Annex 1 – Description of the Action

United Nations Development Programme

Project Document

Project Title: EU Floods Recovery Programme– Improvement of Flood Prevention and Mitigation Response in Affected Areas

UNDAF Outcome(s):	By 2020, individuals, the private sector and state institutions base their actions on the principles of sustainable development, and communities are more resilient to disasters and environmental risks
Expected CP Outcome(s):	By 2020, individuals, the private sector and state institutions base their actions on the principles of sustainable development, and communities are more resilient to disasters and environmental risks
Expected Output(s):	1. Priority damaged water / flood control infrastructure is repaired or reconstructed and improved thus reducing the likelihood and/or the impact of future floods in the affected areas 2. The repaired and reconstructed water / flood control infrastructure is better operated and maintained, creating national models for scaling-up

Executing Entity: United Nations Development Programme

Brief Description

The goal of the project is to assist the country's recovery efforts in the aftermath of the floods that occurred in early 2015 by reconstructing damaged water / flood control infrastructure. The "building back better" approach will be used to maximize resilience to future floods and mitigate the risk of floods in priority sensitive regions of the country. Project intervention will focus on improvement and enhancement of discharge capacities of priority regulated river sections and drainage networks in the affected Crna Reka and Strumica River Basins, as well as reconstruction and better management of four priority dams which were damaged by the floods.

The project will build upon the experiences, results and lessons learned from past projects on emergency coordination support as well as ongoing programmes in the areas of disaster and climate risk reduction and integrated river basin management.

It will be implemented in close partnership with the Secretariat for European Integration, Ministry of Agriculture, Forestry and Water Economy, Environment and Physical Planning, Water Management Organization, local governments of the affected municipalities as well as the key entities in the disaster risk management system in the country.

Programme Period: 2016 - 2020	
Key Result Area: Disaster Risk Reduction (DRR), Preparedness, Response and Recovery	
Atlas Award ID:	
Start date:	01 April 2016
End Date	30 September 2018
PAC Meeting Date	
Management Arrangements	DIM

Total resources required

Total allocated resources:

European Union EUR 6,819,261
7,493,693.41 USD
(as per the UN Exchange rate 1 US$ = 0.910 Euro)

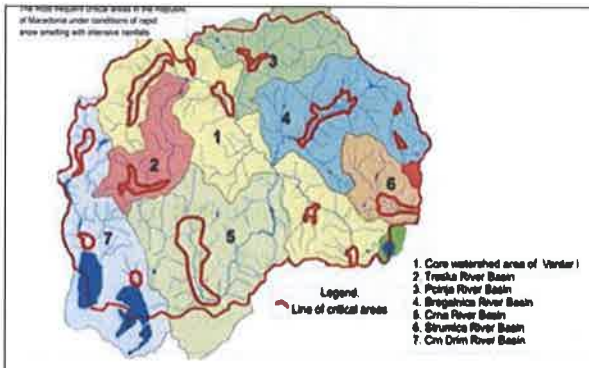
Agreed by (UNDP):

Louisa Vinton, Resident Representative

I. SITUATION ANALYSIS

BACKGROUND

Severe flooding hit much of the country in January and February 2015, causing widespread damage and economic losses. Heavy rainfall caused rivers to overflow in many locations, and 44 out of 80 municipalities experienced floods. The most affected regions were the basins of the **Crna Reka**, **Bregalnica** and **Strumica rivers**, which cover 45% of the territory of the country. Roughly 170,000 people were affected in all. The floods caused major damages to roads and bridges, interrupting transport; and private houses, private-sector industrial facilities, schools and public facilities in some villages were also flooded. Much agricultural land was also flooded, causing extensive losses to farming families. Critical **water infrastructure** (e.g., drainage and irrigation systems, riverbed regulation infrastructure and dams) was also severely damaged.



The country's river basins – numbers 4, 5 & 6 were most affected by the floods in spring 2015

The flooded area in the Pelagonija Region alone was bigger than all of Dojran Lake, which has surface area of 43,100 km^2.

A second flood-related disaster hit the country on 3 August 2015, when flash floods and mudslides struck the northwest Polog Region, killing six people and causing damage to municipal infrastructure and houses in the city of Tetovo and villages in the surrounding mountainous areas.

High vulnerability to floods

As this rapid sequence of disasters suggests, the country is highly vulnerable to flooding. Some of this vulnerability stems from natural causes. Most river basins experience dramatic variations in water flows over time, and the risk of floods is also exacerbated by the country's specific topography and land structure. However, human factors are also at work. Changing use of land and land cover – for example, cultivation or construction in wetland areas, and heightened erosion from logging in forests – are altering hydrological regimes, increasing the risk of floods. Other causes include neglected maintenance of regulated river segments, for example through the conversion of flood plains and river corridors for agricultural or commercial use; decaying or poorly maintained flood control infrastructure, for example by failing to clear drainage channels regularly; and insufficient use of existing dams and reservoirs to mitigate the risk of floods.

Vulnerability to floods contributes to a profile of the country as particularly disaster-prone. The country also faces a high risk of earthquakes, wild fires, droughts, extreme temperatures and landslides. But although earthquakes pose the largest risk in terms of the potential costs in human lives and material damages, and wildfires are the disaster that occurs most frequently, floods deserve particular attention because they are on the rise in terms of frequency and intensity.

Flooding is of particular concern owing to the impact of climate change. Of the 28 countries in Europe and Central Asia covered by the World Bank in its 2009 study, *Adapting to Climate Change in Eastern and Central Europe*, the country comes fourth in the occurrence of climate-related natural disasters in the 1990-2008 period. And although climate-change research forecasts a rise

in temperatures and 4 percent decrease in precipitation over the coming decade, the number of extreme weather events is expected to surge, bringing with them a heightened risk of flooding.

Flood response and impact

The Government responded to the floods in early 2015 with the immediate deployment of personnel and equipment to affected areas. Among the institutions participating in the response were the National Directorate for Protection and Rescue, the Army, municipal public enterprises, the police and firefighters. They were supported by technical staff from relevant ministries. Significant support was provided by the Macedonian Red Cross, which delivered emergency supplies and evacuated endangered families to designated shelters (schools, dormitories).

In the flood aftermath, the Government commissioned a Rapid Damage and Needs Assessment (RDNA), with the aim to assess the full impact of the disaster on the country and, on the basis of the findings, to produce a feasible and sustainable Recovery Strategy for mobilizing financial and technical resources. The RDNA was coordinated by the Ministry of Agriculture, Forestry and Water Economy, in cooperation with experts from the World Bank.

The initial impact assessment estimated the total cost of the spring 2015 floods at EUR 35,691,672 (Table 1). Of this total, 62 percent was classified as damages and 38 percent as losses.

Table 1 Summary of damages and losses by sectors

Sector	Total (EUR)	Share (%)
Agriculture	13,671,655	38.3
Industry	536,459	1.5
Transport	15,276,736	42.8
Electricity	976	--
Water and sanitation	235,439	0.7
Irrigation and drainage	**4,900,680**	**13.7**
Housing	975,504	2.7
Education	94,224	0.3
Total	**35,691,673**	**100.0**

The floods caused heavy damage to water infrastructure including irrigation and drainage systems, dams as well as river regulations. According to the impact assessment, total costs to the water sector were almost EUR 5 million, or 14 percent of total damages and losses (Table 2).

Table 2 Estimated damages and losses to water infrastructure

Sector	Total (EUR)
Irrigation systems	855,945
Drainage systems	1,294,759
Dams	161,724
River regulation	2,588,252
Total	4,900,680

Damage affected 32 municipalities, and overall 26 percent of the country's drainage systems, 17 percent of irrigation systems and 3 percent of dams were damaged. The damaged water infrastructure plays crucial role in overall flood mitigation, making its repair and reconstruction a high priority for preventing future damages.

The RDNA identifies a wide range of immediate and short-, medium- and long-term investments in the water sector to repair the existing infrastructure and improve the prevention of and response to future extreme weather events. The short-term needs include cleaning of irrigation/drainage networks and riverbeds, preparation of technical documentation for future flood mitigation projects, capacity development assistance for Water Management Organization, as well as planning for improved emergency response in the event of floods. The total cost of the short-term needs is estimated at EUR 27,614,505.

With an estimated value EUR 144,100,000, the mid-term priorities include river regulation/restoration projects in sensitive areas, combining flood risk management with integrated management of river basins, improvements in the legal system for flood risk management, improving the cadaster of drainage/irrigation systems and improving monitoring for the needs of better management of future floods.

The cost of recommended long-term measures totals EUR 618,781,789, and proposed interventions include construction of new water infrastructure, implementation of additional preventive measures (e.g., forest regeneration), improving hydro-meteorological forecasting, and building systems of small reservoirs.

On the basis of the RDNA, the national authorities requested recovery funding from the EU for four components: 1) reconstruction and rehabilitation of transport infrastructure; 2) support to agriculture; 3) reconstruction and rehabilitation of the irrigation and drainage network; and 4) reconstruction and rehabilitation of affected housing. The European Commission opted to focus assistance on the transport and **water infrastructure components**, as part of a broader strategy to improve capacities for flood protection and mitigation in the most affected areas.

Support to the agriculture sector will be provided under the IPARD Programme by increasing the IPA co-financing rate from 50% to 85% for flood-affected farmers. Damages to the housing sector were judged to be limited, so the EU declined to provide assistance in this area.

This project focuses on the **reconstruction and rehabilitation of priority water and flood control infrastructure,** mainly irrigation and drainage systems, river regulations and dams. A complementary parallel EU funded project will cover transport infrastructure (roads and bridges).

II. STRATEGY

The project strategy builds upon the RDNA exercise carried out in February-March 2015 by an Inter-sectoral Working Group composed of representatives of relevant national institutions and experts from different areas supported by a team of experts from the World Bank.

The RDNA assesses damages to water infrastructure and provides recommendations for short, medium and long-term measures. The long-term measures – for example, the development and implementation of comprehensive river basin management plans, flood hazard and risk mapping, and early warning systems – are complex and time-consuming, so they will be addressed through separate future programmes with longer lifespans. Current EU assistance, by contrast, will focus on a selected set of priority short- and mid-term interventions defined in the RDNA.

The project will support the implementation of priority flood risk mitigation measures in some of the country's most affected areas/river basins. The measures will be combined to optimize benefits for the population and the environment. Specific measures will include but not be limited to: a) enhancing discharge capacities of river channels at critical sections; c) improving the status of existing drainage canals; and c) reconstruction and better management of dams/reservoirs.

The project will target priority damaged water infrastructure in six locations in the country's East, West, Southeast and Pelagonija regions (Figure 1), with an emphasis on: a) rehabilitation of existing regulated riverbeds and drainage systems in the Crna Reka (Pelagonija) and Strumica River Basins; b) the reconstruction and better management of four priority dams: Mavrovica, Slatina, Drenska Reka and Lipa.

A post-RDNA prioritization/project selection process has been conducted by an inter-sectoral government working group composed of representatives of all key sectors with in-depth understating of the functions and status of the affected infrastructure (e.g., managers of the branches of the water management organization and senior water advisors). The list of proposed projects was then approved by the Government for possible funding under the EU Flood Recovery Programme. This provided the basis for preparatory activities already taken by the responsible national authorities (e.g., preparation of design documentation for the selected projects, initiation of permitting procedures).

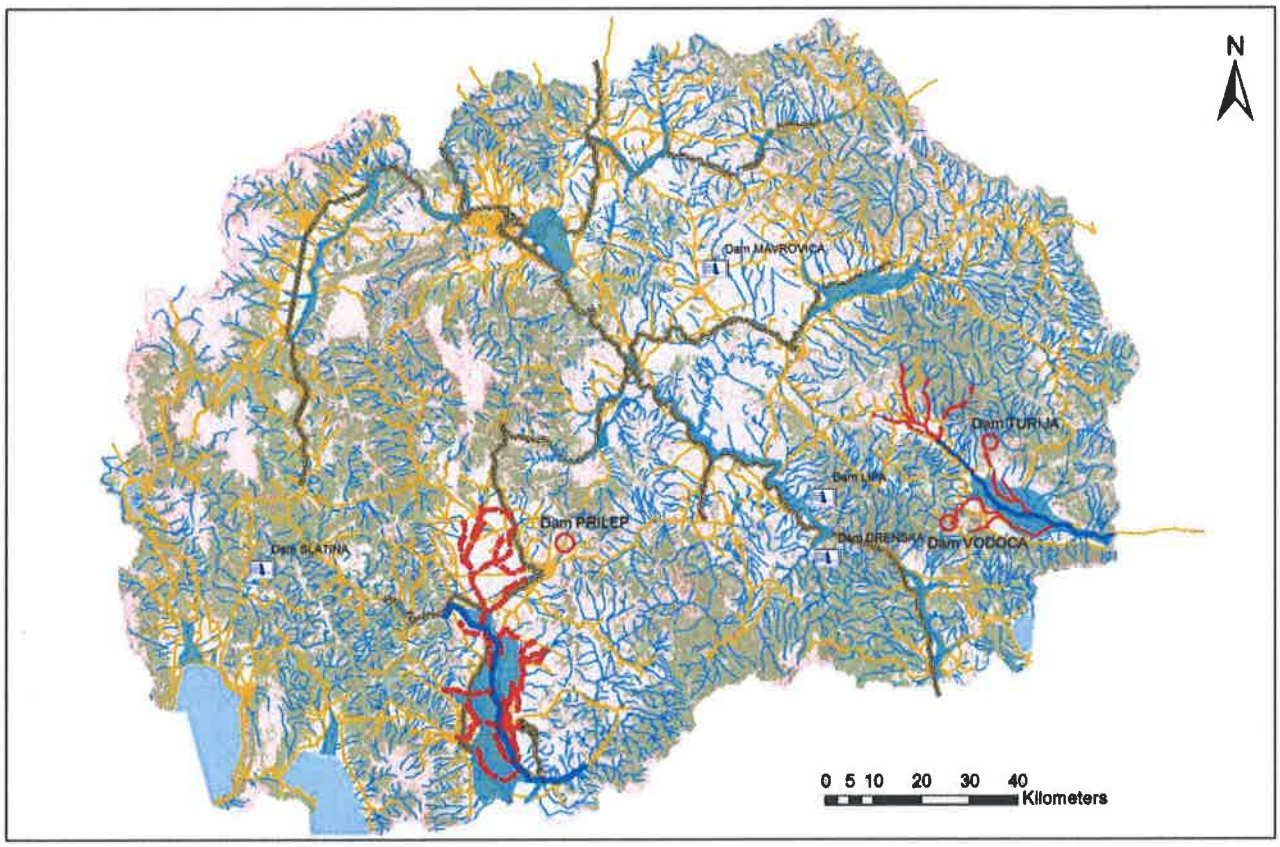


Figure 1: Geographic location of the proposed projects

The relevance of the proposed specific rehabilitation projects has been further validated by UNDP by applying additional criteria, including: a) the size of the affected population; b) access to other funding sources (all rehabilitation projects that are funded or likely to be funded from other sources, such as national and local government budgets, were not selected for funding under the EU recovery programme); c) the complexity of rehabilitation projects (the projects that are considered more complex were prioritized for EU financial and technical assistance); d) the urgency of reconstruction needs (the most urgent rehabilitation projects were already started with government funding in order not to wait for approval of the EU recovery programme); e) and availability of EU funding for water infrastructure projects.

The majority of proposed project interventions focuses on rehabilitation of drainage systems and riverbed regulations (see Table 2). The remaining interventions focus on reconstruction of four existing priority dams. The inclusion of rehabilitation projects for dams, despite their limited contribution in the overall estimated damages from the 2015 floods, stems from the following

factors: a) dam rehabilitation projects are usually more complex and therefore are considered more suitable for EU financial and UNDP technical assistance; b) they have a primary flood control role in comparison with other mechanisms; c) improvement of dam operations provides an excellent opportunity to enhance their flood mitigation potential; d) EU/UNDP-backed rehabilitation of dams based on the "build back better" approach provides an opportunity to create models with replication potential at national level; d) a large number of other potential rehabilitation projects (e.g., for drainage systems and riverbeds in other parts of the country) are already underway because of their urgency (e.g., as preparation for the anticipated rainy period). The rehabilitation of irrigation networks is also less in the focus of the project because most of them were reconstructed earlier due to the need to have them functional in the period when farmers require water for their crops.

The overall effort will comprise a series of structural and non-structural measures aiming at reducing the flood risk both by influencing hazards (e.g., by introducing water retention options, increasing discharge capacities at critical sections, and promoting better operation and maintenance of existing flood control structures) and limiting future damages (e.g., by emergency planning, forecasts and early warning). Co-financing of this component in terms of technical studies for flood risk assessment will be provided by ongoing parallel UNDP projects (Strumica and Crna Reka River Basins, Emergency Floods Coordination Support).

Besides reconstruction works, the project will also include support to relevant authorities in applying models for improved management of the repaired structures, maximizing their future use in flood control. The recovery efforts will be coupled with updated hydrological/hydraulic and water use analyses and study of recent changes in the management priorities vis-à-vis the competing purposes of the existing dams. Finally, for all priority dams, optimization models will be developed to support adjustment of their operating regimes for better flood control, while at the same time fulfilling other socio-economic purposes (e.g., water supply, irrigation and power generation). Since most of the dams are built as multi-purpose systems, their reconstruction will restore and/or upgrade additional services such as irrigation, water supply and power generation.

Comprehensive modelling efforts and feasibility assessment of flood risk mitigation have been completed recently for the River Basins of the Crna Reka and Strumica Rivers, supported by UNDP's complementary *Emergency Floods Coordination Support* and *Restoration of the Strumica River Basin* projects. These studies generated and evaluated alternative flood risk mitigation scenarios by combining various structural and non-structural measures, based on a set of space-oriented economic damage simulations. Pursuant with the latest trends in flood risk and river basin management, the modelling work helped assess the relative contribution of various solutions to reducing flooding risks (including ecosystem-based ones, such as use of retention areas, floodplain management, improvement of the basin's structure to stabilize the hydrological regime, and river restoration). Such a hierarchy of management options, coupled with the assessment of possibilities for mitigating flood risks by improving the operation of existing water/flood control structures, helps to identify the most environmentally acceptable solutions. Proposed priority interventions based on these parallel studies are included in the project.

The subsequent engineering designs for the priority interventions takes into account the application of more environmentally-friendly approaches at basin-scale (e.g. river basin management that will help improve hydrological regimes by storing water in landscape during wet periods and later using it for irrigation and maintaining basic ecosystem services), bio-engineering techniques for riverbed/riverbanks stabilization, removal of deposited waste material which reduced discharge capacities or riverbeds, in line with the requirements of the EU Water Framework and Floods Directives.

Overall effects of the project will be further complemented/upgraded by integrating early warning systems (to be supported by the parallel UNDP project in Crna Reka and Strumica River Basins).

This would require linking the dam/reservoir operation with meteorological/hydrological forecast data to be provided by the Hydro-meteorological Service (HMS). In practice this would mean increasing discharges from reservoirs when anticipating heavier rainfall and/or snowmelt so as to increase their capacity to absorb more water and help better protect downstream communities and assets. Such an approach will enable better use of existing structures, lessening the need of additional expensive engineering solutions for those areas which can be effectively protected.

Adequate and up-to-date technical documentation is a precondition for initiating infrastructure projects. The technical documentation is available for three out of four proposed dam (re)construction projects (Mavrovica, Drenska and Lipa dams), commissioned earlier by the Government through the Ministry of Agriculture, Forestry and Water Economy in recognition of their urgency. The technical documentation for the Slatina dam will be supported by the project.

The preparation of the detailed technical documentation for the drainage network and riverbed regulation/restoration works is anticipated for the project's earliest stages. This documentation will be based on the specific proposed measures of the recently completed UNDP-backed feasibility studies for flood risk mitigation options for the Crna Reka and Strumica River Basins, both aligned with the requirements of the EU Floods Directive.

In the months preceding the start of the project, UNDP-led assessment of the prioritized projects with existing technical documentation (Mavrovica, Drenska Reka and Lipa dams) has been conducted in close cooperation with the key stakeholders at national and local levels. This assessment validated the relevance and benefits of the proposed projects vis-à-vis national flood recovery priorities and also verified the existing engineering designs.

The engineering designs have been evaluated against a number of critical parameters:

a) Are the causes of the damages adequately studied and included in the recovery projects?

b) Will the reconstructed infrastructure have any influence on future flood occurrence?

c) Are the main design/construction standards adequately applied?

d) Do the design process and documents adhere to national regulations for construction projects?

Detailed descriptions for each of the proposed projects (Project IDs) are included in Annex I. The Project ID contains information on the type and priority of the project, the affected population, the estimated investment value, the maturity of technical documentation, the status of required permits, co-funding availability, the exposure of the relevant locality to flood risk, as well as the socio-economic aspects, including the benefits of the projects for the communities and the country.

The overall conclusion is that the existing technical documentation meets these criteria and can serve as the basis for immediate implementation of the necessary recovery works. The causes of the damages have been well analyzed given limited availability of meteorological and hydrological data. As a safeguard against future damages, additional analyses will be conducted as part of the project in parallel to the construction works. Possible additional interventions may include off-site measures on nearby sources of sediment affecting the infrastructure (e.g., erosion prone areas, smaller torrents), and additional water control structures.

The overall programme will not only have a very positive impact in the areas affected by the floods, but will also increase the resilience of the water sector as a whole, and will contribute to better understanding of the main principles of risk mitigation among the relevant stakeholders.

UNDP will make every effort to create added value and increase the efficiency and effectiveness of all planned interventions by making synergies with other relevant ongoing interventions with the goal of supporting the advancement of the EU agenda in the country related in particular to

the EU Floods and Water Framework Directives. Particular emphasis will be placed on projects focusing on the preparation of technical studies for flood risk assessments for the Strumica and Crna Reka River Basins and on the introduction of an early warning system. Of specific relevance is that UNDP has supported the preparation of multi-hazard and multi-risk assessment for all municipalities in the country in partnership with the Crisis Management Centre. These assessments provide information and data on identified risk, exposed infrastructure and people, and coping capacity for each municipality and will be utilized to further ensure the that the "building back better" principle is embedded in all its projects.

Given that the floods recovery project is the first of its kind in the country to incorporate the main principles of disaster risk management, its successful implementation could establish a model for such integrated approach in construction and rehabilitation of water infrastructure.

Sustainability aspects

The sustainability of the recovery efforts would have a critical role not only ensuring the longevity of infrastructure's functionality, but also in mitigating the risk of future flooding. The sustainability principles are embodied throughout the entire lifespan of the intervention, from design to commissioning and future maintenance and operation.

The designs of recovered infrastructure will help minimize its vulnerability by applying better design standards and due consideration of the causes of damages (including conveyance capacities of infrastructure, effects of erosion processes and landslides and similar). Multi-level assurance of quality of designs will be introduced to ensure improved resilience of recovered infrastructure (reviews by independent reviewers and experts, verification during commissioning procedures, and requests for compliance with international design standards).

There is a clear responsibility for the future maintenance of the recovered infrastructure between the respective branches of the Water Management Organization. Considering the critical importance of the infrastructure for the normal functioning of entire socio-economic activity in the affected regions, the responsible institution will allocate budgets for its regular maintenance and any future contingencies. One advantage is that the recovered infrastructure will require lower maintenance interventions and costs, because of better design and quality of execution.

The entire Action is designed to enable significant stakeholder participation and promote awareness on the benefits and maintenance needs of the recovered infrastructure. This is considered an important element of the social sustainability of all results.

III. PROJECT OBJECTIVES, INTENDED OUTPUTS AND ACTIVITIES

Impact/Overall Goal of the Project

Priority existing water infrastructure is improved and better operated to maximize resilience to future floods and mitigate flooding risk in priority sensitive regions of the country

Project Outcome

The country and its citizens benefit from the reconstructed infrastructure, its increased resilience to floods and improved floods mitigation potential

Output 1

Priority damaged water / flood control infrastructure is reconstructed and improved thus reducing the likelihood and/or the impact of future floods in the affected areas

The project inputs (e.g., funds, expertise) will be transformed into long-lasting replicable results through carefully planned activities. This output would include the adjustment of the existing and completion of the remaining necessary technical documentation for the priority projects in line with the "build back better" approach followed by the physical execution of the priority recovery works.

Mature recovery projects aligned with the enhanced resilience requirements will be initiated earlier in parallel with complementary analyses of additional potential measures addressing the causes of the damages and increasing flood mitigation potential. This applies to the three projects completed by the Government / Ministry of Agriculture, Forestry and Water Management Organization. The project will ensure that all necessary technical documentation is prepared and reviewed by qualified engineers, in accordance with the requirements of the relevant national legislation and enhanced resilience objectives. The detailed engineering designs for riverbed and drainage network rehabilitation projects in Crna Reka and Strumica River Basins to be supported with the project funds, will be aligned with the proposed measures of the UNDP-backed feasibility studies for flood risk mitigation options.

If there are any savings after the completion of the contracting procedures for the proposed projects, additional recovery projects may be considered under this project output, subject to prior approval of the Project Board. The prioritization process would be conducted through a transparent procedure by a comparative assessment of possible interventions against a set of objective criteria (including the relevance/importance of projects, the affected population, size of investment, co-funding opportunities, flood risks, maturity of project, and socio-economic and environmental aspects).

Activity 1.1. Design, technical review and permitting of selected water infrastructure projects

This activity will be implemented through a few interrelated stages, depending on the maturity of the existing technical documentation and its compliance with the "build back better" principle. These stages would include: a) further analysis of the existing mature water infrastructure projects (Mavrovica, Drenska Reka and Lipa dams) and identification of additional preventive measures; and b) development and review of engineering designs for priority technical documentation for other projects (e.g., Slatina dam, flood mitigation interventions in the Crna Reka and Strumica River Basin).

The overall project implementation schedule will be aligned with this activity, depending on the status of each project. The detailed description of the status of each project intervention is included in Annex I.

One particular advantage for an early start of physical interventions is the completed or advanced permitting procedures for the proposed projects. No delays are anticipated in this direction because of: a) simpler permitting procedures for existing structures; b) no land ownership related issues; and c) urgency of recovery needs.

The recently completed UNDP-backed studies for Crna Reka and Strumica River Basins proposed a long-list of priority flood risk mitigation options. A selected combination of these measures will be developed to the level of detailed engineering deigns, or other forms of technical documentation as required by the national regulations. Once the review and permitting procedures for these measures are completed, the necessary physical interventions will be carried out by the project.

In order to ensure complementarity with the ongoing UNDP-backed project for the Strumica River Basin, a clear division between EU and SDC-funded (Swiss Development Cooperation) interventions will be made. EU-funding will be dominantly used for the clean-up and rehabilitation of priority regulated riverbed sections of Strumica River and its main tributaries, as well as clean-up of drainage/irrigation canals. SDC funding, in the early stages of the project, will mainly focus

on completion of the planning documentation (Flood Risk Management Plan as per EU Floods Directive), followed by support for better management of existing flood control structures, including optimization modeling for the largest existing dams in the basin. Once EU funding for the Strumica River Basin is used, additional SDC finances may be allocated to further extend/upgrade clean-up and rehabilitation works in order to achieve even higher flood risk mitigation.

Since no additional funding is currently available for the Crna Reka River Basin – except the previously UNDP-backed feasibility study – all interventions in the basin will be primarily EU-funded. Besides the preparation of detailed engineering deigns, or other forms of technical documentation, the clean-up and rehabilitation works, EU funding will be used to improve management of flood control structures, including the main dams in the basin.

Activity 1.2 Supervised execution of construction works and commissioning of reconstructed/improved infrastructure

This activity encompasses all the necessary repair/construction works which will be distributed across the project lifespan depending on the degree of maturity of the projects and the time needed to complete documentation and permitting procedures.

The selection of the construction contractors for the proposed infrastructure projects will be carried out in accordance with UNDP procurement procedures that will ensure transparency, competitiveness and best value for money. Tenders will be open to both national and international construction companies.

All works will be subject to multi-layer supervisory control provided by:

a) a qualified/licensed supervising engineer as per the requirements of the national legislature;
b) additional monitoring by a qualified independent engineer (water infrastructure expert) who will be hired to further strengthen UNDP's internal capacities;
c) project management staff with long-term experience from management of construction projects; and
d) professional staff from the beneficiary institutions (e.g., engineers from the Ministry of Agriculture, Forestry and Water Economy, Water Management Organization and the municipalities).

Upon finalization of the construction works and completion of the required documentation, the respective infrastructure will be commissioned and handed over to the relevant national/local authorities for future use and maintenance.

To the extent possible, a cost catalogue will be prepared in order to avoid the risk that some of the beneficiaries may over- or under-estimate the value of the project. The cost catalogue will be derived from the earlier and current Bills of Quantities (BoQs) and signed contracts, and will include the average unit costs of items that are standard for water infrastructure projects.

Based on field inspections of damaged water/flood control infrastructure and existing technical documentation (e.g., feasibility studies and engineering designs), the following types of interventions are anticipated as part of the project:

1. **Drainage network and riverbed regulation/restoration**

1.1. Crna Reka River Basin (Pelagonija)

With an average accumulated sediment deposits of 0.75 m, the riverbed of Crna Reka has a dramatically reduced conveyance capacity, which is among the key causes of the frequent

flooding of adjacent land and assets. The project anticipates cleaning the regulated sections of Crna Reka in total length of 57 km (average width of 20 m). The deposited material estimated at 855,000 m^3 will be safely removed and disposed of properly so as to avoid/minimize environmental risks.

Additional clean-up interventions will be carried out in the most critical tributaries and drainage canals of Crna Reka, in total length of 106 km (average width of 10 m). The average sediment depth of 0.15 m in the tributaries will produce approximately 159,000 m^3 excess material to be deposited safely.

The interventions in the main river channel and tributaries will be distributed across a few municipalities, as per the prioritization carried out under the UNDP-backed feasibility study for the river. The distribution of interventions by municipalities is as follows: Bitola – 15%, Prilep – 5%, Krivogashtani – 5%, Mogila – 35%, Novaci – 35% and Krushevo – 5%.

In addition, project-supported interventions will include reconstruction of damaged earth embankments along regulated sections of Crna Reka in total length of 600 m. The operating regime of the Prilep reservoir will also be improved for better flood control.

The EU funding of approximately 3,300,000 EUR would enable the implementation of the 'do minimum' scenario of the feasibility study, which would enable generating a net present value of the intervention of almost 10 million EUR for a planning horizon of 25 years. By contrast, the baseline (or 'do nothing') scenario would generate a negative net present value of over 42 million EUR. The EU-funded interventions would actually create a sound basis for upgrading the flood control measures to the 'low project' or 'low/medium' project scenarios that would further stimulate growth and achieve higher benefit/cost ratios.

1.2. Strumica River Basin

The proposed interventions in the Strumica River Basin include clean-up of regulated riverbed sections in total length of approximately 24 km. With an average width of 20 m and 0.5 m deep sediment deposits, these sections are expected to generate some 240,000 m^3 material for removal. The distribution of these sections by affected municipalities is as follows: a) Strumica – 20% (5 km); b) Bosilovo – 40% (9.5 km) and c) Novo Selo – 40% (9.5 km). Interventions will also include development of a software-based system for regulating the water volume/level in Turija and Vodoca reservoirs, as a flood mitigation measure.

All measures in the Strumica River Basin will be coordinated with the ongoing UNDP-implemented *Restoration of the Strumica River Basin* project, financed by the Swiss Agency for Development and Cooperation. With funding of over 830,000 CHF available for flood-mitigation measures, this project will further upgrade the EU-financed interventions to maximize socio-economic and environmental impacts.

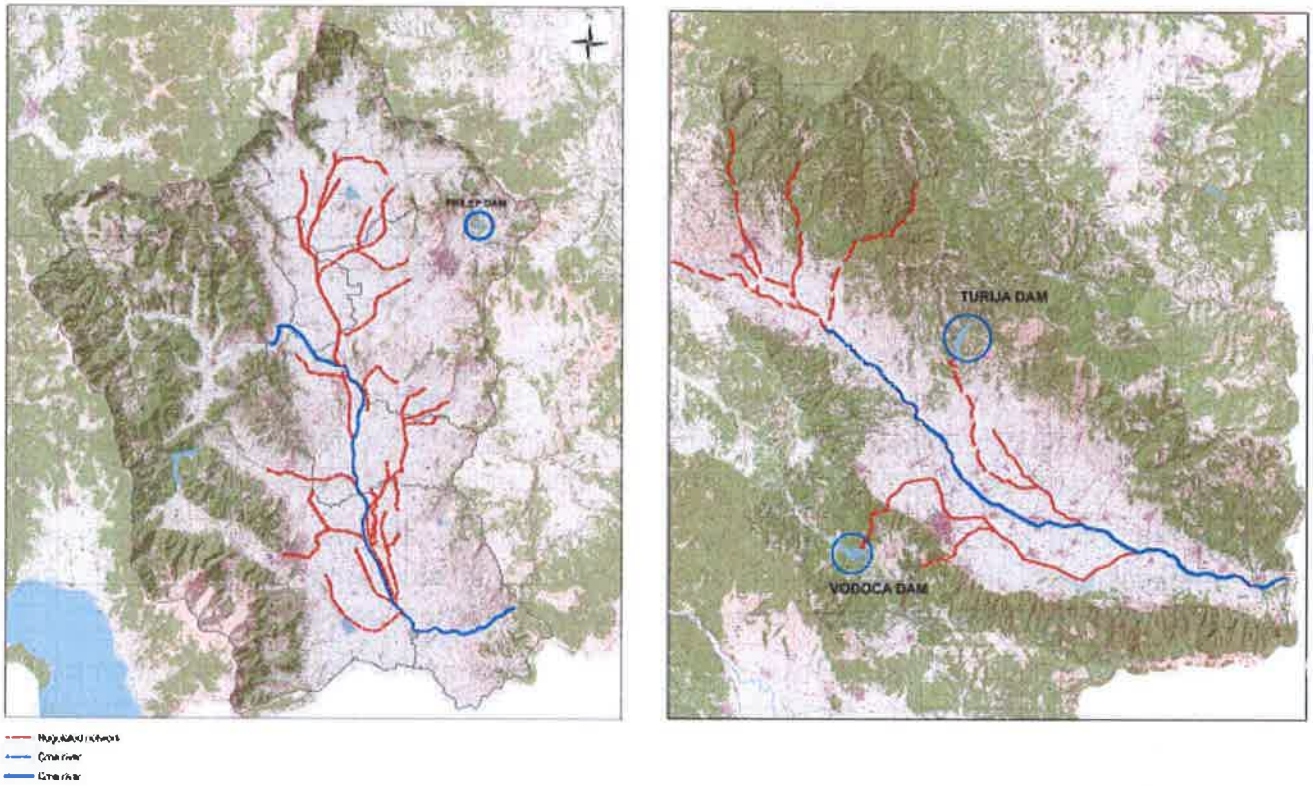


Figure 2 Priority stretches of drainage network/regulated riverbeds for clean-up in Crna Reka River Basin (left) and Strumica River Basin (right)

2. Dam rehabilitation

2.1. Slatina dam

This severely damaged dam requires major rehabilitation works that would concentrate on improvements in the body of the dam and the reconstruction of the spillway structure. This will not only improve its structural stability, but will also improve flood mitigation potential. To ensure that the dam is operated properly to maximize flood control, optimization models/software will be developed and handed over to the dam operator, followed by adequate training.

2.2. Lipa dam

The crest of this dam has faced major damage due to deficiencies in its design and poor maintenance. Approximately 200 m^3 earth material has been washed away by intensive rainfall and the river forces. Its spillway structure and sluice way (downstream outlet) have also been damaged and are dysfunctional, inhibiting better control of floods and fulfillment of other purposes.

Besides the obvious reconstruction needs in the crest, the spillway and downstream outlet of the dam, EU funding will be used for increasing dam height by an additional 70-80 cm, in line with the recent technical documentation (subject to additional quality assurance by UNDP experts and engineers). All these combined interventions will greatly enhance the flood-mitigation function and resilience of the dam in the face of meteorological and hydrological extremes.

2.3. Drenska Reka dam

The Drenska Reka dam is built on a torrential stream with significant energy of flow. Because of deficiencies in the design, including a non-regulated torrent, the dam has been damaged severely twice in the past. Its spillway structure is also damaged, as a result of which, the retention capacity/flood control function of the dam is dramatically reduced.

The EU funding will be used to improve dam stability and increase capacity of the spillway structure. It will also include regulation of the torrential stream so as to dissipate energy of the flow and sediment transport rates. This would address the main causes of damages and greatly enhance the longevity of the dam. Once rehabilitated, besides the flood mitigation function, the dam will continue securing irrigation water for the nearby farming families.

2.4. Mavrovica dam

This is one of the most critically damaged dams in the country, requiring urgent rehabilitation. As a result of poor maintenance, design deficiencies and the natural geological structure, the water infiltrates through the body and under the toe of the dam, jeopardizing its structural stability.

The necessary/designed interventions include improvement of the concrete side protection of the dam, reinforcement of the upstream side with riprap protection, additional lining in the foundation of the dam and other complex interventions. All these measures will prevent possible catastrophic damages to the dam, while its flood mitigation potential will be improved by developing and applying appropriate optimization models/software.

The management of all construction works shall abide to the following general terms and conditions of UNDP contracts:

Defect Liability

The Defects Liability Period shall be at least twelve (12) months, calculated from the date of completion of the Works stated in the Certificate of Substantial Completion issued by the Engineer.

During the Defects Liability Period, the Contractor shall finish the work, if any, outstanding at the date of the Certificate of Substantial Completion, and shall execute all such work of repair, amendment, reconstruction, rectification and making good defects, imperfections, shrinkages or other faults as may be required of the Contractor in writing by the Engineer during the Defects Liability Period and within fourteen (14) days after its expiration, as a result of an inspection made by or on behalf of the Engineer prior to expiration of the Defects Liability Period.

Upon satisfactory completion of the work outstanding on the Works, the Engineer shall within twenty eight (28) days of the expiration of the Defects Liability period issue a Certificate of Final Completion.

Liquidated Damages

If the Supplier fails to supply the specified works within the time period(s) stipulated by the Contract, UNDP shall, without prejudice to its other remedies under the contract, deduct from the Contract price, as liquidated damages, a sum equivalent to 2 percent of the delivered price of the delayed works for each week of delay until actual delivery, up to a maximum deduction of 10 percent of the delayed works Contract price. Once the maximum is reached, the UNDP may consider termination of the Contract.

Performance Security

In accordance with the UNDP Procurement rules, all contracts exceeding USD 500,000 require a performance security in an amount sufficient to protect UNDP in the case of breach of contract by the Contractor. However, UNDP may require it for contracts lower than this amount depending on the potential cost of non-performance/breach of contract, the degree of risks involved in the

performance of the work, and other factors, including but not limited to, performance history of the selected Offeror/s.

The amount of the performance security may vary, depending on the nature and complexity of the requirements, and the magnitude of the risks. However, the recommended performance security should equal at least ten (10) percent of the total contract amount.

A performance security is retained to extend sufficiently beyond the date of completion or receipt to cover defects or maintenance up to final acceptance by UNDP. In addition to the provision of a guarantee to protect against non-performance of a contract, such security may also cover warranty obligations, and any installation or commissioning requirements.

The performance security shall be returned to the Contractor within 30 days after the completion of the contract, including any warranty obligations or defects liability period as may be agreed in the contract.

Output 2

The reconstructed water / flood control infrastructure is better operated and maintained, creating national models for scaling-up

The effectiveness and sustainability of the water / flood control infrastructure largely depends on the ability of the responsible management institutions to operate and maintain it properly. The primary responsibility for the management of these structures rests within the Water Management Organization.

This output will produce the main tools (optimization models/software) for the future management of the reconstructed dams for better flood risk mitigation.

Activity 2.1 Improvement of dam management

For the priority dams whose structure and flood-control functions will be improved by the project, their operators will be provided with and trained in the use of optimization models that will be instrumental in improving flood mitigation, while at the same time fulfilling other needed functions.

The work under this activity would entail comprehensive evaluation of the existing management practices, including assessment of the system performance in satisfying multiple purposes, and analysis of possible ways of increasing reservoir efficiency for flood wave transformation through the implementation of operational rules and management policies.

Such models are already developed or under development for the Strezevo and Prilep dams (Crna Reka Basin) and Turija and Vodoca dams (Strumica River Basin), as part of UNDP-implemented projects. EU funding will be used to upgrade these models (as required) and develop new models for the other project-supported dams (Mavrovica, Lipa, Drenska Reka and Slatina).

Activity 2.2 Communications, sharing lessons learnt and public awareness-raising

The project is expected to generate considerable information and knowledge from the practical implementation of contemporary approaches to recovering damaged water/flood control infrastructure and enhancing its resilience to floods and other natural disasters. This will be shared through various national and international networks and at different events on topics related to infrastructure recovery, disaster risk reduction and flood risk management.

In addition, meetings and public presentations on these topics will be organized to promote the "build back better" principle, achievements and lessons learned as well as introduce the public to the benefits of the newly restored infrastructure and its maintenance requirements.

A systematic approach to communication and awareness-raising will be applied to mobilize stakeholders and resources and to create partnerships for the development and implementation of all recovery projects.

Lessons learnt and guidance document for integrating the "build back better" concept into the engineering designs for water infrastructure will be prepared and shared with all relevant stakeholders to support its future replication/scaling-up. The key project stakeholders will include the Ministries of Agriculture, Forestry and Water Economy, Environment and Physical Planning, Transport and Communications, the Water Management Organization, the Chambers of Commerce, the Association of Architects and Civil Engineers, and local governments.

IV. RESULTS AND RESOURCES FRAMEWORK

Intended Outcome as stated in the Country Programme Results and Resource Framework: By 2020, individuals, the private sector and state institutions base their actions on the principles of sustainable development, and communities are more resilient to disasters and environmental risks

Outcome indicators as stated in the Country Programme Results and Resources Framework, including baseline and targets: Indicator 1: Economic loss from natural hazards and disasters as a share of GDP; Baseline (2013): 2.6%; Target (2020): 2.1%

Applicable Key Result Area (from 2014 - 2017 Strategic Plan): Disaster risk reduction, preparedness, response and recovery

Partnership Strategy: UNDP will establish close collaboration and coordination with the EU Delegation and the key national stakeholders, particularly the Secretariat for European Affairs, the Ministry of Agriculture, Forestry and Water Economy, Ministry of Environment and Physical Planning, Water Management Organization, local governments and affected population in the target areas

Project title and ID (ATLAS Award ID): EU Recovery Programme for Floods – Improvement of Flood Prevention and Mitigation Response in Affected Areas

INTENDED OUTPUTS	OUTPUT TARGETS FOR (YEARS)	INDICATIVE ACTIVITIES	RESPONSIBLE PARTIES	INPUTS	
Output 1 Priority damaged water / flood control infrastructure is reconstructed and improved thus reducing the likelihood and/or the impact of future floods in the affected areas *Baseline*: 26 percent of the drainage systems, 17 percent of the irrigation systems and 3 percent of the dams were damaged in 32 municipalities. The dams of Mavrovica, Slatina, Drenska and Lipa suffered major damage during the early 2015 floods. As a result their flood control and other purposes are undermined The drainage network and regulated riverbeds in the Crna Reka and Strumica River Basins are damaged and	Targets (year 1) • The technical documentation reviewed and completed for all dam projects • Detailed technical documentation is prepared for priority flood mitigation measures for the River Basins of Crna Reka and Strumica • Permitting procedures for all reconstruction projects are completed • The reconstruction works for the Mavrovica, Drenska and Lipa dams are initiated • Priority flood mitigation measures for Crna Reka	*Activity 1.1.* Design, technical review and permitting of selected water infrastructure projects *Activity 1.2* Supervised execution of construction works and commissioning of reconstructed/improved infrastructure	UNDP Relevant ministries and local governments of selected priority municipalities, Water Management Organization	61100 - Staff Services - Operations Manager	$ 11,221.55
				61100 - Staff Services - Programme Officer	$ 17,990.67
				61100 - Staff Services - Project Manager	$ 88,637.81
				61200 - Staff Services - Procurement Associate	$ 15,302.43
				61200 - Staff Services - Programme Finance Associate	$ 8,418.05
				71400 - Staff Services - Project Associate	$ 34,108.52
				71400 - Staff Services - Monitoring Officer	$ 44,756.26
				71600 - Travel (Per Diems)	$ 4,584.95
				71600 - Travel (In-Country transportation)	$ 7,892.75
				72100 - Contractual Services-Companies	$ 6,514,499.81
				72400 - Communication Services	$ 1,500.00

poorly maintained. As a result they perform their flood mitigation function only in a very limited fashion. *Indicators*: • Total length of cleaned/restored river regulations and drainage network (improved discharge capacity): **a. Crna Reka**: *57 km of main regulated riverbed* *106 km secondary channel network and drainage canals (tributaries)* *600 m restored embankments on Crna Reka* **b. Strumica**: 24 km of main regulated riverbed • Minimum original (design) flood conveyance capacity is achieved in restored river sections/drainage canals • Minimum four reconstructed dams / reservoirs (Mavrovica, Drenska Reka, Lipa and Slatina dams) • Reduced frequency in overflowing of recovered dams (as a result of improved operating regimes)	and Sturmica River Basins are initiated Targets (year 2) • The reconstructed Mavrovica, Drenska Reka, and Lipa are commissioned • Flood mitigation measures for Crna Reka and Strumica River Basin are substantively completed Targets (year 3) • The reconstructed Slatina dam is commissioned • Flood mitigation measures for Crna Reka and Strumica River Basin are completed			74100 - Audit services	$ 30,000.00
Output 2 The reconstructed water / flood control infrastructure is better operated and maintained, creating national models for scaling-up	Targets (year 1) • Optimization modeling for four priority dams is initiated • Guidance document for incorporating the 'build	*Activity 2.1* Improvement of dam management *Activity 2.2* Communications,	UNDP Relevant ministries and local governments of selected priority municipalities,	71400 - Staff Services – Communications Officer 71600 - Travel (Per Diems) 71600 - Travel (In-Country transportation) 72100 - Contractual Services-	$ 47,953.13 $ 2,747.25 $ 2,747.25 $ 112,000.00

Baseline: The operating regimes of existing flood control structures (dams/reservoirs) do not maximize their flood mitigation potential. There is limited understanding of the 'building back better' approach and enhanced resilience objectives in reconstruction projects at national level. Indicators: • Optimization models for minimum four (4) dams/reservoirs • Guidance document for incorporating the 'build back better' principle in the reconstruction of water infrastructure projects • # of knowledge products and public awareness material	back better' principle in the reconstruction of water / flood control infrastructure projects is published • Development and promotion of appropriate communication and public awareness material Targets (year 2) • Optimization models for at least four dams are finalized • Development and promotion of appropriate communication and public awareness material Targets (year 3) • Optimization models for all dams are finalized and applied to regulate their operation • Communication and public awareness material	sharing lessons learnt and public awareness-raising	Water Management Organization	Companies 74200 – Audio Visual & Print Production $ 19,091.36

V. ANNUAL WORK PLAN

Year: 2016

EXPECTED OUTPUTS *And baseline, indicators including annual targets*	PLANNED ACTIVITIES *List activity results and associated actions*	TIMEFRAME				RESPONSIBLE PARTY	PLANNED BUDGET		
		Q1	Q2	Q3	Q4		Funding Source	Budget Description	Amount
Output 1 Priority damaged water / flood control infrastructure is reconstructed and improved thus reducing the likelihood and/or the impact of future floods in the affected areas *Baseline*: 26 percent of the drainage systems, 17 percent of the irrigation systems and 3 percent of the dams were damaged in 32 municipalities. The dams of Mavrovica, Slatina, Drenska and Lipa suffered major damage during the early 2015 floods. As a result their flood control and other functions are limited or prevented entirely. The drainage network and regulated riverbeds in the Crna Reka and Strumica River Basins are damaged and poorly maintained. As a result they perform their flood mitigation function only in a very limited fashion. *Indicators*: • Total length of cleaned/restored river regulations and drainage network (improved discharge capacity): **c. Crna Reka:** *57 km of main regulated riverbed* *106 km of secondary channel network and drainage canals (tributaries)*	1. Activity Result Design, technical review and permitting of selected water infrastructure projects Action: • Update/prepare designs, carry out technical review of technical documentation and obtain permits as needed		X	X	X	UNDP, Ministry of Agriculture, Forestry and Water Economy, Water Management Organization	EU	61100 - Staff Services - Operations Manager	$ 448.86
								61100 - Staff Services - Programme Officer	$ 719.63
								61100 - Staff Services - Project Manager	$ 3,545.51
								61200 - Staff Services - Procurement Associate	$ 612.10
								61200 - Staff Services - Programme Finance Associate	$ 336.72
								71400 - Staff Services - Project Associate	$ 1,364.34
								71400 - Staff Services - Monitoring Officer	$ 1,790.25
								71600 - Travel (Per Diems)	$ 200.00
								71600 - Travel (In-Country transportation)	$ 300.00
								72100 - Contractual Services-Companies	$ 300,000.00
	2. Activity Result Supervised execution of construction works and commissioning of reconstructed/improved infrastructure Actions: • Select construction		X	X	X	UNDP, Ministry of Agriculture, Forestry and Water Economy, Water Management Organization	EU	61100 - Staff Services - Operations Manager	$ 4039.76
								61100 - Staff Services - Operations Manager	$ 6,476.64
								61100 - Staff Services - Operations Manager	$ 31,909.61
								61200 - Staff Services - Procurement Associate	$ 5,508.87
								61200 - Staff Services -	$ 3,030.50

600 m restored embankments on Crna Reka **d. Strumica**: 24 km of main regulated riverbed • Minimum four reconstructed dams / reservoirs (Mavrovica, Drenska Reka, Lipa and Slatina dams) • Minimum original (design) flood conveyance capacity is achieved in restored river sections/drainage canals • Reduced frequency in overflowing of recovered dams (as a result of improved operating regimes) Annual Targets: • Detailed technical documentation is prepared for priority flood mitigation measures for the River Basins of Crna Reka and Strumica • The technical documentation reviewed and completed for Mavrovica, Drenska Reka and Lipa dam rehabilitation projects • The development of technical documentation for Slatina dam is underway • Permitting procedures for majority reconstruction projects are completed (except Slatina dam) • The recovery works for the Mavrovica, Drenska and Lipa dams are initiated • Priority flood mitigation measures for Crna Reka and Sturmica River Basins are initiated Related CP outcome: By 2020, individuals, the private sector and state institutions base their actions on the principles of sustainable development, and communities are	contractors and supervising engineers • Execute construction projects • Commissioning of reconstructed infrastructure							Procurement Associate 71300 – Individual Consultant Local $ 13,000.00 71400 - Staff Services - Project Associate $ 12,279.07 71400 - Staff Services - Monitoring Officer $ 16,112.25 71600 - Travel (Per Diems) $ 1,200.00 71600 - Travel (In-Country transportation) $ 2,500.00 72100 – Contractual Services Companies $ 1,666,226.19 72400 – Communication services $ 600.00

more resilient to disasters and environmental risks									
Output 2 The reconstructed water / flood control infrastructure is better operated and maintained, creating national models for scaling-up Baseline: The operating regimes of existing flood control structures (dams/reservoirs) do not maximize their flood mitigation potential. There is limited understanding of the 'building back better' approach and enhanced resilience objectives in recovery projects at national level. Indicators: • Optimization models for minimum four dams/reservoirs • Guidance document for incorporating the 'build back better' principle in the recovery of water infrastructure projects • # of Knowledge products and public awareness material Annual Targets: Optimization models for at least four dams are finalized and applied to regulate their operation *Related CP outcome:* By 2020, individuals, the private sector and state institutions base their actions on the principles of sustainable development, and communities are more resilient to disasters and environmental risks	1. Activity Result Improvement of dam management Actions ▪ Development of optimization models for dams/reservoirs ▪ Preparation of guidance documents (applying 'build back better' approach in recovery projects for water flood control infrastructure) ▪ Development and promotion of adequate communications and public awareness material		X	X	X	UNDP, Ministry of Agriculture, Forestry and Water Economy, Water Management Organization	EU	72100 - Contractual Services-Companies	$ 20,000.00
	2. Activity Result Communications, sharing lessons learnt and public awareness-raising Action ▪ Preparation of knowledge products, guidance documents and other communications material					UNDP, Ministry of Agriculture, Forestry and Water Economy, Water Management Organization	EU	71400 - Staff Services - Communications Officer	$ 19,181.25
								71600 - Travel (Per Diems)	$ 1,098.90
								71600 - Travel (In-Country transportation)	$ 1,098.90
								72100 - Contractual Services-Companies	$ 31,000.00
								74200 - Audio Visual & Print Production	$ 9,000.00
TOTAL									**$ 2,153,579.35**

Year: 2017

EXPECTED OUTPUTS *And baseline, indicators including annual targets*	PLANNED ACTIVITIES *List activity results and associated actions*	TIMEFRAME				RESPONSIBLE PARTY	PLANNED BUDGET		
		Q1	Q2	Q3	Q4		Funding Source	Budget Description	Amount
Output 1 Priority damaged water / flood control infrastructure is reconstructed and improved thus reducing the likelihood and/or the impact of future floods in the affected areas *Baseline*: 26 percent of the drainage systems, 17 percent of the irrigation systems and 3 percent of the dams were damaged in 32 municipalities. The dams of Mavrovica, Slatina, Drenska and Lipa suffered major damage during the early 2015 floods. As a result their flood control and other purposes are undermined The drainage network and regulated riverbeds in the Crna Reka and Strumica River Basins are damaged and poorly maintained. As a result they perform their flood mitigation function only in a very limited fashion. *Indicators*: • Total length of cleaned/restored river regulations and drainage network (improved discharge capacity): **a. Crna Reka**: *57 km of main regulated riverbed* *106 km of secondary channel network (tributaries) and drainage canals* *600 m restored embankments on Crna Reka* **b. Strumica**:	1. Activity Result Design, technical review and permitting of selected water infrastructure projects Action: ▪ Preparation of 'as built' designs for the reconstructed water / flood control infrastructure as needed	X	X	X		UNDP, Ministry of Agriculture, Forestry and Water Economy, Water Management Organization	EU	61100 - Staff Services - Operations Manager	$ 448.86
								61100 - Staff Services - Programme Officer	$ 719.63
								61100 - Staff Services - Project Manager	$ 3,545.51
								61200 - Staff Services - Procurement Associate	$ 612.10
								61200 - Staff Services - Programme Finance Associate	$ 336.72
								71400 - Staff Services - Project Associate	$ 1,364.34
								71400 - Staff Services - Monitoring Officer	$ 1,790.25
								71600 - Travel (Per Diems)	$ 200.00
								71600 - Travel (In-Country transportation)	$ 300.00
								72100 - Contractual Services-Companies	$ 131,000.00
	2. Activity Result Supervised execution of construction works and commissioning of reconstructed/improved infrastructure Action: ▪ Completion /	X	X	X	X	UNDP, Ministry of Agriculture, Forestry and Water Economy, Water Management Organization	EU	61100 - Staff Services - Operations Manager	$ 4,039.76
								61100 - Staff Services - Operations Manager	$ 6,476.64
								61100 - Staff Services - Operations Manager	$ 31,909.61
								61200 - Staff Services - Procurement Associate	$ 5,508.87
								61200 - Staff Services – Programme Finance	$ 3,030.50

24 km of main regulated riverbed • Minimum four reconstructed dams / reservoirs (Mavrovica, Drenska Reka, Lipa and Slatina dams) • Minimum original (design) flood conveyance capacity is achieved in restored river sections/drainage canals • Reduced frequency in overflowing of recovered dams (as a result of improved operating regimes) <u>Annual Targets:</u> • The reconstructed Mavrovica, Drenska Reka and Lipa dams are commissioned • Flood mitigation measures for Crna Reka and Strumica River Basin are nearly completed <u>Related CP outcome:</u> By 2020, individuals, the private sector and state institutions base their actions on the principles of sustainable development, and communities are more resilient to disasters and environmental risks	commissioning of the reconstructed infrastructure							Associate	
								71300 – Individual Consultants Local	$ 13,000.00
								71400 - Staff Services - Project Associate	$ 12,279.07
								71400 - Staff Services - Monitoring Officer	$ 16,112.25
								71600 - Travel (Per Diems)	$ 1,784.95
								71600 - Travel (In-Country transportation)	$ 2,392.75
								72100 - Contractual Services-Companies	$ 3,060,206.27
								72400 – Communication services	$ 600.00
Output 2 The reconstructed water / flood control infrastructure is better operated and maintained, creating national models for scaling-up Baseline: The operating regimes of existing flood control structures (dams/reservoirs) do not maximize their flood mitigation potential. There is limited understanding of the 'building back better' approach and enhanced resilience objectives in recovery projects at national level.	1. Activity Result Improvement of dam management Actions ▪ Application of optimization models for dams' operation	X	X	X	X	UNDP, Ministry of Agriculture, Forestry and Water Economy, Water Management Organization	EU	72100 - Contractual Services-Companies	$ 30,000.00
	2. Activity Result Communications, sharing lessons learnt and public					UNDP, Ministry of Agriculture,	EU	71400 - Staff Services - Communications	$ 19,181.25

Indicators: • Optimization models for minimum four dams/reservoirs • Guidance document for incorporating the 'build back better' principle in the reconstruction of water infrastructure projects • # of knowledge products and public awareness material Annual Targets: • Optimization models for at least three dams are finalized and applied to regulate their operation • Communication and public awareness material *Related CP outcome:* By 2020, individuals, the private sector and state institutions base their actions on the principles of sustainable development, and communities are more resilient to disasters and environmental risks	awareness-raising Action ▪ Communications and awareness raising activities					Forestry and Water Economy, Water Management Organization		Officer	
								71600 - Travel (Per Diems)	$ 1,098.90
								71600 - Travel (In-Country transportation)	$ 1,098.90
								72100 - Contractual Services-Companies	$ 21,000.00
								74200 - Audio Visual & Print Production	$ 7,000.00
TOTAL									$ 3,377,037.13

Year: 2018

EXPECTED OUTPUTS *And baseline, indicators including annual targets*	PLANNED ACTIVITIES *List activity results and associated actions*	TIMEFRAME				RESPONSIBLE PARTY	PLANNED BUDGET		
		Q1	Q2	Q3	Q4		Funding Source	Budget Description	Amount
Output 1 Priority damaged water / flood control infrastructure is reconstructed and improved thus reducing the likelihood and/or the impact of future floods in the affected areas *Baseline*: 26 percent of the drainage systems, 17 percent of the irrigation systems and 3 percent of the dams were damaged in 32 municipalities. The dams of Mavrovica, Slatina, Drenska and Lipa suffered major damage during the early 2015 floods. As a result their flood control and other purposes are undermined. The drainage network and regulated riverbeds in the Crna Reka and Strumica River Basins are damaged and poorly maintained. As a result they perform their flood mitigation function only in a very limited fashion. *Indicators*: • Total length of cleaned/restored river regulations and drainage network (improved discharge capacity): **a. Crna Reka**: *57 km of main regulated riverbed* *106 km of secondary channel network (tributaries) and drainage canals* *600 m restored embankments on Crna Reka* **b. Strumica**:	1. Activity Result Design, technical review and permitting of selected water infrastructure projects Action: ▪ Preparation of 'as built' designs for the reconstructed water / flood control infrastructure as needed (Slatina dam, riverbed/drainage network rehabilitation)	X	X	X		UNDP, Ministry of Agriculture, Forestry and Water Economy, Water Management Organization	EU	61100 - Staff Services - Operations Manager 61100 - Staff Services - Operations Manager 61100 - Staff Services - Operations Manager 61200 - Staff Services - Procurement Associate 61200 - Staff Services - Procurement Associate 71400 - Staff Services - Project Associate 71400 - Staff Services - Monitoring Officer 71600 - Travel (Per Diems) 71600 - Travel (In-Country transportation) 74100 - Audit services	$ 224.43 $ 359.81 $ 1,772.76 $ 306.05 $ 168.36 $ 682.17 $ 895.13 $ 200.00 $ 400.00 $ 5,000.00

24 km of main regulated riverbed • Minimum four reconstructed dams / reservoirs (Mavrovica, Drenska Reka, Lipa and Slatina dams) • Minimum original (design) flood conveyance capacity is achieved in restored river sections/drainage canals • Reduced frequency in overflowing of recovered dams (as a result of improved operating regimes) <u>Annual Targets:</u> • The reconstructed Slatina dam is commissioned • Flood mitigation measures for Crna Reka and Strumica River Basin are completed <u>Related CP outcome:</u> By 2020, individuals, the private sector and state institutions base their actions on the principles of sustainable development, and communities are more resilient to disasters and environmental risks								
	2. Activity Result Supervised execution of construction works and commissioning of reconstructed/improved infrastructure Action: ▪ Completion / commissioning of the reconstructed infrastructure (Slatina	X	X	X		UNDP, Ministry of Agriculture, Forestry and Water Economy, Water Management Organization	EU	61100 - Staff Services - Operations Manager $ 2,019.88 61100 - Staff Services - Programme Officer $ 3,238.32 61100 - Staff Services - Project Manager $ 15,954.81 61200 - Staff Services - Procurement Associate $ 2,754.44 61200 - Staff Services - Programme Finance Associate $ 1,515.25 71300 – Individual Consultants Local $ 14,000.00

	dam, riverbed/drainage network rehabilitation)							71400 - Staff Services - Project Associate	$ 6,139.53
								71400 - Staff Services - Monitoring Officer	$ 8,056.13
								71600 - Travel (Per Diems)	$ 1,000.00
								71600 - Travel (In-Country transportation)	$ 2,000.00
								72100 - Contractual Services-Companies	$ 1,357,067.35
								72400 - Communication Services	$ 300.00
								74100 - Audit services	$ 25,000.00
Output 2 The reconstructed water / flood control infrastructure is better operated and maintained, creating national models for scaling-up Baseline: The operating regimes of existing flood control structures (dams/reservoirs) do not maximize their flood mitigation potential. There is limited understanding of the 'building back better' approach and enhanced resilience objectives in recovery projects at national level. Indicators: • Optimization models for minimum four dams/reservoirs • Guidance document for incorporating the 'build back better' principle in the reconstruction of water infrastructure projects • # of knowledge products and public	1. Activity Result Improvement of dam management Actions ▪ Application of optimization models for the operation of all dams	X	X	X		UNDP, Ministry of Agriculture, Forestry and Water Economy, Water Management Organization	EU		

awareness material Annual Targets: • Optimization models for all dams are finalized and applied to regulate their operation • Communication and public awareness material *Related CP outcome:* By 2020, individuals, the private sector and state institutions base their actions on the principles of sustainable development, and communities are more resilient to disasters and environmental risks									
	2. Activity Result Communications, sharing lessons learnt and public awareness-raising Action ▪ Communications and awareness raising activities	X	X	X		UNDP, Ministry of Agriculture, Forestry and Water Economy, Water Management Organization	EU	71400 - Staff Services - Communications Officer	$ 9,590.63
								71600 - Travel (Per Diems)	$ 549.45
								71600 - Travel (In-Country transportation)	$ 549.45
								72100 - Contractual Services-Companies	$ 10,000.00
								74200 - Audio Visual & Print Production	$ 3,091.36
TOTAL									$ 1,472,835.31

VI. PROJECT BUDGET BREAKDOWN:

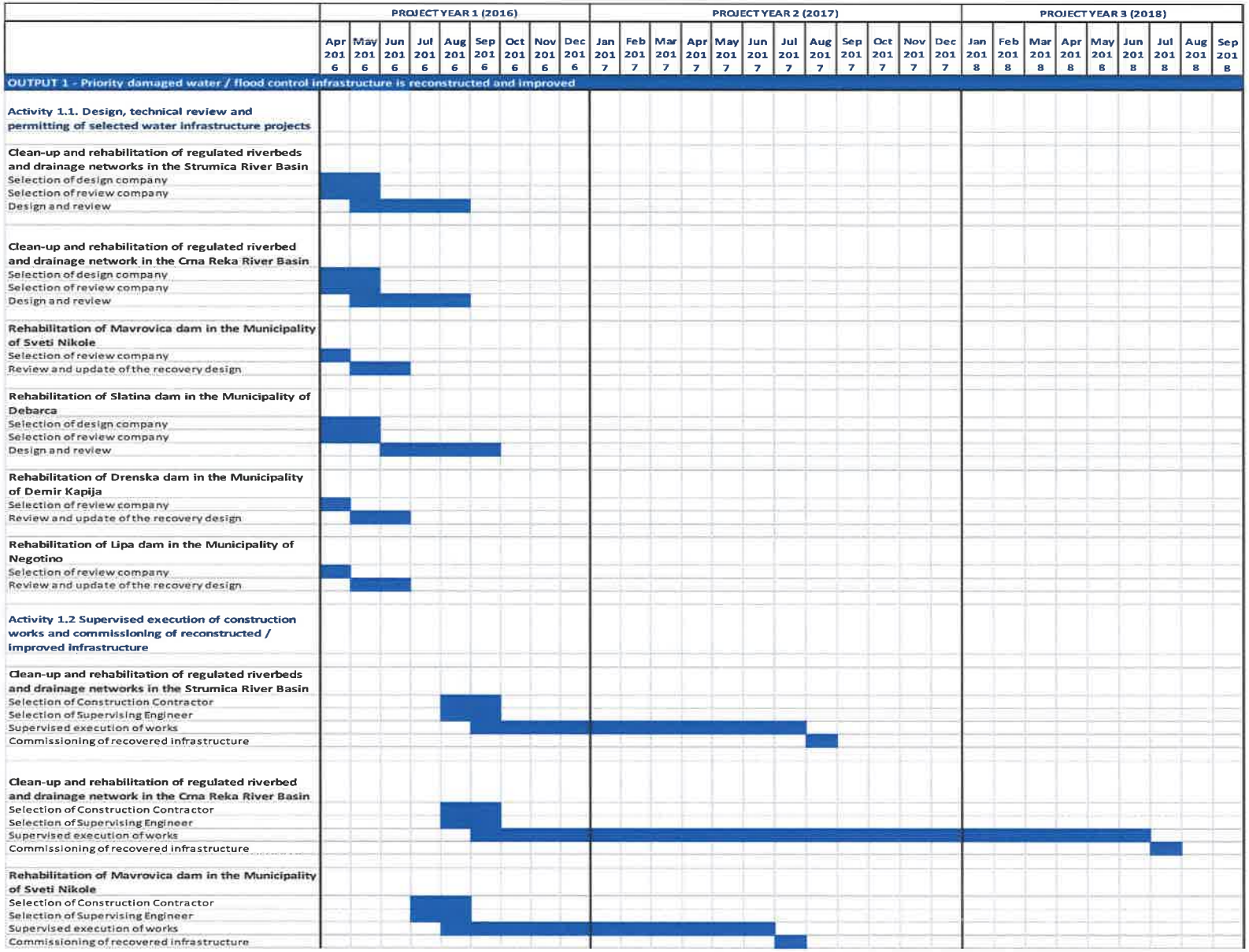
	Expected Outputs & Monitoring Activities	Key Activities	Budgetary Accounts*	Budget (USD)*
OUTCOME 1: The country and its citizens benefit from the reconstructed infrastructure, its increased resilience to floods and improved floods mitigation potential	**Output 1.** Priority damaged water / flood control infrastructure is reconstructed and improved thus reducing the likelihood and/or the impact of future floods in the affected areas	Activity 1.1. Design, technical review and permitting of selected water infrastructure projects	61100 61100 61100 61200 61200	459,643.53
		Activity 1.2 Supervised execution of construction works and commissioning of reconstructed/improved infrastructure	71400 71400 71300 71600 71600 72100 72400 74100	6,359,269.27
			Total Output 1:	**6,818,912.80**
	Output 2. The reconstructed water / flood control infrastructure is better operated and maintained, creating national models for scaling-up	Activity 2.1 Improvement of dam management	71400 71600 71600	50,000.00

		Activity 2.2 Communications, sharing lessons learnt and public awareness-raising	72100 74200	134,538.99
		Total Output 2:		**184,538.99**
		TOTAL DIRECT ELIGIBLE COST		**7,003,451,79**
		TOTAL INDIRECT ELIGIBLE COST (GMS) 7%:		**490,241.62**
			TOTAL BUDGET:	**7,493,693.41**

Budgetary Account*	Description
71200	International Consultants
71300	Local Consultants
71400	Contractual services – Individuals
71600	Travel
72115	Contractual Services – Companies (Professional Services)
72105	Contractual Services – Companies (Civil Works)
72200	Equipment and Furniture
72300	Materials & Goods
72400	Communic & Audio Visual Equip
72800	Information Technology Equipmt
74200	Audio Visual & Print Prod Co
75100	Facilities & Administrations

*Exchange rate used for conversion purposes: UN Operational rate 1 USD = 0.910 EUR

DETAILED TIMELINE OF ACTIVITIES FOR THE IMPLEMENTATION PERIOD




Rehabilitation of Slatina dam in the Municipality of Debarca
Selection of Construction Contractor
Selection of Supervising Engineer
Supervised execution of works
Commissioning of recovered infrastructure
Rehabilitation of Drenska dam in the Municipality of Demir Kapija
Selection of Construction Contractor
Selection of Supervising Engineer
Supervised execution of works
Commissioning of recovered infrastructure
Rehabilitation of Lipa reservoir dam in the Municipality of Negotino
Selection of Construction Contractor
Selection of Supervising Engineer
Supervised execution of works
Commissioning of recovered infrastructure
OUTPUT 2 - The reconstructed water / flood control infrastructure is better operated and maintained
Activity 2.1 Improvement of dam management
Selection of consulting company
Development of optimization models
Activity 2.2 Communications, sharing lessons learnt and public awareness-raising
Survey - opinion poll 1
Survey - opinion poll 2
Design of project brand book
Focus groups consultations
Design, translation and editing and production of visibility documents and promotional materials (t-shirts, umbrellas, caps, etc.)
Video and photo production
Organization of 10 special events

VII. MANAGEMENT ARRANGEMENTS

Project implementation will be governed by the Delegation Agreement which will be signed between the EU Delegation in Skopje and the UNDP Country Office in Skopje, and will be in line with UNDP's Programme and Operations Policies and Procedures.

Internally, the project will be implemented under the Direct Implementation Modality (DIM). The UNDP Country Office will be responsible for developing and managing the project, and ensuring that the project results are delivered as planned and that the project resources are used efficiently and effectively.

In the course of project implementation UNDP will maintain close collaboration and coordination with the EU Delegation and the key national stakeholders, particularly the Secretariat for European Affairs, the Ministry of Agriculture, Forestry and Water Economy, the Ministry of Environment and Physical Planning, Water Management Organization, and local governments in the affected areas.

A Project Board (PB) will be established as the main body responsible for the overall direction and management of the project. It will consist of representatives from the EU Delegation in Skopje, the UNDP Country Office, the Secretariat for European Affairs and the Ministry of Agriculture, Forestry and Water Economy.

The Project Board is the group responsible for making management decisions by consensus when guidance is required by the Project Manager, including approval of project work plans and revisions. In order to ensure UNDP's ultimate accountability, Project Board decisions are made in accordance with standards that ensure management for development results, best value for money, fairness, integrity, transparency and effective competition. In case a consensus cannot be reached within the Board, final decision shall rest with the UNDP Programme Manager (the UNDP Resident Representative) in consultation with the EU Delegation.

The Project Board approves the Annual Work Plans (AWP). It also reviews and approves quarterly project plans when required, and authorizes any major deviation from the agreed quarterly plans. The Project Board has authority to sign off on the completion of each quarterly plan and start the next quarterly plan.

In the course of project implementation Project Board assumes the following specific duties:

- Overall guidance and direction to the project;
- Review of each stage and approval of progress to the next; and
- Review and approval of work-plans and any exception plan.

At the end of the project, the PB will:

- Assure that all expected outputs have been delivered in a satisfactory manner;
- Approve the Final Project Report; and
- Approve the Lessons Learned Report.

The representatives of the Beneficiaries in the Project Board represent the interests of those who will ultimately benefit from the project. Their primary function within the Board is to ensure the realization of project results from the perspective of project beneficiaries.

Project Assurance: Project Assurance is the responsibility of each Project Board member; however the role can be delegated. The project assurance role supports the Project Board by carrying out objective and independent project oversight and monitoring functions. This role ensures that

project management milestones are met. Project Assurance has to be independent of the Project Manager; therefore, the Project Board cannot delegate any of its assurance responsibilities to the Project Manager. A UNDP Programme Officer holds the Project Assurance role on behalf of UNDP. She/he ensures that funds are made available to the project and are managed efficiently and in line with their stated purpose; ensures that the project makes progress towards intended outputs; and performs regular monitoring activities, such as periodic monitoring visits and "spot checks."

The role of UNDP Deputy Resident Representative is to ensure that: resources entrusted to UNDP are utilized appropriately; the project makes progress towards intended outputs; and national ownership, ongoing stakeholder engagement and sustainability are addressed appropriately.

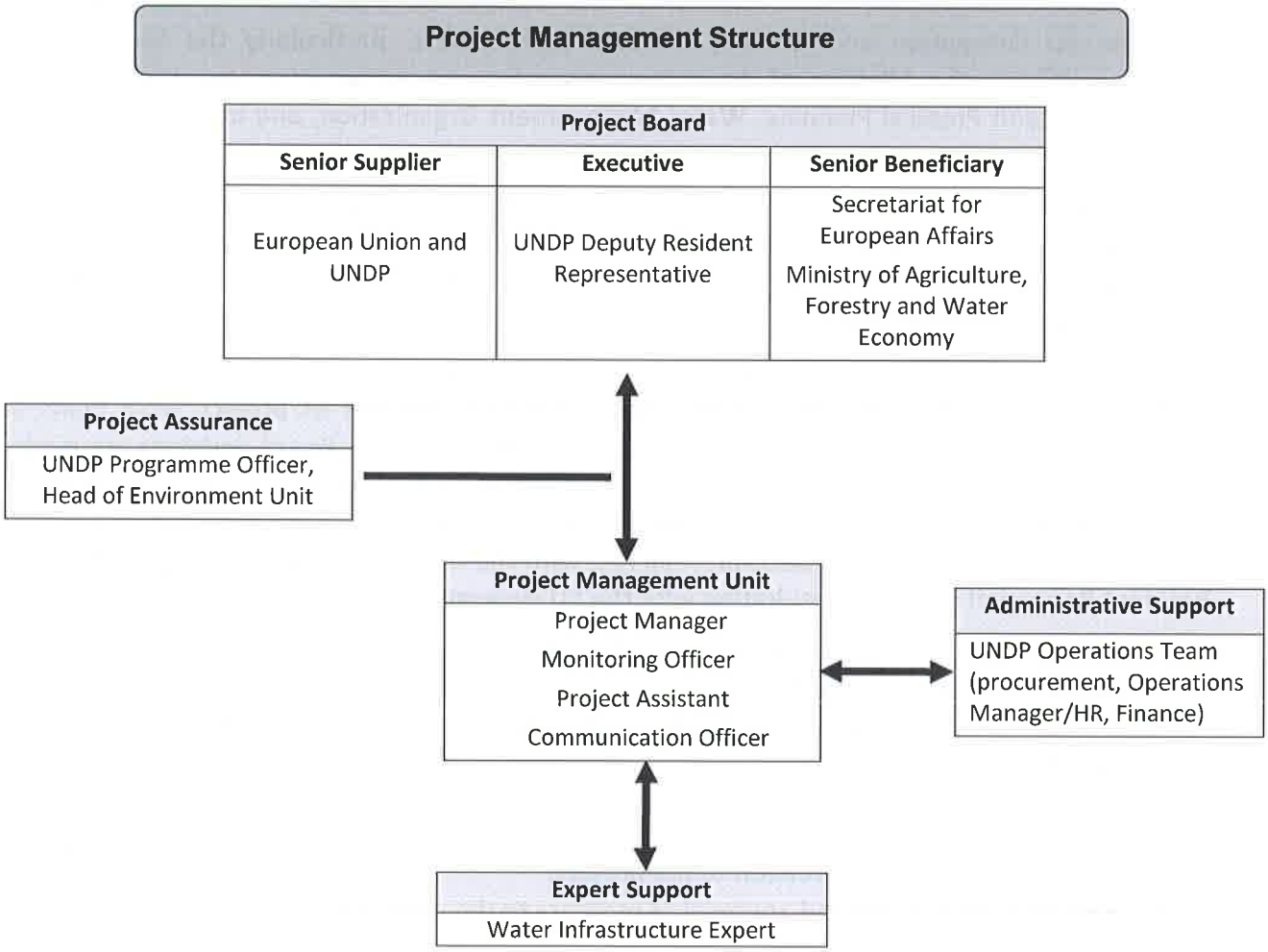


Figure 3 Project Management Structure

The Project's day-to-day implementation will be carried out by the Project team composed of a Project Manager, Monitoring Officer and a Project Assistant, supported by the Programme Officer managing the Environmental Portfolio. The Project Manager, the Monitoring Officer, the Project Assistant and the Communication Officer will also be responsible for implementation of the EU Recovery project on transport infrastructure, and the cost for their salary shall be accordingly shared between these projects (such arrangement is already reflected in the project budget). The project team will be located in UNDP Country Office premises.

Relevant members of the UNDP team will also support implementation in accordance with their area of expertise, particularly the Project Manager responsible for the Disaster Risk Reduction

projects. The Communication Officer will ensure that proper visibility of the action in line with the Joint Visibility Guidelines for EC-UN Actions in the Field.

Additional support shall be provided by national water infrastructure expert who will be hired to additionally strengthen internal construction projects implementation capacities of UNDP. S/he will advise on issues related to the technical designs, quality of works, applicable legislation, control of interim payment certificates etc.

The UNDP Operations team will provide administrative support in terms of procurement, operations management, human resources, financial management, and other required admin support.

UNDP's direct costs will be charged in line with its rules and regulations, as outlined in the project document and budget. Financial transactions and financial statements shall be subject to the internal and external auditing procedures laid down in the Regulations and Rules of UNDP.

Ownership of equipment, supplies and other properties financed from the contribution shall vest in UNDP. Matters relating to the transfer of ownership by UNDP to the national partners shall be determined in accordance with the relevant policies and procedures of UNDP.

The project will be implemented in the period of 30 months which is considered as optimal for completion of all project activities. The main consideration while deciding on the duration of the project is given to the sessional nature of construction works which cannot be executed during the winter season, as well as the fact that the execution of such works is affected by the unfavorable weather conditions.

VIII. MONITORING FRAMEWORK AND EVALUATION

The project will be monitored through the following activities.

Project start:

A Project Inception Workshop will be held within the first two months of project start with those entities which have assigned roles in the project organization structure, UNDP Country Office and other relevant stakeholders on central and local levels. The Inception Workshop is crucial to building ownership for the project results and to plan the annual work plan.

The Inception Workshop should address a number of key issues including:

a) Assist all partners to fully understand and take ownership of the project. Detail the roles, support services and complementary responsibilities of UNDP CO. Discuss the roles, functions, and responsibilities within the project's decision-making structures, including reporting and communication lines, and conflict resolution mechanisms.

b) Based on the project results framework, finalize the first annual work plan. Review and agree on the indicators, targets and their means of verification, and recheck assumptions and risks.

c) Provide a detailed overview of reporting, monitoring and evaluation (M&E) requirements. The Monitoring and Evaluation work plan should be agreed and scheduled.

d) Discuss financial reporting procedures and obligations.

e) Plan and schedule Project Board meetings. Roles and responsibilities of all project organization structures should be clarified and meetings planned. The first Project Board meeting should be held within the first 12 months following the inception workshop.

An Inception Workshop report is a key reference document and shall be prepared and shared with participants to formalize various agreements and plans decided during the meeting.

Within the annual cycle:

- On a quarterly basis, a quality assessment shall record progress towards the completion of key results, based on quality criteria and methods captured in the Quality Management (see Annex II).
- An **Issue Log** shall be activated in Atlas and updated by the Project Manager to facilitate tracking and resolution of potential problems or requests for change. The purpose of the Issue Log is to capture, categorize and track all Project Issues. A Project Issue is anything that could have an effect on the project (either detrimental or beneficial). Managing Project Issues will involve: capturing and formally logging the Project Issue; assessing the Project Issue to decide on the type and therefore what action is required; investigating the required actions; documenting the actions and confirming their completion; and reviewing the Issue Log on a regular basis to monitor progress on outstanding Project Issues.
- Based on the initial risk analysis submitted, a **Risk Log** shall be activated in Atlas and regularly updated by reviewing the external environment that may affect the project implementation. Risk can be defined as the possibility that an event will occur and affect the achievement of the project results either negatively or positively. As such, it can represent a threat or a missed opportunity. In order to contribute to a project's success, risks are identified, assessed and prioritized. Then the possible actions to deal with these risks are considered and an appropriate action plan is developed (see Annex III).
- Based on the above information recorded in Atlas, a **Project Progress Report (PPR)** shall be submitted by the Project Manager to the Project Board through Project Assurance. The purpose of Project Progress Report is to provide the Project Board (and possibly other

stakeholders) with a summary of the project status at regular intervals. The report compiles various financial and substantive data to compare project achievements with the project plans. The Project Board uses the report to monitor project progress. The Project Manager also uses it to advise the project Board of any potential problem or areas where the Board could help, by capturing information on risks and issues.

- **Project Lesson-learned Log** shall be activated and regularly updated to ensure on-going learning and adaptation within the organization, and to facilitate the preparation of the Lessons-learned Report at the end of the project. The purpose of the Lessons Learned Log is to be a repository of any insights and lessons based on good and bad experiences and behaviors. As part of a continuous improvement process, documenting lessons learned helps the project management team discover the root causes of problems that occurred and avoid those problems in later project stages or future projects. At the close of the project, key lessons learned will be extracted from the log and further elaborated in the Lessons Learned Report. The Log will be updated regularly, with any good or bad point that arises during the formulation and the implementation of the project. The lessons learned log and report will also be an integral component of UNDP's knowledge sharing efforts and can be used to inform the development of other projects, programmes and policy work.
- **Monitoring Schedule Plan** shall be activated in Atlas and updated to track key management actions/events. The purpose of the Monitoring Schedule Plan is to serve as a tracker and communication tool about key monitoring events during the project lifecycle such as: annual review, audit, monitoring visit, donor report, evaluation etc. It also contains information on the due date (when the action should take place or be completed), milestone description (description of the monitoring action); comments (text field to provide further details and update about the status and/or completion of the monitoring action); completed (check box to indicate the actual completion of the monitoring action); date completed (actual completion date of the monitoring action), and responsibility (name of the person who has entered the information in Atlas). The Monitoring Schedule Plan will be prepared at the Inception Workshop.

Annually:

- **Annual Progress Report**. An Annual Progress Report shall be prepared by the Project Manager and shared with the Project Board. The Annual Progress Report shall cover the whole year and will provide a comprehensive description of all relevant aspects of the implementation of the Action for the period covered. The Report shall provide a summary of activities carried out during the reporting period and results achieved against pre-defined annual targets at the output level, difficulties encountered and measures taken to overcome problems, eventual changes which need to be introduced, information on the implementation of the Visibility and Communication Plan, and any other information as deemed necessary to assess the progress of the project. The narrative report will be accompanied by the Annual Financial Report, and an Annual Work Plan for the upcoming year. UNDP will submit the Annual Progress Report within 60 days after the period covered by such report.
- **Annual Project Review**. Based on the above report, an annual project review shall be conducted during the fourth quarter of the year or soon after, to assess the performance of the project and appraise the Annual Work Plan (AWP) for the following year. In the last year, this review will be a final assessment. This review is driven by the Project Board and may involve other stakeholders as required. It shall focus on the extent to which progress is being made towards outputs, and that these remain aligned to appropriate outcomes.

- **Final Report**. UNDP will submit the Final Report to the EU Delegation in Skopje within six months after the end of the Implementation Period. The report will cover the entire period of implementation and shall include but limited to: summary and context of the Action, results achieved as measured by their corresponding indicators, agreed baseline and targets, and relevant data sources, and information on the implementation of the Visibility and Communication Plan. The narrative report will be accompanied by a Financial Report.

UNDP will submit any other reports as required to the EU Delegation in Skopje in line with the reporting requirements set out in the signed Delegation Agreement between UNDP and EU and its relevant Annexes.

Audit clause. Audit on project will follow UNDP Financial Regulations and Rules and applicable UNDP Audit policies.

Evaluation. Evaluation of the project (Action) shall be conducted in line with the Financial and Administrative Framework Agreement (FAFA) in place between the European Union and the United Nations, and in accordance with the provisions of the signed Delegation Agreement and its relevant Annexes.

Learning and knowledge sharing. Results from the project will be disseminated within and beyond the project intervention zone through existing information sharing networks and forums.

The project will identify and participate, as relevant and appropriate, in scientific, policy-based and/or any other networks, which may be of benefit to project implementation though lessons learned. The project will identify, analyze, and share lessons learned that might be beneficial in the design and implementation of similar future projects.

Communications and visibility. A detailed Communication and Visibility Action Plan is provided as Annex VI. The project shall comply with the "Joint Visibility Guidelines for EC-UN Actions in the Field".

IX. LEGAL CONTEXT

This project document shall be the instrument referred to as such in Article 1 of the Standard Basic Assistance Agreement between the Government and UNDP, signed on 30 October 1995.

UNDP as the Implementing Partner shall comply with the policies, procedures and practices of the United Nations safety and security management system.

UNDP agrees to undertake all reasonable efforts to ensure that none of the UNDP funds received pursuant to the Project Document are used to provide support to individuals or entities associated with terrorism and that the recipients of any amounts provided by UNDP hereunder do not appear on the list maintained by the Security Council Committee established pursuant to resolution 1267 (1999). The list can be accessed via hthttp://www.un.org/sc/committees/1267/aq_sanctions_list.shtml. This provision must be included in all sub-contracts or sub-agreements entered into under this Project Document.

The project will also comply with the Delegation Agreement signed between the EU and UNDP.

X. ANNEXES

Annex I: Description of the proposed water infrastructure projects

1. Clean-up and rehabilitation of regulated riverbeds and drainage networks in the Strumica River Basin

Municipalities: Strumica, Bosilovo, Vasilevo, Novo Selo

Statistical region: Southeast; River Basin: Strumica

Evaluation criteria	Status	Comments
Type of project / rank	**High priority**: Clean-up and rehabilitation of regulated riverbed	
Affected population	124,405	Population of Strumica River Basin District (2002 census)
Estimated investment value	€800,800	
Estimated investment breakdown by type of activity:	• Cleaning of regulated sections along Strumica river: total length – 24 km; average width – 20m; average deposit/sediment depth – 0.5m; total estimated deposits for removal – 240,000m3; Value: €770,000 • Distribution of river sections for cleaning by municipalities: o Strumica – 20% (5 km) o Bosilovo – 40% (9.5 km) o Novo Selo – 40% (9.5 km) • Preparation of detailed documentation/design for the activity – €30,800	
Possibility for (co)financing on local level	Low	Average municipal budget 2013-2015: N/A Average from budget for capital expenditures: N/A
Technical documentation	Status: Feasibility study available; detailed technical design pending	
	Quality of design: N/A	
	Permitting: N/A	
Exposure of locality to flood risk	Frequency of flooding	In January/February 2015, as a consequence of heavy rainfall rapid raising of the water level was recorded in the entire Strumica River basin. In addition, due to snow melting watercourses from Belasica Mountain were bringing additional water which due to the high level of Strumica River caused overflowing and flooding in the lower sections of the basin. At certain points sections of flood protection embankments have been damaged, causing flooding on surrounding areas. Recorded maximum water flow was 150 m^3/s, which according to historical data is the second maximum flow in February and eighth since 1961.
	% of total damage from 2015 floods	Municipalities of the Strumica River Basin are among the most affected ones in the country by the recent floods. Damages in the agriculture sector were dominant, with all Strumica river basin municipalities being affected. In addition, the transport (Novo Selo, Bosilovo, Vasilevo), sanitation (Bosilovo, Radovish) and Housing (Bosilovo) sectors were also significantly affected.
Socio-economic aspects	Indicators (data on regional level)	• Unemployment (2013): 18.8% (65% of MK average) • Average net salary (2013): €268 (78% of MK average) • GDP (2012): €710 mill (9.4% of RM total) • GDP per capita (2012): €4,102 (111% of MK average)
	Local economy	Dominant sectors: agriculture, forestry
	Expected benefits	• Reduced flood risk in the Strumica river basin • Improved resilience of the communities to future flooding

2. Clean-up and rehabilitation of regulated riverbed and drainage network in the Crna Reka River Basin

Municipalities: Bitola, Prilep, Krivogashtani, Mogila, Novaci, Krushevo

Statistical region: Pelagonija; River Basin: Crna Reka

Evaluation criteria	Status	Comments
Type of project/rank	**High priority**: Clean-up and rehabilitation of regulated riverbed and drainage network	
Affected population	232,367	Population of Pelagonija Statistical Region
Estimated investment value	€3,310,510	
Estimated investment breakdown by type of activity:	• Cleaning of regulated sections along Crna Reka: total length – 57 km; average width – 20m; average deposit/sediment depth – 0.75m; total estimated deposits for removal – 855,000m3; Value – €2,565,000 • Cleaning of regulated sections on Crna Reka tributaries: total length – 106 km; average width – 10m; average deposit/sediment depth – 0.15m; total estimated deposits for removal – 159,000m3; Value – €477,000 • Distribution of river and tributaries sections for cleaning by municipalities: Bitola – 15%; Prilep – 5%; Krivogashtani – 5%; Mogila – 35%; Novaci – 35%; Krushevo – 5% • Reconstruction of damaged embankments along regulated sections of Crna Reka: total length – 600 m; average embankment width – 25m; total estimated earth works – 15,000m3; Value – €75,000 • Replacement of equipment and development of software/system for regulating water volume/level in Prilep reservoir, as a flood mitigation measure – €100,000 • Preparation of detailed documentation/design for the activity – €93,510	
Possibility for (co)financing on local level	Low	Total municipal budget in 2015: N/A Total from budget for capital expenditures:
Technical documentation	Status: Feasibility study available; detailed technical design pending	
	Quality of design: N/A	
	Permitting: N/A	
	Frequency of flooding	In January/February 2015 the Crna Reka river basin experienced two consequent high water waves as a consequence of snow melting and continuous rainfall. Floods were recorded along the entire course of the river. Compared to historical data for the Novaci hydrological station, the 2015 water level and flowrate are the third highest since the most damaging floods in 1962 and 1979.
	% of total damage from 2015 floods	The transport sector was the most affected sector in the 2015 floods, with 42.71% of total damages and losses. Municipality of Mogila was the most affected municipality by these floods, with nearly 31% of the total damages and losses in the country. Nearly 6% of the damages and losses in Mogila is related to transport infrastructure. In addition, the municipality has suffered from important damages in the housing (6% of total), electricity, and agriculture (85% of the country total) sectors.
Socio-economic aspects	Indicators (data on regional level)	• Unemployment (2013): 22.2% (77% of MK average) • Average net salary (2013): €322 (94% of MK average) • GDP (2012): €828 mill (10.9% of RM total) • GDP per capita (2012): €3,552 (96% of MK average)
	Local economy	Dominant sectors: agriculture, services (transport, distribution, health)
	Expected benefits	• Reduced flood risk in the Crna Reka river basin • Improved resilience of the communities to future flooding

3. Rehabilitation of Mavrovica dam in the Municipality of Sveti Nikole

Municipality: Sveti Nikole; Statistical region: East

Watercourse: Mavrovica; River Basin: Bregalnica (Vardar) River

Evaluation criteria	Status	Comments
Type of project/rank	**High priority**: Rehabilitation of water reservoir	
Affected population	18,497	Population of Sveti Nikole Municipality (2002 census)
Estimated investment value	€ 262,390	
Estimated investment breakdown by type of activity:		Construction works: €250,000 Review: €4,890 Supervision: €7,500
Possibility for (co)financing on local level	Low	Average municipal budget 2013-2015: €4,647,650 Average from budget for capital expenditures: €811,000
Technical documentation	Status: Detailed technical design completed	
	Quality of design: Good	
	Permitting: N/A	
Exposure of locality to flood risk	Frequency of flooding	Based on information from a Needs Assessment Report (UNDP, WMO, ISDR, and WB), floods are the dominant hazard in the country; also flood frequency and intensity have rising tendencies. In January/February 2015 the Bregalnica river basin experienced three high water waves as a consequence of snow melting and continuous rainfall. Floods were recorded along the entire course of Bregalnica river.
	% of total damage from 2015 floods	The Municipality of Sveti Nikole is among the top 10 municipalities in the country with affected infrastructure facilities by the recent floods. The municipality has experienced significant damages and losses in the water and sanitation (13.4% of the total water sector damages in the country) and irrigation (agriculture) sectors.
Socio-economic aspects	Indicators (data on regional level)	• Unemployment (2013): 18.8% (65% of MK average) • Average net salary (2013): €268 (78% of MK average) • GDP (2012): €710 mill (9.4% of RM total) • GDP per capita (2012): €4,102 (111% of MK average)
	Local economy	Dominant sectors: agriculture, livestock, forestry
	Other	The Mavrovica reservoir, with total volume of 2.8 million m^3, is used for water supply, irrigation of 250 ha arable land, as well as flood mitigation in Sveti Nikole municipality.
	Expected benefits	• Restored and secured/continued water supply and irrigation services • Reduced flood risk potential • Increased resilience to future flooding (due to advanced design standards and applying optimization models) • Reduced operating costs for reservoir maintenance

4. Rehabilitation of Slatina reservoir dam in the Municipality of Debarca

Municipality: Debarca; Statistical region: Southwest

Watercourse: Slatinska River; River Basin: Crn Drim

Evaluation criteria	Status	Comments
Type of project/rank	**High priority**: Rehabilitation of a water reservoir	
Affected population	5,507	Population of Debarca Municipality (2002 census)
Estimated investment value	€921,087	
Estimated investment breakdown by type of activity:		Construction works: €650,000 Design: €244,475 Review: €7,112 Supervision: €19,500
Possibility for (co)financing on local level	Low	Average municipal budget 2013-2015: €1,241,500 Average from budget for capital expenditures: €386,300
Technical documentation	Status: Detailed technical design pending (to be supported by the project)	
	Quality of design: N/A	
	Permitting: N/A	
Socio-economic aspects	Indicators (data on regional level)	• Unemployment (2013): 36.7% (127% of MK average) • Average net salary (2013): €314 (91% of MK average) • GDP (2012): €612 mill (8.1% of RM total) • GDP per capita (2012): €2,772 (75% of MK average)
	Local economy	Dominant sectors: agriculture, forestry, textile industry, tourism
	Other	The Slatina reservoir, with total volume of 1.4 million m^3, is used for irrigation of 250 ha arable land in Debarca municipality. Additional flood control functions are also performed by this dam.
	Expected benefits	• Restored and secured/continued irrigation services • Reduced flood risk potential • Increased resilience to future flooding (due to advanced design standards and applying optimization models) • Reduced operating costs for reservoir maintenance

5. Rehabilitation of Drenska reservoir dam in the Municipality of Demir Kapija

Municipality: Demir Kapija; Statistical region: Vardar

Watercourse: Drenska River; River Basin: Vardar

Evaluation criteria	Status	Comments
Type of project/rank	**High Priority**: Rehabilitation of water reservoir	
Affected population	4,545	Population of Demir Kapija Municipality (2002 census)
Estimated investment value	€210,445	
Estimated investment breakdown by type of activity:		Construction works: €200,000 Review: €4,445 Supervision: €6,000
Possibility for (co)financing on local level	Low	Average municipal budget 2013-2015: €2,039,700 Average from budget for capital expenditures: €547,500
Technical documentation	Status: Detailed technical design pending / nearly completed	
	Quality of design: To be confirmed / Improved (if needed)	
	Permitting: N/A	
Exposure of locality to flood risk	Frequency of flooding	The project is located in a high flood risk hazard area. The Vardar River Basin, which is the largest in the country, accounts for 80% of the water resources and experiences the highest level of exposure to flooding. In January/ February 2015 the Vardar river basin experienced three high water waves as a consequence of the snow melting and continuous rainfall. The three waves, in addition to the impact of the Vardar river and its tributaries, occurred mainly as a consequence of the timings of peak flows in the Pchinja, Bregalnica and Crna Reka rivers.
	% of total damage from 2015 floods	The water supply (including for irrigation) and sanitation, along with transport, agriculture and housing sectors, are the most affected ones in the 2015 floods. Among these, the total damages and losses in agriculture and irrigation infrastructure represent 38% of the total damages in the country. The Municipality of Demir Kapija is among the top 10 municipalities in the country with affected infrastructure facilities by the recent floods. It is ranked as number 2 in assessed irrigation-related damages and losses. In addition, the municipality has experienced significant damages in the transport and agriculture sectors.
Socio-economic aspects	Indicators (data on regional level)	• Unemployment (2013): 29.8% (103% of MK average) • Average net salary (2013): €272 (79% of MK average) • GDP (2012): €590 mill (7.8% of RM total) • GDP per capita (2012): €3,838 (104% of MK average)
	Local economy	Dominant sectors: agriculture, fisheries, forestry, textile industry, tourism
	Other	The Drenska reservoir, with total volume of 0.2 million m^3, is used for irrigation of 50 ha arable land in Debarca, as well as for control of floods
	Expected benefits	• Restored and secured/continued irrigation services • Reduced flood risk potential • Increased resilience to future flooding (due to advanced design standards and applying optimization models) • Reduced operating costs for reservoir maintenance

6. Rehabilitation of Lipa dam in the Municipality of Negotino

Municipality: Negotino; Statistical region: Vardar

Watercourse: Lipska River; River Basin: Vardar

Evaluation criteria	Status	Comments
Type of project/rank	**High Priority**: Rehabilitation of dam/reservoir	
Affected population	19,212	Population of Negotino Municipality (2002 census)
Estimated investment value	€209,556	
Estimated investment breakdown by type of activity:		Construction works: €200,000 Review: €3,556 Supervision: €6,000
Possibility for (co)financing on local level	Medium	Average municipal budget 2012-2015: €6,625,600 Average from budget for capital expenditures: €2,145,200
Technical documentation	Status: Detailed technical design pending (nearly completed)	
	Quality of design: Good	
	Permitting: N/A	
Exposure of locality to flood risk	Frequency of flooding	The Vardar River Basin, which is the largest in the country, accounts for 80% of the water resources and experiences the highest level of exposure to flooding. In January/ February 2015 the Vardar river basin experienced three high water waves as a consequence of the snow melting and continuous rainfall. The three waves, in addition to the impact of the Vardar river and its tributaries, occurred mainly as a consequence of the timings of peak flows in the Pchinja, Bregalnica and Crna Reka rivers.
	% of total damage from 2015 floods	The water supply (including for irrigation) and sanitation, along with transport, agriculture and housing sectors, are the most affected ones in the 2015 floods. Among these, the total damages and losses in agriculture and irrigation infrastructure represent 38% of the total damages in the country. During the 2015 floods, the Municipality of Negotino has suffered significant damages and losses in the transport and irrigation and drainage sectors.
Socio-economic aspects	Indicators (data on regional level)	• Unemployment (2013): 29.8% (103% of MK average) • Average net salary (2013): €272 (79% of MK average) • GDP (2012): €590 mill (7.8% of RM total) • GDP per capita (2012): €3,838 (104% of MK average)
	Local economy	Dominant sectors: agriculture, forestry, textile industry, construction, transport, distribution, tourism
	Other	The Lipa reservoir, with total volume of 0.2 million m^3, is used for irrigation of 50 ha arable land in Negotino municipality. It also performs additional flood control function
	Expected benefits	• Restored and secured/continued irrigation services • Reduced flood risk potential • Increased resilience to future flooding (due to advanced design standards) • Reduced operating costs for reservoir maintenance

Annex II: Quality Management for Project Activity Results

OUTPUT 1: Priority damaged water / flood control infrastructure is reconstructed and improved thus reducing the likelihood and/or the impact of future floods in the affected areas		
Activity Result 1 (Atlas Activity ID)	**Improving resilience of water/flood control infrastructure**	Start Date: 01.04.2016 End Date: 30.09. 2018
Purpose	This output would include the adjustment of the existing and completion of the remaining necessary technical documentation for the priority projects in line with the "build back better" approach followed by the physical execution of the priority recovery works.	
Description	Planned actions to produce the activity result: Activity 1.1. Design, technical review and permitting of selected water infrastructure projects This activity will be implemented through a few interrelated stages, depending on the maturity of the existing technical documentation and its compliance with the "build back better" principle. These stages would include: a) further analysis of the existing mature water infrastructure projects (Mavrovica, Drenska Reka and Lipa dams) and identification of additional preventive measures; and b) development and review of engineering designs for priority technical documentation for other projects (e.g., Slatina dam, flood mitigation interventions in the Crna Reka and Strumica River Basin). The recently completed UNDP-backed studies for Crna Reka and Strumica River Basins proposed a long-list of priority flood risk mitigation options. A selected combination of these measures will be developed to the level of detailed engineering deigns, or other forms of technical documentation as required by the national regulations. Once the review and permitting procedures for these measures are completed, the necessary physical interventions will be carried out by the project. Based on the findings of these studies the measures to be supported would include: clean-up of priority sections of the riverbeds of Crna Reka and Strumica rivers and their main tributaries, clean-up of existing drainage/irrigation channels in the Crna Reka River Basin, and optimization of reservoirs' operating regimes for better flood control, etc. The optimization modelling is either completed or already underway as part of the complementary UNDP-backed projects. Activity 1.2 Supervised execution of construction works and commissioning of reconstructed/improved infrastructure This activity encompasses all the necessary repair/construction works which will be distributed across the project lifespan depending on the degree of maturity of the projects and the time needed to complete documentation and permitting procedures. The selection of the construction contractors for the proposed infrastructure projects will be carried out in accordance with UNDP procurement procedures that will ensure transparency, competitiveness and best value for money. Tenders will be open to both national and international construction companies. All works will be subject to multi-layer supervisory control provided by: a) a qualified/licensed supervising engineer as per the requirements of the national legislation; b) additional monitoring by a qualified independent engineer (water infrastructure expert) who will be hired to further strengthen UNDP's internal capacities; c) project management staff with long-term experience from management of construction projects; and d) professional staff from the beneficiary institutions (e.g., engineers from the Ministry of Agriculture, Forestry and Water Economy, Water Management Organizations and the municipalities). Upon finalization of the construction works and completion of the required documentation, the respective infrastructure will be commissioned and handed over to the relevant national/local authorities for future use and maintenance.	

	To the extent possible, a cost catalogue will be prepared in order to avoid the risk that some of the beneficiaries may over- or under-estimate the value of the project. The cost catalogue will be derived from the earlier and current Bills of Quantities (BoQs) and signed contracts, and will include the average unit costs of items that are standard for water infrastructure projects.

Quality Criteria	Quality Method	Date of Assessment
Compliance with the Bill of Quantities Compliance with the "Build Back Better" principle	The Supervising Engineer will verify that the construction works are carried out as per the Bill of Quantities, and are compliant with the respective national standards. Additional quality assurance of all works and control of interim and final payment certificates will be provided by an independent water infrastructure expert (engineer).	The quality of the works will be monitored regularly by the Supervising Engineer, the Project Manager and the Monitoring Officer. Upon completion of the works, an "As Build Design" for each of the construction project will be prepared and verified by the Supervising Engineer.

OUTPUT 2: The reconstructed water/flood control infrastructure is better operated and maintained, creating national models for scaling-up		
Activity Result 2 (Atlas Activity ID)	**Improvement of dam management**	Start Date: 01.04.2016 End Date: 30.09.2018
Purpose	The effectiveness and sustainability of the water / flood control infrastructure largely depends on the ability of the responsible management institutions to operate and maintain it properly. The primary responsibility for the management of these structures rests within the Water Management Organization. This output will produce the main tools (optimization models/software) for the future management of the reconstructed dams for better flood risk mitigation.	
Description	*Planned actions to produce the activity result.* Activity 2.1 Improvement of dam management For the priority dams whose structure and flood control functions will be improved by the project, their operators will be provided with and trained in the use of optimization models that will be instrumental in improving flood mitigation, while at the same time fulfilling other necessary functions. The work under this activity would entail comprehensive evaluation of the existing management practices, including assessment of the system performance in satisfying multiple purposes, and analysis of possible ways of increasing reservoir efficiency for flood wave transformation through the implementation of operational rules and management policies. Such models are already prepared or under development for the Strezevo and Prilep dams (Crna Reka Basin) and Turija and Vodoca dams (Strumica River Basin), as part of UNDP-implemented projects. EU funding will be used to upgrade these models (as required) and develop new models for the other project-supported dams (Mavrovica, Lipa, Drenska Reka and Slatina). Activity 2.2 Communications, sharing lessons learnt and public awareness-raising The project is expected to generate considerable information and knowledge from the practical implementation of contemporary approaches to recovering damaged water/flood control infrastructure and enhancing its resilience to floods and other natural disasters. This will be shared through various national and international networks and at different events on topics related to infrastructure recovery, disaster risk reduction and flood risk management. In addition, meetings and public presentations on these topics will be organized to promote the "build back better" principle, achievements and lessons learned as well as introduce the public to the benefits of the newly restored infrastructure and its maintenance requirements. A systematic approach to communication and awareness-raising will be applied to mobilize stakeholders and resources and to create partnerships for the development and implementation of all recovery projects. Lessons learnt and guidance document for integrating the "build back better" concept into the engineering designs for water infrastructure will be prepared and shared with all relevant stakeholders to support its future replication/scaling-up. The key project stakeholders will include the Ministries of Agriculture, Forestry and Water Economy, Environment and Physical Planning, Transport and Communications, Chambers of Commerce, the Association of Architects and Civil Engineers, and local governments.	

Quality Criteria	**Quality Method**	**Date of Assessment**
Compliance with optimization models for dams management	The independent water infrastructure expert will verify that the water management organization adopts and applies specific models developed for dam management. Survey among the key staff of the Water Management Organization	The quality of the works will be monitored regularly by the Project Manager, the Monitoring Officer, and an independent water infrastructure expert. Survey Report at the end of

		the project implementation
Satisfaction of the affected population/beneficiaries	Survey among the affected population/beneficiaries and water management organization	Survey Report at the end of the project implementation Quarterly update of the lessons Learnt Log
Understanding of the key target groups about the resilient infrastructure and floods	Surveys/Questionnaires among the key target audience	Report of the surveys at the beginning, mid and at the end of the project implementation Quarterly update of the lessons Learnt Log
Level of implementation of the Visibility and Communication Plan and results achieved	Appropriate tools for measuring the impact of the public awareness/communication activities will be used	Brief Report for the implementation of the Visibility and Communication Plan will be prepared after the first year of the project implementation and at the end of the project implementation period. Updated lessons Learnt Log at the end of the first year and at the end of the project implementation period.

ANNEX III: RISK LOG

Description	Date Identified	Type	Impact & Probability	Countermeasures / management response	Owner	Submitted, updated by	Last Update	Stat
Changes imposed by the political situation and elections at local and national level	September 2015	Political	Probability P = 3 Impact I = 4 The upcoming extraordinary Parliamentarian elections in April 2016, and the regular local elections in the first quarter of 2017 might slow down the dynamic of the project implementation and/or cause delays in issuing of permits.	UNDP will liaises with multiple stakeholders, including professionals from different institutions on central and local levels so as to ensure project implementation proceeds regardless of political conditions and election processes;	UNDP Project Manager	Programme Manager	Automatically recorded in ATLAS	
Insufficient understanding of the benefits of the build back better principle among the stakeholders	September 2015	Strategic	Probability P = 3 Impact I = 4 The general wish to complete the water infrastructure projects in a short period of time might have potentially adverse impact on the quality of works and consequently on the reputation of all involved partners (Government, EU and UNDP)	UNDP in close collaboration with the key partners will make sure that everyone recognizes and understands the need to ensure high quality of all project intervention that is based on build back better principle. This will be done through series of meetings with the key project beneficiaries and partners, as well as continuous public awareness building The project team will use the best practices and lessons learnt from other similar projects, especially the Floods Recovery project in Bosnia and	UNDP Project Manager	Programme Manager	Automatically recorded in ATLAS	

				Herzegovina The Supervision Engineers will closely monitor the implementation of the construction works and endure the expected high quality				
Prolonged procedures for issuing permits and/ or licences	September 2015	Regulatory	Probability P = 2 Impact I = 4 Delays in issuing respective permits and/or licenses may have potentially negative consequences on the effectiveness and timeliness of the interventions.	From early on the project ream will closely liaise with the key national institution responsible for issuing permits/licenses to ensure timely completion of all required procedures	UNDP Project Manager	Programme Manager	Automatically recorded in ATLAS	
Significant fluctuation of the US$/EURO exchange rate	September 2015	Financial	Probability P = 3 Impact I = 4 Significant fluctuation of the exchange rate might result in deficiency of funding thus jeopardizing the implementation of planned project interventions	UNDP will closely monitor the project budget and timely inform the EU and national partners if problems caused by fluctuation occur and have significant impact on the activities.	UNDP Project Manager	Programme Manager	Automatically recorded in ATLAS	