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#### Future work of the Committee on Sustainable Energy

## United Nations Resource Management System: Guiding principles and structure

Prepared by the United Nations Resource Management System Sub-group of the Expert Group on Resource Management

### *Summary*

The 2030 Agenda for Sustainable Development has inaugurated a new era of global development marked by an imperative to integrate social, environmental and economic objectives. The multifaceted requirements of sustainable development depend on optimal and responsible production and use of natural resources. This draft document provides the structure of the United Nations Resource Management System (UNRMS), which will be aligned to the United Nations Framework Classification for Resources (UNFC). UNRMS is a comprehensive, sustainable resource management system that supports the realization of the 2030 Agenda for Sustainable Development. UNRMS is a voluntary global standard for integrated resource management within the framework of public, public-private and civil society partnerships that is uniformly applicable to all resources. This draft document provides the guiding principles and structure of UNRMS, which was recommended by the Expert Group on Resource Management at its twelfth session, 26-30 April 2021. UNRMS will be further developed based on the guiding principles and structure presented in this document.

This document is presented to the Committee on Sustainable Energy at its thirtieth session for information and any feedback or guidance the Committee might wish to offer on the development of UNRMS.

## I. Introduction

1. This document provides the guiding principles and structure of the United Nations Resource Management System (UNRMS), which will be based on the United Nations Framework Classification for Resources (UNFC). UNRMS is a comprehensive, sustainable resource management system that supports the realization of the 2030 Agenda for Sustainable Development. While resources are required to support sustainable development, resources need to be produced and consumed sustainably.
2. UNRMS is a voluntary global standard for integrated resource management within the framework of public, public-private and civil society partnerships that is uniformly applicable to all resources.
3. UNRMS is based on the concepts presented in the following documents:
  - “Transforming our world’s natural resources: A step change for the United Nations Framework Classification for Resources?” (ECE/ENERGY/GE.3/2018/7)
  - “United Nations Resource Management System: Concept and design” (ECE/ENERGY/GE.3/2019/10)
  - “The United Nations Framework Classification for Resources Applied to Commercial Assessments – Update” (ECE/ENERGY/GE.3/2020/5); and
  - “United Nations Resource Management System Concept Note: Objectives, requirements, outline and way forward” (ECE/ENERGY/GE.3/2020/4).
4. A synthesis of UNRMS concepts is provided in the United Nations Economic Commission for Europe (ECE) document (2020) United Nations Resource Management System: An overview of concepts, objectives and requirements.<sup>1</sup>
5. Following the request of the Committee on Sustainable Energy, the Expert Group on Resource Management at its twelfth annual session has requested the UNRMS Subgroup to accelerate the development of UNRMS as a system in line with the proposals outlined in the document “Draft UNRMS: Provisional structure and guidelines” (ECE/ENERGY/GE.3/2021/10).

### A. Purpose of UNRMS

6. The 2030 Agenda for Sustainable Development has inaugurated a new era of global development marked by an imperative to integrate social, environmental and economic objectives. The multifaceted requirements of sustainable development depend on optimal and responsible production and use of natural resources. However, the sustainable use of resource faces a myriad of challenges today. These challenges include economic aspects like market volatilities, long-term decline and fluctuation of commodity prices, persistent issues in maintaining demand and supply balance, eroding investor confidence, failure to address social and environmental impacts, geo-political issues and conflicts, and widespread social dissatisfaction. While recognizing that some of the challenges mentioned above are widespread in the general economy and industrial sectors, sustainable resource management by the government, combined with the industry’s efforts as financed by the capital market, can change the situation. Resource production, transformation and use, properly managed, can ensure beneficial social and environmental outcomes, inducing equitable distribution, reducing poverty, and eliminating conflicts.
7. Resource management decisions have historically been made on a project-by-project or sector-by-sector basis and usually by a single government entity and companies involved in the respective sectors such as minerals, petroleum, renewable energy, nuclear fuel resources, anthropogenic resources, geological storage resources, groundwater resources etc. This fragmented approach has come up significantly short, lacking a broad, “bird’s-eye”

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<sup>1</sup> See: ECE ENERGY SERIES No. 68 United Nations Resource Management System: An overview of concepts, objectives and requirements <https://unece.org/sustainable-energy/publications/united-nations-resource-management-system-overview-concepts>

perspective and often with a limited diversity of knowledge and viewpoints used to support informed decision-making. The limitations of siloed management practices are becoming more evident, leading to conflict, delays, and severe natural capital losses. The world needs to shift the way it plans and manages resources from siloed processes toward more integrated approaches.

8. Integrated management of resources is the key to overcoming the challenges mentioned above. UNRMS embraces the critical concept of integrated resource management that considers complexity, multiple scales, and competing interests and brings these together to make informed decisions. The process of sustainable resource management starts from understanding the world's natural capital and natural resources, including the efforts required to refine and use them and how these resources relate to societal needs. Natural capital is the world's stocks of natural assets. Natural capital includes various components such as water, geology, energy, biodiversity, soil, ozone layer and properties like ecological resilience, ecosystem health and integrity.

9. Natural resources are parts of the natural capital used in economic activities to produce goods and services. Material resources such as minerals, petroleum, nuclear fuels, injection projects,<sup>2</sup> anthropogenic resources,<sup>3</sup> renewable energy resources such as geothermal, solar, wind, biofuels and water resources could be considered natural resources. While utilizing natural resources for society's benefit, the net natural capital could be enhanced rather than depleted.<sup>4</sup>

10. Sustainable resource management is defined as the total of policies, strategies, regulations, investments, operations and capabilities within the framework of public, public-private and civil society partnerships, and based on environmental-socio-economic viability and technical feasibility, which determine what, when and how resources are developed, produced, consumed, reused and recycled by the society.

11. Sustainable resource management using UNRMS is intended for optimizing sustainable benefits to stakeholders within the people-planet-prosperity<sup>5</sup> triad. The approach emphasizes cross-sectoral nexus linkages and minimization of potential adverse impacts.

12. UNRMS is a/an:

- (a) Global voluntary system for resource management to be used by Governments, Industry, Investors, and Civil Society;
- (b) Innovative integrated resource management framework for resources such as minerals, petroleum, renewable energy, nuclear resources, anthropogenic resources, geological storage and groundwater, to support the development of policies and regulations in the sustainable management and the advancement of SDGs;
- (c) Comprehensive information framework and methodology to support resource progression applicable for programme, portfolio, project and asset-level management;
- (d) Sustainability framework to aid the financing of resource sectors;
- (e) System for local and indigenous communities for evaluating and assessing projects against stated environmental-social-economic objectives;
- (f) Scheme for long term considerations of commercial and policy aspects of projects;

<sup>2</sup> For Injection Projects for the purpose of Geological Storage, the resource is the reservoir available for geological storage.

<sup>3</sup> Anthropogenic resources are natural resources that are modified by humans. As with many resources that are modified by the biological systems, anthropogenic resources too are intimate part of the natural resource base.

<sup>4</sup> Dasgupta, P. (2021), *The Economics of Biodiversity: The Dasgupta Review*. (London: HM Treasury) [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/962785/The\\_Economics\\_of\\_Biodiversity\\_The\\_Dasgupta\\_Review\\_Full\\_Report.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/962785/The_Economics_of_Biodiversity_The_Dasgupta_Review_Full_Report.pdf)

<sup>5</sup> "This Agenda is a plan of action for people, planet and prosperity." See Preamble Transforming our world: the 2030 Agenda for Sustainable Development <https://sustainabledevelopment.un.org/post2015/transformingourworld>

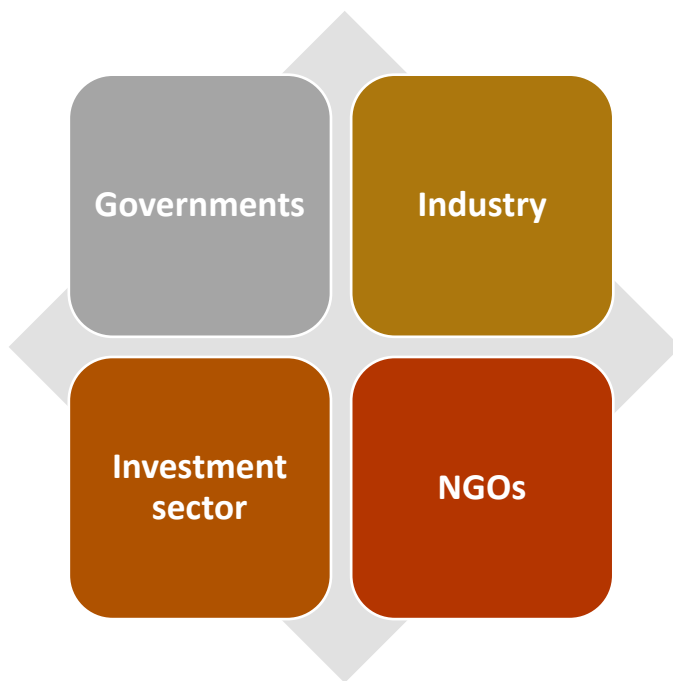
- (g) Design of conditions for the industry to harness the integrative dynamic capabilities;
- (h) Support kit for projects to help align with applicable regulations; and
- (i) Instrument to support sustainability and financial reporting.

**B. Users of UNRMS and intended uses**

13. Primary users of UNRMS will be governments/regional bodies, industry, capital investment entities and civil society, including academia, non-profits, indigenous communities and the public. Each stakeholder group will be using UNRMS for specific purposes, as shown in the Figure and the Table. UNRMS will be a principles-based system; therefore, the applications listed in the Table may be achieved by ensuring the requirements listed in Section III B. A part of the requirements may be satisfied through the standards and guidelines already available elsewhere, which will be referenced in detailed UNRMS guidelines to be developed in future. UNRMS documentation will be developed for requirements that do not have proper pre-existing guidance.

Figure

**Primary users of UNRMS**



Table

**Primary users of UNRMS and its intended applications**

**A. Governments/Regional bodies**

- (a) Achieving the Sustainable Development Goals (SDGs), including climate objectives
- (b) Formulation of regional and national policies on energy and raw materials for sustainable development
- (c) Assuring the security of supply and fulfilling demand, including assessment of the global stocks and flows and ensuring access to resources
- (d) Planning, including the formulation of fiscal policies
- (e) Framing the necessary laws and regulations

- (f) Assessments of global, national risks and opportunities
- (g) Maintain national data inventories
- (h) Revenue management
- (i) Developing international standards beyond the existing ones necessary for elevated challenges of the future
- (j) Supporting global market development
- (k) Increasing resource management efficiency and capturing the value of resources at the source of production
- (l) Developing hard and soft infrastructures
- (m) Managing social issues
- (n) Managing land use
- (o) Managing employment issues
- (p) Managing nature protection issues
- (q) Implementing health, safety and environmental protection measures
- (r) Aiding partnership and conflict resolution
- (s) Improving education and research
- (t) Mitigating and managing the impact of climate change
- (u) Managing the impact of natural disasters
- (v) Developing disclosure requirements

**B. Industry**

- (a) Strategic planning including managing resource portfolio, supply and product chains
- (b) Ensuring alignment of stakeholder interests
- (c) Supporting capital investment decision-making
- (d) Strengthening social and environmental controls
- (e) Building resilience
- (f) Stress testing
- (g) Operations management
- (h) Serving financial obligations
- (i) Developing and deploying capabilities
- (j) Building partnerships
- (k) Supporting research and development
- (l) Assisting mergers and acquisitions;
- (m) Assessing business proposals, including risks and opportunities
- (n) Securing returns on investments
- (o) Managing opportunities and risks at the portfolio level

(p) Managing projects and corporate risks and opportunities

(q) Managing disclosure requirements

**C. Investment**

(a) Supporting investment analysis and decision-making

(b) Developing capital ownership policies and practices

(c) Developing disclosure requirements from invested entities

(d) Developing self-reporting requirements

**D. Academia, Non-profits, Indigenous Communities and the Public**

(a) Resource flow modelling at various space and time-scales

(b) Understanding the complexities of integrated resource management

(c) Assisting technology development with a systems perspective

(d) Cross-disciplinary capacity building

(e) Sustainable development support

(f) Education and training

(g) Ensuring gender equality and diversity

(h) Managing the traditional rights of the indigenous people

(i) Aiding futuristic studies

(j) Enhancing stakeholder communications

(k) Building International Centres of Excellence on Sustainable Resource Management (ICE-SRM)

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**C. Desired outcomes**

14. Desired outcomes are based on applications listed in the Table above. They are expected to be achieved through satisfying the UNRMS requirements listed in Section III. B. UNRMS will be referencing guidance that are already available to meet the requirements or developing new documentation where a gap exists. The preliminary list of desired outcomes is:

(a) Resource security, i.e., assuring resources for sustainable development;

(b) Removing negative externalities of resource recovery and use, such as pollution, wastes, tailings etc.;

(c) Addressing the moral hazard, i.e., preventing rewarding actions that aggravate the negative externalities and ensuring there are no undue profits;

(d) Securing affordable and sustainable services;

(e) Equitable distribution of benefits to all stakeholders and alignment of incentives that promote sustainable development.

**II. Definitions**

15. The language, concepts, and terminology required to define UNRMS are briefly provided in this section. Currently, this list is only a starting point, and more terms will be added in future revisions of the document. The definitions provided below are preliminary in nature and may be modified in alignment with stakeholder needs. The definitions provided

here also need to be aligned with the UNFC glossary under preparation and to similar uses in international initiatives:

- **Resource:** A resource is a source from which an environmental-social-economic benefit is produced. Resources can be renewable e.g. solar, wind, groundwater or non-renewable. Resources can be for primary use e.g. minerals, petroleum, renewable energy, injection projects (geological storage), groundwater. It could be derived from or after primary use as secondary resources (anthropogenic resources, e.g. mining residues and tailings, processing or refining residues, construction wastes etc.. The term is used in a generic sense in UNRMS and should not be confused with specific requirements of financial reporting
- **Management:** The activity of controlling resources or of using or dealing with resources in a way that is effective
- **System:** A set of definitions, principles, procedures, organized schemes or methods according to which resource management is done to deliver environmental-social-economic benefits.

### III. Structure

16. The structure of UNRMS will include the fundamental principles and requirements of resource management for sustainable development. The system will also include data standards and guidelines for analysis and decision making.

#### A. Fundamental principles of sustainable resource management

17. For sustainable resource management to be holistic, i.e., respond to the complexity of all resources, time and space scales, and life cycles, it should be principles based. Principles provide general guidance on the direction sustainable resource management should proceed. From the fundamental principles, requirements are established at a lower level.

18. The fundamental principles of sustainable resource management are listed below. These principles are provisional at this stage and will be firmed up as UNRMS is developed through pilot studies.

- (a) State rights and responsibilities in the management of resources;
- (b) Responsibility to the planet;
- (c) Integrated and indivisible management of resources;
- (d) Social contract on natural resources;
- (e) Service orientation;
- (f) Comprehensive resource recovery;
- (g) Circularity;
- (h) Health and safety;
- (i) Innovation;
- (j) Transparency;
- (k) Continuous strengthening of core competencies and capabilities.

#### 1. Principle 1: State rights and responsibilities in the management of resources

*States (governments) shall have rights and legal and regulatory responsibilities for the resources located on their territory.*

19. **Explanation:** The 2030 Agenda for Sustainable Development, adopted by all United Nations Member States in 2015, provides a shared blueprint for peace and prosperity for people and the planet, now and into the future. At the heart of the 2030 Agenda are the 17

SDGs, an urgent call for action by all countries to manage resources sustainably. The state has sovereignty over all resources located on its territory. It has independent legislation and full rights to manage and use resources sustainably. The principles of good governance provided in UNRMS may be applied by States on the principle of voluntariness.

20. States (governments)<sup>6</sup> have a dominant role in the production and consumption of resources. States usually take a long-term view in weighing the costs and benefits of the various measures. They establish policies for resources through different instruments, statutes and laws and reinforce the roles and capacities of resource management agencies such as ministries, regulatory entities, geological surveys and universities.

## 2. Principle 2: Responsibility to the planet

*The primary responsibility of sustainable resource management shall be the continued well-being of the earth, its inhabitants, and the environment.*

21. **Explanation:** The principle of environmental limits to sustainable development is recognized in the Brundtland Commission Report (1987) and reflected in Agenda 21 (1992), the Rio Declaration (1992), the Millennium Development Goals (2000) and the Sustainable Development Goals (2015). The Brundtland Commission Report (1987) says that “the concept of sustainable development does imply limits - not absolute limits but limitations imposed by the present state of technology and social organization on environmental resources and by the ability of the biosphere to absorb the effects of human activities. At a minimum, sustainable development must not endanger the natural systems that support life on earth: the atmosphere, the waters, the soils, and the living beings.”

22. Sustainable development can be defined as development that meets the needs of the present without compromising the ability of future generations to meet their own needs. Sustainable development also means considering the balance of costs and benefits to society and the planet. Resource production and consumption could have adverse impacts. Therefore, a sustainable balance between the advantages and the disadvantages needs to be found.

23. The Paris Agreement (2016) says that “climate change is a common concern of humankind”. Its central aim is to strengthen the global response to the threat of climate change by keeping a global temperature rise this century well below 2 degrees Celsius and to pursue efforts to limit the temperature increase even further to 1.5 degrees Celsius.

24. Primary responsibility to the continued well-being of the planet is also the core of the Equator Principles, a framework adopted by financial institutions to assess and manage environmental and social risks.

## 3. Principle 3: Integrated and indivisible management of resources

*Sustainable resource management shall be undertaken within the framework of public, public-private and civil society partnerships in an integrated and indivisible manner consistent with its social, environmental and economic viability and systems and a full life cycle view.*

25. **Explanation:** The Brundtland Commission Report (1987) highlighted the need for an integrated approach to natural resources management. The report says: “Until recently, the planet was a large world in which human activities and their effects were neatly compartmentalized within nations, within sectors (energy, agriculture, trade), and within broad areas of concern (environment, economics, social). [...] Yet, in the end, sustainable development is not a fixed state of harmony, but rather a process of change in which the exploitation of resources, the direction of investments, the orientation of technological development, and institutional change are made consistent with the future as well as present needs. [...] Yet, most of the institutions facing those challenges tend to be independent, fragmented, working to relatively narrow mandates with closed decision processes. Those responsible for managing natural resources and protecting the environment are institutionally separated from those responsible for managing the economy”. Many of the environmental

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<sup>6</sup> States have different legal structures, and therefore the term ‘State’ is used in a broad sense and is accordingly interchangeable here with the term ‘Government’.



and development problems that confront us have their roots in this decoupling of responsibility. Sustainable development requires that such fragmentation be overcome. The real world of interlocked economic and ecological systems will not change; the policies and institutions concerned must. The ability to anticipate and prevent environmental damage will require that the ecological dimension of policies be considered simultaneously as the economic, trade, energy, agricultural, and other dimensions.

26. The language of the 2030 Agenda highlights the need for interconnected thinking between the natural and social sciences and between the research community and decision-makers. The 2030 Agenda says that “the SDGs are integrated and indivisible and balance the three dimensions of sustainable development: the economic, social and environmental”. The interlinked and integrated nature of the SDGs is crucial in ensuring that the purpose of the 2030 Agenda is realized on time. The need for effective public, public-private and civil society partnerships are included in SDG 17.

27. The Brundtland Commission Report (1987) says that “problems cannot be treated separately by fragmented institutions and policies. They are linked in a complex system of cause and effect”. Natural resources serve as direct or functional inputs for socio-economic systems of provision, either for the production of another input, general production and consumption purposes, or the built environment. Systems thinking suggests that researchers and practitioners should start from a broader nexus understanding but may well focus on specific critical interlinkages across selected layers.

28. Focusing on resources, economic sectors, or different environmental or human impacts as individual silos will not encourage progress towards improved resource use or, more broadly, the achievement of international agreements and the SDGs. Addressing one area without consideration of the others may even have negative consequences. A systems approach is crucial to maximize benefits across sectors and mitigate trade-offs from natural resource use.

29. The systems approach to environmental policy development and implementation can address multiple global goals and is no longer an option but is the only way forward for a societal transformation to achieve global sustainability.

30. Life cycle management of resources stems from the systems approach. Life cycle analysis is a technique to assess the environmental impacts associated with all the stages of a product’s life – from raw materials production through materials processing, manufacture, distribution, use, repair and maintenance, and disposal or recycling (cradle-to-cradle).

#### 4. Principle 4: Social contract on natural resources

*Sustainable resource management shall ensure obtaining and keeping the social license to operate.*

31. **Explanation:** Respect human rights, and the interests, cultures, customs and values of employees and communities affected by resource production is an integral part of sustainable resource management and are stressed in the United Nations Guiding Principles on Business and Human Rights. Such an approach will need to pursue continual improvement in social performance and contribute to social, economic and institutional development. Resource management needs to engage key stakeholders on sustainable development challenges proactively. It should also consider opportunities and transparently report and independently verify progress and performance.

32. Sustainable resource management can also have complex social impacts related to displacement, land rights, cultural heritage, indigenous peoples, gender equality, employment, public health, safety and security, sexual exploitation and abuse, and other issues. Rights-based social safeguards, inclusive dialogue and risk management principles should be applied to resource projects to ensure that it benefits the poor, leaves no one behind, and respects human rights. Chief among these is the need for inclusive, participatory, transparent, and ongoing stakeholder consultation to be built into infrastructure planning processes.

33. Sustainable resource management should be based on free, prior and informed consent, in line with the UN Declaration on Indigenous Peoples' Rights. Several SDG targets reinforce the above views, such as SDG targets 1.4 and 16.7.

#### 5. Principle 5: Service orientation

*Resources shall be produced primarily as a service to society.*

34. **Explanation:** The decoupling of natural resource use and environmental impacts from economic activity and human well-being is essential in the transition to a sustainable future. Achieving decoupling is possible and can deliver substantial social and environmental benefits, including repairing past environmental damage while supporting economic growth and human well-being. Service orientation is a core principle that facilitates this decoupling.

35. Service orientation departs from the narrow and restricted commodity-view of resources hitherto followed by industry. There is a growing recognition that the industry primarily exists to "serve" customers, employees, suppliers, and communities. It is only through that service perspective that the industry can create long-term value for shareholders and society.

#### 6. Principle 6: Comprehensive resource recovery

*Sustainable resource management shall facilitate and support the knowledge-base and systems for comprehensive recovery of value at all operation stages.*

36. **Explanation:** Comprehensive resource recovery, the idea that the environment should be disturbed minimally by the recovery of all possible values, with a full life cycle focus on a set of priorities, shall be one of the core propositions of resource management. The principle can be expanded to all life cycle stages, where tangible and intangible values should be captured and utilized. Comprehensive resource recovery is also one of the core principles that can contribute to resource use and development decoupling.

#### 7. Principle 7: Circularity

*Sustainable resource management shall facilitate and support the knowledge-base and systems for responsible design, use, reuse, recycling and minimization of wastes at all stages.*

37. **Explanation:** A circular economy is a systems approach to industrial processes and economic activity that enables the resource to maintain its highest value for as long as possible. Critical considerations in implementing circularity are reducing and rethinking resource use, the pursuit of longevity, renewability, reusability, reparability, replaceability and upgradability for resources and value-added products.

38. Sustainable resource use requires sound management of renewable resources. It should aim to recycle the non-renewable resources that lend themselves to reuse, leading to the concept of a circular economy in which waste is minimized. The by-product of a process becomes a raw material for another process. In a circular economy, efficient use of resources across their entire life cycle is critical: from production to manufacturing, through consumption and use, to recycling and reuse. Circularity is also key to the decoupling of resource use and development.

39. The Brundtland Commission Report (1987) says that "all countries need to anticipate and prevent these pollution problems, by, for instance, enforcing emission standards that reflect likely long-term effects, promoting low-waste technologies, and anticipating the impact of new products, technologies, and wastes". Sustainable resource management will need to focus on the conservation of all resources employing responsible production, consumption, reuse, and recovery of all products, packaging, and materials, without burning them to the extent possible and without discharges to land, water, or air that threaten the environment or human health. This requirement is also vital for the attainment of the SDGs.

**8. Principle 8: Health and safety**

*Sustainable resource management shall facilitate and support the knowledge-base and systems that pursue continual improvement in health and safety performance with the ultimate goal of zero harm as reasonably achievable.*

40. **Explanation:** The maximization of safety for workers and local populations is integral to International Labour Standards on Occupational Safety and Health<sup>7</sup> and other international conventions. Resource management can be practical and implementable only if the basic concept of safety is given the highest priority in all life cycle stages.

**9. Principle 9: Innovation**

*Sustainable resource management shall facilitate and support the knowledge-base and systems that promote innovation for the uptake of hybrid technologies and diversification in production and use.*

41. **Explanation:** The coming together of diverse science streams, technology, and the industry is becoming a reality. Getting out of a state of lock-in is to embrace hybrid technologies, diversifications and smart approaches. This principle is acknowledged in the 2030 Agenda, in its call to “achieve higher levels of economic productivity through diversification, technological upgrading and innovation, including through a focus on high-value-added and labour-intensive sectors.”

**10. Principle 10: Transparency**

*Sustainable resource management shall ensure a public understanding of the transfer of revenues and expenditures will help public debate allowing for an informed choice of sustainable development options.*

42. **Explanation:** Open information that can be trusted informs better policy and fuels social license to operate. There has been a record of corruption cases along the value chain of numerous extractive industries. The need to avoid corruption, from the award of contracts and licences to the delivery of services, emphasizes transparency in informing public debate and realistic options for sustainable development. Many governments and public and private organizations have sought to reduce the risk of corruption and ensure revenues are adequately used by improving governance and increasing transparency within the sector. Ultimately knowing who controls and benefits from a resource has been used as the key to fighting corruption and preventing illicit financial flows in all sectors of an economy.

43. A public understanding of the transfer of revenues and expenditures over time will help public debate allowing for an informed choice of sustainable development options. This requires the disclosure of accurate and verifiable information along the value chain. The appropriate use of natural resource wealth should be a significant driver for sustainable economic growth that contributes to sustainable development and poverty reduction. However, if it is not managed correctly, it can create negative economic and social impacts.

**11. Principle 11: Continuous strengthening of core competencies and capabilities**

*Sustainable resource management shall ensure continuous strengthening of core competencies and capabilities required for cross-disciplinary research, development, demonstration, deployment and operations.*

44. **Explanation:** Integrated and indivisible resource management requires a cross-disciplinary approach to problem-solving and working in diverse teams. Such an approach goes beyond what is available in traditional education and requires continuous improvement of competencies and capabilities.

<sup>7</sup> <https://www.ilo.org/global/standards/subjects-covered-by-international-labour-standards/occupational-safety-and-health/lang--en/index.htm>

## **B. Requirements**

45. The following are a list of provisional requirements. The list will be modified/expanded based on the outcome of conceptual studies.

### **1. State rights and responsibility in the management of resources**

(a) National policy and strategy: To support the implementation of sustainable resource management aligned to the 2030 Agenda;

(b) Compliance with regulations: Establish regulatory bodies, which are responsible for sustainable resource management;

(c) Coordination: Coordination with different authorities responsible for the regulating sustainable resource management;

(d) Provision of technical services: Providing technical services needed for sustainable resource management;

(e) Adherence to international obligations, and arrangements for international cooperation.

### **2. Responsibility to the planet**

(a) Long-term cost-benefit analysis concerning planet-people-prosperity;

(b) Strategic environmental assessments: A Strategic Environmental Assessment (SEA) is a systematic process for evaluating the environmental implications of a proposed policy, plan or programme and provides means for looking at cumulative effects and appropriately address them at the earliest stage of decision making alongside economic and social considerations;

(c) Climate change-related activities: All activities align to Nationally Determined Contributions (NDCs), investor and company vision, and climate change policies;

(d) Resource and energy use efficiency: Actions to reduce resource and energy inputs used to produce resources;

(e) Greenhouse Gas (GHG) Intensity indicator: expressed in g CO<sub>2</sub> eq/MJ;

(f) Water use and management: How water inputs are optimized and released to the environment and managed according to country legislation;

(g) Land use and management: How the land footprint could be minimized or optimally managed;

(h) Biodiversity conservation and enhancement activities: All activities in the area to conserve and enhance biodiversity;

(i) Sustainability reporting for various purposes.

### **3. Integrated and indivisible management of resources**

(a) Information platform, data interoperability, dashboard: Availability of accurate and complete information on the area or project promptly to help in decision making;

(b) Proper estimate of resources and assigning the degree of confidence in the estimated quantities according to UNFC;

(c) Nexus approach: See how activities are diversified to support various areas of the economy;

(d) Opportunity and Risk management: identification, evaluation, and prioritization of opportunities and risks followed by coordinated and economical application of resources to minimize, monitor, and control the probability or impact of unfortunate events, including resource-based conflicts, and to maximize the realization of opportunities;

(e) Productivity: Describes various measures of the efficiency of production. Often, a productivity measure is expressed as the ratio of aggregate output to a single input or an aggregate input used in a production process, i.e. output per unit of input, typically over a specific period;

(f) Preventing illicit financial flows, Base Erosion and Profit Shifting (BEPS): Illegal capital flight. Domestic tax BEPS occur due to multinational enterprises exploiting gaps, and mismatches between different countries' tax systems affect all countries. Developing countries' higher reliance on corporate income tax means they suffer from BEPS disproportionately;

(g) Supply-chain transparency: Supply chain transparency requires companies to know what is happening upstream and downstream in the supply chain and communicate this knowledge internally and externally;

(h) Sustainable investment principles: A set of standards for a company's operations that socially conscious investors use to screen potential investments;

(i) Artisanal and small-scale mining (ASM): If ASM is present in the area, it should be integrated with the development programmes;

(j) Supply chain optimization: aims to ensure the optimal operation of the supply chain;

(k) Life cycle assessments: Methodology for assessing environmental impacts associated with all the stages of the life cycle of the resource utilization;

(l) Competent and qualified assessments: All criteria necessary to ensure the quality of data and information provided;

(m) Provision for the decommissioning of facilities.

#### **4. Social contract on natural resources**

(a) Human rights-based protocols to prevent child and forced labour and safeguard employee rights;

(b) Indigenous populations: In alignment with the United Nations Declaration on the Rights of Indigenous Peoples;

(c) Communications and outreach;

(d) Stakeholder capitalism: orientation to serve the interests of their stakeholders such as customers, suppliers, employees, shareholders and local communities.

#### **5. Service orientation**

(a) Resource as a Service model: Resource as a Service (RaaS) is a business model whereby customers pay for a value-added product or service, such as heat, light or mobility, without buying the commodities. Life cycle environmental and waste management recycle etc., could be part of a long-term service contract.

#### **6. Comprehensive resource recovery**

(a) Feasibility studies: Detailed studies that look into resource and energy efficiency, productivity and utilization of all values from the resource produced;

(b) By- and co-product management: Maximizing the utility of all by- and co-products;

(c) Land value release/ land value capture: Optimize land use by releasing it from inefficient use.

(d) Management of all residues and effluents in an appropriate manner.

**7. Circularity**

- (a) Design for circularity: Design out waste and pollution; keep products and materials in use; and regenerate natural systems;
- (b) Anthropogenic resource management: Use of residues as secondary resources;
- (c) Waste hierarchy model: The “waste hierarchy” ranks waste management options according to what is best for the environment. It gives top priority to preventing waste in the first place.

**8. Health and safety**

- (a) Crisis management, emergency response: Where possible, Emergency Response Preparedness actions foresee emergencies that are likely to occur and pre-plan critical components of a response;
- (b) Safety Protocols: System for protective actions to reduce existing or unregulated risks;
- (c) Worker and population health standards: Adherence to international and national standards and regulation to protect workers and the population;
- (d) Tailings and residue management: Safety of tailings and residues;
- (e) Closure and decommissioning plans: A plan for operation closure and its details should be available from the project’s initiation.

**9. Innovation**

- (a) Models of innovation through combining hybrid technologies and approaches applicable to diverse technologies;
- (b) Build-Measure-Learn: A method to gain quick feedback on the utility of a new product or service;
- (c) Development of Minimum Viable Products (MVPs): a prototype that is evaluated solely for internal quality;
- (d) Innovation accounting. A quantitative approach that allows seeing whether innovations are bearing fruit and create learning milestones.

**10. Transparency**

- (a) Due diligence: Investigation, audit, or review performed to confirm facts or details;
- (b) Data quality: Confirming accuracy and precision; legitimacy and validity; reliability and consistency; timeliness and relevance; completeness and comprehensiveness; availability and accessibility; and granularity and uniqueness.

**11. Continuous strengthening of core competencies and capabilities**

- (a) Competent assessment criteria;
- (b) Rigorous quality control and assurance;
- (c) Institutional strengthening (ICE-SRMs): Creation of institutions with a long-term mission to build sustainable value and change the world for the better;
- (d) Re-Skilling: Preparing workers for the end of the project and just transitions.

**C. Guidelines**

46. Guidelines provide additional information on specific activities that are part of the overall sustainable resource management. A partial and provisional list of topics are as follows:

- Sustainability reporting
  - Financial reporting
  - Resource project classification
  - Resource management reporting
  - Readiness assessment
  - Technology prospecting
  - Valuation workflow (tangible and intangible assets).
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