United Nations Development Programme

Country: fyr Macedonia

Project Document

Project Title: Restoration of Strumica River Basin – Implementation of the Strumica River basin management Plan

UNDAF 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

Expected 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

Expected Outputs: Output 1.1 Point source pollution of water bodies in the Strumica River Basin is reduced; Output 1.2 Diffuse source pollution from agricultural runoff and erosion processes is reduced; Output 1.3 Overall resilience of communities to the flooding hazard in SRB is enhanced; Output 2.1 Decentralized and adaptive basin-scale management of water resources is introduced; Output 2.2 Lessons learnt and best practices are shared and replicated at national and international level

Executing Entity: UNDP

Implementing Agencies: UNDP

The overall objective of this project is to introduce a set of comprehensive measures that will help restore Strumica River Basin's socio-ecological functions and its overall resilience against the complex pressures resulting from human activities and global changes. The project is based on the Programme of Measures of the Strumica River Basin Management Plan and the Preliminary Flood Risk Assessment conducted as part of the one year-long preparatory stage.

Aligned with the key principles of the EU Water Framework and Floods Directives and the underlying concept of Integrated Water Resources Management, this project aims at addressing the main types of pressures in the Basin (point source and diffuse pollution, as well as hydromorphological modifications), maximizing at the same time the possibilities for mitigating flooding risk.

This six-years project will not only have significant po
livelihoods by introducing better resource management p
water-related risks.

Total resources required	US$ 2,940,000
Total allocated resources:	US$ 2,940,000
Donor: Swiss Agency for Development and Cooperation	
Unfunded budget: N/A	
In-kind Contributions	

	Environment
Atlas Award ID:	00096178
Start date:	01 July 2015
End Date	30 June 2021
PAC Meeting Date	24 July 2014
Management Arrangements	Support to NIM

Agreed by (Executing Entity): Nurhan Izairi, Minister of Environment and Physical Planning

Agreed by (UNDP): Louisa Vinton, Resident Representative

I. SITUATION ANALYSIS

Main Natural Conditions and Hydrography

The Strumica River Basin (SRB) is one of the four river basin districts in Macedonia (Figure 1). Basin's area is part of a larger trans-boundary river basin comprising parts in Bulgaria and Greece which gravitates toward the Aegean Sea. The Basin includes a total area of roughly 1,484.50 km2, which accounts for app. 6% of the country's territory.

SRB is influenced by sub-Mediterranean climate from the Aegean Sea with a mixture of continental climate characterized by long dry summers with high midday temperatures, low annual amount of rainfall, increased aridity, variable pluviometric regimes and low winter temperatures.

The Basin contains a multitude of watercourses that are formed in the highest picks of mountain Plackovica (Figure 2). However, the actual beginning of Strumica River is considered to be the spring of Radoviska Reka which is on an altitude of 1,540 meters. In the Radovish valley, Radoviska Reka joins Oraovichka Reka and from that point on it is named as Stara Reka. Where Stara Reka crosses the short gorge between the Radovish and Strumica valleys, it is renamed into Strumica. Strumica River for the most part flows through the Strumica Valley where it receives a large number of torrential streams which deposit significant amount of sediments in the riverbed.

Near the village of Novo Selo Strumica flows through the valley and the Kljuchkata gorge, which is formed between the mountains Ograzden on the North and Belasica on the South, where it crosses the border with Bulgaria at an altitude of 186 masl, joining later the Struma River. The length of Strumica River on the territory of Macedonia is approximately 75 km.

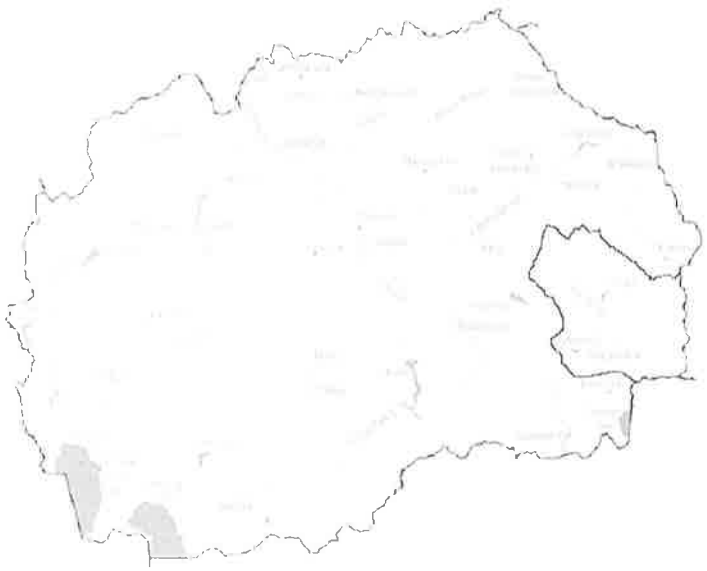


Figure 1 River Basin Districts in R. Macedonia

The average water flow of Strumica River at Novo Selo is 3.86 m3/s, where the average minimum water discharge is 0.184 m3/s and the average maximum is 76.6 m3/s. The maximum flows take place in the end of winter and beginning of spring (in February, March and April). The minimum flows occur in the months of August and September (only 0.05 m3/s). Strumica has four major confluent rivers: Oraovichka Reka, Plavaja, Turija and Vodochnica.

Past efforts to address the spatial and temporal variability of water resources in the Basin, have resulted in the construction of a system of multi-purpose reservoirs providing water mainly for irrigation and water supply, except Turija that is also used for hydropower generation. Besides the beneficial effects of the existing dams/reservoirs, they are amongst the key causes of the hydromorphological modifications of the rivers.

Major water reservoirs in the Strumica RBD are:

- Turija (1972) on Nivicanska Reka, 16 km northeast from Strumica. Its primary purpose is the irrigation of about 10,000 ha of arable land in the Strumica valley, in addition to water supply and power generation;

- Vodocha (1966) on the river Vodochica, 7 km west of Strumica. It provides drinking water supply to the Strumica city and irrigation water for roughly 3,100 ha of farmland in the Strumica valley.
- Micro reservoirs in the Strumica RBD are:
- Ilovica in the Municipality of Bosilovo;
- Drvoshka in the Municipality of Bosilovo;
- Novoselska in the Municipality of Novo Selo; and
- Markova Brana – in the Municipality of Strumica.

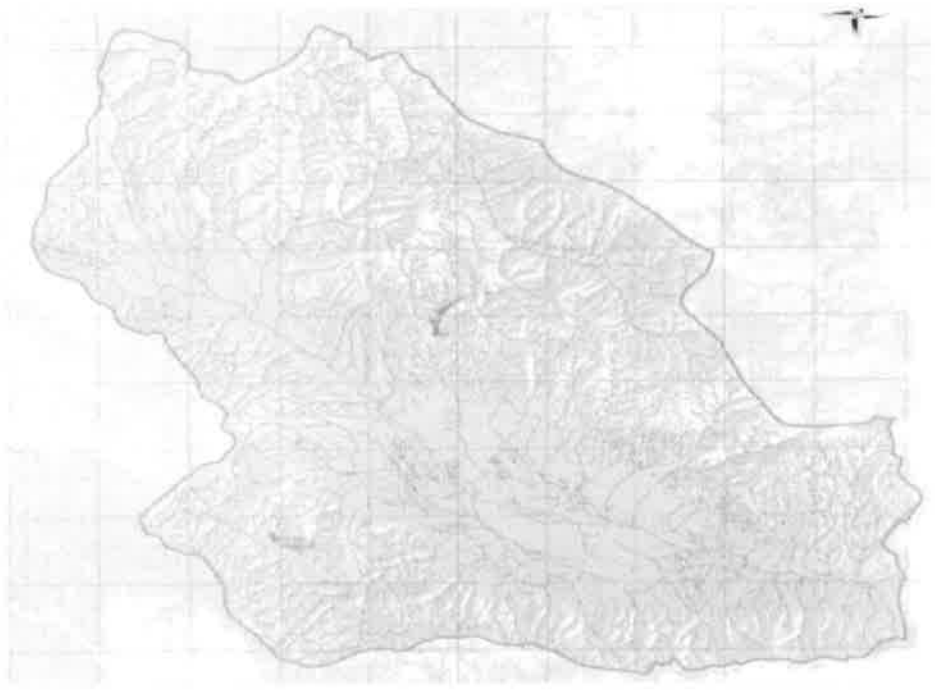


Figure 2 Hydrographic network of Strumica River Basin

Land-use

The analysis of the current land-use in the SRB is conducted on the basis of two existing official sources of information – the State Statistical Office of Macedonia (SSO) and the CORINE Land Cover (Corine LCU, 2006) (Figure 3). The total cultivated land (e.g., arable land and gardens, orchards, vineyards) covers an area of 39,885.6 ha, or 27% of the Basin. The combined use of CORINE and land-use according to SSO is very important as CORINE gives a good indication of the spatial distribution of various types of land use, while data from the SSO represent detailed information on participation of certain crops within various land-use types. Interaction of this two databases provides a solid ground for further analysis of pressures originating from agricultural activities.

The total area of agricultural land is approximately 83,209 ha. The remaining area of roughly 61,705 ha (or 42%) is land under forests (broadleaved or coniferous forests). The most dominant forest classes are broadleaved forests (40%) and transitional woodland and shrubs (19%), while among the cultivated land the most dominant classes are non-irrigated arable land (13%) and complex cultivation patterns (10%).

Arable land and gardens are the dominant land-use types. The second important land-use type is the area under vineyards. Significant part of the class of arable land and gardens is under greenhouses and plastic houses, which is in fact very intensive type of land-use, which together with vineyards and orchards are expected to impose serious pressure on water resources.

The total 'non-productive' area equals to 3,148.3 ha (or 2% of the Basin) and refers land-use classes such as road and rail network, urban areas (settlements, sport and recreational centers), industrial area as well as surface water bodies, such as natural lakes, rivers, or reservoirs.

The total area of non-cultivated land, equals to 43,324 ha or 29% of the Basin.

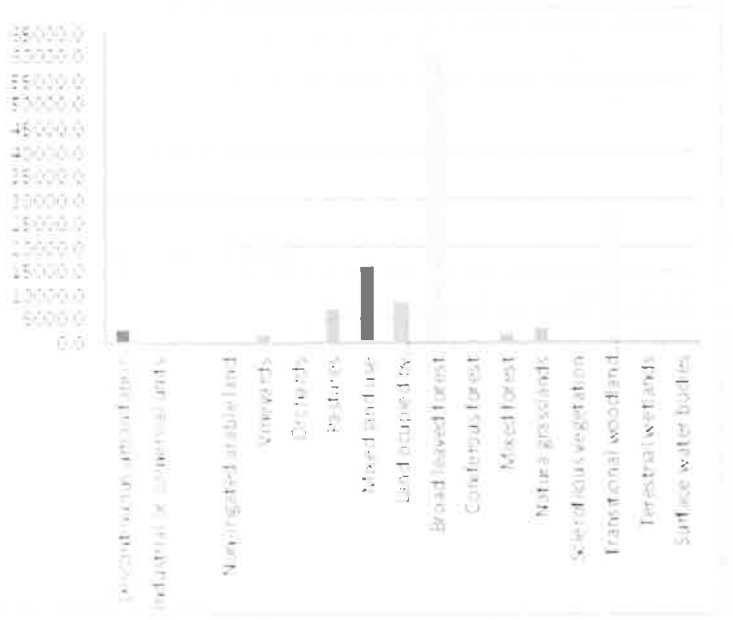


Figure 3 Main land-use classes in the SRB

Socio-economic conditions

SRB encompasses the territories of five municipalities (Radovis, Strumica, Vasilevo, Bosilovo and Novo Selo), small parts of the municipalities Valandovo and Konce, and a larger part of the mountainous area of the Municipality of Berovo (Figure 4). Furthermore, in terms of administrative division of the country, except for the municipality of Berovo, all other municipalities within the Basin's territory belong to the Southeast Region.

The total population of the SRB equals to 120,869, of which 58,162 (48%) is urban and 62,707 (52%) is rural population (Table 1). The average population density in the basin equals 63.2 inhabitants per km^2, which is slightly lower than the national average of 82.7 inhabitants per km^2.

Table 1 Population of the Strumica River Basin

Municipality	Municipal center	Urban populatiom	Rural population	Total population	% of total population
Radovis	Radovis	16,223	12,021	28,244	23%
Strumica	Strumica	35,311	20,769	56,080	45%
Vasilevo	Vasilevo	2,174	9,948	12,122	10%
Bosilovo	Bosilovo	1,698	10,759	12,457	10%
Novo Selo	Novo Selo	2,756	9,210	11,966	10%
Total		**58,162**	**62,707**	**120,869**	**100%**

The unemployment rate in the region is estimated at around 18 (17.9% for men and 19.9% for women), which is lower than the national average of 29%. The unemployment in urban areas is approximately 30.3%, and 10.6% in rural areas. The average gross salary in 2013 amounted to 24,120 MKD, which is lower than the national average of 31,025 MKD. The main economic activities in the wider Southeast region and their added value are shown in Table 2.

Table 2 Main activities in the Southeast region (2013)

Activity	Gross added value (mil MKD)	% of share in total
Agriculture, forestry, fishing	12,974	33.2%
Mining; manufacturing; energy	6,902	17.6%

Construction	2,553	6.5%
Wholesale and retail trade, transport, accommodation	6,912	17.7%
Financial services and real estate	2,889	7.4%
Other activities	6,879	17.6%
Total	**39,109**	**100%**

The Gross Domestic Product (GDP) in the South-East region in 2011 equaled 44,688 mil MKD, which is roughly 10% of the national GDP for the same year (459,789 mill MKD). The GDP per capita, in the same region in 2011 equaled 258,230 MKD, which is 15.6% higher than the national average for the same year (223,357 MKD).

Figure 4 Municipalities within SRB

1.2. Situation Analysis: description of water-related issues

Water supply

Each of the Basin's municipalities has its own public enterprise in charge of water supply and wastewater collection service that is provided to households, public institutions and businesses.

The average water supply coverage is estimated at 76%. The coverage ratio, however, varies from 96% in Radovish to 54% in Vasilevo. The average ratio of households connected to public water supply systems in rural areas is approximately 56%. Households in villages without organized public water supply service either use own wells, or in some cases small-scale, unengineered and uncontrolled water distribution systems. Overall this Basin is characterized with the lowest rate of water supply coverage in the country.

Table 3 Water supply coverage by municipalities

Municipality	Number of settlements		Settlements with public water supply system		Number of households		Households connected to public WS system		Percent of total hoseholds connected to public WS system	Percent of rural hoseholds connected to public WS system
	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural		
Strumica	1	24	1	16	10,551	5,345	10,551	2,812	84%	53%
Radovish	1	24	1	15	4,916	3,354	4,916	3,060	96%	91%
Vasilevo		18		8		3,306		1,799	54%	54%
Bosilovo		16		11		3,661		N/A		
Novo Selo		17		12		3,131		2,945	94%	94%
Total	2	99	2	62	15,467	18,797	15,467	10,616	76%	56%
	101		64		34,264		26,083			

The organized water supply systems use various sources of water, including surface water taps, constructed wells, or connections to water reservoirs. The total average water consumption in the Basin equals 100 l/capita/day. The total annual water volume distributed through the organized public water supply systems equals 4.35 mil m3. The average water price in the region equals 27.6 MKD/m3 for households and 40 MKD/m3 for institutions and businesses.

Point source pollution

Wastewater management

The coverage with wastewater management service in the Basin is limited – among the lowest in the country (Table 4). The overall ratio of households connected to public wastewater collection system for the region equals 49%, where there is a high discrepancy in coverage between urban (92% coverage) and rural areas (14% coverage). The differences between rural areas are even greater. With the exception of rural communities within the Municipality of Radovis, the percent of connections varies from 5% in Strumica, 8% in Novo Selo and practically no wastewater collection in Vasilevo and Bosilovo.

Table 4 Coverage with wastewater collection service

Municipality	Number of settlements		Settlements with public WW collection system		Number of households		Households connected to public WW system		Percent of total hoseholds connected to public WW system	Percent of rural hoseholds connected to public WW system
	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural		
Strumica	1	24	1	2	10,551	5,345	9,348	291	61%	5%
Radovish	1	24	1	7	4,916	3,354	4,916	2,157	86%	64%
Vasilevo		18		0		3,306		0	0%	0%
Bosilovo		16		0		3,661		0	0%	0%
Novo Selo		17		1		3,131		240	8%	8%
Total	2	99	2	10	15,467	18,797	14,264	2,688	49%	14%
	101		12		34,264		16,952			

Currently there is no treatment of wastewaters in the Basin. According to the EU WFD and thenational Law on Waters a total of ten settlements are required to have organized access to wastewater collection and treatment (settlements with population greater than 2,000) (Table 5). Only two of these – the municipal centers of Strumica and Radovish – have population above 15,000 each, while the remaining eight are rather small communities with 2,000 to 2,500 inhabitants.

There is an ongoing initiative by MoEPP for introducing wastewater treatment in both of Basin's municipal centers (Radovis and Strumica), planned to be financed by the EU IPA. By building adequate wastewater treatment plants for these municipal centers the ratio of population with access to wastewater treatment service will reach 40-45%. Furthermore, if the legislation requirements are fully implemented and all ten settlements with population over 2,000 are provided with wastewater treatment, the coverage ratio will not exceed 55%.

Table 5 Analysis of municipalities requiring wastewater treatment as per the EU WFD

Settl./Municipality	Strumica	Radovish	Vasilevo	Bosilovo	Novo Selo	Total
>15,000	1	1				2
10,000 - 15,000						
2,000 - 10,000	4	1	1	1	1	8
100 - 2,000	14	16	13	10	11	64
<100	6	7	4	5	5	27
Total number of settl.	25	25	18	16	17	**101**
Settl. Under WFD	**5**	**2**	**1**	**1**	**1**	**10**

Industrial pollution

Industrial and other similar operations in the Basin pose significant pressure to Basin's water bodies caused by the emissions of various pollutants from the technological processes. Industrial waste, wastewater and stormwater discharges from industrial facilities are the key contributors to the degradation of the aquatic ecosystems. Currently there are a total of 53 functional industrial operators eligible for environmental permitting as per the existing national regulations. The type of facilities (A or B) and their distribution by municipalities is presented in the following table:

Table 6 Industrial operators eligible for environmental permitting by municipality

Municipality	Operators eligible for permitting	
	Type A	Type B
Strumica	3	24
Radovish	1	16
Vasilevo	1	3
Bosilovo	1	2
Novo Selo		2
Total	**6**	**47**

According to the existing regulations, the control over the A type of operations is the mandate of MoEPP, while for B type of installations the respective municipalities are in charge of emissions control. Introducing a functional system for integrated pollution prevention and control at local level would significantly reduce the point sources of pollution.

Based on information from municipalities all industrial operations have undergone a process of obtaining environmental permit, although the progress in meeting the emission limits and other standards is largely incomplete. This is to a large extent attributed to the limited enforcement capacities. Providing capacity development support for a more effective enforcement of regulations will drive significant investments by the operators which will leverage the available financing for the protection and better management of Basin's water resources.

Diffuse pollution

Agriculture plays a dominant role in SRB in terms of securing income for households, but at the same time as a significant source of pressure to the water bodies. Dominant crops in the Basin are cereals (wheat and maize) that are grown on an area of almost 11,000 ha. Industrial crops cover app. 5,500 ha, most of which (over 98%) is which is under tobacco, mainly concentrated in the Municipality of Radovis. Vegetables are cultivated on an area of more than 8,000 ha, almost 95% of which is located in the Strumica valley (Strumica, Vasilevo, Bosilevo and Novo Selo). Fodder crops cover an area of 3,500 ha out of which almost 69% is under alfalfa. Orchards exist on only app. 550 ha, more than 50% of which are situated in municipality of Strumica. The average area under vineyards is 2,300 ha.

Irrigation water demand

The estimated demand of irrigation water in the entire Basin is app. 132,058,546 m3, as calculated by using available meteorological data, crop water demand and actual land-use structure (Table 7).

Table 7 Analysis of the irrigation water demand and total fertilizer input in the Basin

Crop	Strumica Basin Area in 2013 (ha)	Irrigation water req. mm per ha	Irrigation water req. total per crop (m3)	Total fertilizer input per catchment (t) N	P_2O_5	K_2O
Cereals						
Wheat	5,696	183.0	10,423,680	530.77	235.90	393.16
Rey	196	183.0	358,680	11.32	7.84	10.83
Barley	1,723	174.0	2,998,020	87.96	77.54	105.56
Oats	3	174.0	5,220	0.15	0.11	0.20
Maize	3,365	509.0	17,127,850	617.29	236.63	706.65
Industrial crops						
Tobacco	5,160	383.0	19,762,800	540.13	206.40	1,163.35
Sunflower	0	374.0	0	0.00	0.00	0.00
Vegetables						
Potatoes	1,059	619.7	6,563,019	104.4	41.76	177.47
Onions	169	515.8	871,771	18.93	10.14	25.35
Garlic	10	515.8	51,584	0.8	0.5	1.2
Beans	774	515.8	3,992,607	46.44	27.09	61.92
Cabbage	1,593	342.2	5,451,635	286.74	119.48	438.08
Peas/grain	207	515.8	1,067,790	9.32	5.18	12.42
Tomatoes	1,183	619.7	7,331,494	479.12	266.18	585.59
Peppers	2,005	709.3	14,220,498	732.92	333.15	932.81
Cucumbers	543	388.5	2,109,502	195.48	146.61	244.35
Melons and watermelons	1,234	410.9	5,070,675	80.1	55.53	111.06
Fodder Crops						
Clover	70	725.8	508,084	5.05	2.66	4.41
Alfalfa	2,456	725.8	17,826,477	343.84	85.96	239.46
Vetches/hay	141	725.8	1,023,426	15.63	5.21	12.37
Fodder peas- hay	85	121.5	103,317	9.52	5.16	12.90
Fodder maize	367	128.1	470,084	48.44	30.73	55.05
Fodder beet	3	112.5	3,374	0.36	0.14	0.66
Orchards						
Cherries	31.7	621.0	196,754	2.28	1.27	3.14
Sour cherries	20.3	621.0	125,918	1.22	0.71	1.82
Apricots	21.3	621.0	132,273	2.13	1.60	2.93
Quinces	17.1	621.0	105,881	0.85	0.51	0.51
Apples	109.7	621.0	681,299	13.17	7.68	19.75
Pears	31.8	621.0	197,633	3.18	1.43	2.39
Plums	226.0	621.0	1,403,201	22.60	8.47	31.07
Peaches	152.2	621.0	945,235	18.27	6.85	25.11
Walnuts	57.1	621.0	354,343	2.57	1.43	4.28
Almonds	14.4	621.0	89,424	0.58	0.36	0.86
Vineyards						
Vineyards	2,330.0	450.0	10,485,000	302.90	111.84	167.76
Total demand of water in mm and fertilizers in tons			**132,058,546**	**4,231.54**	**1,930.16**	**5,386.71**

The most significant water consumers among crops are wheat (app. 10.5 mil. m^3) and maize (app. 17.2 mil. m3). Tobacco is the most significant industrial crop in terms of consumption of water (app. 19.8 mil. m^3). The total water demand of vegetables is app. 46.7 mil. m^3, out of which the most significant consumers are cucumbers, tomatoes, cabbage, potatoes and watermelons. Although with only 3,300 ha in total, forage crops have a high demand of water which amounts to nearly 20 mil m^3, which is mainly attributed to the high demand of alfalfa. The total demand of water for irrigation of orchards is 4.2 mil. m3, and almost 10.5 mil. m^3 for viticulture.

Data from the two existing irrigation companies ('Stumicko pole' and 'Radovisko pole') show that the total volume of water supplied for irrigation in 2013 equaled 21.2 and 7.1 mil. m^3 respectively. The total irrigated area accounts for 2,080 ha for 'Strumicko pole' and 928.5 ha for 'Radovisko pole' (3,008 ha in total). Considering the average irrigation water requirements of roughly 450 mm/ha, an important inefficiency of irrigation is observed. A twofold increase of the irrigated land may be reached by using the same quantity of irrigation water, only by improving irrigation efficiency.

Moreover, having in mind the actual land-use structure and the climate conditions the majority of the crops cannot achieve economically sustainable yields without irrigation. Assuming that cereals are not

irrigated, and the rest of the cropped area is irrigated with the optimum quantities and water use efficiency, the actual water demand for the whole Basin is app. 118 mil. m3. Since both irrigation systems delivered only 28.3 mil. m3, there is a water shortage of 89.7 mil. m3, which is most likely compensated from other sources.

Fertilizer input

Cereals and vegetables consume most of the fertilizer input in the Basin. The relative consumption of the total nitrogen input (app. 4,534 t) of cereals and vegetables accounts for 1,247 t and 1,954 t respectively. Since more than 95% of vegetable and maize production is situated in Strumica, Vasilevo, Bosilevo and Novo Selo, it is to be expected that more than 90% of the total nitrogen will be applied in the Strumica valley. Other fertilizer intensive crops in the Basin include tobacco, potatoes, alfalfa and vineyards, which have a total annual demand of 1,578 t of nitrogen.

The quantities of phosphorus (2,042 t) and potassium (5,554 t) applied in SRB are also considerable, while the same crops remain the main consumers. A more detailed analysis of the fertilizers input by crops and nutrients is also provided in Table 7.

In conclusion, diffuse pollution is a significant source of stress to the Basin's water bodies. Expert analysis shows that quantities of fertilizers used, especially in the greenhouses and plastic houses, are significantly above the plant demands – a few times above the optimal thresholds. This causes progressive soil and water degradation, as well as economic losses. Nitrogen presents a serious source of pressure to groundwaters because of its mobility and leaching from soil. The loss of phosphorus from soil to water bodies is mainly through erosion processes. Inappropriate irrigation practices (especially in tobacco and maize production), besides reducing water-use efficiency, amplify the contamination of water bodies by promoting agricultural runoff and sediment transport processes.

Flood risk assessment and management

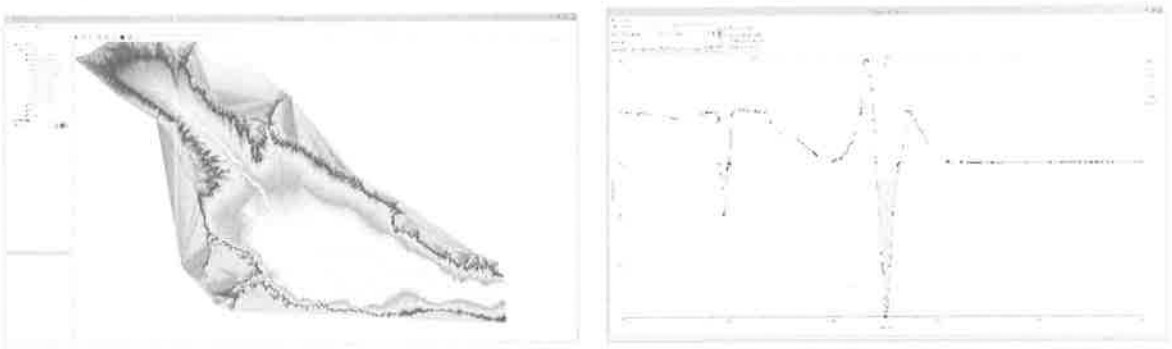
Expert studies and stakeholder surveys identify the flooding hazard as one of the main water-related challenges in SRB. The topographic and land characteristics enable rapid concentration of rainfall from the mountainous to the lower parts of the Basin. The relatively dense hydrographic network is also a major cause of the frequent occurrence of floods. A number of flood control measures (e.g., riverbed regulations) have been implemented in the past to mitigate the adverse effects of flooding.

A small number of water streams in the upper part of the Basin (the Radovish valley) are regulated along their sections in populated area. The remaining water courses are regulated only at crossings with bridges. Major sub-sections with total length of over 30 km of Strumica River are also regulated, as well as major sections of Turija (8 km), Vodochnica (15 km) and Trkanja (6 km). Moreover, nearly all water flows and torrents in the Strumica valley are regulated along the sections flowing through settlements. All regulated river channels have a design capacity for discharges with a return period of 20 to 50 years; in urban centers the design criteria is stricter (they have higher flow capacity).

The current discharge capacity of the river channels has been significantly reduced because of the poor maintenance of the regulated sections over a prolonged period of time. Expert analyses show that at certain localities the current discharge capacity is by 50% lower than originally designed and built. Of particular significance are those sites where riverbed regulations intersect with bridges (e.g. in Radovish), and sites where existing embankments (channel boundaries) are damaged.

As part of the project preparatory stage, floods were analysed in terms of their historical and possible future occurrence. For this purpose historical flow data, statistical (for watercourses where flow monitoring data exist) and empirical (for watercourses without flow measurement) methods, and characteristic potential flood waves with different return periods (risk occurrences) have been determined. Moreover, digital three-dimensional terrain models, as well as hydraulic water flow models, for the entire basin have been created (Figure 5).

Figure 5: Digital 3D terrain and hydraulic modelling example



Using these models and flood discharges, preliminary assessment/simulation of flood risks and related damages, separately for urban (Radovish and Strumica) and rural areas, have been conducted.

The assessment of flooding risk showed that the design capacity of the regulated river channels, if maintained properly, is sufficient to convey the most frequent (with return period of up to 50 years) floods in urban areas, and for the most part in rural areas. Floods with a return period of 100 more years (i.e. below 1% probability of occurrence) have the potential of causing severe adverse effects in urban areas, damages on farmland and infrastructure in rural areas.

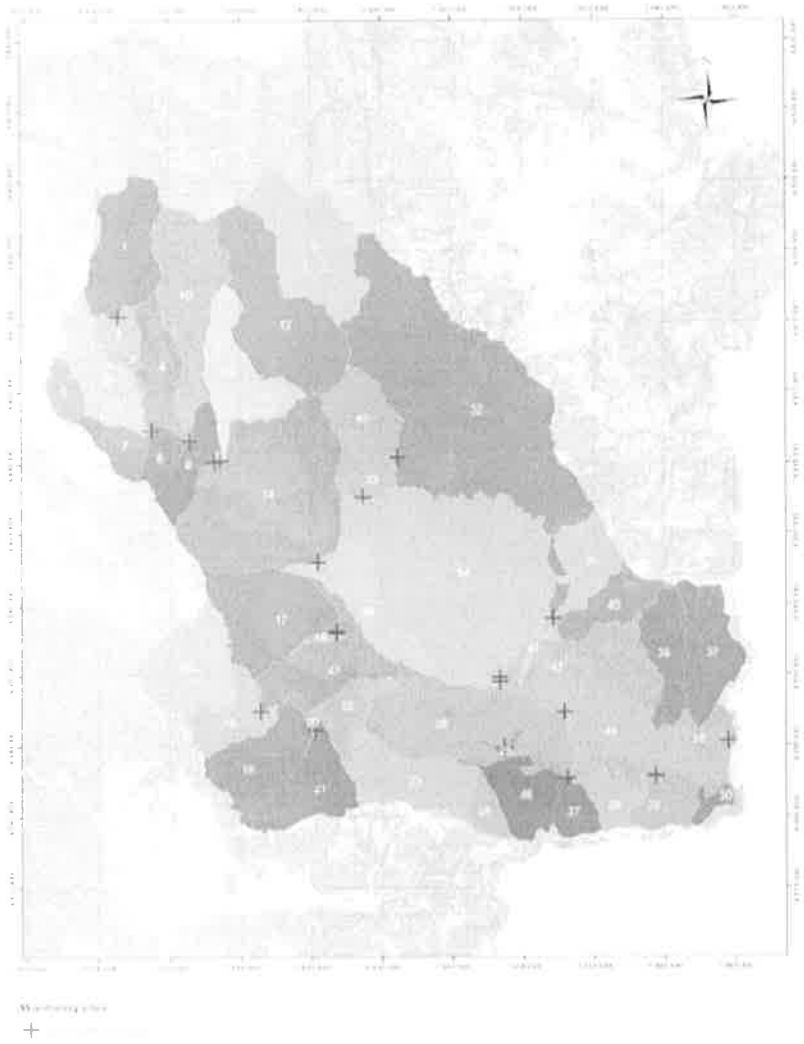
In conclusion, the existing flood control structures no longer perform their main purpose mainly because of previous poor maintenance. These systems are inadequate even for an effective protection of frequent flood events (low magnitude and high probability of occurrence). The potential for flood mitigation by the adjusting the operating regimes of existing reservoirs is not adequately used too. In addition, no alternative (non-structural) strategies/approaches and measures for mitigating the flooding risks (e.g. zoning, flood forecasting and warning, etc.), and/or 'modifying' the floods (e.g. land treatment, channel alterations, on-site flood detention, etc.), have been implemented so far. This provides the opportunity for considerable positive intervention of the project in reducing the flooding risks and enhancing the overall resilience of the Basin's communities to this considerable water-related hazard.

Monitoring system

Despite the importance of water resources for the overall Basin's development, there is severe insufficiency of monitoring and research data that are inhibiting more informed management responses to the growing pressures.

The overall understanding of hydrological, hydrochemical and hydrobiological characteristics of the Basin is very low. The number of sites for hydrological measurements (only water level in the river) is very low too. Some chemical analyses are made by Public Health Institute in Strumica (Turbidity, Nitrates/NO3, MnO_4 test, Fe, TSS, Mn, Ammonia/NH4, Cr^{6+}, Nitrites/NO_2 and Dissolved Oxygen/DO). The biological elements are measured only at one site (Novo Selo) annually or seasonally. However, none of the biological quality elements required by WFD are measured in the Basin.

Figure 6 Monitoring stations/sites on representative delineated water bodies in the Basin



Recognizing the importance of monitoring data in the course of the preparatory stage of the project a targeted monitoring programme has been designed to: a) fill-in the existing data gaps that inhibit a better understanding of the ecological status of the water bodies (support the process of characterization of the water bodies); b) start building a water quality monitoring database for the delineated water bodies; c) preliminary assessment of the presence/absence of some of the key water quality parameters, including priority substances as per the EU WFD; and d) gain valuable experience/knowledge on the main challenges that might affect the introduction of a long-term basin-scale monitoring system (organizational, financial, technical...).

The locations of the monitoring stations/points, for which a full range of EU WFD-based ecological status parameters will be analyzed as part of the basin-scale monitoring programme, is presented in Figure 6.

Conclusions/Summary of Findings

SRB is one of the country's most vulnerable river basins, characterized with significant degradation of the ecological status of water bodies and the hydrological regimes, which leads to frequent occurrence of harmful hydrological events such as floods and droughts. The main human activities contributing to the degradation processes include: agriculture, industry and urban areas/settlements.

Agriculture, the principle income generation activity of the local population, poses considerable pressures resulting from: water abstractions, use of agrochemicals (pesticides and fertilizers), regulation/canalization of rivers, as well as intensification of erosion and sediment transport processes. The cultivated farmland is the most significant consumer of available water resources, which when exported outside the Basin, create an increasingly negative water balance. The inefficient irrigation practices, does not only inhibit a more sustainable growth of agriculture, but also contribute largely to the transfer of pollutions to water bodies, by promoting agricultural runoff and sediment transport processes.

The pressures associated with industrial development in the basin involve water abstractions and release of various pollutants from the technological processes (stormwater and wastewater discharges).

Significant pressures are caused by the urbanization in the lowland areas of the basin, most important of which are: water abstraction, hydromophological modifications (river regulations and flood control measures), urban wastewater and stromwater discharges and disposal of solid waste.

The absence of regular basin-scale monitoring of the key ecosystem health parameters, coupled with the limited management capacities, prevent the introduction of a more integrated management of water resources that would help optimize social and ecological benefits.

II. STRATEGY

To address the ongoing degradation of SRB and the associated socio-economic effects a comprehensive set of measures will be implemented as part of the project. The measures, which are derived from the RBMP and PFRA prepared in the course of the project preparation stage, are combined to maximize the benefits for the environment and communities, reinforcing the overall feasibility of the project.

This six years project would support the implementation of measures with potential to: a) reduce point source pollution; b) reduce diffuse source pollution; c) address the hydromorphological modifications so as to restore, to the extent possible, ecological functions of water bodies and minimize the flooding risks.

To address the point sources of pollution the project will: a) strengthen capacities of Basin's municipalities to enforce the environmental permitting system (based on the Integrated Pollution Prevention and Control principles); b) demonstrating low-cost small-scale decentralized wastewater treatment technologies with replication potential; and c) support the efforts to mobilize additional resources from other sources by identifying the most feasible wastewater management solutions and formulating the necessary technical documentation.

Given the importance of agriculture for the socio-economic and environmental sustainability of the Basin, a comprehensive programme to introduce more sustainable farming practices will be developed and implemented. Innovative solutions to improve the access to knowledge and information on agro-ecological and Good Agricultural Practices (GAP) will be co-designed with farmers to bring about important environmental and socio-economic benefits. Direct support to farmers comprising trainings backed by grants programme will be provided to improve farming and minimize the associated diffuse pollution mainly by introducing better agrochemicals application practices and adopting more efficient irrigation practices.

The hydromorphological improvements will be addressed in such manner to maximize the opportunities for reducing the flooding risks, in line with the contemporary approaches for integrated flood risk management and disaster risk reduction (DRR). The project aims to make SRB a showcase of applying the risk-based flood management that needs to replace the traditional approaches based on purely engineering/design-based standards and ad-hoc interventions triggered by flooding events. The project will actually make SRB the national pilot basin where the principles of the EU Floods Directive will be applied.

Such an approach would provide valuable lessons for a more systemic national level integration of the principles of integrated flood risk management through the harmonization with the EU Floods Directive. The early activities in this regard, have been initiated by the project preparatory stage, and will continue throughout the project implementation stage in close cooperation with multiple stakeholders, including other interested donors and implementing agencies.

The project will also support the operationalization of a basin-scale monitoring system already designed in the course of the project preparatory stage. For this purpose a more comprehensive analysis of the available national/regional monitoring capacities will be conducted so as to identify the most cost-effective approach given the specifics of the local setting. A limited, project supported monitoring programme, will be implemented to gradually increase the knowledge about Basin's water resources, but also to document and quantify changes as a result of the implemented measures.

Besides introducing monitoring, the project will contribute greatly to introducing additional capacities for the long-term integrated river basin management, by supporting a new organizational / institutional setup

and creating cross-sectoral participatory mechanisms. Such an intervention is expected to help transform a highly centralized water management to a contemporary water governance system.

Recognizing the power of communications, stakeholder outreach and access to international best practices, the project will consistently work on promoting results, raising awareness and partaking in the international/regional networks of knowledge.

Structured in such manner, the project fully consider the principles of the contemporary integrated river basin management and integrated flood risk management approaches. These approaches are also considered as excellent entry points for introducing the principles of DRR, which is gaining on international importance, especially in light of the recently adopted Sendai Framework for Disaster Risk Reduction. The project will explore the viability of a wide range of 'no regret' measures based on the ecosystem-based disaster risk reduction (Eco-DRR) and ecosystem based adaptation (EbA) approaches that use ecosystem properties to enhance Basin's resilience to various hazards (e.g., floods) and changing climate.

Besides direct benefits for SRB, the implementation of the project would provide valuable experience and know-how on implementing WFD- and FD-based integrated river basin and flood risk management in the national context.

The implementation of this programme would be supported by a wide range of stakeholders, including Basin's municipalities and MoEPP as the main beneficiaries. Besides the local benefits, the project would have a great national importance since SRB is one of the four RBDs in the country – facing also with the most complex water-related challenges.

The broader stakeholder participation throughout the project implementation would be provided through the Strumica River Basin Management Council (RBMC). The establishment of this cross-sectoral mechanism is underway in a process led by MoEPP. Once established, RBMC would play the role of a multi-stakeholder advisory structure that will help balance the different interests and inform future river basin management decisions. RBMC will be chaired by MoEPP and will involve representatives of the main sectors governing and/or influencing water quantity and quality within the Basin. Throughout the project implementation, RBMC will provide the necessary cross-sectoral oversight of the RBMP implementation.

Given the existing legal environment, and the adopted project implementation modality (support to National Implementation Modality / NIM), the overall responsibility for the implementation of the RBMP, and consequently the success of the project would rest within MoEPP.

Toward the end of the project, a revision and an update of the Strumica River Basin Management Plan would take place, so that an adequate planning base is secured for the subsequent 6-years period. This exercise will be used to review overall project progress as well as the progress in the implementation of the RBMP.

The project would built upon the experiences from and contribute to the ongoing national processes – largest proportion of which are funded by SDC and SECO – to formulate and initiate implementation of RBMP for the country's most important river basins and sub-basins. The project would also capitalize upon the ongoing SDC-funded technical assistance to the Government in pursuing the necessary reforms of the water sector in light of the demanding character of the new regulations. By this it will provide an additional impetus for the country to move forward in meeting its obligations toward the EU accession process.

Based on the previous and ongoing positive experience from the implementation of the project preparatory stage, the existing management structures and mechanisms that have already been successfully developed would be used for the project implementation. Aiming at building local capacities for integrated river basin management, besides the UNDP project personnel from the Environment and Disaster Risk Reduction Practice Area, the implementation team would involve the Center for the Development of Southeast Region (CDSER). The Center which represents Basin's municipalities, would be instrumental in balancing and overcoming potential conflicting interests over water resources by the local stakeholders – a role they already play in other initiatives (e.g., identifying projects of regional importance, optimizing investments by region's municipalities to maximize mutual benefits...). Their involvement in the project would help improve local management capacities and ensuring involvement of stakeholders in project activities, toward a more democratic management of Basin's water resources.

Project Objectives

Impact / Overall Goal of the Project

The economic wellbeing of the population and the environmental status of the Strumica River Basin have improved through integrated water resource management

Project Outcomes

OUTCOME 1:

Citizens and farmers reduce pressures on water bodies and enhance resilience of the Strumica River Basin to the flooding hazards

The outputs and activities under this outcome aim at significantly reducing the pressures to water bodies resulting from the human/economic activities in the Basin (industry, agriculture, settlements). Different set of measures will be implemented to address the point source and diffuse pollution, ranging from supporting the enforcement capacities for integrated pollution prevention and control to adopting better resource management practices in agriculture.

Major project support will be provided in mitigating the flooding risks in the Basin which has been identified as one of the key water-related challenges both by stakeholders and up-to-date expert analyses.

Output 1.1 Point source pollution of water bodies in the Strumica River Basin is reduced

Besides the direct project-supported investments to address the pollution from point sources, efforts will be made so that complementary co-financing is secured by: a) instigating private investments in preventing and/or reducing emissions from industrial operations; b) enabling municipalities and other stakeholders raise additional financing from other available funding mechanisms (e.g., by supporting the identification of best management practices and preparation of the necessary technical documentation).

Activity 1.1.1 Strengthening municipal capacities for environmental permitting by applying the principles of integrated pollution prevention and control

A total of 53 industrial facilities are currently operating in the Basin. Six of them are in the jurisdiction of MoEPP (A type of installations) and even 47 under municipal jurisdiction, when it comes to regulating emissions of pollutants from the technological processes. According to municipal data, all eligible operators have undergone the permitting procedure, except the new Ilovica mine which is about to start its operation.

However, the RBMP process has revealed that there is a clear need for strengthening municipal capacity by enhancing their knowledge on the practical dimension of IPPC implementation, including the monitoring of performance of existing installations and their compliance with the permit conditions. At the same time there is a need for raising awareness of the existing industrial operators, and other stakeholders (including the local communities) on the needs and the benefits of introducing such system.

The increased enforcement capacities of municipalities for a systematic implementation of the integrated pollution prevention and control (IPPC) system will inevitably result in series of beneficial environmental and socio – economic effects. The better enforcement of such system will help meeting the following objectives: a) protection of the environment by preventing or minimizing emissions to all media (air, land and water), b) encourage reductions in raw materials and energy use and increase recycling and reuse, and c) promote the use of clean technology to reduce pollution at sources.

The project will support the municipal authorities, the industry installations, and other stakeholders to introduce and comply with the integrated pollution prevention and control requirements, through delivery of hands-on trainings on all key elements of the system, focusing on overcoming the barriers to better enforcement. Capacity development support will be specifically designed to consider the current level of knowledge of authorized municipal personnel and the environmental enforcement officers, including their field inspection capacities. Proposals for improving organizational setup for more efficient implementation of the system will be provided to all municipalities.

Municipalities will be supported to build a basin-scale database of pollutant emissions and track pollution changes as the permit conditions are gradually met by industrial operators.

Activity 1.1.2 Support to municipalities in identifying the most feasible wastewater management approaches and preparing the necessary technical documentation

Aiming at building a strong base for a gradual reduction of wastewater pollution from settlements, the project will support the authorities in identifying the most feasible localized wastewater management systems. Mindful of the current and projected wastewater discharges in the basin, the size and position of settlements and other factors, the project will help conducting a comparative analysis of the technical, environmental, economic, and sustainability parameters of various wastewater management alternatives for a selected number of priority communities. Different types of management systems and technological solutions will be compared so to identify those which are the most suitable for the local context.

The selection of communities will be made based on an objective set of criteria including the requirements of the EU WFD/Law on Waters, the relative impact to the water bodies, the co-financing abilities and the capacity for a sustainable operation and maintenance of the systems.

Small-scale, cost-effective and decentralized wastewater management options will be considered given their sustainability prospects.

Following the feasibility assessment stage, municipalities will be supported to prepare the detailed technical (engineering) documentation for the selected wastewater treatment options, as well as to explore additional sources for financing their construction.

This support will focus on the rural communities of the Basin since the urban ones (Strumica and Radovis) are already in the pipeline for IPA funding – a process led by MoEPP.

Activity 1.1.3 Demonstrating small-scale decentralized wastewater treatment system in selected rural communities in SRB

Following the feasibility and detailed engineering design stage, the project will select 1-2 communities in which small-scale decentralized wastewater treatment systems will be demonstrated. Selection will be made based on a comprehensive set of objective criteria including the ability of a community to operate the system, the willingness-to-pay for the new service and to co-finance its construction.

The purpose of this activity is to showcase cost-effective treatment options, with high efficiency rates in removing organic matter, nutrients, heavy metals and toxic compounds in wastewaters. Such an approach would address one of the main challenges to wastewater management – the sustainability of the systems, providing by this examples with significant replication potential.

Output 1.2 Diffuse source pollution from agricultural runoff and erosion processes is reduced

Diffuse source pollution from agriculture will be reduced by introducing more sustainable practices (e.g., agro-ecological / agrienvironmental farming, Good Agricultural Practices and similar). The project will provide direct support to local farmers to modify their farming practices so to: 1) reduce/better control the use of agrochemicals and irrigation water and 2) prevent the loss of nutrients from land to water bodies with agricultural runoff and erosion processes.

Project activities would comprise comprehensive capacity development assistance (theoretical and hands-on trainings), followed by a grants programme. Creating synergies with other ongoing financial instruments for agriculture (e.g., IPARD) will be one of the project priorities for multiply the beneficial effects of the assistance to farmers.

Structured in such manner the activities under this output have an ultimate goal of triggering behaviour change among the local farmer's community, contributing to the protection of the water bodies and supporting the local livelihoods (e.g., through reducing the production costs resulting from the reduced use of agrochemicals and irrigation water).

Activity 1.2.1 Reducing the use of agrochemicals and modifying irrigation practices to reduce agricultural runoff and to ensure more sustainable use of water resources

This activity will capitalize on the contemporary methods of combined irrigation and plant nutrition (so called 'fertigation'), because of their efficiency in using fertilizers and water and much better environmental properties. Project funding will be used to promote on-demand (pressurized) irrigation systems, modern irrigation techniques (e.g. drip irrigation), introduction of modern systems for irrigation scheduling through fast and accurate monitoring of climate and soil data and promotion of cropping pattern change, as a measure to reduce irrigation water demand and increasing sustainability on a farm level.

Soil analyses will be included the programme not only to ensure more efficient use of fertilizers, but also to better understand the current status of nutrients and other elements in soils.

Having in mind the positive experience from the Restoration of the Prespa Lake Ecosystem project, the introduction of more sustainable farming practices will be supported through a specially designed grants scheme for farmers. Direct support in equipment and expert advice will be provided to a selected group of farmers who will successfully complete a comprehensive training programme.

The focus of the project supported interventions will be on agricultural land contributing most significantly to the ecological status of water bodies.

Innovative solutions will be used to enable as many farmers as possible to access to information/knowledge/training on the new farming practices. This would entail preparing video lectures, online training courses, tests of knowledge, mobile phone and computer applications as decision-support tools on the key aspects of farming (irrigation, fertilizer application). Localized solutions for improving the access to agricultural extension support, including encouraging farmer-to-farmer support, will be co-designed with farmers, prototyped and scale-up as part of this project activity.

Output 1.3 Overall resilience of communities to the flooding hazard in SRB is enhanced

This output comprises a combination of 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). The principles of Integrated Flood Risk Management as per the EU Floods Directive will be applied for the first time on national level in the case of SRB. Compliant with the principles of DRR the project would support stakeholders to better understand and implement a combination and structural and non-structural measures to reduce the flooding risks, including adopting a hazard-appropriate behavior.

Activity 1.3.1 Basin-scale detailed analysis of flood risk and identification of feasible short- and long-term (systemic) flood risk mitigation options

As a continuation of PFRA process, the project will help complete the remaining steps defined in the EU Floods Directive, namely the preparation of flood hazard and flood risk plan and formulation of the integrated flood risk management plan. The EU/regional models and best practices will be used as the basis for finalization the first cycle of flood risk management for the Basin.

In addition, combined hydrological and hydraulic modeling will be applied at the basin-scale in order to generate and evaluate detailed alternative flood risk mitigation scenarios by combining various structural and non-structural measures. Pursuant with the latest trends in flood risk and river basin management, as well as the Eco-DRR principles, the modeling work would help to assess the relative significance of various ecosystem-based solutions in reducing the flooding risks (e.g., use of retention areas, floodplain management, improvement of the basin's structure to stabilize hydrological regime, 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, would enable identification of the most ecologically acceptable solutions, limiting the engineering solutions/hydromorphological modifications to their absolute minimum (i.e., only in cases where particularly valuable assets and human lives are at risk, and the costs for adopting other options are disproportionally high for the society).

The modeled management scenarios will serve as a basis for the implementation of the most feasible combination of specific interventions that will feed into Activity 1.3.2 and 1.3.3.

Activity 1.3.2 Optimizing the operating regimes of existing reservoirs and other water structures and introducing early warning system to reduce flood risk

The project will partner with the operators of the existing dams/reservoirs in the Basin to explore the potential of flood risk mitigation by improving their operating regimes. Optimization models will be used to identify the most suitable operating regimes of dams/reservoirs so to increase their flood mitigation potential by at the same time maintain their primary purposes (e.g., water supply, irrigation, power generation).

This effort may be further upgraded by integrating an early warning system. This would require linking the dam/reservoir operation with meteorological/hydrological forecast data that might be provided by the Hydrometeorological Service (HMS). In practice this would mean increasing the discharges from the reservoirs when anticipating heavier rainfall and/or snowmelt so that they are able to absorb a more significant flood wave and protect downstream communities.

Such an approach would enable good use of existing structures, lessening the need of additional expensive engineering solutions for those areas which can be effectively protected.

Activity 1.3.3 Implementation of selected set of basin-scale flood risk mitigation measures

Based on the input from Activity 1.3.1 the project will support the implementation of priority flood risk mitigation measures. The measures will be combined to optimize benefits for the population and the environment. These measures would range from small-scale interventions (improving the state of existing flood control infrastructure, improving discharge capacities of river channels at critical sections), ecological restoration projects (river and wetland restoration, better management of floodplains), to proposals for long-term systemic adaptation to current and projected floods such as improving land-use.

OUTCOME 2: Municipalities and the central level authorities efficiently apply integrated water resources management in the Strumica River Basin

The outcome is designed to strengthen capacity for restoring the Strumica River Basin and reducing the risk of extreme hydrological events by applying the IRBM and IFRM principles. The authorities will be supported to introduce adequate monitoring and management capacities so to be able to adaptively manage a particularly complex system such as SRB.

As part of this Outcome the national authorities will be assisted in strengthening the legal and regulatory enabling environment for integrated flood risk management, by supporting the harmonization with the EU Floods Directive and scaling-up the integrated flood risk management approach piloted in SRB.

Output 2.1 Decentralized and adaptive basin-scale management of water resources is introduced

Activity 2.1.1 Piloting a basin-scale monitoring programme

In the course of the preparatory stage of the project a targeted monitoring programme that includes the main parameters of the ecological status of water bodies (hydromorphological, physico-chemical and biological) has been designed in line with the new delineation system. Following a stage of comprehensive assessment of available capacities, as well as sustainability prospects of the future monitoring system, the project will support its piloting in the course of the entire period of implementation. For this purpose institutional agreements with the responsible monitoring institution(s) mandated by the authorities to carry out the future SRB will be made. The project will work closely with the institutions to help build capacities (in terms of expertise and equipment) and improve access to financing as the key conditions for the sustainability of the monitoring system.

The newly introduced monitoring will not only help enhance the knowledge on the hydrological and ecological characteristics of the Basin, but will also help document the effects of the project supported, and other complementary interventions over the six-years period. Moreover, the monitoring system will greatly contribute to the establishment of the early warning system for floods (Activity 1.3.2).

Activity 2.1.2 Strengthening integrated river basin management capacities through organizational maturation at local level

By building upon the preliminary analyses of the project preparatory stage, this activity would help identify and introduce the most adequate organizational/institutional setup for the needs of future integrated management of SRB. This may include establishing a local management unit in the Basin, hiring new personnel and other interventions. The new management of SRB will also consider the changes brought by the ongoing SDC-supported reforms of the country's water sector.

Once the new structures are in place, they will be given a critical role in the implementation of the project which is also considered an excellent capacity development opportunity for the responsible personnel. Series of trainings and other capacity development assistance will be provided so as to enable transformational change from a UNDP-assisted project management modality to an independent long-term integrated management of SRB.

Until the SRB management arrangements are formalized the UNDP-supported project implementation will greatly involve existing structures in the Basin (e.g., municipalities, Center for the Development of Southeast Region), creating by this additional local capacities for the future management of SRB upon project closure.

Activity 2.1.3 Introducing cross-sectoral participatory mechanisms to democratize and decentralize water resources management

Once the Strumica River Basin Management Council (RBMC) is established by the Government, the project will support a comprehensive capacity strengthened through trainings, involvement in specific project activities, study visits and exchange programs with other Basins.

RBMC for Strumica would involve about 35 representatives from the following institutions and organizations with roles and specific interests in water management: MoEPP, MAFWE, Ministry of Health, Ministry of Transport and Communications, municipalities, water management companies, Hydrometeorological Administration, Hydrobiological Institute, Crisis Management Center, Directorate for Protection and Rescue, protected areas management authorities, Chamber of Commerce (hydropower plants section), regional NGOs, water user groups, fishermen associations, association of public utility enterprises (ADKOM), industrial installations, consumers organizations and ZELS (Association of the Units of Local Self-Governments).

Supporting the operationalization of RBMC will provide the main mechanism for stakeholder participation in the river basin management, helping to decentralize water management-related decisions, and creating a system of local self-regulation. RBMC will help balance the interests of various water-stakeholders and optimizing the benefits of water management decisions both for the local economy and environment.

Outcome 2.2 Lessons learnt and best practices are shared and replicated at national and international level

Activity 2.2.1 Contribute to and take part in existing knowledge networks

One of the keys to the longevity of the newly introduced system for integrated management of SRB is the continuous capacity building of the responsible personnel through networking, trainings and education.

The project will also generate considerable information and knowledge on the SRB that will be shared through various national and international networks. The project findings and results will be promoted at different events on topics related river basin management, river restoration, flood risk management and other compatible areas.

Activity 2.2.2 Strengthening the legal and regulatory enabling environment for integrated flood risk management

Being the national pilot initiative in flood risk management, the activities under Output 1.3 would have a huge scaling-up/replication potential. In addition, the proposal made on the introduction of integrated flood risk management at national level by harmonizing the legislation with the EU Floods Directive, provide a solid ground for a continued project support in this direction.

This will be implemented in close cooperation with other donors/implementing agencies providing support to transforming the existing flood control approaches to a contemporary flood risk management model aligned with the EU legislation and international best practices.

The new approach to flood risk management would rest upon the following key principles: a) applying river basins as a geographical unit for planning of floods management ; b) replacing ad-hoc responses to flood events with long-term planning for management of flooding risks; c) support the evolution of the traditional flood protection approaches founded upon design standards (e.g., protection from flood events with certain return period) to a more comprehensive management of risks that considers vulnerability of the area and exposure of assets at various flooding scenarios; d) use of the latest Disaster Risk Reduction (DRR) approaches, including the concept of Eco-DRR in selecting possible flood mitigation options at basin-scale (e.g., ecosystems-based solutions to improving hydrological regimes and increasing overall resilience of communities to the flooding hazard); e) progress toward performance-based engineering (to enable comparison of the expected outcomes and costs of alternative flood management options on the basis of their impact on the frequency and magnitude of flooding).

To facilitate the future use of the concept for other river basins in the country, the project will produce guidance documents for the formulation and implementation of flood risk management plans (for the specifics of the national context) to be used by the relevant national and local authorities. Designed in such a way, the project will provide direct support and know-how required to overcome the existing barriers in adopting the contemporary, FD-based methodologies in flood risk management at national level and basin-scale.

Activity 2.2.3 Communication, education and public awareness raising for integrated water resources management

The excellent visibility of the project achieved in the course of the project preparatory stage will be reinforced so to ensure promotion of the project concepts and successes, as well as to mobilize stakeholders in the project implementation. Previous work has helped creating a network of the key communication/PR people from the municipalities and other stakeholders who are now potential supporters of project implementation and conveyors of its key messages.

A systematic approach to communication, education and awareness raising will be applied to build more partnerships for the needs of project implementation and strong ownership over the project objectives. Many of the anticipated project activities would require improvement of current resource management practices and behavioral change amongst the stakeholders. To support this various innovative approaches that have proven successful in other projects would also be applied under this project (e.g., foresight, gamification...).

Project Stakeholders

The project is designed to enable broad stakeholder participation not only to facilitate project implementation, but also to decentralize future water management. A wide range of stakeholders with overlapping, and often conflicting interests have been identified and have been involved from the project outset in identifying threats and formulating possible solutions.

The positive experiences from use of the innovative Foresight methods for stakeholder engagement have proven to be a good model for harvesting local wisdom, understanding needs and perceptions, and co-designing responses to the water-related challenges. Similar approaches will be applied in the course of project implementation because of their potential to mobilize major action and allow for balancing multiple interests.

The key project partners and beneficiaries are the Ministry of Environment and Physical Planning, the Ministry of Agriculture, Forestry and Water Economy, the Center for the Development of South-East Region and Basin's municipalities. The project would be launched in a context of limited capacities of all partners for the integrated management of water resources, and the ongoing reforms of the water sector. Through carefully planned and implemented comprehensive capacity development support, project partners would benefit from a new knowledge and expertise. This would enable them, at the end of the project, to continue implementing future RBMPs and managing water resources without external support.

For this purpose the necessary personnel will be hired, trained and capacitated through direct involvement in the wide range of project activities.

Because of the complexity of the Basin, and the long list of stakeholders, the Center for the Development of Southeast Region is anticipated to be an important linking mechanism not only with the municipalities they represent, but also other stakeholders and the local population in general. Their existing capacities and networking abilities would be strengthened in areas linked to water resources management.

For the specific activities related to flood risk management the project will also partner with the specialized agencies in charge of disaster risk management. The Crisis Management Center (CMC) and the Directorate for Protection and Rescue (DPR), especially their branch offices in SRB, will benefit from considerable project support in terms of improved capacity to address the flood risk management issues (throughout the key stages of the DRR cycle).

Authorities will be supported to formulate new and improved organizational/institutional setup for the future management of the Basin, by making maximum use of existing capacities. This would help to avoid unnecessary costs and support sustainability of the new management system.

The involvement of the key interests in water management will be ensured through the River Basin Management Council to be established as per the current country's legislation and EU WFD principles. The Council will provide a forum for discussing water issues, overcoming conflicting interests, creating a common vision, and prioritizing interventions, from early actions to improve best practices, to the implementation of a complex and comprehensive management strategies. It will also benefit from the project support by the transfer of lessons from other Basins in the country (e.g., Prespa and Bregalnica) and the wider region and trainings on integrated river basin management in a multi-stakeholder context.

An extensive, but not an exhaustive list of stakeholders to be involved in and benefit from the project is included in the following table:

Table 8 Key stakeholders and their role in the project and management of SRB

	Stakeholder	Role
1.	Ministry of Environment and Physical Planning (MoEPP)	• Key authority for river basin management in the country • Chairs the RBMC • Responsible to organize the management structure for SRB • Responsible for reporting progress in improving the status of water bodies according to the Law on Waters, but also toward the EU integration process • Will gain additional mandate in flood risk management (as a result of harmonization of the national legislation with the EU Floods Directive) • Holds the Executive function on the Project Board
2.	Basin's municipalities (Strumica, Radovis, Bosilovo, Novo Selo, Vasilevo)	• Main project beneficiaries • Support the preparation and implementation RBMP • Represented in the RBMC • The process of decentralization gives them an increased role in environmental management (e.g., environmental permitting, waste and wastewater management) • Main partner of MoEPP in the implementation of the environmental laws at the local level
3.	River Basin Management Council (RMBC) (to be established)	• The main cross-sectoral stakeholder body involved in the preparation RBMP • Advisory and oversight role during the implementation of the RBMP • Integrates all sectors contributing to and/or affected by water quantity and quality in Prespa (key role in balancing interests in water management)
4.	Center for the Development of Southeast Region	• Important stakeholder representing/articulating the interests of the municipalities of SRB • Will be integrated into the project implementation structure by linking it with the UNDP project management unit • Will provide support in the communication/coordination of project activities with municipalities and networking with many stakeholders at local level

5.	Ministry of Agriculture, Forestry and Water Economy	• Important stakeholder given the importance of agriculture for SRB • Member of RBMC • Key partner/beneficiary in all areas related to agriculture (including irrigation), forestry, fisheries and other • May play key role in providing co-financing for complementary project activities to introduce more sustainable farming practices
6.	Monitoring institutions (Hydrometeorological Institute, Hydrobiological Institute, Public Health Institute, universities...)	• Responsible for monitoring of water quality and quantity in SRB • Will take part in the establishment and operationalization basin-scale monitoring system • May be involved in the project supported monitoring programme • Possess historical data from monitoring/research programmes/studies
7.	Water management associations (public utility enterprises, water management companies ,water-user groups)	• In-charge of the regular management of water resources (e.g., water supply, irrigation, wastewater management) • Represented in RBMC • Potential partners and beneficiaries for a wide range project activities • May have access to valuable data required to formulate RBMP
8.	Farmer's Associations	• Important stakeholder organizations for project activities in agriculture (e.g., introducing better farming practices) • Represented in RBMC • Beneficiaries of future project activities
9.	Public Forest Enterprise	• Responsible for forest management in SRB • Will be involved in formulating and implementing basin-scale solutions to improve hydrological regime and reduce harmful erosion processes
10.	NGOs, CBOs and individuals	• Beneficiaries of the project results (environmental, agricultural, tourism NGOs and similar) • Partners and supporters to the project implementation.
11.	Crisis Management Center and Directorate for Protection and Rescue	• Members of RBMC • Specific roles in flood risk management (most important partners for project activities related to flood risk management)

The project is designed so as not exclude any stakeholder based on gender, age, ethnicity, or religion. It will particularly attempt to mainstream gender aspects in different interventions by recognizing the differential impact on the gender groups. This would include collection and analysis of gender disaggregated data and, wherever applicable, implementation of specific measures for different gender groups. The project will consider the latest relevant strategies, policies and incentives to address the gender issues and enable both men and women to benefit equally from the project.

Following the experience from the Restoration of the Prespa Lake Ecosystem project, gender-specific criteria will be intoruced in selecting farmer grantees, so as to encourage greater role of women in promoting transformation of farming practices.

Sustainability measures, scaling-up and exit strategy

The sustainability dimension is integrated into the project design and will be given due consideration throughout the entire project lifespan. By providing important capital investments to support localized solutions to the Basin's key challenges, including building long-term local capacities, the project would incentivise stakeholders to become the main drivers of change. This will ensure not only a successful project implementation, but most importantly sustainability of the individual project results and their transformation into positive impacts for the entire Basin.

This process has been opened in the course of the project preparation stage, when the stakeholders have been given the unique opportunity of identifying the main challenges and priorities of the Basin. Reflecting this in the project design, reinforces the sustainability prospects of the entire undertaking.

Moreover, the current legal environment also provides important mechanism to ensure sustainability of the project. The Law on Waters identifies Strumica as one of the country's four river basin districts for which the necessary planning documentation (RBMP) and management structures should be established.

The project would provide impetus for a greater progress in this direction, which will ensure a more efficient achievement of the key objectives of country's water legislation.

The experience and lessons this project is going to produce by piloting the implementation of the EU Floods Directive, will be of critical importance for finalizing the harmonization of the national legal system with the EU water regulations (the adoption of the EU Floods Directive is amongst the few incomplete processes until the full alignment of the EU regulations is achieved. It is therefore one of the key priorities of the Government). The growing concerns over the adverse effect of extreme hydrological events are expected to mobilize additional support to applying the contemporary approaches to flood risk management, building also a strong basis for the sustainability of the newly introduced management model.

Implementing the project would be one of the key drivers toward Basin's sustainability. The project will help introduce better management of water and other related resources that would eventually lead to improved status of waters in terms of quality and availability for people, economic development and ecosystems. It also aims at instigating additional 'green' investments that would help enhance the Basin's services for the benefit of the local population and the environment.

The analysis of the sustainability aspects the project outputs is provided in the table below:

Table 10 Sustainability considerations of the project

Project Outcome	Project Output	Sustainability measures
OUTCOME 1: Citizens and farmers benefit from the reduced pressures to water bodies and enhanced resilience of Strumica River Basin to the flooding hazard	Output 1.1 Point source pollution to water bodies is reduced	Implementing the phased pollution reduction concept is a requirement of the existing environmental legislation. The project will only help in identifying localized solutions and building capacities for accelerated and cost-effective implementation of the IPPC requirements. The project will only consider demonstrating / showcasing low-cost, high-efficiency, wastewater treatment approaches that have much better sustainability prospects than the conventional and sophisticated treatment systems
	Output 1.2 Diffuse source pollution from agricultural runoff and erosion processes is reduced	Being designed to help reduce the use of agrochemicals and irrigation water, this output, will also result in reducing the production costs, and improve marketability of the products
	Output 1.3 Overall resilience of communities to the flooding hazard in SRB is enhanced	There is a profound interest among local stakeholder for introducing and maintaining systemic solutions to the growing flooding risk. The reduced risk of floods would help decrease the economic losses in future Sustainability criteria have been applied in conceptualizing the main flood mitigation options to be supported, such as: a) improving the operating regimes of existing systems (not building new ones that will create additional operation and maintenance costs); b) implementing ecosystem-based, 'no-regret' measures with multiple benefits (besides flood protection) which are also less expensive to maintain (e.g., watershed management, restoring riparian zones/floodplains); c) selecting measures that balance the economic, environmental, public and private interests through an all-inclusive stakeholder engagement processes.

		The model for the future management of SRB will fully consider the available/possible financing options and legal possibilities. To achieve this, best efforts will be made so as to use existing structures and invest in strengthening their capacities to meet their responsibilities for IRBM.
OUTCOME 2 Municipalities and the central level authorities efficiently apply integrated water resources management in the Strumica River Basin	Output 2.1 Decentralized and adaptive basin-scale management of water resources is introduced	The sustainability of the basin-scale monitoring system would be supported by its cost-effectiveness and use of existing capacities in creating localized, modest, but long-lasting monitoring support. Due consideration will be paid to reducing the monitoring costs by, for example, avoiding using too sophisticated equipment and expensive analyses, focusing on a limited number of monitoring parameter that well represent the health status of the Basin's water bodies
		Additional capacity building support will be provided to the new monitoring and RBM staff so as to enable them to run the new systems in a sustainable way
		The locally established capacities will be capacitated to continue participating in different knowledge networks and partnerships beyond project closure
	Output 2.2 Lessons learnt and best practices are shared and replicated at national and international level	The ongoing harmonization of the national water legislation with the EU directives will focus on floods, one of the key challenges to be addressed by the project. The recent damage cause by floods and the associated costs raise the interest in identifying better approaches to dealing with the flood risk. This would well position the project to take part in the national level efforts of finding more sustainable solutions, aligned with the EU concepts and approaches.

The proposed project has a great scaling-up and replication potential which is considered throughout the project design. The project is going to set-up an effective model for integrated river basin management in the country. By capitalizing on previous experiences, it will attempt to further raise the benchmarks established with the other national projects pursuing similar objectives (e.g., Prespa and Bregalnica). The practices to demonstrated are relevant to the existing or emerging challenges faced at national level, but also in much broader context.

Given the transboundary character of the Strumica River Basin, potential follow-up financing may be expected through EU and other funds. The project will explore such opportunity and assist local stakeholder to access these financial instruments. Specific measures from RBMP and other technical documentation would provide the basis for scaling-up and replication of in a transboundary context. Similar approach may be applied for promoting transboudnary flood risk management.

The scaling-up in the area of flood risk management will be made by supporting the efforts for harmonizing the national regulations with the requirements of the EU FD. In addition, the project will produce guidance documents for formulation and implementation of flood risk management plans to be used by the relevant national and local authorities. Designed in such a way, the project will provide direct support and know-how required to overcome the existing barriers in adopting the contemporary, FD-based methodologies in flood risk management and national level and basin-scale.

The lessons learnt and best practices will be shared in a way that contributes to the latest international developments in the field of integrated river basin management, integrated flood risk management, freshwater ecosystems restoration and similar. For this purpose, cooperation will be established with similar river basins and complementary projects. A number of publications, guidance materials and other knowledge products will be produced to improve visibility, knowledge and awareness on the project issues.

A comprehensive evaluation of the achievements and outstanding challenges will carried out at least twice in the course of project implementation (mid-2018 and mid-2020), in line with the proposed project implementation phases (please see Table 9). Besides documenting the project progress, these independent evaluations will also consider the capacity development achievements of responsible institutions for IRBM. Each evaluation would include a set of recommendations to be taken by authorities so as to ensure sustainability of project outcomes. Such an exit strategy is considered the most appropriate one given the nature, size and degree of complexity of the project and the challenges it intends to address.

In the final project stages, a thorough assessment of the achievements against the project indicators and the SRB's environmental objectives will be carried out. This assessment of the progress will serve as a basis for the formulation of the subsequent 6-years RBMP. Such an approach, supported by the capacities established at local level, would ensure the continuity of the efforts towards the Basin's vision expressed in the RBMP. This exit strategy is considered the most appropriate given the complexity of the efforts.

The project is designed to ensure maximum use of existing country systems, such as the mandated institutions (e.g., MoEPP, MAFWE and other national level authorities), municipal administrations, different institutions / organizations (e.g. agricultural associations, forest management authorities, institutions responsible for environmental monitoring, and others). However, it will also help operationalize new structures (e.g., RBMC, the new model for long-term management of SRB aligned with the water sector reforms), creating by this an environment for better addressing the challenging tasks of integrated river basin management.

III. MANAGEMENT ARRANGEMENTS

The project will be implemented under the Support to NIM (NEX) modality with the Ministry of Environment and Physical Planning (MoEPP) as the implementing entity/responsible partner. The Ministry will be responsible for ensuring the government's participation in the project and the timely and verifiable attainment of project objectives. The MoEPP will also facilitate interaction, coordination and input of the relevant ministries, public organizations, research institutions and private organizations.

UNDP Country Office (CO) will be responsible for the procurement and recruitment of the project staff, consultants and consulting companies. UNDP will be also responsible for overseeing project budgets and expenditures; project evaluation and reporting; result-based project monitoring; and organizing independent audits to ensure the proper use of funds. Procurement, Recruitment, Financial transactions, auditing and reporting will be carried out in compliance UNDP procedures for national execution, based on the Agreement for provision of Support Services signed between UNDP and the Ministry of Environment and Physical Planning.

UNDP will provide procurement and contracting services in accordance with the relevant UNDP rules and regulations, policies and procedures for procurement, human resources management and RBM guidelines.

UNDP Country Office will also be responsible for timely submission of progress reports, audit and evaluation reports to the Ministry of Environment and Physical Planning, and to the Swiss Development Cooperation Agency.

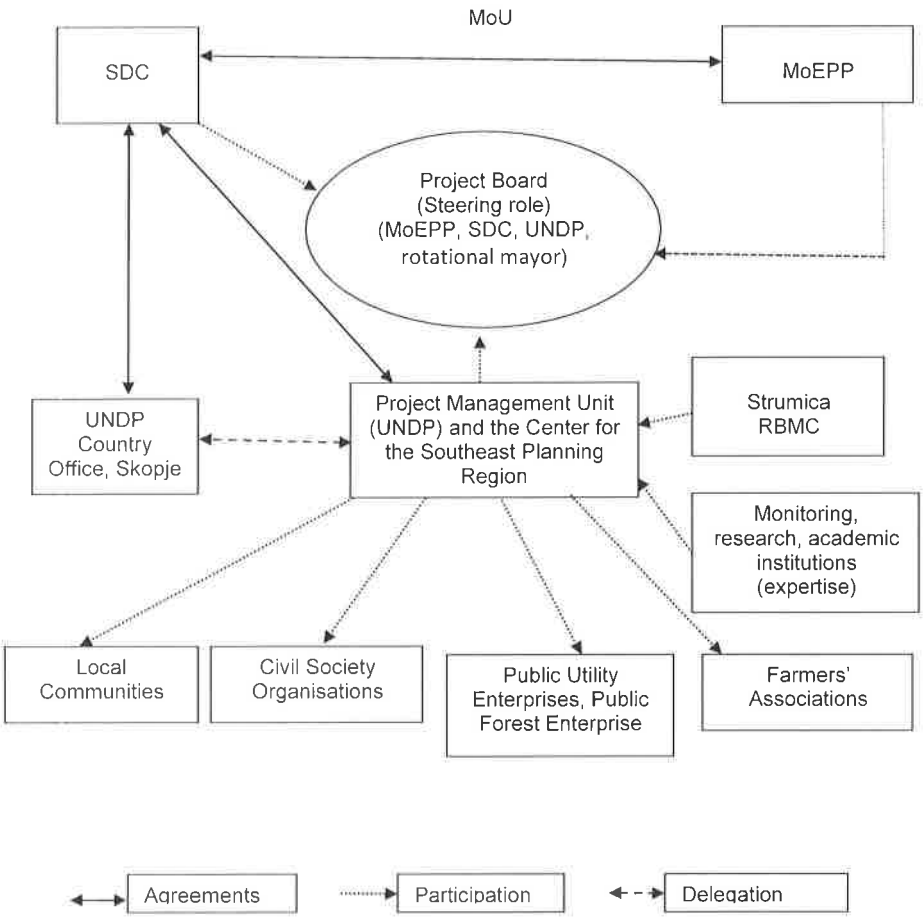
The basic project management structure, based on the latest result based management approaches is presented in Figure 7 which clearly displays the role of wide range of partners in the course of project implementation. The key governing structure of the project would be the Project Board (PB) comprising representatives of MoEPP, SDC, UNDP and Basin's municipalities.

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 their revisions. In order to ensure accountability, the Project Board decisions would be made in accordance with highest standards of integrity and transparency.

Besides approving the Annual Work Plans (AWP), PB also authorizes any major deviation(s) from original plans. PB also ensures that required resources are committed, and arbitrates any conflicts within the project or negotiates a solution to any problems between the project team and external bodies. In addition, it approves any delegation of Project Assurance responsibilities.

The Executive function will be held by MoEPP. Its role is to ensure that the project is focused throughout its life cycle on achieving its objectives and delivering outputs that will contribute to higher level outcomes. The Executive has to ensure that the project gives value-for-money, ensures a cost-conscious approach to the project and balances the beneficiary-supplier demands.

Figure 7 Composition and structure of project management



The interests of project beneficiaries in the PB will be represented by the mayors of Basin's municipalities. The participation of mayors in the PB will be on a rotational basis (each year a mayor of a different municipality will take part in the PB based on an internal agreement among mayors). By the end of the project each municipality will have the chance to take part in the highest decision-making body for the project.

UNDP's internal project management resources from the Environment and Disaster Risk Reduction Practice Area will be engaged for the needs of project implementation. A Project Manager and a part-time Project Assistant will be in charge of the day-to-day management of the project.

Wishing to create long-term local capacities for project implementation and IRBM, the project will directly involve the Center for the Development of Southeast Region in the project implementation. The Center will assign at least one full-time staff, and, when required, additional human resources (e.g., in the periods of more intensive project implementation, when organizing major local events and similar). An institutional agreement will be signed with CDSER for this purpose, with possibility for renewal on an annual basis based on assessment of the project implementation needs.

If, at any stage of project implementation, changes in the management of SRB are introduced as part of the ongoing reforms of the water sector, the project management modality will be adjusted to involve the new structures in project implementation (e.g., if MoEPP hires local personnel in-charge of the SRB, they may be hired together and be supported by the project for a limited period of time, i.e. before their full transfer into MoEPP). Such an adaptive approach would be particularly beneficial in introducing sustainable river basin management capacity at local level. The involvement of the national staff of a possible formal

structure for the management of SRB would be an excellent capacity development opportunity. This would be harmonized with the transition of the project management modality described in Table 9.

Should there be a major/unexpected intensification of project activities, or a major change in the baseline conditions that may affect project implementation, hiring additional personnel (to be based in the region) as part of the UNDP management unit, will also be considered (e.g., a monitoring officer or a project specialist).

Such a flexible structure would enable the project to absorb potential changes that may affect its implementation, reducing at the same time overall management costs.

Besides the role in the PB, MoEPP will also designate a responsible person (coordinator) providing additional quality assurance of the projec. It will also nominate the chairperson of the RBMC who will also have an important role in all stages of project implementation.

IV. MONITORING FRAMEWORK AND EVALUATION

In accordance with the programming policies and procedures outlined in the UNDP User Guide, the project will be monitored through the following:

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 table below.
- Semi-annual Project Progress Report. This report covering 6-month periods will have the role of the main oversight, monitoring and project management tool. It will be a self-assessment report prepared and submitted to the Donor and the Project Board. It will include information on: project performance over the reporting period (including outputs produced); the constraints experienced in the progress towards results and the reasons for these; expenditures analysis; lessons learned and recommendations for future orientation in addressing key problems.
- 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.
- Based on the initial risk analysis submitted (see annex 1), a risk log shall be activated in Atlas and regularly updated by reviewing the external environment that may affect the project implementation.
- Based on the above information recorded in Atlas, a Project Progress Reports (PPR) shall be submitted by the Project Manager to the Project Board through Project Assurance, using the standard report format available in the Executive Snapshot.
- a 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
- a Monitoring Schedule Plan shall be activated in Atlas and updated to track key management actions/events

Annually

- Annual Review Report. An Annual Review Report shall be prepared by the Project Manager and shared with the Project Board. As minimum requirement, the Annual Review Report shall consist of the Atlas standard format for the QPR covering the whole year with updated information for each above element of the QPR as well as a summary of results achieved against pre-defined annual targets at the output level.
- 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.

Mid-term Evaluation

An independent Mid-Term Evaluation will be undertaken at the end of the third year of implementation. The MTE will determine progress being made towards the achievement of outcomes and will identify course correction if needed. It will focus on the effectiveness, efficiency and timeliness of project implementation; it will highlight issues requiring decisions and actions; and it will present initial lessons learned about project design, implementation and management.

The findings of this review will be incorporated as recommendations for enhanced implementation during the next half of the project's term. The organization, terms of reference and timing of the mid-term evaluation will be decided after consultation between the parties to the project document.

This independent evaluations should verify the changes in national/local capacities for the integrated management of SRB. This evaluation will suggest if the conditions for the transition to the second project implementation modality are met.

Terminal Evaluation

An independent Final Evaluation will take before the end of the fifth year of implementation of the project. The final evaluation will look at the impact and sustainability of results, including the contribution to capacity development and the achievement of the set objectives. The Final Evaluation should also provide recommendations for follow-up activities, including an elaboration of a detailed exit strategy.

This evaluation will verify if the conditions for the transition of project implementation from UNDP-assisted modality to full national implementation are met.

Besides the programmatic monitoring and evaluation, the project will be subject to an audit (focusing also on the financial aspects), as per the rules and procedures of UNDP and SDC.

V. LEGAL CONTEXT

This project document shall be the legal instrument as referred in Article 1 of the Standard Basic Assistance Agreement (SBAA) between the Government of FYR Macedonia and the United Nations Development Programme, signed by the parties on 30 October 1995. The host country-implementing agency shall, for the purpose of the SBAA, refer to the government-cooperating agency described in that agreement.

The following types of revisions may be made to this project document with the signature of the UNDP Resident Representative only, provided he or she is assured that the other signatories of the project document have no objections to the proposed changes:

- Revisions in, or addition of, any of the annexes of the project document.
- Revisions which do not involve significant changes in the immediate objectives, outputs or activities of a project, but are caused by the rearrangement of inputs already agreed to or by cost increases due to inflation.
- Mandatory annual revisions which rephrase the delivery of agreed project inputs or increased experts or other costs.

The executing agency 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 http://www.un.org/Docs/sc/committees/1267/1267ListEng.htm. This provision must be included in all sub-contracts or sub-agreements entered into under this Project Document.

VI. 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 Transport and Communication, the Public Enterprise for State Roads, the Ministry of Agriculture, Forestry and Water Economy, Ministry of Environment and Physical Planning, local governments and affected population in the target areas
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

INTENDED OUTPUTS	OUTPUT TARGETS	INDICATIVE ACTIVITIES	RESPONSIBLE PARTIES	INPUTS
Output 1.1 Point source pollution to water bodies is reduced *Baseline*: Slow progress in phased pollution reduction by industrial operations because of limited enforcement capacity No wastewater treatment exists in SRB at present Only limited technical documentation for viable wastewater management solutions for priority communities in SRB exist at present *Indicators:* Initial characterization of Strumica river basin is carried out	***Targets*** Capacity development assistance for operationalization of the integrated pollution prevention and control system at local level Feasibility study for wastewater management options Technical documentation for priority wastewater treatment options Demonstration of small-scale wastewater treatment systems	Activity 1.1.1 Strengthening municipal capacities for environmental permitting by applying the principles of integrated pollution prevention and control Activity 1.1.2 Support to municipalities in identifying the most feasible wastewater management approaches and preparing the necessary technical documentation Activity 1.1.3 Demonstrating small-scale decentralized wastewater treatment systems in selected rural communities in SRB	UNDP, MoEPP, CSEPR, municipalities	Expertise Construction works Project management support Basic facilities and equipment

Baseline flood risk data are collected for the needs of the Preliminary Flood Risk Assessment Basin scale monitoring plan is proposed to support the characterization process				
Output 1.2 Diffuse source pollution from agricultural runoff and erosion processes is reduced *Baseline*: Current farming practice rely on an uninformed use/ overuse of agrochemicals and irrigation water Limited or no agricultural land currently under sustainable farming practices (e.g., GAP or agro-ecological farming) *Indicators*: Quantifiable reduction of agrochemicals and water used for agriculture on pilot farms Size of land under improved farming practices	***Targets*** Capacity development support for introduction of agro-ecological farming practices Implementation of grants programme for agro-ecological farming practices Compilation of best practices and lessons learnt	Activity 1.2.1 Reducing the use of agrochemicals and modifying irrigation practices to reduce agricultural runoff and to ensure more sustainable use of water resources	UNDP, MoEPP, CSEPR, municipalities, Ministry of Agriculture, Forestry and Water Economy	Expertise Project management support Basic facilities and equipment
Output 1.3 Overall resilience of communities to the flooding hazard in SRB is enhanced *Baseline*: SRB is among the country's most vulnerable regions to the flooding hazard; significant economic losses have been encountered in the past	***Targets*** Flood hazard and flood risk maps Flood risk management plan Optimization models for dams/reservoirs operation	Activity 1.3.1 Basin-scale detailed analysis of flood risk and identification of feasible short- and long-term (systemic) flood risk mitigation options Activity 1.3.2 Optimizing the operating regimes of existing reservoirs and other water structures and introducing early warning system to reduce flood risk Activity 1.3.2 Implementation of selected set	UNDP, MoEPP, CSEPR, municipalities, Water Management Organization, Ministry of Agriculture, Forestry and Water Economy, dam operators	Expertise Project management support Construction works Basic facilities and equipment

years due to damage on agricultural land, infrastructure and other assets in SRB *Indicators* Size of land (hectares) under better protection against floods with certain probability	Implementation of flood risk mitigation measures	of basin-scale flood risk mitigation measures		
Output 2.1 Decentralized and adaptive basin-scale management of water resources is introduced *Baseline*: No suitable management structure for integrated management of SRB exists at the moment No basin-scale monitoring system exists RBMC is in the process of establishment by the national authorities *Indicators:* New management structure for long-term management of SRB Establishment of Strumica RBMC Introduction of a basin-scale monitoring system	***Targets*** Proposals for management structure Implementation for monitoring structure Establishment of the Strumica River Basin Management Council	Activity 2.1.1 Piloting a basin-scale monitoring programme Activity 2.1.2 Strengthening integrated river basin management capacities through organizational maturation at local level Activity 2.1.3 Introducing cross-sectoral participatory mechanisms to democratize and decentralize water resources management	UNDP, MoEPP, CSEPR, municipalities	Expertise Project management support Basic facilities and equipment
Output 2.2 Lessons learnt and best practices are shared and replicated at national and international level *Baseline*:	***Targets*** Project promotion and networking Legal documents drafted	Activity 2.2.1 Contribute to and take part in existing knowledge networks Activity 2.2.2 Strengthening the legal and regulatory enabling environment for integrated flood risk management Activity 2.2.3 Communication, education and	UNDP, MoEPP, CSEPR, municipalities	Expertise Project management support Basic facilities and equipment

Insufficient number of knowledge products to raise awareness and promote better management practices *Indicators*: Number of knowledge products (manuals, guidance documents, lessons learnt booklets, fact sheets and articles)	Communication material and campaigns completed	public awareness raising for integrated water resources management		

VII. ANNUAL WORK PLAN

Year: 2015 / 2016

EXPECTED OUTPUTS *And baseline, associated indicatorsand annual targets*	PLANNED ACTIVITIES *List activity results and associated actions*	TIMEFRAME				RESPONSIBLE PARTY	PLANNED BUDGET		
		Q3	Q4	Q1	Q2		Funding Source	Budget Description	Amount (USD)
Output 1.1 Point source pollution to water bodies is reduced *Baseline*: Slow progress in phased pollution reduction by industrial operations because of limited enforcement capacity No wastewater treatment exists in SRB at present Only limited technical documentation for viable wastewater management solutions for priority communities in SRB exist at present *Indicators:* Initial characterization of Strumica river basin is carried out Baseline flood risk data are collected for the needs of the Preliminary Flood Risk Assessment Basin scale monitoring plan is proposed to support the	Activity 1.1.1 Strengthening municipal capacities for environmental permitting by applying the principles of integrated pollution prevention and control Activity 1.1.2 Support to municipalities in identifying the most feasible wastewater management approaches and preparing the necessary technical documentation Activity 1.1.3 Demonstrating small-scale decentralized wastewater treatment systems in selected rural communities in SRB	X	X	X	X	UNDP, MoEPP, CSEPR, municipalities	SDC	71200 72100 71400 74200 75100	110,000

characterization process *Targets:* Feasibility study on wastewater management options Initiation of capacity development programme for IPPC Start of preparation of technical documentation for wastewater management systems *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									
Output 1.2 Diffuse source pollution from agricultural runoff and erosion processes is reduced *Baseline*: Current farming practice rely on an uninformed use/ overuse of agrochemicals and irrigation water Limited or no agricultural land currently under sustainable farming practices (e.g., GAP or agro-ecological farming)	Activity 1.2.1 Reducing the use of agrochemicals and modifying irrigation practices to reduce agricultural runoff and to ensure more sustainable use of water resources	X	X	X	X	UNDP, MoEPP, CSEPR, MAFWE, municipalities	SDC	71400 72100 71600	146,000

Indicators: Quantifiable reduction of agrochemicals and water used for agriculture on pilot farms Size of land under improved farming practices *Targets:* Implementation of capacity development programme for agro-ecological farming practices Initiation of grants programme for farmers *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									
Output 1.3 Overall resilience of communities to the flooding hazard in SRB is enhanced *Baseline*: SRB is among the country's most vulnerable regions to the flooding hazard; significant economic losses have been encountered in the past years due to damage on agricultural	Activity 1.3.1 Basin-scale detailed analysis of flood risk and identification of feasible short- and long-term (systemic) flood risk mitigation options Activity 1.3.2 Optimizing the operating regimes of existing reservoirs and other water structures and introducing early warning system to reduce flood risk	X	X	X	X	UNDP, MoEPP, CSEPR, MAFWE, municipalities			250,000

land, infrastructure and other assets in SRB *Indicators* Size of land (hectares) under better protection against floods with certain probability Targets: Flood hazard and flood risk maps Implementation of priority flood risk mitigation measures *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	Activity 1.3.2 Implementation of selected set of basin-scale flood risk mitigation measures								
Output 2.1 Decentralized and adaptive basin-scale management of water resources is introduced *Baseline*: No suitable management structure for integrated management of SRB exists at the moment No basin-scale monitoring system exists	Activity 2.1.1 Piloting a basin-scale monitoring programme Activity 2.1.2 Strengthening integrated river basin management capacities through organizational maturation at local level Activity 2.1.3 Introducing cross-sectoral participatory mechanisms to democratize and decentralize water resources management	X	X	X	X	UNDP, MoEPP, CSEPR, MAFWE, Water Management Organization, municipalities	SDC	71200 72100 71400 74200 75100	80,000

RBMC is in the process of establishment by the national authorities *Indicators:* New management structure for long-term management of SRB Establishment of Strumica RBMC Introduction of a basin-scale monitoring system *Targets:* Initiation of monitoring programme Proposals on organizational setup for the future management of SRB *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									
Output 2.2 Lessons learnt and best practices are shared and replicated at national and international level *Baseline*: Insufficient number of knowledge products to raise awareness and promote better	Activity 2.2.1 Contribute to and take part in existing knowledge networks Activity 2.2.2 Strengthening the legal and regulatory enabling environment for integrated flood risk management Activity 2.2.3 Communication,	X	X	X	X	UNDP, MoEPP, CSEPR, municipalities	SDC	71200 72100 71400 74200 75100	75,000

management practices *Indicators*: Number of knowledge products (manuals, guidance documents, lessons learnt booklets, fact sheets and articles) Targets Awareness raising material Legal documents drafted Project promotion and networking *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	education and public awareness raising for integrated water resources management								
TOTAL									**611,000**

VIII. BUDGET BREAK DOWN

	Expected Outputs & Monitoring Activities	Key Activities	Budgetary Accounts*	Budget (CHF)
OUTCOME 1: Citizens and farmers reduce pressures on water bodies and enhance resilience of the Strumica River Basin to the flooding hazards	**Output 1.1** Point source pollution to water bodies is reduced	Activity 1.1.1 Strengthening municipal capacities for environmental permitting by applying the principles of integrated pollution prevention and control	71300 72115	5,000 70,000
		Activity 1.1.2 Support to municipalities in identifying the most feasible wastewater management approaches and preparing the necessary technical documentation	72115	100,000
		Activity 1.1.3 Demonstrating small-scale decentralized wastewater treatment systems in selected rural communities in SRB	72115 72105	25,000 500,000
		TOTAL Output 1.1:		**700,000**
	Output 1.2 Diffuse source pollution from agricultural runoff and erosion processes is reduced	Activity 1.2.1 Reducing the use of agrochemicals and modifying irrigation practices to reduce agricultural runoff and to ensure more sustainable use of water resources	72115 72300	150,000 405,000
		TOTAL Output 1.2		**555,000**
	Output 1.3 Overall resilience of communities to the flooding hazard in SRB is enhanced	Activity 1.3.1 Basin-scale detailed analysis of flood risk and identification of feasible short- and long-term (systemic) flood risk mitigation options	72115	35,000

		Activity 1.3.2 Optimizing the operating regimes of existing reservoirs and other water structures and introducing early warning system to reduce flood risk	72115	35,000
		Activity 1.3.2 Implementation of selected set of basin-scale flood risk mitigation measures	72105	756,930
			72200	65,000
		TOTAL Output 1.3		**891,930**
		TOTAL OUTCOME 1:		**2,146,930**
OUTCOME 2: Municipalities and the central level authorities efficiently apply integrated water resources management in the Strumica River Basin	**Output 2.1** Decentralized and adaptive basin-scale management of water resources is introduced	Activity 2.1.1 Piloting a basin-scale monitoring programme	72115	145,070
			72200	46,000
		Activity 2.1.2 Strengthening integrated river basin management capacities through organizational maturation at local level	71300	5,000
			72800	12,000
			72115	15,000
		Activity 2.1.3 Introducing cross-sectoral participatory mechanisms to democratize and decentralize water resources management	71600	20,000
		TOTAL Output 2.1		**243,070**
	Output 2.2 Lessons learnt and best practices are shared and replicated at national and international level	Activity 2.2.1 Contribute to and take part in existing knowledge networks	71200	5,000
			71600	20,000
		Activity 2.2.2 Strengthening the legal and regulatory enabling environment for integrated flood risk management	71300	10,000
			72115	25,000
		Activity 2.2.3 Communication, education and public awareness raising for integrated water resources management	72400	20,000

			74200	30,000
		TOTAL Output 2.2		**110,000**
		TOTAL OUTCOME 2:		**353,070**
PROJECT MANAGEMENT	General Management Support (8%)		75100	240,000
	Project staff		71400	200,000
		TOTAL MANAGEMENT:		**440,000**
		TOTAL PROJECT BUDGET:		**2,940,000**