

The logo for GAIA, featuring the word "GAIA" in a white, sans-serif font. The letter "A" is stylized with a light green circular outline around its top and bottom curves.

NATURAL CAPITAL

NATURAL CAPITAL
AS AN ASSET CLASS

13 September 2022

AN EMERGING ASSET CLASS

WHAT IS NATURAL CAPITAL?

Natural capital is defined as the stock of the world's natural assets that support life. It is a system that includes land, soil, oceans, air, trees, plants, animals, and all living organisms.

The natural environment is critical for sustaining human populations globally. The OECD estimates that ecosystem services provide societal benefits worth \$US125-140 trillion per annum, which represents ~1.5 times global GDP. Examples include agricultural production, regulating air quality, providing biomedical resources and water.

Regardless of this inherent value, historically this asset base has not been valued in an economic sense – **preserving the environment has not been profitable**. As a result, human activity has caused significant global deforestation and environmental pollution.

This concept is termed the ‘tragedy of the commons’:

“The tragedy of the commons is an economic theory used to describe the conflict for common resources such as air, land and oceans between an individual’s short-term interests and the long-term welfare of society.”

There is an emergence of a structural change that will reverse the tragedy of the commons problem. Over the past few decades, we have seen the emergence of **global carbon markets**.

HOW DOES A PRICE ON CARBON PROTECT THE ENVIRONMENT?

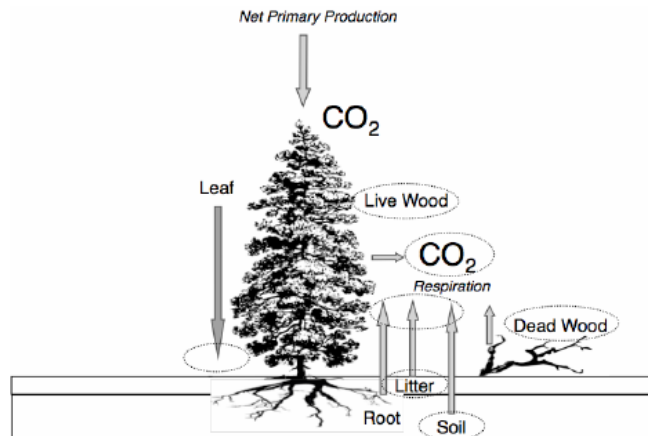
The natural environment is a major source of carbon storage. This carbon storage capacity has value.

In its basic elemental form, carbon manifests in coal, diamonds, and graphite. Its uniqueness stems from its ability to form millions of compounds. The entire field of organic chemistry is dedicated to understanding carbon compound creation.

Every living organism contains carbon. The human body comprises approximately 20% carbon, a typical tree 50%, soil 10%.

With a price of carbon evolving over the past few decades, this in turn **generates a value for organisms that contain carbon**.

To provide a simplified example, if a tree grows and can absorb atmospheric carbon, it is now commercially valuable. Not for its use as a material, but its value in situ.



WHAT IS CARBON WORTH?

The price of carbon differs greatly across markets. In Europe, one tonne of carbon is valued at \$US70 per tonne, in Australia, \$US25 per tonne and in New Zealand \$US15. The global market for carbon stored in the natural environment is circa \$US10 per tonne¹.

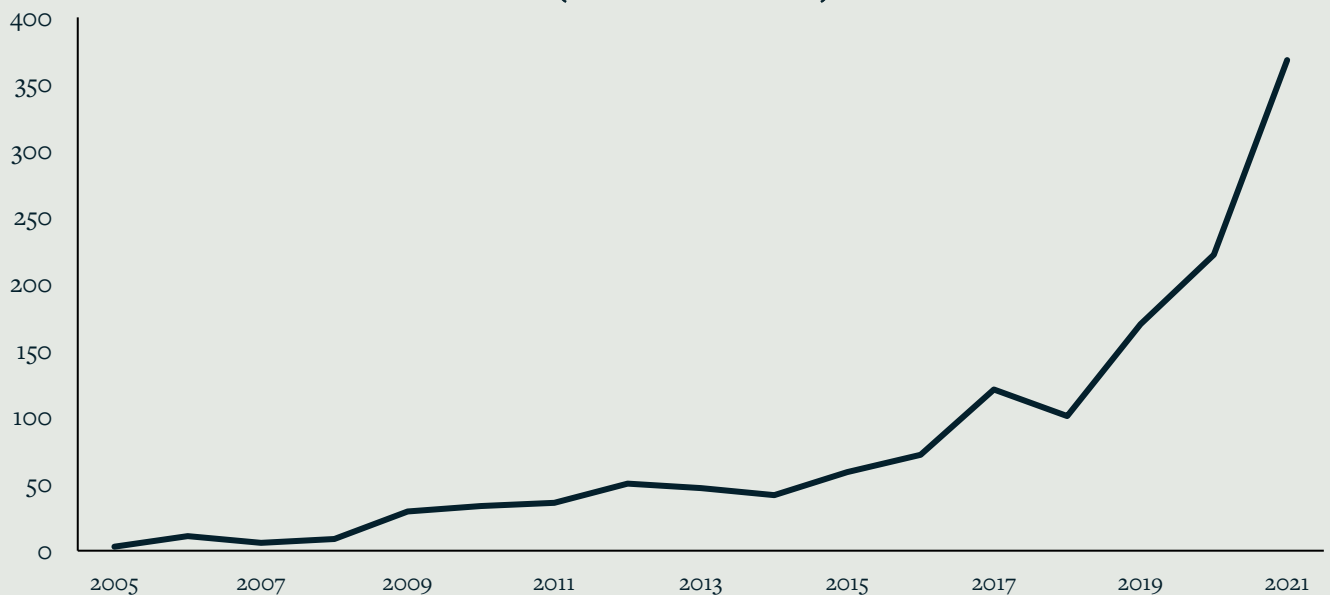
The fact carbon has value has made projects that restore or protect natural environments commercial. These are generally called “**nature-based carbon projects**” and act like an infrastructure asset. The ancillary benefits are material. The protection of habitat for biodiversity and the opportunity for indigenous communities to manage the project are the two primary co-benefits.

While it is the trees and soil that absorb the carbon, the positive externalities are an overall improved ecosystem.

The chart below shows the issuance of global voluntary carbon credits. The market is growing rapidly but remains relatively small compared to global emissions. Approximately 350 million tonnes of carbon were sequestered or stored in 2021² – compared to 35 billion tonnes of annual emissions – about 1% of total emissions.

This market is expected to continue to grow substantially. By 2030 it is expected up to two billion tonnes per annum will be absorbed through carbon sequestration projects – about 6% of global emissions³. At a carbon price of \$US20 per tonne, this would represent an annual value of \$US40 billion.

**Global Issuances of Carbon Credits
(millions of tonnes)**



Source: Ecosystem Marketplace, Trove Intelligence

¹ Nature based credits traded in voluntary carbon markets

² Trove Intelligence

³ Mckinsey



THE VALUE OF NATURAL CAPITAL AN EXAMPLE

BLUE CARBON

Coastal vegetated systems are ecosystems that store large amounts of carbon. Coastal vegetated systems include mangroves, salt marshes and seagrasses. The emissions that are avoided by maintaining coastal vegetation - or drawn from the atmosphere through their restoration - are significant. The biomass is dense, and the soil deep.

Because of the potential to absorb carbon, these types of ecosystems are highly valuable under voluntary carbon markets - and are specifically known as **blue carbon projects**.

Assuming a carbon price of US\$50 per tonne, coastal vegetated systems are valued between \$US30k to \$US50k per hectare. This compares with the value of agricultural land - which trades at between \$US5k and \$US30k

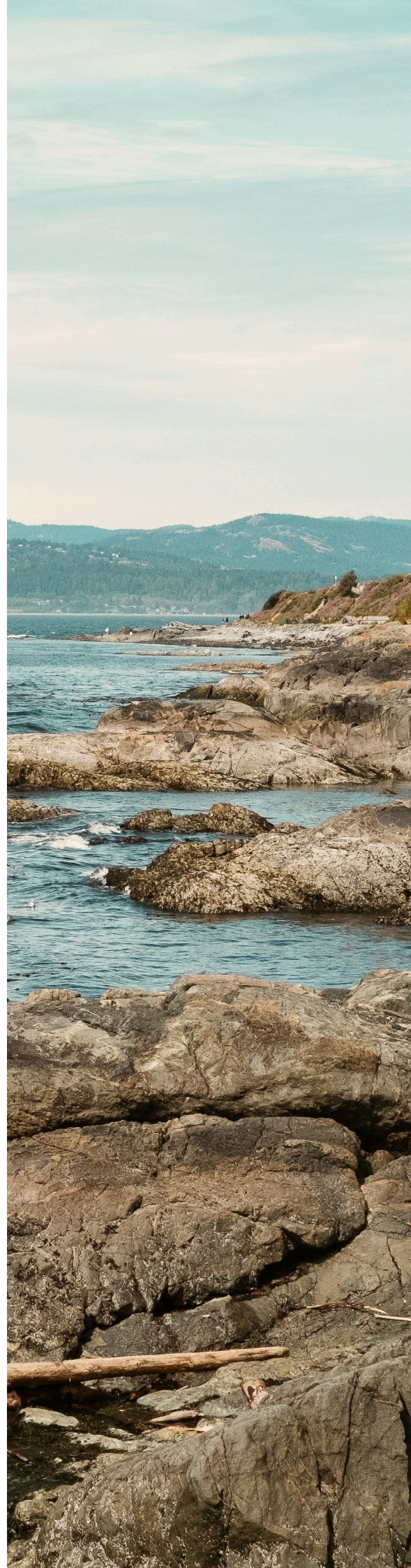
It is estimated there are 50 million hectares of mangroves, seagrass, and tidal marshes globally.

This delivers an in-situ value of \$US2.5 trillion. While this seems a large figure, it represents a fraction of global GDP - and compares to New York's residential value of circa \$US3 trillion - which represents less than 100k hectares of land mass.

This is not an academic exercise. With global carbon markets evolving to include nature-based solutions - natural ecosystems are generating carbon credits. These projects can generate credits for 30 to 50 years. The credits are tradeable and are increasing in value.

The purchaser of carbon credits are not just emitters seeking to retire the credits to offset emissions. Financial buyers are entering the market to gain access to the value of natural assets.

As the value of nature-based carbon credits increases, we expect nature will eventually be considered an alternative infrastructure asset. Natural capital has the potential to become a component of a balanced portfolio over the medium to long term.



EXAMPLE PROJECT

INDUS DELTA BLUE CARBON

The Indus Blue Carbon project in Pakistan is one of the largest environmental restoration projects in the world.

The Sindh Indus delta is a vast complex of tidal river channels and creeks, low-lying sandy islands, mangrove forests and inter-tidal areas. The delta's mangrove forests are unique in being the largest area of arid climate mangroves in the world, and the 7th largest mangrove forest.

Over several decades, mangrove forests in the Indus Delta have experienced significant deforestation and degradation due to human activity.

The region also holds ecological significance, supporting unique fisheries and shrimp species, invertebrates, turtles, migratory birds, and coastal area floral species.

The Indus Blue Carbon Project seeks to reverse the degradation and, in the process, generate 143 million tonnes of carbon emission removals over the project's 60-year lifetime.

Over this time the project will sequester 142 million tonnes of carbon dioxide (Co_{2e}) across its 250,000-hectare ecological footprint. For context, this is 0.14 gigatonnes – compared to annual global Co_{2e} emissions of circa 35 gigatonnes.

SATELLITE IMAGERY OF THE PROJECT



THE ECONOMICS

INDUS DELTA BLUE CARBON

The chart below illustrates the projects expected carbon emission absorption over the life of the project. Nature based projects generally absorb carbon following a S-shaped curve.

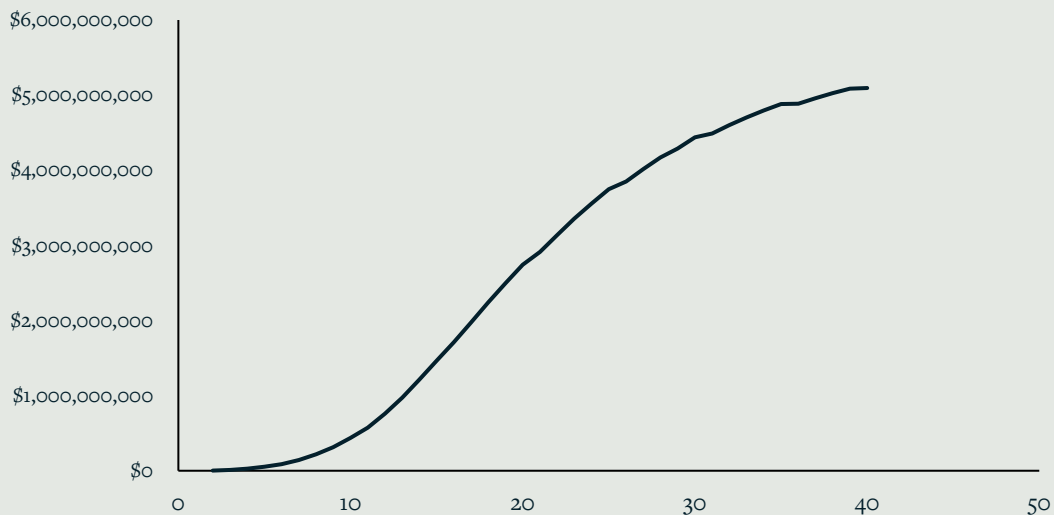
Indus Blue Carbon Project
Aggregate carbon absorption (tonnes)



Source: Gaia Natural Capital

The chart below illustrates **the cumulative revenue from the project** assuming a static carbon price of US\$40 per tonne. Assuming a 15% discount rate, **the revenue stream has a net present value of circa US\$500 billion.**

Project Revenue
Cumulative Lifetime Revenue (\$USD)



Source: Gaia Natural Capital

NATURAL CAPITAL

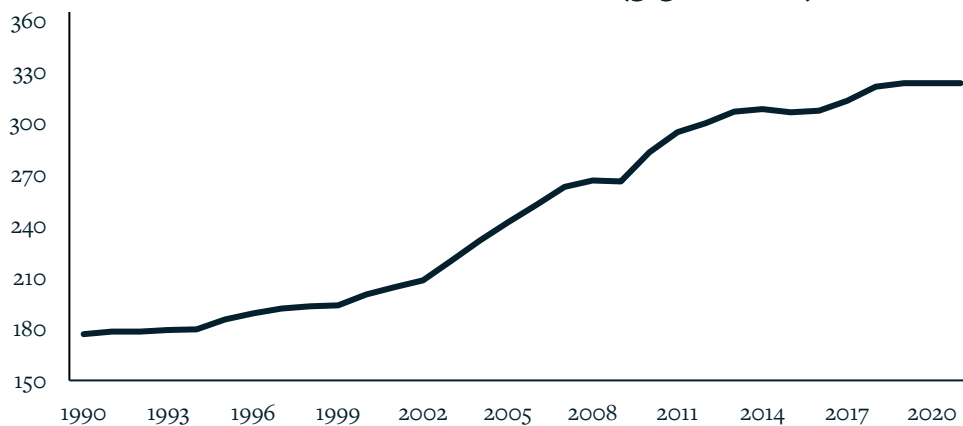
ASSISTING THE MOVE TO NET ZERO

The path to net zero is a large task. Coal, oil, and gas are still in heavy use in providing energy to the global economy, still representing over 70% of all energy production.

Despite all existing efforts to reduce global emissions, they have not yet started their downward trajectory.

While developed nations are moving aggressively to decarbonise – large countries such as China are still adding fossil fuel sources of energy. China accounts for nearly 30% of all global emissions. While the country has committed to net zero by 2060 – its emissions are still increasing as its GDP per capital increases.

Global Carbon Emissions (gigatonnes)



Source: OECD

Decarbonisation will require contributions from an array of sectors. Renewable energy, energy efficiency, carbon capture and storage and emerging fuel sources such as hydrogen will all play a role. Nuclear energy is also being reconsidered as a clean energy source – and our analysis indicates it will need to be a major contributor to move to net zero.

The existing reality is that there are major industries that are unable to reduce emissions without the advent of new technology. For companies within these industries, **purchasing carbon credits to offset emissions** will assist reducing carbon emissions while technology evolves. When these projects are nature based, they have significant ancillary community and biodiversity benefits.

Natural capital projects will be a major contributor to moving to net-zero. The price for voluntary nature-based projects is circa US\$10 per tonne. This price is expected to rise as organisations purchase carbon credits to abate emissions.

NATURAL CAPITAL GROWTH OF THE MARKET

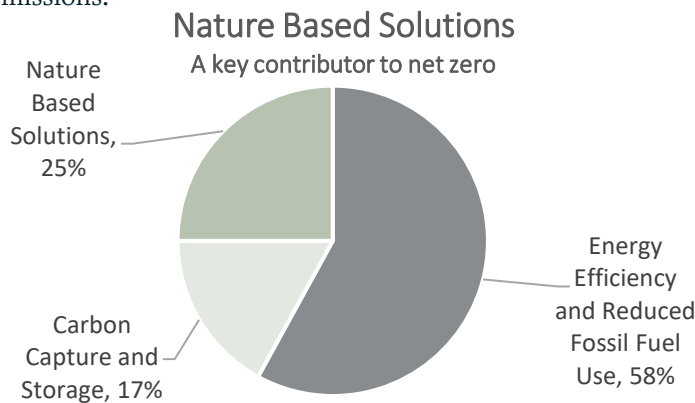
Natural capital projects are an established means of preventing, reducing, capturing and storing carbon emissions. Natural capital projects provide opportunities for both climate change mitigation and increased climate resilience.

Preventing deforestation, improving soil management techniques, protecting natural carbon sinks, restoring damaged habitats, and implementing climate-smart agriculture practices are solutions that are being scaled today.

Investments in nature could **potentially deliver one-third of the emission reductions** needed to align with the Paris Agreement between now and 2030.

Academic research suggests that nature-based solutions may have the potential to remove up to 12 gigatonnes of carbon emissions **per year** by 2050. This is in the context of global emissions of 35 gigatonnes.

The chart below illustrates the potential for nature-based solutions to be a critical contributor to a reduction in global emissions.



Source Barclays

At a price range for carbon credits that varies between US\$10 and US\$50 per tonne, this translates to US\$120 billion to US\$600 billion of investment into natural capital assets per annum.

This is the argument for natural capital as an asset class. Nature and ecosystems will have an explicit value. We ultimately see ecosystem investment as part of a balanced portfolio, and potentially listed on global securities exchanges.





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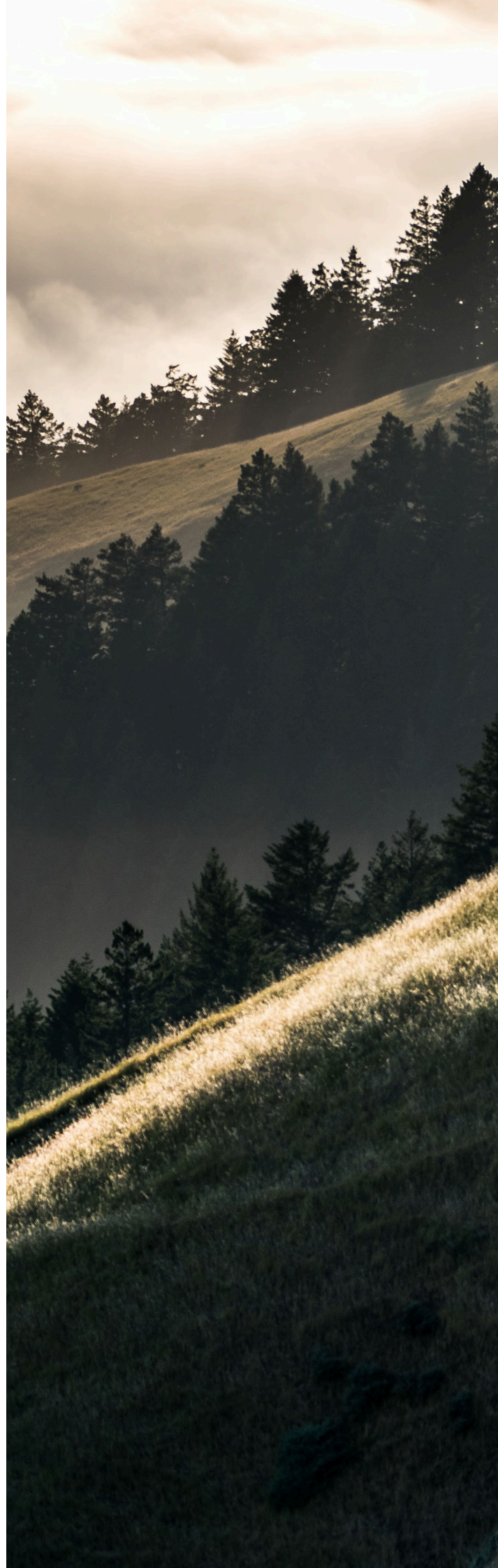
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