

Kingdom of Morocco

Head of the Government



رئيس الحكومة



Agence Marocaine de Sûreté  
et de Sécurité Nucléaires  
et Radiologiques



الوكالة المغربية للأمن والسلامة  
في المجالين النووي والإشعاعي



INSIDER THREAT  
MITIGATION

**Regional Workshop for French-Speaking Africa: Addressing the Nexus of  
Artificial Intelligence and Insider Threat Mitigation**  
Rabat, Morocco, 21 - 23 October 2025

*Safety and Security Regulatory Capacity Building: AMSSNuR experience*



Presented by Taïb MARFAK, Head of Nuclear Safety and Security Department, AMSSNuR

21<sup>th</sup> October 2025

[www.amssnur.org.ma](http://www.amssnur.org.ma)

- 1. National & International Context*
- 2. AMSSNuR : the Moroccan Agency*
- 3. Strategic approach for Capacity Building*
- 4. Main Achievements*
- 5. Conclusion & Challenges*

# 1- NATIONAL & INTERNATIONAL CONTEXT

## Overview on Nuclear & Radiological Sector



More than 11000 X-ray facilities.

### HEALTH

60 radiotherapy centers.  
79 particle accelerators for radiotherapy.  
40 brachytherapy facilities.  
More than 35 Nuclear Medicine Center.  
32 PET/CT scans  
13 SPECT/CT  
2 Gamma knife Facilities



More than 400 radiometric gauges used for quality control in cement plants petrochemicals, sugar factories.

### INDUSTRY

More than 15 NDT companies.  
3 particle accelerators used in the wiring industry.



More than 700 scanners installed at ports, airports and other.

### SECURITY CONTROL

More than 20 particle accelerators dedicated to the control of goods.



More than 10 research laboratories.

### RESEARCH AND EDUCATION



2 Cyclotrons for the production of Fluorine-18

1 laboratory for the production of Iodine-131 (in the test phase)

### RADIOPHARMACEUTICALS



More than 20 veterinary radiology installations

### AGRICULTURE

One (01) irradiator of food for Research  
One (01) irradiator used in the Sterile insect technique (SIT)



2MW Nuclear Research Reactor

### ENERGY

NPPs Considered Beyond 2030 & Opportunities for SMRs

# 1- NATIONAL & INTERNATIONAL CONTEXT

## *Moroccan International Commitments*



Convention on Nuclear Safety

May 2019

Convention on  
Early Notification of  
Nuclear Accident

October 1993

Convention on The  
Physical Protection  
of Nuclear  
Material (CPPNM)  
and its  
Amendments

2005, 2012 and 2015

Convention on  
Assistance in  
case of Nuclear  
Accident or  
Radiological  
Emergency

October 1993



November 1970

Joint Convention on  
Safety of Spent Fuel  
management and  
Safety of  
Radioactive Waste  
Management

July 1999

### ADDITIONAL PROTOCOL

VERIFYING THAT ALL NUCLEAR MATERIAL REMAINS IN PEACEFUL ACTIVITIES

#### KEY FACTS



The Model Additional Protocol was approved by the IAEA Board of Governors in 1997 to supplement a State's safeguards agreement.



While voluntarily concluded, once it enters into force the Additional Protocol becomes legally binding.



As of November 2018, the Additional Protocol was being implemented in 133 States.

2011

- UNSC resolutions 1540 (2004) & 1373 (2001)
- International Convention for the Suppression of the Financing of Terrorism
- International Convention for the Suppression of Terrorist Bombings
- International Convention for the Suppression of Acts of Nuclear Terrorism :
- Safeguards Agreements (1975)
- The African Nuclear-Weapon-Free Zone "Pelindaba Treaty" Ratified on April 2022

+ *Non-Binding Instruments : Codes of Conduct on Safety of the Research Reactors & Safety of Radioactive Sources*

# 1- NATIONAL & INTERNATIONAL CONTEXT

## *The Law 142-12 & AMSSNuR Creation*

- ❑ **The Law 142-12**, adopted in 2014, relates to nuclear and radiological safety and security, and the creation of the Moroccan Agency for Nuclear and Radiological Safety and Security (AMSSNuR) as an independent authority under the supervision of the Head of Government.
- ❑ **The Law 142-12** covers all activities, installations and all exposure situations involving ionizing radiation, with the aim of protecting workers, the public and the environment.



# 1- INTERNATIONAL & NATIONAL CONTEXT

## *Roles & Responsibilities*



**The Law 142-12** aims to ensure the safe, secure and responsible management of nuclear and radiological activities, considering the IAEA safety standards and nuclear security recommendations and the international best practices.



The **Law 142-12** establishes the Moroccan Agency for Nuclear and Radiological Safety and Security (**AMSSNuR**) as responsible for **Regulatory Oversight** of Safety, Security and Safeguards of ionizing radiation facilities (IRF) and sources (IRS).



The Law requires that **the Licensee** has the **Prime Responsibility** to take all necessary (technical, organizational & human) measures to protect the public, the workers, and the environment from the harmful effects of ionizing radiation.



## 2- AMSSNuR : THE MOROCCAN AGENCY

### *Vision & Mission*

*The Objective is to protect People & the Environment from the harmful effects of ionizing radiation.*



### VISION

An Authority which is :

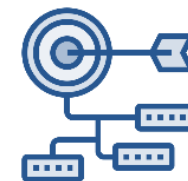
- **Strong**, through its human capital, its experience, and the ongoing development of its technical, organizational and human competencies.
- **Exemplary**, through its rigorous fulfillment of its mission, its continuously improving human capital, and its ambition to be a regional and continental Leader for Safety.
- **Independent**, in the fulfilment of its regulatory mission in accordance with the Law 142-12 and related regulations.

### MISSION

Our mission is to :

Oversee the protection of workers, patients, the public and the environment from risks associated with ionizing radiation sources (IRSs), and ensure compliance with the Kingdom's international commitments on safety, security and safeguards, and international best practices.

**Facilitate while being strict**



## 2- AMSSNuR : THE MOROCCAN AGENCY

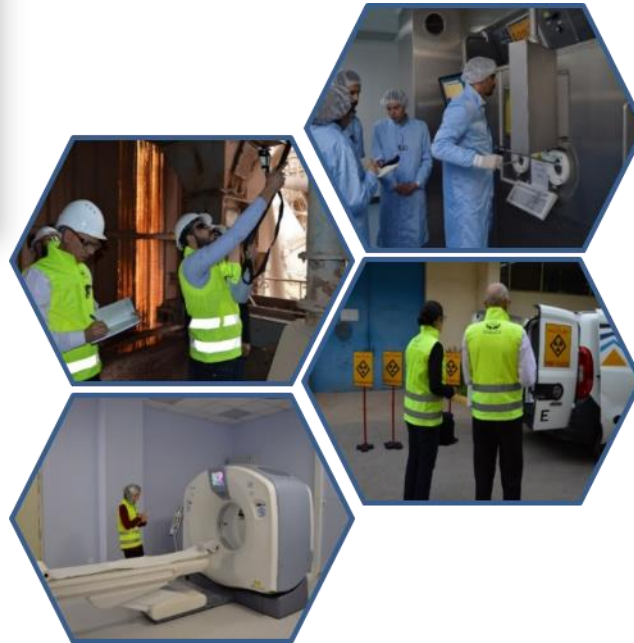
### *Main Regulatory Functions*

### Regulate

AMSSNuR proposes to the government the legislation and regulations relating to nuclear and radiological safety and security, & gives its opinion and advice.

### Authorize

AMSSNuR authorizes activities and installations using ionizing radiation sources (IRS).



### Inspect

AMSSNuR verifies the regulatory compliance of the authorized facilities or activities involving ionizing radiation sources (IRS).

### Enforce

AMSSNuR applies, in case of non-compliance, the enforcement measures provided for by the Law and regulations in force.



## 2- AMSSNuR : THE MOROCCAN AGENCY

### *Main Regulatory Functions*

### Inform

Inform the public on regulatory processes and the aspects relating to the safety and security of authorized activities.

### Contribute

AMSSNuR contributes to the national radiological and nuclear emergency preparedness and response plan.

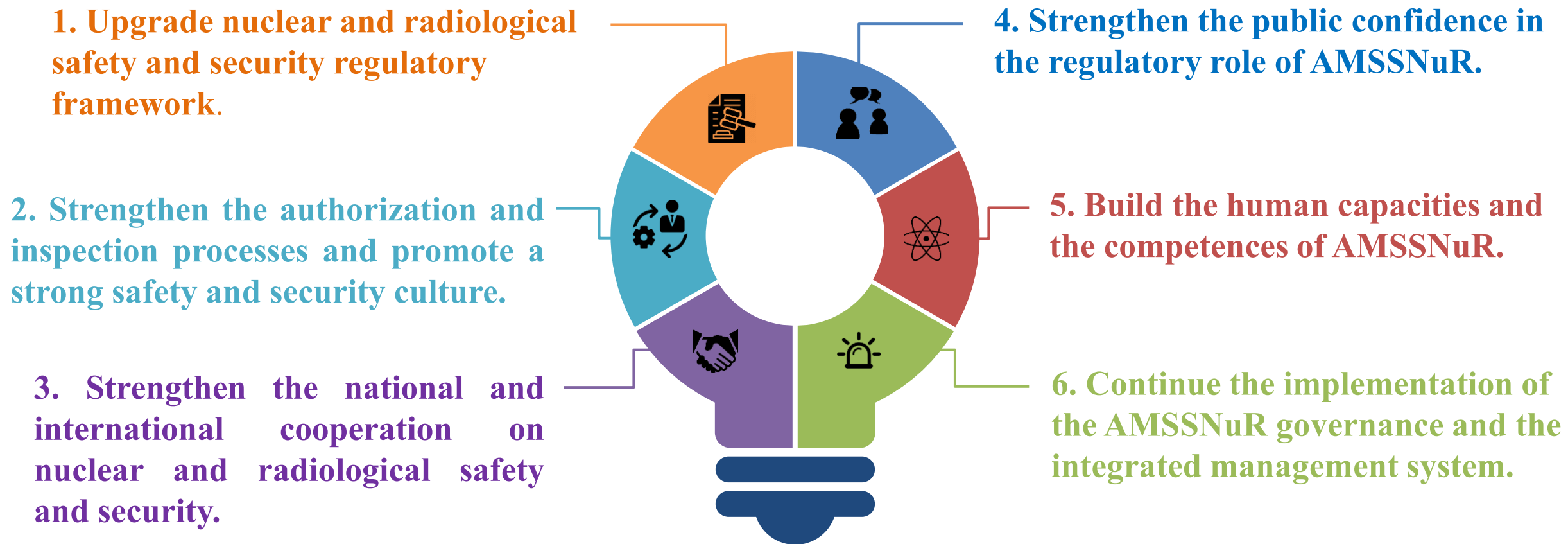


### Ensure

AMSSNuR ensures a permanent watch on nuclear and radiological safety and security, safeguards and non-proliferation, as well as on scientific, health and medical matters regarding the effects of ionizing radiation taking into account the progress made at the international level.

### 3- STRATEGIC APPROACH FOR CAPACITY BUILDING

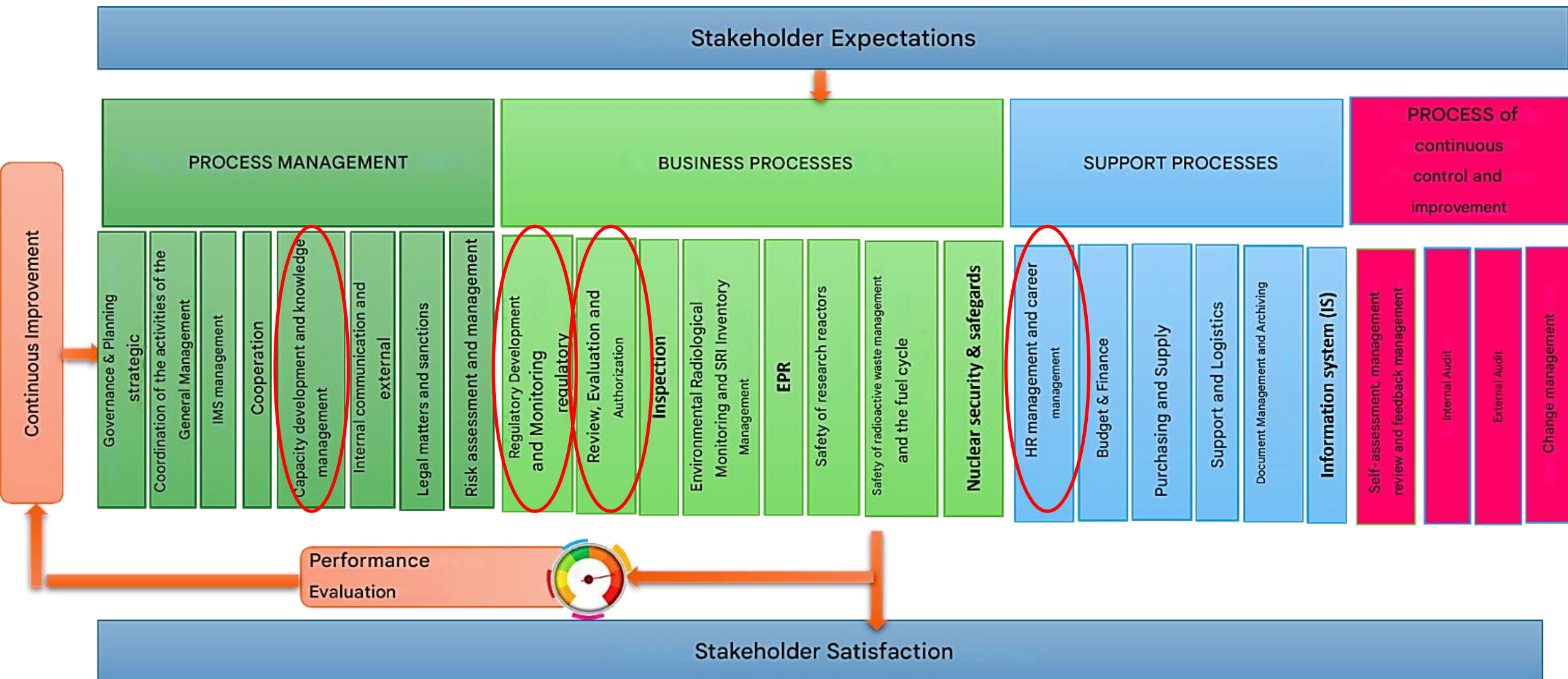
#### *Strategic Orientations of AMSSNuR*



*Legal framework covers the main elements of capacity building for acquiring and maintaining the necessary competences to ensure Nuclear and Radiological Safety & Security*

### 3- STRATEGIC APPROACH FOR CAPACITY BUILDING

#### *IMS: Capacity Building & Knowledge Management Process*



### 3- STRATEGIC APPROACH FOR CAPACITY BUILDING

#### *Capacity Building & Knowledge Management Process*



The following methodology has been developed and implemented by the Agency at the end of 2024 to address our skills and expertise “ **Needs** ” and followed through the “**Capacity Building & Knowledge Management**” process :

- ❖ **Where are we ?** => Accurately identify the current capacity building situation of the Agency and visualize it in the form of a three-level competencies mapping (**Beginner/Advanced/Expert**).
- ❖ **Where are we going ?** => Define the target situation to be achieved in terms of skill levels and the number of experts.
- ❖ **How do we get there ?** => Implement a “Training Catalog & Plan” based on internal (by our experts) and external (national and international) training programs.
- ❖ **Take the road or Pave the way** => Define individual and collective training programs based on the previous steps.
- ❖ **Periodic evaluations** => Review the “ Training Catalog & Plan ” annually, and the “ Competencies Mapping” of the Agency every three years.

AMSSNuR is putting in place a multi-year “ **Training Catalog & Plan** ” using :

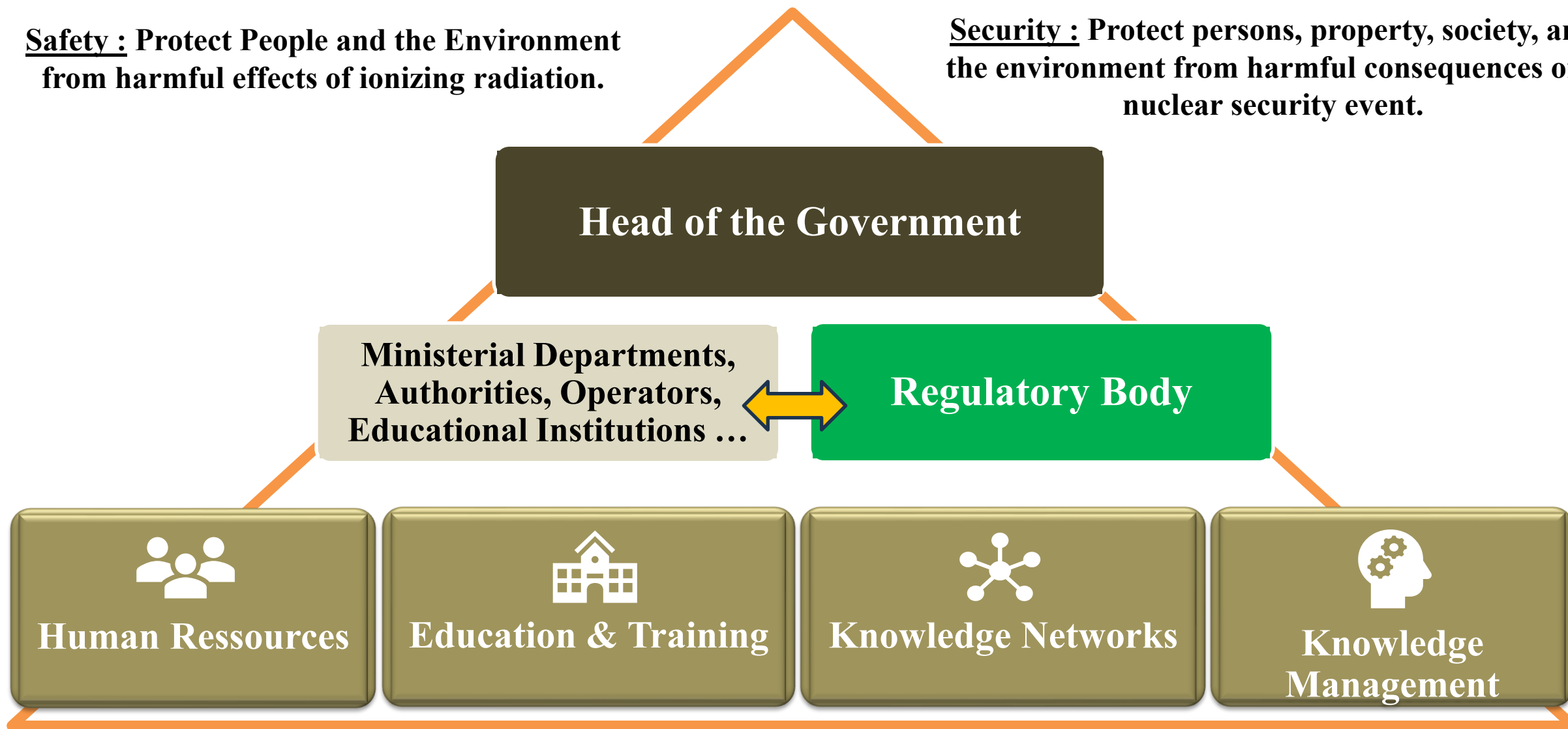
- Internal resources : coaching, mentoring, interne courses and trainings, ... ; as well as
- External resources : national and international trainings, scientific visits, expert missions, ...

### 3- STRATEGIC APPROACH FOR CAPACITY BUILDING

#### *At National Level*

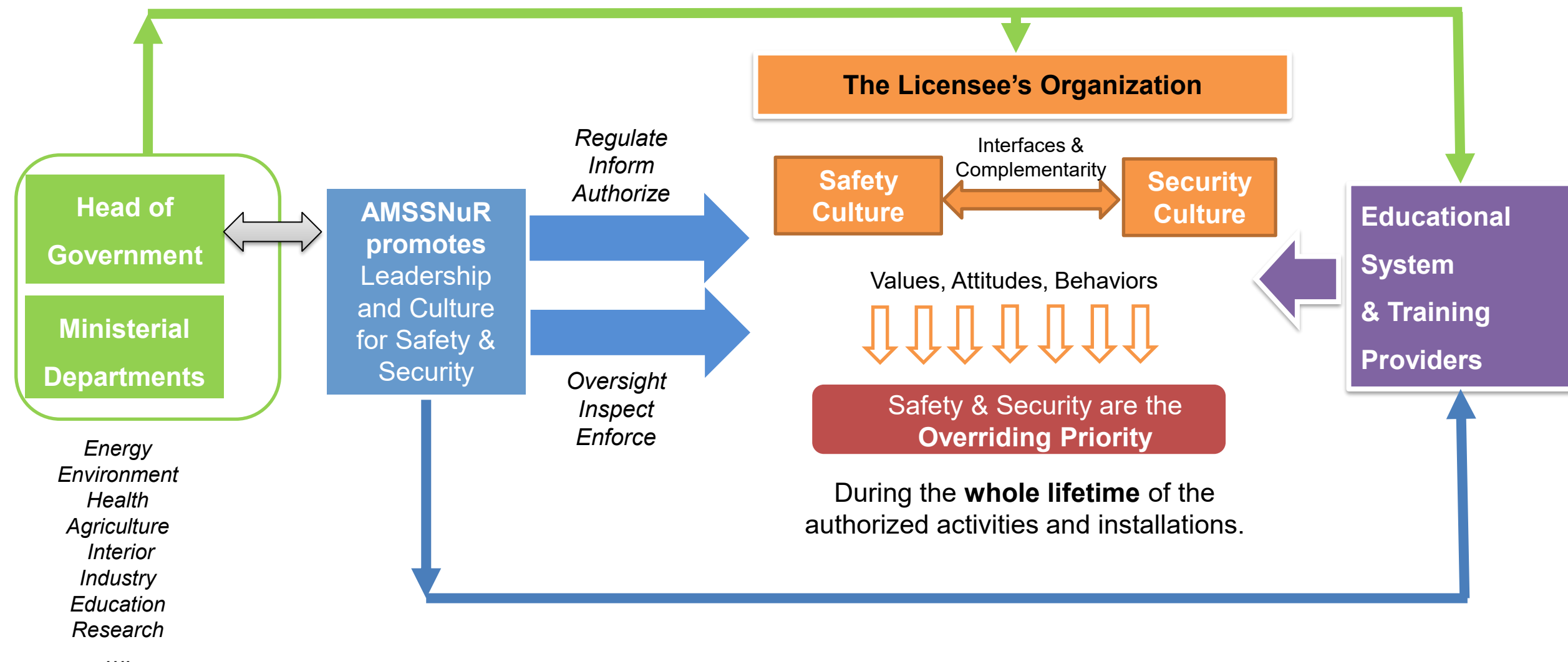
**Safety :** Protect People and the Environment from harmful effects of ionizing radiation.

**Security :** Protect persons, property, society, and the environment from harmful consequences of a nuclear security event.



### 3- STRATEGIC APPROACH FOR CAPACITY BUILDING

#### *Main National Concerned Parties*

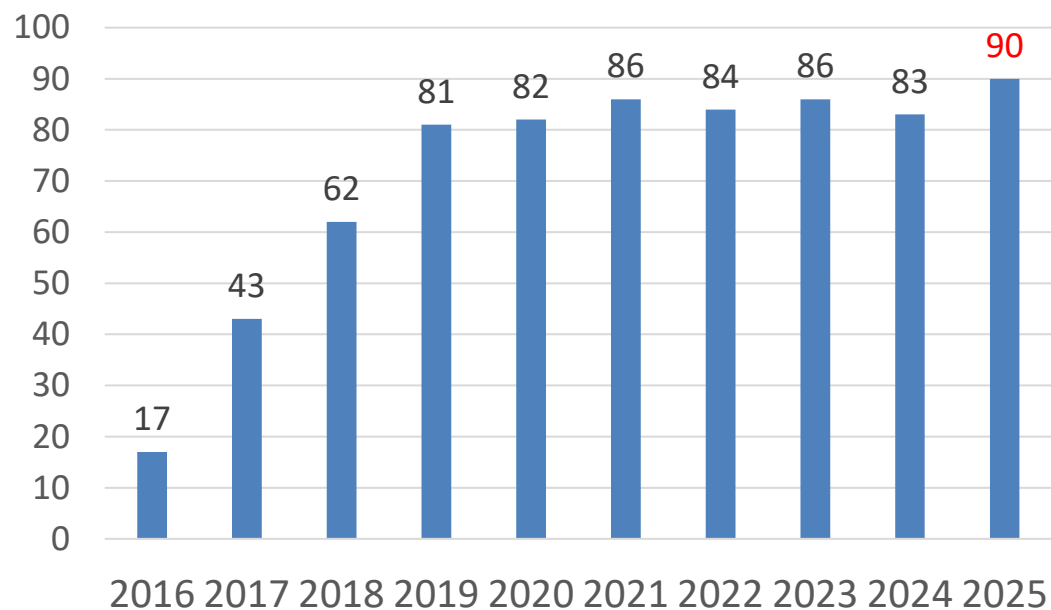




# 4- MAIN ACHIEVEMENTS :

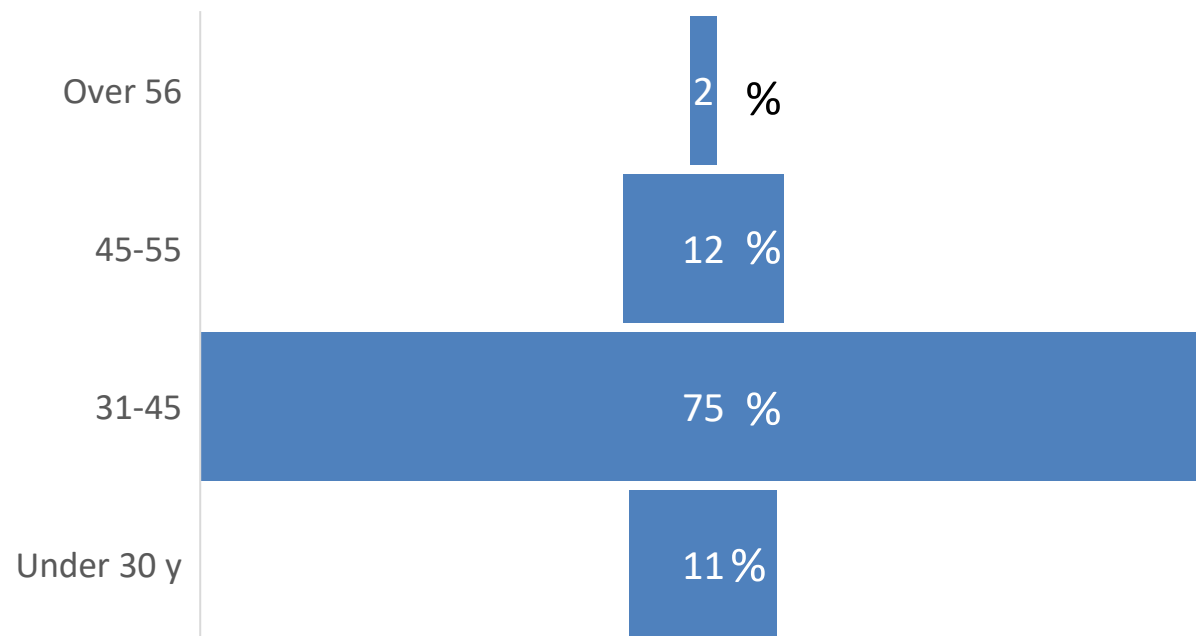
## HRD Plan

### STAFFING



Average Age = 37 years

### AGE PYRAMID



60 %



40 %

≈ Gender Equality

# 4- PRINCIPALES RÉALISATIONS

## Plan de formation et Gestion des Connaissances

Royaume du Maroc



Chef du Gouvernement



Agence Marocaine de Sûreté  
et de Sécurité Nucléaires et Radiologiques

### CATALOGUE DE FORMATIONS MÉTIER & SUPPORT

MAÎTRISE DU DOCUMENT				
Rôle	Fonction	Nom	Visa	Date
Rédacteur	Chef du DSND/DS NGN	M. Taib MARFAK		
Vérificateur (s)	Chef du DSRPE Chef du DAF	Mme Rachida EL GAMOUSSI M. El Mostafa EL KHANNOUS		
Approbateur (s)	SG DG	M. Rada NOUR M. Saïd MOULINE		

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REFERENCE: AMSSNuR/PRO-CBKM-001/V1	Catalogue de Formations Métiers & Support	Page : 5/71
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### II. STRUCTURE DU CATALOGUE DE FORMATION

En s'inspirant des publications<sup>1,2,3</sup> de l'AIEA portant sur le développement et le renforcement des compétences au niveau des organismes réglementaires, l'Agence Marocaine de Sûreté et de Sécurité Nucléaires et Radiologiques (AMSSNuR) a développé le processus « Capacity Building & Knowledge Management » au sein de son Système de Management Intégré (SMI) et ce en couvrant les cinq volets suivants :

#### 1. Volet 1 : Bases Légales et Réglementaires, Politiques & SMI

- V1.1 : Politique et Gouvernance de l'Agence
- V1.2 : Système de Management Intégré
- V1.3 : Base légale (Loi 142-12 et autres textes législatifs)
- V1.4 : Réglementation, Guides et autres textes référant à la Loi 142-12
- V1.5 : Instruments juridiques contraignants et non contraignants
- V1.6 : Standards et Recommandations internationales
- V1.7 : Affaires juridiques
- V1.8 : Dépenses publiques : Lois et autres textes réglementaires

#### 2. Volet 2 : Compétences Techniques

- V2.1 : Sûreté Radiologique (Sûreté des SRI et Radioprotection)
- V2.2 : Détection et mesure des rayonnements ionisants
- V2.3 : Protection de l'environnement (Etude d'impact et Surveillance)
- V2.4 : Sûreté Nucléaire des réacteurs de recherche
- V2.5 : Sûreté du combustible nucléaire (cycle)
- V2.6 : Sûreté des Déchets radioactifs
- V2.7 : Sécurité Nucléaire et Radiologique
- V2.8 : Garanties Nucléaires
- V2.9 : Préparation et Gestion des situations d'Urgence
- V2.10 : Transport des matières radioactives

<sup>1</sup> IAEA SAFETY REPORTS SERIES NO. 79, MANAGING REGULATORY BODY COMPETENCE, 2013.

<sup>2</sup> IAEA-TECDOC-1757, Methodology for the Systematic Assessment of the Regulatory Competence Needs (SARCON) for Regulatory Bodies of Nuclear Installations, 2014

<sup>3</sup> IAEA-TECDOC-1860, Methodology for the Systematic Assessment of the Regulatory Competence Needs (SARCON) for Regulatory Bodies of Radiation Facilities and Activities, 2019

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#### 3. Volet 3 : Fonctions Réglementaires

- V3.1 : Elaboration et veille réglementaires & Guides
- V3.2 : Autorisations et Agréments (Examen, Evaluation et Octroi)
- V3.3 : Inspections (préparation, réalisation et suivi des actions)
- V3.4 : Sanctions

#### 4. Volet 4 : Compétences Supports

- V4.1 : Développement des capacités humaines et formations
- V4.2 : Administration du personnel
- V4.3 : Achats et Marchés publics
- V4.4 : Budget & finances
- V4.5 : Moyens généraux et patrimoine
- V4.6 : Technologie de l'information (IT)
- V4.7 : Audit et Contrôle de gestion
- V4.8 : Information et Communication
- V4.9 : Coopération et Relations internationales
- V4.10 : Assistantat administratif

#### 5. Volet 5 : Compétences comportementales

- V5.1 : Leadership et Management
- V5.2 : Culture de Sûreté et de Sécurité
- V5.3 : Communication (écrite, orale, en public)
- V5.4 : Travail en équipe
- V5.5 : Gestion de projets
- V5.6 : Développement Personnel
- V5.7 : Posture de l'inspecteur

Ces volets couvrent l'ensemble des compétences nécessaires à la réalisation efficace des missions légales et des fonctions réglementaires de l'Agence. Chaque compétence couvre plusieurs sous compétences conformément à la cartographie des compétences Métiers et Support (CCMS), et leur développement en continu est basé sur une offre de formations internes et externes gérée par le service « Centre de Formations de l'Agence (CFA) ». Cette offre est reprise de façon détaillée au chapitre IV et mise à jour périodiquement.

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### III. GUIDE DES SYLLABUS DE FORMATION METIERS ET SUPPORT

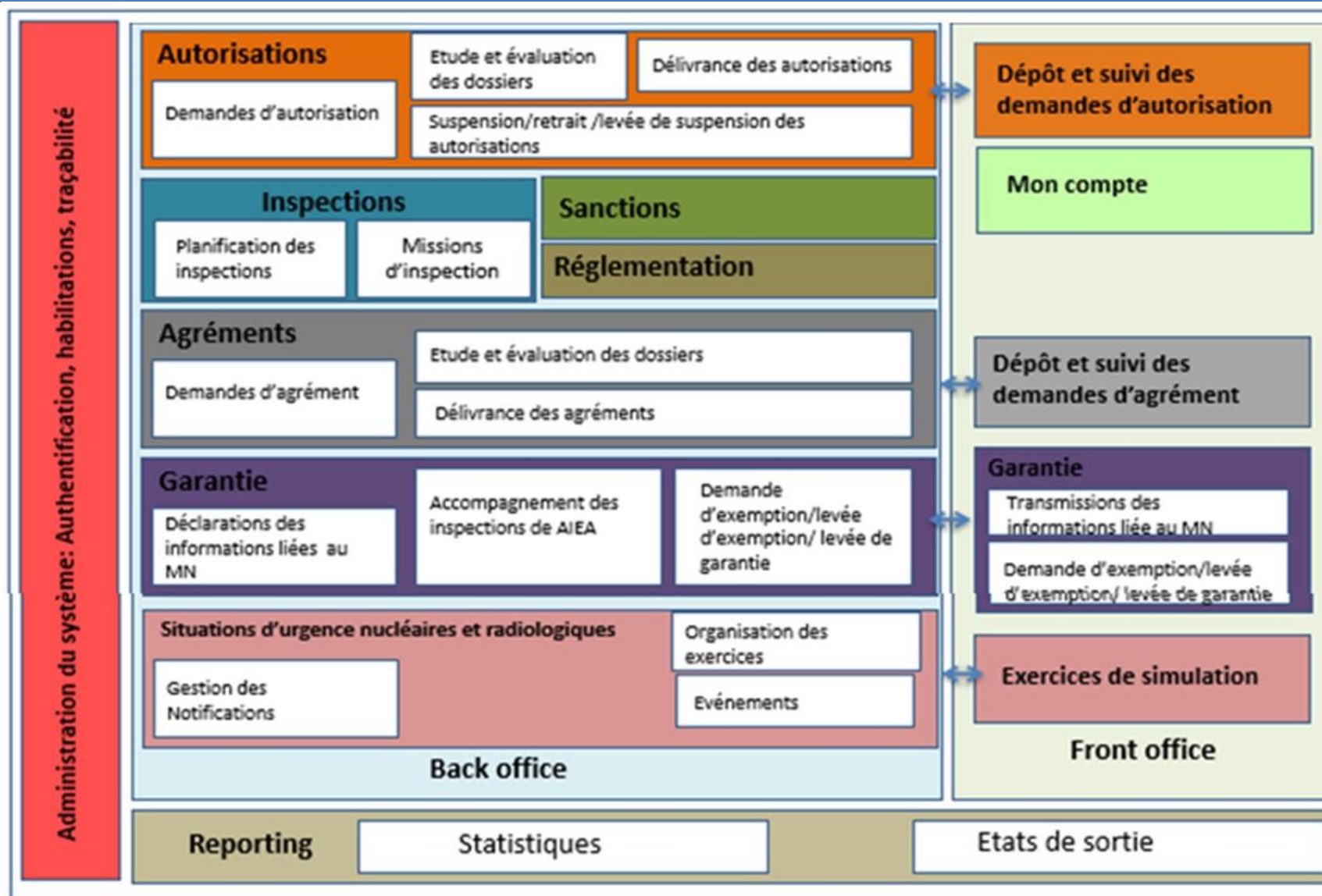
Intitulé de la formation	: Exemple 'Nom de la compétence'
Code de la formation	: T.i.j
Durée de la formation	: exprimée en heures ou en jours
Responsable(s) de la formation	: Nom(s) et Prénom(s) des experts désignés

- Objectifs de la Formation :**
  - ✓ Fixer les objectifs en rapport avec l'intitulé de la formation.
- Description de la Formation :**
  - ✓ 8 à 12 lignes
- Prérequis :**
  - ✓ Lectures obligatoires des : manuels (si disponible), des documents techniques, des références et standards de l'AIEA, des normes, ...
  - ✓ Autres Ressources : Visionnage de vidéos, Consultation de sites web ...
- Public Cible :**
  - ✓ Affectation.
  - ✓ Expérience.
  - ✓ Ancienneté.
- Moyens Pédagogiques :**
  - a- **Support de la Formation :** Présentations, Documents et autres supports (à développer).
  - b- **Exercices et Travaux Pratiques (optionnel) :**
    - ✓ Les exercices peuvent inclure les études de cas, les affectations de rôle, les revues critiques d'articles ou publications, l'élaboration de documents, ...
    - ✓ Exemples de travaux pratiques : l'utilisation des équipements de détection, le calcul informatique, la visite d'installations ...
- Contrôle des connaissances et des acquis :**
  - ✓ Evaluations écrites ou orales.
  - ✓ Projets individuels ou en groupe.

- 39 Modules couvrant l'ensemble des activités Métiers & Support.
- Plan de formation étalé sur trois ans avec des évaluations annuelles.
- Plus de 90 % des modules sont pris en charge par les ressources internes.
- Expérience partagée au niveau régional et international.

## 4- MAIN ACHIEVEMENTS :

### *Digitalization of Regulatory Functions*



# 4- MAIN ACHIEVEMENTS :

## National & International Cooperation



### National, Regional and International Cooperation

- Departments of Energy, Health, Interior, High Education, ...
- Security authorities
- CNESTEN, CNRP, Universities, NGO

### Multilateral Cooperation

IAEA, GNSSN, RCF, FNRBA, ANNuR, iNET-EPR, IGTLN, AFRA, AFCONE, NHSI ...

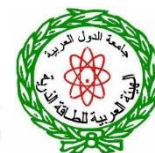
### Bilateral Cooperation

Hungary (HAEA) -USA (NRC and DOE-NSA) - Spain (CSN) - Germany (GRS) - France (IRSN) - Russia (Rostechnadzor) - Canada (CNSC) - Argentina (ARN) - Slovenia (SNSA) - Slovakia (UJD-SR) - Mauritania (ARSN) - Rwanda (RURA) - Burkina Faso (ARSN) - Côte d'Ivoire (ARSN) - Egypt (ENRRA)

### UE/CE

**Project 2018/22** to support AMSSNuR for capacity building and for enhancing the regulatory framework for nuclear and radiation safety

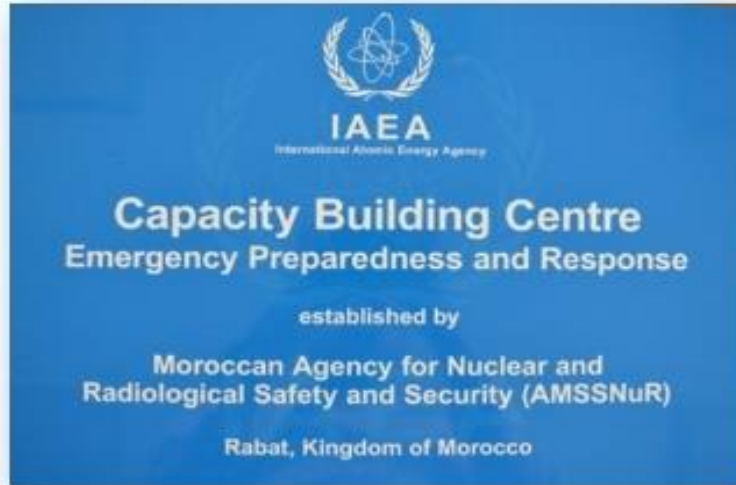
**New Project 2025/28**  
Kick-off meeting in February 2025



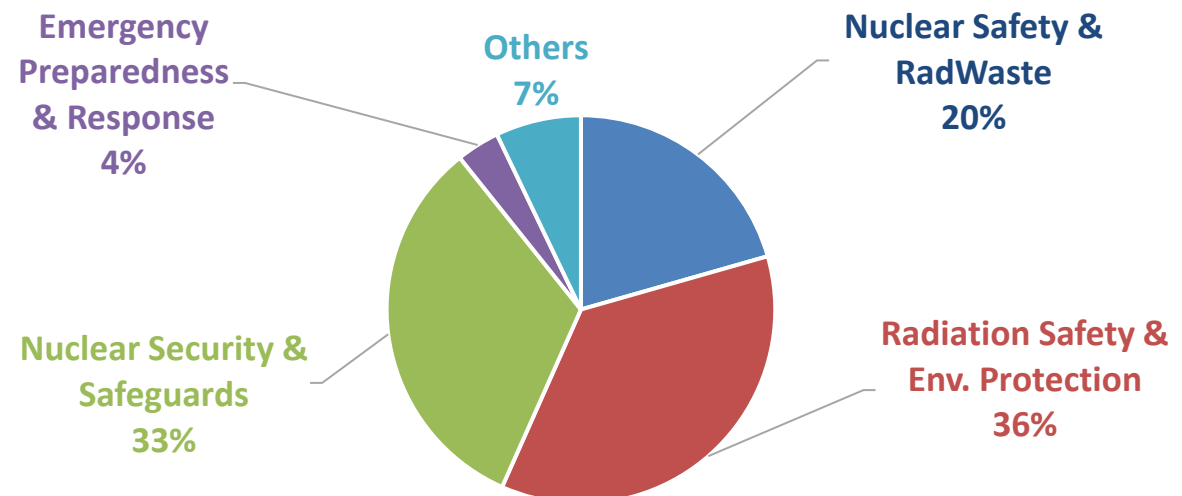
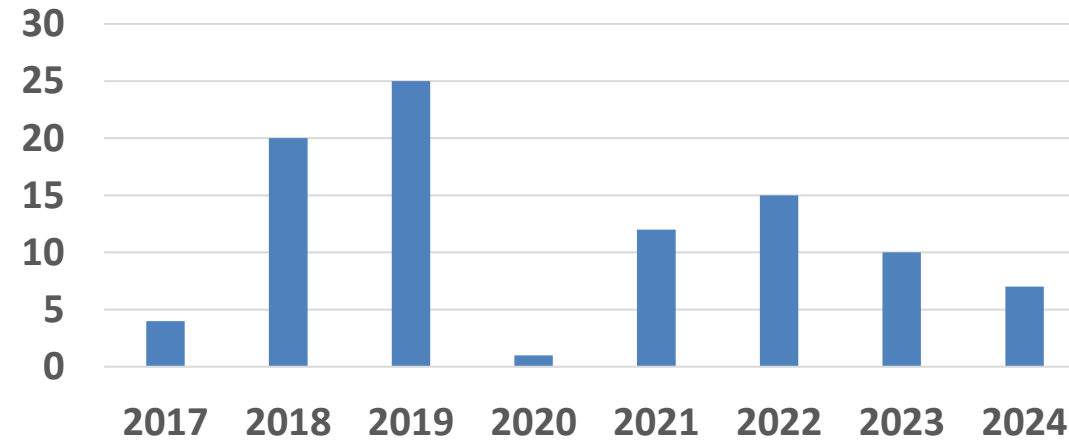


## 4- MAIN ACHIEVEMENTS :

### IAEA - AMSSNuR Centers in EPR & Nuclear Security



More than 90 Workshops organized by  
AMSSNuR since its creation



Repartition of Training Areas

## 4- MAIN ACHIEVEMENTS :

### *African School For Radiation Safety Regulators*

A Practical Cooperation Agreement has been signed between the IAEA and AMSSNuR to promote radiation safety expertise on the African continent by setting up an **African School for Radiation Safety Regulators** in Morocco.



The objective is to **support African countries** to further improve the existing **national regulatory** infrastructure for radiation safety through the organization of several training courses supported by :

- » Mentorship programs ;
- » Experts and Advisory missions ;
- » Train-the-Trainer for Radiation Protection Officers ;
- » Train-the-Trainer for health professionals ;





## 4- MAIN ACHIEVEMENTS :

### *IAEA Peer Reviews*



EPREV, Nov.2022,Rabat

***IAEA Missions & Reviews: (EPREV2022 & IRRS2023)** permitted to check the progress made regarding the international standards:*

- ✓ ***Our Governance & IMS:** the Integrated Management System of AMSSNuR includes the “Capacity Building and Knowledge Management” process.*
- ✓ ***National & International Cooperation:** important to define and develop Education programs and trainings that match our needs.*

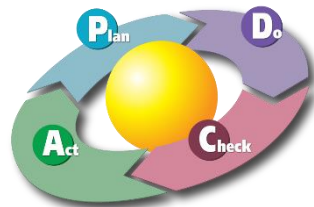


IRRS, 27 Nov. – 6 Dec. 2023,Rabat

## 4- MAIN ACHIEVEMENTS :

### *Certification of our Integrated Management System (IMS)*

#### IMS



- **ISO-9001 Certification** of our Integrated Management System.
- **The Continuous Improvement** of all processes is crucial, especially Self-Assessments, Management Reviews, Internal & External Audits, Review Missions ...
- **«Capacity Building & Knowledge Management »** process has been implemented to develop and maintain our competencies.
- **Sharing experience** related to our IMS with the other peer African Authorities.



- ➡ *Good progress in implementing our strategic approach to develop national capacity building in Nuclear and Radiation Safety & Security, with the support of our national and international partners especially with IAEA, USA, UE/CE, ....*
- ➡ *Adopt at the national level a National Policy and Strategy for Nuclear and Radiation Safety and Security covering all the pillars of Capacity Building.*

*Keep Up the  
Good Work!*





Thank you for your attention



المستور  
AMSSNuR

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