sustainable development

Getting the picture…

Many books, many words are written on the subject of sustainable development. Too many? Not necessarily. They bring many perspectives, concerns and solutions. But how do they connect with each other and with us?

This publication has few words because we want to use a different language. We present a graphical description of the critical links between the natural, the economic and the social dimensions of our world.

Sustainable Development requires a holistic approach. This is not easy with books and words only. The preparation of the 2002 World Summit on Sustainable Development has revealed one more time how difficult it is to integrate different agendas and create a coherent strategy that inspires collective action.

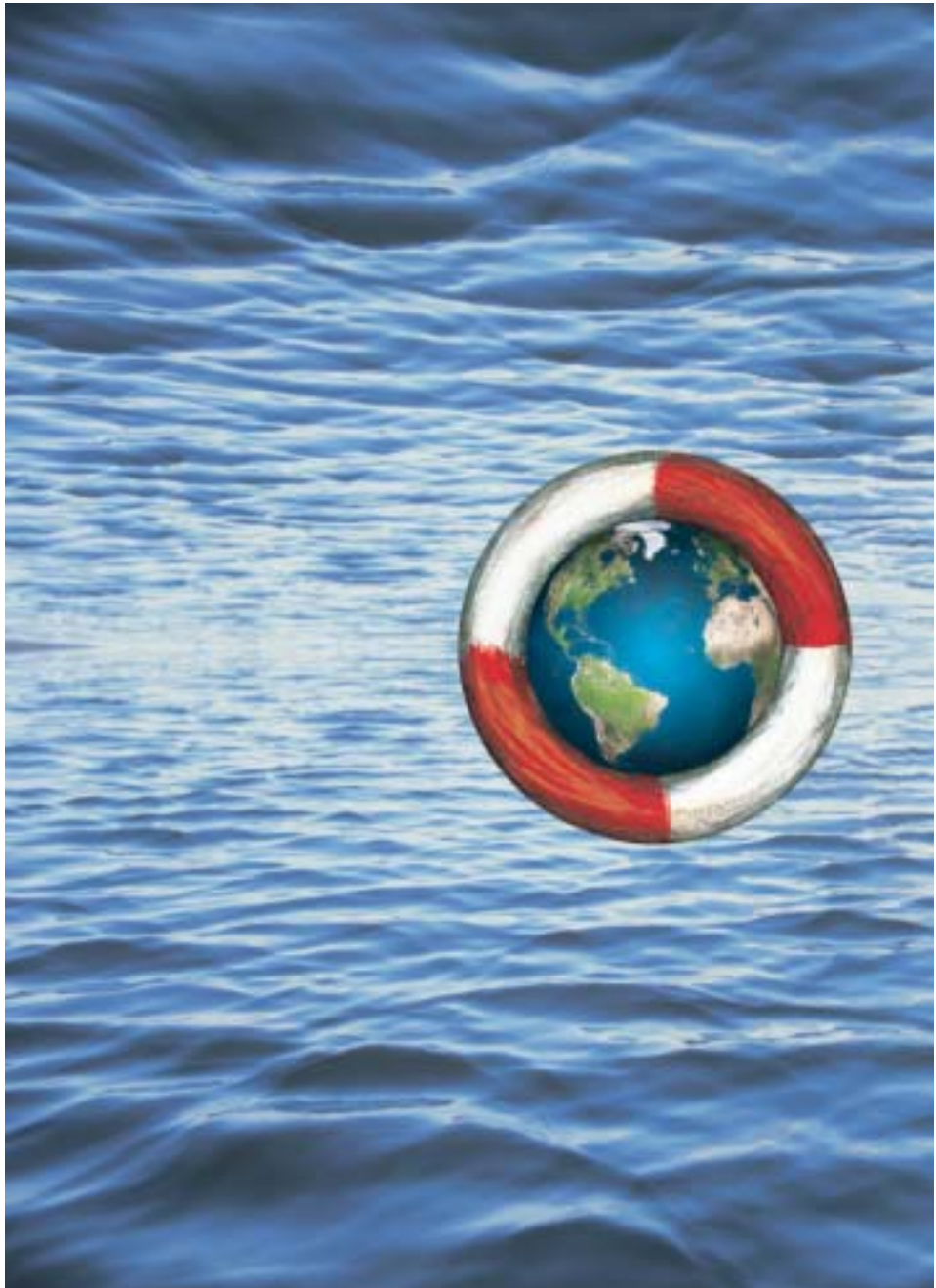
This publication is a map, a wiring diagram of the global challenges. Because the map is complex we take it in six steps, one layer at a time. The final complete picture will help you to understand how humanity is hooked on growth, how values or social tensions drive technology innovation, how production not only creates environmental degradation but also the social capacity for solutions…

This "learning" map was designed during a long conversation with three enthusiastic system thinkers. Dennis Meadows, Jørgen Randers and Khaled Saeed accepted an invitation by Dow Europe for a retreat at the American Academy of Berlin. There they shared their views about which elements would be necessary and sufficient to describe our world and how they influence each other. While system experts model connections and feedback loops with mathematical function we only used the simplest convention: The increase of one variable induces a decrease – or increase – of the connected variables. The minus or plus signs appear on each link in the map.

The commentary of the six layers avoids facts and statistics. But to bring words and facts back into the picture we refer to a list of major recent sources at the end of the publication.

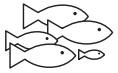
This is not a map of specific solutions. There is not yet any proven recipe to achieve sustainable development. But the map helps one realize that in a complex system, where no one is quite in charge, progress will only come through the cooperation of key system participants and beneficiaries. Together humanity must agree on a common purpose and manage change interdependently towards that purpose. While the map does not propose specific solutions, it indicates several rescue rings where connected innovation, actions and partnerships are needed.

Claude Fussler



The population engine

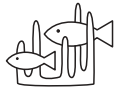
Our economy lives on a finite stock of materials formed through geological times. This constitutes an almost closed system – except for the heat and light it receives from the sun and the ability of humans to combine materials and intelligence with ever growing creativity …



Population
The world population continues to grow. From the current 6.2 billion it will reach 8 billion in less than 25 years.

Consumption
We will need more food and water, more housing, energy and all the goods and services that satisfy the needs of this growing population.

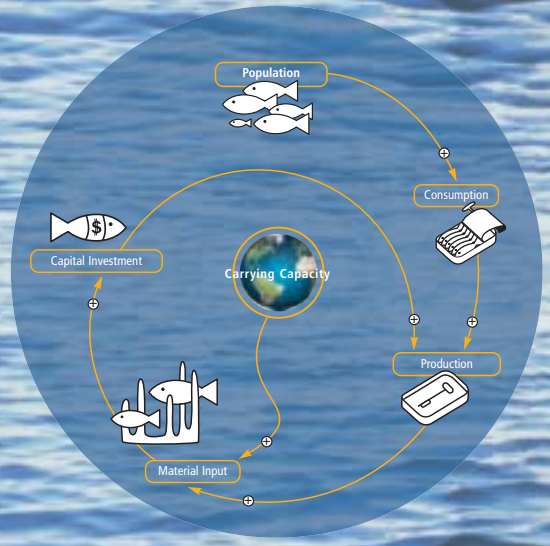
Production
We will occupy more space. Communities and cities, farms, factories and stores, roads and transport hubs will spread deeper into nature.



Material Input
This will draw more resources, fuels and minerals, wood, crops and fish from the earth. Our economy is material intensive. Just imagine how one cup of coffee with cream and sugar pulls a chain of supplies - packaging, transport, cultivation and land use, home appliances and dishes - that spans the globe.

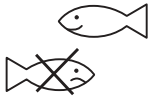
Carrying capacity
Many scientists therefore worry about the ability of our planet to carry this increased withdrawal and displacement of materials. Extraction and flows of many materials exceed the rate of natural replenishment and compete with the web of food chains that maintain the diversity of species in our ecosystem.

Capital Investment
The transformation of materials and distribution to the point of consumption require technology choices and a stream of financial investments to create and maintain the productive means of our economy.



Hooked on growth

Surplus wealth
Investors, public and private, are prepared to place their money into productive capacity because it generates wealth – consumers pay more for the goods they need than it costs producers to conceive, make and distribute them. At the country level this added wealth is aggregated into the Gross Domestic Product, the principal indicator of economic health and activity. Wealth creation is a function of a chain of demand and supply signals constantly swapped in the market.

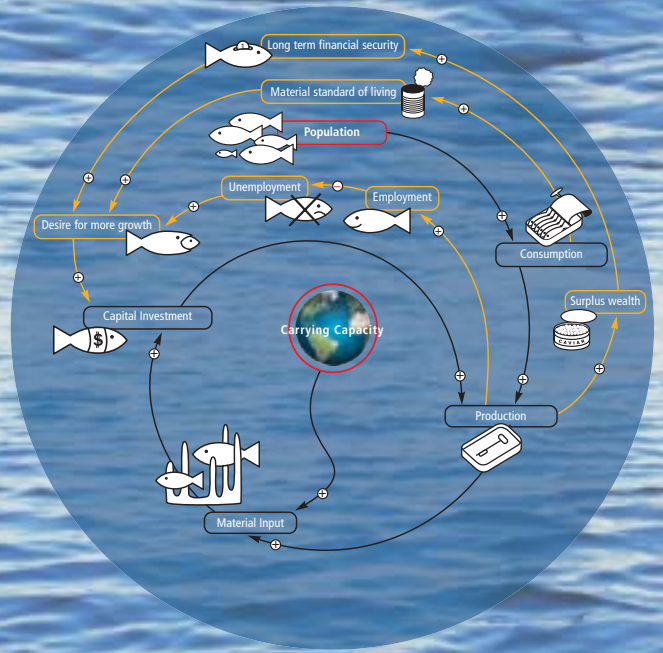


Employment - Unemployment
Production also creates employment in the sectors with growing prospects. It therefore absorbs the continuous stream of people reaching working age. The pressure to get a job is critical. Except for rare isolated subsistence economies a job-related wage provides access to consumption and relative freedom from needs. Unemployment benefits are also related to other workers ability to create enough value to redistribute a portion to those unable to get a job.

Financial security
We also live longer beyond working age. Our financial security always relates to the wealth creation in the economy, whether it is through our family or other workers' social contributions while we retire, or through the appreciation of our pensions schemes and private bank savings.

Standard of living
Consumption mainly contributes to quality of life. Beyond the satisfaction of basic and essential needs we also consume to fulfill dreams. Rituals of shopping, collecting and giving help us to become who we would like to be in the world as we see it. We have a cultural bias for consumption.

Desire for more growth
Our economy is therefore programmed for growth. As long as we have a growing population, rising life expectancy, more information and more dreams we will continue to invest in the means to produce more and better goods. Politicians will stimulate consumption to pursue full employment policies, with a cautious eye on inflation and capital productivity.

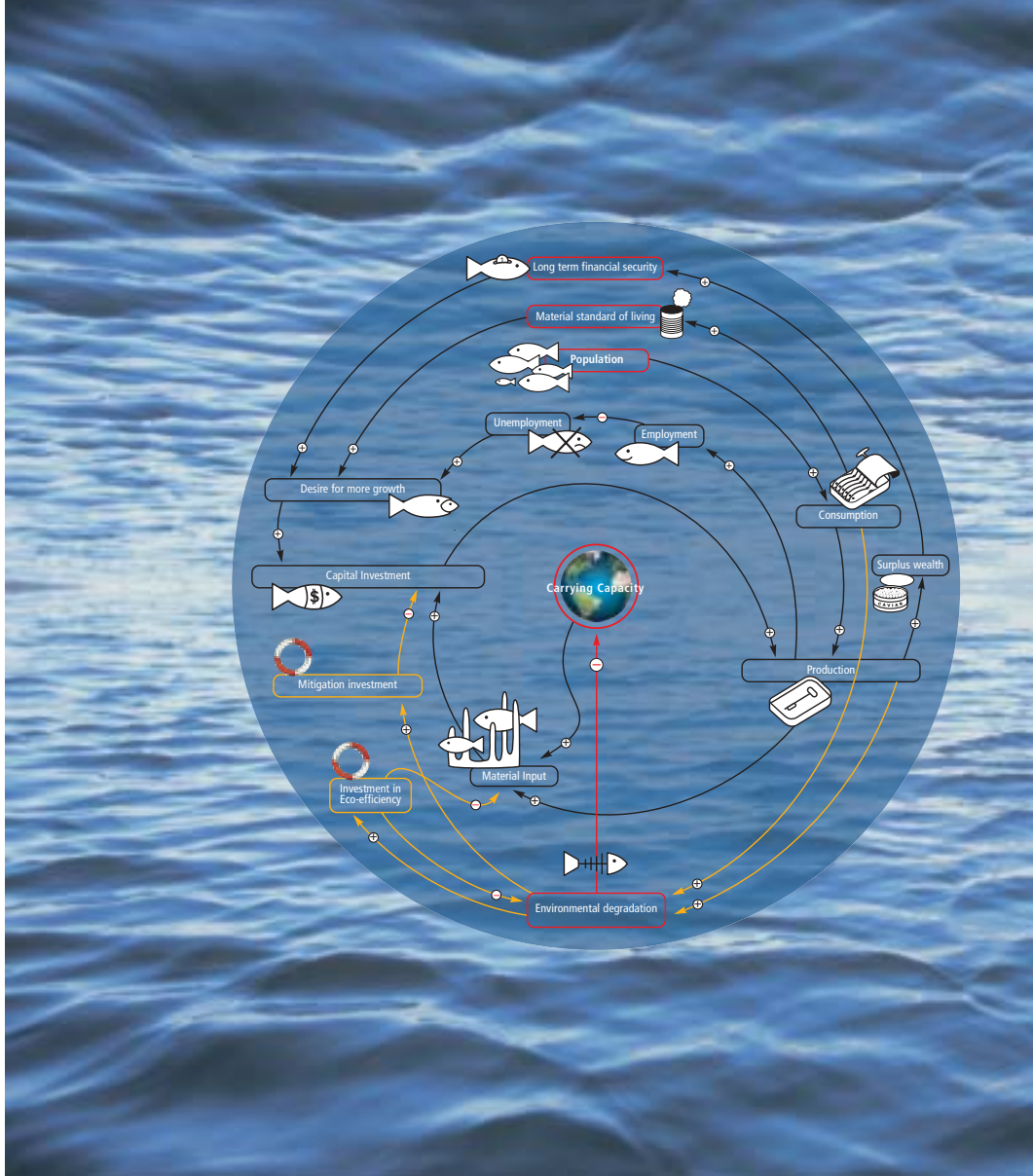


Running into limits

Environmental degradation
The debate over the carrying capacity of the earth will continue but even though many limits are uncertain and the consequences of breaking them are not clear it is already apparent that production and consumption growth are draining our ecosystems.

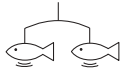
Mitigation
A significant amount of capital must therefore be diverted from productive use to clean up and protect the environment. The polluter pays principle is enforced in countries with functioning institutions, a mobilized public opinion and enough wealth creation. Others are locked in predatory production-consumption cycles.

Eco-efficiency
This strategy response designs waste and pollution out of the production-consumption cycle. The goal is to consume and produce differently to achieve the same standard of living with significantly less material input. The understanding of product life cycle impacts, innovation and design skills are essential to succeed in eco-efficiency. While it is the better approach it still eludes many sectors and producers.



We can’t succeed unless we all do

Average growth rate
Economic growth is the measure of progress most widely accepted. It uses a comparison of wealth created (GDP), period after period, divided by the number of people in the economy. Whatever the statistical intricacies and data gathering limitations, GDP per capita tries to reflects what an economy is doing for its citizens and how they keep getting ahead.



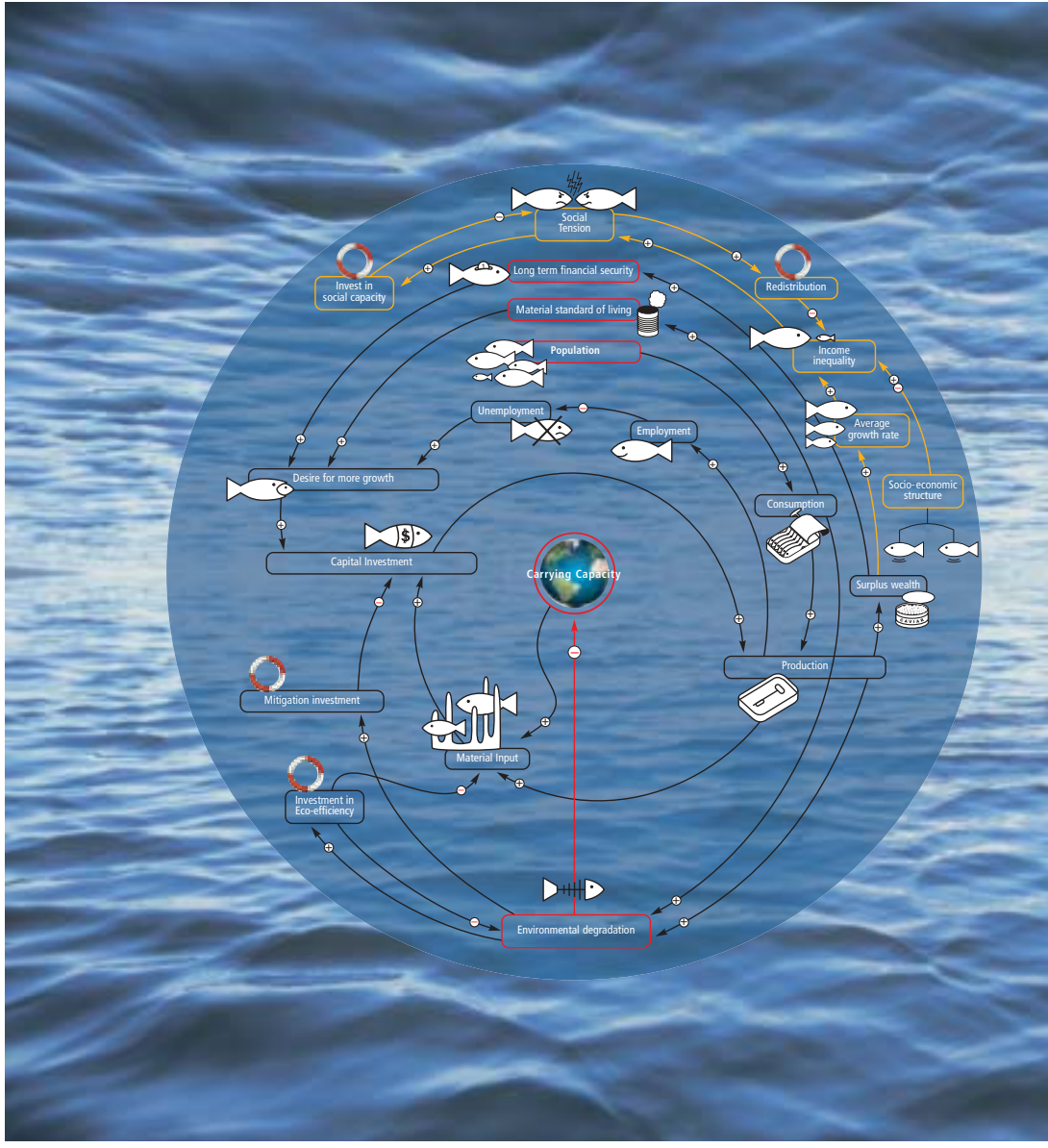
Socio-economic structure
But averages by definition level all distortions. There are very poor people in rich economies and very rich people in poor economies. The degree of individual rights, gender bias, access to justice, health services and higher education, create a deep-seated inertia in the pattern of social and economic progress.

Income inequality
While the world GDP trebled in the last 30 years the income inequalities between countries and within countries persisted. The trickle down effect from rich to poor is hard to detect. Income improvement, health and environmental standards have mainly benefited a minority of the world population.

Social tension
The world has therefore become a place where the richest 1% receives as much income as the bottom 57% and 78% of the population can be classified as poor by United Nations standards. Access to water, energy, sanitation, jobs and economic opportunities create acute tensions that increasingly drive migration, break out in local violence and challenge the prevailing global economic world order.

Redistribution
This strategy reduces tensions and creates social security nets through economic transfers within an economy. At the global level emergency relief and development assistance is also provided from the richest to the poorest. Redistribution, although justified on the basis of solidarity, tends to attenuate social tensions rather than attacking and eliminating the root causes.

Social capital
In this strategy part of the wealth created by the local and global economies is reinvested in eliminating the barriers to job opportunities, access to basic goods and services, justice, property, credit, etc. This is a daunting task as it concerns billions of people in different political and cultural environments. Like all investments, this will take time to bear fruits.



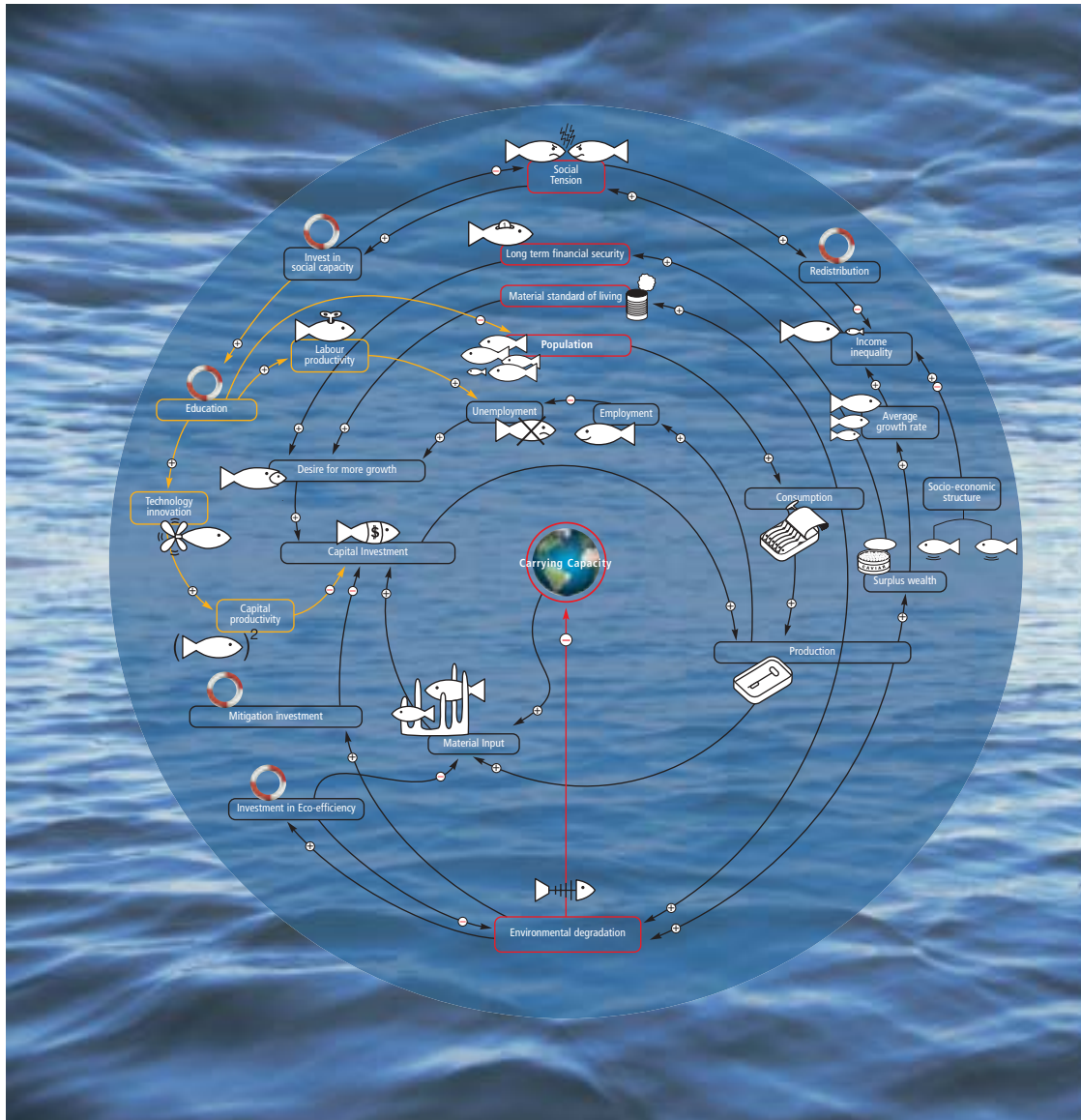
The power of creative knowledge

Education
Education equips all people to be productive workers, informed consumers, confident households, empowered citizens and positive contributors to the community. To increase social capacity one must invest in all forms of education and life long learning. Most important of all in the current context are health and environmental issues, system thinking and entrepreneurship. Educated households have higher income security and lower fertility rates.

Labor productivity
Educated labor has higher productivity - it produces more wealth per working hour. This can contribute to higher unemployment but it also contributes to more affordable goods and services.

Technology innovation
Education makes people more creative. It exposes them to knowledge, to multiple behaviors and models. Creativity is the ability to combine existing knowledge, behaviors and materials in ways not tried before. Turning these ideas into useful, replicable methods to make and distribute goods is the essence of technology innovation.

Capital productivity
Only technology innovation can enhance capital productivity. This is essential to produce a wealth surplus that can be allocated to build social capacity and social security nets, environmental mitigation and eco-efficiency development. Capital productivity and labor productivity are essential to produce quality goods and services affordable by the poor.



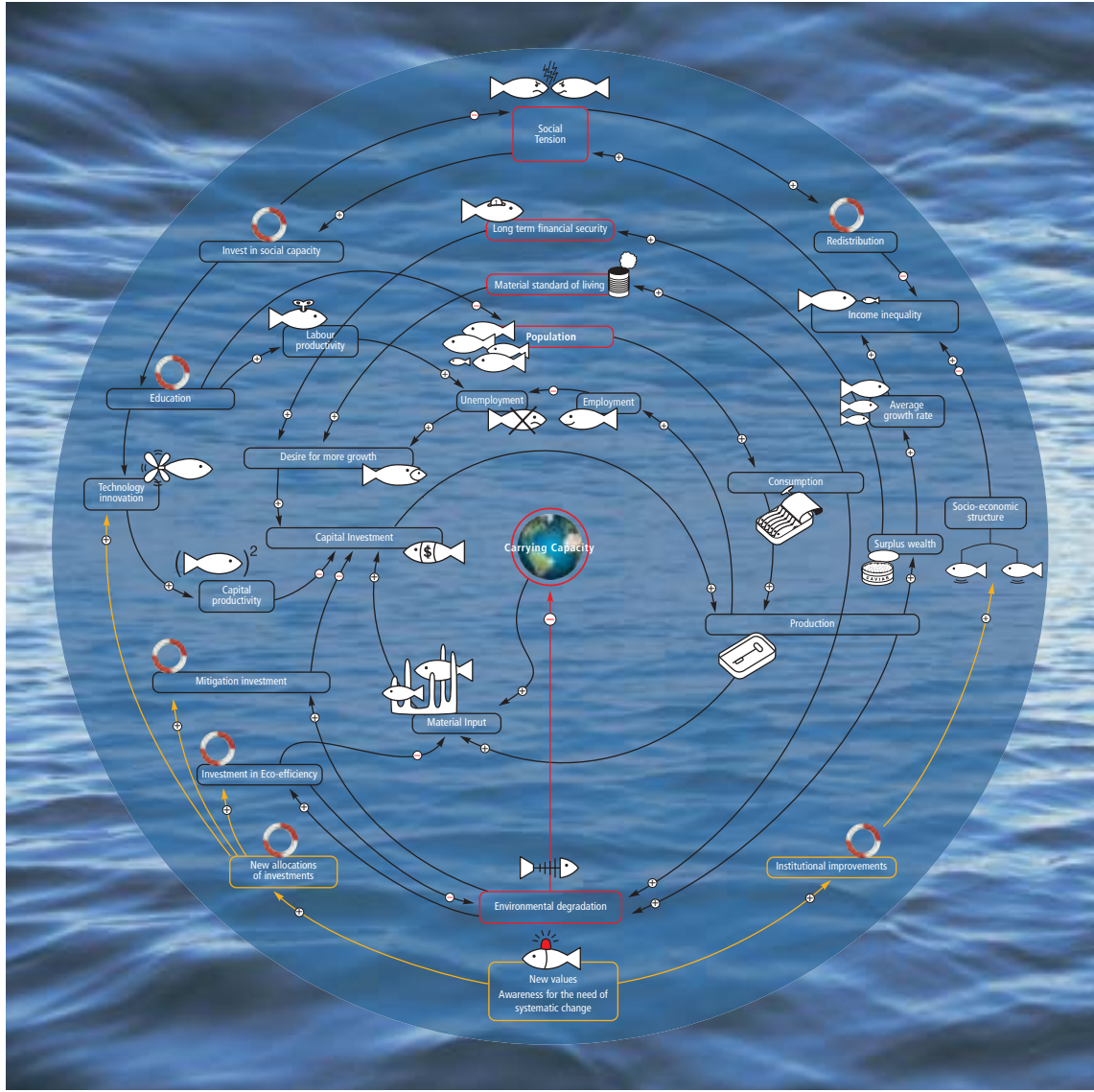
Redesigning the system by values

New values
We have reached a state of global connections and information load where anxiety about environmental degradation, social tensions, long term financial security and standard of living are on top of the mind of many citizens.
It is a characteristic of system behavior that they reach "tipping" points when a number of drivers and feedback loops start to operate in the same direction.

We may reach this phase where enough realize that our global economy is not going where we thought we were heading to, that its brilliant successes are only topping an immersed iceberg of difficult lives, exhausted nature, failed economies and institutions. Our way of life may be on a slow collision course of titanic proportion.
We need to redesign an economy that works for all within the limits of the planet. Global opportunities must go hand in hand with global solidarity and global responsibilities. This means activating a couple of additional rescue rings in our system.

Allocation of investments
We need to allocate yet more resources to eco-efficiency, environmental protection and technology innovation. We need to reduce impacts and live from the dividends of natural systems, not from depleting the reserves. This rescue ring is in the hand of every household, community, enterprise and region. It has very local, daily connections as well as global ones like greenhouse gases emissions.

Institutional improvements
At this last element in the map we can appreciate that even this "easy" version describes sustainable development as a complex systemic challenge.
A complex system, where no one is quite in charge, needs a new approach and governance. It needs on one hand more alliances and partnerships at all levels between key system participants and beneficiaries who can together manage improvements towards shared objectives. On the other hand it needs better local, national and global institutions where alignment of objectives and compliance with common interest rules is achieved.



Safety warning

Maps are not the territory. This map is not a sustainable development strategy (although it is difficult, in places, not to repeat and stress pertinent advice developed by sustainable development advocates).

The map is to help better manage all the dimensions of the challenge and bring good specific advice in the context of the whole. It is to help the dialogue, the action and the learning.

We are all in charge and, with our children, we will all benefit or suffer from our ability to steer the system in the right direction.

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The World Business Council for Sustainable Development is a business think tank that has produced many solution oriented publications on all topics in this map – **www.wbcsd.org**

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Dennis Meadows is Director of the Institute for Policy and Social Science Research at the University of New Hampshire. In addition to the groundbreaking 1972 Club of Rome report "Limits to growth", he has written or co-authored eight books on growth, systems, and educational games. These have collectively been translated into more than 30 languages. He has a PhD from MIT and honorary doctorates from three European universities for his contributions to environmental education.

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This publication is relalized and distributed with the material support from Dow Europe, The American Academy of Berlin and the World Business Council for Sustainable Development. While these organizations are interested in promoting a better understanding and implementation of Sustainable Development their support does not imply that they agree with every word in this publication.

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