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# D 9.19 - Scenarios and issues to address with stakeholders. Structured communication technique results

### Lead Author(s):

Milagros Montero; Cristina Trueba (CIEMAT)

### With contributions from:

Partners of CONFIDENCE-WP4

**Reviewer(s): CONFIDENCE Coordinator and CONCERT coordination team**

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## Abstract

This document contains the deliverable D9.19 on “Scenarios and issues to address with stakeholders. Structured communication technique results” of the work package WP4 “Transition to long-term recovery, involving stakeholders in decision-making processes” of the CONFIDENCE Project (HORIZON 2020 EJP-CONCERT, EC GA 662287).

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# Scenarios and issues to address with stakeholders.

## Structured communication technique results.

### Final

#### Version 1.0

**CONFIDENCE-WP4.** Transition to long-term recovery, involving stakeholders in decision-making processes

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**Montero, M.; Trueba, C (CIEMAT)**

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## Executive Summary

This document contains the deliverable D9.19 on “Scenarios and issues to address with stakeholders. Structured communication technique results” of the work package WP4 “Transition to long-term recovery, involving stakeholders in decision-making processes” of the CONFIDENCE Project (HORIZON 2020 EJP-CONCERT, EC GA 662287)

It is related with a brainstorming process to define and establish a generic contaminated scenario and the questions and issues to be used as basis for panel discussions, as was foreseen in the Subtask 4.1.3, “*Structured communication technique to the establishment of a generic scenario*”. The basic concept for the scenario is to focus on the preparedness to long-term recovery and decisions to be taken during the transition phase: Identifying action alternatives, development of action strategies, implications of actual situation and decisions on future, structure and roles of decisors and makers, stakeholder preferences and their engagement in the plans.

The process has been iterative and continuous along this first year. Two meetings with the WP4 partners and a final workshop joined to an exploratory questionnaire involving also other representatives from WP1, WP2, WP3 and WP6 were organised for this purpose.

The findings from in each of them are summarised. Also, the main conclusions obtained to establish the scenarios and to engage stakeholders are presented.

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## 1 Introduction

In the framework of the European project CONFIDENCE<sup>2</sup>, the work package WP4 (*Transition to long-term recovery, involving stakeholders in decision-making processes*) is devoted to improve the preparedness and response during the transition phase after a nuclear accident, identifying and trying to reduce the uncertainties in the subsequent management of the long-term exposure situation, reflecting the requirements of the new European Basic Safety Standards<sup>3</sup> (BSS).

Initially, in agreement to general work plan of the WP4, a methodology based in a sequential process was established involving a structured collaboration among the specialized researchers and technologists (WP's partners) and stakeholders [1]. To this end, different tools and participatory approaches, with the support of a collaborative web page<sup>4</sup>, are being used to facilitate the incorporation of the expertise and the points of view and interests of the stakeholders, as part of the preparedness process for the consequences management and post-accident recovery.

A brainstorming process to define and establish a generic contaminated scenario and the questions and issues to be used as basis for panel discussions, is foreseen in the Subtask 4.1.3, "*Structured communication technique to the establishment of a generic scenario*". The basic concept for the scenario is to focus on the preparedness to long-term recovery and decisions to be taken during the transition phase: Identifying action alternatives, development of action strategies, implications of actual situation and decisions on future, structure and roles of decisors and makers, stakeholder preferences and their engagement in the plans.

The process has been iterative and continuous along this first year. Two meetings with the WP4 partners and a final workshop joined to an exploratory questionnaire involving also other representatives from WP1, WP2, WP3 and WP6 were organised for this purpose.

Following the findings from in each of them are summarised. Also, the main conclusions obtained to establish the scenarios and to engage stakeholders are presented.

## 2 Identifying the issues and relationships among WPs: CONFIDENCE-WP8 Meeting in Lisbon, Portugal

The main issues and questions to address in the studies on the establishment of scenarios and optimisation of remediation strategies have been discussed in a meeting in Lisbon the 19th May 2017.

One scenario with a same assignable contamination pattern to all panels should be used. The scenario should take into account potential actions in both urban, agricultural environments and market (as different and whole restoration units), so that they can be adapted or transferred (as a puzzle) according to the needs and interests of each panel. Results from WP4.1 are envisaged to contribute to prepare this part of the scenarios. This will allow asking the same questions to all panels but answers may differ due to the participants but not due to a different scenario. Related to the details, it was

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<sup>2</sup> CONFIDENCE: Coping with uNcertainties For Improved modelling and DEcision making in Nuclear emergenCIes. HORIZON 2020 EJP-CONCERT, EC GA 662287. <https://portal.iket.kit.edu/CONFIDENCE/index.php>

<sup>3</sup> Council Directive 2013/59/EURATOM, of 5 December, Laying down basic safety standards for protection against the dangers arising from exposure to ionising radiation. <https://ec.europa.eu/energy/sites/ener/files/documents/CELEX-32013L0059-EN-TXT.pdf>

<sup>4</sup> <http://projects.ciemat.es/web/confidence-wp4/>

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agreed that the scenario should be not detailed – at least for the first round – to have enough time for the strategy development at a broader level.

The nine national panels defined their main concerns and aspects of interest, the type and role of potential stakeholders attending and connection and coordination with panels foreseen in other WPs, mainly, WP5 and WP6.

Taking into account the aforementioned, a first approach about the type and characteristics of the scenario for the panels has been agreed. Most panels will focus on the decisions to be taken during the transition phase to face the recovery phase in urban, agricultural environments or consumption/marketing management. The French panellists pose a slightly different approach. They will discuss how decisions taken in the early phase (more specifically, the evacuation of population and the prohibition/restriction of the consumption and marketing of locally produced foodstuffs) - despite inherent uncertainties about the real situation - would drastically impact the return of people, as well as the restart of consumption / production of local foodstuff.

### 3 Decision context and scope of scenarios: CONFIDENCE-WP4 Meeting in Paris; France

Discussions on the understanding of the transition phase in the cycle of the emergency, (When is it initiated?, How long is it?, How is it related to the preceded phase?, What implications does it have for the long term?) and the context for a decision-oriented scenario-analysis was undertaken in a WP4 coordination meeting in Paris, the 11<sup>th</sup> October 2017.

Following, the context and scope of scenarios, that should provide guide to prepare the management of the long term during this transition phase, were discussed. The elements that should characterize such scenarios (namely, objectives of the decision, valuation criteria, alternatives of performance, key drivers and uncertainties for future), to support a structured decision-making engaging the stakeholders were also stressed. A mention on how they should be considered to establish and optimise the strategies of action was made. Discussions on how to obtain / collect the necessary information to characterize the alternatives of action, were also carried out, proposing the use, as far as possible, of data from European statistics (costs, efficiency, hours / men, ...) and whether to model some of them (using JRODOS or ARGOS e.g).

Other point of interest was to clarify the structure and objectives of each phase of the WP. Therefore, in this first phase of building or planning scenarios, the main objective is to clarify the decision context, collecting ideas and elements that matter in order to construct generic scenarios able to accommodate to the specific needs of each national Stakeholder (SH) panel.

In the second phase, discussions in the SH panels will be addressed, first, the selection and refinement of the objectives, criteria and alternatives on concern for SH (1<sup>st</sup> session panel) and following, the prioritisation of their preferences will be obtained (2<sup>nd</sup> session panel).

The Delphi studies to be held in parallel have been planned to bring together the most relevant preferences and criteria from the different panels, to structure them and rank them for later use by the decision-making tools in WP6. The questionnaires for Delphi will be made between CIEMAT, SCK and EEAE.

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## 4 Scenario Planning during the Transition Phase to support the Preparedness for Post-Accidental Recovery: Workshop in Madrid, Spain.

The Workshop on “Scenario planning during the transition phase to support the preparedness for post-accidental recovery” took place in Madrid, Spain on November 20-21, 2017. It has been attended by 27 participants representing the partners of the Work Package 4, as well as other representatives from WP1, WP2, WP3 and WP6 of the CONFIDENCE project.

The workshop has provided the opportunity to collect the main ideas from participants to define and establish generic scenarios situated in the transition between the emergency and the recovery phases addressing remediation strategies and other issues to be used as basis for further discussions in national stakeholders' panels

It was developed as a brainstorming process, where the participants shared their expertise and discussed to obtain as many elements as possible to build the scenarios. The identification and understanding of the uncertainties involved in the preparedness for a future long-term recovery were also highlighted.

To facilitate the participatory process, the workshop was structured in several topics, as they are developed below, with the idea of covering, as much as possible, all the elements to be considered in the scenario planning and decision making process. These include the lessons learnt from past events, the specific issues to be considered in evacuated and/or restricted areas, in urban inhabited environments and in rural/agricultural environments, as well as the engagement of stakeholders in the decision making process.

### 4.1 Framing the problem

It is important to be able to identify the challenges in the transition phase and to learn from past events.

The transition phase is set between early phase and before the start of the recovery phase, that is, from an emergency exposure situation after an accident to an existing exposure situation. It is a broad and diffuse phase, during which efforts are made to withdraw the emergency response, establishing specific plans to begin the late phase recovery and rehabilitation of the affected areas. The aim is to return, as far as possible, to normal living conditions.

These plans need to be developed through a process of national dialogue with stakeholders, taking into account the inherent uncertainties on:

- the knowledge of the real consequences of an accident,
- the strategies to be implemented, and
- the potential socioeconomic impact on the affected population.

Management efforts are therefore complex because of the multiple objectives, actions, metrics, participants and so on and because the implementation takes place in a constrained world (location, money, time, resources, knowledge). The management of these complexities is the main challenge to deal with.

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According to [2], an organized approach to identify and evaluate alternatives that focuses on engaging stakeholders, experts and decision makers in productive decision-oriented scenario-analysis can follow different steps:

1. Define the Problem / Clarify the Decision Context: Define what question or problem is being addressed and why, identify who needs to be involved and how, establish scopes and bounds for the decision (constraints, goals or targets), and clarify the roles and responsibilities of the decision team.
2. Define Objectives and Evaluation Criteria: Together they define “what matters” about the decision (issues), drives the search for creative alternatives (preferred direction), and becomes the framework for comparing alternatives and making trade-offs between alternatives.
3. Develop Alternatives: A range of creative policy or management alternatives designed to address the objectives is developed. Alternatives should reflect substantially different approaches to the problem or different priorities across objectives, and should present decision makers with real options and choices. A “strategy” or “portfolio” is a logical combination of actions designed to be implemented as a package.
4. Estimate Consequences: Analytical exercise in which the performance of each alternative is estimated in terms of the evaluation criteria developed in Step 2 using available knowledge and predictive tools. Care must be taken to determine the focal areas of uncertainty and to ensure that these are represented properly in the analysis.
5. Evaluate Trade-Offs and Select: The next step involves evaluating the trade-offs and making value-based choices (Social, Technological, Environmental, Economic and/or Ethical values). Who is consulted and who participates in making choices may vary by the decision. Explicit choices about which alternative is preferred, could be made directly. Alternatively, structured methods for more explicitly weighting the evaluation criteria, making trade-offs, and scoring and ranking the alternatives may be used.
6. Implement and Monitor: The last step in the decision process then is to identify mechanisms for on-going monitoring to ensure accountability with respect to on-ground results, research to improve the information base for future decisions, and a review mechanism so that new information can be incorporated into future decisions. A key challenge will be to both reduce critical uncertainties and build in institutional flexibility to respond to new information without overextending management and political resources.

The transition phase can be addressed by means of scenarios for the decision-making process. Scenarios are narrative descriptions of potential futures that focus attention on relationships between events and decisions that have to be taken.

Following the approach identified above, the definition of the problem (step 1), is the scenario-construction process, requiring its characterisation in terms of:

Radiological characterisation:

- Initial situation of the contaminated area and exposure impact estimated or measured.
- Zoning of the contaminated territories, based in dose criteria after deposition, the level of deposition or in Euratom Food Intervention Levels CFILS
- Estimation of radiological impact in the long-term through the relevant pathways.
- Estimation of population affected
- Socio-economic and environmental situation.
- Spatio-temporal evolution of the scenario

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Environmental characterization: the scenario can be structured into elemental units, as function of the parameters and attributes that affect the behaviour of the radionuclides but also the response and applicability of the remediation actions.

- Climatic regions
  - Sub-artic Taiga
  - Maritime
  - Continental
  - Mediterranean
- Land Use
  - Artificial surfaces (urban)
  - Agricultural areas
  - Forests
  - Semi-natural

On each scenario different evaluation models are required to quantify factors for decision. Concerning the radiological impact, it is estimated calculating the fluxes of energy or contamination from the deposition place to the exposed population. In urban scenarios, the external irradiation is the most significant route of exposure, while in agricultural and grazing land scenarios, the ingestion of contamination through the foodstuff is the relevant way and in forest scenarios, both ingestion and external irradiation must be considered.

Each of these scenarios have their own specificities as will be seen further in this document. Their identification as well as the lessons learnt from past events can help in the approach of the transition phase management. Among them, it is important to highlight the importance of the involvement of stakeholders. Several examples can be referred to.

In 2011, ICRP initiated a series of Dialogues between representatives of the Fukushima Prefecture, local professionals, local communities, and experts in radiation protection from Japan and abroad. The aim was to find ways to respond to the challenges of the long-term rehabilitation of living conditions after the Fukushima accident.

Up to now, 10 Dialogue seminars have been organized, in cooperation with Japan Radiation Safety Forum, IRSN, ASN, NRPA and the Committee on Radiation Protection and Public Health of NEA/OECD, being the topics addressed:

- The human dimension after a nuclear accident
- The stakeholder engagement: authorities, the public and experts
- The co-expertise process
- The development of the practical radiological protection culture
- Perspectives

According to the human dimension, both Chernobyl and Fukushima accidents show that the medium- (transition phase) and even long- term (late phase) management of their consequences is not straightforward. In both cases, the human consequences are very similar and can be summarized as:

- Loss of confidence in authorities and experts
- Strong worry about health and especially of children health
- General feeling of discrimination and exclusion
- Feeling of helplessness and abandonment
- Loss of control on daily life and apprehension of the future

The technical answer to improve the radiological situation (evacuation, decontamination, interdictions, restrictions and controls of food) has indirect effects that isolate the affected people from their day-to-day environment. The main key issues to be addressed by each inhabitant are: *i)* to continue to live in the affected territories or to leave them and *ii)* to return or not at home

The involvement of experts in the Fukushima accident management were mainly focussed in the Local authorities, that took charge of the situation with the help of experts and local communities that mobilized themselves to initiate actions with the help of experts; the National authorities remained away from these local initiatives.

From this experience it can be highlighted, among other conclusions:

- The importance of engaging local professionals from education, health and administration and the establishment of mechanisms for sustainable cooperation
- The dialogue and measurements are important to restore confidence
- Scientific explanations cannot alone create confidence in the experts
- There are some key elements to work with the population such as: using a common language, be sincere and commit in the long term, produce tangible results for the population

It is important also to promote the co-expertise process as a way to promote the practical radiological protection culture within the affected communities

Another example to be considered in relation to the importance of the stakeholder involvement is the management of contaminated food in emergency and post-accident response. The results of the WP3 PREPARE Project [3] obtained after the fruitful participation of various stakeholders in the different national panels in Europe, showed their significant contribution in addressing the problem and the need to take into consideration their views. The objective of engaging stakeholders should not be to promote the acceptability of the accident, but to integrate their views in the management of the contaminated scenario and contaminated food production.

Temporary food-bans and restrictions are important during the emergency phase, but in the transition and long-term phases, the radiological control is crucial, as well as the application of agricultural countermeasures and food processing.

Another important issue to consider when framing the problem is the deposited contamination. This is the starting point from which to establish specific plans to begin the late phase recovery and rehabilitation of the affected area.

Within CONFIDENCE Project, WP1 (Model improvement in the pre-and release phase, through uncertainty analysis and propagation with an ensemble approach) develops probability maps for threshold exceedance of a number of reference levels previously established. Although these maps locate the priority action areas, it must not be forgotten that they are probability maps, thought to be used to delimitate the areas for the implementation of urgent measures in the emergency phase. They do not take into account the doses resulting from food intake, which is the main exposure pathway in the long term. Besides, the establishment of specific plans to begin the late phase recovery and rehabilitation of the affected areas, requires a proper radiological characterisation.

For these reasons, the outputs from WP1 will not be used in WP4, instead a specific generic scenario with different levels of deposition will be used as starting point.

## 4.2 Issues in evacuated zones and/or restricted for use

The first post-accident zoning is established on the basis of predictive modelling of future population exposure to ambient radioactivity in the inhabited zones and food chain contamination due to radioactive depositions. The evacuation of population and /or the prohibition of the consumption and placing on the market of locally-produced foodstuffs are decisions that can be made taking into account the projected doses.

During the transition phase, decisions to lift or maintain such actions should be taken, focussing in the consequences derived of the evacuation of people and the management for returning.

The main issues at stake related to evacuation or temporary housing, learned from past experiences as Fukushima accident, have been identified:

- The more time passes, the more difficult the return. After several years, the return rate remains rather low (< 10%);
- Large cost of decontamination programme;
- Trend of ageing population in areas where the order of evacuation has been lifted;
- Significant impact of threshold effects induced by the zoning;
- Deleterious effect of compensation → Lack of social cohesion;
- Radiological issues are only one dimension among others for deciding or not to return
- Key concern on possible long term consequences on health (question on effects of chronic exposure to low doses)
- Possibility of return for "red areas" very difficult to envisage even on the long term period: how to deal with these areas?

Some questions to deal in the discussions:

- What are the main objectives or goals of evacuation?
- Which uncertainties and how to take them into account?
- Which criteria to take into account to assess the impact of decision?
- How to integrate the stakeholders in the decision-making process?

## 4.3 Issues in urban/inhabited environments

Regarding the urban/inhabited environments, the main considerations are made in relation on how panellists will approach the recovery decision making cycle:

Define situation - Assess impacts - Identify goals and options - Evaluate options - Make decisions - Implement decisions - Monitor and evaluate - Define situation

In particular, the following issues have to be taken into account:

Defining the situation:

- How is the deposition going to be treated: as the result of WP1?, as an atmospheric dispersion model result?, as best estimate including measurements and uncertainty or as ground truth?
- Current status of the area (evacuated/sheltered etc)?

Assessing the impacts:

- Who is defining the criteria; panels or owners (multiple or a single imposed)?
- Given criterion what information to present to the user (maps of duration, estimates of population, infrastructure etc. with uncertainties?)
- Do the panel members contribute local knowledge?
- Do we constrain the subject (e.g omit waste) or by area (e.g. to just one town)?

Identify goals and options:

- Who defines the situation specific goals; panels or owners? (constrained?)
- Who selects options and puts together; panels or owners?

Evaluate options/make decision:

- How is the task of evaluating options and strategies split between panels and owners? E.g. owners estimate dose/impact/costs, evaluate/identify uncertainties and panels synthesise all factors => decision?

Several tools are proposed for developing scenarios, such as:

- Generic handbook for assisting in the management of contaminated food production systems in Europe following a radiological emergency (EURANOS)
- European Handbook, UK Recovery handbooks.
- ERMIN in JRODOS
- HARMONE Guidance Handbook for Recovery after a Radiological incident

There are some specific issues to consider in the case of non-nuclear countries, specifically related to the initial deposition scenario:

- Is it a consequence of a radiological emergency?, or of a trans-border NPP accident?
- Does it affect a large area or a small one?

Depending on these issues, the urban environment might be a composite area, that is, a mixture of commercial, habitational, industrial, leisure, etc.; or a very specific one. The population involved, the radionuclides involved and the remediation strategies will dependant on those issues.

#### 4.4 Issues in rural/agricultural environments

The main considerations to be made in rural and agricultural scenarios can be grouped as follows:

1. Environmental and radiological characterisation, of the different elements or elemental units that constitute the agricultural environments, as function of the parameters or attributes that influence the behaviour and transfer of radionuclides. These elemental units can be defined as:
  - Primary component: soil -plant/crop,
  - Secondary components: transfer pathway along food chain (crop - animal - product)
  - Final component: the exposed individuals
2. Define and characterise the action alternatives in each one of these components.
3. Develop methodologies and models to estimate and measure the consequences (spatial-temporal evolution of the radionuclides without and with countermeasures)

#### 4. Identify other factors that could influence the practicability and optimisation of the strategies (social, economic, political, environmental and ethical)

In this framework, and according to ICRP-103 [4], *protection* can be achieved by taking action at the source (the soil in this case), or at points in the exposure pathways (the foodstuffs), and occasionally by modifying the location or characteristics of the exposed individuals (modifying the dietary habits of the exposed individuals).

There are different management options to reduce the consequences of contamination of the food-chain [4]; each of them are characterised by different criteria in order to help their evaluation, by local and national stakeholders, in the decision-making process. Among the criteria considered the following are distinguished: effectiveness, feasibility, waste, doses, costs, side-effects, constrains, ethical considerations and communication needs.

Among the main issues that must be considered in the agricultural environments

- Zoning? Constrains? Reference levels?
- Identification of product systems / soils / pathways /products / population groups more vulnerable
- Prognostic versus monitoring results? In which cases should these results be used? How to obtain a balanced use?
- Selection and establishment of strategies. How to apply the optimisation principle?
- Effects influencing the decision and future evolution of scenarios: Social, Technological, Economic, Environmental, Political and Ethical values. Criteria to measure them.
- How to translate these issues into goals and objectives suitable for the restoration of agricultural environments?

#### 4.5 Engaging stakeholders in the decision-making process

The methodological approach used in WP4 is a scenario-based stakeholder engagement. It comprises the following steps:

- Scenario analysis: To establish generic scenarios.
  - Structured brainstorming
  - Participatory workshops
  - Modelling
- Stakeholders Discussion Panels: Discussion on the inputs, concerns and viewpoints of the stakeholders, with specific consideration of the uncertainties that stem from the different decision criteria and actions taken in the transition phase.
- Delphi Survey: Agreement and prioritisation on preferences of stakeholders.

The discussion panels (second phase of the work plan) are organised to establish and assay the process of national dialogue with stakeholder during the transition to recovery in the generic contamination scenarios defined previously. The target of the discussions will deal on what to do and how to proceed in such contaminated scenario and evaluate the potential impacts of their decisions on the course of actions to recover acceptable living conditions.

There are different stakeholders categories, according to their involvement in the post-emergency planning and management of the transition phase:

- Directly involved (Decision makers, Government institutions, agencies or companies)
- Others affected but not involved (Population, producers, industries, marketers, directly affected)
- Others unaffected but interested (Experts, NGOs,...)

An expert Delphi survey will be carried out among stakeholders of each country, to prepare the panel meetings and to obtain a prioritization of stakeholders' preferences.

The aim of this Delphi survey is:

- To continue the work initiated in the brainstorming (by the experts)
- To get a broad spectrum of different views (from different stakeholders)
- To identify the most important issues

These questions and issues will be used as a basis for panel discussion in order to achieve a consensus regarding the main criteria for the decision-making during the recovery phase.

Regarding the Multi-criteria Decision Analysis (MCDA), a set of alternatives describing the possibilities for decision making for a given scenario is defined,  $A_1, \dots, A_n$ .

The criteria  $C_1, \dots, C_m$  important for the decision making in that scenario have to be defined as value for each criterion-alternative pair. The importance of the criteria is taken into account by weights  $w_1, \dots, w_m$  defined for each criterion.

Criterion and weights can be defined as single values, what is called deterministic approach. These, generate uncertainties that can be dealt applying a distribution and providing boundary conditions (e.g. 5% and 95%). The proposed realisation considers providing direct results from ensemble calculations for attributes and providing a distribution for the weights.

## 5 Exploratory questionnaire of ideas from experts

A questionnaire was launched previously to the workshop to collect the initial ideas from participants. The survey has been an exploratory nature:

- To collect some first ideas regarding future recovery strategies
- To serve as a pilot for the first round Delphi study
- Helping and complementing brainstorming exercise (will feed next deliverable)
- Helping to establish the panel topics

The answers to questions related to Critical issues for future recovery, Objective of restoration plan, Alternative actions and Stakeholders' engagement were shown. The preliminary results are presented as follows:

### 5.1 Critical issues for future recovery

1. Which scenario or situation are you most concerned about?

- Radiological impact of environmental contamination
- Accident scenario with local consequences (food restriction, distanced inhabitants)

- Public health - exposure pathways and protective actions
- All of them, need to ensure that uncertainties are designed in and understood and so can be explored with decision makers and workshop participants
- Recovery phase, large scale contamination issues, relocation and cleanup actions
- Long term contamination due to a large radioactivity release from a nuclear power plant abroad.

2. What do you identify as critical issues for a future recovery?

- Type of contamination (radionuclide and activity)
- Extent of the affected area
- Type of affected area (land use, urban or rural)
- Population density
- Lifting of orders
- Restoration of living conditions
- Good communications
- Radiation protection culture
- Waste management
- Maintaining confidence / trust of the public and interested parties
- Social/ public support, acceptance
- Cost / economic effects
- Efficiency of countermeasures
- Dealing with uncertainties
- Characterising adequately the radiological contamination (deposition) in long distances
- Stigmatization of areas and products
- Communication to the stakeholders

3. What are the specific issues or concerns you would like to see addressed?

- Type of remediation strategies applied and their impact (extent, and time to return to normal activity)
- Criteria used by decision makers for food restriction and temporary evacuation
- Setting of realistic and achievable RLs taking into account prevailing circumstances and avoiding too much
- Balance of different objectives
- Large areas radiological characterization
- Role of models in the process of characterization
- Uncertainties in the response of the public and in estimating social impact.

## 5.2 Objective of restoration plan

1. What would you see as a desirable outcome after implementing the restoration plan?

- low impact in the life of populations of the areas involved in the scenario
- return of all distanced people
- restart of economic and agricultural activities
- the accident is not dominant in peoples thoughts

- public confidence in a return to a normal living, even if it is different normal environment to that before
  - an optimized set of measures
  - to achieve public trust, so to reduce public actions from undue radiological fear that is not warranted by the actual radiological situation. This would contribute greatly in successful restoring normal living conditions and minimizing the social and economical cost of the accident and the protective actions.
2. What would you wish to include to obtain such outcome?
- acceptable level of radioactivity (maximum twice the background before the accident), compensation of victims
  - public meetings and good engagement with all those affected
  - honest recognition of the uncertainties and their resolution over time
  - Mechanisms to compare recovery strategies against all defined objectives
  - Communication to the public in the context of national exercises. In particular, the communication should explain the uncertainties and how they are treated and compensated in order to achieve adequate protection of the public according to predefined radiological - dosimetric criteria.
3. What factors do you think could affect the success of the plan?
- risk perception, good communication to the public, good implementation of restoration plan
  - involvement of local stakeholders, complete radiological characterisation programme
  - rumour, poor communications , lack of resources,
  - Recognition of full range of uncertainties among CONFIDENCE partners!
  - Acceptability and costs, technical feasibility

### 5.3 Alternative actions

1. What are all the possible ways you think these objectives could be achieved? (Only identify the full range of them, e.g. monitored non-intervention, containment, removal, change of use, ...)
- contaminant removal / decontamination
  - Compensation
  - Information
  - local stakeholder engagement in monitoring
  - Environmental and health surveillance
  - full radiological characterization of the contaminated area
  - decontamination where doses are highest
  - Set up scenarios in which the uncertainties are truly representative of those present in a real accident
2. What do you see as the priority actions that should be carried out soon?
- information of potential stakeholders (in peace-time) - exercises 'playing' the emergency, transition and late phases (with local stakeholders).
  - awareness of decision makers (eg crisis centres) about the consequences of decisions (eg food restriction, evacuation)

- full radiological characterisation of the contaminated area
  - frequent engagement with the affected people
  - allocation of adequate resources
  - Estimate and address the significant uncertainties
  - safety and reassurance issues
3. What do you think would be a great alternative (even if you consider it infeasible)?
- everyone to be given personal dose rate monitors and support to understand the readings
  - access to food monitoring facilities
  - a full detailed characterization of the radiological contamination and subsequent decontamination
4. What do you think would be a bad alternative?
- no information, no preparation of the local stakeholders - top down and irreversible decisions in real situation
  - top down decision making and no engagement
  - brushing aside the issue of uncertainty which the community has done continually since Chernobyl
  - radiologically effective but not generally accepted
  - implementing protective measures (e.g. food restrictions) in large areas with no adequate assessment basis (e.g. monitoring results), based solely on a potential radiological hazard. This may cause undue and avoidable social cost
5. What specific information do you think is needed to evaluate the impact of these alternatives regarding the planned objectives?
- appropriate level of resources and availability of trained personnel; stakeholder feedback
  - a recognition among the public, interested parties and politicians that the emergency managers and recovery team will face many uncertainties and not be able to answer all questions with certainty
  - instruments to compare different alternatives
  - comparison with situation ante

## 5.4 Stakeholder engagement

1. Which stakeholders should be involved?
- National and Local Government
  - Community representatives (e.g. teachers)
  - Public from local communities
  - Health care professionals (medical doctors, nurses, pharmacists)
  - Farmers
  - Industry /businesses: food producers, processors, retailers, tourism, etc.
  - NGOs (protection of environment, social and medical care, food quality, etc.),
  - elected people
  - health and safety and food authorities (at different level of decision)
  - TSOs

- Media
- Emergency and recovery managers
- civil servants away from the nuclear domain who will be involved in recovery
- Regulatory bodies
- Scientific organizations

2. How could they be involved?

- Workshops
- Exercises
- Feedback experience (from Chernobyl and Fukushima accidents and other cases)
- Meeting of information
- Bilateral meetings, public meetings, stakeholder panels, social media, education - talks Q&As
- Web simulations
- Expert panels
- Group interviews
- Focus groups
- Stakeholder consultations

3. Please, highlight some challenges deriving from stakeholder engagement in this kind of situations.

- availability (time consuming)
- reimbursement of costs for venue
- capability to apprehend their roles in a real situation (which is very uncertain and difficult to imagine)
- finding the time to engage
- education and understanding
- finding places to meet
- sustainability of engagement when there is no crisis
- getting broad enough attendance
- defining common goals
- undue fear of radiation
- lost of public trust
- communicating which exposure level is safe.

## 5.5 Other issues

1. Would you like to add something else regarding the management of the transition phase?

- to my opinion, there is no 'transition phase', post accident it is a continuum with all phases (and associated problems to manage) coexisting at the same time. Cutting the post accident into pieces like a Thanksgiving turkey (phases) may be convenient for experts, but is far from the reality of real accidents!
- collaborative working between those leading on the emergency phase and those leading on the recovery
- although the uncertainties are higher in the response phase, some remain and others develop in the weeks after an event

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## 6 Conclusions

- During this first phase of the work the issues and elements to take into account in the transition phase have been treated.
- The problem has been framed, identifying the challenges.
- Discussions on the items to be considered in the panels have been carried out.
- A structured and simplified scenario will be defined and to test the preferences of the stakeholders a selection of a few number of strategies will be made.
- A initial contaminated scenario to use in each panel based in two or three levels of severity will be prepared. The countries hosting panels will have to decide which area or NPP will be the object of the study and will provide a detailed environmental characterisation of the affected area complementing and structuring the contaminated scenario according the specific characteristics of each one.
- In the panels no technical matters should be discussed but the preferences and how to reach the decisions.
- A guideline of common questions has to be developed and chaired among partners to be used for discussions in the panels, this will help the comparison of results in order to favour the different weightings.
- In the different countries that will host panels, these are already targeted and the stakeholders are defined.
- The exploratory questionnaire will be included in a common document for use of all partners of the project, as basis to the different purposes in the WPs and the panels.
- The questionnaire will be open to other respondents, including the CONFIDENCE partners and NERIS Community, as well as whatever other national stakeholders concerned on the preparedness for long-term recovery during the transition phase.

## 7 References

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