Regenerative information technology

the ultimate impact investment

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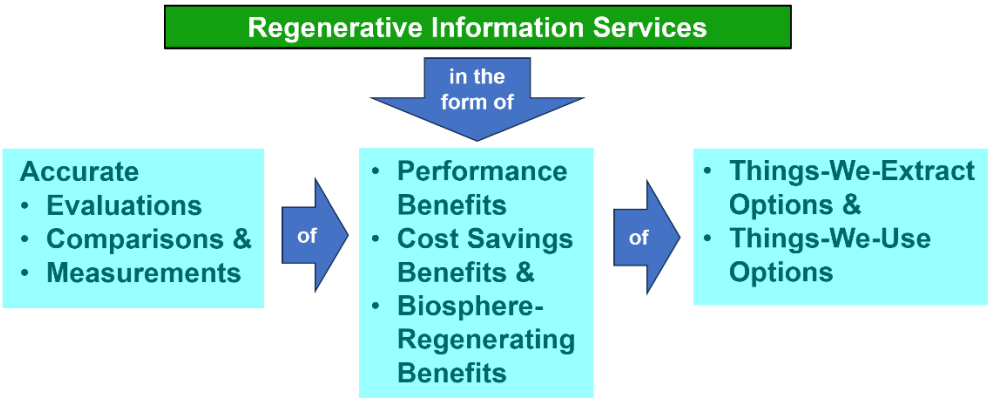
Table of Contents

1.0 Executive Summary

Regenerative information technology ("regen info tech") is the ultimate impact investment because it supplies "***regenerative information services***" …

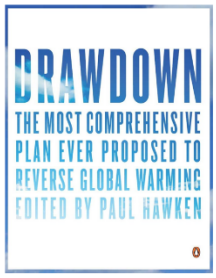


… usable by people everywhere for ***wanting, deciding and acting*** to adopt "***regenerative options***" for meeting human physical needs …

A **regenerative option** that people everywhere ***want*** to adopt:

① Delivers performance benefits	because it meets a human physical need
② Delivers cost savings benefits	because it avoids more costs than it incurs
③ Delivers biosphere-regenerating benefits	because it's a things-we-extract option that increases the number of species in an area, or because it's a things-we-use option that avoids more pollution than it incurs

… that deliver ***beneficial ecological impacts*** -- on a scale of ***1 trillion tons*** of avoided greenhouse-gas pollution -- for reversing the planet's ecological crises, and deliver ***beneficial social impacts*** -- on a scale of ***$97 trillion*** of avoided cost savings -- for adopters of regenerative options …



93 categories of regenerative options

> $97 trillion of avoided cost savings

> 1 trillion tons of avoided pollution

sources: https://drawdown.org/solutions/table-of-solutions/
and https://earth.org/project-drawdown

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2.0 Regenerative information technology supplies people everywhere with regenerative information services

To reverse the planet's ecological crises as a whole, and to create beneficial social impacts – in the form of avoided cost savings on a scale of $97 trillion – for people everywhere:

First, I invented – with the help of Project Drawdown – the concept of a "***regenerative option***" that people everywhere want to adopt because the regenerative option delivers measurable performance benefits, measurable cost savings benefits and measurable biosphere-regenerating benefits …

A **regenerative option** that people everywhere ***want*** to adopt:

① Delivers performance benefits	because it meets a human physical need
② Delivers cost savings benefits	because it avoids more costs than it incurs
③ Delivers biosphere-regenerating benefits	because it's a things-we-extract option that increases the number of species in an area, or because it's a things-we-use option that avoids more pollution than it incurs

Second, I invented a breakthrough information technology -- called "***regenerative information technology***" ("regen info tech") -- in the form of a simple algorithm called the "***Regenerative Information Algorithm***" …

Regenerative Information Algorithm

Incurred cost (per unit of physical performance supplied or saved) of a things-we-extract option	(minus)	Avoided cost (per unit of physical performance supplied or saved) of a things-we-extract option	(equals)	Cost savings benefit of a things-we-extract option
Incurred cost (per unit of physical performance supplied or saved) of a things-we-use option	(minus)	Avoided cost (per unit of physical performance supplied or saved) of a things-we-use option	(equals)	Cost savings benefit of a things-we-use option
Number of species-per-area after adoption of a things-we-extract option	(minus)	Number of species-per-area before adoption of a things-we-extract option	(equals)	Biosphere-regenerating benefit of a things-we-extract option
Incurred pollution (per unit of physical performance supplied or saved) of a things-we-use option	(minus)	Avoided pollution (per unit of physical performance supplied or saved) of a things-we-use option	(equals)	Biosphere-regenerating benefit of a things-we-use option

… used by a simple computer-implemented database & application (a "***regenerative information database & app***") for processing performance data, incurred cost data, number of species-per-area data and incurred pollution data of options for meeting human physical needs …

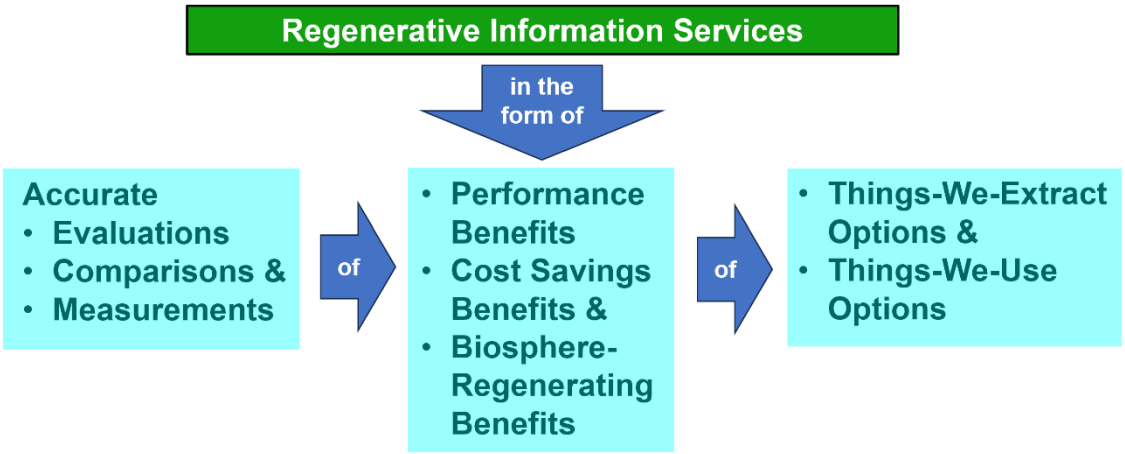
Regenerative Information Database & App

App Processes Data:		for Evaluating, Comparing & Measuring:	Human Physical Need Options
performance data	→	performance benefits	of Things-We-Extract Options for extracting: ➢ Forests ➢ Fresh Water ➢ Wildlife ➢ Soils ➢ Minerals from the biosphere
incurred cost data	→	cost savings benefits	
number of species-per-area data	→	biosphere-regenerating (increased # of species-per-area) benefits	
performance data	→	performance benefits	of Things-We-Use Options: ➢ Energy Options ➢ Water Options ➢ Materials & Chemicals Options ➢ Food & Fiber Options ➢ Manufactures & Structures Options
incurred cost data	→	cost savings benefits	
incurred pollution data	→	biosphere-regenerating (avoided pollution) benefits	

… and supplying people everywhere with "***regenerative information services***" in the form of:

- accurate evaluations, comparisons and measurements
- of performance benefits, cost savings benefits and biosphere-regenerating benefits
- of things-we-extract options and things-we-use options for meeting human physical needs

…



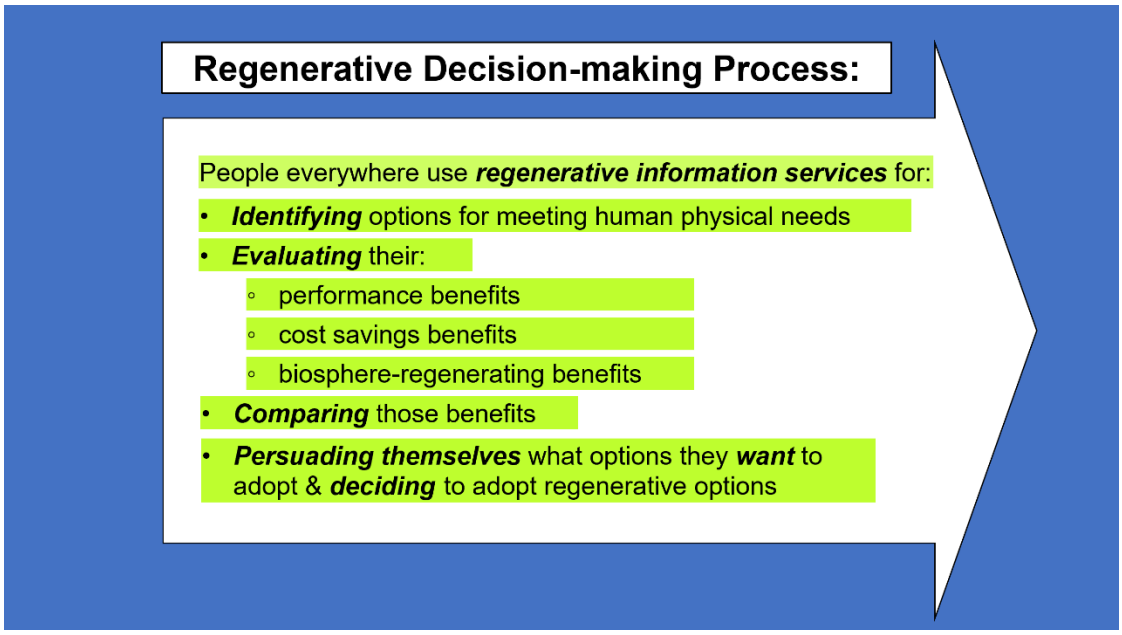
Third, I invented a revolutionary decision-making process – called "***regenerative decision-making***" – through which people everywhere use ***regenerative information services*** for …

… ***identifying*** options for meeting human physical needs …

… ***evaluating*** the performance benefits, cost savings benefits and biosphere-regenerating benefits of those options …

… ***comparing*** those benefits …

… ***persuading themselves*** what options they ***want*** to adopt …



… and ***deciding*** to adopt "***regenerative options***" that deliver measurable performance benefits for meeting human physical needs, measurable cost savings benefits for delivering beneficial social impacts, and measurable biosphere-regenerating benefits for reversing the planet's ecological crises as a whole …

A **regenerative option** that people everywhere ***want*** to adopt:

① Delivers performance benefits	because it meets a human physical need
② Delivers cost savings benefits	because it avoids more costs than it incurs
③ Delivers biosphere-regenerating benefits	because it's a things-we-extract option that increases the number of species in an area, or because it's a things-we-use option that avoids more pollution than it incurs

Fourth, I invented a simple Observe – Orient – Decide – Act (OODA) feedback loop – called a "***regenerative OODA loop***" -- through which people everywhere …

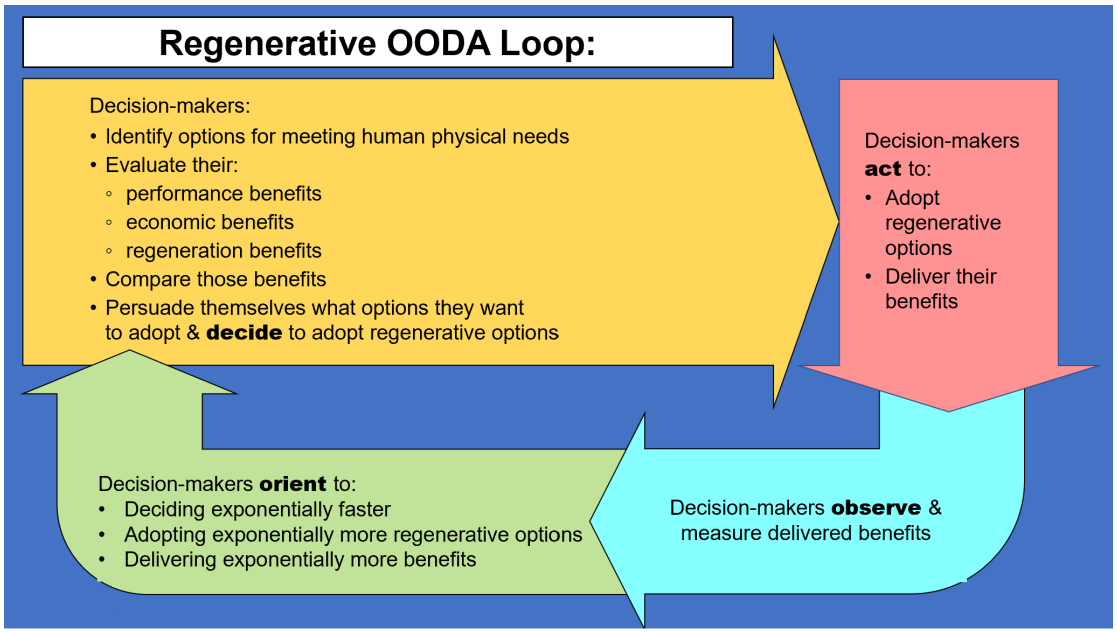
… ***observe*** and measure the benefits actually delivered by the adopted regenerative options

… ***orient*** to deciding exponentially faster to adopt exponentially more regenerative options for delivering exponentially more benefits

… ***decide exponentially faster*** to adopt exponentially more regenerative options

… ***act exponentially faster*** to adopt exponentially more regenerative options and deliver exponentially more benefits

… ***observe*** and measure the benefits delivered by the recently-adopted regenerative options, and ***cycle again*** through the regenerative OODA loop.

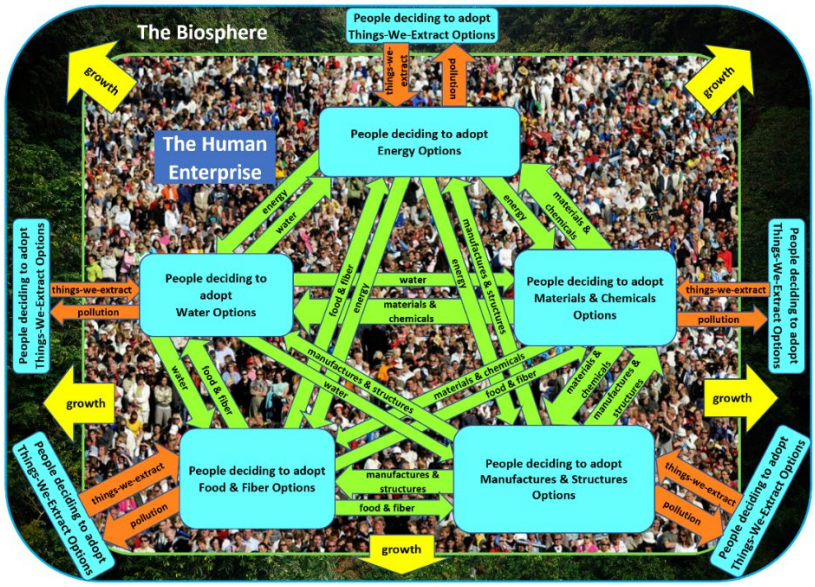


Through a simple regenerative decision-making process within a simple regenerative OODA loop, people everywhere ***decide exponentially faster*** to adopt regenerative options at the exponential rate required for reversing the ecological crises as a whole and delivering beneficial social impacts on a scale of ***$97 trillion*** of avoided cost savings.

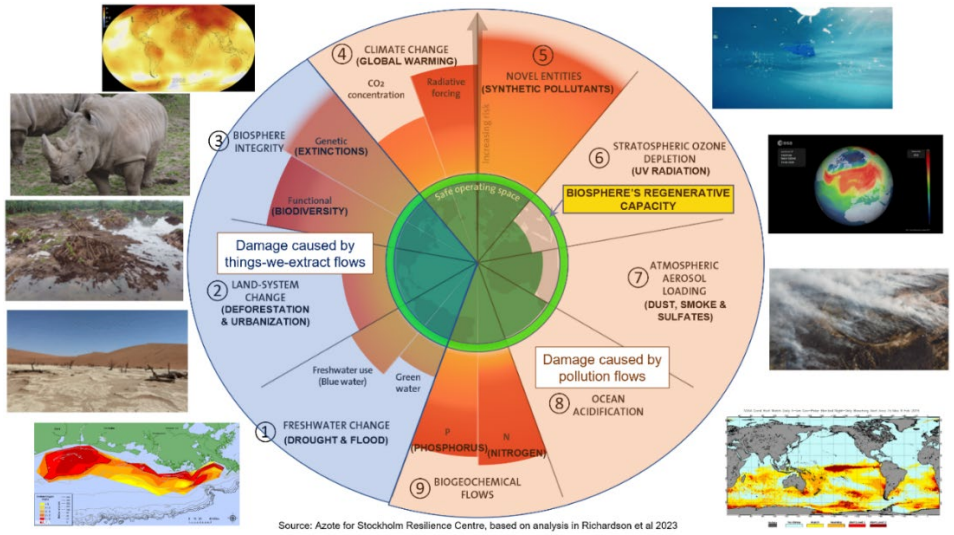
* * * *

3.0 Regenerative information technology delivers beneficial ecological impacts for reversing the ecological crises

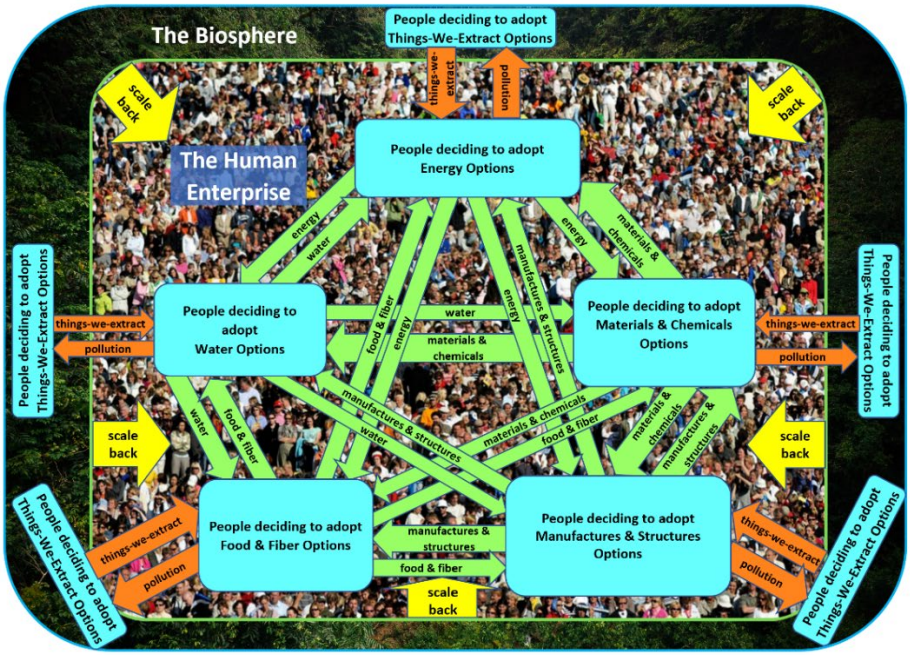
People everywhere making decisions for meeting human physical needs (in turquoise) are creating exponentially growing things-we-extract flows and pollution flows (in orange) that are damaging the biosphere (in deep green) faster than the biosphere can regenerate itself …



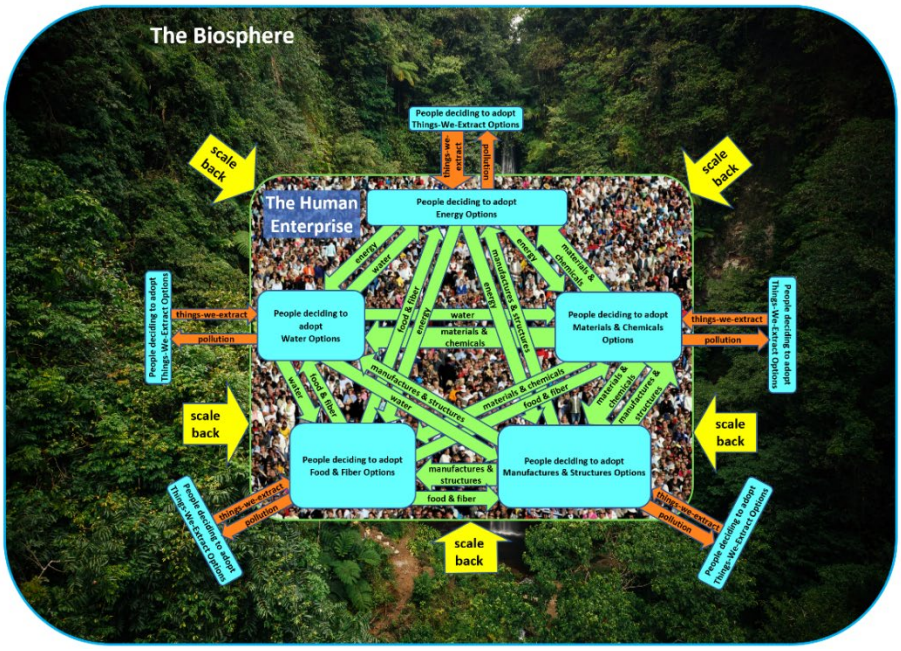
This exponentially-growing damage to the biosphere as a whole is showing up as the nine planet-scale ecological crises identified by the Stockholm Resilience Centre …



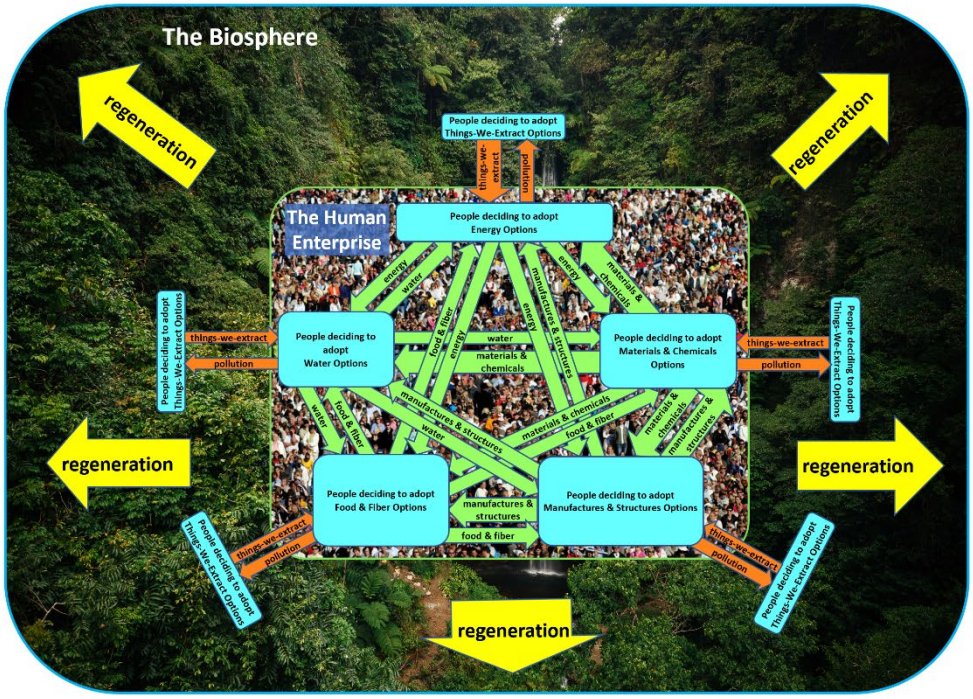
People everywhere using ***regenerative information technology*** – for ***wanting, deciding & acting*** to adopt regenerative options (in turquoise) that deliver biosphere-regenerating benefits -- ***scales back*** (in yellow) the things-we-extract flows and pollution flows (in orange) …



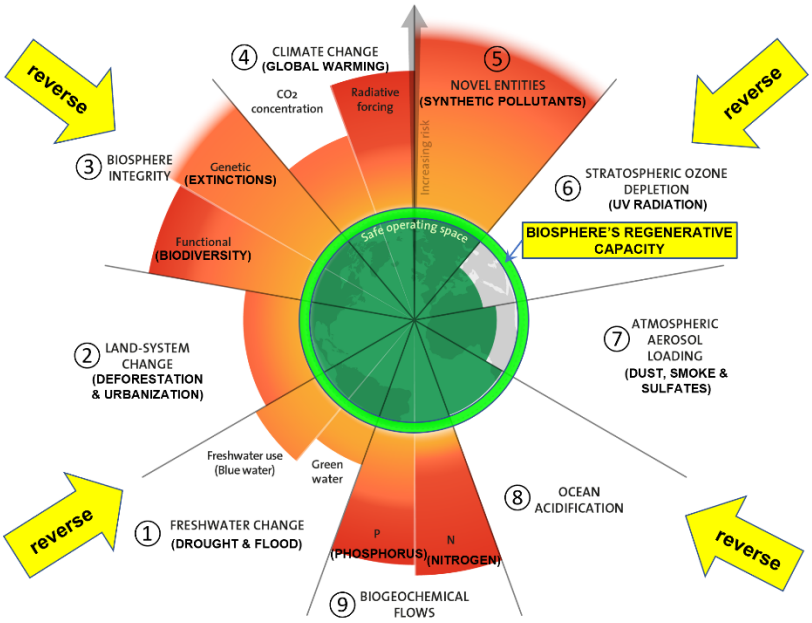
… and, at the same time, ***keeps intact*** the things-we-extract flows (in orange) and things-we-use flows (in chartreuse) for meeting every human being's physical needs …



… which ***allows*** the biosphere (in deep green) to ***regenerate*** itself (in yellow) as a whole …



… and ***allows*** the biosphere's regenerative capacity (in bright green) to ***reverse*** (in yellow) the ecological crises (in orange) as a whole …



Source: Azote for Stockholm Resilience Centre, based on analysis in Richardson et al 2023

… and meet the physical needs of ***all*** its living beings -- including its human beings -- as a whole

…

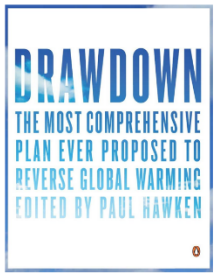
Source: Azote for Stockholm Resilience Centre, based on analysis in Richardson et al 2023

* * * *

4.0 Regenerative information technology delivers beneficial social impacts on a scale of $97 trillion

What's the scale of beneficial social impacts delivered through regenerative information technology?

Project Drawdown showed the present-day availability of 93 categories of regenerative options that – when widely adopted – were estimated to deliver more than ***$97 trillion of avoided cost savings*** (cost savings benefits) and more than ***1 trillion tons of avoided greenhouse gas (GHG) pollution*** (biosphere-regenerating benefits)…



93 categories of regenerative options

> $97 trillion of avoided cost savings

> 1 trillion tons of avoided pollution

sources: https://drawdown.org/solutions/table-of-solutions/
and https://earth.org/project-drawdown

Through people everywhere using regenerative information services for adopting regenerative options, regenerative information technology delivers ***beneficial social impacts*** – on a scale of ***$97 trillion*** of avoided cost savings – to people everywhere who use regenerative information services.

* * * *

5.0 Regenerative information technology presents an entrepreneurial opportunity on a scale of $2 trillion

Today -- in this very moment -- the living planet is calling for entrepreneurs to ***found an enterprise*** that builds the regenerative information technology required for reversing the ecological crises as a whole.

What is the opportunity for entrepreneurs who found such an enterprise?

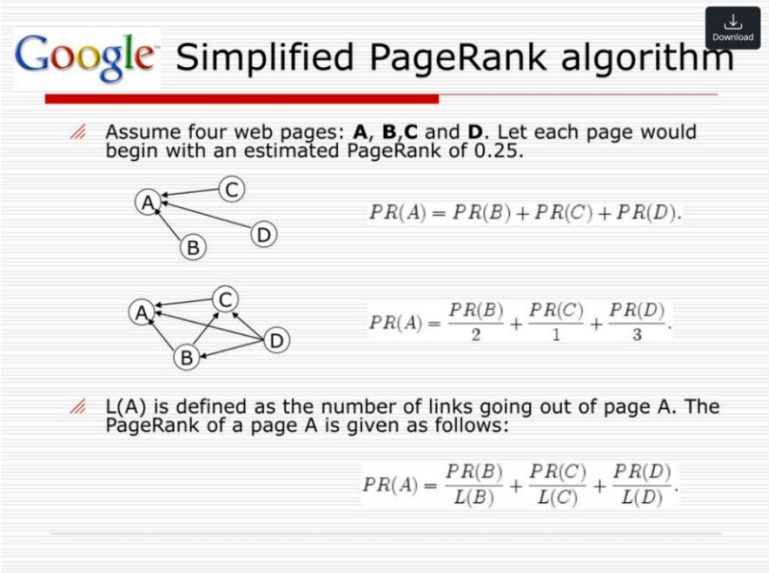
For such entrepreneurs, founding such an enterprise presents an opportunity as simple and uniquely valuable as the invention of Google Search in 1997.

Founding such an enterprise presents such an opportunity because regenerative information technology – using the Regenerative Information Algorithm – is as ***simple*** as Google Search using the Google PageRank Algorithm.

Regenerative information technology presents such an opportunity because both the Regenerative Information Algorithm and the Google PageRank Algorithm are ***simple algorithms*** for processing vast amounts of data into usable information for people everywhere.

The Google PageRank Algorithm – as invented by Larry Page and Sergey Brin[1] – is a simple link analysis algorithm for assigning a numerical weighting – to vast numbers of web pages – that measures the relative importance of each web page for supplying people everywhere with usable search services …

[1] S. Brin & L. Page, "The anatomy of a large-scale hypertextual Web search engine," Computer Networks and ISDN Systems 30 (1998) 107-117.



Like the simple Google PageRank Algorithm, the simple Regenerative Information Algorithm …

Regenerative Information Algorithm

Incurred cost (per unit of physical performance supplied or saved) of a things-we-extract option	(minus)	Avoided cost (per unit of physical performance supplied or saved) of a things-we-extract option	(equals)	Cost savings benefit of a things-we-extract option
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Number of species-per-area after adoption of a things-we-extract option	(minus)	Number of species-per-area before adoption of a things-we-extract option	(equals)	Biosphere-regenerating benefit of a things-we-extract option
Incurred pollution (per unit of physical performance supplied or saved) of a things-we-use option	(minus)	Avoided pollution (per unit of physical performance supplied or saved) of a things-we-use option	(equals)	Biosphere-regenerating benefit of a things-we-use option

… processes vast amounts of:

- performance data
- incurred cost data
- # of species-per-area data for things-we-extract options, and
- incurred pollution data for things-we-use options

… and supplies people everywhere with usable information (that is, ***regenerative information services***) in the form of:

- accurate evaluations, comparisons and measurements
- of performance benefits, cost savings benefits and biosphere-regenerating benefits
- of things-we-extract options and things-we-use options for meeting human physical needs.

* * * *

Founding such an enterprise -- that builds the regenerative information technology required for reversing the ecological crises as a whole – presents an opportunity as ***uniquely valuable*** as the invention of Google Search in 1997 because regenerative information technology is as ***uniquely valuable*** as Google Search.

Google Search –using the Google PageRank Algorithm -- supplies uniquely valuable information search services because:

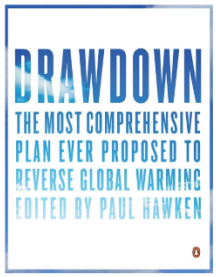
- Google Search – using the Google PageRank Algorithm – supplies information search services usable by people everywhere, and
- Google Search – using the Google PageRank Algorithm -- supplies the core information search services through which Alphabet (Google) has built a **$2 trillion** business enterprise as of May 2025.

Just as Google Search supplies people everywhere with ***uniquely valuable information search services***, so does regenerative information technology supply people everywhere with ***uniquely valuable regenerative information services*** for adopting regenerative options that deliver performance benefits, cost savings benefits and biosphere-regenerating benefits.

* * * *

What's the scale of value supplied by regenerative information services?

Paul Hawken's *Project Drawdown* showed the present-day availability of 93 categories of regenerative options that – when widely adopted – were estimated to deliver more than ***$97 trillion of avoided cost savings*** (cost savings benefits) and more than ***1 trillion tons of avoided greenhouse gas (GHG) pollution*** (biosphere-regenerating benefits)…



93 categories of regenerative options

> $97 trillion of avoided cost savings

> 1 trillion tons of avoided pollution

sources: https://drawdown.org/solutions/table-of-solutions/
and https://earth.org/project-drawdown

Rounding up the scale of avoided cost savings – delivered by regenerative options – from ***$97 trillion*** to ***$100 trillion***[2]…

… and multiplying the scale of avoided cost savings by **$2** spent on regenerative information services to gain **$100** of avoided cost savings …

… equals a ***$2 trillion*** scale of value for regenerative information services …

$100 trillion scale of avoided cost savings from regenerative options × (**$2** spent on regenerative information services / to gain **$100** of avoided cost savings) = **$2 trillion** scale of value for regenerative information services

[2] Rounding up the Project Drawdown avoided cost savings figure from ***$97 trillion*** to ***$100 trillion*** is justified because Project Drawdown selectively studied only 93 categories of regenerative options from among thousands of categories of options for meeting human physical needs.

In other words, simple regenerative information services present an entrepreneurial opportunity as ***uniquely valuable*** – on a scale of ***$2 trillion*** – as the ***$2 trillion*** value of the Google enterprise built on the information search services supplied through Google Search.

In the words of Ben Silbermann, "If Google teaches you anything, it's that small ideas can be big."

* * * *

Founding an enterprise -- that builds the regenerative information technology required for reversing the ecological crises – presents an opportunity as ***simple*** and ***uniquely valuable*** as the invention of Google Search because regenerative information technology is as ***simple*** and ***uniquely valuable*** as Google Search.

* * * *

6.0 Regenerative information technology creates tens of thousands of career opportunities

Regenerative information technology creates tens of thousands of career opportunities[3] for people with training, skills and experience in the following disciplines:

Physical Sciences

Designing, building, testing and operating units-of-physical-performance databases & apps for evaluating performance benefits of things-we-extract options and things-we-use options for meeting human physical needs

Designing, building, testing and operating incurred-pollution-per-unit-of-physical-performance databases and apps for evaluating biosphere-regenerating benefits of things-we-use options for meeting human physical needs

Natural Sciences

Designing, building, testing and operating units-of-physical-performance databases & apps for evaluating performance benefits of things-we-extract options and things-we-use options for meeting human physical needs

Designing, building, testing and operating number-of-species-per-area databases and apps for evaluating biosphere-regenerating benefits of things-we-extract options for meeting human physical needs

Evaluating, comparing and measuring cumulative impacts of biosphere-regenerating benefits for reversing the ecological crises as a whole

[3] This figure is derived from Google's professional workforce of 182,975 employees as of February 2025.

Cost Accounting

Designing, building, testing and operating incurred-cost-per-unit-of-physical-performance databases and apps for evaluating cost savings benefits of things-we-extract options and things-we-use options for meeting human physical needs

Information Sciences

Designing, building, testing and using regenerative information databases and apps for evaluating performance benefits, cost savings benefits and biosphere-regenerating benefits of things-we-extract options and things-we-use options for meeting human physical needs

Psychology

Applying psychological science – specifically the cognitive psychology of human decision-making and human decision-making processes – for adapting regenerative information databases and apps to people's informational and decision-making needs

Regenerative Option Innovation

Applying regenerative information services for innovating regenerative options that deliver more performance benefits, more cost savings benefits and more biosphere-regenerating benefits

Regenerative Consulting Services

Designing, building, testing and operating regenerative information databases and apps for use with regenerative consulting services

Regenerative Financial Services

Designing, building, testing and operating regenerative information databases and apps for use with regenerative financial services

Regenerative Information Technology Enterprise

Performing managerial and other business functions of a large enterprise for building regenerative information technology and delivering regenerative information services, including:

- governance and administration
- marketing and sales
- customer services
- finance and accounting
- enterprise information systems
- human resources
- communications and public relations
- investor relations

* * * *

7.0 Operational Plan and Budget

A provisional operational plan and budget for a regenerative information technology enterprise might look this:

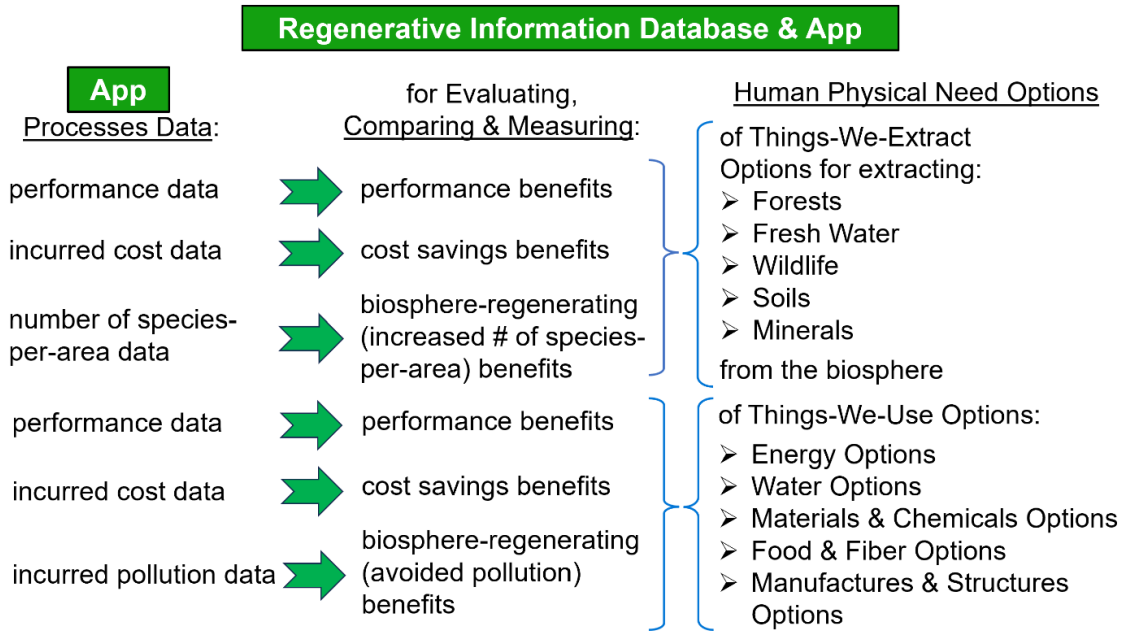
First, build a core management team composed of individuals with skills and experience in:

- founding, organizing and operating a very large information technology enterprise, and
- designing, building, testing and operating a very large database and applications for supplying regenerative information services to people everywhere

To build the core management team, the enterprise will be guided by this principle expressed by Steve Jobs:

> When you're in a start-up, the first ten people will determine whether the company succeeds or not. Each is 10 percent of the company. So why wouldn't you take as much time as necessary to find all the A players? If three were not so great, why would you want a company where 30 percent of your people are not so great? A small company depends on great people much more than a big company does.

Second, the core management team will design, test and implement a work process and a work plan for designing, building, testing and operating the very large regenerative information database and applications for supplying regenerative information services to people everywhere …



In a project of this scale, the potential is enormous for mistakes, conflicts, complexity, delays, overruns and waste in the designing, building, testing and operation of the very large regenerative information database and applications. To mitigate those risks, the design, testing and implementation of the work process and work plan is critical to the success of the enterprise.

Third, a budget for the regenerative information technology enterprise will depend on the work process and work plan developed by the core management team during the initial phase of the enterprise's operations.

A provisional budget for the enterprise might look like this:

Working from a nominal ***$2 trillion*** value for the successful regenerative information services enterprise (per Section 5.0), a nominal budget for designing, building, testing and operating a regenerative information database and app might look like 1% of that nominal $2 trillion value, or ***$20 billion***.

Such a nominal $20 billion budget – for designing, building, testing and operating a regenerative information database and app – might fund the salaries & overhead of a workforce of 100,000 people[4] at a nominal salary & overhead of $200,000 per capita.

Working from a nominal ***$20 billion*** budget for designing, building, testing and operating the regenerative information database and app, a nominal budget for designing, testing and implementing the work process and work plan – during the initial phase of the enterprise's operations -- might look like .1% of that nominal $20 billion budget, or ***$20 million***.

Such a nominal ***$20 million*** budget – for designing, testing and implementing the work process and work plan – might fund the salaries & overhead of a workforce of 50 people at a nominal salary & overhead of $400,000 per capita.

* * * *

[4] Such a nominal workforce of 100,000 people is on a scale with Google's professional workforce of 182,975 employees as of February 2025.

8.0 Management

Erik Kvam, Founder and Interim CEO, is a generalist and writer in the fields of energy transition and reversing global warming. He has law degrees from Georgetown University and New York University, a Masters of Science degree from Columbia University's School of Engineering and Applied Sciences, and an undergraduate degree in Finance and Economics from the University of Wisconsin-Madison. You can subscribe to his Substack channel, Solving the Eco-crises, at https://erikkvam.substack.com.

Appendix: A first-ever problem statement for solving and reversing the ecological crises as a whole

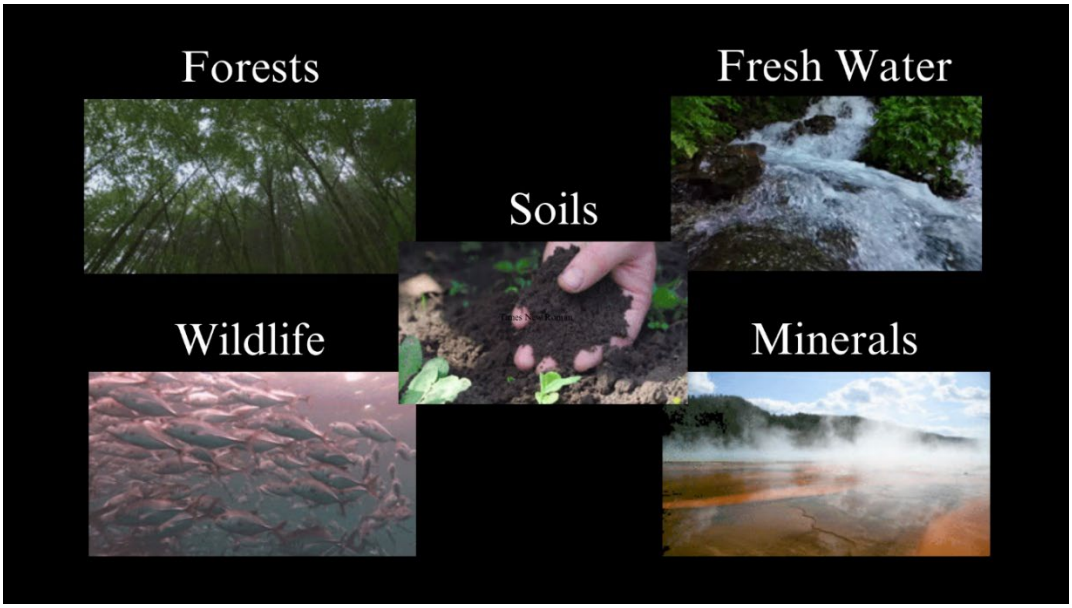
People everywhere making decisions for meeting human physical needs are creating the ecological crises.

Human decision-making for meeting human physical needs -- which may be called "the Human Enterprise"[5] -- may be depicted as …

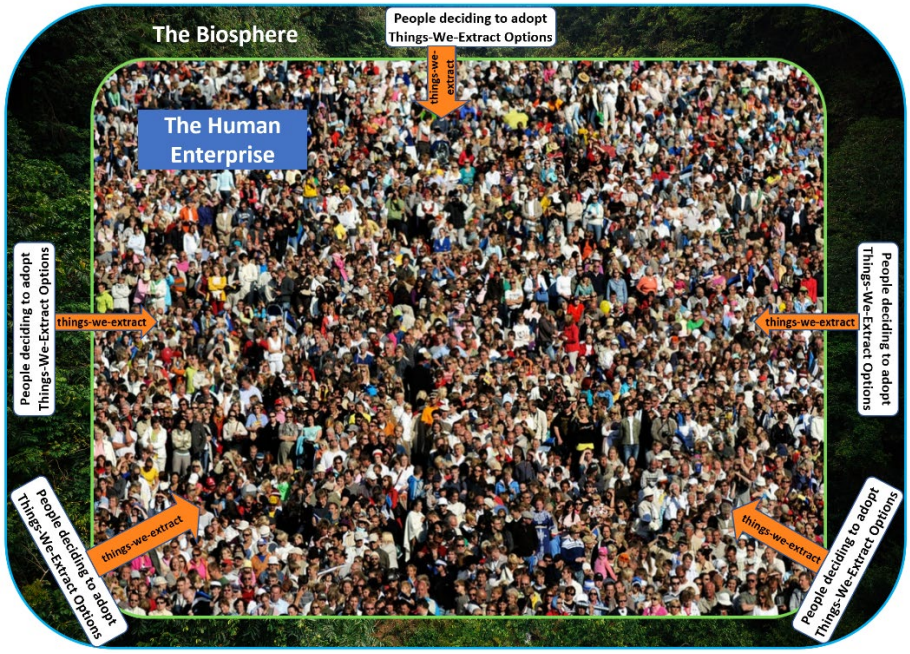
… the sum of people everywhere ***deciding to extract physical things*** (in turquoise) from the biosphere (in deep green) …

[5] Biologist Paul Ehrlich used the expression -- "the human enterprise" -- to capture the entirety of human activities in relation to the biosphere: "To rescue the human enterprise in the long run requires strong action in the short run directed toward saving biodiversity and bringing the human enterprise within sustainable limits."

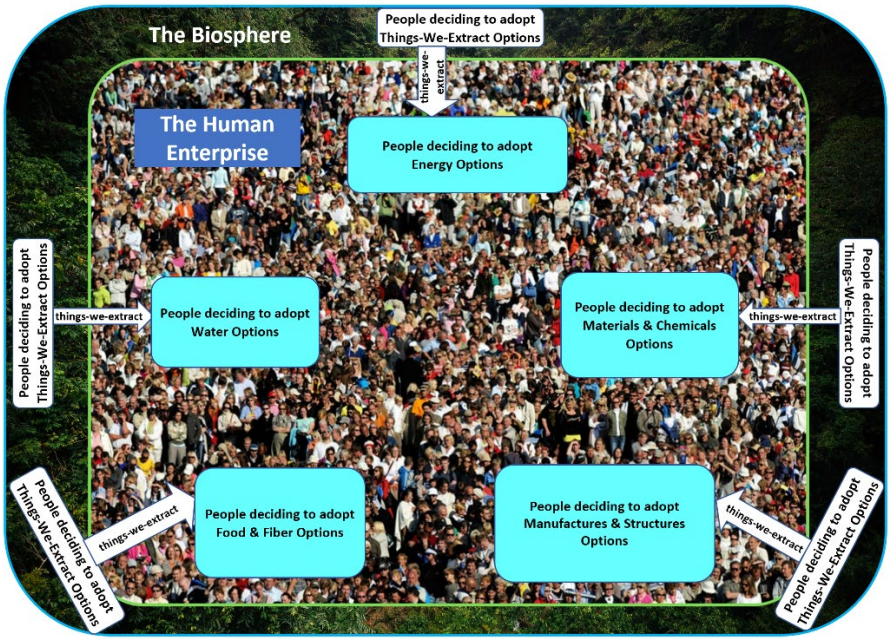
… things like forests, fresh water, wildlife, soils and minerals -- that may be called the "things-we-extract" …



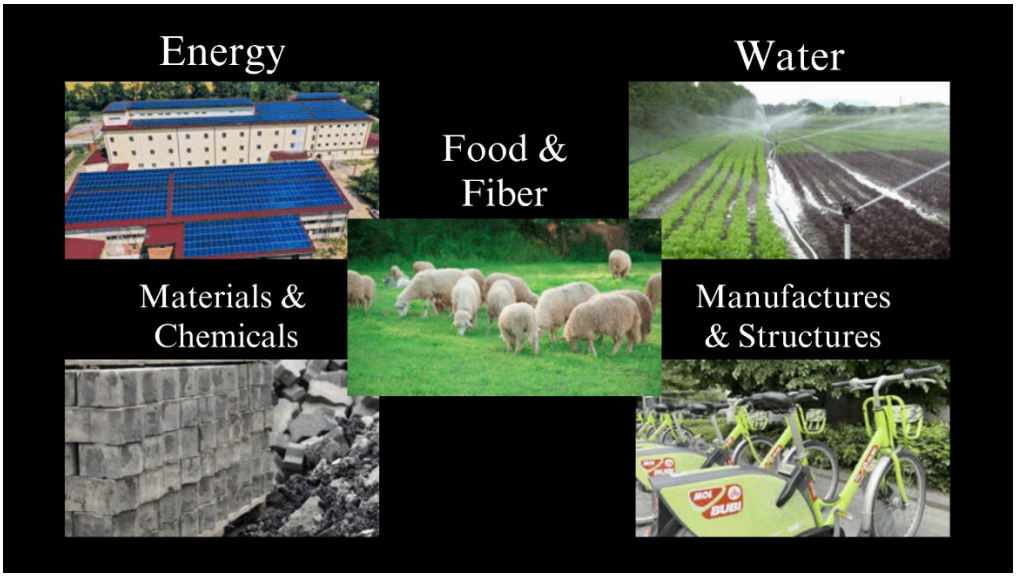
… plus all the ***physical flows of all those things-we-extract*** (in orange) – things like forests, fresh water, wildlife, soils and minerals -- from the biosphere (in deep green) and into the Human Enterprise …



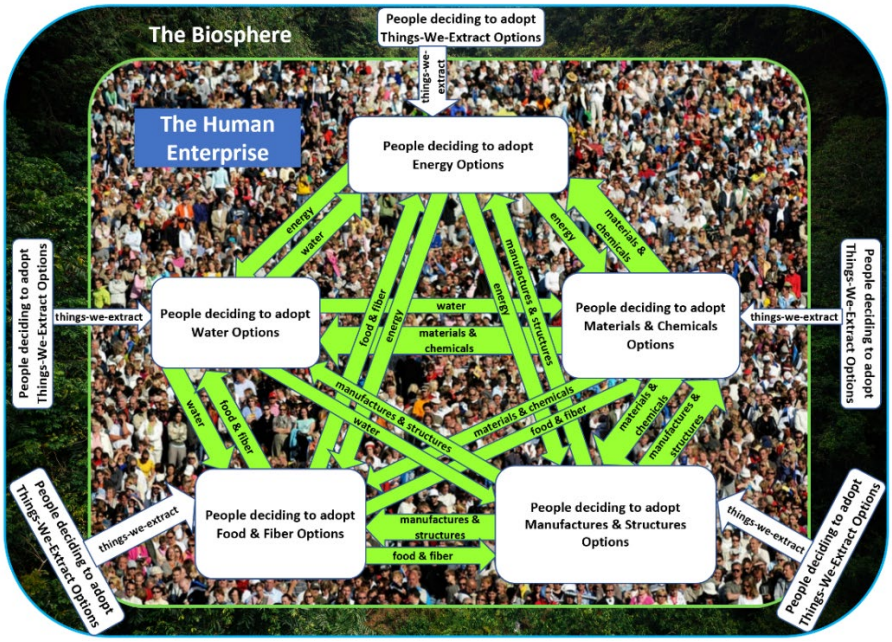
… plus people everywhere ***deciding to use all those things-we-extract*** (in turquoise) -- in the forms of energy, water, materials & chemicals, food & fiber and manufactures & structures …



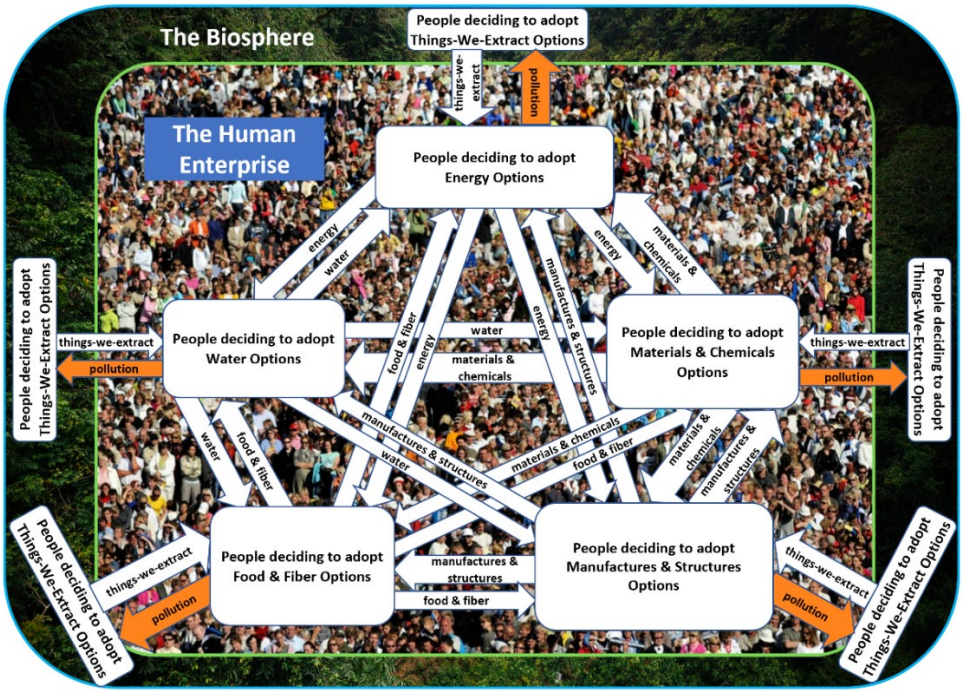
… things like energy, water, materials & chemicals, food & fiber and manufactures & structures that may be called the "things-we-use" …



… plus all the ***physical flows of all those things-we-use*** (in chartreuse) – things like energy, water, materials & chemicals, food & fiber and manufactures & structures -- ***within*** the Human Enterprise for meeting human physical needs …

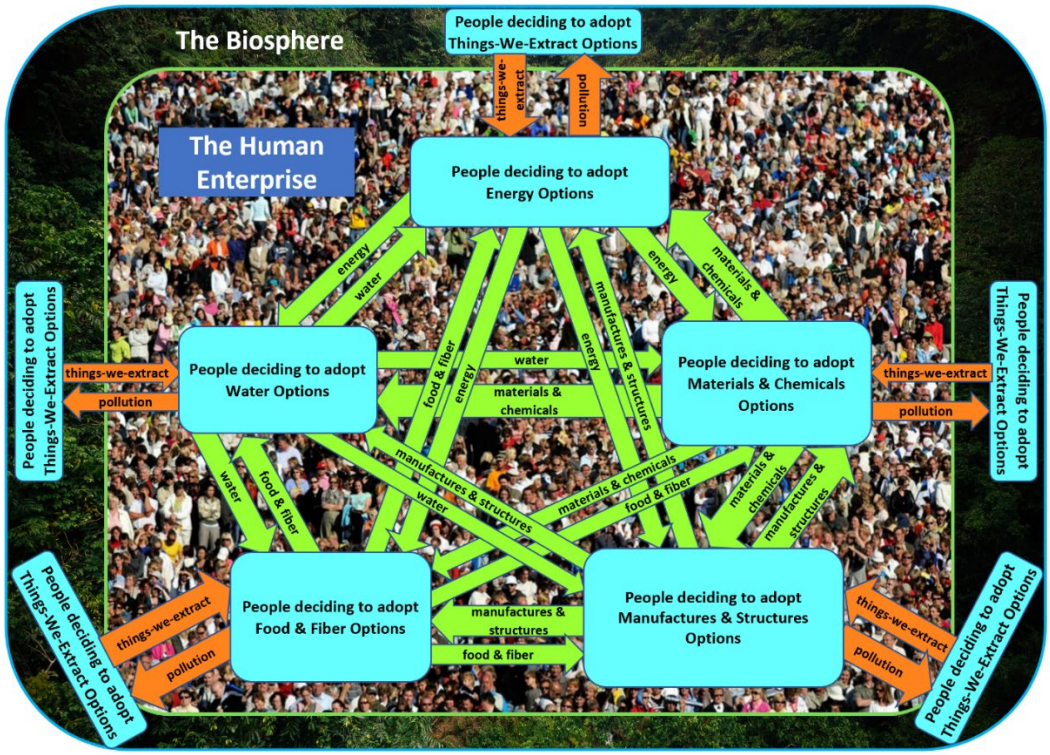


... plus all the ***physical flows of pollution*** from all those things-we-use (in orange) from the Human Enterprise back into the biosphere (in deep green) …

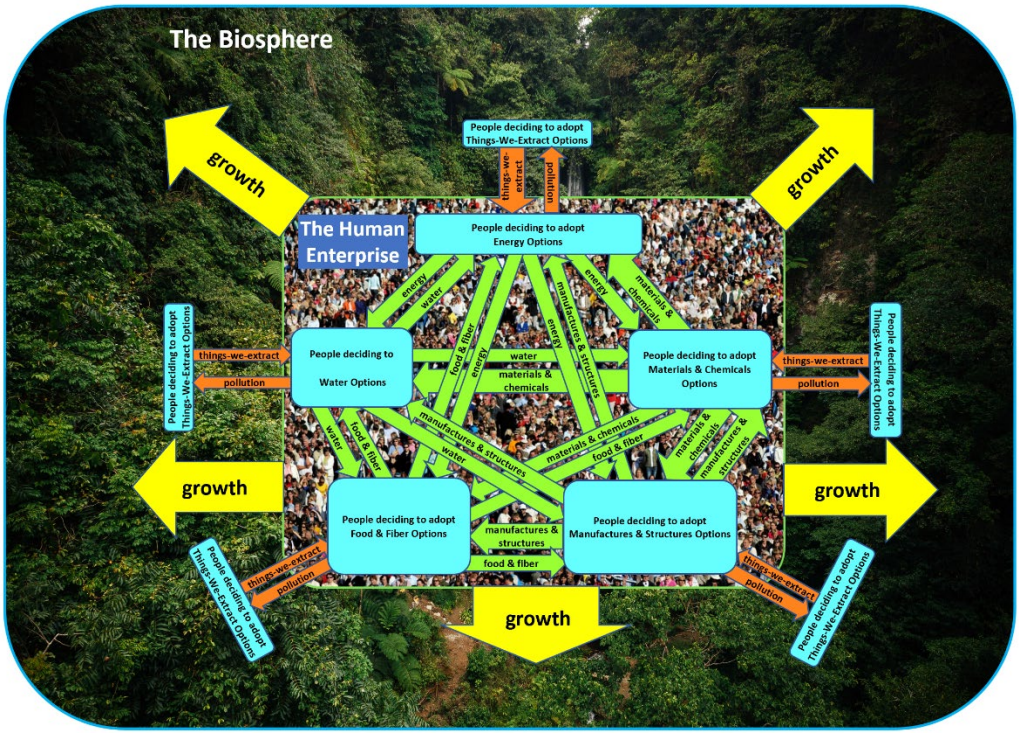


This simple "map" of the Human Enterprise depicts:

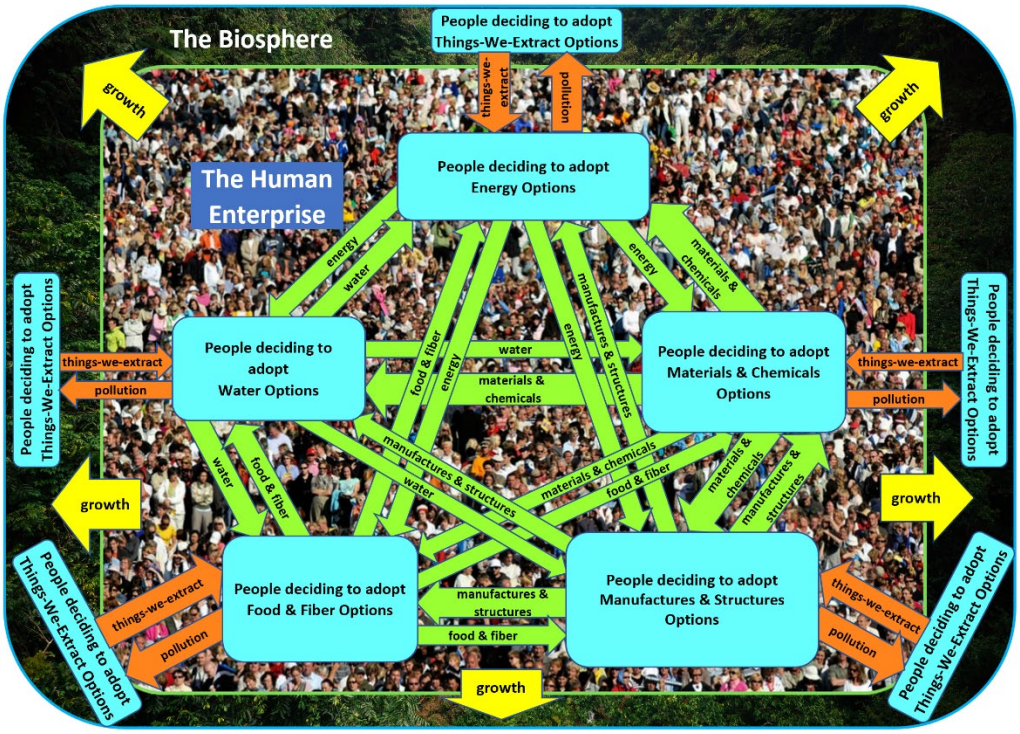
- people everywhere making decisions for meeting human physical needs (in turquoise), plus
- all the physical things-we-extract flows (in orange), physical things-we-use flows (in chartreuse) and physical pollution flows (in orange) created by people everywhere making decisions for meeting human physical needs …



The simple map of the Human Enterprise allows one to visualize that the ***exponential growth*** of the Human Enterprise (in yellow) …

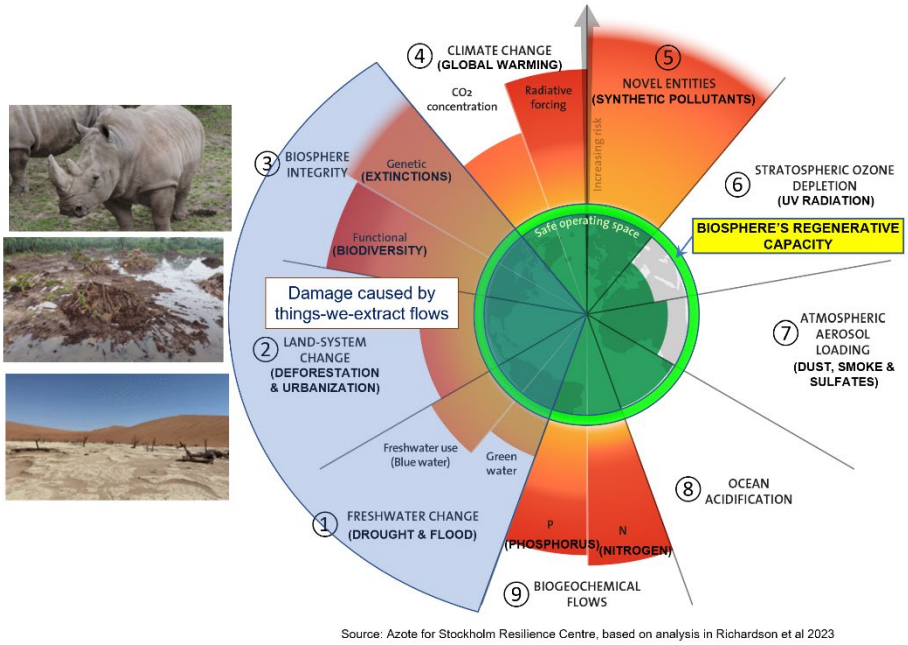


… has reached a point where the exponential damage to the biosphere (in deep green) from the exponentially growing things-we-extract flows and pollution flows of the Human Enterprise (in orange) is outstripping the biosphere's capacity to regenerate itself …



The exponential damage to the biosphere as a whole from the ***things-we-extract flows*** of the Human Enterprise is showing up (in blue-gray) as:

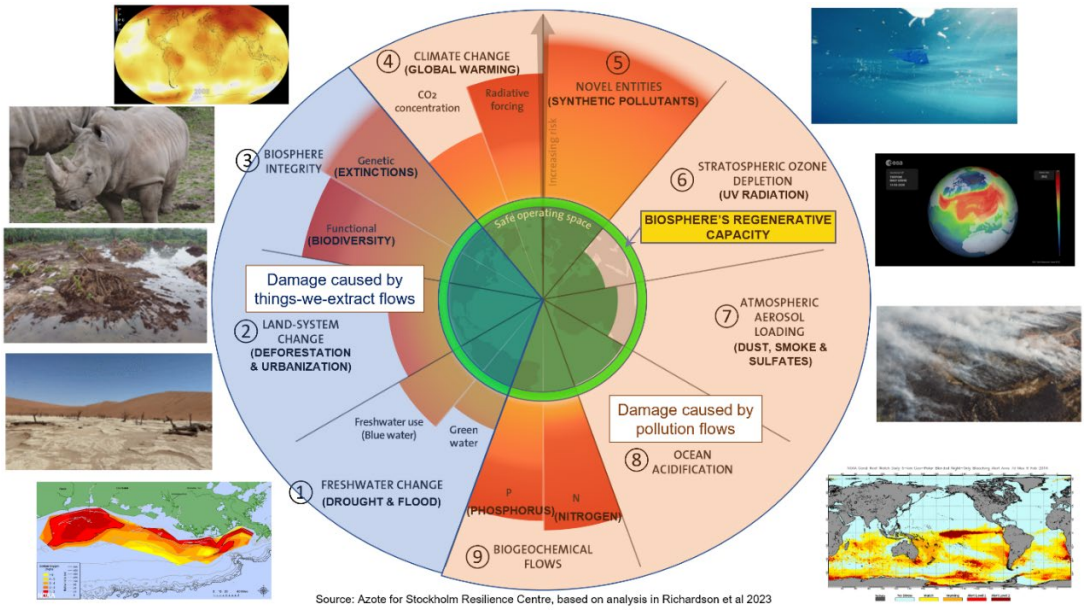
- eco-crises of freshwater drought and flood
- eco-crises of deforestation and urbanization, and
- eco-crises of species extinctions and biodiversity loss …



Source: Azote for Stockholm Resilience Centre, based on analysis in Richardson et al 2023

The ***exponential damage*** to the biosphere as a whole from the ***pollution flows*** of the Human Enterprise is showing up (in orange) as:

- eco-crises of global warming and climate change
- eco-crises of synthetic pollutants such as herbicides, pesticides and microplastics
- eco-crises of ozone layer depletion
- eco-crises of aerosol pollutants such as dust, smoke and sulfates
- eco-crises of ocean acidification, and
- eco-crises of phosphorus and nitrogen pollutants in rivers and coastal seas …



* * * *

The simple map of the Human Enterprise – depicting decision-making for meeting human physical needs that is creating the complex problem of the planet's ecological crises – allows one to apply the principle that ***the solution is embedded within the problem***.[6]

Defining the complex problem of the planet's ecological crises -- as being created by simple human decision-making depicted in the simple map of the Human Enterprise – allows one to solve the problem of the ecological crises:

- through the general process depicted in Section 3.0 for scaling back the things-we-extract flows & pollution flows and reversing the ecological crises as a whole, and
- through the specific process depicted in Section 2.0 through which people everywhere ***want, decide and act*** to adopt regenerative options at the exponential rate required for scaling back the things-we-extract flows & pollution flows.

[6] In the words of author Steven Pressfield:

> Problems seeking solutions. This is a very powerful way of thinking about the creative process. Implicit in this point of view is the idea that the answer already exists within the question, that ***the solution is embedded within the problem***. If your job is to find that solution, the first step is to define the problem … Define the problem and you're halfway to the solution.