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Development of the United Nations Resource Management System.

Draft United Nations Resource Management System: Provisional structure and guidelines

Prepared by the UNRMS Subgroup 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 provisional 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. 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.

I. Introduction

1. This draft document provides the provisional 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 in a sustainable manner.

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.[1]

A. Purpose of UNRMS

5. 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.

6. 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" 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.

[1] See draft version: https://unece.org/sites/default/files/2020-12/UMRMSdraft.pdf

7. 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.

8. 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,[2] anthropogenic resources,[3] 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.[4]

9. 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.

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

11. 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 tool kit for resources such as minerals, petroleum, renewable energy, nuclear resources, anthropogenic resources, geological storage and groundwater to support the advancement of SDGs;

(c) Comprehensive information framework and methodology to support resource progression applicable for programme, portfolio, project and asset-level management;

(d) Tool kit to support the development of policies and regulations in the sustainable management of national resources;

(e) Sustainability framework to aid the financing of resource sectors;

(f) System for local and indigenous communities for evaluating and assessing projects against stated environmental-social-economic objectives;

(g) Scheme for long term considerations of commercial and policy aspects of projects;

(h) Design of conditions for the industry to harness the integrative dynamic capabilities;

(i) Support kit for projects to help align with applicable regulations; and

[2] For Injection Projects for the purpose of Geological Storage, the resource is the reservoir available for geological storage.

[3] 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.

[4] 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

[5] "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

(j) Instrument to support sustainability and financial reporting.

B. Users of UNRMS and intended uses

12. 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 tools already available elsewhere, which will be referenced in detailed UNRMS guidelines to be developed in future. UNRMS tools will be developed for requirements that do not have acceptable pre-existing tools.

Figure
Primary users of UNRMS

Table
Primary users of UNRMS and its intended applications

A.	**Governments/Regional bodies**
(a)	Achieving the 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. Capital investment entities, including stock exchanges and banking sectors

(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)

C. Desired outcomes

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

(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., rewarding actions that aggravate the negative externalities;

(d) Securing affordable and sustainable services;

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

II. Definitions

14. 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 the 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

15. 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

16. 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.

17. 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.

(i) State rights and responsibilities in the management of resources;

(ii) Responsibility to the planet;

(iii) Integrated and indivisible management of resources;

(iv) Social contract on natural resources;

(v) Service orientation;

(vi) Comprehensive resource recovery;

(vii) Circularity;

(viii) Health and safety;

(ix) Innovation;

(x) Transparency;

(xi) 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.

18. **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 its heart are the 17 Sustainable Development Goals (SDGs), an urgent call for action by all countries to manage the resource sustainably. The state has sovereignty over all resources located on its territory. It has independent legislation and full rights to manage and use the resources sustainably. The principles of good governance provided in UNRMS may be applied by States on the principle of voluntariness.

19. States (governments)[6] 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. The state establishes policies for resources through different instruments, statutes and laws. State reinforces 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.

20. **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). Brundtland Commission Report (1987) says, "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."

21. 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.

22. The Paris Agreement on Climate Action (2016) says, "climate change is a common concern of humankind". The Paris Agreement 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.

23. 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 lifecycle view.

24. **Explanation:** The Brundtland Commission Report (1987) highlighted the integrated nature of natural resources. 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 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

[6] States have different legal structures, and therefore the term 'State' as used in a broad sense and is accordingly interchangeable here with the term 'Government'.

prevent environmental damage will require that the ecological dimensions of policy be considered simultaneously as the economic, trade, energy, agricultural, and other dimensions.

25. 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.

26. The Brundtland Commission Report (1987) says, "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 research and practitioners should start from a broader nexus understanding but may well focus on specific critical interlinkages across selected layers.

27. 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.

28. 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.

29. Life cycle management of resource 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.

30. **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.

31. 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.

32. 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 1.4 and 16.7.

5. Principle 5: Service orientation

Resources shall be produced primarily as a service to society.

33. **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.

34. 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.

35. **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.

36. **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.

37. 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.

38. The Brundtland Commission Report (1987) says "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.

39. **Explanation**: Maximization of safety for workers and local populations is integral to International Labour Standards on Occupational Safety and Health[7] 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.

40. **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.

41. **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.

42. 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.

43**.** **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.

B. Requirements

44. The following are a list of provisional requirements. The list will be modified/expanded based on the outcome of conceptual studies mentioned in Section D.

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

1. State rights and responsibility in the management of resources

(a) National policy and strategy: for safety, the implementation of sustainable resource management, which shall be subject to national circumstances to achieve the 2030 Agenda for Sustainable Development. Compliance with regulations: established or adopted by the regulatory bodies responsible for sustainable resource management;

(b) Coordination: of different authorities responsible for the regulatory framework for sustainable resource management;

(c) Provision of technical services: provision, where necessary, technical services need for sustainable resource management;

(d) International obligations and arrangements for international cooperation.

2. Responsibility to the planet

(a) 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) Green House Gas (GHG) Intensity indicator: expressed in g CO2eq/MJ;

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

(g) Land use and management: How to 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 scheme.

(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 occurs 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) Lifecycle assessments: Methodology for assessing environmental impacts associated with all the stages of the lifecycle 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. Lifecycle 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 (ERP) 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

45. 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 below:

- Sustainability reporting
- Financial reporting
- Resource project classification
- Resource management reporting
- Readiness assessment
- Technology prospecting

- Valuation workflow (tangible and intangible assets).

D. UNRMS Conceptual Pilot Study – Outline

46. This section provides some possible conceptual studies to help visualize the application of UNRMS.

1. Aim

47. Develop one or more conceptual pilot studies to:

- Make tangible the purpose and role of UNRMS
- Explore and clarify the problems to be addressed, the stakeholders and what would assist them in Sustainable Resource Management, the types of solution which should be developed.

48. The following is an outline that should be revised and developed further.

2.1 Scenario 1 - Energy Projects

49. Two Energy Projects are at the concept stage:

- A foreign energy company is considering developing a discovered gas field and an associated gas-fired power station to deliver electricity into the national grid. Substantial concerns have been raised about the GHG impact of the development. Capture and storage of CO_2 from the power station have been suggested, but this will be costly and carries some technical risks
- A national company is considering a large solar project to deliver electricity into the national grid. The solar project is proposed to be on land belonging to indigenous people who have raised strong objections
- Both companies are discussing the proposals with the government and with investors. The national company is discussing its proposal with Indigenous Leaders.
- Both projects have the potential to provide local employment and the development of industrial capabilities.

2.1.1 Who are the stakeholders, and what are the decisions to be made?

- Government: should either or both of these projects be supported, and if so, what should be done by the government representatives to optimize these projects and to provide for long-term energy needs for the country in a socially, environmentally and economically responsible way?
- Indigenous Leaders: should they support the projects or work to steer their development, and if so, how?
- Investors: should money be invested in either or both projects?
- Foreign energy company and national company: should investment in capabilities of the next stage of development be done and, if so, what should be done next?

2.2. Scenario 2 Mineral projects

50. Several mining projects are expected to be approved in a mineral-rich region. The area has indigenous ownership. The mining projects are expected to contribute to the GDP and boost exports. The government wants a Strategic Environmental Assessment for the region ahead of individual project-by-product environmental assessments. The government also does not want a significant dependency on commodity exports and wants to diversify the economy. Decisions on mining projects need to be taken in the early stages so that investments made will not have undue risks on the cancellation of the approvals at a later stage.

2.2.1. Who are the stakeholders, and what are the decisions to be made?

51. Governments - at a national scale:

- Are the projects aligned to national priorities and programmes?
- If the projects do not provide sufficient benefits, can they be improved, or must the project be stopped?
- Suppose the projects provide sufficient benefits but would not meet the investors' requirements. How does one support the projects to achieve the benefits?
- If they offer abundant benefits but local harms, can the harms be mitigated or compensated somehow?
- Are stakeholders' interests aligned, or do the benefits accrue to some and the inconveniences to others causing conflicts?
- What other opportunities are lost if the project or projects are chosen to be supported?

52. Indigenous Community:

- How will this benefit my people?
- Is it money, jobs, business opportunities, education and skills?
- How will this damage my people?
- Is it environmental damage, cultural impacts introduction of disease, more accessible access for addicts to their poison, loss of language and heritage, physical harm and danger?
- Are the short-term benefits worth the long-term damage? How to balance values?
- How involved in decision making can I become, and can I influence it?

53. Investors:

- Will the project return my investment?
- Will the project grow my investment, and by how much?
- What are the risks that will prevent growing the investment or not seeing it returned?
- Are there better opportunities out there with more growth or less risk?

54. Companies:

- Should money be invested in the next stage of development and, if so, what should be done next?
- A statement on capabilities. Does the company have the required capabilities? Is it in the interest of the company to develop them? Is this an industrial opportunity or a business case for buying and selling assets?
- Will the project profitably return the company's effort? Is it big enough to be worth it for the company?
- Will the project grow the company's reputation and market presence?
- What are the risks that will prevent the project from succeeding, and can they be mitigated? What are the opportunities, and can they be captured?
- Are there better opportunities out there with more growth or less risk?
- Can the company profit more from doing the project or selling the opportunity to have a return on the sunk costs and identify other opportunities?

2.3. Scenario 3 Double materiality and nexus projects

55. Double materiality accounting that considers risks and opportunities and the potentials for capturing the opportunities and mitigating the risks can be material from both a financial and non-financial perspective. Issues or information that are material to environmental and

social objectives can have financial consequences over time. A related consideration is the nexus approach, which moves beyond traditional sectoral thinking to achieve several resources' overall security and sustainability. This scenario examines how the double materiality and nexus approach can influence decision making.

56. Several minerals and renewable energy projects can be feasible in a mineral-rich region. But the region is socially and economically less developed and is environmentally fragile. The minerals can support revitalizing the economy and increase job opportunities. However, the government is sensitive to environmental damage and waste issues. The government is committed to SDGs and Paris Accord and wants to ensure that the region could be developed according to its sustainability vision. Does not make decisions on a project by project basis but aligned to overarching national policies, strategies and developmental programmes. The government wants only investors and companies aligned to its sustainability vision to come in and develop the mineral and other resource projects. The government and the local communities are concerned with the future of the area after mining ceases. How should they plan for the future?

2.3.1 Who are the stakeholders, and what are the decisions to be made?

57. Governments:

- How are the projects or assets aligned to the national (and regional) vision, policies, programmes such as the SDGs and climate action (Nationally Determined Contributions)?
- How much revenue can be expected from the projects in the next 20 years? How can it contribute to the region's socio-economic development?
- How can the projects help bridge the gap in full availability of data on resource potential, production and utilization?
- How can the projects contribute to economic diversification?
- What are the other related projects that could be supported in the nexus ecosystem of food-water-energy?
- How will the projects contribute to job creation?
- What are the externalities and trade-offs for the projects?
- What sort of environmental and safety regulations are required?
- How can the externalities such as environmental impacts and wastes be minimized?
- Are the minerals recovered efficiently so that nothing is wasted?
- How can the worker and local population safety be assured?
- How can labour and human rights be assured?
- How can the conflicts over land and water use be mediated?
- How can the relocation of the local population be managed?
- How can the country save itself from the "resource curse"?
- How can the country stem illicit financial flows?
- How can we plan for remediation and continued development of the region after mining is expected to cease in 20 years?

58. Local/indigenous communities:

- Will the projects provide social benefits such as employment and enhanced quality of living?
- Are the interests of the company and the communities aligned?
- Will it damage cultural heritage and the environment?
- Will it compete with other sources of livelihood, such as farming and pastoralism?

- How can the projects support food, water and energy availability in the region?
- Will the projects have an impact on community health?
- Will the projects pose risks of catastrophic failures such as tailing dam failures?
- What will happen after the mining ceases in the area?

59. Investors:

- Can the project provide a stable and long-term return on the capital?
- How is the project aligned with the Environmental, Social, and Corporate Governance (ESG) and ethical investing practices?
- What is the market / financial risks for this project?
- Is the project within the allowed tolerances of market risks?
- Are the projects in alignment with our ESG principles?
- How can the double materiality accounting be done?
- Are there social and environmental risks for this project?
- Will the project contribute to the economic growth of the country?
- Will the project contribute to the well-being of the local community?

60. Company/Project operators:

- Is this project aligned with the company's purpose/vision?
- Can the project assure a safe return on investments?
- Can the project be beneficial to all the stakeholders – investors, customers, communities, employees, and suppliers?
- Is the project aligned with the sustainability policies of the company?
- Can the project support the food-water-energy activities of the area?
- Is the project resilient against extreme weather event and other natural disasters?
- Can the operations minimize the impact on the environment?
- How can the project reduce water, energy and other resource consumption?
- How can the project minimize the wastes generated?
- How can the project improve worker and local population safety?
- Can renewable energy be used in the operations?
- How can the project contribute to the sustainable development of the region?
- How can the project contribute to the preservation of biodiversity of the area?

2.4. Scenario 4 - Resource as a Service

61. Critical raw materials (CRMs) are plentiful in a particular area of a country. Several raw materials such as rare earths, lithium, cobalt and phosphate could be produced. CRMs are required for decarbonizing the economy through energy, e-mobility and digital transitions. But the market is not stable at present. Due to mining and processing and the threat of environmental pollution, social opposition is very high. The government is proposing an alternative approach to CRM development through a public-private partnership (PPP) model that links investors, companies, suppliers and end-users. The new model explores the possibility of moving away from the commodity model to an innovative "Resource as a Service" (RaaS) model. The RaaS model examines how projects can provide services rather than commodities to customers. For example, instead of providing lithium as a commodity to battery manufactures, a project can guarantee a minimum level of electrochemical potential high energy-density rechargeable batteries. The raw materials will remain in the company's custody. They could be recovered after the end of the life of the

battery for appropriate recycling. Unlike energy, raw materials are never consumed when utilized. Apart from losses and leakages, the materials could be recycled and brought back into service. The Raas model could potentially support the indefinite recycling of many critical raw materials.

2.4.1 Who are the stakeholders, and what are the decisions to be made?

62. Government:

- How vital are CRMs to the green transitions?
- Can the projects transcend the current commodity models?
- Will the projects strain the environmental balances in the region?
- Can the projects contribute to the water, energy and food security of the country?
- Can the projects in the area produce just enough CRMs for end-users as a long-term (about 20 years) service contract?
- What type of services can the CRMs provide to end-users?
- Can the CRMs provide on lease to end-users, which could be recovered and reused after end of life?
- Can the local communities be partners in the service value chain?
- Can the mining and processing be modernized and value-added products designed for circularity?
- Can the activity identify other materials as co- or by-products to maximize value and minimize wastes?
- Can there be a road map for the continued economic development of the area after CRM resource are depleted?
- Can the projects transform a widely perceived “drain industry” into a “re-generative industry”?
- Can be projects be resilient in the face of technology transitions, climate impact and other less foreseen events?

63. Local communities:

- How can the project support the sustainable development of the area?
- How the resources (minerals, energy, water) of the area developed in an integrated manner?
- How can the local population partner with the investors, operators and customers in the CRM service industry?
- Will health and safety be assured?
- Can the development of this resource be a public good?
- Will the natural capital (environment, ecosystem) value diminish, or can it be increased?

64. Investors (Public and Private):

- Is the return on capital to pensioners, lenders, insured customers and others be assured?
- Can the project be resilient against market volatilities?
- Can public participation be ensured for the project?
- How can we measure the impact of this project on the green transition?
- How can we ensure that the highest ESG standards are followed?
- How can we weigh short-term gains over long-term value for all stakeholders?

65. Operators:

- How can innovative practices be introduced in the production of CRMs?
- How can the project conserve energy and other inputs such as water?
- How can the value-added products be designed for resource efficiency and circularity?
- How can environmental impacts be minimized?
- How can waste be minimized?
- How can effluents be minimized?
- How can the products and services contribute directly to the food-water-energy security of the area?
- How can the products and services contribute to the economic diversification of the activities in the area?
- How can the project support optimization of supply chains to increase local content?
- How can the tangible and intangible assets valued properly with full ESG considerations?

3. What do the decision-makers require to help them make good decisions?

66. Based on each scenario, this section explains the elements of good decision-making, such as:

- Principles as the foundation for the decisions
- Language – clear concepts and terminology
- Structure and specifications – Framework and specifications to make
    - Strategic decisions on the applicable framework conditions, such as legal, regulatory, fiscal, contractual etc. (governments)
    - Describe, classify, compare and progress the projects (investors, companies)
    - Explore alternative options and diversification(indigenous/local communities/local governments.
- Information (an organized set of reliable data which will inform the decisions)
    - Relevant data concerns the status of projects, what their products will be over time, their social, environmental, economic footprints (costs and benefits) and scope to improve these, the risks/opportunities, uncertainties and mitigations/contingencies, impacts of regulations and policies, hurdles to the progression and optimization and how these could be overcome etc.
    - Different stakeholders will require different subsets of the data and organized in a way that is informative for their decisions (identify the specific data and information different stakeholders require in this example)
        - The government decision-makers need to know…
        - The investors need to know….
        - The decision-makers in each company need to know…
        - The indigenous /local community leaders need to know…
- Guidance on
    - How to evaluate the information and compare it with alternatives
    - How to influence and select outcomes to meet stakeholder needs and SDGs, e.g. factors to consider in deciding an approach to optimizing projects and portfolios (short and long term), managing risks and opportunities etc.
    - The different decision makes require specific guidance on:

- Government decision-makers need guidance on…
- Indigenous/local communities need guidance on…
- Investors need guidance on…
- Company decision-makers need guidance on…

4. What will UNRMS provide to help decision-makers?

67. Based on the scenarios, this section will explain the content and nature of principles, concepts and terminology, framework and specifications, data standards and guidelines for analysis, guidance tools UNRMS could provide on a programmatic, project or assets scales. The guidelines being developed on the commercial applications of UNFC highlights the need to be expanded from quantities to other information, such as legal rights of asset holders, costs, revenues, emissions, employment and pollution. The UNRMS may use the UNFC in a backwards-looking mode, holding inventories of past estimates and forward-looking mode holding alternative estimates consistent with new policies and decisions under consideration.