Exploring self-reinforcing socio-economic forces that operate as catalyst or threat to social change

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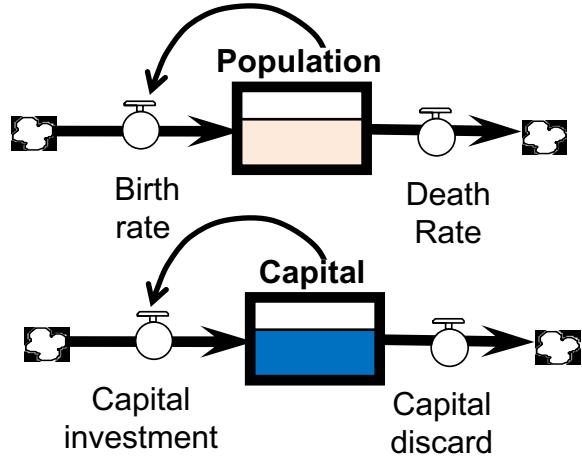
GSI

Time schedule

- Review of the Limits to growth and Reinforcing loop (10 minutes)

- *Examples of reinforcing loops and interactions (5 minutes)*

- *Review of the 12 Villages 6 possible groups (5 minutes)*

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- *Closing remarks (5 minutes)*

- *Group picture and Sending our recommendations to Assisi!*

What is Limits to Growth about?
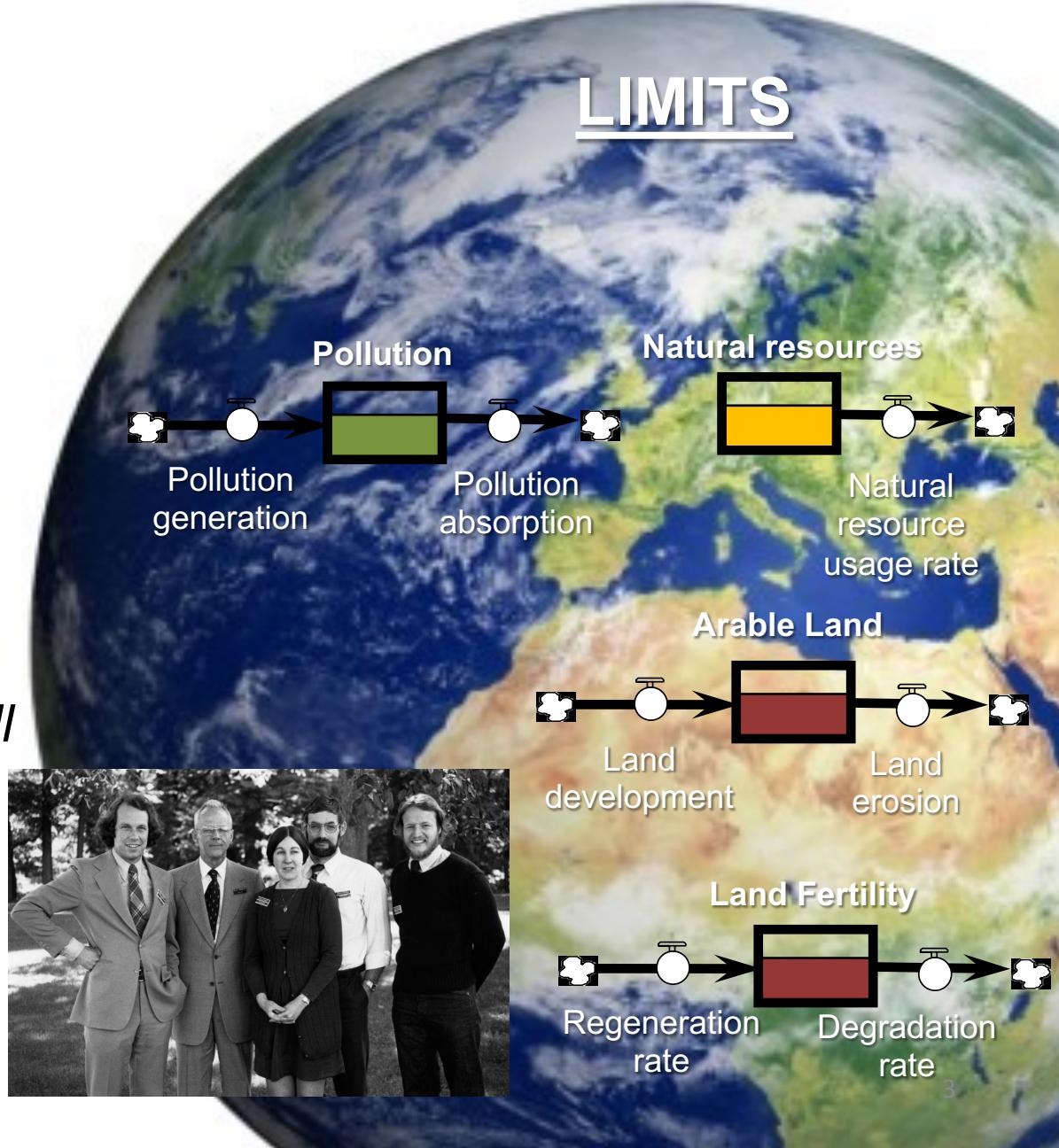
GROWTH

«What we meant in 1972 in 'The Limits to Growth' and what is still true, is that there is simply no endless physical growth on a finite planet.»

(Meadows, D. 2012)

## LIMITS

World3 model and 'what if' scenario analysis

World3 Variables

Natural resources

Natural resource usage rate

Land Fertility

Regeneration rate — Degradation rate

Arable Land

Land development — Land erosion

Population

Birth rate — Death Rate

Capital
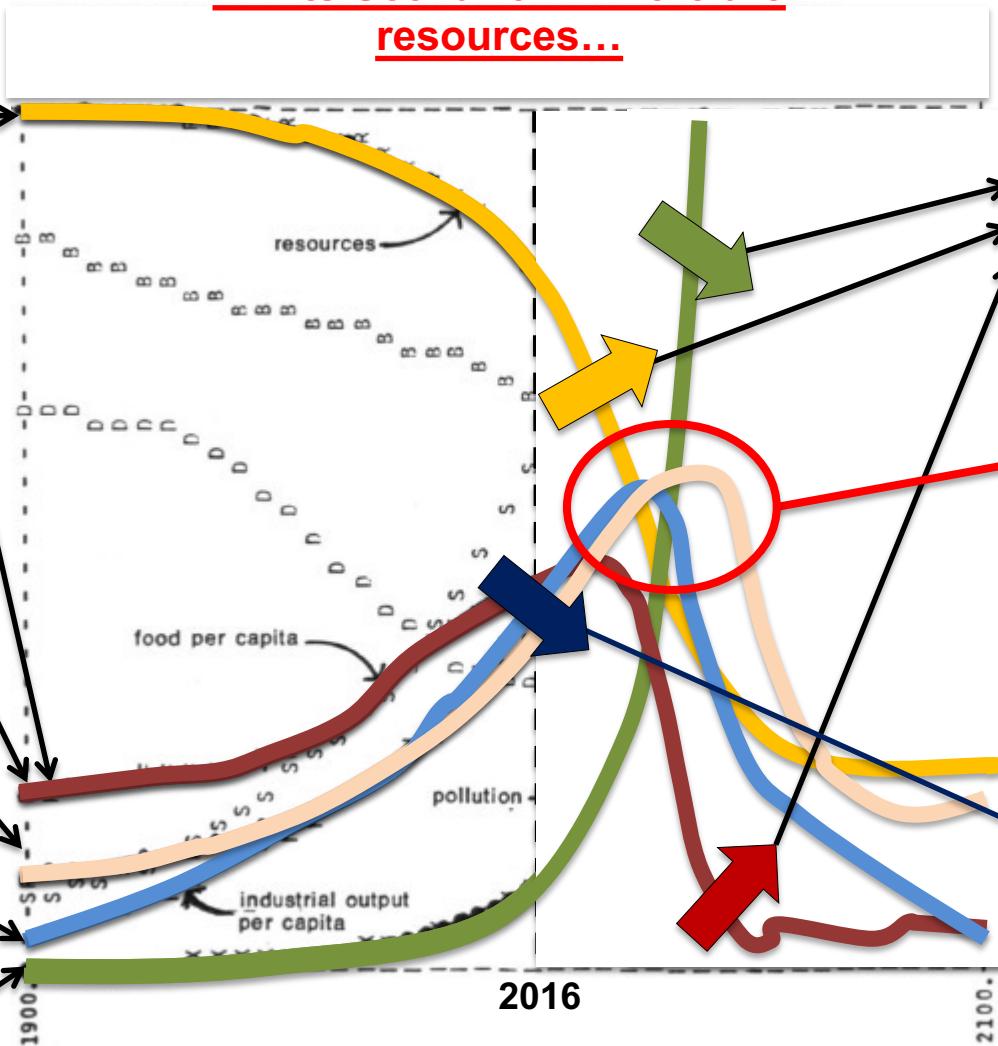
Capital investment — Capital discard

Pollution

Pollution generation — Pollution absorption

***Limits* Scenario 2: There are resources…**

resources

food per capita

industrial output per capita

pollution

1900   2016   2100.

Global Policies & Scenario analysis
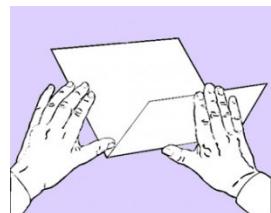
What: **Technology-oriented policies to remove planetary constraints**

Goal: **avoid OVERSHOOT and collapse of economic output and population growth!**
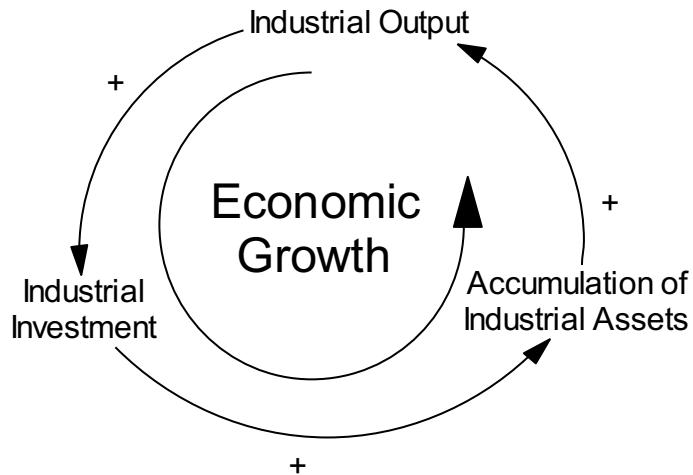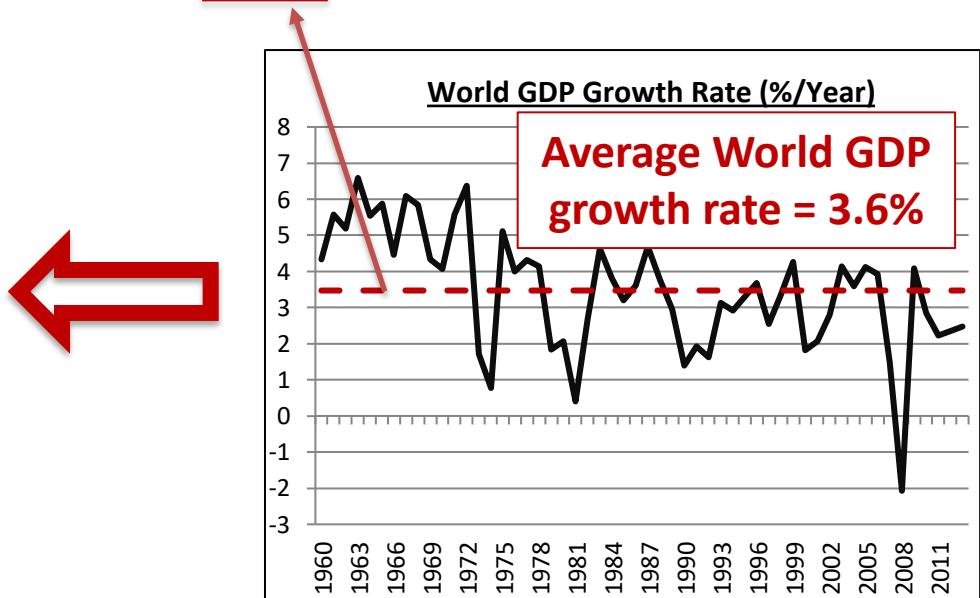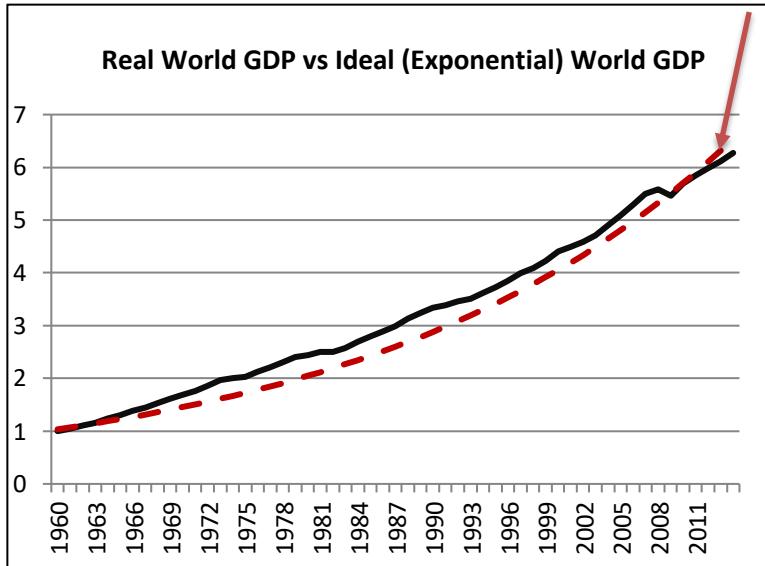
Cost: **Economic resources are allocated to remove global constraints**

(Meadows et. al, 1972)

Dynamics of growth and exponential growth?
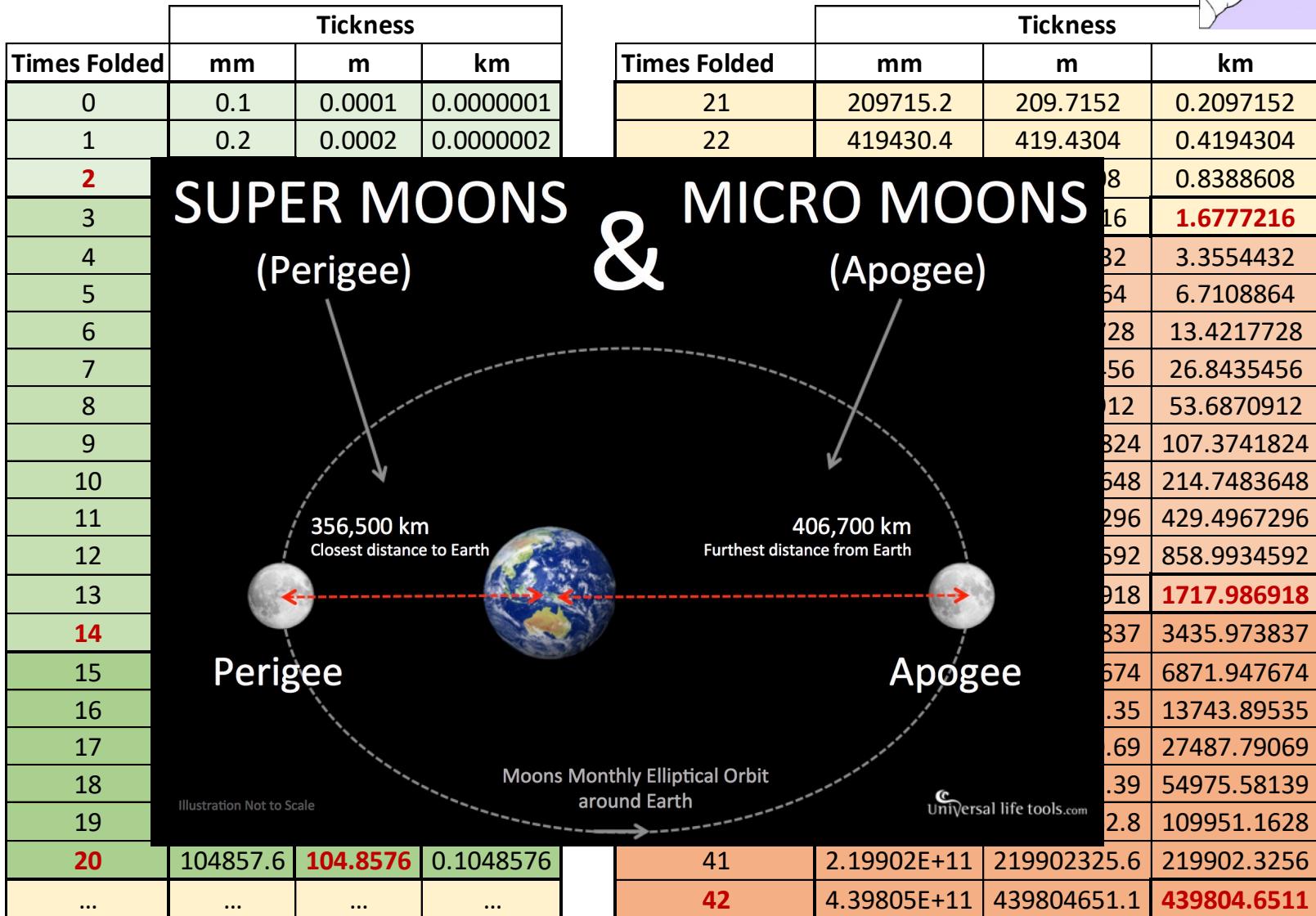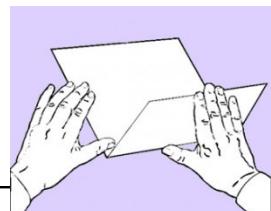
$$\frac{GDP(Years)}{GDP_{1960}} = (1 + \boxed{0.036})^{Years}$$

Real World GDP vs Ideal (Exponential) World GDP

World GDP Growth Rate (%/Year)

Average World GDP growth rate = 3.6%

Industrial Output

+

Economic Growth

+

Industrial Investment

Accumulation of Industrial Assets

+
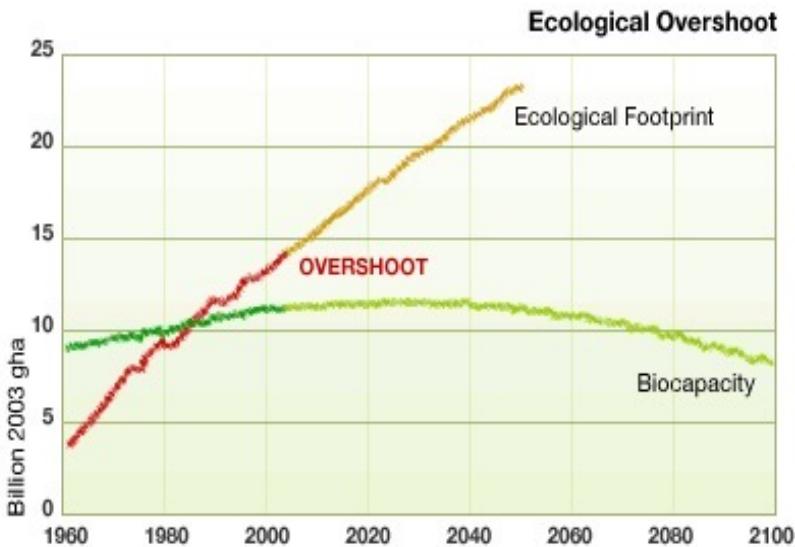
A note on terminology:

- *(+) Sign: Means that an increase in one factor causes an increase in another factor*

- *Loop: Closed causal chain from one node to itself*

- *Reinforcing Loop: A closed loop where an increase in one factor leads to an increase on itself through the loop*
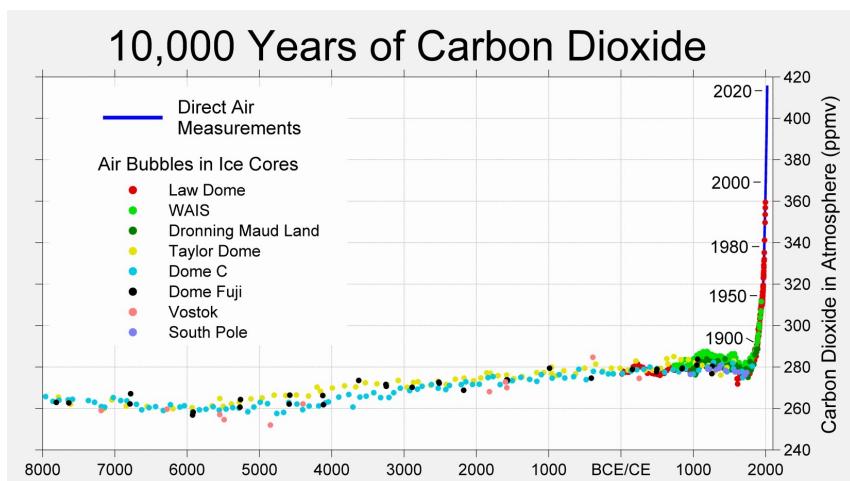
Issues with exponential growth

Times Folded	Tickness		
	mm	m	km
0	0.1	0.0001	0.0000001
1	0.2	0.0002	0.0000002
2			0.8388608
3		16	1.6777216
4		32	3.3554432
5		64	6.7108864
6		28	13.4217728
7		56	26.8435456
8		12	53.6870912
9		824	107.3741824
10		648	214.7483648
11		296	429.4967296
12		592	858.9934592
13		918	1717.986918
14		837	3435.973837
15		674	6871.947674
16		.35	13743.89535
17		.69	27487.79069
18		.39	54975.58139
19		2.8	109951.1628
20	104857.6	104.8576	0.1048576
...	...	...	...

Times Folded	Tickness		
	mm	m	km
21	209715.2	209.7152	0.2097152
22	419430.4	419.4304	0.4194304
41	2.19902E+11	219902325.6	219902.3256
42	4.39805E+11	439804651.1	439804.6511

SUPER MOONS (Perigee) & MICRO MOONS (Apogee)

356,500 km
Closest distance to Earth

406,700 km
Furthest distance from Earth

Perigee

Apogee

Moons Monthly Elliptical Orbit around Earth

Illustration Not to Scale

Universal life tools.com

# Results of exponential growth
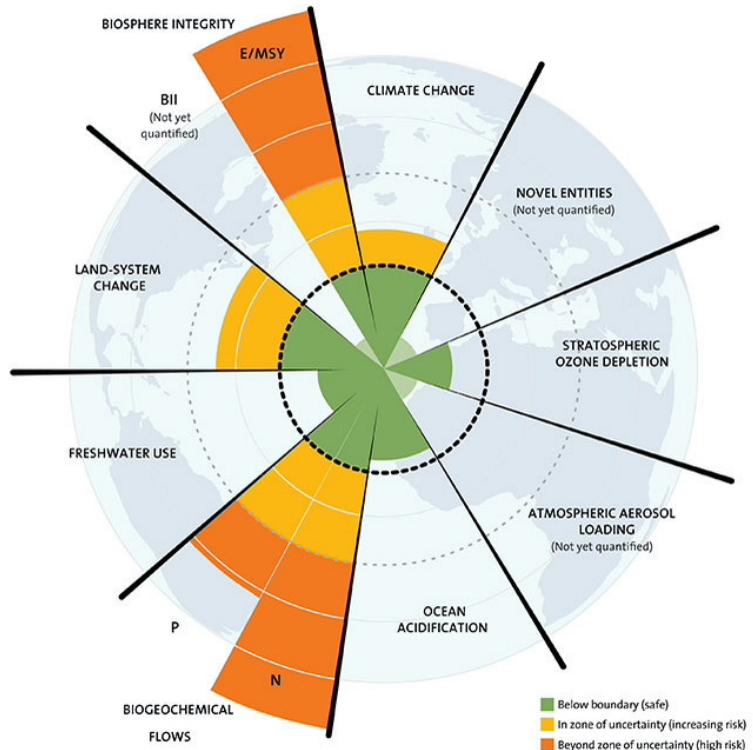
(Living Planet Report, 2008)

(Berkeley's Earth Report, 2020)

Planetary Boundaries Report
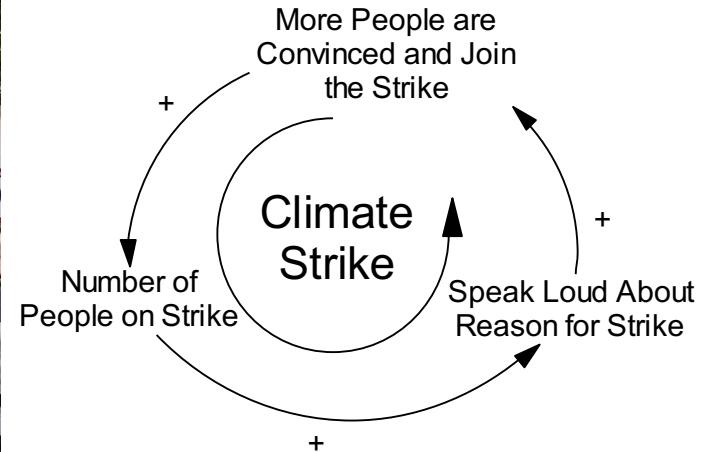

*(Steffen et al. , 2015)*
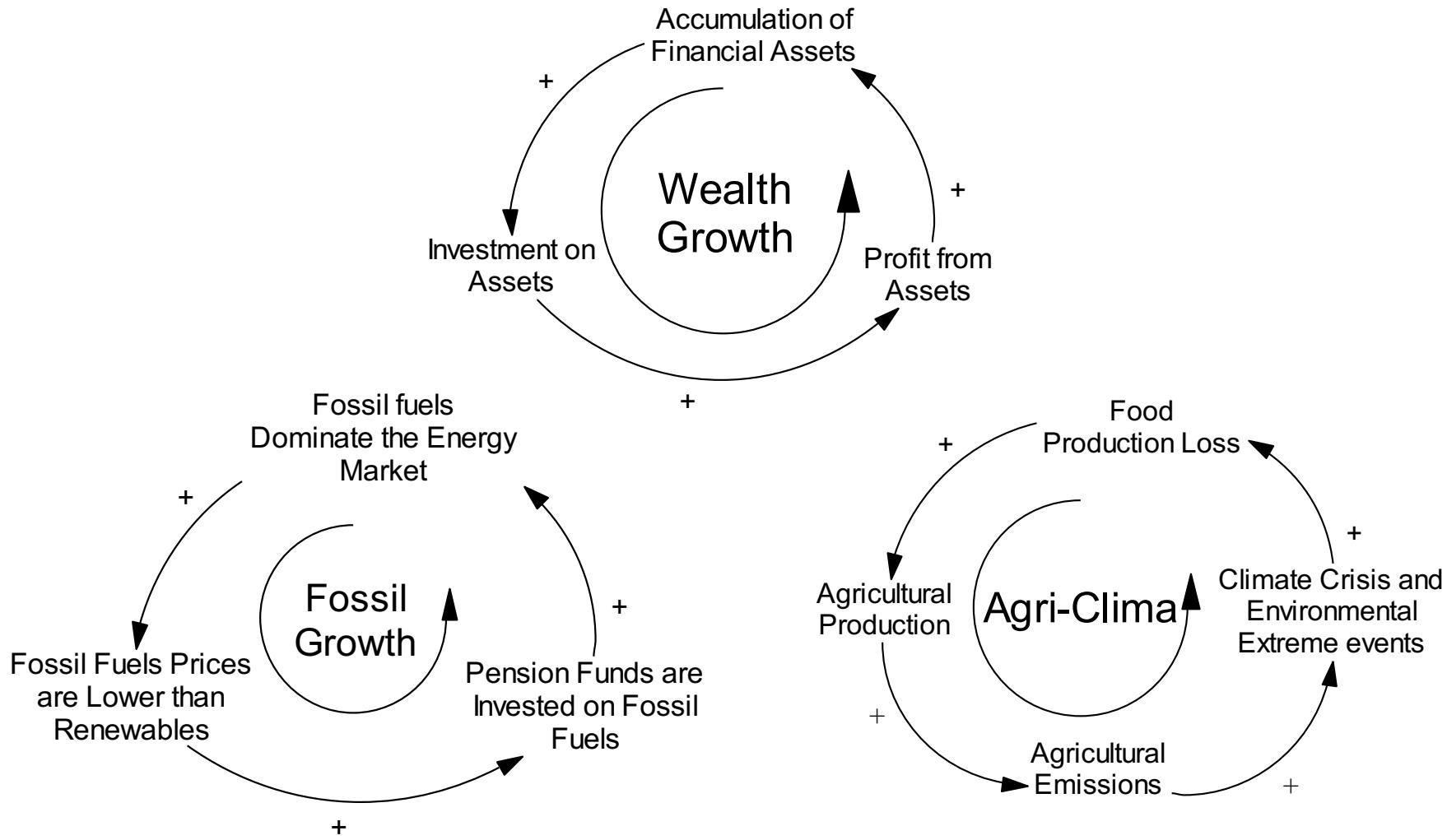
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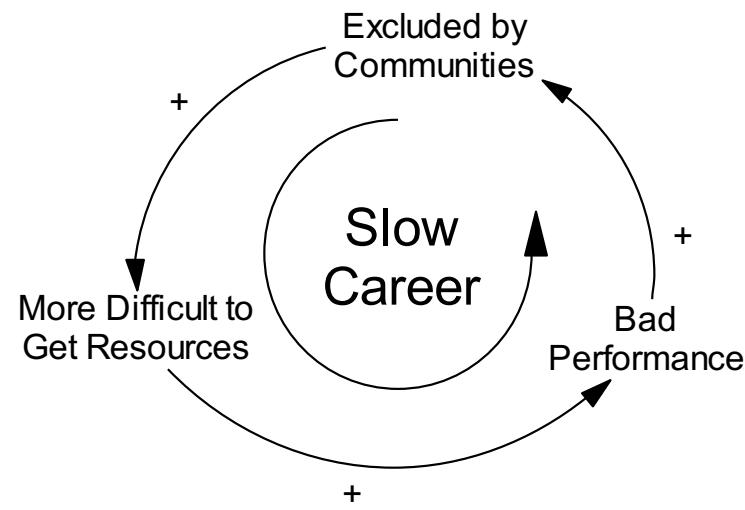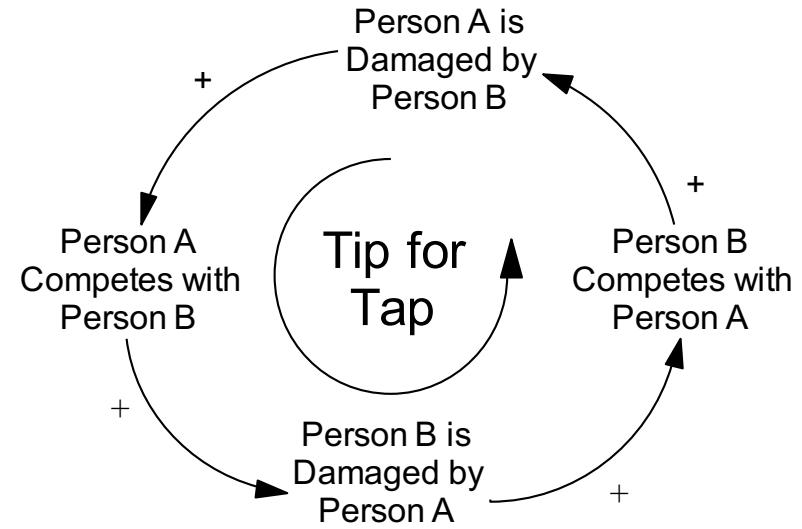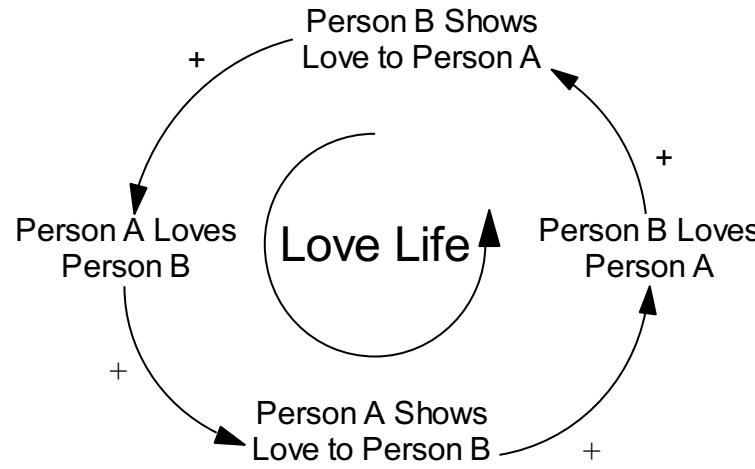
Reinforcing loops can be good!

Climate Strike

More People are Convinced and Join the Strike

+ Number of People on Strike

+ Speak Loud About Reason for Strike

+
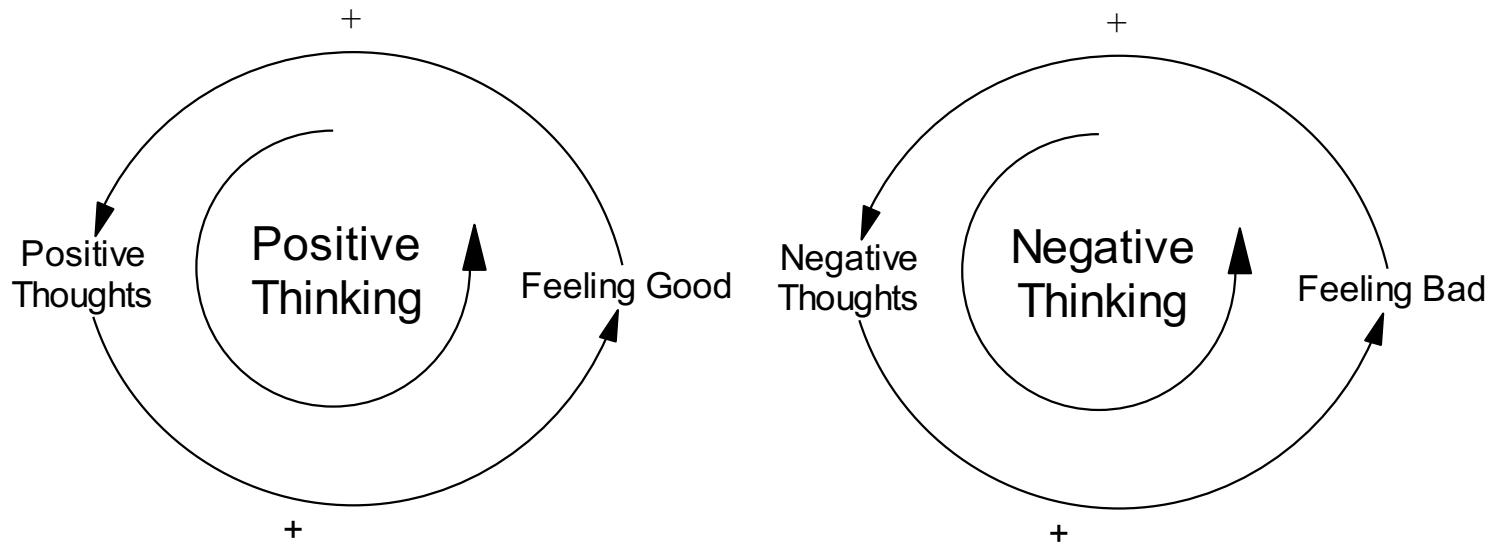
Examples of reinforcing loops: <u>Systems Level</u>
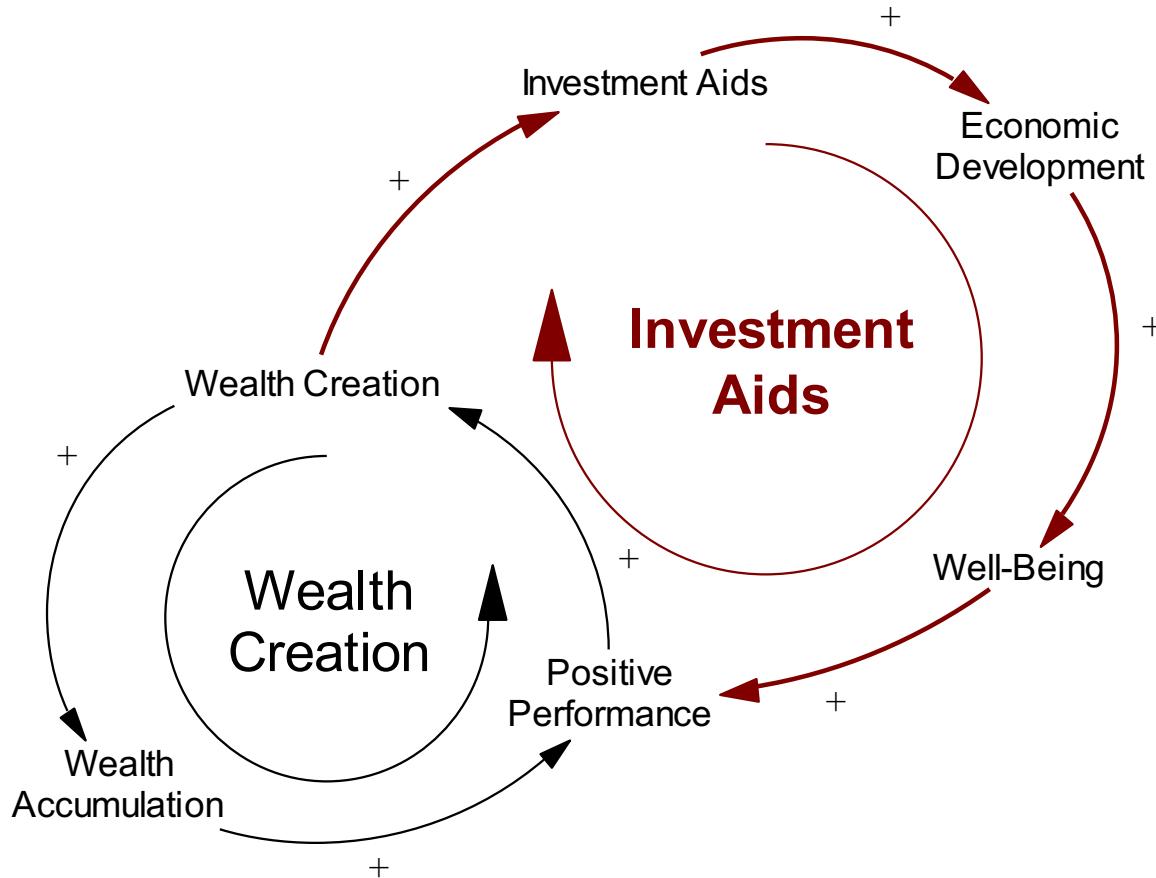
Examples of reinforcing loops: <u>Interpersonal level</u>

Love Life

+ Person B Shows Love to Person A
+ Person B Loves Person A
+ Person A Loves Person B
+ Person A Shows Love to Person B

Tip for Tap

+ Person A is Damaged by Person B
+ Person B Competes with Person A
+ Person A Competes with Person B
+ Person B is Damaged by Person A

Good Career

+ Accepted by Community
+ Good Performance
+ Given Resources to Perform Well

Slow Career

+ Excluded by Communities
+ Bad Performance
+ More Difficult to Get Resources

Examples of reinforcing loops: <u>Introspective Level</u>

Example of interaction between loops: Synergy

Example of interaction between loops: Threat

Worth noting:

- **(-) Sign:** *indicates that an* **increase** *in one factor determines a* **decrease** *in another factor – thus creating* **Opposition**

- **Two Negative** *influences that follow each other in a loop also create a* **Reinforcing loop**

- *In this diagram two groups aim for expansion, and* **erode each other's influence**

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CO2 of Inequalities

Life and Life-Style

Vocation and Profit

Work and Care

Management and Gift

Finance and Humanity

Business and Peace

Agriculture and Justice

Business in Transition

Energy and Poverty

Women for Economy
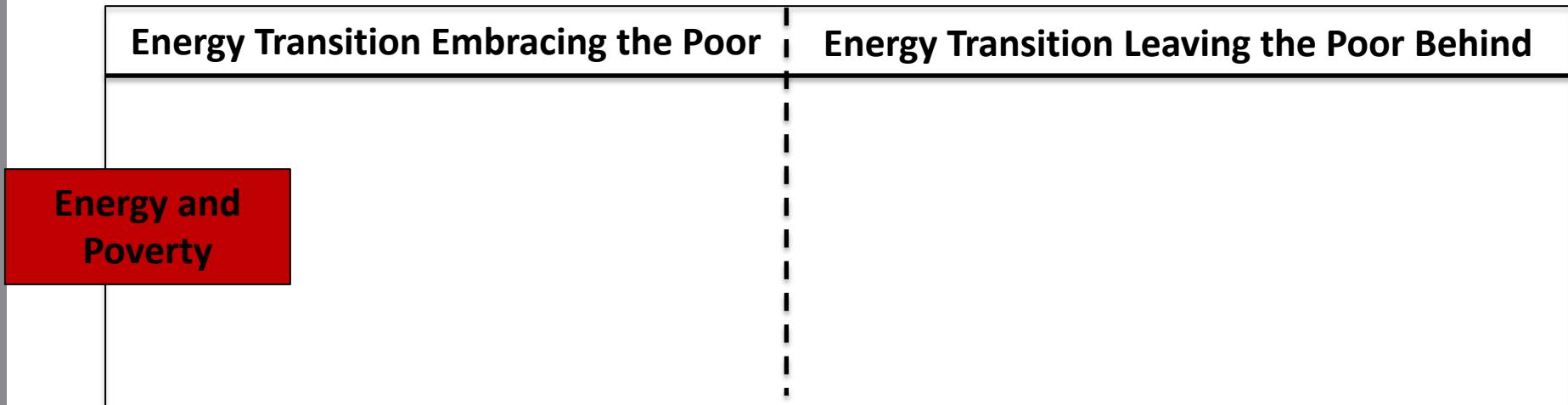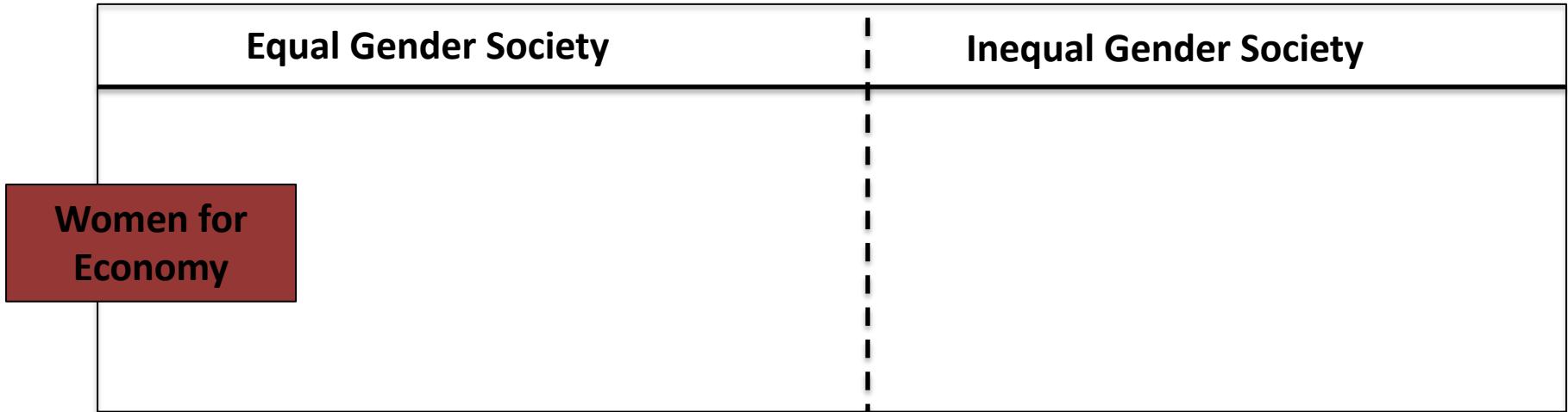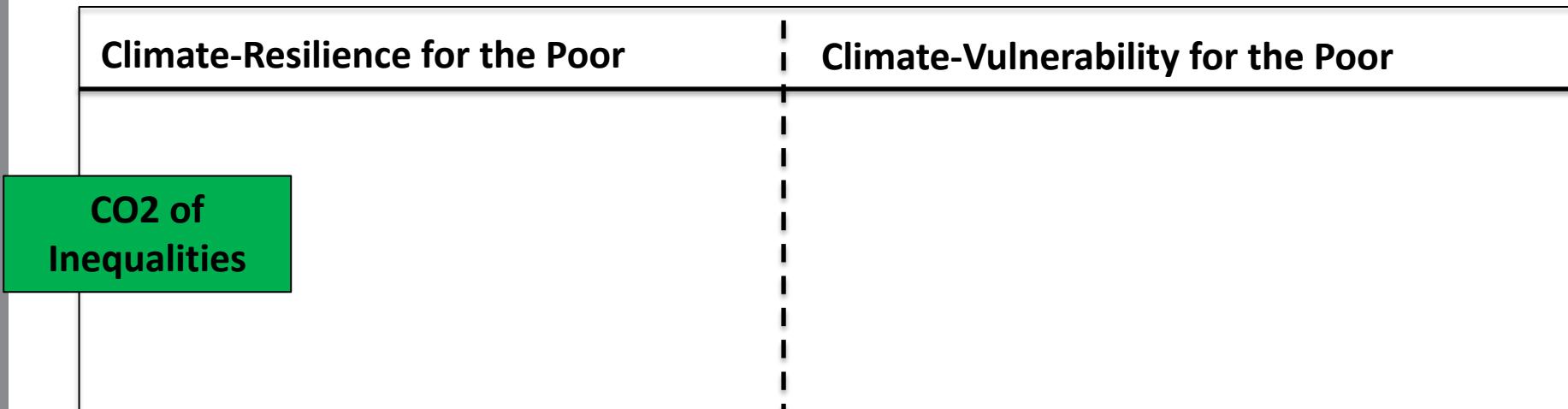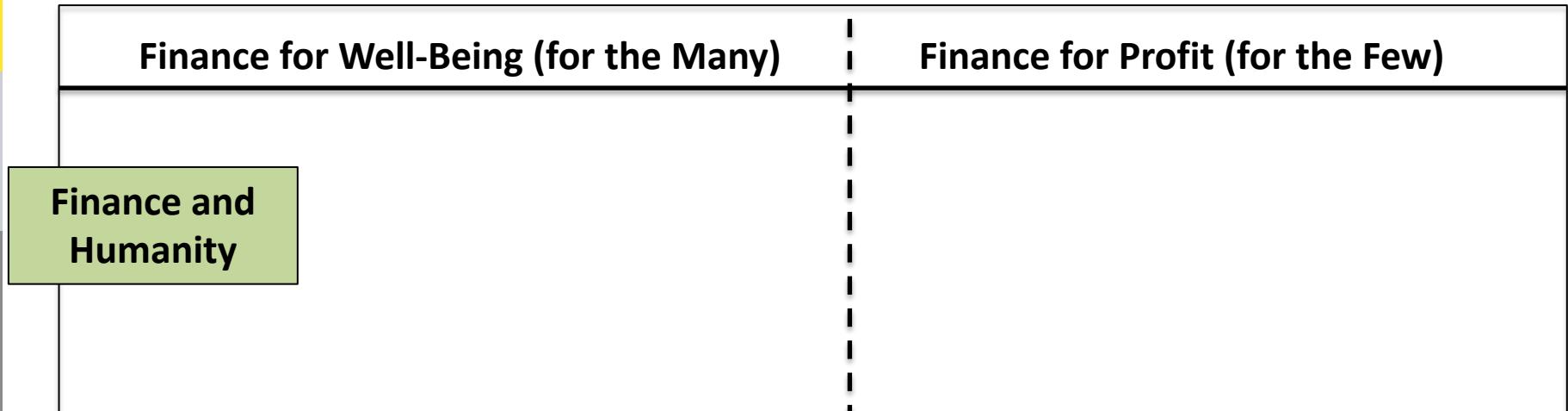
Policies for Happiness
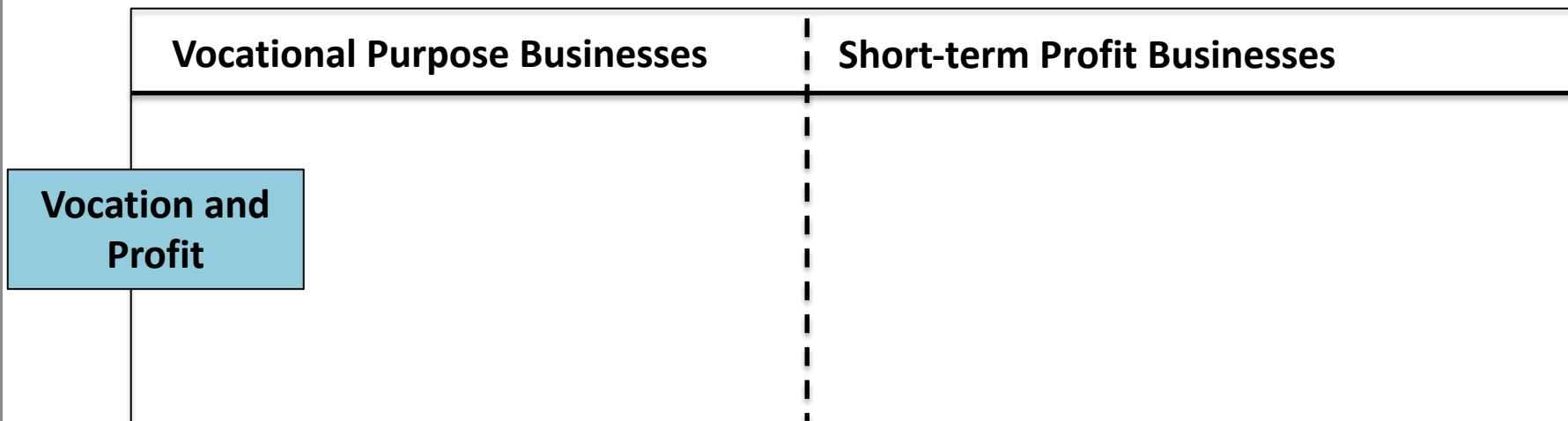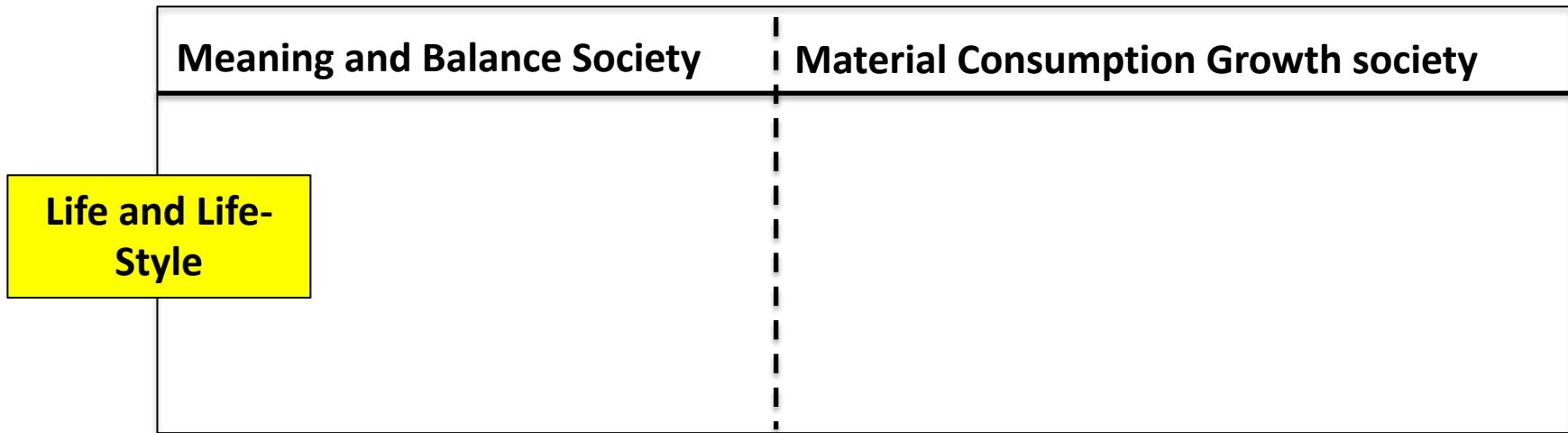
Proposed Systems: 1 and 2

Equal Gender Society	Inequal Gender Society

Women for Economy

Energy Transition Embracing the Poor	Energy Transition Leaving the Poor Behind

Energy and Poverty

Proposed Systems: 3 and 4

Finance for Well-Being (for the Many)	Finance for Profit (for the Few)

Finance and Humanity

Climate-Resilience for the Poor	Climate-Vulnerability for the Poor

CO_2 of Inequalities

Proposed Systems: 5 and 6

Meaning and Balance Society	Material Consumption Growth society

Life and Life-Style

Vocational Purpose Businesses	Short-term Profit Businesses

Vocation and Profit

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Group Activity 1 (30 minutes)

- *You have:*

  - *Sticky Notes*
  - *Paper*
  - *Markers*

- *As Individual:*

  - *Choose the system you most feel like contributing to*

- *As small groups:*

  - *Step 1: draw a system map of all the positive loops that can support system change in the direction of the objective set by the village (15 Minutes)*
  - *Step 2: Expand the initial system map with all positive loops that can be seen as a threat to change (15 minutes)*
  - *Step 3: List at least **3 intervention** points that can support changing the system towards the better*

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Group Activity 2 (30 minutes)

- *Step 1: get close together with all system maps*

- *Step 2 (Each group in turn): describe to the other groups the functioning of their map, their rationale, and why they chose those intervention points (open to comments from other groups)*

- *Step 3 (all groups together): seek for **synergies for system change and threats** while looking at possible connections among all system maps*

- *Step 4 (all groups together): Do the intervention points change? List the **key intervention** points that could help change the interconnected system toward the better*

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Closing remarks

- *Everything you do will impact and feed into some sort of reinforcing loop!*

- *You will need to recognize them if you really want to assure system change!*

- *Finding answers is hard, and systems will change under your feet – perseverance and system thinking are key*

Thank you for participating, hope you enjoyed this activity today!

LET'S SEND OUR FINDINGS TO EOF IN ASSISI!!