



Hellenic Red Cross (HRC) volunteers distributing water in Athens during a heatwave in July 2022. Photo credit: HRC

sEAP No: sEAP2023GR01	Total Budget CHF 217,260	Readiness: CHF 101,708	Prepositioning: CHF 51,653	Early Action: CHF 63,900
People to be assisted: 2,000 People ¹	sEAP approved: 22/09/2023	sEAP timeframe: 2 Years	sEAP lead time: 5 days	Operational timeframe: 3 months
Prioritized geographical areas: Cities of Athens, Patras, and Thessaloniki				

RISK ANALYSIS AND EARLY ACTION SELECTION

Prioritized hazard and its historical impact

Every year, heatwaves claim the lives of vulnerable people, including infants, older people, homeless and people with chronic health conditions. In fact, extreme heat kills more people per year than any other climate disaster, and negatively affects nearly every human activity and society worldwide. The magnitude of the danger and the number of people exposed to extreme heat only rises as the world urbanizes. More intense and frequent heatwaves are already occurring in many parts of the world. Their frequency and intensity are expected to rise globally due to climate change.

People living in urban areas are amongst the hardest hit when a heatwave occurs because cities are hotter than the surrounding countryside. The urban poor frequently bear the brunt of extreme heat, however, all too often this is a **silent emergency** – out of the headlines and without the attention and focus needed. In addition to threatening the lives and health of vulnerable populations, heatwaves have cascading impacts in other areas of society, such as reduced economic output, strained health systems, rolling power outages and devastating forest fires. The Lancet estimates that in 2017, 153 billion hours of work were lost due to extreme heat. However,

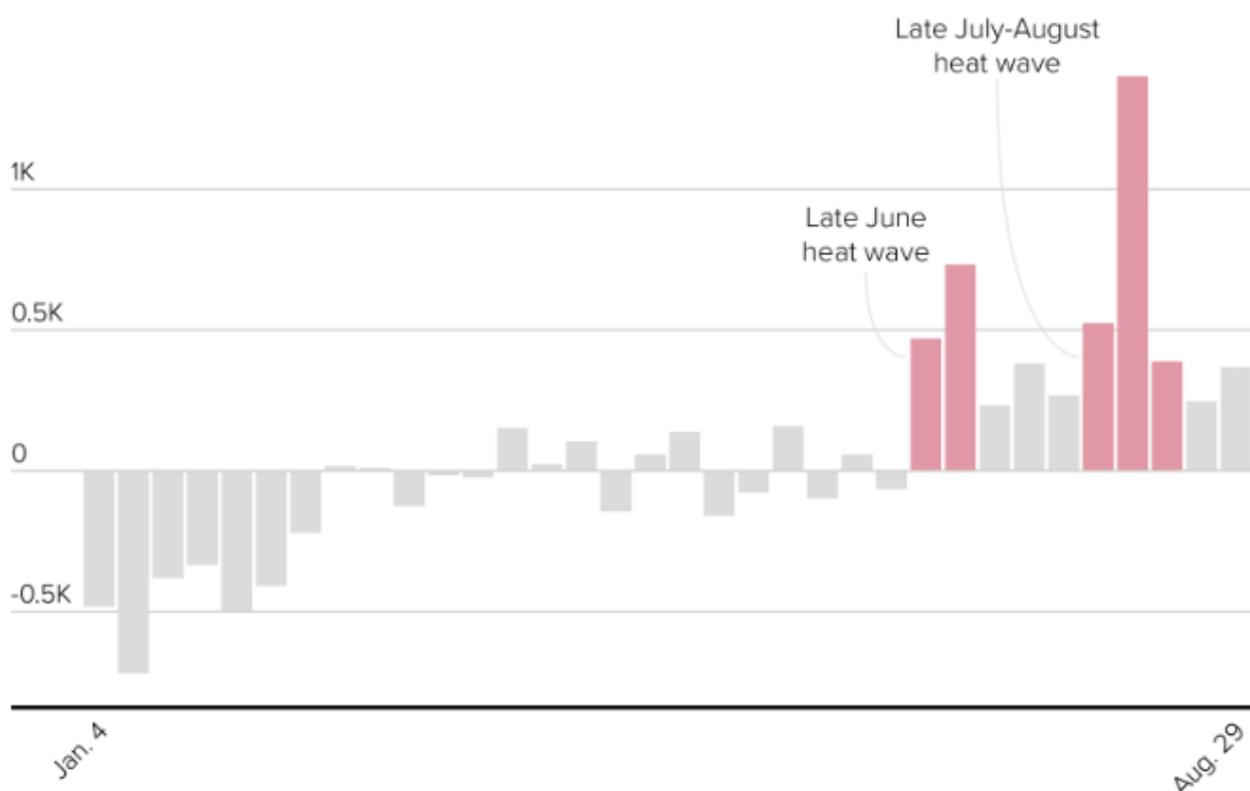
¹ This figure includes people reached directly through HRC services and doesn't include people reached through large scale information campaigns on social media or other mass communication mediums. Indirect reach target is 10,000 people.

deaths from heatwaves are not inevitable and they can be greatly reduced through the implementation of relatively simple and cost-effective actions.

Rising temperatures continue to have devastating consequences in Greece. In 2021, wildfires burned more than 100,000 hectares of land across Greece, resulting in billions of dollars' worth of damages. Athens is the hottest capital city in mainland Europe. The Greek capital city has experienced long-lasting and record-setting heatwaves in 2021, leading to discussions on the possibility of identifying individual heatwaves, similar to the process of identifying major storms, to improve preparedness and response in order to prevent heat-related deaths. Greece recorded over 2,300 excess deaths — excluding registered deaths from COVID-19 — between late-July and mid-August 2021 compared with the last five years. Around 1,400 excess deaths were in the first week of August alone. See below:

GREECE

Weekly excess deaths in 2021, excluding deaths attributed to COVID, compared to the 2016-2020 average.



The death deficit early in the year can be explained by the "harvesting effect", a short-term shift in the mortality rate attributed to external causes — such as COVID, or a very aggressive flu season. In the short term, deaths increase because the most vulnerable groups — like the elderly, people with chronic conditions or compromised immune systems — are disproportionately affected. This peak in mortality is then followed by a period of lower-than-average death rates.

SOURCE: Eurostat, POLITICO research

By Giovanna Col

Source: [POLITICO research by EUROSTAT, 2021](#).

Climate scientists predict a two-degree temperature rise in the Eastern Mediterranean by the middle of the 21st century. Approximately 5.5 million citizens living in Greece's 25 largest cities will be the most exposed to the consequences of extreme heat conditions. In 2022, Dr. Eleni Myrivili, the former and first-ever Athens Chief Heat Officer initiated an innovative partnership with the Hellenic Red Cross (HRC) and the International Federation of

Red Cross and Red Crescent Societies (IFRC) with the aim of identifying innovative ways to work together in the framework of Athens's Heat Preparedness Plan to protect the city's most vulnerable before and during extreme heat events. Accordingly, this Simplified Early Action Protocol (sEAP) builds on the work and learning undertaken in 2021 and 2022, and as outlined above.

Explain which risks have been selected for this protocol and why:

The sEAP will target the risks related to mortality and morbidity.

Risk to lives due to extreme heat: The National Observatory of Athens (NOA), in partnership with the Arsht-Rockefeller Foundation and the Atlantic Council, have studied excess mortality data from the last 20 years overlaid against heat information to estimate the number of deaths due to extreme heat. Through this collaboration, **in 2021 alone, the City of Athens estimated that 2,300 people have lost their lives due to extreme heat**, many of which could have been prevented if at-risk individuals were aware and prepared for extreme heat conditions.

Acute health risks due to extreme heat: The health risks related to prolonged and extreme heatwaves include heat-related illnesses, such as heat stroke and dehydration, as well as the inability to sustain physical activities, including life-sustaining activities, particularly in vulnerable populations such as older people, chronically ill or with mobility issues, as well as livelihoods activities).²

Describe the selected early actions and explain how they will address the risks and lead to the intended outcome:

By acting in advance of the heatwave, the HRC can ensure that the general public has access to relevant information via large-scale campaigns, while being able to prepare and protect themselves before the heat peaks. Since there are limitations of access to mainstream media, some vulnerable groups require bespoke messaging and assistance. Specific messaging on how to protect children will be provided to carers of young kids as well as school aged children. During a heatwave, the activation of the helpline and the dispatch of mobile health teams and volunteer teams will enable HRC to provide health information and assistance in the form of first aid, the provision of isotonic drinks and water. Furthermore, HRC volunteers will provide referrals to government-run cooling centres or hospitals whenever required. Through this assistance, heatstroke, as well as the exacerbation of pre-existing medical conditions due to sun exposure can be mitigated.

² I.e., people whose livelihoods depend on them working outside even in extreme weather conditions.

EARLY ACTION INTERVENTION

<p>Overall objective of the intervention</p>	<p>The Hellenic Red Cross staff and volunteers, working in collaboration with public authorities and community leaders, will undertake early action activities in advance of forecasted extreme heat focused in the cities of Athens, Patras, and Thessaloniki.</p>
<p>Potential geographical high-risk areas that the simplified EAP would target</p>	<p>Many areas in Greece are prone to high temperatures and frequent heatwaves. The sEAP will specifically target urban areas in the cities of Athens, Patras, and Thessaloniki, where already high temperatures can feel even higher due to city structures.</p> <p>According to a recent paper by NOA scientists, the aforementioned Greek cities are among the areas that experienced a significant increase in heatwaves during the elapsed 70 years.³ Moreover, HRC branches in these cities have adequate capacities and previous disaster response experience which enables them to respond to the needs of vulnerable people affected by the heatwaves in a timely and efficient manner.</p>
<p>Who will be assisted through this operation and what criteria will be used for their selection?</p>	<p>The early actions will target vulnerable groups including older people (especially older than 65 years old), young children, caregivers of babies, pregnant women, those living with chronic diseases, as well as people marginalised due to poverty, homelessness, or lack of social security (including migrants and refugees).</p> <p>Low-income households are disproportionately affected by extreme heat as they lack cooling equipment, such as air conditioners, fans, and refrigerators, and live in substandard accommodation lacking ventilation in general.</p> <p>People with chronic diseases and the older people are particularly vulnerable, especially when they have to leave their apartments to restock food supplies or pick up medication. Most vulnerable older persons will be identified through the HRC database, including the health and social welfare divisions registry lists.</p> <p>Children (particularly children under the age of 12 months) are vulnerable to heat as they cannot regulate their temperature as well as adults.</p> <p>Homeless people are also vulnerable due to their exposure to the elements and lack of access to cooling equipment. As some homeless populations may be undocumented, they are not eligible for support from social protection systems. They will be identified through the HRC's partners, including police and social welfare departments of the cities.</p> <p>The groups to be actively targeted by this simplified EAP have been selected based on those most exposed to the prioritized risks and hazard impacts, takes into consideration the level of vulnerability and coping capacities, with attention to most-at-risk groups:</p> <ol style="list-style-type: none"> 1. People who are living on the street or in substandard housing. 2. Migrants, including undocumented people. 3. People who have pre-existing medical conditions.

³, Galanaki, E.; Giannaros, C.; Kotroni, V.; Lagouvardos, K.; Papavasileiou, G.: [Spatio-Temporal Analysis of Heatwaves Characteristics in Greece from 1950 to 2020](#). Climate **2023**, 11, 5.

	<ol style="list-style-type: none"> 4. People with mobility issues. 5. Older people, specially over 65 years 6. Young children, in particular under 12 months old. 7. Pregnant women and caregivers of babies. <p>However, the early actions related to the extreme heat awareness campaign and the Helpline can be accessed by anyone in need. ⁴</p>
Trigger(s) statement	<p>The sEAP trigger will be reached when NOA issues a Heat Alert category 3, with a predicted excess mortality rate of 45% or higher, within a five-day lead time to implement the early action activities.</p>
Trigger threshold justification	<div data-bbox="539 607 1412 1115" data-label="Diagram"> </div> <p>The Arsht-Rockefeller and Atlantic Council Extreme Temperature Categorization system, developed in partnership with the National Observatory of Athens (NOA), is an impact-based forecast tool based on 20 years of existing extreme temperature data and overlaid with excess mortality data.</p> <p>The Extreme Temperature Categorization system anticipates the following excess mortality on the basis of retrospective and prospective data:</p> <ul style="list-style-type: none"> • Category 1 – 1% - 12.49% excess mortality • Category 2 – 12.5% - 29.9% excess mortality • Category 3 – 30% or higher excess mortality (<i>ranging upwards as high as 45 – 65% excess daily mortality</i>)

⁴ References:

- Meehl, G.; Tebaldi, C. *More Intense, More Frequent, and Longer Lasting Heat Waves in the 21st Century*. *Science* **2004**, 305, 994–997.
- Xu, Z.; FitzGerald, G.; Guo, Y.; Jalaludin, B.; Tong, S. *Impact of Heatwave on Mortality under Different Heatwave Definitions: A Systematic Review and Meta-Analysis*. *Environ. Int.* **2016**, 89–90, 193–203.
- D'Ippoliti, D.; Michelozzi, P.; Marino, C.; De'Donato, F.; Menne, B.; Katsouyanni, K.; Kirchmayer, U.; Analitis, A.; Medina-Ramón, M.; Paldy, A.; et al. *The Impact of Heat Waves on Mortality in 9 European Cities: Results from the EuroHEAT Project*. *Environ. Health A Glob. Access Sci. Source* **2010**, 9, 37.
- Zinzi, M.; Santamouris, M. *Introducing Urban Overheating-Progress on Mitigation Science and Engineering Applications*. *Climate* **2019**, 7, 15.
- Papanastasiou, D.K.; Melas, D.; Kambezidis, H.D. *Air Quality and Thermal Comfort Levels under Extreme Hot Weather*. *Atmos. Res.* **2015**, 152, 4–13.

4 Lemonsu, A.; Viguié, V.; Daniel, M.; Masson, V. *Vulnerability to Heat Waves: Impact of Urban Expansion Scenarios on Urban Heat Island and Heat Stress in Paris (France)*. *Urban Clim.* **2015**, 14, 586–605

	<p>NOA will provide regular Heat Alert information for Category 1 and above to the HRC for the three target cities, with a forecast range of five days. HRC will liaise with NOA to monitor Heat Alerts over the peak summer months.</p> <p>A Category 3 event with an excess mortality of 45% or higher predicted will be used to trigger the early actions under the simplified Early Action Protocol due to the severity of the extreme temperature at this level, the risk to human mortality and morbidity and the need for a proactive response.</p> <p>Heat Alerts from 0 – 3 under this threshold will not trigger the early actions outlined in the simplified Early Action Protocol. However, HRCS will commence some of the usual heat activities within its existing capacity in order to raise awareness about the risks and prevent suffering and loss of life.</p>
Next steps – For National Societies that intend to develop a full EAP (Optional)	The National Society does not plan to develop a full EAP at this stage. By the implementation of a simplified EAP, the National Society aims to test early actions via a real-time activation prior to expanding to other cities, as well as revising and fine-tuning activities in case necessary.

PLANNED INTERVENTION

	Health & Care	Budget	CHF 68,693
Indicator:	Number of people reached with health services in advance of the peak of a heatwave	Target:	2,000
Readiness activities:	<ol style="list-style-type: none"> 1. Produce and revise training material for first aid training. 2. Conduct annual refresher training for HRC staff and volunteers (including helpline) on the dangers of extreme heat, best practices, and referrals. 3. Conduct annual first aid training with city officials and front-line responders. 4. Conduct annual checks and maintenance of bicycles and vehicles. 5. Check annually licenses of drivers of mobile medical vehicles. 6. Produce messaging in multiple languages for first aid activities, in coordination between Health, Samaritans, Social Welfare and Communications sectors. 7. Coordinate with other actors (including those who refer people to be assisted) to ensure consistent messaging on first aid. 8. Prepare lists of the targeted population, including confirming contact details. 9. Develop a simple Standard Operating Procedure (SOP) / guideline for the helpline operation for wellness checks. 10. Adapt and review a simple SOP/ guideline for the deployment of the bicycle first aid teams, nursing at home and Mobile health teams during a heatwave activation (early action activities). 		

	<ol style="list-style-type: none"> 11. <i>Practicing using the telephone-based wellness calling system.</i>
Prepositioning activities:	<ol style="list-style-type: none"> 1. <i>Preposition communication materials for first aid (including referral cards with emergency phone numbers).</i> 2. <i>Preposition of first aid material (fans, ice packs, hats) and sunscreen to distribute to the target population.</i> 3. <i>Preposition food items (including nutritional bars, Isotonic Drinks, and bottled water) to distribute to the target population.</i> 4. <i>Procure bicycles, helmets, and personal protective equipment (PPE) for volunteers.</i> 5. <i>Telephone/headsets for the helpline.</i>
Prioritized Early Actions:	<ol style="list-style-type: none"> 1. <i>Activate helpline for two-way outreach – proactive telephone wellness checks as well as reactive calls for information and assistance.</i> 2. <i>Deploy Bicycle First Aid Teams to conduct follow-up wellness checks for homeless, markets, and house-to-house visits targeting older persons and people with chronic illnesses.</i> 3. <i>Deploy Mobile Health and Nursing at Home teams, when needed, to provide emergency first aid support to assist with referrals to cooling centres or medical facilities.</i> 4. <i>Distribute bottled water, Isotonic Drinks, Food (nutritional bars), and Sun Cream to homeless population and vulnerable groups.</i> 5. <i>Refer seriously at-risk/affected people to local hospitals.</i> 6. <i>Monitor the distribution process and other activities provided on the field level.</i>

	Risk Reduction, climate adaptation and Recovery	Budget	CHF 41,535
Indicator:	Number of people reached with information in advance of the peak of a heatwave	Target:	10,000
Readiness activities:	<ol style="list-style-type: none"> 1. <i>Prepare and revise key messaging in multiple languages for information awareness-raising activities and campaigns, developed in close coordination between the Health, Social Welfare and Communication sectors of the HRC and in coordination with local and national government officials and the Chief Heat Officer.</i> 2. <i>Produce a map of cooling stations (municipalities and HRC-led locations) in each targeted city, which will be hosted. The digital version will be hosted by METEO.GR, alongside the heat categorization system, in multiple languages.</i> 3. <i>Produce information boards for care homes, HRC Branches, Multifunctional Centres (MFCs) and Educational Health Stations (EHSs) to raise awareness, including on general protection measures against heat.</i> 4. <i>Prepare content for a website, social media campaigns, newspaper advertisements and radio jingles (based on</i> 		

	<p>community feedback), including investing in paid social media boosts to increase reach and impact when soft triggers are met.</p> <ol style="list-style-type: none"> 5. Conduct awareness-raising sessions and trainings with relevant authorities, including the Ministry of Education. 6. Conduct outreach / awareness-raising sessions with people at-risk, including youth and children. 7. Conduct interactive awareness sessions on the risks of extreme heat and the ways to prevent health risks targeting children/students.
Prepositioning activities:	<ol style="list-style-type: none"> 1. Maintain annual inventory, including a log of maintenance checks (vehicles) at city/district level warehouse. 2. Print and preposition communication materials, brochures and kits for public outreach, including maps of cooling stations in each city targeted. Ensure they are available in multiple languages.
Prioritized Early Actions:	<ol style="list-style-type: none"> 1. Launch a large-scale information campaign, including TV spots, social media paid posts and face-to-face outreach to inform the wider population as well as targeting at-risk groups of the a) health risks of extreme heat, b) the ways to mitigate them, as well as c) the category system of the METEO.GR platform. Ensure that information is accessible and available in multiple languages. 2. Conduct/intensify outreach activities through existing HRC programmes, such as homelessness outreach programme, Nursing at Home (Health Sector) and Home Care (Social Welfare Sector).

ENABLING APPROACHES

	Secretariat services	Budget	CHF 16,614
Indicator:	Number of staff engaged in the maintenance and activation of early action	Target:	5
Readiness activities:	<ol style="list-style-type: none"> 1. Participate in annual meetings, prepare tabletop simulation exercise, and facilitate lessons learned. 2. Conduct visits to Athens, as well as Patras and Thessaloniki to conduct monitoring and evaluation activities, and provide technical support if needed. 3. Accompany readiness activities and facilitate reporting. 		
Prepositioning activities:	<ol style="list-style-type: none"> 1. Support prepositioning activities (including procurement processes), if required. 		
Prioritized Early Actions:	<ol style="list-style-type: none"> 1. Support activation of the SEAP when the trigger is reached. 2. Facilitate lessons learned workshop, post activation, evaluation, and reporting. 		

	National Society Strengthening	Budget	CHF 52,611	
		People targeted	150	
Indicator:	Number of staff and volunteers engaged in early action	Target:	150	
Readiness activities:	<ol style="list-style-type: none"> 1. Annual internal meeting for HRC Headquarters (HQ) and Branches 2. Annual training for HRCS staff on the NOA Alert System. 3. Salary contribution for staff (EAP lead and communications focal point). 			
Prepositioning activities:	<ol style="list-style-type: none"> 1. Procure volunteer visibility (e.g., t-shirts, badges, sunhats, sunglasses). 			
Prioritized Early Actions:	<ol style="list-style-type: none"> 1. Staff and volunteer costs for monitoring during activation, communication/awareness-raising activities, and post-distribution monitoring. 			

	Partnership and Coordination	Budget	CHF 37,808	
		People targeted	60	
Indicator:	Number of strategic partners involved in the maintenance of the simplified EAP	Target:	4	
Readiness activities:	<ol style="list-style-type: none"> 1. Conduct annual meetings with NOA regarding the Heat Alert system, including signing the agreement for service provision. 2. Conduct outreach to relevant municipalities in the targeted areas, in coordination with key partners, to brief them on the sEAP and ensure that they are aware of the Extreme Weather Categorization System and the desire of HRC to respond. 3. Conduct annual stakeholder meetings with for City and Frontline officials (Department of Health, Civil Defense and Chief Heat Officer) at the start of the summer to refresh awareness of sEAP and the early action activities. 4. Conduct annual meetings with the Ministry of Health/Social Welfare to identify preidentified at-risk individuals. 5. Conduct annual simulation of an activation including NOA, local and central government, if required (Civil Defense, Health, Social Welfare), HRC HQ and branch staff and volunteers – including lessons learned to debrief and update to the sEAP, if required. 6. Forecast monitoring by NOA: ensure ongoing communication maintained by NOA to the HRC focal points in case a level 1 and above in the Heat alert system threshold is reached. Proactive communication if there is a high likelihood for the trigger of the sEAP to be reached, to increase the preparation time in case of activation. 			
Prepositioning activities:	<ol style="list-style-type: none"> 1. National Observatory of Athens equipment for forecast monitoring. 			

Prioritized Early Actions:	1. <i>Initiate/join early action coordination meetings with stakeholders and relevant actors.</i>
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	Community Engagement and Accountability	Budget	N/A
		People targeted	2,000
Indicator:	Number of tools and mechanisms established and used to collect information and feedback	Target:	6
Readiness activities:	<ol style="list-style-type: none"> 1. <i>Build staff and volunteer capacity in community engagement and accountability mechanisms and tools.</i> 2. <i>Conduct a survey to identify the knowledge, attitudes, and practices of the target groups in order to refine activities, messages and approaches in line with the information obtained, taking into consideration their ability to access services.</i> 3. <i>Establish feedback tools and mechanisms which are accessible to the target population.</i> 4. <i>Ensure that activities (including distributions), information provided, and two-way communication channels are adequate, active and people are aware of and trust them.</i> 5. <i>Ensure that information materials are culturally appropriate and adapted according to gender, age, disability, language.</i> 		
Prepositioning activities:	N/A		
Prioritized Early Actions:	1. <i>Collect, analyse, and report on feedback received, when possible, adapt the activities using the analysis received to improve the response.</i>		

CONDITIONS TO DELIVER THE EARLY ACTION

Experience and/or capacity to implement the early actions.	<p>Established in 1877, the Hellenic Red Cross (hereafter HRC) is the largest humanitarian organization in Greece, with 86 branches throughout the country, some 430 staff and over 4,500 active volunteers. It has a wide range of activities in the areas of health, social care, migration, search and rescue, disaster preparedness and response, restoring family links, first aid and volunteer training.</p> <p>The Hellenic Red Cross has prioritized climate change within its 2020–2025 Strategy and is developing critical operational expertise and local response capacity to assist communities that are vulnerable to climate-related disasters, including extreme heat. Its highly trained and professional staff and volunteers have developed expertise in heat-related first aid, which is already being deployed during heatwaves in Greece.</p> <p>With 80 local branches throughout the country, some 430 staff and over 4,500 active volunteers, the HRC is the local humanitarian actor in Greece strategically positioned to respond to extreme heat. In addition, in 2021, the HRC signed Memorandums of Understanding with several key Ministries, as well as the Municipality of Athens to continue to advance its critical work in this area.</p>
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	<p>In 2022, the HRC has already taken the following actions, with the support of staff and volunteers to raise awareness and mitigate the negative effects of heat waves on people in the city of Athens:</p> <ul style="list-style-type: none"> • Distributed essential items & provided medical and psychological first aid to homeless people in the historic centre of Athens on Thursday, 23 June 2022. • Distributed parcels containing personal hygiene items, basic food items, clothing, items for protection against COVID-19, etc., which was funded in the context of Emergency Appeal for COVID-19 implemented by the NS, with the funding of the International Federation of Red Cross and Red Crescent Societies. • Provided information to the population about the air-conditioned temporary accommodation facilities and the relief and support measures for the target group developed by local authorities. • Provided essential training on heat preparedness & response to officials of the Municipality of Athens. • Specifically, Samaritans Rescuers trainers of the Hellenic Red Cross provided comprehensive training to deal with particularly high temperatures so that the municipality staff of Athens is ready to respond effectively to heatwaves throughout the summer. • Awareness raising and prevention regarding the dangers of heat at the historical Acropolis monument. • On 7 July, outside the ticket offices of the Acropolis, HRC volunteers and staff have distributed water and provided information on the measures to prevent and deal with extreme temperatures, focusing especially on high-risk groups (older people, people with chronic illnesses, homeless people, etc.).
<p>Red Cross Red Crescent Movement partners, Governmental / other agencies consulted/involved on this simplified EAP</p>	<p>Responding to climate and environmental crisis is a strategic priority of the International Federation of the Red Cross and Red Crescent Societies (IFRC) both globally and in Greece, with the piloting of new and innovative activities linked to climate change identified as a key operational priority for the IFRC Greece Delegation in 2022. The IFRC is a member of the Extreme Heat Resilience Alliance (EHRA) at the global level and has been driving the development of tools and best practices linked to heatwaves and climate change that are critically relevant to both city officials and Red Cross and Red Crescent (RCRC) National Societies tasked with responding to extreme heat (Heat Toolkit). The IFRC Secretariat also plays a key role in connecting locally led humanitarian efforts, such as those led by the HRC, with the wider global RCRC Network.</p> <p>In 2022, IFRC supported HRC in developing a peer learning partnership with the Australian Red Cross to learn from their experience in supporting the most vulnerable in response to extreme heat, particularly related to their TelecrossREDi – telephone-based wellness checks programme. Trainings were undertaken with key staff and volunteers on basic programme components, SOPs, escalation protocols, readiness activities and partnerships with public authorities and other stakeholders.</p> <p>The HRC and the IFRC in Greece continue to work closely with the above partners, as well as the Regional Climate Change Lead and the Heat and Resilience Team within the Global Climate Centre to bring expertise, best practices, and resources in support of the HRC’s growing efforts in this area.</p> <p>In addition, in 2022, the IFRC supported the HRC in developing a partnership with the Municipality of Athens, the Chief Heat Officer of Athens, the Arsch-Rockefeller Foundation, and the National Observatory of Athens. Preparedness materials were developed to increase awareness around the dangers of extreme heat, leveraging</p>

IFRC tools and materials. Further, HRC conducted tailored first aid trainings with city officials on the risks of extreme heat and how to factor this into their role on the front line of the city – as care providers in old age homes, as homecare workers, as health care professionals and as service providers.

The **National Observatory of Athens (NOA)**, established in 1842, is the oldest research centre in Greece and a public entity supervised by the General Secretariat for Research and Technology. The Institute for Environmental Research and Sustainable Development (IERSD) is one of three Institutes of NOA, and it was established in 1846. The main activities of IERSD focus on: (a) meteorology and hydrology (operational weather forecasts, meteorological and hydrological observations and modelling with emphasis on extreme hydrometeorological events and the study of surface and underground water bodies), (b) the atmospheric environment (investigation of physio-chemical processes in the atmosphere based on observations and models, air quality and other environmental pressure studies), (c) climate and climate change (studies of the past, current and future climate trends and extremes, on the assessment of the environmental, financial and social impacts of climate change and on adaptation and mitigation measures) and (d) energy (building typologies, energy efficiency, solar energy resources, energy modelling and planning).

More specifically, the METEO Unit involved in the proposal has a long experience and is working on:

- a) Improving the forecast of severe and extreme weather (including lightning activity, hail occurrence, tornados, dust storms) through the operational implementation of numerical [weather prediction](#) (NWP) models (Bolan, Moloch, WRF,) and coupled atmosphere-chemistry models (WRF-Chem, [Dust-WRF Model](#)).
- b) Improving the scientific understanding of extreme fire weather and fire behaviour through the implementation of advanced coupled fire-atmosphere models (e.g., WRF-Fire); on improving the capability to anticipate the occurrence of extreme wildfires through the operational computation and monitoring of specialized fire weather indices; on providing operational predictions of fire spread through the implementation of an advanced coupled fire-atmosphere rapid response fire spread forecasting system (IRIS 2.0).
- c) Monitoring weather through advanced observational networks, including (a) the ZEUS VLF lightning detection network, operated since 2005 (<https://meteo.gr/talos/en>), (b) a [dense network](#) (510) of automatic weather stations (AWSs), operated since 2007, and (c) level meters and snow meters.
- d) Development of early warning systems tailor-made for civil protection needs against high impact weather risks, including wildfires (e.g., <https://www.meteo.gr/kilkis>).
- e) Study of the dynamical and physical properties of atmospheric weather systems in the Mediterranean with emphasis on high-impact weather events using ground and space-borne platforms (flash floods, intense cyclogenesis, windstorms, heat waves).
- f) Monitoring and analysis of the socio-economic impact of weather-related hazards, including the maintenance and expansion of a [dedicated database](#) for Greece, the realisation and analysis of behavioural surveys on the weather-related hazards and risk perceptions, preparedness, adaptability, and emergency response; the continuous update of a database of flood fatalities, their demographic profiles and death circumstances in the frame of a European research network.

- g) Dissemination of the R&D outcomes to the general public through layman articles and a dedicated [Wikipedia-like website](#) & development of educational programmes and activities on weather, climate and related natural hazards.
- h) Solid experience on regional climate simulations and analysis of climate scenarios.

In relation to heat waves, NOA METEO Unit initiated an operational procedure of ranking heatwaves in Athens in the summer of 2022, as a collaborative effort with the Arsht-Rock Resilience Centre/Atlantic Council and the Municipality of Athens. Daily info on the categorization of heat waves was posted on [Meteo.gr](#) a very popular webpage operated by the METEO Unit (> 350.000 average daily visitors).

In the frame of this proposed sEAP, the HRC's response will be informed by two early warning mechanisms, more specifically:

- 1) Based on the high-resolution temperature forecasts, a 10-day warning will be issued for the entire country when temperature forecasts exceed some predefined thresholds.
- 2) The 4-level categorization system will be developed for the 6 target cities, for five days ahead (see details in the following). The 4-level system will be based on an impact-based algorithm combining mortality data and meteorological data, trained over the last twenty years.

The first level of warning will be communicated at the Hellenic Red Cross on a daily basis, permitting to assess a general overview of the thermal stress situation across Greece for a 10-day period. If an extreme categorization is foreseen five days prior, the categorization scheme for the six selected cities will be communicated to the Hellenic Red Cross in order to initiate the actions to mitigate the impacts of the heatwave on vulnerable population of the target areas.

The categorization system is based on an algorithm for forecasting the effects of high temperatures on the health of the residents. The development of the algorithm was initially carried out specifically for the city of Athens through the correlation of historical meteorological data and human health impact data over a period of two decades (1999 - 2018). In early 2023, the algorithm is under development for five other major cities of Greece.

Category	Number of days over the 20-year period	Characterization of temperatures	Risk and recommendations	Likelihood	Red Cross Action
3	23	Extreme heat	Serious health hazard. Take the utmost precautions.	Rare**	YES - when Category 3 is expected with a predicted excess mortality of 45% or higher anticipated, the simplified Early Action Protocol and full set of are actions triggered.
2	33	Extremely high temperatures	Health hazard. Take precautions. Prepare to help vulnerable people.	Possibly	Yes - some or all actions within normal response

					capacities of the HRC
1	144	Very high temperatures	Follow the instructions and avoid prolonged exposure to heat. Notify vulnerable people.	Likely	Yes – some or all actions within normal response capacities of the HRC
0	163	High temperatures.	Risks to the health of vulnerable people.	Almost certain	Communications and public messaging only

***Over a 20-year period only five (5) or six (6) heatwaves of this category with the excess mortality above 45% have occurred.*

The categories are triggered by a computer algorithm that was developed based on the correlation between mortality data and temperatures, wind, length of high temperatures, etc. over 20 years. There is no specific or exact temperature that triggers each category, as it includes the amount of time anticipated at a certain temperature, winds, etc. This is an impact-based forecast. The Meteo.gr website flags the categorization when specific thresholds are met.

Budget

To implement the simplified Early Action Protocol, **CHF 217,260** have been allocated, split between readiness, pre-positioning of stock and early action costs as per below summary by area of intervention.



Early Action Protocol Summary

sEAP2023GR01 - Hellenic Red Cross Heatwave

Operating Budget

	Readiness	Pre-Pos Stock	Early Action	TOTAL
Planned Operations	21,833	43,133	45,263	110,228
Shelter and Basic Household Items	0	0	0	0
Livelihoods	0	0	0	0
Multi-purpose Cash	0	0	0	0
Health	8,520	27,690	32,483	68,693
Water, Sanitation & Hygiene	0	0	0	0
Protection, Gender and Inclusion	0	0	0	0
Education	0	0	0	0
Migration	0	0	0	0
Risk Red., Climate Adapt. and Recovery	13,313	15,443	12,780	41,535
Community Engagement and Accountability	0	0	0	0
Environmental Sustainability	0	0	0	0
Enabling Approaches	79,875	8,520	18,638	107,033
Coordination and Partnerships	34,080	2,130	1,598	37,808
Secretariat Services	11,289	0	5,325	16,614
National Society Strengthening	34,506	6,390	11,715	52,611
TOTAL BUDGET	101,708	51,653	63,900	217,260

all amounts in Swiss Francs (CHF)

Contact information

For further information, specifically related to this simplified EAP please contact:

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