PROPOSED EU REGULATION ON NATURE RESTORATION – NEED FOR RETHINKING

Discussion paper

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The European Commission is in the process of drafting a regulation for nature restoration that is planned to be launched in June 2022. This paper highlights some of the issues in the current version[1] and identifies reasons why rethinking is necessary. The focus of this review is in forest ecosystems. The key outcome of the review is that the design of this legislative initiative is inadequate and the preparation for the regulation on nature restoration should be restarted and integrated with comprehensive scientific knowledge and renewable resource management experience. The main reasons are (i) incomplete and deficient definitions, (ii) lack of information on the extent of areas subject to restoration measures in Member States, (iii) unrealistic and impractical targets, (iv) deficiencies in criteria and their measurement, and (v) lack of information on direct and indirect costs of targeted restoration measures as well as impacts on national economies and security of food, energy and forest products and services.

1. Objectives

The three laudable objectives of the draft regulation are (1) to contribute to the continuous, long-term and sustained recovery of biodiverse and resilient nature across the Union's land and sea areas through the restoration of ecosystems, (2) to contribute to achieving Union climate mitigation and climate adaptation objectives, and (3) to meeting EU international commitments (Art.1).

The first objective has two qualitative aspects of nature: biodiversity and resilience. Only the first term is defined in the proposal while the second one is taken as granted. Several resilience definitions have been presented in the literature. [2] Clarification is therefore needed.

Contributing to continuous, long-term and sustained recovery of resilience through restoration is applicable in situations in which the current state is disturbed to a limit beyond which the ecosystem is unable to recover. As natural dynamics prevail and disturbances continue to occur, a long-term target[3] is moving and thereby difficult, if not impossible, to define in practice. The draft proposal is, however, built on the assumption that setting long-term quantitative time-bound targets for biodiversity and resilience are feasible.

[1] Preliminary version, undated, (April 2022).

[2] As an example, resilience has been understood as the capacity of a system to absorb disturbance and reorganize while undergoing change so as to still retain essentially the same function, structure, identity, and feedbacks. The focus is on the dynamics of the system when it is disturbed far from its modal state (Walker, B., C. S. Holling, S. R. Carpenter, and A. Kinzig. 2004. Resilience, adaptability and transformability in social–ecological systems. Ecology and Society **9**(2): 5. [online] URL: http://www.ecologyandsociety.org/vol9/iss2/art5/).

[3] Cf. Art. 4

The underlying assumption regarding the first two objectives is that they are as a rule positively correlated. However, this is not generally true. In forest ecosystems there are also trade-offs between biodiversity benefits and carbon sinks and pools, particularly in old forests. These trade-offs should be duly recognised in the document.[4]

2 Area coverage of the proposed regulation and its implications

The proposed regulation covers six groups of habitat types comprising all terrestrial, coastal and freshwater habitat types (Annex I), namely 1) Wetlands (coastal and inland), 2) Grasslands and other pastoral habitats, 3) River, lake, alluvial and riparian habitats, 4) Forests, 5) Steppe, heath and scrub habitats, and 6) Rocky and dune habitats.

A review of the listed habitat types reveals that their area could be in the range of tens of millions of hectares in Member States, in some cases almost the total forest area of the country. This suggests that direct restoration costs would be measured in tens of billions of euros.

The area-based restoration targets in Art. 4 of the proposed regulation would therefore have significant economic burden for governments, farmers and private forest owners. Every country should carry out a prior assessment on how large areas of agricultural, forest and other land, and watercourses would be covered by the proposed regulation Thorough analyses should also cover the effects on biodiversity, resilience and climate. Furthermore, a proper assessment would be necessary on the direct and indirect costs and benefits (including costs of losses in production), as well as impacts on food and energy security as well as supply of forest products and services.

3 Definitions

The current proposal for the regulation raises a number of major definitional issues that would need careful consideration from the viewpoint of implementation on the ground and also assessment of how nature restoration affects the three pillars of sustainability. Some of these issues are discussed below.

The purpose of the proposed regulation is to take measures to achieve 'good condition' in situations where a non-good condition exists. Good condition is "*a situation whereby key characteristics of an ecosystem (physical state, chemical state, compositional state, structural state, functional state, and landscape and seascape characteristics) reflect high ecological integrity, stability and resilience, and closely resemble those of the reference condition"* (Art. 3(e)).

The definition is not possible to employ in practice as (i) it includes assessment of large number of factors for which information is not readily available, (ii) it requires establishment of thresholds for each aspect, and (iii) weighting of the identified characteristics.

[4] For example, in habitats for old-forest species the carbon sink is generally very low. As a result, the carbon pool starts to decline while some old-forest dependent species groups may benefit from decaying trees and small open gaps in forests. On the other hand, open regeneration areas maintain other species groups and also enhance great carbon sinks over time.

Furthermore, the 'reference condition' is not defined which would be essential for assessing need for restoration and type of measures to be taken.

According to the proposed regulation the area which cannot be classified as 'good condition' will automatically be considered non-good, independently from what is its actual condition. In view of gaps in the existing information on the status of habitat types and their species, it is possible that in many countries 'unknown non-good' areas are extensive calling for identification of possible sites through research and estimation of the costs of restoration.

The second important term is 'favourable reference area' (Art. 3 (g)) meaning "*the total area of a habitat type in a given biogeographical region or marine region at national level that is considered the minimum necessary to ensure the long-term viability of the habitat type and its species, including all its significant ecological variations in its natural range, and which includes the existing area of the habitat type and, if the existing area is not sufficient, the area necessary for the re-establishment of the habitat type*".

This definition is proposed to be used for establishing how large areas in a country are (1) presently covered by a habitat type and its species and (2) the extent of new areas to be restored for this purpose. If the current area of the habitat type is not sufficient for 'favourable reference', such new areas have to be established elsewhere which are or should be occupied by other habitats. No guidance is provided for such overlapping situations in which prioritisation between habitat types becomes necessary.

In general, adequate reliable information does not typically exist to establish what is needed for the long-term viability of individual habitat types and their species at national level. A major time-consuming research effort should be needed for identifying necessary 'favourable reference areas' in Member States.

The third key term is *'sufficient quality and quantity of a habitat of a species'* (Art. 3 (h)) refers to situations in which "*the ecological requirements of a species are fulfilled at any stage of its biological cycle so that it is maintaining itself on a long-term basis a viable component of its habitat in its natural range".* Establishing sufficiency of quality and quantity on a species level appears subjective and challenging.

The above terms could be considered scientifically correct, but their application in practical implementation of setting targets, choosing between options for restoration measures and areas, as well as measuring progress towards the area targets will be difficult, if not, impossible.

Furthermore, several important terms in the body of the proposed regulation and its annexes are not defined at all or their description is inappropriate. Examples include 'resilience', 'reference condition', ´satisfactory level', 'forest connectivity', 'sufficient connectivity', 'favourable conservation status', and 'biological cycle'. In addition, the definitions should not use references for measurement tools such as pixels, satellite data, etc. (cf. Box 1).

4 Restoration of terrestrial, coastal and freshwater ecosystems

Art. 4 defines targets for restoration of terrestrial, coastal and freshwater ecosystems. Para 1 (a) requires that Member States *shall put in place, without delay, for each group of habitat types listed in Annex I, the restoration measures necessary to improve to good condition all*

areas where the habitats are not in good condition. The top-down national targets for 'good condition' areas are to reach 30, 60, and 90 percent of the existing total area of each habitat type in 2030, 2040 and 2050, respectively. As pointed out in section 3, this schematic approach is unrealistic and cannot be considered feasible.

Art. 4 (1) (b) identifies those areas which are not presently covered by each habitat type but are necessary to reach their total ´favourable reference area' as defined in Art. 3 (g). Establishing the extent of these areas is likely to require a research effort due to lack of available information, as underlined in section 3.

Restoration measures to end up in 'good condition' in areas starting from the scratch would often take long time. The proposed target dates are likely to be unrealistic from a practical point of view in many cases. In addition, new areas to be restored for individual habitat types may be in conflict with each other. Prioritisation becomes necessary in such situations but no guidance is offered for how to address this issue.[5]

Art 4 (2) requires to determine "*the most suitable areas to be subject to restoration measures*". The issue of urgency needs is not considered.

The clause "*Areas where habitat types listed in Annex I are in unknown condition should be considered as not in good condition"* can be seriously contested as being unfair for landowners possibly leading to potential exaggeration of the needs for areas to be restored.

Art 4 (4) requires that *"Member States shall ensure that the areas that are subject to restoration measures … show a continuous improvement in the condition of habitats … until good condition is reached and a continuous improvement of the quality and quantity of the habitats of species … until the sufficient quantity and quality of the habitats of such species is reached."* The paragraph looks unrealistic in the light of the definitional issues of these terms and their measurement difficulties in practice.

Art. 4 (5) calls Member States for ensuring that the restoration measures taken lead to *"an increase of habitat area in good condition … until at least 90% is in good condition and until the favourable reference area for each habitat type in each biogeographic region of their territory are reached".* In view of the natural risks involved and time periods required to reach the set targets, this clause also appears unrealistic.

The cross-cutting 'good condition' concept is aimed at to be used for assessment both in local situations and at national level. The draft regulation does not provide for how local assessments should be carried out and by whom. There should be clarity about this aspect (regional or local authority, independent auditors, certification bodies, etc.).

Articles 5 to 10 define specific requirements for six different thematic areas of restoration measures including agriculture and forest ecosystems and pollinator populations. This approach does not duly recognise that conservation and restoration should be considered in a holistic manner, also paying attention to interrelationships between various types of ecosystems (agriculture, forestry, freshwater, coastal areas). Focusing on the condition of

[5] Art. 4 (2) a states that *"The determination of the most suitable areas to be subject to restoration measures… shall be based on the best available knowledge on the condition of the habitat types …in accordance with the guidance issued under Article 17 of Directive 92/43/EEC, and on the quality and quantity of the habitats of the species"*. However, the referred Art. 17 has no guidance for this purpose.

each individual ecosystem type through specific requirements fails to address these interrelationships. The proposed approach often separating origins and outcomes of degradation processes is not appropriate for designing adequate restoration measures.[6]

5 Restoration of forest ecosystems

According to Art. 10 (1) Member States shall put in place without delay the restoration measures necessary to enhance biodiversity of forest ecosystems beyond the areas that are restored pursuant to Article 4 (1). These 'additional' areas are not to be 'restored' but the proposed regulation presents an obligation to achieve a continuously improving trend at national level of each of the following seven indicators: (a) deadwood; (b) age structure; (c) forest connectivity; (d) tree cover density; (e) abundance of common forest birds; and (f) stock of soil organic carbon in forest land (annex V). Improvement is necessary in each indicator until 'satisfactory levels' are achieved. What these levels are remains undefined.

Some of the indicators raise a number of concerns as regards how they are measured and what their limitations are. It is also unclear what are acceptable "continuously improving trends". These issues are discussed in Box 1. In general, the six indicators are inadequate and partly inappropriate for ensuring biodiversity and resilience in forest ecosystems at large.

An important omission in the list of forest ecosystem indicators is the lack of growth of trees and the health and vitality of forests which are critical for resilience and climate mitigation. Tree growth maintains large litter production and soil carbon sink together with sequestration of carbon in tree biomass. Health and vitality of forests are necessary to maintain forest ecosystems so that they do not get degraded and thereby pre-empting needs for restoration. Prevention is always more cost-effective than restoration.

6 Conclusions

This preliminary review has revealed that the proposed theoretical top-down approach for the proposed legal obligations in nature restoration is impossible to implement in practice. Setting strict time-bound long-term area targets for 'good condition' of habitat types and species is not feasible.

Many fundamental terms have not been defined or need to be revised. This is a major constraint for planning, implementation and assessment of progress in nature restoration.

The area of the identified habitat types could cover tens of millions of hectares and their total restoration costs would be measured in tens of billions of euros. In view the vast spatial scale, evidence on the targeted biodiversity benefits is necessary. All Member States should carry out a careful prior analysis of the area to be covered by legally binding nature restoration targets (if maintained) in their specific conditions. This would be crucial for assessing the environmental, social and economic impacts of the proposed requirements.

[6] A relevant example in the proposed regulation is the lack of due consideration of watershed management that is crucial for reducing external load of nutrients on lakes and rivers, and protection of soil preventing landslides and flooding. Another example is the importance of borders between agricultural fields and other open areas, and closed forest as key habitats for many bird and other species.

An alternative strategy could be to start with restoration of degraded habitats. Preliminary investigations should reveal which areas should and could be restored, what are the direct and indirect restoration costs, and what are the impacts on biodiversity, resilience, climate and national economies.

The proposed regulation appears to derive from an implicit assumption that all agricultural, forest and other wooded lands are in an urgent restoration need. However, the current situation is not leading to loss or degradation of nature everywhere in all habitat types. Many farmlands and forests are already well managed and further improvement is being taken to improve their status, notwithstanding that much more effort is still needed.

It goes without saying that biodiversity-friendly sustainable management of agricultural lands and forests has to be implemented maintaining the health and vitality of the renewable natural resources for generating wellbeing for European people. More food and bioenergy can be sustainably produced by Member States without adding to needs for nature restoration.

The current security situation in Europe has seriously endangered the food, energy and other supply chains which has led to re-assessment of the role of natural resources at regional, national and local levels in Member States. The impact assessment of the proposed regulation has not duly addressed these challenges.

It appears that scientific sectoral knowledge and renewable resource management experience has not been duly involved in drafting of the proposed regulation. This may explain why important interrelationships between ecosystem types have not been taken into account to enable a proper holistic consideration of origins and outcomes of degradation processes.

From the perspective of forest ecosystems, the proposed regulation fails to recognise the track record of modern sustainable forest management (SFM) as it is broadly practised in Member States in preventing degradation and enhancing biodiversity and resilience. These measures have been taken by the forest owners and their costs have been internalised in the market. Support to SFM implementation that is based on ecological, social and economic criteria would be the most cost-effective option for many restoration measures.

Box 1 Review of indicators of restoration of forest ecosystems

Deadwood is defined as the volume of non-living woody biomass standing or lying on the ground in forest and other woodland (unit, m^3/ha). The diameter threshold in the international definitions is 10 cm with a minimum length of a stem part of 1.3 metres. The underlying implicit strategy is based on an increase in nation-wide average volume of deadwood in all forests. As a satisfactory level is not defined, the text implies ever-increasing volumes of deadwood which can be questioned. The possibilities to increase the volume of the deadwood depends also on the eco-zone. Furthermore, it is not recognised that the most effective strategy to increase the habitat for deadwood-dependent species could be concentrating the increase of deadwood on the sites that provide the best prospects for their conservation.

Age structure is proposed to be measured as the share of forests available for wood supply with uneven-aged structure as compared to even-aged forests. The indicator fails to provide a definition for age structure of forest. Every forest stand includes almost always trees with different ages independently from its history and management practice. From the biodiversity perspective, every stage of forest development (independently from what is the chosen management strategy) is a habitat for species that depend on that specific forest stage.

For the age of forest, the text should define how to establish the age structure, and what are the criteria for uneven-aged and even-aged forests. The indicator, as it is described, has nothing to do with the age structure of forests. In addition, the measure covers only forests available for wood supply, not considering other forests which are used for other purposes.

Forest connectivity is defined as follows: "*Forest connectivity measures the degree of connectivity in forest ecosystems*". It is not a proper definition. Connectivity is an ecological concept related to species and species groups in a spatial scale, ranging from very large scales (up to hundreds of kilometres) to micro level (tens of metres). Connectivity should be defined and analysed in a scientific way. The proposed indicator is Forest Area Density at local (pixel) level does not suit for measuring connectivity.

Tree cover density indicator is stated as the degree of tree cover on 10-m grid cells. This is not a proper definition either. Tree Cover Density is the vertical projection of tree crowns to a horizontal earth's surface.[7] For the purpose of measuring habitat conditions for species, a more appropriate measure would be to use the exact characteristics, i.e., tree stems per area unit, preferably by diameter and height classes. Definitions should not be linked to specific data type, such as satellite data.

Stock of soil organic carbon in forest land is proposed to describe the change of carbon stocks in the forest floor and in the mineral soil [0-30 cm] in forest. A part of carbon on forest floor belongs to litter which is a separate group forest carbon pools, not part of soil carbon. The indicator does not cover the other carbon pools of mineral soils and not at all organic soils. [8]

The most reliable way to assess the status of forests in Member States and at the EU level is to rely on the information of the national forest inventories (NFI). However, their

[7] The associated concept Forest Canopy Density (FCD) refers to the proportion of an area in the field/ground that is covered by the crown of trees and is expressed in percentage of the total area.

[8] According to the IPCC, the LULCF pools are above ground biomass, below ground biomass, litter, dead wood and soil organic carbon. These are further divided into categories.

harmonisation should be continued and completed to make information fully comparable[9]. The current proposal on forest ecosystem indicators is primarily based on the use of remote sensing data. Such data can be used to enhance the NFI estimates and to make estimates for smaller area units than what is possible with the field data only. Remote sensing data alone does not suit for measuring any one of the proposed indicators.

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[9] Already on-going in COST Action E43 of the European Union.