 245 staffs in DMH to cover the entire territory for 24 hours.  - Also, there is a lack of advanced experts and analysts with higher education to improve forecast accuracy. Currently, there is only 2 Ph.D. and 9 MSc working in DMH so they are missing key personnel that can conduct research and enhance the quality of forecast.   1. **Budget**   - DMH’s annual budget is around US$300,000. In order to modernize and advance national hydro-meteorological services, financing plan using ODA funds is necessary.  **More problems will be defined and analyzed in detail during the project** in the phase of environmental analysis and As-Is analysis. Improvement direction to overcome problems and challenges will be established and be reflected to the Master Plan. | | | | | | | | |
| **Project Objective** | | | | | | | | |
| The principal objectives of the project can be summarized in the following items: (i) to establish a well-defined and realistic Master Plan which will be a mid-long term plan of DMH that allows for an in-depth reference of assessment and planning, and (ii) to provide a capacity building program for the modernization and advancement of national hydro-meteorological services of Lao PDR focusing on the Mekong River basin. It will enable the countries to establish modernized hydro-meteorological infrastructure and prepare strategies to enhance Disaster Risk Reduction (DRR) and DRM capacity of target countries by mitigating the damages caused by natural disasters and climate change through preventative measures. Furthermore, it aims to strengthen the cooperation for joint response towards climate change issues.  These objectives will fulfill the criteria of both national and regional priorities. The government integrated climate risks and measures in the 7th National Socio-Economic Development Plan (NSEDP) during 2011-2015 and has scaled up a notch on DRM in the 8th NSEDP for 2016-2020. Also, key sectoral policies and strategies in the environment, transport, education and agriculture sector have integrated climate and disaster considerations. For example, the Ministry of Natural Resources and Environment (MONRE) has introduced a chapter on Disaster Risk Management and Climate Change in its Vision 2030, Strategy 2025 and Action Plan 2020. The Ministry of Planning and Investment (MPI) has issued a ministerial decision in 2017 to establish a public investment review process that takes into account climate and disaster risk considerations. Mekong River Commission (MRC) also defined its priorities and challenges by integrating climate change and water-related poverty in the Strategic Plan 2016-2020. Understanding the needs between development, sustainability and resilience, Lao PDR has adapted disaster and climate resilience into many of its policies, but they are faced with challenging issues on setting the stage of implementation.  Also, this project is directly related to the following MKCF priority sectors: [1. Infrastructure] / [2. ICT] / [6. Human Resource Development] as it targets the development of national hydro-meteorological infrastructure and system as well as capacity building of human resources, directly contribute to enhancing DRM ability of Lao PDR. In addition, this project will ultimately contribute to [3. Green Growth] / [4. Water Resource Development] / [5. Agriculture and Rural Development] sectors when the project successfully achieves the outcomes and impacts.  The project also contributes to the cooperation between Lao PDR and Korea, since it will reflect the unique modernization experience of Korea Meteorological Administration (KMA) that WeatherPia possess. KMA successfully completed its modernization in a short period of 15 years from 1985 to 2000. This unique experience stands out compared with other advanced national weather agencies worldwide due to the fact that the modernization strategy was planned out efficiently by utilizing ODA cooperation with donor partners. By sharing KMA’s modernization and strategic implementation planning in this project, it will cooperate and attract many donor partners of Lao PDR as they will get a thorough look and idea of the future model of national hydro-meteorological infrastructure and system of target countries and eventually contribute towards future projects designed in the Master Plan. In conclusion, the modernization experience and knowledge of ROK will not only be transferred and customized toward target countries but can spread out to other Mekong countries as well. | | | | | | | | |
| **Project Description / Implementation Arrangement** | | | | | | | | |
| The project mainly consists of two (2) activities; 1) Establishment of Master Plan for DMH and 2) Capacity building (Invitational training programs) for DMH. After completion of the project, 1) the Master Plan including Action Plan will be established for DMH and 2) Two (2) times invitational training programs in Korea will be successfully conducted and total sixteen (16) officials from DMH will complete the courses.   1. **Establishment of Master Plan for DMH**   **1) Method of approach**  The general approach is to develop a practical Master Plan that will be a reference of modernization and advancement of national hydro-meteorological infrastructure, and system that meets the core objectives of DRR. The methodology shown below in Figure 1 is a process flowchart that optimizes this project application. During all four (4) stages, capacity building of staffs is conducted simultaneously. Project Implementation Agencies (PIA) will ensure quality and organization of the Master Plan project with its knowledge through the implementation of similar projects.    <Figure 2. Methodology of Master Plan Establishment>  **2) Description of each stage**   1. **Environment analysis (External and Internal) and SWOT analysis**   External analysis prioritizes on the circumstances, and environment of target countries and internal analysis focuses on the national policy and organizational strategies of target countries and agencies. With the analyzed data gathered, SWOT analysis will be conducted.   1. **As-Is analysis**   The goal of this stage is to precisely diagnose the current status of national hydro-meteorological services and infrastructure of DMH-Lao PDR. Analysis will cover all hydro-meteorological fields of DMH, define challenges and problems, and figure out directions to improve. Activities during this stage are the following:   1. Collection/organization of accumulated data 2. Field survey to all sector levels of national hydro-meteorological service, which include main, regional offices, observation stations, etc. 3. Interviews with decision-maker, working-level officials of all related fields 4. **To-Be model establishment**   Based on the data from ① and ②, experts of the PIA will establish a To-Be model with accumulated experience. During this stage, the needs of DMH will be assessed through discussion. After this, PIA will draft the ideal future model for DMH. The model includes essential factors of modernization and advance national hydro-meteorological services of Lao PDR such as automation of observation, comprehensive information system, automation of data collection and dissemination, quality control, organizational advancement, etc. In this stage, PIA will define the projects that need to be implemented so that it can be reflected in the Action Plan based on the data derived from ① and ②.  Workshop that invites Project Working Group(PWG), target agencies and related ministers will be held with the purpose of building a consensus to understand and carry out the Master Plan.   1. **Action Plan establishment**   Based on the To-Be model, an Action Plan that is divided by phase will be developed by the consulting agency with the addition of detailed financial statements as it is essential for the Master Plan development and creation of future pilot projects targeted towards feasible donor organizations. For this project, PIA will design a pilot project for a grant project, and will try to submit the Project Concept Paper (PCP) during the project. Furthermore, the team will closely cooperate with the World Bank project team so that the established Master Plan could be fully reflected to the World Bank project.  **3) Implementing activities *– [Appendix 4: Indicative Work Plan]***  Activities to form following projects will be conducted during entire project period. Especially, PIA will closely cooperate with KOICA Lao PDR Office to create a pilot grant project and World Bank to reflect the Master Plan to the Lao PDR Southeast Asia Disaster Risk Management project.   1. **1st travel (Kick-off meeting, General field survey) and following activities  *- Environmental analysis, As-Is analysis***   During the first trip, kick-off meeting will be held in DMH to create a consensus among all related stakeholders for this project and future collaboration. PWG will be invited to the meeting to understand the project. PWG workshop will be also held during the first trip to discuss how the project can contribute to Lower Mekong region.  Also, the first field survey will be conducted. This survey aims to understand general status of DMH by collecting data, interviews, visiting representative sites. After the trip, the consulting agency will conduct environmental analysis, SWOT analysis and As-Is analysis with the data from the first trip.   1. **2nd travel (Detailed field survey) and following activities  *- Completion of Assessment / Analysis / Evaluation phase***   In the second trip, PIA will conduct additional survey and detailed survey on the areas where the data is lacking. Main purpose of the trip is to finalize the analysis data and reflect DMH’s opinion on generated diagnosis so that PIA will be able to set the direction of To-Be model up. After the trip, the consulting agency will finalize the analysis data and draft To-Be model.   1. **3rd travel (To-Be model design, Workshop) and following activities  *- To-Be model establishment***   Main purpose of the third trip is to hold a workshop to design To-Be model. In the workshop, finalized analysis data such as diagnosis of current status, problems, opportunities, and improvement directions will be shared to all stakeholders. Discussion on the draft To-Be model will be followed to gather opinions on it. Opinions from DMH and stakeholders will be reflected to the To-Be model. Based on the To-Be model, an Action Plan will be drafted by consulting agency.   1. **4th travel (Final report)  *- Action Plan establishment***   Based on the To-Be model and Action Plan organized by consulting agency, the Master Plan will be finalized and will be reported to DMH and relevant organizations during the fourth trip. During this trip, activities to form a following project such as KOICA grant project will be conducted in order to materialize the Master Plan.   1. **Capacity Building (Invitational training in Korea)**   **1) Background**  PIA accompanies and supports a wide range of relevant training experiences. WeatherPia has consistently provided training program under KOICA and KMA and retains strong list of instructors and curriculum optimized to related contents of the project. Consulting agency is also providing its training program to Mekong partners on the relevant sectors. Consulting agency, WeatherPia, have already provided training program with various related courses to many national agencies such as DMH(Lao PDR), DOM(Cambodia), DMH(Myanmar), PAGASA(Philippines), ANACIM(Senegal) and so on.    <Figure 2. General process of training program>  Training programs will follow general procedure of invitation training program of Korean government. Since Korea International Cooperation Agency (KOICA) is the agency that conducts the most of invitational training programs of Korea, consulting agency will follow the process of KOICA training program.  **2) Description of each course**  Two courses of training will be provided for DMH officials. Each course has different goals and curriculum. Based on the target, consulting agency will organize and provide a customized and optimized training course.  Duration of each project is two weeks. Each course will invite around 8 participants. But it can be changed according to DMH’s opinion.  The main goal of the training programs are the following;   1. *To provide and understand conceptual knowledge and services of the integrated hydro-meteorological information system to be constructed after modernization* 2. *To share the entire experience and knowledge during KMA’s modernization process* 3. *To enhance trainees capability enough to contribute towards modernization*   In addition to letting each trainee take full advantage of every learning opportunity during training, lectures on general hydro-meteorological tasks, field trips to understand advanced hydro-meteorological infrastructure and systems, and cultural tours will be provided.   1. **Management course *– for high-level officials, decision-makers, and head of department***   Management course will be the first training program. Because it is important for high-level officials to understand overall concept of modernized national hydro-meteorological services as they are decision-makers of DMH. This course aims to provide overall understanding of modernization and advanced hydro-meteorological services and system so that the leaders will actively participate and drive modernization by themselves.  Therefore, it will not focus on just one specific field or lectures. This program consists of field trips and study visits to all related organizations so that they can understand how entire KMA has been running. Also, meeting with high-official of Korean government such as KMA will be arranged to discuss further cooperation between two countries.   1. **Analysis course – *for forecast related officials***   Forecast is the most important product of national hydro-meteorological services. Forecasters are the producer of it. They will be real users of modernized national hydro-meteorological system. Therefore, this course will focus more on how to utilize and apply data from advanced systems and services to generate forecast and how to improve forecast service of Lao PDR. Field trip and study visit will be arranged to related organizations such as KMA HQ, National Meteorological Satellite Center (NMSC), National Institute of Meteorological Research (NIMR), etc.  **3) Implementation activities *– [Appendix 4: Indicative Work Plan]***  Implementation of training is divided by three stages. Each stage will be well-managed and monitored. Utilization of training costs will be based on the guideline of KOICA budgetary plan.   1. **Pre-training stage – *planning, preparation, and arrangement***   The pre-training stage is started around one (1) to two (2) months before training. Reflecting each courses’ goals, customized and optimized training program and curriculum will be planned. Based on the plan, Course Information will be written and shared to DMH. DMH’s opinion on Course Information will be reflected and DMH will select participants based on the criteria that agreed.  WeatherPia arranges everything needed for training based on the confirmed Course Information. Arrangement includes; 1. Lecturers, 2. Field trips & Study visits, 3. Hotel & Accommodation, 4. Etc. (Stationary, car, restaurants, etc.)  Lecture materials and training information will be prepared in advance through having discussion with lecturers in order to provide customized contents to DMH. Since WeatherPia has a wide range of training experience, it has a lecturer pool consists of qualified lecturers from KMA, universities, and relevant organizations.  <Table 2. Sample of training plan for management course (Brief ver.)>   |  |  |  |  | | --- | --- | --- | --- | | **Participants / Duration** | High-level officials of Department of Meteorology and Hydrology of Lao PDR (10 people)  / 1 week | | | | **Period** | To be decided after discussion with DMH (Expected period : September 2017) | | | | **Curriculum (Lectures)** | **No.** | **Subject** | **Contents** | | 1 | Introduction of KMA | * Introduction of KMA and its international cooperation * Introduction of national meteorological system(COMIS) and services | | 2 | Observation | * Observation network of KMA * Operation of Global Standard Meteorological Observation Station | | 3 | Forecast | * Forecast services of KMA * Study visit to National Meteorological Center | | 4 | Radar | * Radar services of KMA | | 5 | Agro-meteorology | * Agro-meteorological services of KMA | | 6 | Communication | * Meteorological communication network (Introduction of concept, operation method, and etc.) * Study visit to ICT Center of KMA | | 7 | Seismology and volcano monitoring | * Understanding of seismology and volcanic services * Study visit to seismology and volcano monitoring center | | 8 | Numerical Weather Prediction (NWP) | * Numerical Weather Prediction of KMA * International trend of NWP | | **Activities** | **No** | **Category** | **Contents** | | 1 | Orientation, Welcoming ceremony, Closing ceremony | * Welcoming remarks * Orientation (Program introduction, etc.) * Survey on satisfaction / Lecture evaluation | | 2 | Field trip and Study visit | * KMA, National Meteorological Satellite Center * National Center for Meteorological Supercomputer * National Institute for Meteorological Research * K-Water and etc. | | 3 | Cultural experience | * Seoul tour (Performance, Traditional activities) * Cultural trip (Gyeong-ju) |  1. **Training implementation stage – *Provide the best experience and contents of training***   During training, coordinators from WeatherPia accompanies entire schedule from arrival to departure. (24/7)  Program consists of lectures, field trips, study visits, and cultural experience. Qualified lecturers who have experienced to provide a lecture on training program of Korean Government will provide lectures. Based on WeatherPia’s rich experience for the training management, the program will be organized in the most efficient way. Entire program will be evaluated by participants through survey sheet on lectures and program.  <Table 3. Sample schedule of management course (1 week ver.)>   |  |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | **Time**  **Day** | **1**  **09:00**  **~09:50** | **2**  **10:00**  **~10:50** | **3**  **11:00**  **~11:50** | **Lunch** | **4**  **13:30**  **~14:20** | **5**  **14:30**  **~15:20** | | **6**  **15:30**  **~16:20** | | **7**  **16:30**  **~17:20** | **Remarks** | | **Day 1** | **Arrival** | | | | | | | | | |  | | **Day 2** | **Welcoming Ceremony  Orientation** | **Lecture 1**  [Introduction of KMA] | **Lecture2**  [Observation] |  | **Lecture3**  [Forecast] | | **Lecture4**  [Seismology] | **Study visit 1 / Lecture 5**  KMA HQ [National Meteorological Center, National Seismic Center, National Meteorological ICT Center] | | | Welcoming dinner | | **Day 3** | **Lecture6**  [Agro-Met] | **Lecture7**  [Radar] | **Lecture8**  [Numerical Weather Prediction (NWP)] |  | **Field trip 1**  [KIAPS - Korea Institute of Atmospheric Prediction Systems] | | **Travel time** | **Field trip 2**  [Han River Flood Control Office] | | |  | | **Day 4** | **Travel time** | **Study visit 2**  [NCMS – National Center for Meteorological Supercomputer] | |  | **Travel time** | | **Study visit 3**  [NMSC – National Meteorological Satellite Center] | | **Travel time** | |  | | **Day 5** | **Travel time** | **Action Plan** [Country report,  SWOT analysis, Define improvement direction] | | **Evaluation Closing ceremony** | | **Study visit 4**  [Seoul Meteorological Observation Station] | **Cultural Experience 1**  [Namdaemun Market] | | | Farewell dinner | | **Day 6** | **Cultural Experience 2** [Seoul Tour & Traditional Tea time] | | | **Cultural Experience 3**  [Myeongdong & Performance(Nanta)] | | | | | |  | | **Day 7** | **Departure** | | | | | | | | | |  |  1. **Post-training stage – *Reporting, reflect the survey data for next training program***   After the training, the resulting report will be made. WeatherPia will analyze the survey data from participants. Analyzed data will be reflected to the next training program after having a feedback discussion based on it.  Also, consulting agency will keep supporting the participants so that they can reflect what they learn in Korea to their daily tasks.   * **Project Implementation Agencies (PIA) and its role**  1. **Ministry of Natural Resources and Environment (MoNRE)**   MoNRE became a ministry in June, 2011 by including Water resources and environment Administration (WREA), the Land Management Administration, Geology Department, and some division from forestry Department (DoF).  As DMH belongs to MoNRE, the ministry is the key ministry to promote a master plan. As this Master Plan meets the high priority set by the Government of Lao PDR with implementing a national water resource strategy, MoNRE as one of the core PIA partners will promote sustainable development in the To-Be design of the Master Plan implementation, provide guidance through utilizing its project experience in previously implemented water-related projects and make efforts to secure participation of all related sectors; especially private sectors and local actors as this will bring a huge synergy effect among all PIA partners and Lao PDR.   1. **Department of Meteorology and Hydrology (DMH)**   Established in 1950 and registered as a member of WMO in 1955, DMH Lao PDR is a national government agency under the auspice of Ministry of Natural Resources and Environment (MoNRE). As the PIA, DMH will provide related information of Lao PDR (accumulated hydro-meteorological data, organizational data, and all related material), support local site survey, handle and support governmental affairs (Build consensus, administration, etc.), and reflect the Master Plan to its policy and strategic plan.   1. **WeatherPia Inc. (Consulting agency)**   WeatherPia will contribute to this project as a consultant under DMH. Established in 2005, WeatherPia is private weather consulting company in South Korea that consists of weather specialists and retirees of KMA (Korea Meteorological Administration). As the leading provider of overseas consulting such as establishment of Master Plan or Feasibility Study for modernization and advancement of National Weather Services in developing countries, WeatherPia will provide strategic consulting to design, develop, and complete the Master Plan project as well as support invitational training in Korea for capacity building.   * **Project Working Group (PWG) and its role**  1. **Mekong Institute (MI) and PIA : Co-chair of PWG**   Mekong Institute acts as the Coordinator of MKCF in collecting and circulating project proposals, disbursing funds, helping Senior Officials review and monitor the projects. During the project, MI will play the role as PSC and support PIA to monitor progress and assess results and outcomes.  As a co-chair of PWG, MI will participate online conference with PWG members and PIA via Skype at the beginning, halfway and the final stage of the project. Also, MI will be invited to online meeting during the PWG workshop period.   1. **Hydro-Meteorological Administration(HMA) under Ministry of Natural Resources and Environment(MoNRE) of Vietnam**   HMA under Ministry of Natural Resources and Environment (MONRE) of Vietnam is recently transferred to the Administration from National Hydro-Meteorological Service (NHMS). HMA has been implementing component 2 of WB project called ‘Vietnam Managing Natural Hazards Project (VN-Haz)’ since 2013 which aims to strengthen its weather forecast and early warning system. HMA could share their experience to DMH on implementing WB project and how to reflect own plan to the project. Once, based upon the MOU between the two Ministers, Ministry of Natural Resources and Environment of the Lao PDR and Ministry of Natural Resources and Environment of Vietnam, dated on 23rd December 2016 and the followed up MOU between the Department of Planning and Cooperation of MONRE of Lao PDR and the Department of International Cooperation of MONRE of Vietnam which was signed recently on 13 March 2017 in Vientiane, the HMA of Vietnam and DMH of Lao PDR will strengthen tightly the cooperation in data sharing and expert exchanging on Hydrology and Meteorology that both side expect them to be launched in 2017.   1. **Department of Meteorology(DOM) under Ministry of Water Resources and Meteorology(MOWRAM) of Cambodia**   DOM under MOWRAM of Cambodia is also seeking opportunities to modernize its national weather services. As a member of PWG, DOM will provide their point of view on strengthening DRM capabilities in the Lower Mekong region. | | | | | | | | |
| **Value Added for the MKCF Involvement/Impact Potential** | | | | | | | | |
| Promoting this project through MKCF is very important not only because it meets the objectives of the fund, but it directly contributes to protecting the lives and property of the people around the Mekong River through enhancing DRM ability of Lao PDR. The project will establish a Master Plan for modernization and advancement of national hydro-meteorological service of Lao PDR. It will be a stable foundation for modernization projects in the future as well as be a national development plan on hydro-meteorological infrastructure. In this regard, DRR and DRM capability will be enhanced and contribute to national development in all aspects through mitigating the damages from natural disasters. Eventually, it will enhance the quality of life of people.  Hydro-meteorological service, dealing with natural phenomena, is not only dedicated mission for a single country. Successful implementation of the project will benefit all countries in the Mekong basin, especially those located near Lao PDR. Most of countries have similar system and structure of the national hydro-meteorological service because of its characteristic of dealing with nature. Therefore, it is possible to extend the model of this project to neighboring Mekong countries. This will enable the establishment of an integrated hydrological master plan for all countries in the Mekong River, which will improve the quality of life for the people of the Mekong River.  MKCF is the fund was established in 2013 to encourage and support cooperation in six priority areas outlined in the Han River Declaration of 2011. The project fulfills all these sectors as it mentioned in Project Objectives.   1. **Infrastructure**   : Establish a Master Plan that will be a reference to establishment of hydro-meteorological infrastructure and capacity building   1. **ICT**   : Establish hydro-meteorological information system and enhancement of related capacity for DRM capacity   1. **Water Resource Development**   : Strengthen water resource management capacity by enhancing hydro-meteorological infrastructure   1. **Green Growth**   : Protect people’s life, property, and environment through providing accurate hydro-meteorological forecast and information, and contribute to increasing economic growth   1. **Agriculture and Rural Development**   : Mitigate damages caused by natural disasters through producing accurate and timely hydro-meteorological information and forecast, and provide customized agricultural weather information and contribute to increasing production   1. **Human Resource Development**   : Enhance capacity through invitational training, strengthen ownership through active participation in the Master Plan establishment, and propose educational training program | | | | | | | | |
| **Exit Strategy** | | | | | | | | |
| This project aims to establish a Master Plan for modernization and advancement of national hydro-meteorological services of Lao PDR. The Master Plan itself is just a plan that will be a reference to form following modernization projects. Therefore, it is essential that the Master Plan must be connected to following projects with financing to ensure its sustainability.  During the project, PIA will try to form a pilot project funded by KOICA. Furthermore, because the World Bank project, Lao PDR Southeast Asia Disaster Risk Management Project, is in pipeline and component 2 of the project is dedicated for DMH, PIA will also try to reflect the result of this project to it.   1. **KOICA Project - Project Concept Paper (PCP) submission for pilot project formation**   In the last stage of the Master Plan establishment, the Action Plan which is an implementation plan how to materialize the designed To-Be model, modernized national hydro-meteorological service, will be established. Generally, the Action Plan consists of pilot project and main project that consists of three phases. Pilot project is designed for grant project, and main projects are designed for loan project as it requires grand-scale financing.  For the pilot project, it will be designed with the budget of around US$ five to ten million and is intended to be a reference to form loan project to implement main projects phase 1 to 3.    <Figure 3. Process of KOICA PCP submission>  During this project, PIA aims to form a grant project funded by KOICA. Main goal of the project is successfully to submit a Project Concept Paper (PCP) to KOICA Lao PDR Office via official diplomatic procedure because it will take around 2 years to initialize the project after PCP submission.  Main contents of the pilot project that will be prioritized in the Master Plan will be a comprehensive meteorological information system, satellite receiving and analysis system, hydro-meteorological equipment to selected pilot area and capacity building. In order to materialize the pilot project, PIA will closely cooperate with KOICA Lao PDR Office.   1. **World Bank project - Lao PDR Southeast Asia Disaster Risk Management Project**   The World Bank project entitled ‘Lao PDR Southeast Asia Disaster Risk Management Project’ is in the pipeline. Especially, component 2 of this, Hydromet Modernization and Early Warning Systems, is dedicated for DMH with allocated budget of US$10 million.  Sub-component 1, Strengthening Early Warning Systems and Service Delivery Systems, is allocated US$5 million and it focuses on the Early Warning Systems and dissemination system.  Sub-component 2, Modernizing the Observing, Forecasting and Communication Systems, is allocated US$4 million. Especially, this sub-component clearly states that all contents under this component such as expansion of observation network, system integration and upgrade of facilities, ICT systems, and data communication based on the DMH’s Master Plan. This sub-component focuses on improving forecast accuracy and ability through expanding and upgrading observation and communication network related to hydro-meteorological service and capacity building. Sub-component 3 is allocated US$1 million for project management.  It is expected that duration of the project and the World Bank project will be overlapped. Since the World Bank project states that they will implement the project based on the Master Plan, PIA will promote to link the Plan and the WB project through close cooperation with World Bank project team so that the Plan will be well-reflected. | | | | | | | | |
| **Outcomes, Outputs, Activities, and Inputs at Project level** | | | | | | | | |
| **Expected Result** | **Indicator** | | | | **Means of Verification** | **Target** | | **Remarks** |
| Mid-term | Final |
| **Project outcomes** | | | | | | | | |
| **1. Strengthen DRR & DRM capacity / Mitigate damages from natural disasters** | * Forecast accuracy improvement * Forecast production time improvement | | | | * Statistics and report of DMH | * Target : 90% of forecast accuracy | | will be able to monitor after actual completion of modernization |
| **2. Link a Master Plan to actual modernization projects** | * Action Plan establishment * KOICA PCP submission * Reflect MP to WB project | | | | * Master Plan report * KOICA PCP * M/M (KOICA, WB) | * Action Plan establishment with project design by phase / mid-term: progress report of Master Plan Final: Submitting the Action Plan * PCP acceptance by KOICA Lao PDR office / mid-term: submitting a fact sheet or report of PCP submitting status (draft) Final: Final version of PCP * Consensus building with World Bank project team /mid-term : mid-term report and M/M final : final report and M/M | | Action Plan is a part of the Master Plan |
| **Project outputs (that contribute to outcomes)** | | | | | | | | |
| **1. Master Plan Establishment of modernization and advancement of national hydro-meteorological services** | * Progress rate of Master Plan establishment | | | | * Monthly Progress report * Field trip report * Workshop report | 50% | 100% (Including Action Plan) |  |
| **2. Capacity building 1 (Invitational Training - Management course)** | * Satisfaction * Number of participants * Pass/Fail rate * Job engagement rate of after training | | | | * Survey result * Lecture evaluation * Training report | * 80% of satisfaction * More than 4(Max 5) points on Lecture evaluation * Over 80% of Pass on Test * 8 trained DMH officials * More than 80% of participants working in related fields. | |  |
| **3. Capacity building 2 (Invitational Training - Analysis course)** | * Satisfaction * Number of participants * Pass/Fail rate * Job engagement rate of after training | | | | * Survey result * Lecture evaluation * Training report | * 80% of satisfaction of each training * More than 4(Max 5) points on Lecture evaluation of each training * Over 80% of Pass on Test of each training * 8 trained DMH officials of each training * More than 80% of participants working in related fields. / mid-term : presenting a fact sheet final : presenting a fact sheet | |  |
| **Activities** | **Description** | | | | | | | |
| **1.1. Environmental Analysis** | * **External environmental analysis –** focus on country’s situation and circumstances * **Internal environmental analysis –** focus on national strategy, policy and plan/organization’s situation and circumstances * **SWOT analysis** * **Field survey** | | | | | | | |
| **1.2. As-Is Analysis** | * **Data collection –** all related documents and observation data * **Field survey –** Representative fields (HQ, Regional Offices, Observation Station, etc.) * **Interview –** Decision-making level, working-level * **Accurate diagnosis of current status through analysis** * **Define improvement direction** * **Report analysis result** | | | | | | | |
| **1.3. To-Be Model Design** | * **Design To-Be model**   + Design Comprehensive and integrated hydro-meteorological information system   + Define needed hydro-meteorological infrastructure and technologies   + Define project list to promote for modernization and advancement * **Workshop** | | | | | | | |
| **1.4. Action Plan Establishment** | * **Action Plan establishment**   + Evaluation of priority among designed projects   + Road-map establishment by phase   + Required resource evaluation and Financing plan * **Pilot project formation**   + Project Concept Paper (PCP) submission to KOICA | | | | | | | |
| **2.1.Pre-training arrangement** | * **Planning (Course Information) –** Curriculum, purpose and goal, contents and etc. * **Participants selection – Define criteria, number of participants** * **Arrangement –** Lecturer, Flight, Accommodation, Materials, Transportation, Activities(Field trip, Study visit, and Cultural experience), Staffs, Meetings, etc. | | | | | | | |
| **2.2.Training implementation** | * **Lectures –** Overall understanding on modernization and advancement of national hydro-meteorological infrastructure and services * **Field trips and study visits** * **Cultural experience** * **Activities –** Orientation, opening ceremony, closing ceremony, welcoming dinner and farewell dinner * **Monitoring / Program coordination** * **Evaluation** | | | | | | | |
| **2.3.Post-training management** | * **Report of results** * **Feedback from evaluation** * **Support training participants to applying training contents to the tasks** | | | | | | | |
| **3.1.Pre-training arrangement** | * **Planning (Course Information) –** Curriculum, purpose and goal, contents, etc. * **Participants selection – Define criteria, number of participants** * **Arrangement –** Lecturer, Flight, Accommodation, Materials, Transportation, Activities(Field trip, Study visit, and Cultural experience), Staffs, Meetings, etc. | | | | | | | |
| **3.2.Training implementation** | * **Lectures –** Forecast related lectures * **Field trips and study visits –** Forecast-oriented organizations * **Cultural experience** * **Activities –** Orientation, opening ceremony, closing ceremony, welcoming dinner and farewell dinner * **Monitoring / Program coordination** * **Evaluation** | | | | | | | |
| **3.3. Post-training management** | * **Report of results** * **Feedback from evaluation** * **Support training participants to applying training contents to the tasks** | | | | | | | |
| **4.1.Pre-training arrangement** | * **Planning (Course Information) –** Curriculum, purpose and goal, contents, etc. * **Participants selection – Define criteria, number of participant** * **Arrangement –** Lecturer, Flight, Accommodation, Materials, Transportation, Activities(Field trip, Study visit, and Cultural experience), Staffs, Meetings, etc. | | | | | | | |
| **4.2.Training implementation** | * **Lectures – ICT technology and its application to hydro-meteorology** / Management of advanced hydro-meteorological systems * **Field trips and study visits –** ICT utilizing organizations related to hydro-meteorology * **Cultural experience** * **Activities –** Orientation, opening ceremony, closing ceremony, welcoming dinner and farewell dinner * **Monitoring / Program coordination** * **Evaluation** | | | | | | | |
| **4.3. Post-training management** | * **Report of results** * **Feedback from evaluation** * **Support training participants to applying training contents to the tasks** | | | | | | | |

1. Mekong River Commission, 2005, *Overview of the Hydrology of the Mekong Basin*, MRC [↑](#footnote-ref-1)
2. World Bank / Global Facility for Disaster Reduction and Recovery. 2012. *ASEAN. Advancing Disaster Risk Financing and*

   *Insurance in ASEAN Member States: Framework and Options for Implementation.* Among ASEAN countries, Lao PDR faces the highest estimated 100-year loss measures as loss of 11.7 percent GDP, rising to 13.9 percent GDP in simulation of a 200-year Probable Maximum Loss. [↑](#footnote-ref-2)
3. World Bank, 2017, Country Context, *Combined Project Information Documents / Integrated Safeguards Datasheet (PID/ISDS) of Lao PDR Southeast Asia Disaster Risk Management Project (P160930),* [↑](#footnote-ref-3)
4. World Bank, 2016. *Unbreakable: Building the Resilience of the Poor in the Face of Natural Disasters* [↑](#footnote-ref-4)