Global Challenges Foundation

Planetary Condominium: the legal framework for the Common Home of Humanity

Authors

Paulo Magalhães, Alessandro Galli, Leena Iyengar, Kate Meyer, Alexandra Aragão, Will Steffen

Inspired by the thoughts of Garrett Hardin and Elinor Ostrom the submission proposes to legally recognize the Earth System as Natural Intangible Common Heritage of Humankind and scale-up the legal model of condominiums to the global level: A condominium is an object with a unitary structure and common functional systems, with private rights for determined fractions and, simultaneously, common ownership and governance for common structures and functions. Different legal regimes would be able to coexist. A revived UN Trusteeship Council would be the guardian of the new heritage and others global commons, as well as for addressing global catastrophic risks using the planetary boundaries framework as a guidance system.

1. Abstract

One of the most crucial challenges of the Anthropocene is to reconcile the rigid dichotomy between two key diverging approaches for the governance of the Commons: on one side, the classic view of Hardin calling for division and private property rights as the only way to avoid the "Tragedy of the Commons"; on the other, Ostrom's suggestion of coordinated actions for community-based management of common-pool goods and resources.

Both views, at a global scale, have been derived from a society that is territorial, which considers "the commons" to be that which is leftover from sovereignty or private property. From a legal viewpoint, the Planet has so far been treated as a **geographic** territory divided among States and the remaining territorial global commons. This over simplified one-dimensional view leaves out the core expression of nature – the **functional** Earth System as a single, complex life-support system. As such, we argue that the favorable Holocene-like state of the Earth System – i.e., the set of interacting physical, chemical, and biological global-scale cycles and energy fluxes that allow life on the planet – is humanity's ultimate global common that is an intangible and legally indivisible good, which the science of the Planetary Boundaries (PB) framework clearly defines as the *"Safe Operating Space for humankind"*.

The global and non-territorial nature of this *intangible space* coupled with the territorial nature of sovereignty and private property require the views of Hardin and Ostrom to coexist.

To achieve this, we propose up-scaling the legal model regulating human interactions in condominiums to the global level: A condominium is an object with a unitary structure and common functional systems, which belongs to various co-owners; each co-owner has private or exclusive rights of ownership over determined fractions (e.g. apartments), while sharing ownership over structural elements (e.g., foundation) and functional systems (e.g., electricity). This is the only legal model that, using functional and spatial legal divisions, allows different legal regimes to coexist within the same physical space.

We argue that the functional and spatial divisions found in a condominium are almost perfectly similar to that of the territorial spaces of the Planet and the functional indivisibility of the Earth System. Thus, for the functional and spatial divisions to co-exist in a Planetary Condominium we propose a) recognizing the legal status of the Holocene-like state of the Earth System as a Common Intangible Natural Heritage of Humankind, b) using the Condominium framework to solve the overlap between this heritage and State's territorial jurisdictions, and c) using Ostrom's design principles to ensure the maintenance of this Heritage.

The key outcomes expected are:
1) Autonomous legal object of governance, complementary to sovereignties: the Intangible Common Heritage of Humankind;

2) Institutional framework with the mandate to govern the management of the Earth System and Global Catastrophic Risks (GCR);

3) Recognition of the intangible global biogeophysical cycles as part of our

heritage, allowing positive and negative global "externalities" to be accounted, internalized and managed;

4) New Earth System Accounting Framework based on Planetary Quotas, that can represent all scales, from individual and community, to regional or national;

5) Economic compensation scheme based on the balance between negative and positive "externalities" and incentives to promote an economy that pro-actively maintain the Earth System;

6) System for financing the management/protection of the Commons at the global level;

7) The ultimate recognition and safeguarding of rights of future generations within the international legal system.

Like in the Condominium model, the mission of keeping the common systems in a functional state should be institutionalized. We propose the revival of the UN Trusteeship Council (TC) to host this mission – working under the umbrella of the Security Council as per the UN Charter – for four reasons: 1) It is one of the six main UN organs; 2) the scope of its mandate is global; 3) its revival would not require drafting a new UN Charter; 4) its original mission (administer trust-territories) is analogous to that proposed here, i.e., trusteeship of non-territorial global commons (Humanity's Safe Operating Space). The revived "Trusteeship Council for the Earth System and the Global Commons" would be the place where local actions get global visibility. TC would become the chief forum for dealing with GCRs and other trans-national matters.

In this new role, half of TC would be composed of representatives from UN member-states and the other half by specially qualified members of civil society nominated by each Member-State. A permanent Scientific Commission, elected by the TC, would guide the work of the TC by continuously monitoring State appropriation and preservation of the Planetary Boundaries. Its composition would be interdisciplinary with experts representing PBs, and appointments of Earth Science experts, ecological economists, ecological lawyers, and experts in GCRs and social sciences.

The TC will deliberate on priorities for Global Commons and GCRs, such as: strategies for the proactive management of each PB using systems of penalties and compensations; rentals for using global commons; and, transaction fees to finance the management of the Commons.

The initiatives first actions would be the conceptual breakthrough of recognizing global commons spanning across multiple national jurisdictions, as a single legal object. By capturing the most important bio-geophysical cycles in the new intangible legal object, it would be possible to integrate Earth System dynamics within economics to create the ideal economy where the provision of positive bio-geophysical processes is synonymous with economic benefits.

The Planetary Condominium model details spatial, functional, and temporal dimensions to addressing humanity's defining challenge: to maintain a favorable state of the Earth System for the continued success of humankind on this Planet.

The proposed model integrates and builds on several mechanisms that already exist, to make tangible, the intangible concept of the Common Heritage of Mankind. This will represent a significant evolution on humankind's civilization journey, from explorers and exploiters, to guardians and managers of our Common Home.

2. Description of the model

I. ESTABLISHMENT OF A GLOBAL ACADEMY FOR CLIMATE CHANGE

1) CONCEPTUAL FRAMEWORK OF THE PLANETARY CONDOMINIUM

The Earth System is a single and deeply interconnected whole and needs to be represented for its multi-dimensional qualities. Climate change, biodiversity loss, water shortage, food security, pandemic diseases, and other large-scale problems are, directly or indirectly, the consequence of the lack of a comprehensive and interactively organized governance system. As Kul Gautam [1] best explains it, "Our understanding of the Earth System today is vastly ahead of our organizational capacity to [...] manage it" and thus "we need to make a quantum jump to a whole new mode of managing the Earth System".

The favorable Holocene-like state of the Earth System – today identifiable through the Planetary Boundaries (PBs) framework [2] – is a global intangible good, which is impossible to legally divide and privatize. This "legal indivisibility" has become one of the most daunting challenges for a globalized society that regards the management of common goods as something that inevitably results in a "tragedy of the Commons" [3], and which considers the regime of division, private property rights and markets mechanisms as the sole way to solve this inevitable tragedy. According to Hardin, if placed in a regime of free access to common goods and resources, each individual will act independently in the pursuit of self-interest, motivated by the goal of maximizing individual benefits, despite the fact that the collective result of such individual action is the sub-optimal use of resources and overexploitation of the commons that impacts everyone. This dominant underlying reasoning continues to misrepresent the concept of the commons as an open-access regime, operating in a free-for-all scenario where there are no boundaries to the usage of a common, no tools for monitoring such use or rules for managing it, and no cohesive representation of the community of users.

Elinor Ostrom [4] pointed out some basic design principles for successful commons' management, and debunked the established paradigm of fatality: a properly managed common has boundaries, rules, monitoring of usage, punishment of free-riders, and social norms. Moreover, being a "common", requires the existence of a community willing to act as a steward of its own Common Pool Resources (CPRs).

A functioning Earth System is indeed humanity's CPR: as such, what is at stake is not "saving the planet" but rather maintaining the Earth System in that

specific state – the Holocene-like state – that is acknowledged to be favorable for humankind to thrive. Our "home" relies on favorable, life-supporting intangible conditions and therefore a planet outside such favorable state cannot serve as our "Common Home".

As humans, we live simultaneously in two different types of communities of interests: one at the level of national societies and the other at the global community level. But unlike the national communities organized in territories, the global community of humanity, is something that, having no personality, appears non-existent and therefore, cannot be titled with any definitive rights or representation.

The "territory" of humanity is the planet, and this fact goes beyond the nation-state based governance. Humanity hasn't yet a locus from which it can base an organized global stewardship community.

One of the main results of this incapacity is the basis of another fundamental question of regulation and collective control: "How can a good that belongs to no one be subject to a legal regime?" [5]. In other words, is it possible to regulate the use of a functioning Holocene-like state of the Earth System if this belongs to no one and doesn't have any legal recognition within human societies? How can we manage and protect something that is intangible, global and not legally defined?

Until now, the legal non-existence of the intangible functional structure of the Earth System has resulted in a model of social organization in which planetary biogeophysical processes are "invisible" to the economic processes; they are considered "externalities" to our societal organization, despite being key vital factors for humankind.

The biogeophysical structure of the Earth System throughout the Holocene epoch – i.e., the set of interacting physical, chemical, and biological global-scale cycles and energy fluxes that provide the conditions for humans to thrive on the planet [6], belong intuitively to all humanity in common. This means that such an Earth System structure cannot be owned, enclosed or appropriated by any State or entity. "As a commons it can be used, but not owned, either as private or common property or via the claim of sovereign rights" [7]. These characteristics of *belonging to all but being owned by none* do not necessarily prevent the Holocene-like state of the Earth System from being used in an organized and regulated way and passed on, unaltered or enhanced, to future generations.

The transmission of a value is the main purpose of the concept of heritage. The principle of intergenerational equity and the existence of the 'right' of future generations to receive and enjoy a functioning global ecological space confer an inheritable dimension to the favorable state of the Earth System. Therefore, as a common heritage, it should be governed in accordance with some basic design principles of successful commons management, along the lines of the innovative theories of Ostrom [8].

The technical obstacle preventing the recognition of this favourable state of the Earth System as a heritage – and thus the construction of an adequate management system – is the fact that this "intangible natural good" cannot be defined by the traditional understanding of the term "global commons", as it

seamlessly overlaps with man-made jurisdictional boundaries – the geopolitical boundaries of nation states. This is a novel situation for the current model of international law, which is unable to interpret and reconcile the intangible functional system of the planet with the tangible sovereignty of states.

Fortunately, the problem of reconciling seemingly opposing interests in a situation of symbiotic interdependence is not completely new to legal sciences as an example can be found in the legal model of a condominium.This model defines a situation in which an object with a unitary structure and common functional systems belongs to various co-owners, where each individual has private or exclusive rights of ownership over determined fractions of the object, while at the same time co-owns the structure and systems that constitute the object's common functional elements.

On further analysis of this legal construction surrounding our daily life, we realize that such a model offers boundless possibilities of management while challenging the conventional paradigms of international law:

1) Condominiums represent not just a space-based division but also a legal division based on structural functions: stability (e.g., foundations), systems of common use (e.g., water, electricity, elevators) and functional elements (e.g., stairs, roof, some of the windows). All elements that ensure the habitability and safety of the building, and on which it is not possible to carry out any legal operation of division or appropriation – not even abstract – are under a legal co-ownership regime.

2) Within the spaces that are under the legal private property regime, there are elements and systems that are also under the legal regime of co-ownership (e.g., some structural walls, water system). This means that by using different types of legal division (functional and spatial) it is possible to ensure the coexistence of different legal regimes, which are usually incompatible, within the same physical space. This is the uniqueness of the condominium model.

3) If we add to this differentiated division a system of equitable contributions from each co-owner to ensure a permanent management of the common systems and structures, it is possible to harmonize the interdependence between the individual property interests and common interests.

4) The existence of these two legal regimes in the same physical space do not compete with each other, nor does common property limit the full power of private property; conversely, the existence of a common property, superimposed on private property, has the mandate of solely ensuring the maintenance and long-term functionality of the systems and structures that all individual owners depend on.

With a proper adaptation of scales, the legal model of the condominium thus provides us with a solution for the legal organization of human societies at the scale of the planet. The legal framework of the Common Home of Humanity is essentially that of a Planetary Condominium.

In such a Planetary Condominium [9, 10], the tangible geographical planet – on which abstract legal divisions are possible (boundaries) and where territorial sovereign powers are exercised – is coupled with the intangible Earth System,

which constitute the functional structure of the planet, and on which no legal division – real or abstract – can be realized (see attached Figure 1). Such a model would allow recognition, at the global scale, of a set of interdependencies and relations similar to those existing among neighbors who inhabit the same materially indivisible building, and who have an equal, vital dependence on the proper functioning of the common functional elements.

In such a planetary condominium, the apparent limitation of sovereign powers presents an opportunity to redefine the meaning and terms of sovereignty, and opens minds to creative and innovative means of problem-solving with the inherent understanding that the overall long-term functionality of the Earth System needs to be safeguarded.

2) REALIZING THE GOVERNANCE MODEL

2.1) The Earth System as an autonomous legal object of governance.

When Arvid Pardo formulated the Common Heritage of Mankind (CHM) concept in 1967 [11], he realized that the characteristics, principles and objectives of CHM did not fit within the one-dimensional view of the planet as a sole geographic area. Conscious of this, he sought to avoid the limitations of the territorial approach by proposing an ocean space treaty that "*attempted to show how the common heritage concept could be implemented in the marine environment as a whole*"[12]. Intuitively, the rationale of the CHM concept incorporated the idea of interconnectedness and the impossibility for the global commons to be solely confined outside national borders, and managed through siloed governance models.

It is only recently that the understanding and measuring of non-territorial, functional and intangible "*global environment as an integrated whole*" has been created by the Planetary Boundaries (PBs) concept [2, 13]. Based on intrinsic "hard-wired" properties, the PBs define a combination of parameters that together describe the state of the Earth System, thus enabling the understanding of the role of interacting chemical, biological and physical processes in the maintenance of a favorable state for humanity (i.e., the Holocene), as well as the role of humankind in pushing the System out of its stable, desirable state.

Such a definition of the favorablestate of the Earth System and its qualitative boundaries is what allow us today to identify the object deserving legal protection – i.e., the *Safe Operating Space* – and in making it a new object of law.

The recognition of objects of intangible character are not new to legal sciences: the recognition of intangible cultural heritage by UNESCO, the good will value of companies in commercial law or intellectual property rights, are examples of "values" that, despite being intangible, received legal recognition and a legal regime to regulate their protection and use. An analogy in scale between these intangible objects of law and the intangible Earth System is then crucial to understand and recognize the global and indivisible functionality of the Earth System for our society. By envisioning a Planetary Condominium, with tangible and intangible parts, we are thus defining a global autonomous legal good, one that is complementary and can co-exist with the sovereign powers of States.

The *intangible favorable state of the Earth System* corresponding to the geological epoch of the Holocene has an outstanding value for humankind. It is the meta-

condition for all current life on the planet, and therefore should be represented appropriately in law. As such, we present the recognition of the maintenance of a Holocene-like state of the Earth System as a **Common Intangible Natural Heritage of Humankind**. Such a conceptual breakthrough is the essential first step for the organization of the global community that must be followed by the development of a new legal system for our Planetary Condominium.

2.2) Structure, functioning and mandate of the governance model.

To institutionalize this newly defined heritage, the mission of the Planetary Condominium – to maintain the Earth System in a well-functioning state for the benefit of all humanity and the future generations – should be tasked to an independent institution, acting on behalf of all nations. The activities of such an institution should be limited to the elements that fall under the regime of "common heritage".

Currently, the only relevant institution with global membership and legitimacy to host such a mission is the United Nations [1]. In order to act upon the whole Earth System rather than its individual components through multiple UN agencies, and taking into full consideration the known difficulties in amending the UN Charter [1], we propose instead, to revive the UN Trusteeship Council (TC) with a mandate to serve the mission of humanity's Common Heritage.

In the early 1990s, the TC was suspended as it had accomplished its mandate of administering trust-territories. A first proposal for a revival of "UN Trusteeship of the Global Commons", advanced in 1994 by the Commission on Global Governance [14], highlighted the need for international trusteeship to be exercised over the management of the physical and territorial environment (i.e., the oceans beyond national jurisdiction, outer space, and the related environment and life-support systems). This proposal was rejected leaving the TC a dormant body which today exists solely on paper.

The increased urgency of major global challenges and the realization of the inadequacy of current governance systems indicate it is time to start thinking beyond the paradigm of sovereign nation-states and conventional market mechanisms to broader planetary concerns. Building and expanding on the original idea of the Commission on Global Governance, we thus propose reviving the TC as a trusteeship for the Earth System and the global commons it represents.

A healthy and stable Earth System is the precursor to all the territorial global commons, and a necessity to mitigate all environmental challenges and Global Catastrophic Risks (GCRs) [15]. A revived 'Trusteeship Council for the Earth System and the Global Commons" would be the chief forum for dealing with the administration of existing environmental treaties and the management of global biogeophysical cycles; it would define priorities, compensations, incentives and quotas among all users of the Common Heritage.

This will require a permanent capacity for the TC to take decisions, with expeditious decision-making processes involving assessing, monitoring, supervising, allocating, awarding and arbitrating. As such, the new TC should function as a true manager of global biogeophysical cycles with a remit to regulate and sanction, with the goal of assuring stable functionality of the system.

The TC would be supported by a permanent Scientific Commission, to be elected in a TC meeting. Such a committee would guide the work of the TC by continuously monitoring appropriation and preservation of the PBs by country. The composition of the permanent Scientific Commission would be interdisciplinary with experts representing PBs, and additional appointments of Earth Science experts, ecological economists, ecological lawyers, and experts in GCRs and social sciences.

Our proposal is to put GCRs and Earth System management at the same priority level as maintaining peace and security – the founding motives of the UN. GCR management and mitigation are a question of security, and therefore are a strategic area upon which the UN should intervene.

Alongside the support of the permanent Scientific Commission, the TC shall carry out its mission in collaboration with, and under the umbrella of, the UN Security Council (SC) – "in order to ensure prompt and effective action by the United Nations" (Article 24.1). Such cooperation and complementary functional competences between the TC and the SC is already provided for by Article 83.1 of the UN Charter *"All functions of the United Nations relating to strategic areas, including the approval of the terms of the trusteeship agreements and of their alteration or amendment shall be exercised by the Security Council"* and Article 83.3 *"The Security Council shall, subject to the provisions of the trusteeship agreements and without prejudice to security considerations, avail itself of the assistance of the Trusteeship Council to perform those functions of the United Nations under the trusteeship system relating to political, economic, social, and educational matters in the strategic areas."*

In accordance with Article 29, and to complement the role of the TC and the SC, we propose that the Security Council establish a new organ – a Global Catastrophic Risks Staff Committee (GCRSC) – (similar to the already-existing Military Staff Committee) – to advise and assist the SC on all questions related to the implementation of concrete actions aimed at avoiding or mitigating Global Catastrophic Risks, and special disasters that could cause serious impacts in the state of the Earth System or could impact at least 10% of world populations.

The GCR Staff Committee shall consist of 11 members chosen between the TC and SC. It is suggested that the GCRSC composition include 2 representatives from TC, 3 members from the permanent Scientific Commission and 6 Members from the SC to ensure equal representation of world geographies. The GCR Staff Committee, with the authorization of the SC and after consultation with appropriate regional agencies, may establish regional sub-committees.

The legal recognition, through the mechanism of a convention, to protect the favorable state of the Earth System as a Common Heritage of Mankind, calls for the development of a system for its legal interpretation and application. The cornerstone of such a convention would be fair and ethical representation and maintenance of the favorable state of the Earth System. Such a mechanism, that finds precedence in the UN Convention on the Law of the Seas, would allow for the arbitration of disputed decisions through an autonomous and specialized international Tribunal.

2.3) Coordination platform for the equitable management of the intangible global commons

The most effective means to organize global relationships in the context of an

international system, where everyone has the power to influence and impact all others, is through a system that aggregates and gives visibility to the different impacts produced by everyone in all the different scales. Rephrasing Ostrom's words [8], there is a need to clearly define who the users of CPRs are, and who have the right to withdraw resource units from such CPRs.

The Common Intangible Heritage will be the platform where the intangible positive and negative global "externalities" are captured, internalized, accounted for, and where the impacts of each individual, family, business, city, and nation State become visible. The proposed global governance mechanism of this intangible heritage will give visibility to all individual or collective actions and their intangible outcomes, whether positive or negative; as such each effort will not disappear into a global legal vacuum, thus empowering each individual to be a steward of the Planet.

This will incentivize decentralized decision-making, where tasks are to be allocated at the lowest possible level as part of a larger nested polycentric governance system, while at the same time, providing feedback on the performance.

Only by clearly accounting for the contributions of each entity will it be possible to create a system of compensation, where equity and the social norm of mutual confidence could flourish. Further, by addressing the human use and management of the Earth System, we firmly believe that the proposed governance model could reduce the environmental-related threats to political instability.

2.4) ESAF: enabling the implementation of the Planetary Condominium

The mechanism for translating the Planetary Condominium's legal framework into action for implementation, requires the construction of a transdisciplinary accounting system able to track and manage nation States' use of the intangible Earth System. To this end, we propose the introduction of the "Earth System Accounting Framework" (ESAF). This requires transposing the PBs to a set of scalable indicators, applicable at any scale of human activity to assign Planetary Quotas (PQs).

The PBs framework summarizes the complex interactions of the Earth System functioning in an intelligible way, and highlights the main trends in its state. However, the main limitation of PBs is that the trespassing of global thresholds cannot be scaled down to the sub-global level (e.g., nation States) nor compared to the specific human activities that are causing it. For example, the PB threshold for climate change is the concentration of CO2 in the atmosphere, with clear difficulties in then assigning acceptable CO2 concentrations to each nation State.

Once fully developed, the ESAF would be able to: 1) quantifythe extent to which socio-economic activities within nation States degrade or enhances the "intangible favorable space" of the Earth System from a biophysical viewpoint and 2) design an economic compensation scheme for the maintenance of such a favorable Earth System state.

2.4.1) The Planetary Quotas

There are 8 Planetary Quotas: carbon, non-CO2 greenhouse gases (GHGs), land, nitrogen, phosphorus, water, aerosols, and ozone depleting substances (ODPs).

The complexity of the Earth System and interrelatedness of the PBs is such that there is no direct one-to-one conversion from the PBs to PQs. However, together, the PQs represent the same safe-operating-space as the PBs and can be divided or allocated to any scale from individual and community, to city, regional or national scales [16].

The basis of the ESAF is that every person has an equal right to our Common Heritage and thus a right to benefit from an equal share of the life-supporting function of the Earth System. Each nation State will thus be allocated one quota/threshold for each of the 8 PQ, based on an equal per capita share. A consumption based environmental accounting procedure composed of 8 indicators – similar in their rationale to Footprint-type of indicators [17] – will then be used to compare each nation State's use of the global commons against the calculated Quotas. The result will be a balance sheet of Earth System credits and debits for each of the 8 PQs, indicating to what extent each nation State deviates from the quota. For a climatic change PQ, for instance, a biophysical threshold (in terms of tonnes of CO2 emitted per person) could be set, which should not be exceeded to maintain warming below 1.5 degrees. A carbon-footprint-type indicator would then be used to calculate the actual amount of CO2 released into the atmosphere by the consumption activities of each nation State's residents. This would then allow the calculation of the deviation (± xx%) of the footprint value from the allocated Quota. A similar approach could be deployed for each of the other PQs.

Overuse or underuse of the Earth System functionalities – in other words trespassing or staying within each of the Quotas – will then correspond to a monetary fee that should be either paid for or received by countries, depending on whether they contribute to the maintenance of or drive perturbations to the Holocene-like state of the Earth System.

As explained in section 2.4.2, the monetary valuation of such overuse or underuse will be estimated by the permanent Scientific Commission of the Trusteeship Council based on the true ecological costs of overshoot per unit of each environmental currency (eg. $/kgCO2) and the information provided by Earth System scientists, taking into account the scarcity and availability of each of the core drivers of PBs. Earth System credits will likewise be compensated using these same rates, thus making the value of the Earth System an integral component of our global economy.

It should finally be noted that, as the Earth System does not trade one environmental impact for another – for example, no amount of safeguarded water would compensate for excessive GHGs emission in preventing global warming – the ESAF does not envision trade-offs among Quotas. Rather it is designed to drive human behaviour such that none of the Quotas are exceeded, and therefore the Planetary Boundaries are adhered to.

We note that there is much controversy over historic contributions to global warming and substantial literature on the ethics of different allocation procedures. However, the ESAF differs from previous accounting systems in two fundamental ways. Firstly, the PQs go well beyond the only GHGs emission, and the historic impacts of, for example, land use, or phosphorous consumption, which have very different global distributions. Secondly, its accounting principle is consumption-based rather than production-based. Conventional carbon accounting, for

instance, assign responsibilities to the producers, and poorer nations, which often devote their production activities to export, thus assigning relatively high impacts on the Earth Systems to them, compared to their quality of life. In the consumption-based accounting system we propose, the embodied impacts of goods and services will be carried over and associated with those nation States consuming them.

2.4.2) Economic compensation scheme

In her book, Ostrom (1990) [8] calls for the need of congruence between appropriation and provision rules, indicating that any successful management of the commons requires not only rules on the commons' use or appropriation, but also a permanent system of maintenance and restoration to ensure their long-term functionality.

As such, planetary stewardship implies not only the control and penalization of negative impacts on the Earth System (e.g., the perturbation of bio-geophysical cycles), but also the provision to acknowledge, reward and incentivize the maintenance or improvement of the functional infrastructures that generate Earth System services.

In the current economic system, economic gains are realized – directly or indirectly – through degradation and/or destruction, that is, in the consumption of natural capital. For instance, the value of forests, vital for the maintenance of the favourable state of the Earth System for our lives and for future generations, only become visible in the financial and economic transactions of society when these forests are destroyed and turned into timber. As Carl Folke [18 states: "A significant part of this challenge is to make the work of the biosphere visible in society, in human actions and in financial and economic transactions".

When the production of positive processes for maintaining the favourable state is synonymous with economic loss, there can be no change in our behaviour to reduce the negative impacts nor can there be any investment in realizing benefits to the common Heritage. However, if we recognize the favourable state of the Holocene as a legal autonomous good, we can capture in this intangible common heritage not only the damages, but also the benefits that contribute to the maintenance of this favourable state. By recognizing and capturing the most vital Earth System services, it becomes possible to frame the economic processes in the context of global chemical, biological and physical processes that support life and human activities, thus modifying economics to become consistent with Earth System dynamics.

The possibility of using this intangible common heritage for making the work of the Earth System visible in society, in human actions and in financial and economic transactions implies a deep conceptual and structural shift in our economy, transforming the current paradigm of individual benefits and collective costs to one in which individual benefits are also gained through collective benefits. In a Planetary Condominium set-up, in which Common Heritage and State sovereignty co-exist, the pursuit of individual interests would become in tune with the interests of all humankind.

For this to be possible, our proposal is to use the accounting system described above in section 2.4.1 as the biophysical basis for an economic compensation

scheme in which the overuse or underuse of the Earth System will correspond to an annual fee to be either paid for or received by nation States, depending on whether they contribute to the maintenance or the perturbation of the Holocene-like state of the Earth System.

Managing the flow of funds – assigning penalty payments and allocating funds to countries with positive Earth System balances – would be a key mandate of the TC carried out annually. We envision a small proporton of the incoming funds to be used to cover administrative expenses of the TC, with the majority of the funds to be used in tackling priority emergencies, paying back historical inequalities (in reimbursing those negatively affected by the abuse and/or misuse of the commons) andto cover payments in the compensation scheme to maintain (or enhance) key ecosystems and biomes – located under or outside the jurisdiction of one or more States – whose services are necessary to ensure the functionality of the Holocene-like state of the Earth System, and to invest in transitioning to a sustainable future for all.

With such a system in place, each nation State shall be given full capacity to define its own strategy for conserving or restoring its ecosystems, such as investing in technology efficiency or other alternatives, or changing or reducing its use of the Earth System, with the mandatory goal of achieving its own best balance in relation to the Common Heritage.

The inclusion of the positive environmental impacts in an accounting system could trigger a positive competition for restoring the state of the Earth System. This would encourage a major paradigm shift, from an economy rewarding natural resources' extraction to an economy which fosters innovation, and where preservation and production of natural resources and well-functioning ecosystems are economically rewarded.

3) FINAL REMARKS

Although Earth has a specific physical spatial attribute of 510,000 million hectares,we are all globally connected through impacts that each of us produce on the intangible biogeophysical functioning of the Earth System. This non-spatial interconnected Global Communityhas no territory in which it can base a legal existence or a cohesive representation of its interests. But attempts have been made to meet this challenge, and valuable and inspiring examples do exist such as:

- The Antarctica Treaty of 1959, considered by some a de facto condominium [19] since it is not a sovereign territory (although various nations claim parts of its territory as their own) and provides voting authority for 28 nations to jointly govern the area. In all, 50 countries are part of the "condominium" although some consider it a "quasi-condominium" [20].

- Article 136 of the Montego Bay Convention (UNCLOS) states, "The Area(Sea-bed) and its resources are the common heritage of mankind". This Convention adopted a concept of humanity that transcends the notion of State, transferring its point of reference to people, regardless of their legal subordination to a State. Humanity appears as a transcendent reality to the states and to the present generation.

Similar to the findings of Nicholas Stern [21] for the case of global warming, we believe the cost of maintaining the Holocene-like state of the Earth System – especially if shared by the global community – is likely to be lower than the future cost of today's inaction. We believe that the Planetary Condominium model is an opportunity for nations to realise and successfully manage their relationship and use of the Earth System. The relationship that this model effectively operationalizes is the environment (a well-functioning, favorable state of the Earth System) supports society, which builds the economy.

Further, this model details spatial, functional, as well as temporal dimensions to addressing humanity's defining challenge: to maintain a favourable state of the Earth System for the continued success of humankind on this Planet.

Besides the legal conceptual evolution, another uniqueness of the Planetary Condominium model is the novel accounting system combined with the renewal of existing global management structures that lead to a very different set of motivations and barriers to sub-national and State involvement. Consumption based accounting in environmental currencies beyond carbon shifts the spread of environmental burdens and opportunities. Not every environmental currency carries historic components inherent to carbon accounting. Thus, the proposed mechanism to operationalize the Planetary Condominium does not carry the same ethical and political barriers that have been present in past global action on climate change

In conclusion, the model of activities and operations proposed by this Initiative constitutes an integrated evolution of experiences in international management and its extension to the management of a "virtual territory" whose existence, despite being intangible, cannot be overlooked. The approach of the proposed Initiative is more extensive and representative in participation. It integrates and builds on several mechanisms that already exist, to make tangible, the intangible concept of the Common Heritage of Mankind. This Initiative puts the Earth System and its stability in the spotlight, attempting to empower it through a legal mandate, to ascertain the continued existence and prosperity of the human civilization. It puts human relationship to the Earth System on centre stage to devise a mechanism of management and maintenance. In being able to do so, the Initiative hopes to opens new avenues and models of solutions to tackle the urgent and trans-generational global challenges today's world presents.

3. Motivation

CORE VALUES

The mission of the proposed initiative is to safeguard the favorable state of the Earth System as a common heritage of humankind across all sectors and societies, irrespective of geopolitical jurisdictions. Such a mission envisions,

a) The creation of a world in which all countries work together to preserve our planet's Safe Operating Space for humans and all living species.

b) For societies to be driven by a new economic model that prioritizes the preservation of nature, not its depletion.

c) The building of an inherent sense of respect and belonging to our Common Home – as citizens of planet Earth, enriched by our individual cultural diversities.

To this end our core values are rooted to ensure scientific rigor and evidence-based activity and response; assign a universally recognized legal existence to the Safe Operating Space – the common intangible heritage for all humankind; practice socio-cultural, economic and political diplomacy; and, create a platform that allows global representation and fosters universal participation.

This would define the construction of an operational mechanism for the monitoring and protection of the Safe Operating Space, that is resilient, allows socio-economic equity, functions through active dialogues and is transparent, reliable and accountable.

DECISION-MAKING CAPACITY

In line with the core values, the decision-making process will be based on scientific evidence, with legislative clarity and expedited in a transparent, reliable and accountable manner.

Operationally, decision-making involving assessing, monitoring, supervising, allocating, awarding and arbitrating is proposed to be undertaken by the revived UN Trusteeship Council for the Earth System and the Global Commons, with a mandate to regulate and sanction, with the goal of assuring functionality of the governance model.

From the perspective of ensuring robust scientific and technical monitoring and assessments, the Council's activity and decision are to be supported by the Permanent Scientific Commission comprised of Planetary Boundaries scientists, Earth System scientists who study the whole system, ecological economists, ecological lawyers, experts in Global Catastrophic Risk and social scientists. The main role of the Commission will be to provide an overview of global effects. This includes establishing the connection between scientific information and assigned monetary values, assessments on cultural acceptance, community rights and responsibilities, among other decision-making parameters requiring trans-disciplinary input.The trans-disciplinary composition of the Permanent Scientific Commission will be mandated to contextualize and frame economic processes in the context of global chemical, biological and physical processes that support life and human activities, integrating Earth System dynamics and economics – work that no market-mechanism is currently able to do.

The Earth System Accounting Framework (ESAF) and the Planetary Quotas (PQ), developed by this scientific commission would aim to offer rigorous administrative accountability and transparency in support of the operational regulation and decision-making processes. Complementary functional competencies and relationship between the Trusteeship Council and the UN Security Council, stated through Articles 24.1, 83.1 and 83.3 of the UN Charter, lends an important degree of administrative surveillance, and therefore further reliability and accountability of decisions and actions.

Further, to complement the roles of the Trusteeship Council and the Permanent Scientific Commission, we propose that the Security Council establish a new organ – a Global Catastrophic Risks Staff Committee (GCRSC) – (similar to the already-

existing Military Staff Committee) – to advise and assist the Security Council in all situations related to the implementation of concrete actions aimed at avoiding or mitigating Global Catastrophic Risks and other disasters that could cause serious impacts to the state of the Earth System or could impact at least 10% of world populations. This would further bolster prompt action and implementation related decision-making in addressing these vital cases.

EFFECTIVENESS

Factoring in the sensitivity of the decision-making process and conscious of the fact that only structural shifts will lead to systemic effects, this initiative proposes an incentive-based system for the production of global public goods, rather than being an exclusive coercive legal system of injunctions, whose legitimacy would always be questionable and that no sovereign State will accept.

In this sense, the effectiveness of the proposed initiative draws from:
a) The communication of its scientific studies and socio-economic management structure that will demonstrate and actively work towards driving the perception that prioritizing an ongoing, resilient and well-functioning Earth System does not result in economic loss.

b) The fact that even though PQs cannot be translated directly back to the PBs (as they are also global limits in different indicators that allow the safe-operating-space to be divided and operationalized), the PB method would still be used to assess the global status of Earth System functioning relative to a Holocene-like state. The point here is that the true ecological costs of overshoot per unit of each environmental currency (e.g. $/kgCO2) can be determined. In this way, if everyone participated, the system would generate enough money to cover the costs of mitigation/adaptation – and that it would be spent for this purpose. This would remove one of the barriers that has prevented some from signing global treaties for limiting carbon emissions – i.e. the idea that the money contributed may be “misused”.

c) The economic element of the ESAF / Planetary Condominium model, that proposes a financing system that will not only favor investments in natural capital and the preservation of critical Earth System functions but also invest to fight extreme poverty by making sure that individual basic needs are met. The accounting system will address inequality between poor and rich, north and south, as well as rural and urban people. This could also contribute towards dealing with the root causes of politically-motivated unrest and in extreme cases, violence.

d) Its programmatic approach, where we choose to organize management of the initiative under the auspices of the United Nations as the sole, truly global and trans-disciplinary institution relevant and respected by all its member nations. We propose to channel the work of the initiative through the close and complementary relations between the TC and Security Council (SC) already foreseen in UN Charter and propose the creation of a Global Catastrophic Risks Staff Committee by the SC to ensure the possibility of prompt and effective action by the United Nations. Thereby, we introduce the Earth System management and GCRs at the same level of importance as the maintenance of peace and security, which are the founding motives of the UN.

Further, providing visibility to all individual or collective intangible outcomes for each action, (positive or negative) would empower each individual to become a

steward of the Planet. This will incentivize decentralized decision-making where tasks are to be allocated at the lowest possible level as part of a larger nested polycentric governance system, while at the same time, providing feedback on the efficiency and efficacy of its performance.

RESOURCES AND FINANCING

Through its work over the past 10 years, the initiative already supports a robust and growing team of:

- Scientific and social science expertise
- Advisory board of the initiative in its current state
- Researchers and academic personnel
- Material resource

In its current operations of building the core features of the initiative, grants and funds have been sourced from Portuguese Governmental authorities and through commercial consulting partnership contracts.

On the international scale, operations would be supported through the inflow of penalty costs and environmental levies that will be charged, once the full penalty, compensation and stewardship schemes are in place, implemented and regulated. This is to be executed under the following mechanism:

a) Comparing each nation State's use of the Common Heritage against the calculated Quotas. The result will be a balance sheet of Earth System credits and debits for each of the 8 PQs, indicating to what extent each nation State deviates from its quota. Overuse or underuse of the Earth System functionalities – in other words, trespassing or staying within each of the Quotas – will then correspond to a monetary fee that should be either paid for or received by countries, depending on whether they contribute to the maintenance or perturbation of the Holocene-like state of the Earth System.

b) There are other possibilities for financing the Planetary Condominium, such as the charging of a modest rental or transaction fees that could mobilize significant funds. These could include charges on military spending and arms exports, foreign exchange transactions, international trade, airline tickets, maritime freight, ocean fishing, sea-bed mining, satellite parking spaces, use of electromagnetic spectrum and the internet.

c) Knowing that humans have already altered the Holocene-like state of the Earth System, entered the Anthropocene, transgressed 4 of the 9 PBs, and overshot all footprint metrics related to our planetary resources and sinks, it is clear that the sum shall begin with costing penalties and compensations. In an ideal world, the success of our initiative will be measured by the reduction of penalties and compensations and a rise in the stewardship awards, complemented by observations and models suggesting restored Earth System stability.

The basis of the ESAF is that every person has an equal right to our Common Heritage and thus a right to benefit from an equal share of the life-supporting function of the Earth System. Through the Economic compensation scheme, fairness and equity could be achieved in balancing the responsibility between the biggest users of the Earth System and those that provide common benefits.

TRUST AND INSIGHT

The functions that enhance trust in the proposed initiative and its mode of operations are:

A) The inability of the multiple siloed mechanisms that attempt to answer globally pervasive challenges

b) The fact that the initiative will provide a legal mandate to the representation of the Earth System in its favorable state in order to represent the interest of all humankind in the present and future

c) The multiple-levels of accountability – the science, the economics, law and governance structure.

d) Operating through the universally recognized body for peace and security- the United Nations.

e) Open access to the science, the practice of the legal framework and all the information that constitutes the basis of all decisions in this initiative and its governance

Most importantly, only by clearly accounting for the contributions of each entity will it be possible to create a system of compensation, where equity and the social norm of mutual confidence could flourish.

The initiative highlights the valuable insight, based on observations in science and in the natural disasters in the world we see today, that intangible systems are equally important and worth recognizing and protecting for humankind to thrive.

Bringing the basis of human survival and enterprise – the favorable, stable Earth System- to the forefront is one of the most profound insights of this initiative. This insight has no economic worth of its own but when it becomes the core concern of socio-economic decisions, it would play a pivotal role in resolving and finding solutions to the most complex challenges humankind is faced with today and will face in the future.

The Law of the High Seas and the Sea Bed conventions that exist to protect their respective domains have proven that it is possible to build on the effectiveness that these frameworks of governance have shown to expand the mandate of the Earth System as a whole.

FLEXIBILITY

The feedback mechanisms of the initiative's model, just as the dynamic nature of the Earth System itself, creates flexibility in incorporating new findings and perspectives into the decision-making system.The initiative has developed its operational model based on the three principles that Dietz et al. [22] listed in 2003 stated as being particularly relevant for problems at larger scales:

- well-structured dialog involving scientists, resource users and interested public;
- institutional arrangements must be complex, redundant and nested in many layers;
- governance should imply mixtures of institutional types.

PROTECTION AGAINST THE ABUSE OF POWER

The initiative maintains the stability of the favorable Earth System as its core objective. The construction of the regulatory mechanisms and the governance systems are hence focused on this core objective and protected as highlighted below:

a) Just as the Earth System does not trade one environmental impact for another the ESAF does not allow trade-offs among Quotas. Rather it is designed to drive human behavior such that none of the Quotas are exceeded, and therefore the Planetary Boundaries are respected.

b) The initiative proposes to be embedded within the UN, as the only existing institution with the most universal membership and legitimacy, with a General Assembly where 193 members-States have a seat, with a majority of democratic procedures in almost all of its organs, with an internal separation of powers and competences in different organs, of which one is the International Court of Justice.

ACCOUNTABILITY

The Common Intangible Heritage will be the platform where the intangible positive and negative global "externalities" are captured, internalized, accounted for, and where the impacts of each individual, family, business, city, and nation State become visible. The initiative has installed an accounting system for its scientific work on Earth System protection, its framework of economic activity within the initiative and the governance structure as highlighted below:

a) The Earth System does not trade one environmental impact for another – for example, no amount of safeguarded water would compensate for excessive GHGs emission in preventing global warming – the ESAF will not allow trade-offs among Quotas.

b) The ESAF system is developed to compare each nation State's use of the global commons against the calculated Quotas. The result will be a balance sheet of Earth System credits and debits for each of the 8 PQs, indicating to what extent each nation State deviate from the quota.

c) The monetary valuation of such overuse or underuse will be estimated by the permanent Scientific Commission of the Trusteeship Council based on the natural capital valuation literature and the information provided by Earth System scientists, taking into account the scarcity and availability of each of the core drivers of PBs. Earth System credits will likewise be compensated using these same rates, thus making the valuation of the Earth System a transparent process.

d) Open access to the databases, scientific material and decision-making criteria allow further accountability of the processes.

e) The multi-layered organization, embedded in the most unbiased of global organizations- the United Nations – and the trans-disciplinary team that executes the governance system of the initiative is able to self-check and regulate the decision-making process to be relevant, impartial, representative, fair as well as contestable.

F) Just as the international Courts have an international tribunal for the law of the Sea, the initiative shall work towards the development of an Earth System Convention that is protected by a similar jurisdictional system.

References

- Gautam, K.L. (2016). Transforming the United Nations trusteeship council for protection of the earth system. In The Safe Operating Space Treaty: A New Approach to Managing Our Use of the Earth System. Magalhães, P., Steffen, W., Bosselmann, K., Aragão, A., Soromenho-Marques, V. (eds), pp. 262-273. Cambridge Scholars Publishing, Cambridge, UK. ISBN-13: 978-1-4438-8903-2.
- Rockström, J., Steffen, W., Noone, K., Persson, Å., Chapin, F. S., Lambin, E. F., et al. (2009). A Safe Operating Space for Humanity. Nature, 461(7263), 472. doi:10.1038/461472a.
- Hardin, G. (1968). The Tragedy of the Commons. Science, 162(3859), 1243–1248. doi: 10.1126/science.162.3859.1243.
- Ostrom, E. (1999). Coping With Tragedies of the Commons. Annu. Review Political Science 2, 493–535. doi: 10.1146/annurev.polisci.2.1.493
- Kiss, A. (1982). La notion de Patrimonie Commun de L'Humanité. Acedémie de Droit International, Recuil de Cours, Vol.175 (TomoII)
- Oldfield, F., Steffen, W. (2004). The Earth System. In: Steffen, W., Sanderson, A., Tyson, P.D. et al. (Eds.), Global Change and the Earth System: A Planet under Pressure. The IGBP Book Series, (p.7). Berlin, Heidelberg, New York: Springer-Verlag.
- Taylor, P. (2016). The Common Heritage: constructive utopianism. In The Safe Operating Space Treaty: A New Approach to Managing Our Use of the Earth System. Magalhães, P., Steffen, W., Bosselmann, K., Aragão, A., Soromenho-Marques, V. (eds), pp. 104-130. Cambridge Scholars Publishing, Cambridge, UK. ISBN-13: 978-1-4438-8903-2.
- Ostrom, E. (1990). Governing the Commons The Evolution of Institutions for Collective Action. Political Economy of Institutions and Decisions. Cambridge: Cambridge University Press.
- Magalhães, P. (2007). Earth Condominium – From the Climate Change to a New Juridic Conception of the Planet. Coimbra: Edições Almedina.
- Magalhães, P. (2016). Earth Condominium: a legal model for the Anthropocene. In The Safe Operating Space Treaty: A New Approach to Managing Our Use of the Earth System. Magalhães, P., Steffen, W., Bosselmann, K., Aragão, A., Soromenho-Marques, V. (eds), pp. 180-212. Cambridge Scholars Publishing, Cambridge, UK. ISBN-13: 978-1-4438-8903-2.
- Pardo, A. (1967). Address to the 22nd Session of the General Assembly of the United Nations, UN GAOR, 22nd sess., UN Doc. A/6695 (18 August, 1967).
- Pardo, A. (1975). The Common Heritage; Selected Papers on Oceans and World Order 1967-1974. Valletta: Malta University Press.
- Steffen, W., Richardson, K., Rockström, J., Cornell, S.E., Fetzer, I., Bennett, E.M., Biggs, R., Carpenter, S.R., de Vries, W., de Wit, C.A., Folke, C., Gerten, D., Heinke, J., Mace, G.M., Persson, L.M., Ramanathan, V., Reyers, B., & Sörlin, S. (2015). Planetary Boundaries: Guiding Human Development on a Changing Planet. Science. doi: 10.1126/science.1259855.
- The Commission on Global Governance (1995). Our Global Neighborhood: The Report of the Commission on Global Governance. Oxford University Press. ISBN: 978-0198279976.

- Global Risks Foundation –(2017) https://api.globalchallenges.org/static/files/Global%20Catastrophic%20Risks%202017.pdf
- Meyer, K and Newman, P. Planetary Accounting The Framework – comparing human activity to planetary limits. Springer. Forthcoming 2018.
- Galli, A. (2015). Footprints. In Oxford Bibliographies in Environmental Science. Ed. E. Wohl. New York: Oxford University Press. DOI:10.1093/obo/9780199363445-0046.
- Folke, C., et al. (2011). Reconnecting to the Biosphere. Ambio 40(7), 719–738. doi:10.1007/s13280-011-0184-y. 17. Stern, N. (2007). The economics of climate change: The Stern review. Cambridge: Cambridge University Press.
- Glennon, J. P. (Ed.) (1991). United Nations and General International Matters, Volume II, Foreign Relations of the United States, 1958-1960. Washington: United States Government Printing Office.
- Hemmings, A. (2014). Time to Revisit the Antarctic Treaty, Maritime. Retrieved from http://www.maritime-executive.com/features/time-to- revisit-the-antarctic-treaty
- Stern, N. (2007). The economics of climate change: The Stern review. Cambridge: Cambridge University Press.
- Dietz, T., Ostrom, E., & Stern, P. C. (2003). The Struggle to Govern the Commons. Science 302(5652), 1907–1912. doi:10.1126/science.1091015.