

ERPW 2025

Defining and testing a framework for resilience to radiation emergencies in armed conflicts

Presented by P. Nunes (APA, Portugal), on behalf of RRADEW WP2



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Radiation emergencies and protective actions

Radiation emergencies

- Various causes
- Various types of installations



Picture source: SCK CEN



Response involves actions such as:

- Communication
- Protective actions:
 1. Evacuation,
 2. Sheltering,
 3. Iodine tablets intake,
 4. Food restrictions
- Monitoring
- Decontamination
- Mental health interventions
- Environmental remediation



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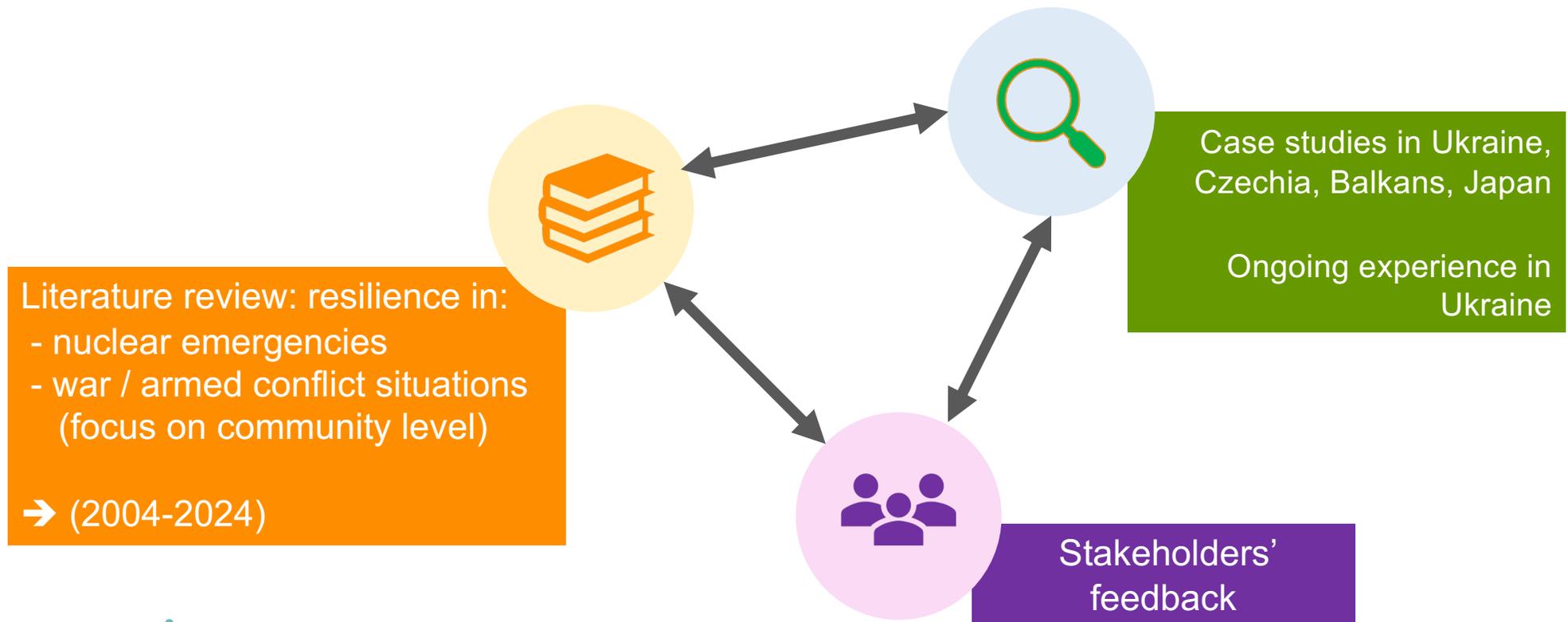
Disaster resilience

- multi-dimensional, multi-level, nested, dynamic, emergent
- capacities (of individuals, households, communities, countries, systems), to resist, absorb, adapt, recover and transform from the effects of a hazard, in a timely and efficient manner (based on UNDP, 2014; UNDRR, 2015; UNDRR, 2025).
 - ⇒ in a way that supports human wellbeing (Folke et al., 2016)
- at community level:
 - agency, self-organisation, adaptive capacity (Cavaye and Ross, 2023)
 - connected to community development (Cavaye and Ross, 2023; Vaneeckhoute et al., 2023)

Disaster resilience and wartime

- How is resilience impacted by/redefined in situations of armed conflict or wartime?

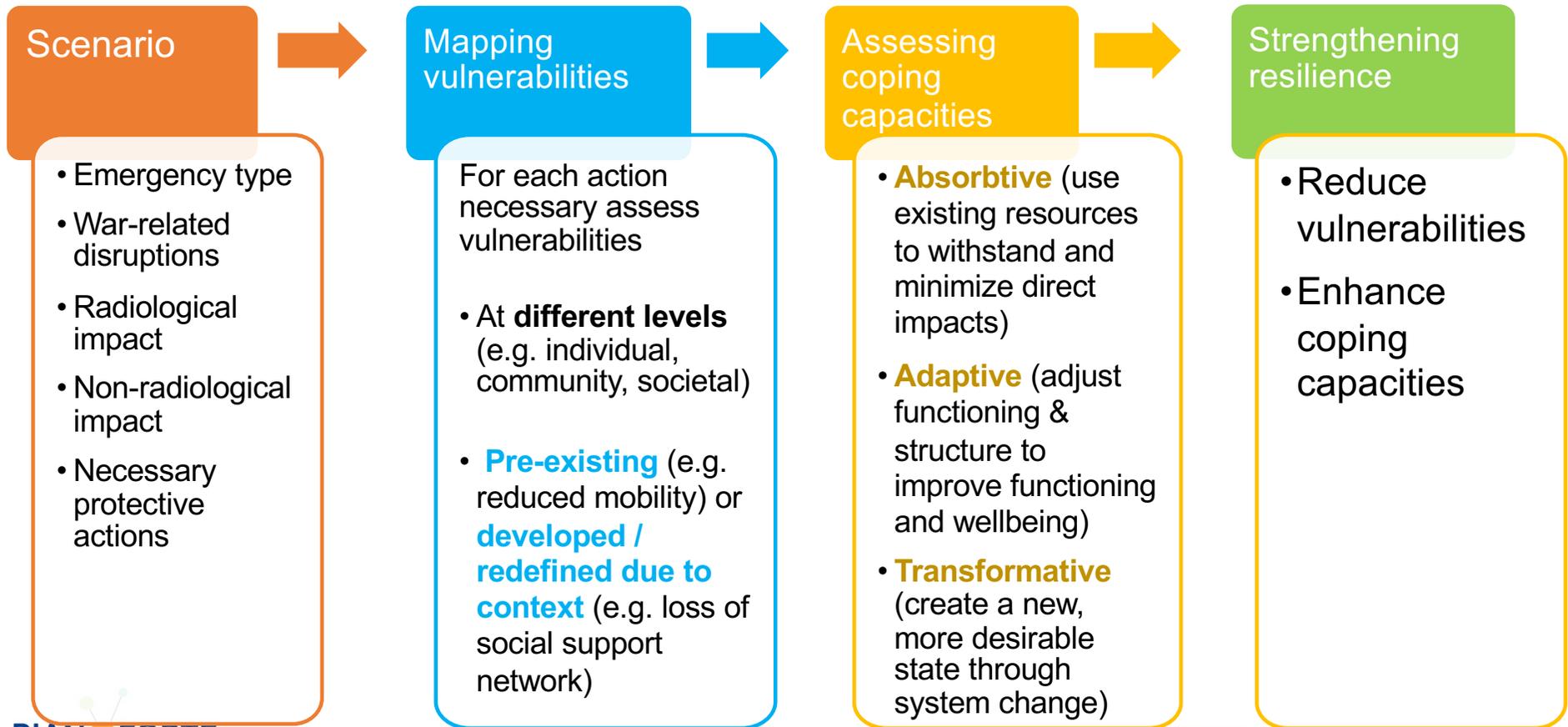
Resilience to radiation emergencies in war situations?



Challenges for radiation emergencies in war situations

Vulnerabilities	Enhanced/ new vulnerabilities	<ul style="list-style-type: none"> • Living or working in occupied territory, near front line, being a refugee,
Hazard	New hazards	<ul style="list-style-type: none"> • Shelling of installations with radiological risks, multiple events,..
Exposure	Higher potential to be affected	<ul style="list-style-type: none"> • Personnel shortage, land mines, international laws not applied, disinformation...
Coping capacities	Decreased or increased	<ul style="list-style-type: none"> • Decreased: e.g. lack of clear legal framework, infrastructure deterioration, limited trained personnel and equipment, mental stress, facilities occupied, ... • Increased: e.g. due to unity against common enemy

Defining the framework



Vulnerabilities- examples

Pre-existent

- (Mental or physical) health conditions, or additional health needs
- Limited family and social support network
- Social group facing discrimination or stigmatisation
- Material insecurity
- Lack of access to public structures, e.g. education, social care, public information
- Lack of access to critical services
- No or restricted access to protective means and information
- Low individual skills and knowledge, e.g. low literacy, no knowledge on protective actions or radiation effects, speaking different language

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May develop/change due to emergency context

← Evacuee

← Living in area with destroyed infrastructure

← Refugee in another country

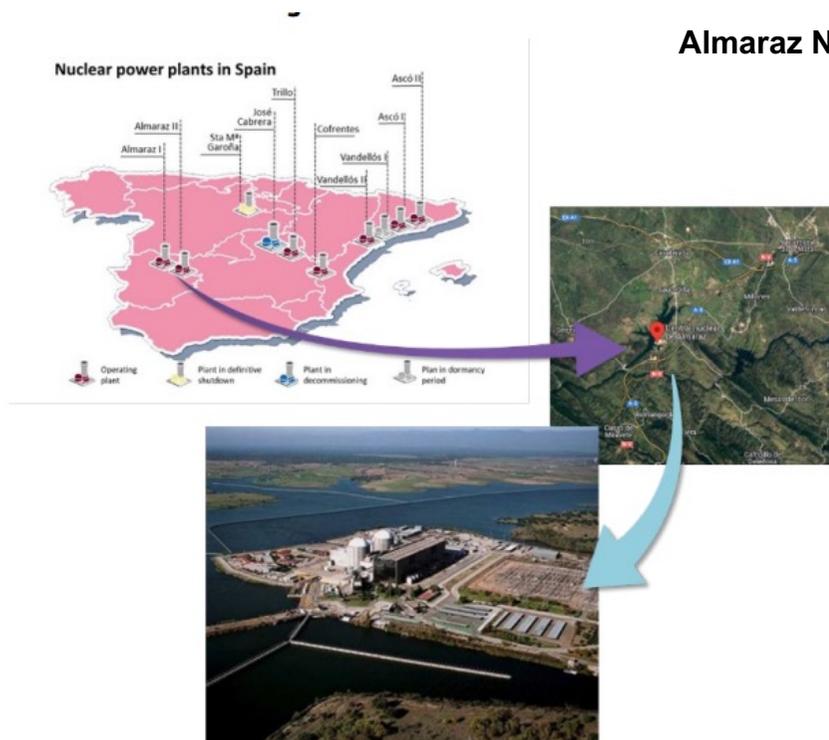
Actions to reduce vulnerabilities - examples

- Ensuring equal access to education and critical services
- Educational and culturally-sensitive interventions (e.g. in communities where exposure is anticipated)
- Promoting and supporting civic engagement
- Enhancing community support systems and connectedness (formal and informal)
- Promoting equal rights, freedom, and advocacy

Factors enhancing coping capacities - examples

- Diversity and redundancy (e.g. alternative logistic routes, economic diversity, communication through various channels and means)
- Rapid access to protective actions (e.g. iodine tablets in children's school backpacks in Ukraine; school shelters)
- Strong social capital through inter- and intra- community networks (e.g. SAFECAST – SaveEcoBot collaboration)
- Incorporating multi-actor perspectives and empowering local actors
- Community agency (e.g. community access to resources allowing to self-organize, community participation in emergency planning, supporting and including citizen radiation monitoring networks)
- Learning (e.g. learning from Ukraine experience; communicating knowledge relating to resilience practices)
- Holistic approaches (e.g. integrating EPR&R into humanitarian response; integrating response across multiple sectors (health, environment, security); integrating mental and psychosocial support in nuclear EPR&R)
- Mapping and creative use of (natural, physical, political, human, cultural, social, economic) community assets (e.g. library model of Antczak & Gruszka, 2023, <https://doi.org/10.1016/j.acalib.2023.102752>)

Testing the framework – coming up



Almaraz NPP

Scenario:

Missile strike on Almaraz NPP with additional infrastructure disruptions to simulate war conditions.

Portugal and Spain will address the same radiological scenario with parallel infrastructure disruptions

Objectives:

1. Use RRADEW P1 scenario to understand the protective actions needed and the impact of the emergency in war conditions
2. Analyse vulnerabilities developed due to war disruptions and consider ways to reduce them
3. Discuss ways to improve coping capacities in the preparedness phase and their effectiveness in reducing impacts
4. Consider the feasibility / applicability of actions taken in other contexts (WP3 case studies and WP2 literature review)

Source: Own elaboration, CIEMAT, 2022, based on a graph from MITECO, 2022⁽¹²⁾, and photos from Google maps⁽¹³⁾ (Terrametrics, 2022) and EFE/lafototeca.com, 2010⁽¹⁴⁾, respectively.

RRADEW WP2 team



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sck cen

ISP NPP

PIANOFORTE Partnership

European Partnership for Radiation Protection Research

Horizon-Euratom – 101061037



WP9 Open Call 1

Project RRADEW



M2.1 – Set of resilience dimensions, attributes, and preliminary assessment methods



UK Health Security Agency

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