United Nations Development Programme (UNDP) in Ukraine

Strengthening Disaster Risk Reduction and Recovery Project

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Background

Exceptionally heavy rainfalls during the last week of June 2020 have caused severe damage in five regions of western Ukraine—Ivano-Frankivsk, Chernivtsi, Transcarpathia, Ternopil, and Lviv Oblasts. Flash floods have resulted in human casualties (injuries and deaths), damage to housing and infrastructure (destroyed roads, bridges, transport connections). Ivano-Frankivsk Oblast was identified as the hardest hit.

The 22-23 June 2020 heavy rainfalls led to flash floods in the highlands' areas, as well as to flooding of plains along the Dniester River in Ivano-Frankivsk Oblast, having affected 263 settlements in 16 administrative sub-divisions. Four fatalities recorded due to the floods—three in the Verkhovyna district, one - in the town of Vorokhta, Yaremche City Council, while 276 km of roads were destroyed, and 603 km more were damaged. The floods destroyed 93 and damaged 249 bridges, while close to 80 km of bank protection structures were lost.

According to preliminary data, 20 residential buildings were completely destroyed; however, the number of households that were affected could have been higher. The rural population, accounting for about two thirds Oblast-wide with even greater shares in mountainous areas as the region is estimated to be the third least urbanized in Ukraine, suffered the most: both as a result of damages to their houses and gardens, as well as due to the damages to their agricultural fields (in total 7,411.25 hectares of agricultural land were flooded). Transport connections and natural gas supply were limited or completely severed in a number of settlements and having remained so through the summer of 2020 (5 settlements were cut off any transport connection by land; 2,967 customers in 20 settlements had to cope without natural gas supply).

On 1 July 2020, the Expert Commission of the State Emergency Service of Ukraine (SESU) classified the flooding in western Ukraine as an emergency of national level. The natural disaster exacerbated the plight of the region, already being among the most heavily affected by the spread of COVID-19 disease. According to Ivano-Frankivsk SESU, an estimated 13,000 families (approximately 39,000 people) in 263 settlements had been directly affected by the floods, including four lethal cases. SESU confirmed the complete destruction of at least 20 private houses. Infrastructure damage was reported to amount to approximately USD 74 million. An inter-agency UN humanitarian and recovery needs assessment mission was deployed on 07-10 July to the affected areas and provided recommendations for tackling the impact of the floods, enhancing the emergency response and recovery from the disaster.

During the mission, interlocutors in Ivano-Frankivsk Oblast reported that a usual monthly quantity of rainfall poured during just 3-4 hours on 22-23 June, leading to flash floods, landslides and rapid flooding of river plains. The intensification of such instances and the violent character of the flash floods has indicated that climate change might potentially lead to similar emergencies becoming more frequent and more devastating.

The mission visited eight affected communities and came up with findings in four specific areas of concern, including:

- Emergency Planning and Early Warning;
- Community Engagement/Public Information;
- Sustainable Water and Forest Management; and
- Management of Compensations and Insurance.

Across the listed areas of concern, major issues and potential ways to address them have been identified as follows.

Emergency Planning and Early Warning—Although according to both regional and local interviewees some emergency planning has existed at the Amalgamated Hromada (AH) and Oblast levels, flood forecasting and early warning have fallen short of an adequate design and implementation. The absence, intermittence or disruptions of reliable landline or mobile network coverage in affected areas (both highlands and Dniester plains) thwarted authorities' efforts from developing a robust system to ensure emergency safety measures, alert the public upon a contingency event and manage rescue operations at all levels. Concentrating on developing a sufficient communication infrastructure, as well as implementing digital solutions that would ensure timely access to appropriate information and alerts alongside the severity and spread forecasts, would subsequently enable those affected by the floods to take necessary precautions limiting the severity of damages to property or life.

Community Engagement—Local governments were found at times falling short of duly engaging their constituencies into disaster preparedness planning and risk education. Model Community Security Working Groups (CSWG) approach, piloted by UNDP Ukraine in conflict-affected Donetsk and Luhansk oblasts, has been recommended for consideration and trial to ensure both participative decision-making and engaging the members of the community in preparing for potential contingencies. Application of these community engagement and mobilization approaches has been proven, in eastern Ukraine, to improve the quality and implementation of decisions, as well as found instrumental in giving the members of the community an opportunity

to voice their concerns and perceptions. In addition, the CSWG approach, pursuing an ultimate goal of due public awareness and participation in preparation for, during and post-disaster, provides also for an avenue to implement psycho-social support (PSS) programmes at community level, taking into account the level of distress observed during the meetings with the victims of the floods.

Sustainable Water and Forest Management—Reportedly, the devastating effects of years of illegal logging have led to the water flows produced by rainfall being not retained on the slopes of the mountains and unprecedented resulting flash floods in mountainous areas of Ivano-Frankivsk Oblast. Poor forest governance and management contributes therefore to clogging up of riverbeds and insufficient discharge of surplus water during heavy rainfall in the highland areas, that devastates consequently the downstream communities, as in the case of Lanchyn community located on the foothill.

Recognizing logging as a staple economic activity for the livelihoods in the Carpathians, urgent action recommended to be taken to ensure sustainable forest management, cleanup and engagement of affected communities in monitoring illegal logging in affected areas, understanding the need of an integrated management of forest and water resources, as well as of the importance of a balanced approach to logging and re-forestation. A similar approach is expedient to develop along the river plains of the Dniester, promoting agriculture activities and water control measures in parallel to prevent devastating effects of heavy rainfall.

Management of Compensations and Insurance— The existing scheme of compensation distribution to the victims of the floods in Ivano-Frankivsk Oblast, ranging from UAH 300k to 100k to 50k individual payments depending on the severity of damages to affected properties, is prone to human error, misuse and, while remaining important in terms of restoring affected livelihoods, is hardly sufficient as a sound financial approach to sustainable mitigation of the effects of the disaster. Future interventions can promote a partial reallocation of respective state budgetary allocations and potential public or private insurance setups for the flood victims. The system to be put in place can range from obligatory to voluntary insurance, while engaging those insured in implementing measures to protect their houses or business facilities against damages resultant from a disaster.

As the above-stated findings from the assessment mission were shared with the Office of the Prime Minister of Ukraine, Prime Minister authorized consultations for developing a comprehensive strategy for flood prevention in Ivano-Frankivsk Oblast. The Oblast State

Administration has been assigned responsible for coordination among the government stakeholders, which included also the ministries of Environmental Protection and Natural Resources; Internal Affairs; Community and Regional Development, as well as the State Water Resources Agency.

Setting

Ukraine is home to circa 63 thousand rivers, 20 thousand lakes, 48 thousand ponds, over one thousand water reservoirs as well as at least five major canals. The country's exposure to geophysical and hydro meteorological risks continues to increase, and the June 2020 flooding in the western regions is another exemplification thereof. A changing climate is exacerbating these negative trends. Considering its economic structure, anthropogenic influence and geographic features, Ukraine is highly vulnerable to climate change and is exposed to disasters due to hydrometeorological phenomena and natural hazards, as well as human behaviour.

Among the factors contributing to the challenges are economic and social inequalities, urban migration, exploitation and degradation of the environment; government systems´ insufficient attention to disaster risk reduction and its impact on the lives of women and men from diverse groups, especially the most vulnerable. In addition, when disasters occur and recovery is not properly managed, gaps and inequalities worsen vulnerabilities, thereby contributing to a vicious cycle of incomplete recovery processes that generate conditions for new disasters. For any country to bounce back extreme events it is necessary to reduce disaster risks and strengthen institutional and community resilience to diminish the number of disasters, improve institutional capacities to prepare, respond to and manage disasters more effectively to avoid the loss of development achievements. The summer 2020 floods in Ivano-Frankivsk, among other western Ukrainian regions, Oblast serve as an example of the interdependencies and the need to pursue cross-dimensional approaches in disaster management.

Floods are natural phenomena which cannot be prevented. However, human activity is contributing to an increase in the likelihood and adverse impacts of extreme flood events. Firstly, the scale and frequency of floods are likely to increase due to climate change - which will bring higher intensity of rainfall - as well as to inappropriate river management, deforestation due to uncontrolled tree logging and construction in flood plains which reduces their capacity to absorb flood waters. Secondly, the number of people and economic assets located in flood risk zones continues to grow, appealing to the matters of sustainable urban and community planning.

Apart from direct losses caused by the high water, the damage left behind, as the floods recede, can be devastating and the fallout be consequential of many derivative challenges. Floodwaters often become contaminated with sewage or chemicals. Gas leaks and live power lines can be deadly, but are not obvious at first glance. On a larger scale, the floods ravage particularly livelihoods dependent on subsistence farming as well as the local economies relying, increasingly, on tourism as a source of income. Economic resilience of western Ukrainian regions, one of which is Ivano-Frankivsk Oblast, is therefore experiencing a compound pressure due to its orientation on the services and agriculture sectors and the coupling effects of the floods and COVID-19 pandemic. A comprehensive recovery approach that encompasses climate change adaptation (CCA) measures and helps the most affected and vulnerable recover from the recent floods is crucial to ensuring that multisectoral post-flood risks in affected regions are mitigated.

According to SESU analysis[1], the technologies for hydrometeorological forecasting available in Ukraine are currently insufficient to provide the population, regional and local authorities as well as business organizations with quality hydrometeorological information that would enable timely preparedness for natural disasters. This, specifically, includes the lack of automated systems for remote hydrometeorological monitoring as well as of technical personnel sufficiently skilled to operate such systems once they might be available.

As of 2018, weather observation was conducted in Ukraine at 282 facilities in 160 locations. Yearly, authorized Ukrainian hydrometeorological organizations produce the averages of ca. 100 thousand of general weather forecasts and of ca. 200 thousand of specialized weather forecasts, including some 15 thousand of forecast and advisory products relating to hydrology and surface water circulation and over five thousand of storm alerts, produced from a half day to ten days in advance of the suspected event. SESU estimates both forecastability and preventability with the national hydrometeorology and civil protection systems to be not less than 90%. Specifically in 2018, forecastability for water regimes determined at 87% for long-term forecasting, while reaching 99% for short-term forecasts.

The national hydrological observations system has consisted of 328 river and 59 lake stations. All the 328 river stations maintain records on water level and temperature measurements as well as ice regime. Water discharge has been measured at 290 stations, while the volumes of sediment yield have been analyzed at 93 facilities. Thirteen river basin councils have been created in Ukraine; two of which are the Dniester and the Prut basin councils inclusive of the areas laying in

[1] Analytical Review of Technological and Environmental Safety in Ukraine, 2018. Chapter Two: Natural Hazards.

Ivano-Frankivsk Oblast. The industry and agriculture consume about a third of the surface water intake each, while the municipal services account for a quarter of the volume country-wide.

Ivano-Frankivsk Oblast is situated in western part of Ukraine in the piedmont and uplands of the Eastern Carpathians—a country's region abundant in water resources[2] while distinct for the heightened risks of flooding. Rural population of 923 thousand outnumbers 447 thousand of urban dwellers as the total regional population is estimated at around 1.37 million. 240 settlements out of the total number of 804 incorporated in the region designated as mountain settlements[3]. The three river basins of the Dniester, the Prut, and the Cheremosh, encompassing within the Oblast, are characteristic of shower rain frequencies and intensities as incessant rains may persist for up to three days a row, at times altered by hail of up to 20 mm diameter.

8,321 rivers run across Ivano-Frankivsk Oblast with the vast majority belonging to whether the Dniester or the Prut basins—accounting for 4,763 and 3,549 water courses respectively, 70% of which are found in mountainous areas. The region's river network, served by 25 water measurement stations, aggregates at 15,636 km of length and accounts for 8.8% of the country's total water course discharge. Apart from rivers, over 50 lakes, water reservoirs and ponds stretching at over 4.1 thousand ha and retaining 94.2 million m^3.

Within the Oblast, flash floods are particularly rapid and destructive in the foothill and highland areas. Water levels in large or middle-size rivers increase for 0.4-1.5 m per day and the water flow velocities reach from 2 to 5 m per second. Flash flood durations vary from 5-10 days at small to 10 days at large rivers. Intense flash floods may trigger compound hazards as mudflows and landslides, endanger pipelines, bridges, water reservoir dams of Burshtyn and Chechva as well as water supply to the Burshtyn power plant and other industrial facilities.

As the late June 2020 heavy rainfall soaked the soil in mountainous areas, the water contents soared resulting in an increased mudflow and landslide activity that caused transport disconnections specifically in 32 affected settlements in Verkhovyna, Kosiv, Nadvirna, and Tlumach Raions, having also disrupted movement along the Lviv-Mukachevo national highway near Yaremche. The weakened retention capacities on mountain slopes decrease the time water runs within wooded areas to reach the water course from the conventional three hours to a half an hour.

[2] Third in terms of surface water resources among the country's regions.

[3] As defined by the Law of Ukraine on the Status of Mountain Settlements; adopted in 1995, last amended in 2006.

The Prime Minister of Ukraine designated Ivano-Frankivsk Oblast Administration and four government agencies—the Ministry of Environmental Protection and Natural Resources; the Ministry of Internal Affairs; the Ministry of Community and Regional Development; the State Water Resources Agency—to work together, under the regional administration's coordination, on a regional strategy for flood prevention in Ivano-Frankivsk Oblast.

For coordination of emergency prevention and response, **Ivano-Frankivsk Oblast Administration**, similarly to other Ukraine's regional administrations, has created a regional commission on technological & environmental safety and emergencies chaired by the head of administration—the regional governor. Under an individual emergency, a dedicated emergency operations centre can be created and run by the designated deputy governor—the emergency response coordinator. Regional SESU department, in this case, mobilizes and deploys responders. Within the Oblast, the regional commission is in charge of coordination among the functional and local sub-systems of the Unified System of Civil Protection as stipulated in Civil Protection Code.

Among the four strands of work laid out for the **Ministry of Internal Affairs** in the context of national security and community safety is **civil protection** led by the State Emergency Service (SESU)[4].

The Minister of Internal Affairs represents SESU at the Cabinet of Ministers as the Head of Service does not hold Cabinet membership. The Ministry is responsible for both the **formation and execution** of policy in the areas of civil protection, the protection of the population and areas from emergencies and their prevention, emergency response, firefighting, fire and technological safety, search and rescue services as well hydrometeorological activity. SESU, meanwhile, is mandated solely with the **execution** of government policies in all the listed domains.

The Ministry of Internal Affairs is responsible for developing the most important long-term strategic planning document in the civil protection area—the national Public Security and Civil Protection Strategy, as well as the Public Security and Civil Protection Review assessing the Strategy's implementation status. An inaugural edition of Public Security and Civil Protection Strategy has been commissioned for release in spring 2021. The Public Security and Civil Protection Review's issue is commanded by the National Defence and Security Council and shall include two main elements—a public security review and a civil protection review. The civil protection review is defined as a procedure of assessment on the preparedness of the unified

[4] Law on National Security, Article 18.

system of civil protection, its functional and regional sub-systems, of civil protection forces for response to potential emergencies and of the protection of population and areas from such situations.

The **State Emergency Service of Ukraine (SESU)** is a central executive body directed and coordinated by the Cabinet of Ministers through the Minister of Internal Affairs. The Head of the Service is not a member of the Cabinet of Ministers—SESU is represented by the Minister of Internal Affairs at Cabinet meetings unless an extended meeting is summoned. SESU's areas of work, as specified in the Civil Protection Code, Law on National Security and the agency Regulation[5], include:

- civil protection;
- the protection of population and areas from emergencies and prevention thereof;
- emergency response;
- firefighting;
- fire and technological safety;
- search and rescue services; and
- hydrometeorological activity.

An important caveat to repeat is that, as set out in the legislation, SESU provides for the execution of government policies in the named areas, while no mandate for policy formation—in Ukraine practice, a prerogative of full-fledged Cabinet ministries—is vested with the Service.

As the Ministry of Internal Affairs is responsible for issuing, at National Security and Defence Council request, the Public Security and Civil Protection Review, SESU also provides a regular overview in the form of yearly Analytical Review of Technological and Environmental Safety[6].

SESU, alongside the prevention and response mandates, sets approaches for the classification of emergencies to assess their scale and the respective capabilities needed to address a disaster as well as for estimating the resultant loss. The Civil Protection Code outlines the principles for classification of emergencies, specifically by the origin, scope, resources needed to respond as well as human and material losses. By the origin, the following types of emergencies are introduced:

- technological;
- natural;
- social; and

[5] Regulation on State Emergency Service of Ukraine. Last revised and approved by the Cabinet of Ministers of 16 December 2015.

[6] Most recent version available in open sources is accessible at: https://www.dsns.gov.ua/ua/Analitichniy-oglyad-stanu-tehnogennoyi-ta-prirodnoyi-bezpeki-v--Ukrayini-za-2015-rik.html

- military.

By the scope, emergencies are classified into the following types:

- national level;
- regional level;
- local level; and
- object level[7].

Specific provisions on the use of the outlined classifications are set by SESU which *de facto* serves as the National Disaster Management Agency (NDMA) as described in the table below.

<table>
<tr><th>Level</th><th>Area affected/Resources required</th><th>No. of people affected</th><th>Material loss</th></tr>
<tr><td rowspan="2">National</td><td rowspan="2">● Spillover to other countries
● Two or more regions
● Resources required exceed the capacity of the affected regions≥1% of regional budget expenditures</td><td>● Over 10 dead
● Over 300 casualties
● Over 50,000 normal living conditions disrupted</td><td>Over 150,000 minimum wage</td></tr>
<tr><td colspan="2">● Over 5 dead
● Over 100 casualties
● Over 10,000 normal living conditions disrupted for longer than 3 days
● Over 25,000 minimum wage</td></tr>
<tr><td>Regional</td><td>● Two or more districts
● Resources required exceed the capacity of the affected districts≥1% of local budget expenditures</td><td>● 3-5 dead
● 50-100 casualties
● 1,000-10,000 normal living conditions disrupted for longer than 3 days <u>in combination with</u> Over 5,000 minimum wage</td><td>Over 15,000 minimum wage</td></tr>
<tr><td>Local</td><td>● Beyond a single object
● Endangering the environment, nearby populated area, structures and buildings
● Resources required exceed those available at a single object</td><td>1-2 dead
20-50 casualties
1,000-10,000 normal living conditions disrupted for longer than 3 days <u>in combination with</u> Over 500 minimum wage</td><td>Over 2,000 minimum wage</td></tr>
<tr><td>Object</td><td colspan="3">Any other</td></tr>
</table>

[7]Civil Protection Code, Article 5.

According to the mandate specified in the Water Code of Ukraine, the State Water Resources Agency is responsible for flood prevention measures within rural settlements and agricultural land plots. Also, the Agency operates 583 emergency service crews of a 4.3 thousand workforce, equipped with 58 boats, 140 buses, and 235 pumps including 71 mobile pumping stations. For flood prevention within the state-run irrigation system, 113 drainage pumping stations and 254 drainage wells deployed draining the amounts of water in excess of 1.5 million m^3 yearly. However, the key contribution into the water disaster risk reduction process on part of the State Water Agency identifies as prevention within its specifically designated domain—rural and agricultural areas. The Ministry of Environmental Protection and Natural Resources, as the Agency's parent institution, is responsible for the creation and maintenance of the flood prevention functional sub-system of the national Unified System of Civil Protection. The Ministry of Community and Regional Development is responsible for the creation and maintenance of a functional civil protection sub-system for municipal infrastructure.

Meanwhile, Article 107 of the Water Code of Ukraine entrusts the Cabinet of Ministers to approve plans on flood risk management. It, remarkably, notes the development of flood risk management plans to focus on specific areas within a river basin. The Regulation on the Development of Flood Risk Management Plans[8] outlines elements mandatory for inclusion into a flood risk management plan, namely:

- risk management targets;
- set of measures and their sequence as regards prevention, protection, preparedness, forecasting and early warning system within a defined river basin's area;
- for transboundary basin areas—a feasibility study for those measures having cross-border implications;
- an implementation assessment register;
- priorities and modalities of monitoring; and
- public authority interlocutors and coordination mechanisms for a river basin's transboundary portions.

Additionally, a flood risk management plan shall be supplemented with:

- an analysis of flooding historical data, findings from a preliminary risk assessment, a map of the area within a river basin where the limits of zones of a high risk of flooding are defined;

[8] Enacted by the Cabinet of Ministers on 04 April 2018.

- flood risk and threat maps with explicatory notes; and
- a report on public information and public discussion as pertains to the draft flood risk management plan.

The Ministry of Internal Affairs has approved a methodology on flood risk and threat mapping[9]. The Methodology differentiates between flood risk maps and flood threat maps, defined respectively as:

- flood risk map—a map exhibiting potential adverse effects from flooding of a low, medium or high probability; and
- flood threat map—a map defining territories that can be flooded with a low, medium or high probability.

Probability scenario in flood risk and threat mapping shall include the degree of probability as follows:

- low—flooding less frequent than once in 500 years (0.2%);
- medium—flooding less frequent than once in 100 years (1%); and
- high—flooding less frequent than once in 10 years (10%).

Another compulsory requirement in flood prevention and response strategic planning is for SESU to conduct a strategic environmental assessment under the Convention on Environmental Impact Assessment in a Transboundary Context (Espoo Convention) given also the transboundary nature of the Dniester and the Prut/Siret river basins.

Risk assessment of an actual emergency is conducted by SESU, within the Ministry of Internal Affairs system, as the central executive body in charge of hydrometeorological activity under the formal system of emergency classification, which includes hydrological and meteorological hazards under the natural disaster hazard group.

At a stage of actual disaster breaking out, the Oblast-run regional commission on technological & environmental safety and emergencies participates in fallout assessment, usually through the regional commission's secretariat customarily housed within the regional administration's dedicated civil protection department. Nevertheless, SESU's expert commission chaired by the

[9] Order of the Ministry of Internal Affairs of Ukraine of 28 February 2018; registered with the Ministry of Justice on 22 March 2018.

First Deputy Head of the Service have a last say approving disaster loss estimates, including those pertinent to floods.

Summing up from the above, a conclusion can be deduced that although a flood prevention strategy would require an inter-ministerial approach with stakeholders contributing into various elements of disaster management cycle, SESU, based on the existing national framework, would remain responsible primarily for the response element, while the line ministries—the Community and Regional Development and the Environmental Protection and Natural Resources represented by the State Water Resources Agency—would be in charge foremost for the prevention elements, each within the defined civil protection functional sub-system. Regional administration, meanwhile, will exercise coordination function linking the functional and territorial civil protection sub-system at the Oblast level. Raion administrations embody the local-level civil protection sub-system and will follow the general coordination pattern of regional and local commissions on technological & environmental safety and emergencies. Due to the identified regional interconnectedness of flooding and logging contexts, the State Forest Resources Agency, another Ministry of Environmental Protection's affiliate, should also be involved in the strategy development process as concerns the prevention portions.

Stakeholder consultations

A series of consultations dedicated to flood impact assessment and the prevention strategy development was conducted in September-October 2020 with stakeholders in Ivano-Frankivsk Oblast and at central level.

Ivano-Frankivsk Oblast Administration was represented in the consultations by deputy governor Maria Savka, who led the response to flash floods in June 2020 and has been leading the recovery efforts, and by Volodymyr Stebnytsky, the head of the administration's civil protection department. The regional administration stressed the difference of experiences within the typology of areas affected by floods, namely the Dniester River plains, foothill, and highland areas.

Prevention has been pointed out as a long overlooked element in the disaster management cycle in the region and therefore the prospective flood prevention strategy should help to close outstanding gaps hampering also regional development. Based on the available experience and knowledge, a risk assessment model disaggregating seasonal risks can be developed.

Ivano-Frankivsk Oblast Administration suggested prioritizing elements within the regional flood prevention strategy as follows:

- automated controls via the introduction of state-of-the-art technology;
- developing capacities at regional level for disaster risk analysis, modelling, and long-term foresight;
- development of public alert system, in line with the country's current SDG target;
- the upgrade of the regional system of flood defenses.

According to the regional officials, the approaches to disaster risk reduction should be revised as the region witnesses increasing frequencies of flooding—as previously a similarly destructive and scaled disaster would happen normally once a decade, flash floods scalable to the June 2020 events have recently become hardly short of annual. One of potential hotspots, capable of causing especially far-reaching implications, was pointed out as the Dombrovsky quarry in Kalush. A repository of hazardous chemical substances present in the location, once tampered by intense flash floods, may produce particularly harmful spillovers into the Dniester tributaries to eventually effect the transboundary water intake in Romania. This would affect Ukraine's ability to comply with undertaken regional commitments, including under the Framework Convention on the Protection and Sustainable Development of the Carpathians (Carpathian Convention)[10], which has become worldwide only second (along the Alpine Convention) sub-regional treaty on protecting a mountain range.

The effective Ivano-Frankivsk Oblast Regional Development Strategy-2027 recognizes as Strategic Goal 3 'The creation of comfortable and safe living environment in Ivano-Frankivsk Oblast'. The Strategic Goal sets a further Operational Target 3.4 'Improved environmental security/safety', which mentions particularly the hazards of compound hydrometeorological disasters. The two derivative tasks in support of the Target's attainment include:

3.4.4. Civil Protection of Oblast population

- improvement and upgrade of the public alert system;
- the creation of a regional SESU centre for operations coordination and training & personnel recuperation.

3.4.5. Preservation and extension of natural conservation areas, reforestation

[10] http://www.carpathianconvention.org/text-of-the-convention.html

- land planning, survey and delineation in the natural conservation areas;
- environmentally sound use of natural resources;
- inventory of the natural conservation areas;
- the protection of ecosystems from anthropogenic impacts.

The Strategy is implemented within two phases—2021-2023 and 2024-2027—as implementation plans are being designed and adopted for each of the phases.

Roman Mykhailiuk, head of the Dniester Basin department of the State Water Resources Agency, shared an opinion that the development of information management and fiscal capacities should be keystone for developing a regional flood prevention strategy. The current regional Programme on the Development of Water Management 2013-2021 has been underfinanced since its very inception and has generally failed to both secure the appropriate condition of water control structures and respond timely to water course clogging. Across the Oblast, there have been sharp structural imbalances in revenues mobilized under the regional and local environmental funds used for post-disaster recovery. As the environmental funds are replenished from environmental tax revenues, the relative low numbers of taxpayer enterprises coupled with their imbalanced geographical distribution cause disparities in the ability to accumulate disaster management funds across administrative districts. Hydrometeorological data management should become more effective as various information systems are used in different river basins in western Ukraine.

Volodymyr Chernetsky, SESU Regional Director, and Mykola Burlak, Head of International Cooperation Section at the SESU Regional Department, presented the State Emergency Service during stakeholder consultations as well as provided an overview of disaster management coordination mechanisms existing in Ivano-Frankivsk Oblast. The coordination mechanism follows Ukraine's standard pattern as the regional commission on technological & environmental safety and emergencies, chaired by the Head of regional administration, plays the lead role whilst SESU delivers its largely response-focused mandate.

SESU shared a loss estimate for the summer 2020 floods in Ivano-Frankivsk Oblast as broken down per administrative districts below. Important to note in this context upfront that all population number estimates are made by local authorities and usually are not a verifiable statistic. Lack of actual demographic information, as census has not been conducted in Ukraine for the last 19 years, impedes running a sound needs assessment for disaster risk reduction.

no.	Sub-division	Latest population estimate	Flooded				Destroyed		Damaged		Water supply intakes disrupted	Water wells flooded	Agricultural land affected, ha	Population evacuated	Population salvaged
			Settlements	Number of buildings	Healthcare facilities	Number of land plots	Motorways, km	Number of bridges	Motorways, km	Number of bridges					
1	Bohorodchany Raion	70,120	19	70	0	17	5.1	6	8.5	10	1	0	575	0	1
2	Dolyna Raion	69,851	23	301	0	257	0	0	58	39	0	0	219	9	8
3	Halych Raion	42,539	20	1,473	1	1,253	0	0	0	4	0	1,115	36	134	0
4	Horodenka Raion	54,329	7	8	0	140	0	0	0	0	0	0	14.25	16	1
5	Ivano-Frankivsk City	230,507	5	136	7	250	0	0	11.4	1	1	10	194	20	4
6	Kalush Raion	60,339	30	839	1	4,630	19	4	94.6	26	0	4,630	0	136	140
7	Kolomyia Raion	100,511	37	349	2	378	0	0	5	14	0	986	0	23	48
8	Kosiv Raion	88,465	7	139	0	257	0.8	5	17.87	4	0	0	580	0	0
9	Nadvirna Raion	115,135	15	2,318	0	2,318	52	12	58	32	0	0	2,130	53	53
10	Rohatyn Raion	42,789	3	42	0	102	0	0	0	0	0	25	0	0	3
11	Rozhniativ Raion	73,511	17	2,988	0	2,988	92	12	79.7	28	0	673	478	34	34
12	Sniatyn Raion	65,975	25	508	1	1,277	5	1	28.8	0	0	1,200	225	470	36
13	Tysmenytsia Raion	83,186	17	2,750	3	2,750	0	11	4	11	1	2,500	2,750	60	75
14	Tlumach Raion	48,640	10	327	0	538	0	0	0	0	0	741	200	36	0
15	Verkhovyna Raion	30,224	23	256	1	256	48.7	25	212.4	70	0	256	0	11	0
16	Yaremche City	23,121	5	613	1	690	53	17	25	10	2	425	10	0	1
Total			**263**	**13,117**	**17**	**18,101**	**275.6**	**93**	**603.3**	**249**	**5**	**12,561**	**7,411.25**	**1,002**	**404**

Visits were arranged to specific hard-hit villages across Ivano-Frankivsk Oblast to witness the emergency scene and meet with local officials in charge of recovery. The visits helped to gain an on-site understanding of what are the flash floods repercussions specific for the essential types of areas as the Dniester River plains, the foothill, and Carpathian highlands. The areas toured and the local officials consulted are listed below:

***Dniester River plains**:*

- Halych—Orest Trachyk, mayor;
- Dubivtsi, Halych Raion—Svitlana Liudera, chair of village council;
- Nyzhniv, Tlumach Raion—Lesia Kovaliuk, chair of village council;

Foothill

- Lanchyn, Nadvirna Raion—Volodymyr Popovych, head of the Lanchyn Amalgamated Territorial Community;

Highlands

- Verkhovyna Raion—Svitlana Urshedzhuk, deputy head of Raion administration.

In urban environment, as in the city of Halych, the greatest immediate damage from flash floods came to the older multi-story residential buildings as well as to the social infrastructure, including driveways to the local hospital, school and kindergarten edifices. A genuine challenge at the local level is the potential impact of the ongoing decentralization reform onto the civil protection realm. Specifically, the Civil Protection Code bears no reference to decentralized amalgamated territorial communities gradually replacing the local government structures existed previously as well as no framework legislation on amalgamated communities providing for civil protection arrangements within this jurisdictional layer is available at the moment. Moreover, local governments experience shortage of experts qualified in conducting loss assessments. In a lowland village of Dubyntsi in Halych Raion, the water has not reached residential areas, but instead damaged the river dam and locks.

In Nyzhniv, Tlumach Raion—a village situated next to the Dniester National Park—only private households were almost exclusively affected. Circa 70 out of total 150 households affected received assistance by October 2020. Local village councilors have considered climate change to blame for more frequent floods as the Dniester, relative to other rivers of comparable size of Ukraine, is more dependent on water supplies from sources other than underground, including

rain and snow. However, in the river plain areas those directly affected are land plots in immediate proximity to the river flow and its tributaries. A railway bridge crossing the Dniester may potentially present a challenge in terms of infrastructure, but no visible damage to that portion of the area was visible during the visit.

A more compound set of challenges was presented in the areas of altitudinal zonation, as the foothill Lanchyn and highland Verkhovyna.

The Lanchyn Amalgamated Territorial Community is home to a circa 10 thousand population with 8.8 thousand inhabiting the village proper. Although exact figures are difficult to draw as, similarly to most other affected settlements a significant share of adult dwellers had been irregularly present in the area due to labour migration, an estimated number of those affected in the densely populated area was given at around 2 thousand. Flood hazards in Lanchyn have come from the Prut River and its tributary streams running across the village in abundance. For prevention of future floods, protective gabions were erected along the water flows in Lanchyn.

At the scene of flood damages, recovery works in Lanchyn were observed as ongoing and particularly intense if compared to the Dniester plain or highland spots. Moreover, the foothill setting is unique also out of the three due to residential areas located immediately close to the disaster hotspot, with no distance observed especially from the numerous Prut tributary stream flows. Although Lanchyn according to the local interlocutors has not enjoyed a mountain settlement status, many houses were visibly clustered along comparatively steep slopes.

Protective gabion construction in the foothill village of Lanchyn, Nadvirna Raion. September 2020

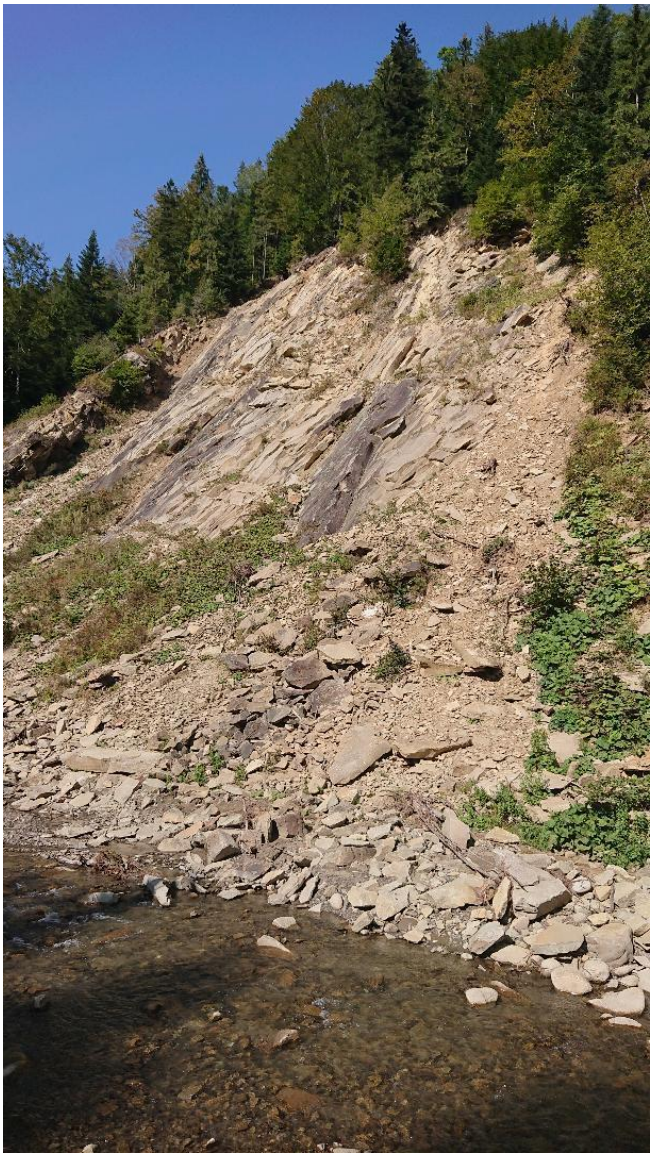
As a warning sign of the hydrometeorological and geological hazards attaining an ever increasing complexity and interconnectedness, an avulsion of the Prut River flow in Lanchyn was identified after the June 2020 floods as water subsided. Bank erosion has intensified threatening to affect the village's portion containing the local school.

The Prut River's avulsion in Lanchyn. September 2020

Due to the population density, observed the highest in the foothill among the three types of areas visited, residential vulnerability to floods in Lanchyn is harder avoidable than in the Verkhovyna highlands. Highlander households are built mostly at sufficient altitudes and within distances ensuring less of immediate interaction with water in flash floods. However, the distinct local vulnerabilities are:

- seismic activity, by far the highest of all the Oblast; and
- the lowest mobile network coverage and Internet penetration.

The area's seismicity makes it susceptible to compound effects of flash floods. E.g., the June 2020 disaster exacerbated slow onset of geological hazards, including the landslide processes in the Cheremosh River basin.



A landslide-susceptible area by the Cheremosh River bank in Verkhovyna Raion. September 2020

A makeshift bridge over the Cheremosh River in Verkhovyna Raion. September 2020

Three out of four fatalities from the flash floods were recorded in Verkhovyna Raion, while another one—in a foothill area near the city of Yaremche. That has been another indicator leading to an overall conclusion of the consultative process that the three sub-regions of river plains, foothill, and highlands experience flash floods differently. The most direct effect on both livelihoods and nature is observed in the densely populated foothill areas, as the village of Lanchyn. In highland areas, flash floods disproportionately affect the especially fragile, in the mountainous conditions, infrastructure while the response is particularly complicated due to difficulty of access and poor communications and signals facilities as well as road conditions. The higher up in the mountains, the shallower and more rapid rivers are; while, relatively of less direct effect onto households, flash floods particularly devastate the communities in terms of their connectedness to outside world, already strained due to the harsh location and conditions.

Eventually, the lowland river plains would particularly benefit from risk-oriented approaches to spatial planning and resilience measures while water control effectiveness there is greater dependent on timely assessment of the condition of locks and dams which were proven whether inadequate or obsolete by the recent disaster.

National strategic framework

A new edition of the National Security Strategy of Ukraine was adopted in September 2020. The National Security Strategy, among others, for the first time introduced Climate Change Adaptation (CCA) to the national security lexicon linking its implication to the growing numbers and effects of natural disasters in Ukraine. The Strategy also points out environmental security 'a top priority', prioritizing environmental sustainability, municipal infrastructure modernization, strengthening of environmental protection, novel waste management approaches, gas emission reduction, the protection of forests and water bodies, disaster prevention and mitigation. The National Security Strategy also stresses the need in 'optimization' of civil protection system through enhancing the structure, coordination and control systems.

The National Security Strategy has mandated the development, by mid-March 2021, of a number of derivative strategies. A few of them are directly related to civil protection and disaster risk reduction, including:

- a Public Security and Civil Protection Strategy—to be developed by the Ministry of Internal Affairs and submitted to the National Security and Defence Council by the Cabinet of Ministers; and
- an Environmental Security and Climate Change Adaptation Strategy—to be developed and approved directly by the Cabinet of Ministers.

The inaugural edition of Public Security and Civil Protection Strategy should eventually be followed by a Public Security and Civil Protection Review which includes two essential elements—a public security review and a civil protection review. The civil protection review is defined as a procedure of assessment on the preparedness of the unified system of civil protection, its functional and regional sub-systems, of civil protection forces for response to potential emergencies and of the protection of population and areas from such situations. SESU takes the lead in the national Public Security and Civil Protection Strategy development as well in the Public Security and Civil Protection Review process as pertains to disaster risk reduction.

The Environmental Security and Climate Change Adaptation Strategy development process, in turn, is likely to be overseen by the Ministry of Environmental Protection and Natural Resources and imply close involvement of its affiliates as the State Water Resources Agency and the State Forest Resources Agency.

The two strategies' development and design processes should be synchronized and aligned with the view of proper inclusion thereto of disaster risk reduction in general, and of flood prevention strategies in particular. The respective inputs to both of the strategies should reflect the specificities communities experience in Ivano-Frankivsk Oblast as per their lowland, foothill, and highland locations. Given the mandates discussed in the stakeholder mapping section, the Environmental Security and CCA Strategy would likely bear a more pronounced inclination toward prevention and mitigation, while the Public Security and Civil Protection Strategy, as concerns disaster management, certainly stress the genuine emphasis on response. The strategies should also look to introduce a uniform disaster risk reduction glossary for the national discourse, as the current practice is rather haphazard and features numerous borrowings from international documents and publications which, however, are often just loosely connected to equivalent Ukrainian terminology.

For priority actions under the recovery strand of flood hazard management, an improvement of legislative framework concerning the environmental fund usage looks at the moment as most expedient. The pressing issue in recovery remains inconsistency in compensation practices, prone to human error and discretional judgement. Local authorities and communities should, on one hand, enjoy more of fiscal room in mobilizing funds for repairing after damages done to particularly private households—a wicked problem, similarly familiar to conflict-affected populations in eastern Ukraine. On the other hand, alternative funding methods, including blended financing, should be introduced in recovery and future prevention in order to decrease the burden and dependencies on public budgets.

The national strategy development process for the Environmental Security and CCA Strategy and for the Public Security and Civil Protection Strategy would therefore be in line with the Sendai Framework on Disaster Risk Reduction for 2015-2030 as it targets number of countries with national and local disaster risk reduction strategies as the most urgent priority. Further proportions of local governments that adopt and implement local disaster risk reduction strategies are, in a situation like Ukraine's where national government has only been making first essential steps under the Sendai Framework, are of a more derivative nature from this strategic process.

The process shall be aligned with national priorities, the most important thereof is European integration under the EU-Ukraine Association Agreement. As part of the

association under the environment commitments, Ukraine has joined the EU Directive 2007/60/EC of 23 October 2007 on the assessment and management of flood risks. SESU has designed an action plan for 2020-2022 including the elements as follows:

- June 2020-March 2021: Risk management plans for high-risk areas within river basins; strategic environmental assessment;
- June-December 2021: Public discussion of risk management plans;
- December 2021-May 2022: Stakeholder review and discussion (public authorities and local governments); and
- June 2022: Plans submitted by SESU to the Ministry of Internal Affairs for further submission for approval by the Cabinet of Ministers.

SDG framework

Ukraine has embarked on a number of commitments under the SDG attainment process. The first Voluntary National Review published in 2020 assessed progress towards achievement of SDGs in Ukraine. Goal 11 'Sustainable Developments of Cities and Communities' appeals directly to strengthening disaster risk reduction at community level through Target 11.4 'Ensure timely public alert about emergencies through innovative technologies'. Positive dynamics has been recorded in recent years in the level of implementation (creation, modernization, improvement) of local automated centralized public alert systems – from 0.05 in 2015 to

0.2 in 2019 country-wide. It is expected that implementation of the public alert systems will enhance the general level of civil protection of the population in Ukraine's regions.

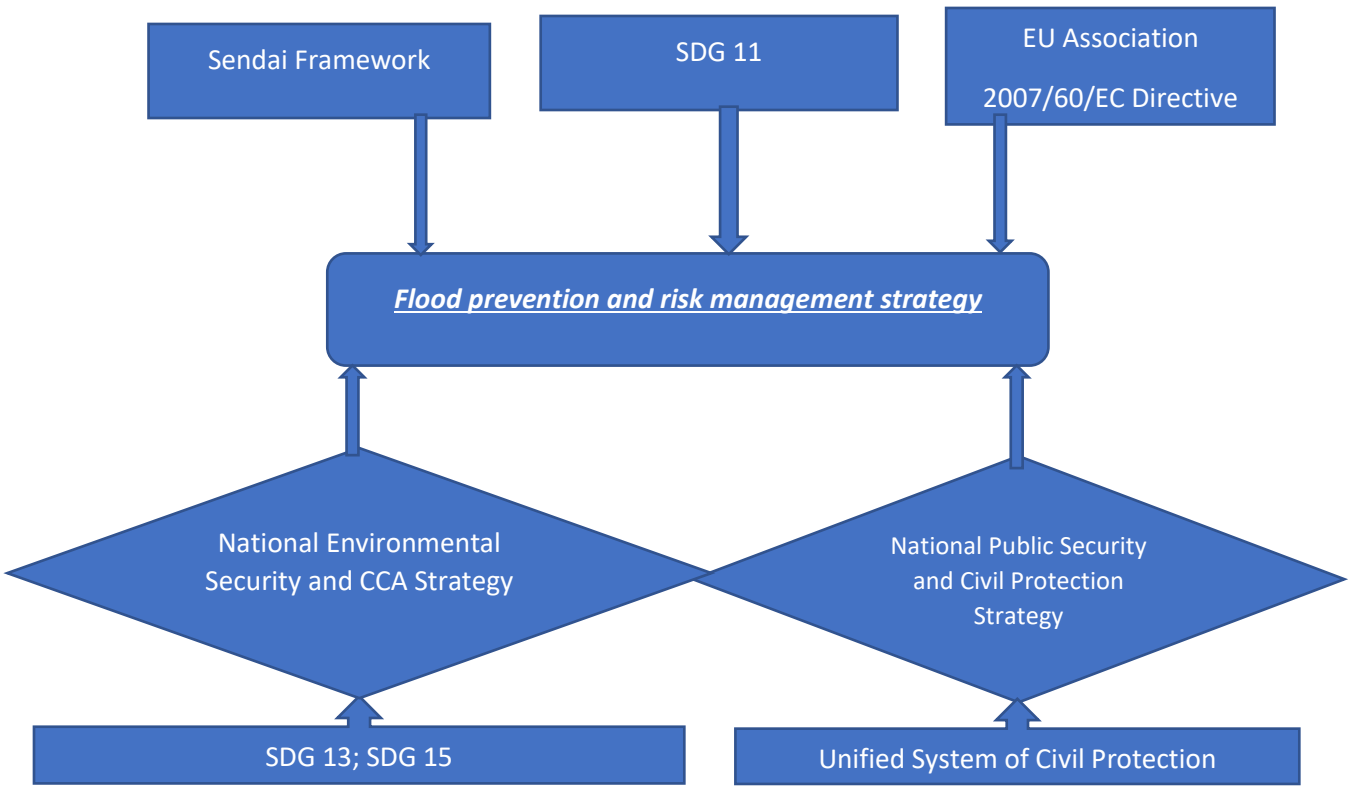
Currently, public alert in emergency in Ivano-Frankivsk Oblast is carried out by the duty officer at the regional administration's civil protection department. This is done through a centralized regional system which includes electric siren, telecommunication and cellular networks. Rural and remote mountainous areas present challenges for a consistent operation of the regional public alert system due to inherently lower levels of the coverage and Internet penetration.

Meanwhile, SESU personnel use analog VHF radio systems which are increasingly susceptible to ever more frequent jams caused by the growing numbers and densities of technology devices. Mountainous relief of a large part of Ivano-Frankivsk Oblast, including the areas particularly

prone to natural disasters, adds to the complexity having to be dealt with by SESU responders when organizing and maintaining proper control and communication processes and stresses the need of introducing digital solutions thereto.

According to SESU analysis of the June 2020 flash floods, an appropriate public alert system to fully reflect the local specificities should also include off-road motor vehicles capable of reaching remote areas otherwise hardly reachable due to the rugged terrain. Similarly, the Sustainable Development Goals 13 'Mitigate Climate Change Impact' and especially 15 'Protect and Restore Terrestrial Ecosystems' provide linkages between disaster risk reduction, and flood management in particular, and the broader Climate Change Adaptation agenda.

The SDG attainment process shall therefore become yet another one element in the flood prevention strategic process which can be exhibited in the following way:



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