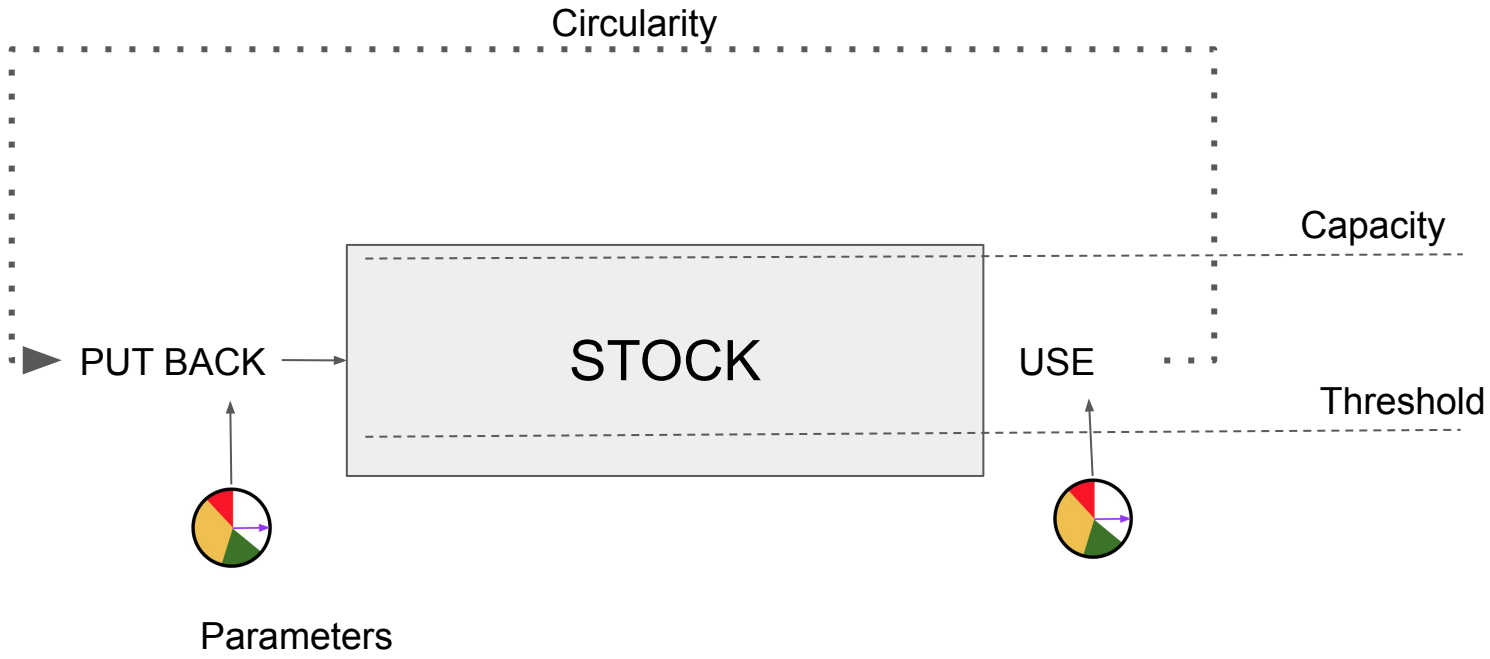
Systems dynamics

Application to the firm’s impact on nature and natural resources:

- The Circular Economy
- Towards creating a decision basis for transition

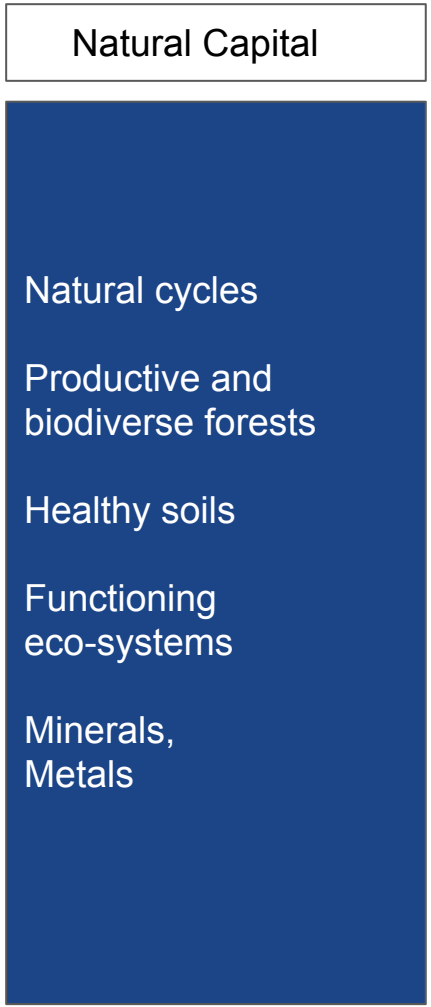
The Swedish Sustainable Economy Foundation TSSEF.se


Capacity
Flow in
STOCK
Flow out


Circularity
Capacity
PUT BACK
STOCK
USE
Threshold
Parameters

CAPITAL ˈkapɪt(ə)l/ : Assets utilized, but not used up, in the provision of goods and services.

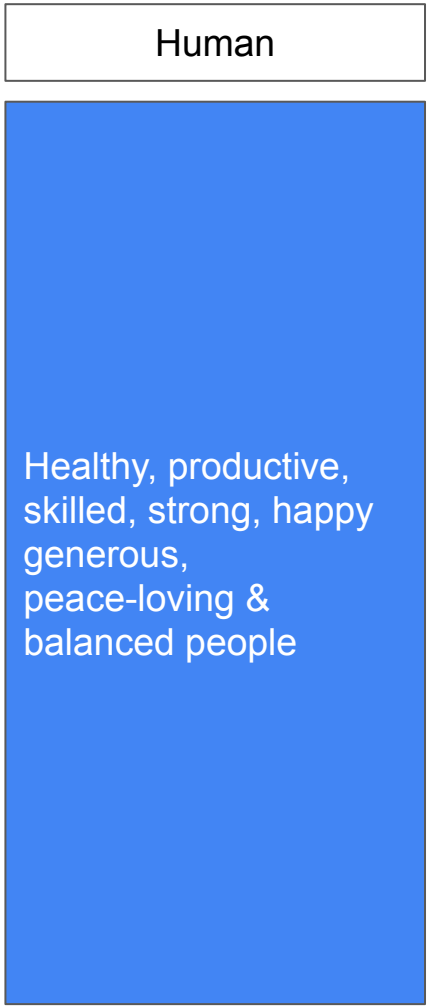
Natural Capital: The living layer we all rely on as well as the layer beneath our feet with the minerals and other substances from the lithosphere, natural systems like the climate and water cycle.

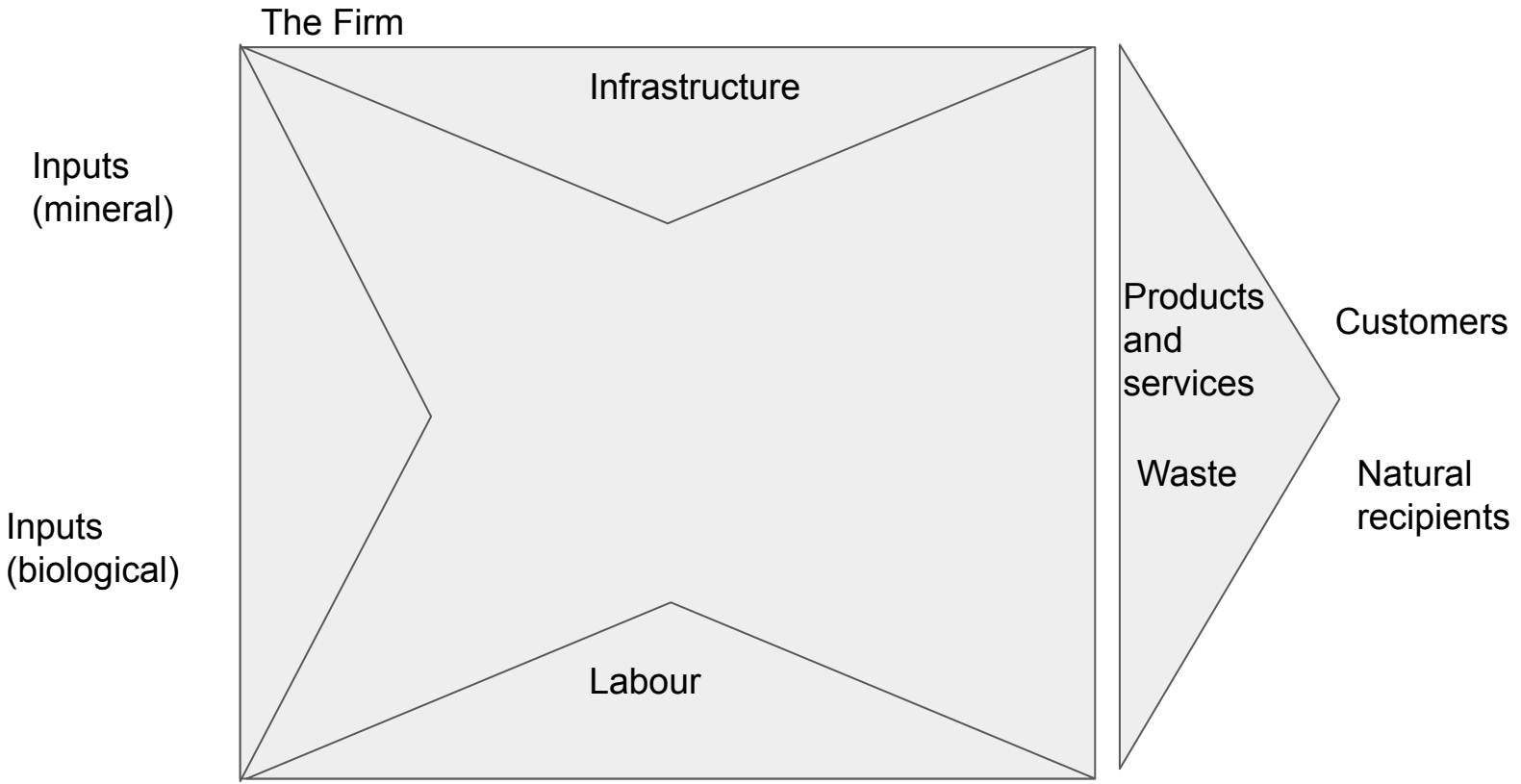


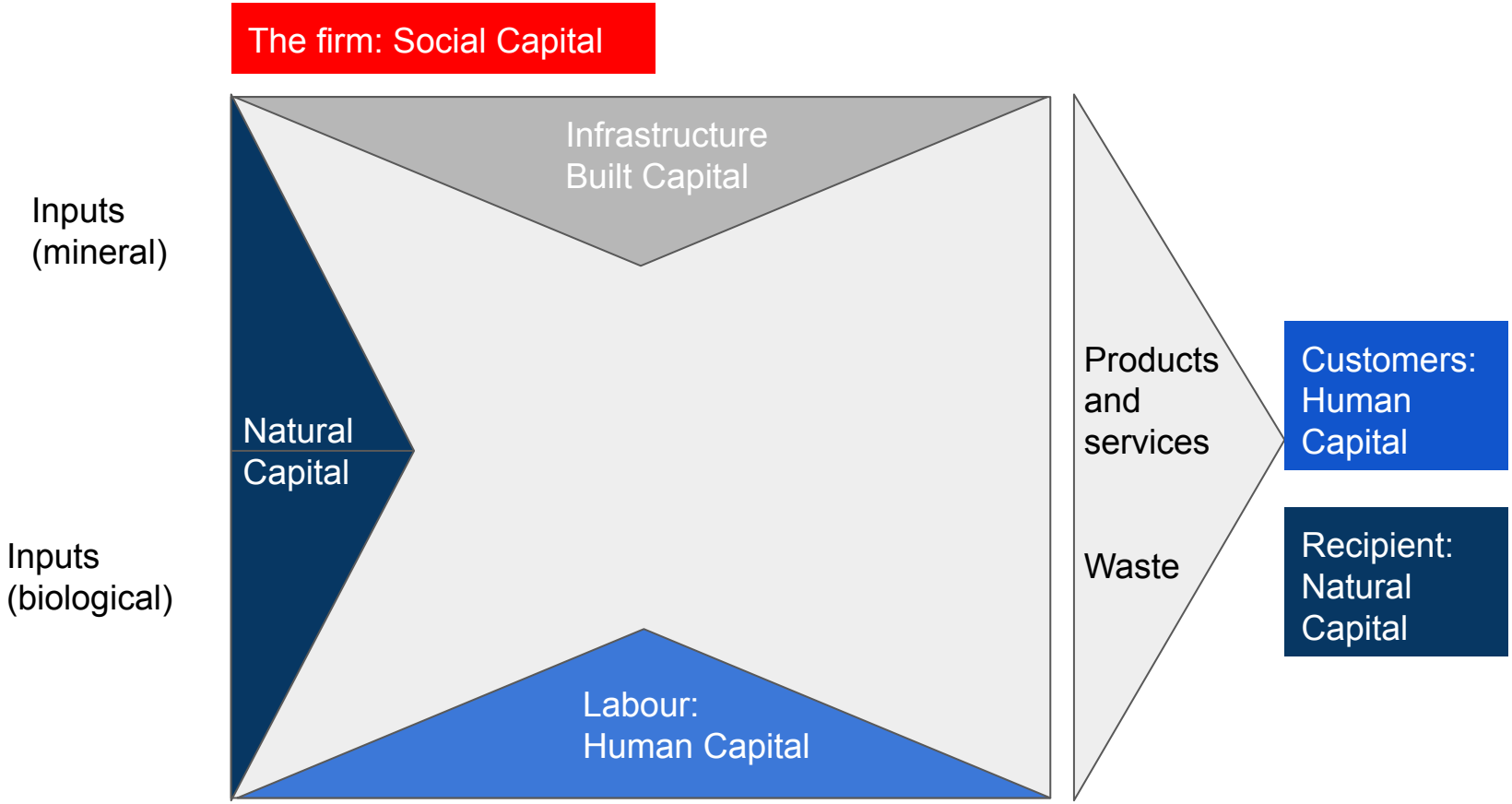
Built Capital: All man-made things that are used to provide our basic needs: houses, roads, factories, equipment, tools etc. This includes systems like telecoms, payments, etc.

Social Capital: Our organisations and institutions including the knowledge and capability that is in these organisations.

Human Capital: What we as humans command in terms of strength, knowledge, insights, attitude, capabilities etc.

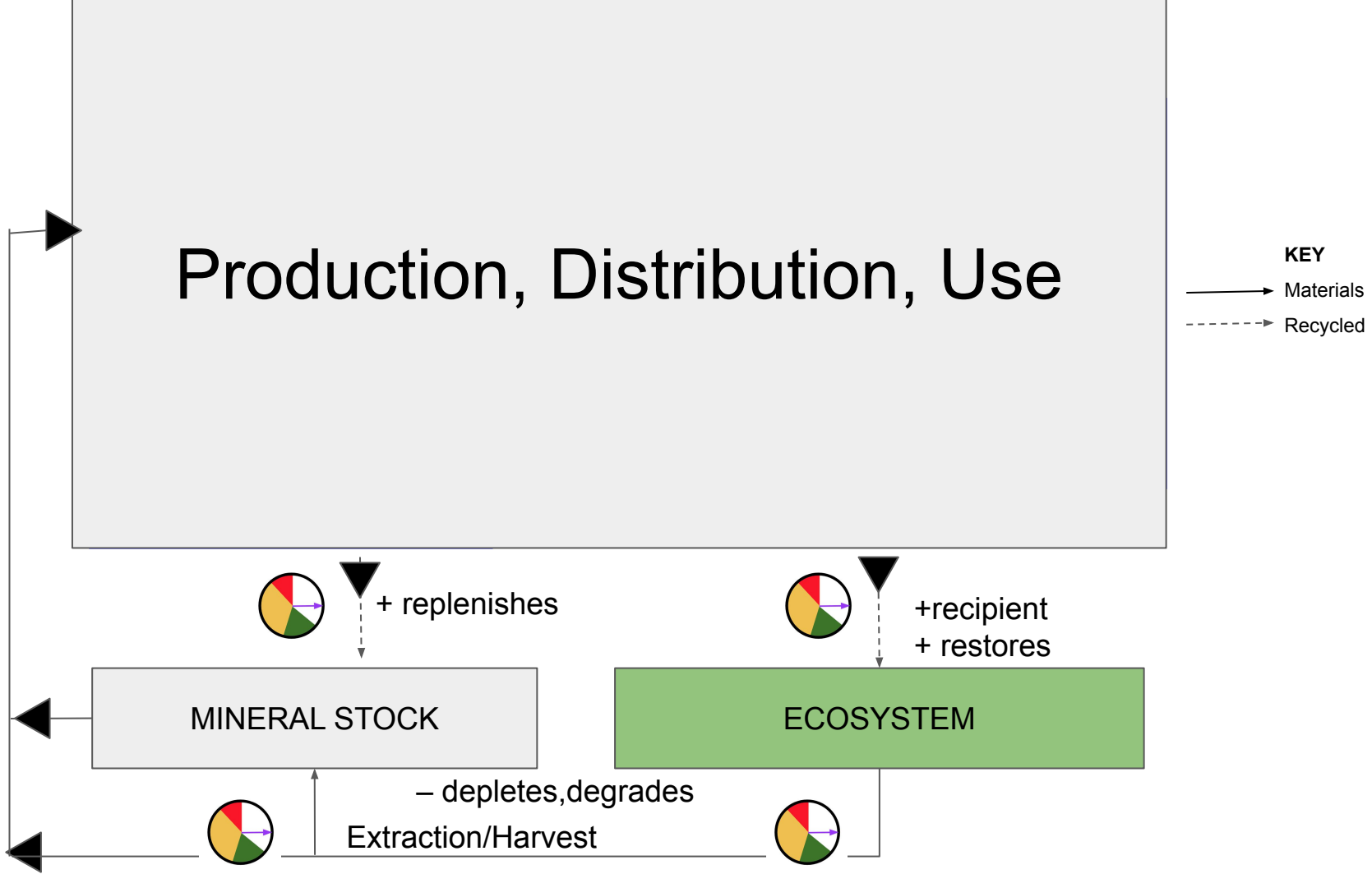



The Firm
Infrastructure
Inputs
(mineral)
Products
and
services
Customers
Waste
Natural
recipients
Inputs
(biological)
Labour


The firm: Social Capital
Infrastructure
Built Capital
Inputs
(mineral)
Natural
Capital
Inputs
(biological)
Labour:
Human Capital
Products
and
services
Waste
Customers:
Human
Capital
Recipient:
Natural
Capital

Why focus on infrastructure - built capital?

- The one that requires most **investment**
- Infrastructure determines the environmental performance of the firm
- Its capacity is a determiner of how many people the firm can serve with essentials


Production, Distribution, Use
KEY
Materials
Recycled
+ replenishes
+recipient
+ restores
MINERAL STOCK
ECOSYSTEM
– depletes,degrades
Extraction/Harvest

Natural Capital Balance Sheet

Current Assets

Total Liabilities

Equity

Property Class	Assets		Liability		Equity	
	For production	Natural capital	Use	Depletion	Capacity remaining, production	Natural Capital remaining
Forest	Potential Fiber for timber, packaging, paper and bioenergy	Forest ecosystem 30 services	Proportion in production vs mature	Depleted biodiversity	Productive capability	Remaining biodiversity & services

Politics

Science-based

Science

Science

If we want (value) then (measure) should be (figure)

Normative

Current status of real capital = $\frac{\text{status now}}{\text{should be}}$

If we want
(to limit global warming to climate stable temperatures)
then
(CO2 levels in the atmosphere)
should be
(at net zero by 2050)

Science, Engineering

To achieve *should be* the *properties* of (real capital) should *be* (figure)

Science, Engineering

To achieve
net zero
the *fossil fuel use* of (the transport and energy system)
should *be*
(zero by 2045)

Science, Engineering

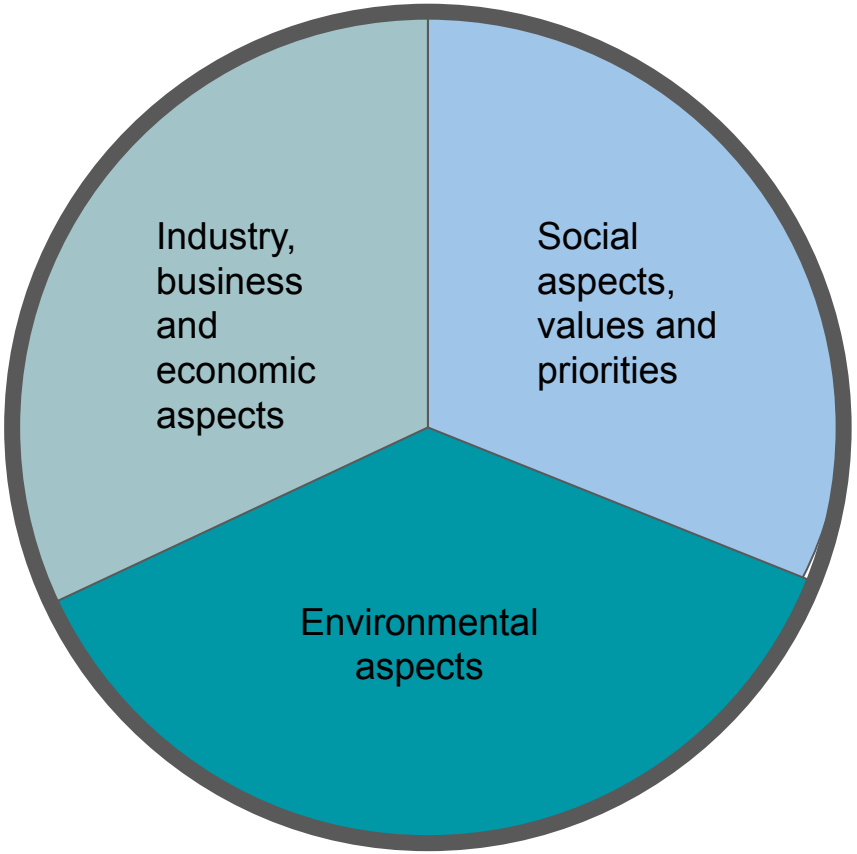
To achieve *should be* the *properties* of (real capital)
should *be* (figure)

Science, Engineering

Science, Engineering, Business

Economics

The real capital *capacity change* will require (investment)


Industry, business and economic aspects
Social aspects, values and priorities
Environmental aspects

Property Class	Assets		Liability		Equity	
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Forest	Potential Fiber for timber, packaging, paper and bioenergy	Forest ecosystem 30 services	Proportion in production vs mature	Depleted biodiverse	Productive capability	Remaining biodiversity & services
Forest cover	Reduced potential required by nature-based methods	Normative 100% cover	Reduced extraction to comply with rules	Uncovered 20% Services lost 20	Remaining capability	80% 10 services

Investment

Investment

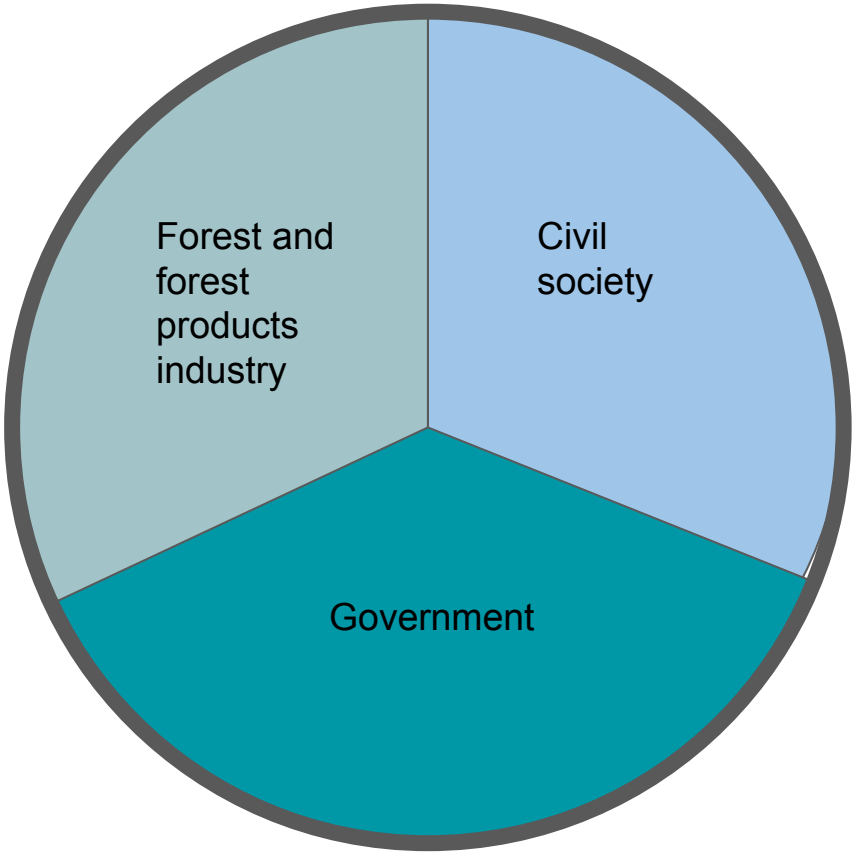
Summary:

System dynamics applied to real capital, its status, capacity and thresholds

The firm’s infrastructure determines large proportion of investment, environmental and social performance

The Assets - Liabilities- Equity approach clarifies and quantifies the firm’s affect om real capital, especially natural capital. Even of the total production system on nature and society for any geographical area

A normative approach with capital status produces a solid decision basis for the three areas of sustainability - Economic, Social - Ecological.


Forest and forest products industry
Civil society
Government

INFRASTRUCTURE CAPABILITY CHECKLIST to…

OPERATION

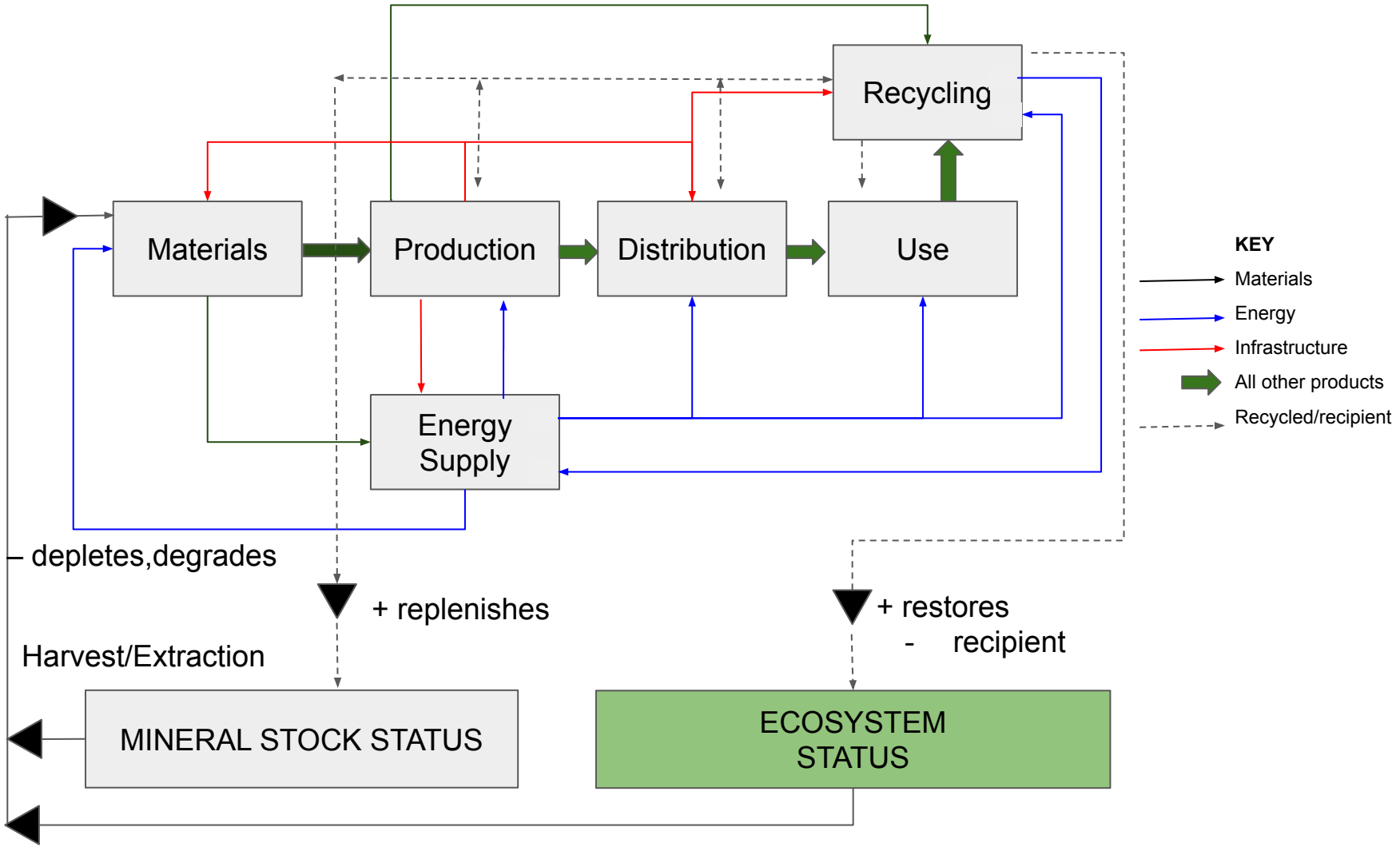
- Run on renewable energy

INPUTS

- Use recycled inputs
- Use nature-based inputs

WASTE PRODUCTION

- Produce recyclable waste


Recycling
Materials
Production
Distribution
Use
Energy Supply
KEY
Materials
Energy
Infrastructure
All other products
Recycled/recipient
– depletes,degrades
+ replenishes
+ restores
- recipient
Harvest/Extraction
MINERAL STOCK STATUS
ECOSYSTEM STATUS