Analysis: Environmental degradation and its offsetting, or ecological compensation

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In the spring of 2021, the World Economic Forum identified biodiversity loss as the fourth most impactful risk threatening humanity after infectious diseases, climate action failure and weapons of mass destruction[1]. Despite the identified risks, the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) reports that the loss of biodiversity and its services to ecosystems is now faster than ever[2], and the assessment of threatened species in Finland indicates biodiversity loss in Finland as well[3]. In the Economics of Biodiversity report[4] published in February 2021, Professor Sir Partha Dasgupta, Professor Emeritus of Economics at Cambridge University, emphasised that nature is the most important capital for humanity and that the financial benefits achieved through the loss of natural capital are short-sighted and unsustainable.

Stopping the loss of biodiversity and achieving ecological no net loss (NNL), not to mention a net positive impact, is not realistically viable without biodiversity offsets, in other words ecological compensation.

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1. What is ecological compensation?

Ecological compensation refers to offsetting our negative environmental impact through positive environmental action[5]. Activities causing the most obvious environmental degradation include, for example, construction projects, where nature must permanently give way to new infrastructure, such as houses, railway lines, forest lorry roads or wind farms, as well as commercial felling of timber. On the other hand, our consumption habits may cause some of the most invisible environmental degradation with unpredictably extensive consequences that we outsource to the world through international trade.

Of course, from an environmental viewpoint, eliminating all losses would be ideal. However, on both the global scale[6] and, at least for the next decade, in Finland[7], the population will keep growing, which will almost inevitably result in an increased need for infrastructure. With increasing consumption levels in developing countries and the difficulty of achieving political consensus in guiding consumption in a more equitable direction even in a country such as Finland, it is clear that completely eliminating all environmental damage is not a realistic goal. Nevertheless, ecological no net loss is possible.

The only known means of achieving ecological no net loss is to comply with the mitigation hierarchy[8] in any activities causing environmental degradation. Ecological compensation is calculated as part of the mitigation hierarchy and referred to when offsetting biodiversity losses somewhere else, in other words systematically improving the health of the environment outside the impact area[9].

> The mitigation hierarchy is based on the idea that avoiding degradation and minimising losses that cannot be completely prevented must take precedence over offsetting. Moreover, the traditional mitigation hierarchy includes correcting losses, in other words restoring the impact area before calculating the residual damage to be offset.

In terms of achieving ecological no net loss and promoting the health of the environment, the concept of taking corrective measures into account in the calculations is one of the weaknesses of the traditional hierarchy as the corrective measures often take place long after the end of the project. In environmental terms, it is better to calculate the amount of losses and produce the necessary offsets with ecological compensation before restoring the damage locally[10]. I will get back to this weakness later.

Ecological compensation can be carried out by restoring previously impaired areas or protecting nature at risk from degradation. Examples of such measures include the restoration of water economy in marshlands by plugging ditches and removing excess trees from marshlands that have become overgrown due to drainage.

In Finland, forests deemed ready for commercial felling are extremely likely to be felled, which is why protecting old forests produces real benefits, as long as all the related challenges are reviewed and the amount of losses and the offsets needed to reverse it are correctly evaluated.

2. How can we know that we are truly offsetting ecological losses?

The idea of ecological compensation is simple, but putting the idea to practice in a way that produces a no-net-loss impact has proven to be challenging. A structural approach of systematically analysing about 15 questions[11], all of which affect whether the losses are truly offset, helps evaluate and balance the environmental losses and gains.

Outlining nature through three fundamental axes – what (biodiversity), where (space) and when (time) – helps determine ecological compensation. Environmental losses can be defined by asking what is lost, where and when. Environmental gains can be defined by asking what is gained, where and when. Moreover, there are questions related to the goals and the characteristics of the restoration and conservation methods used in producing the offsets.

The impact of the answers on the realisation of compensation may not seem self-evident at all. A good example of this is the vitally important choice of time frame for the calculation of losses and gains.

The evaluation time frame refers to the period of time during which all the losses are fully compensated. The question is essential due to the fact that causing quick losses is easy, whereas the production of gains depends on the environment's ability to recover and is inevitably and invariably slow.

If the evaluation time frame is short, for example five years, only a fraction of the natural recovery initiated by the restoration measures has the chance to materialise, which increases the area required for the offsets aiming at ecological no net loss. A long evaluation time frame, such as 50 years, weakens the credibility of compensation. In this scenario, the balance of offsets and losses is not reached until the distant future. To illustrate the excessive duration of a 50-year time frame, it accounts for about half of the history of independent Finland.

Another example is the question of the permanence of offset areas. As most of the losses are permanent or at least very long-term, permanence is a key requirement in order to make no net loss possible and credible. This is why offset areas should be placed under permanent protection in line with nature conservation legislation.

Other questions that need to be considered in order to truly reach no net loss include the additionality of gains, leakage of losses as a result of conservation, present value calculation of delayed offsets, the ecological response to restoration, the uncertainty of an ecological response to restoration and the baseline trend of the biodiversity loss used when calculating the offset.

The approach structured through these questions is based on independent multipliers that are used to increase the area required for offsetting in order to reach no net loss. In the approach based on multipliers, each question adds a partial multiplier with the value 1 or greater than 1. This means that failing to consider even just one of the questions increases the likelihood of ending up with an offset area that is too small for the losses to be fully and correctly compensated.

Even though the ratio of the loss and offset areas depends on various factors, it is clear that the offset areas must almost invariably be multiple compared to impact areas in order to achieve ecological no net loss.

3. Net positive impact – what is it and how to reach it?

Net positive impact means that the health of the environment is improved from its current status. In terms of ecological compensation, it means that the implementation of the offsets exceeds the requirements of no net loss, resulting in an environmentally positive outcome when calculating the balance of losses and offsets. In other words, the offsets overcompensate for the losses.

Reaching a net positive impact as part of compensations requires in-depth understanding of the characteristics of the essential questions in ecological compensation. The simplest way to achieve a net positive impact after determining the offset area required for no net loss with the help of the above questions is to increase the amount of offsets by adding an additional multiplier for net positive impact on top of no net loss. A multiplier for net positive impact means that, for example, if the multiplier is 1.3, the offsetting measures are carried out on an area 30% larger than required when simply aiming for no net loss.

There are two other routes to a net positive impact. The first is related to the abovementioned evaluation time frame which is required for balancing the losses and gains. If a 30-year time frame is selected, for example, it is clear that the site restored as offsets will not have the time to fully recover to its natural state during the time frame; instead, the nature will keep healing for decades after the end of the time frame. As the offset areas must also be permanent, the evaluation time frame and the permanence of the offset areas will inevitably result in an improved state of the environment and a net positive impact in the long term.

A shorter evaluation time frame results in a larger net positive impact and is desirable from an environmental viewpoint but, on the other hand, an evaluation time frame that is too short can set unreasonable demands for the practical implementation of the offsets, impairing their acceptability.

The third way to aim for a net positive impact is to turn the weakness of the traditional mitigation hierarchy described earlier in this article into a strength. This is achieved with an approach where the local restoration of damage is not considered to decrease the amount of ecological compensation required for a no-net-loss impact; instead, all the losses are offset through other measures. However, the approach does not mean that the local restoration of damage is given up. The difference is that, while the local restoration is implemented as before, it is not used to reduce the losses to be offset as in the traditional view but, instead, used to achieve a net positive impact.

4. Habitat hectares as currency for exchanging losses and offsets

When evaluating the extent of environmental degradation, it is important to distinguish:

- the surface area on which the damage is caused;
- the ecological condition of the impact area before the damage;
- the intensity of the damage, in other words the share of the ecological condition of the observed site that is destroyed per unit area;
- and the damage calculated based on the above, measured in habitat hectares.

A habitat hectare refers to one hectare of each habitat type that is in a fully natural state. The habitat hectare value of one hectare in a fully natural state is 1, and the habitat hectare value of a completely destroyed area is 0.

> As an example, let us assume that a project causes environmental damage in an area of 10 hectares. The project area has already been damaged by 40%, meaning that the current habitat hectare value of each hectare is 1 − 0.4 = 0.6.

The damage caused by the project is often partial; it does not fully destroy the hectares. This is true of timber felling, for example. For this reason, the amount of caused damage must be evaluated separately.

Let us assume that the damage caused by the project impairs the health of each hectare by 30%. The purpose of the example and the assumed values is to help illustrate how to calculate the damage caused by a project in habitat hectares:

> damage in habitat hectares = surface area of the impact area x the average condition of the impact area before the damage x the amount of damage caused by the project as a share of the condition of the project area = 10 x 0.6 x 0.3 = 1.8.

Therefore, in this example, the natural losses created by the project in the 10-hectare project area amount to 1.8 habitat hectares. For balance calculations, both the losses and the gains are transformed into habitat hectares. In order to reach no net loss, the habitat hectares of the losses and gains must be equal after considering all the relevant factors and the resulting multipliers.

Similarly to the losses caused by the project, the gains produced by restoration and conservation are also invariably partial. The restoration of one hectare produces a gain that is a fraction of the full habitat hectare because the condition of the area to be restored is not usually 0 at the time of restoration and because the area will not reach a fully natural state, in other words value 1, within the evaluation time frame. The habitat hectare is an excellent currency for calculating the balance between losses and gains, but there are other potential currencies as well.

5. Is this all just greenwashing?

When carried out correctly and honestly, biodiversity offsetting is not greenwashing. However, if carried out fraudulently, it can be. The term 'greenwashing' stems from whitewashing, an act aimed to cover up errors or crimes. Greenwashing is a type of fraudulent communications, in other words lying.

Ecological compensation in and of itself is not greenwashing; it is simply a description of a process where the biodiversity losses caused by any project are offset through positive environmental action. Commercial operators may seek to gain financial benefits from ecological compensation by promising to offset the environmental damage caused by their activities. If the promised offsets are implemented honestly and correctly, we can ask ourselves if aiming to benefit from ecological compensation is truly reprehensible. What makes it greenwashing is when the promises do not translate into action.

As long as any fraudulent activity, in this case greenwashing, is possible, there are also operators guilty of it. The promise of ecological compensation benefits the operator and they can claim to be better than their competition. Therefore, as biodiversity offsetting is still outside the mainstream, operators can stand out from the competition by promising to offset their losses, whether they intend to keep their promise or not.

There is a clear solution to the problem of greenwashing: making biodiversity offsetting obligatory for anyone whose operations damage the environment. When everyone is equally obligated to offset their environmental damage, the promise of offsets no longer enables operators to stand out or call themselves pioneers, thus eliminating the opportunity for greenwashing. At the very least, this changes the essence of greenwashing; even if no net loss or the required level of overcompensation is reached, operators are still able to continue competing with promises of an increasingly high net positive impact.

Occasionally, some commentators accuse ecological compensation of being simply a form of indulgence trading. A common objection is that companies offering compensation no longer need to care about the environmental damage they are causing and that offsets give them permission to destroy nature. In fact, while the construction of nearly any kind of infrastructure requires a permit, the main principle guiding the permit process is that the permit must be granted if there are no particular reasons for rejecting it. Damage to unprotected nature is not usually considered grounds for rejecting a permit. In practice, therefore, we already have the licence to destroy, and operators do not need further permission from ecological compensation.

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The claim about indulgence trading seems to also be based on a suspicion of licensing authorities being inclined to grant permits to operators that offer even the smallest amount of ecological compensation during the permit process, despite the clear principles of the process. In order to prevent indulgence trading, offsetting must be kept separate from any permit considerations and conservation areas must not be opened for damaging activities under the guise of compensation. Instead, once the permit process is complete, the recipient of the permit must be obligated to compensate their environmental damage in all projects without exception.

The obligation to compensate environmental damage would also have a proactively minimising effect on the losses. This is because a compensation obligation makes the costs of the damage visible, and most operators tend to avoid unnecessary costs. This results in avoiding and minimising damage and, thus, the compensation obligation would, in fact, steer the operators towards stricter voluntary adherence to the mitigation hierarchy.

6. Promoting Finnish pioneership

In September 2021, the Strategic Research Council of the Academy of Finland chose to fund the six-year *Boost for biodiversity offsets* consortium promoting the mainstreaming of ecological compensation in Finland. Receiving about EUR seven million in funding, the consortium focuses on the role of ecological compensation in a fair and equal transition to an ecological no net loss and net positive impact. The consortium is directed by the author of this article and its deputy director is Atte Moilanen from the University of Helsinki. The head researchers also include Suvi Huttunen and Minna Pappila from the Finnish Environment Institute, Heini Kujala from the University of Helsinki and Panu Halme from the University of Jyväskylä. Jonna Kangasoja from Akordi Oy manages the consortium's communications.

The consortium examines the social and cultural impact of biodiversity offsets and analyses the changes needed in the Finnish legal framework, including legislation, to create a comprehensive and fair compensation system.

The consortium plans to develop the necessary computation and reporting software required by the practical implementation of biodiversity offsets and, in cooperation with the Finnish Ministry of the Environment, prepare a national compensation register for keeping track of offsets. In addition, the consortium will develop a method based on financial accounting for evaluating environmental losses outsourced through procurement and consumption for organisations and set up the cities of Jyväskylä and Lahti as living laboratories experimenting with ecological compensation in complex city organisations.

Stopping the loss of biodiversity and achieving ecological no net loss, not to mention a net positive impact, is not possible without biodiversity offsets. It is time to stop focusing on ungrounded problems related to ecological compensation and move towards functional implementation that is based on regulations. Rules and obligations related to biodiversity offsets have already been proposed for the current reform of the Finnish Nature Conservation Act. The reformation of the act is truly necessary. It will improve the preservation of the currently protected natural values and act as a vital first step in the Finnish legal framework towards a comprehensive and fair compensation system.

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References:

1. https://www.weforum.org/reports/the-global-risks-report-2021
2. https://ipbes.net/global-assessment
3. https://www.ymparisto.fi/fi-fi/luonto/lajit/uhanalaiset_lajit/Suomen_lajien_Punainen_lista_2019
4. https://www.gov.uk/government/publications/final-report-the-economics-of-biodiversity-the-dasgupta-review
5. Moilanen, A. and Kotiaho, J.S. 2017. Ekologisen kompensaation määrittämisen tärkeät operatiiviset päätökset. Suomen ympäristö 10/2017. http://urn.fi/URN:ISBN:978-952-11-4754-8
6. https://population.un.org/wpp/Publications/Files/WPP2019_Volume-I_Comprehensive-Tables.pdf
7. https://www.tilastokeskus.fi/til/vaenn/2021/vaenn_2021_2021-09-30_fi.pdf
8. https://www.iucn.org/sites/dev/files/import/downloads/bdoffsets.pdf
9. Moilanen, A. and Kotiaho, J.S. 2018. Planning biodiversity offsets. TemaNord 2018: 513. http://urn.kb.se/resolve?urn=urn:nbn:se:norden:org:diva-5223
10. Moilanen, A. and Kotiaho, J.S. 2020. Three ways to deliver a net positive impact with biodiversity offsets. Conservation Biology. https://conbio.onlinelibrary.wiley.com/doi/abs/10.1111/cobi.13533
11. Moilanen, A. and Kotiaho, J. S. 2018. Fifteen operationally important decisions in the planning of biodiversity offsets. Biological Conservation. https://www.sciencedirect.com/science/article/pii/S0006320718310668

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