

Sustainable Development:



Costa Rica in Perspective

Dr. Miguel Karian

Earth Education International

Costa Rica



Development: Perceptions

Technological Development (material things)

‘Progress’ (advancement, improvement)

Economic Development (work, growth, GDP)

International Development (technology transfer)

Community Development (social-cultural)

Human Development

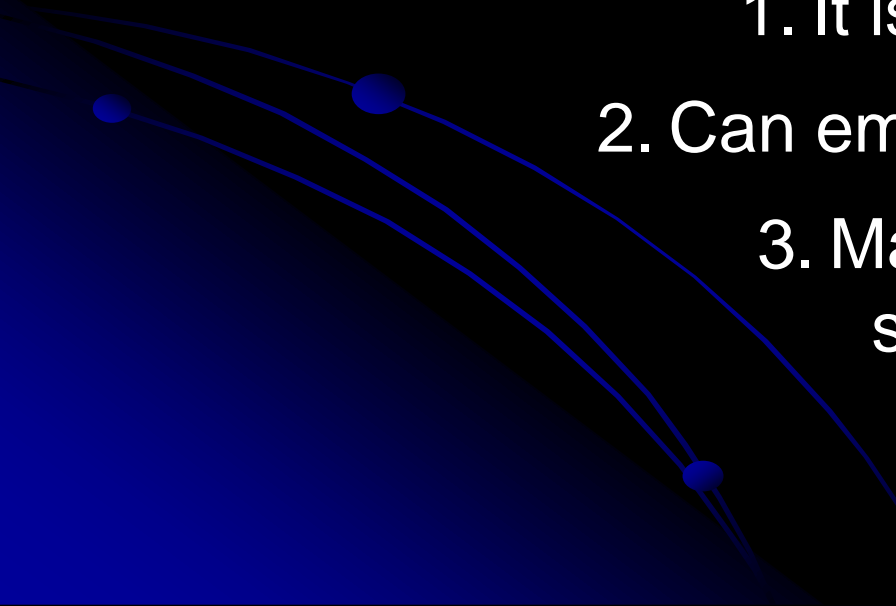


Development Defined

An on-going process used to extend potential including tangibles and/or socio-cultural systems

(Karian, 2006)

Key points

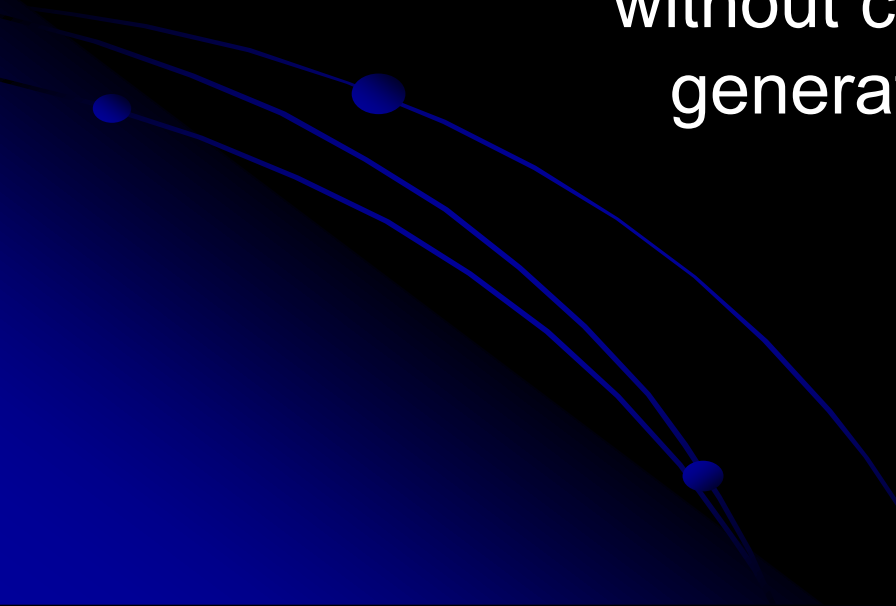
1. It is a process, not a destination
 2. Can employ an infinite number of models
 3. May include technology and/or socio-cultural arrangements
- 

Sustainable Development Defined

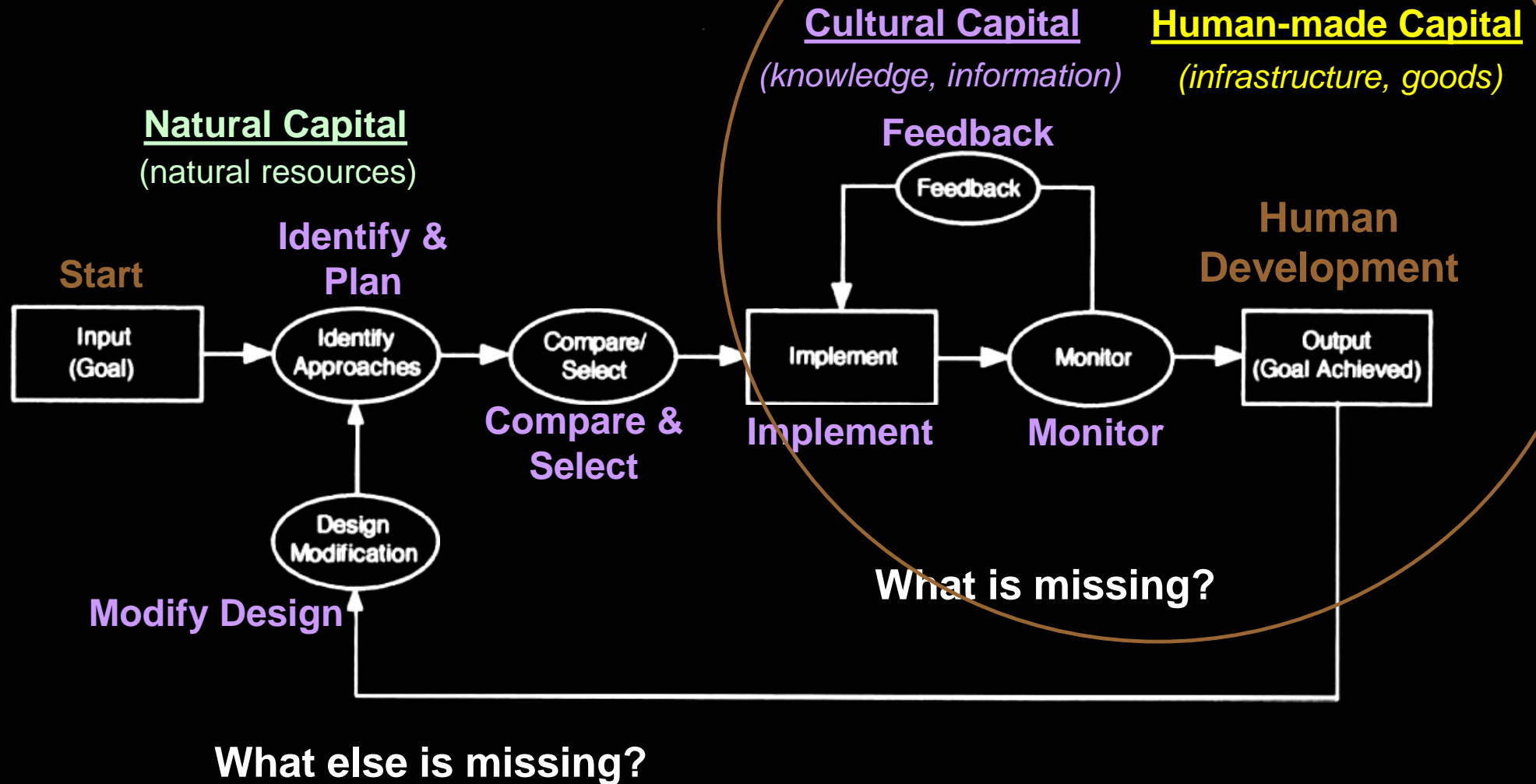
Our Common Future (Brundtland Report), 1987

An international group of politicians, civil servants and experts on the environment and development

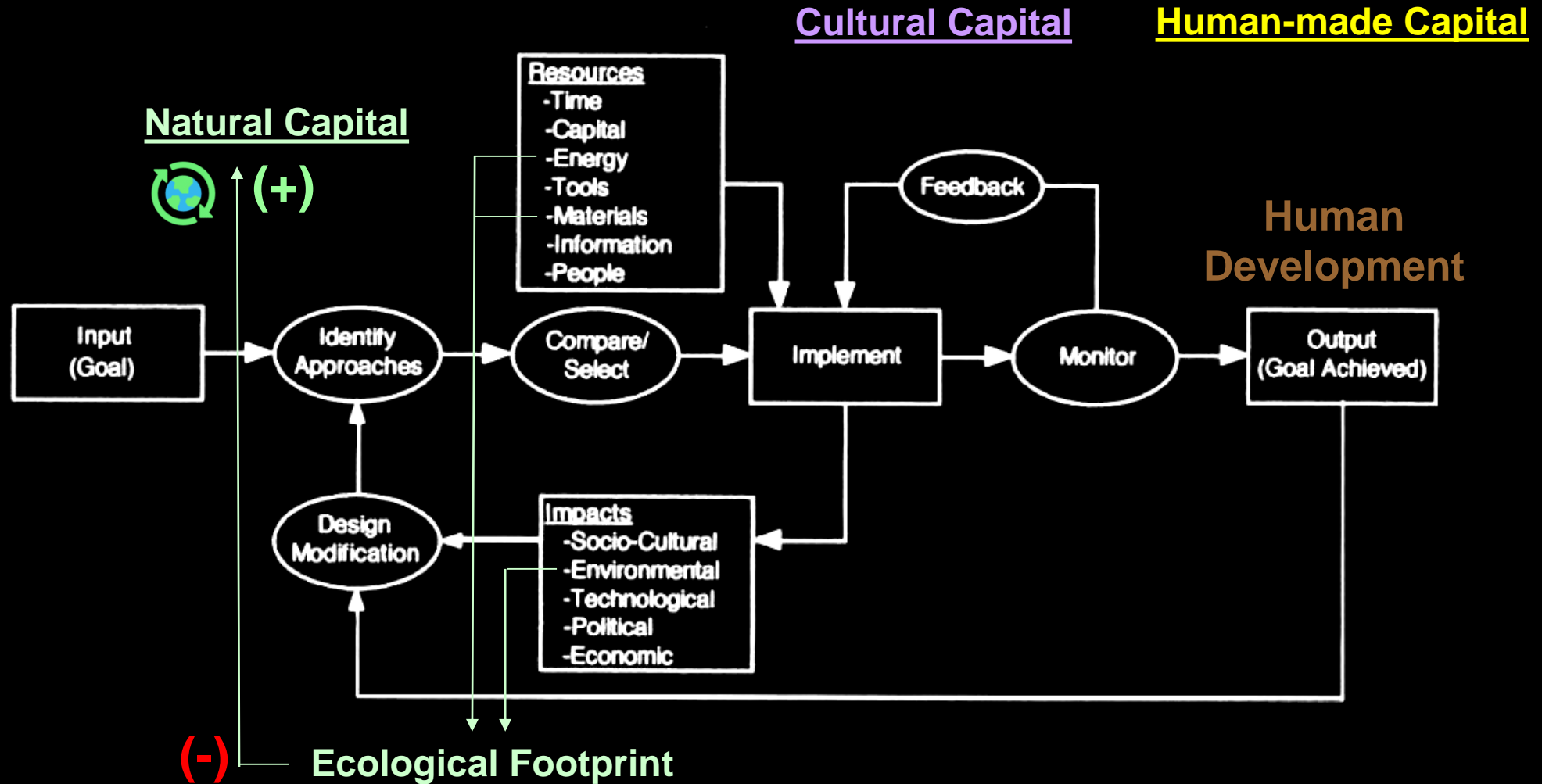
“Development which meets the needs of the present without compromising the ability of future generations to meet their own needs”



Development: The Process



Development: The Process



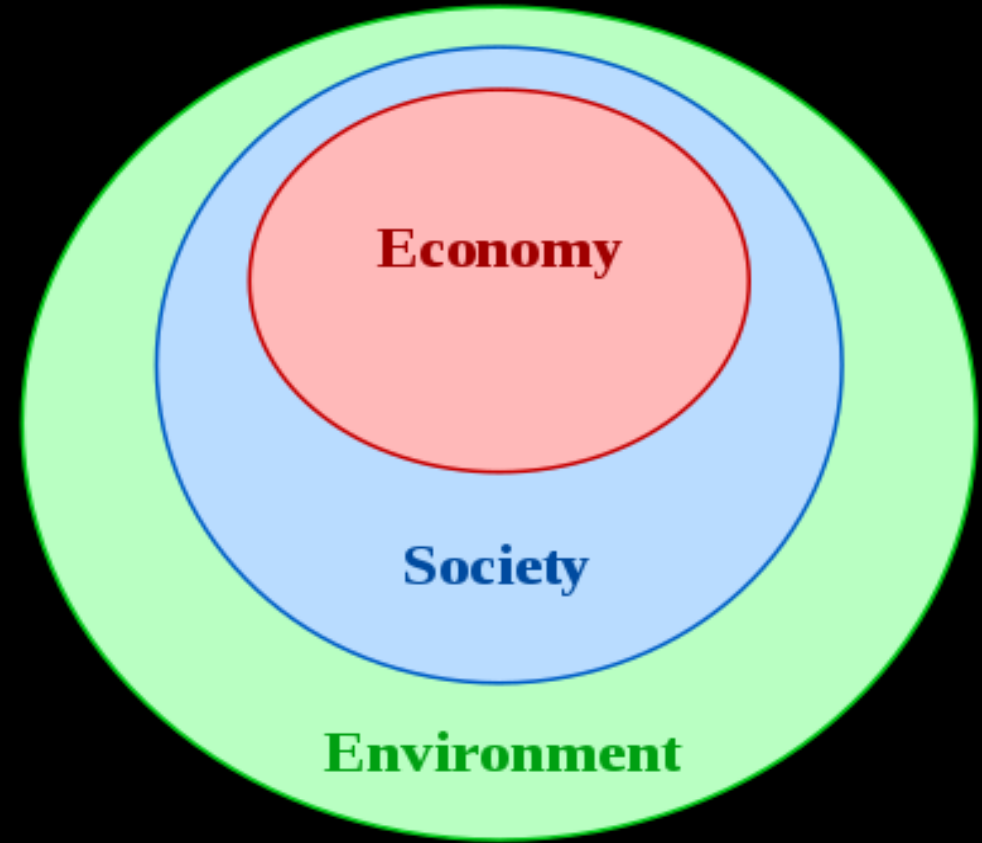
Ecological Footprint Defined

“A tool for measuring and analyzing human natural resource consumption and waste output within the context of nature’s regenerative capacity”

Land area needed in global hectares (gha) to:

- Produce resources consumed
(food, energy and materials)
- Absorb waste generated

Sustainable Development Models



Sustainable Development Models

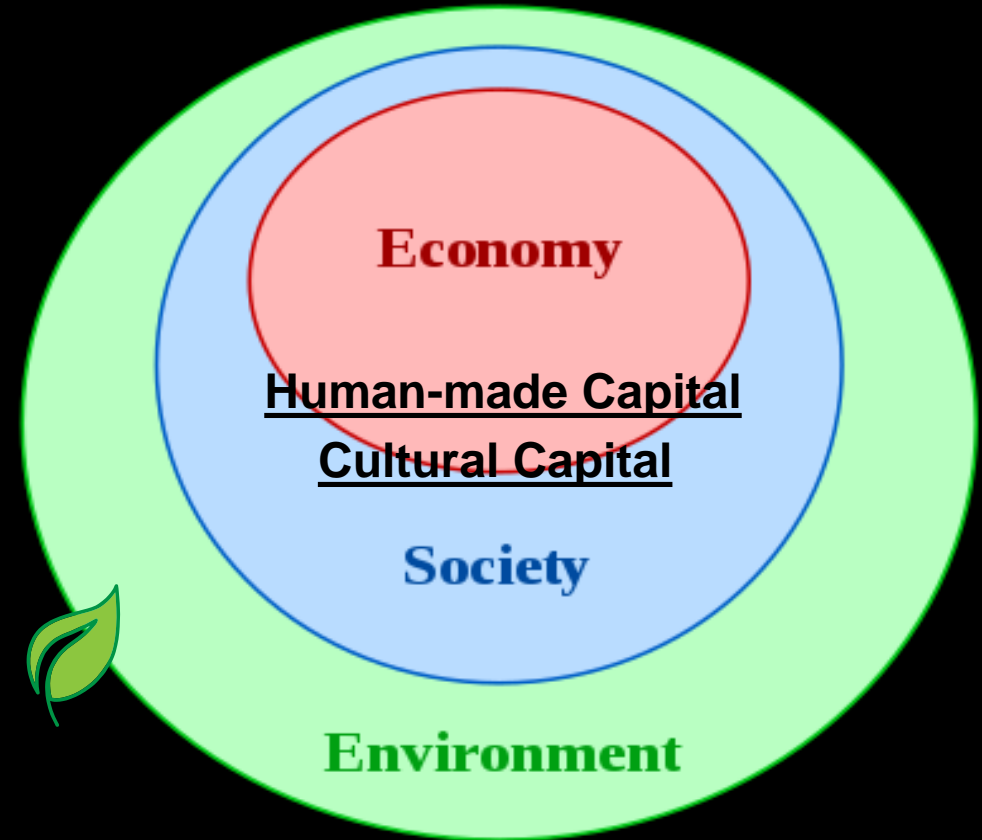
➤ Depletable vs. Renewable Resource



➤ Biocapacity



Natural Capital



Biological Capacity (Biocapacity)

Amount of productive area available to generate renewable resources & absorb waste



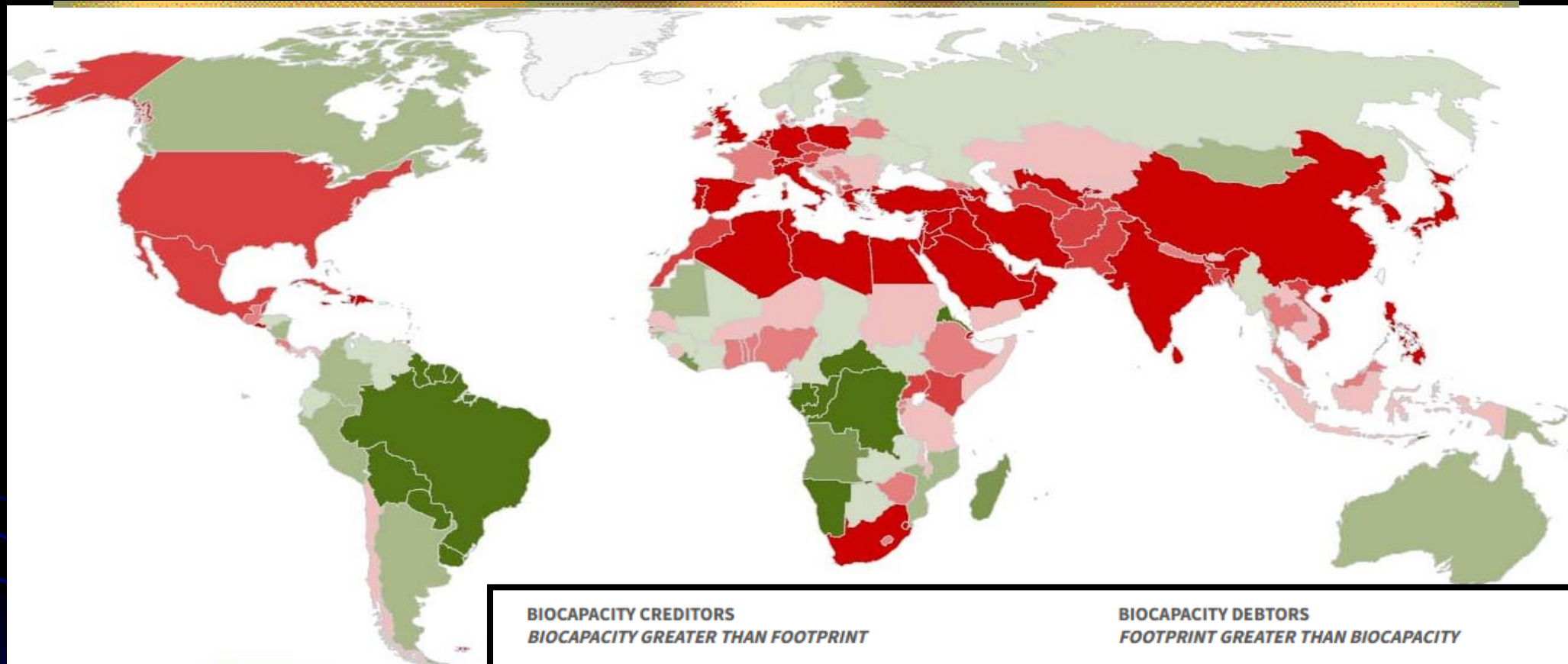
Biological Capacity (Biocapacity)

Amount of productive area available to generate renewable resources & absorb waste



$$\text{Area} \times \text{Bioproductivity}$$

Natural Capital Credit/Debt by Country



BIOCAPACITY CREDITORS
BIOCAPACITY GREATER THAN FOOTPRINT



>150%



100% -
150%



50% - 100%



50% - 0%

BIOCAPACITY DEBTORS
FOOTPRINT GREATER THAN BIOCAPACITY



>150%



100% -
150%



50% - 100%



50% - 0%

Natural Capital: United States



Biocapacity
per person

3.4

gha

Ecological Footprint
per person

8.1

gha

BIOCAPACITY
RESERVE(+)/DEFICIT(-)

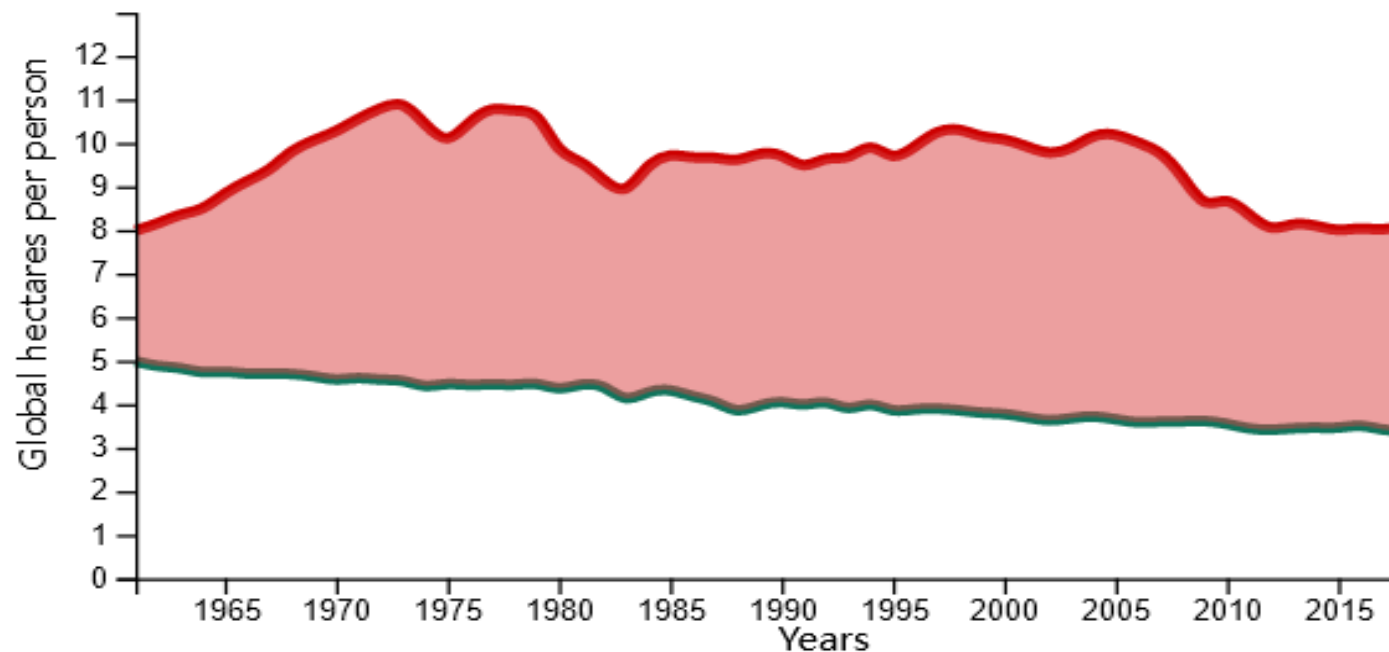
-4.7

gha

Ecological Footprint and
Biocapacity
From 1961 to 2018

Ecological
Footprint per
person

Biocapacity
per person



Natural Capital: Costa Rica



Biocapacity
per person

1.5
gha



-

Ecological Footprint
per person

2.4
gha



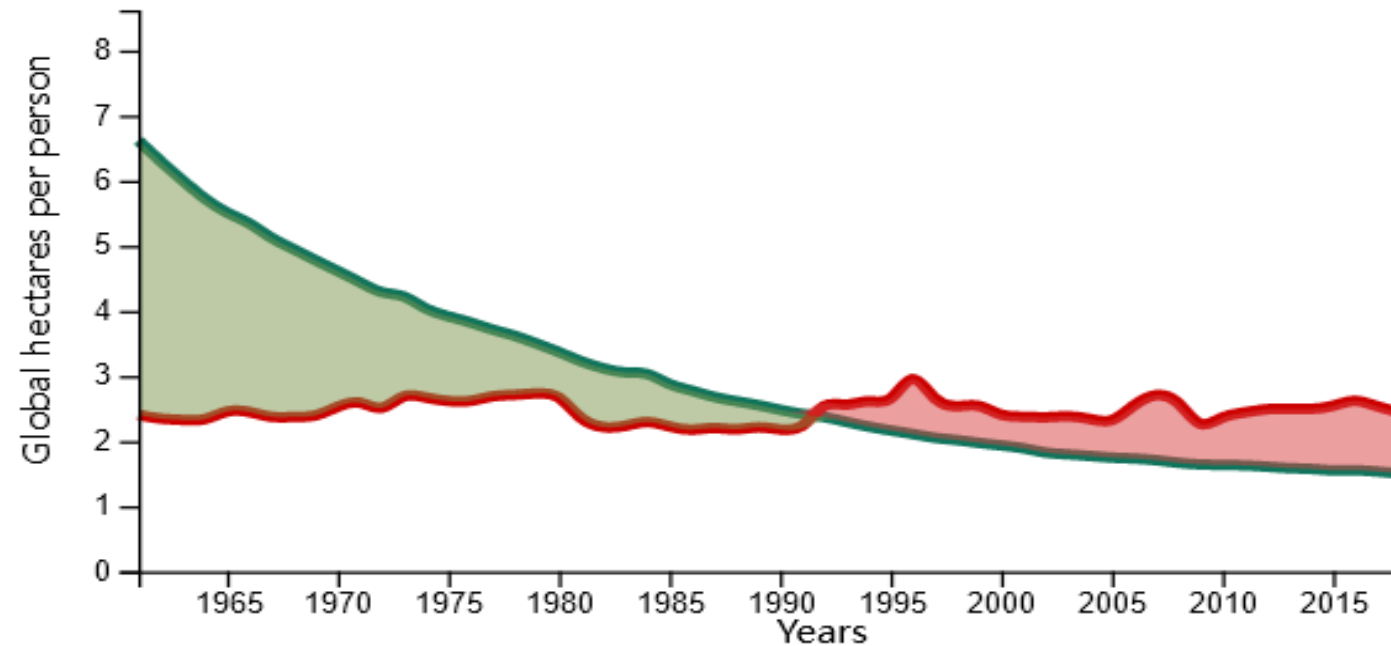
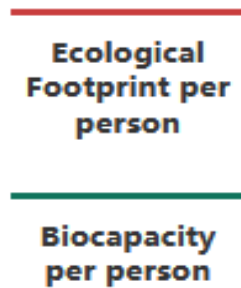
=

BIOCAPACITY
RESERVE(+)/DEFICIT(-)

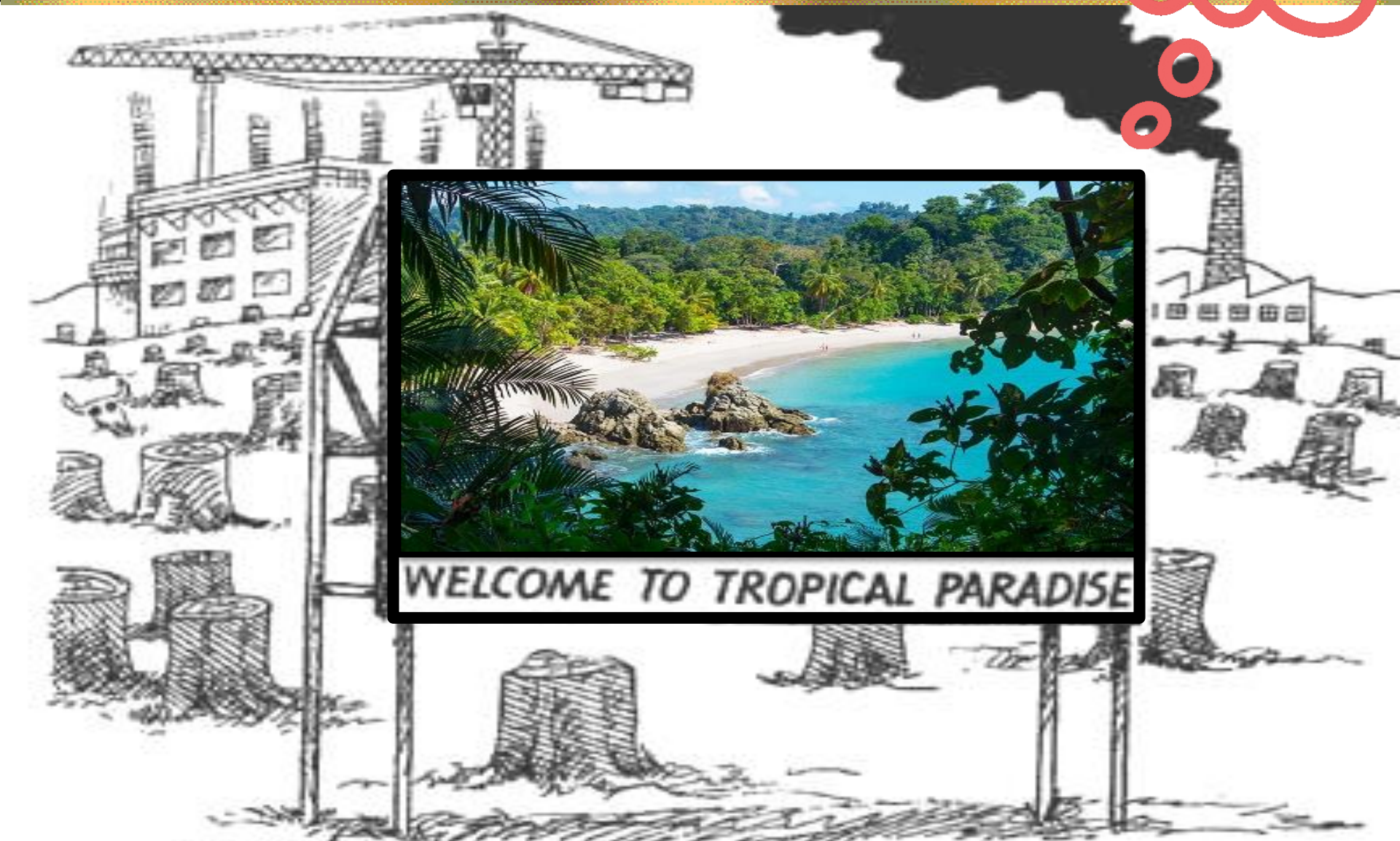
-0.9
gha



Ecological Footprint and
Biocapacity
From 1961 to 2018



Costa Rica: The Green Republic?



WELCOME TO TROPICAL PARADISE

arcadio 2004-29-04

Costa Rica: The Green Republic?

1. Yes or no?



2. One example to support your answer

Costa Rica: Air Quality

- Vehicles make up 75% of air pollution (*remainder from industry*) & up to 60% of all GHG emissions.
- San José: Rush hour commute time increased 40%+ since 2015 & pollution levels double those established by Ministry of Health.
- Vehicle inspection system, San José vehicle restriction, encouragement of new vehicles, etc...



~10% more vehicles/year

Doubling time: $70/10\% = 7$ years

~ 600% increase since 2004

Costa Rica: Carbon-Neutral?

CARBON BALANCE

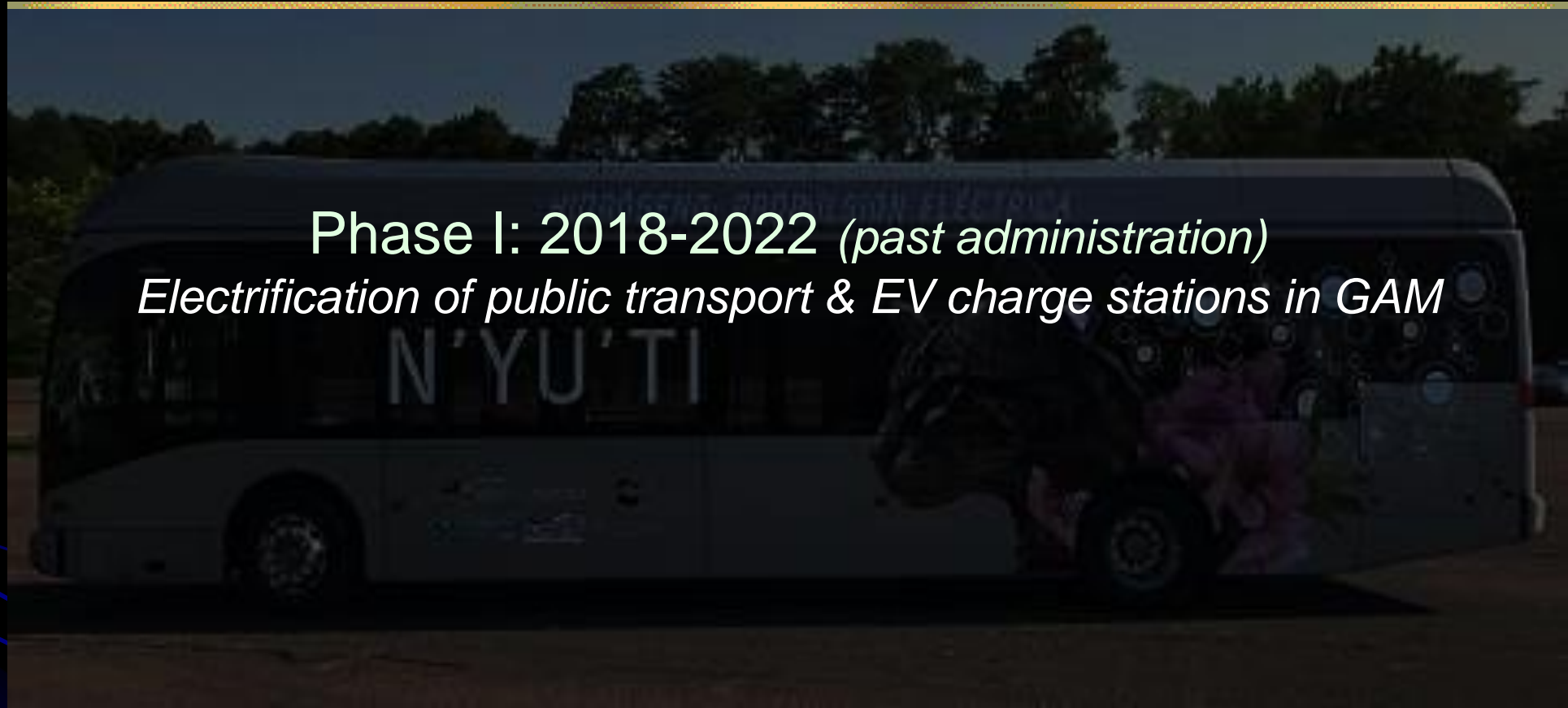
- 21.7 million metric tons emissions
- vs.
- 4.4 million metric tons absorption



**CARBONO
NEUTRAL**

Reconocido por el Gobierno de Costa Rica

National De-carbonization Plan

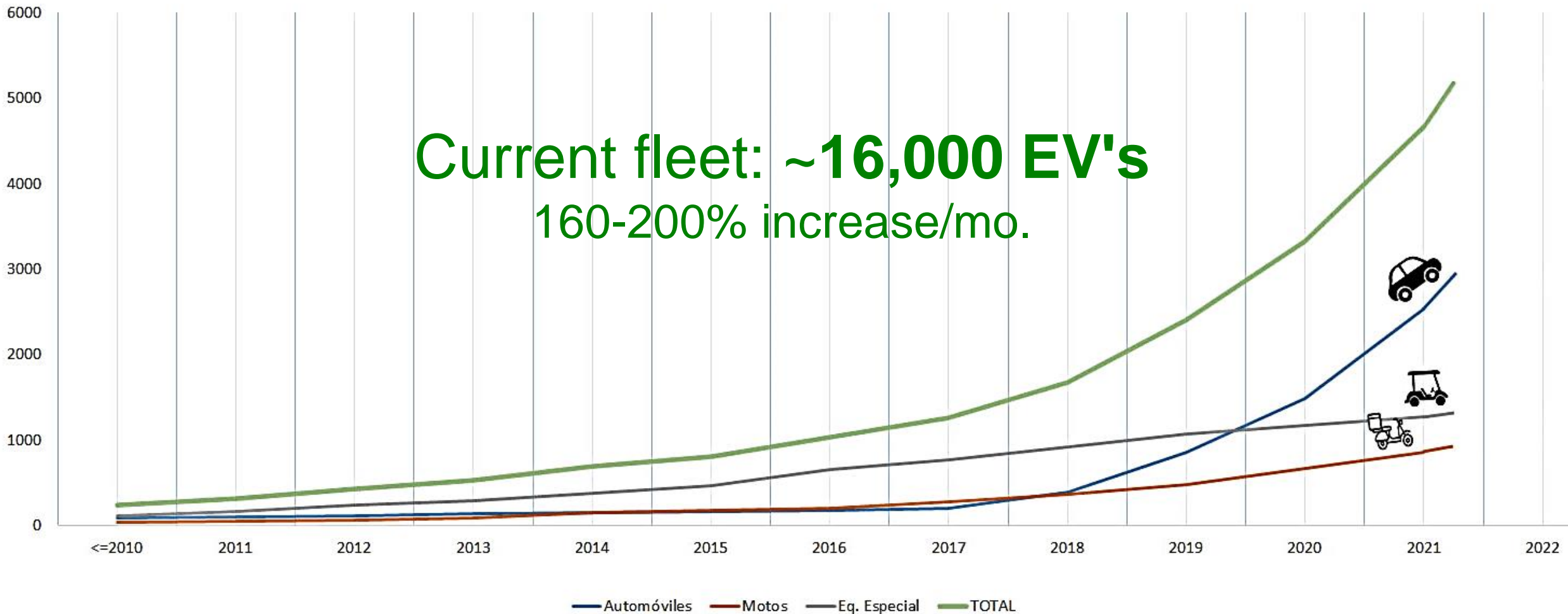


Phase I: 2018-2022 (*past administration*)

Electrification of public transport & EV charge stations in GAM

Costa Rica: Transition to Electric Vehicles

Current fleet: ~16,000 EV's
160-200% increase/mo.



National De-carbonization Plan

Phase I: 2018-2022 *(past administration)*

Electrification of public transport & EV charge stations in GAM

Phase II: 2023-2030

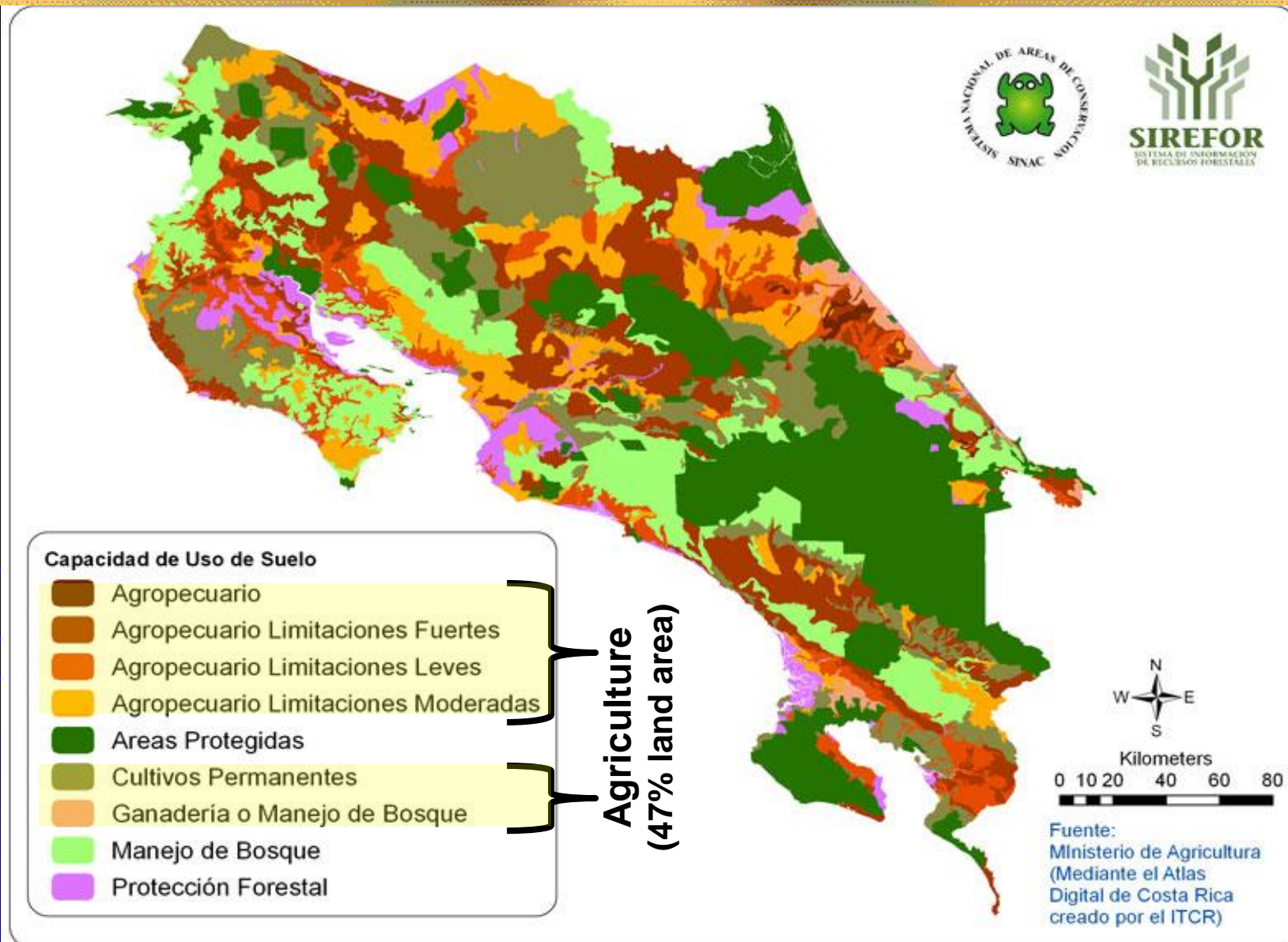
*Green fiscal reform, disincentives of petroleum vehicle use
& livestock & agriculture reforms (e.g., composting)*

National De-carbonization Plan

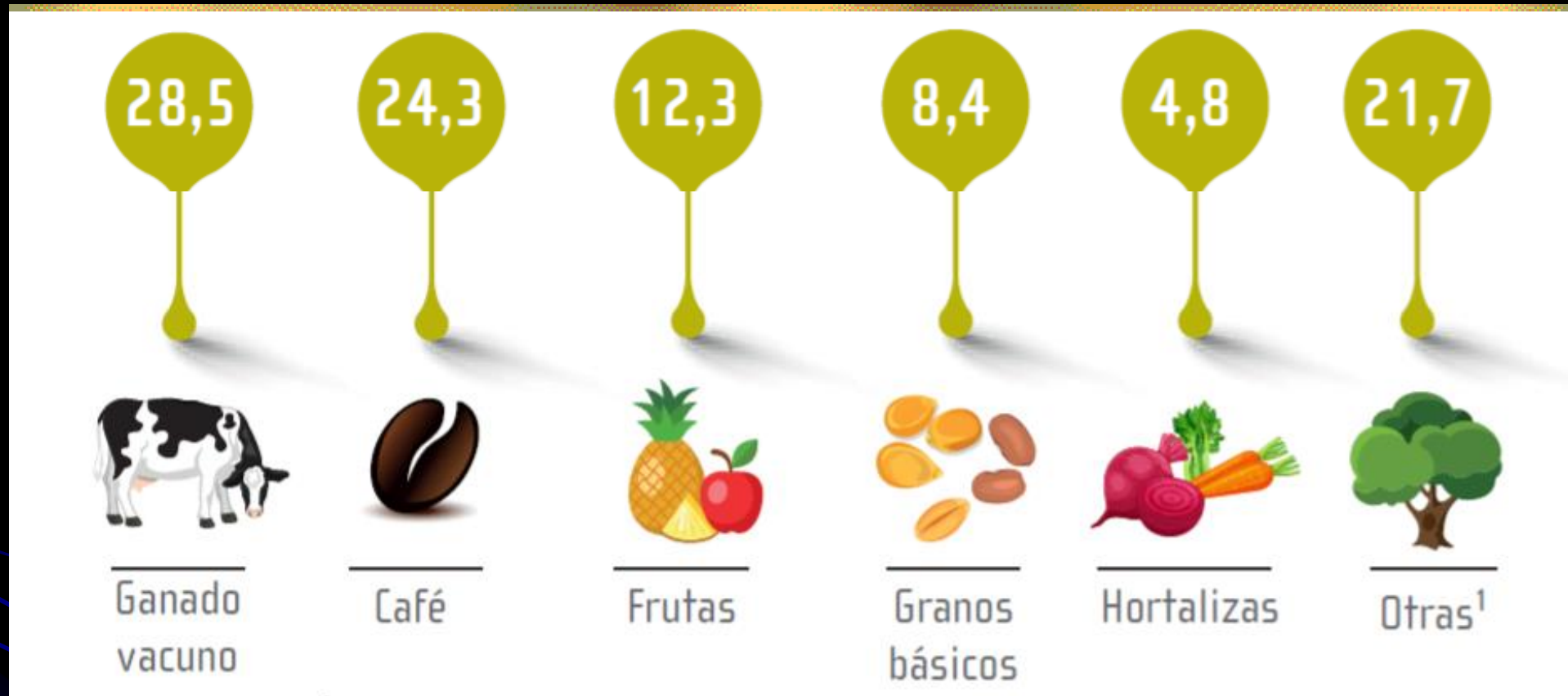
Phase III: 2031-2050

- a) Electricity primary energy source nationwide (ALL sectors)
- b) 20% increase in efficiency of goods transport (vs. 2018)
- c) Nationwide waste management system in-place
- d) 50% buildings meet low emission standards
- e) 20% restoration of rivers in GAM
- f) Public transport primary in GAM

Costa Rica: Land Use



Costa Rica: Agricultural Activities (%)



Did You Know...

Costa Rica Ranks 1st in the world in pesticide use?

Country	Amount (Kg/Hectare of Cropland)
Costa Rica	18.2->35 kg
China	17 kg
United States	2.5 kg

- Highest on important export crops: Banana, pineapple, coffee
- 200+ acute poisoning cases & 100 fatal poisonings/year
- 23% of local vegetables have toxic levels of pesticides

Did You Know...



Did You Know...



Did You Know...



Costa Rica: Water Treatment

Until recently only **4% of waste water treated**

2016: National waste water policy established

San José (Los Tajos) Waste Water Treatment Plant

Largest waste water treatment project in Central America

Completed in 2020:
Waste water treatment level now **27%**
(1 million+ people)



Costa Rica: Waste Management

1.2 Million tons of municipal solid waste generated annually

45,000 tons waste recycled = 6.6%

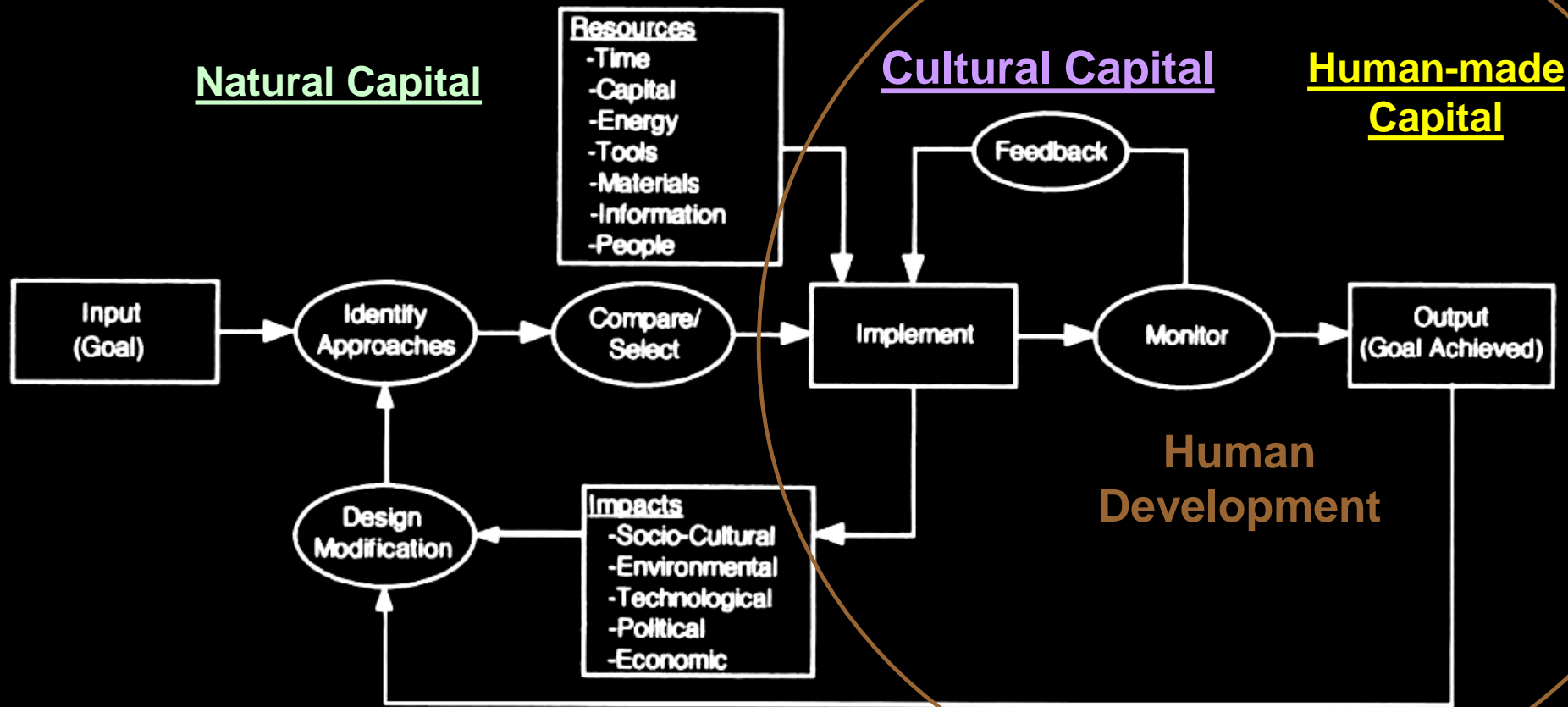
1.2% (2014)

25% (1,000 tons/year)
unaccounted for

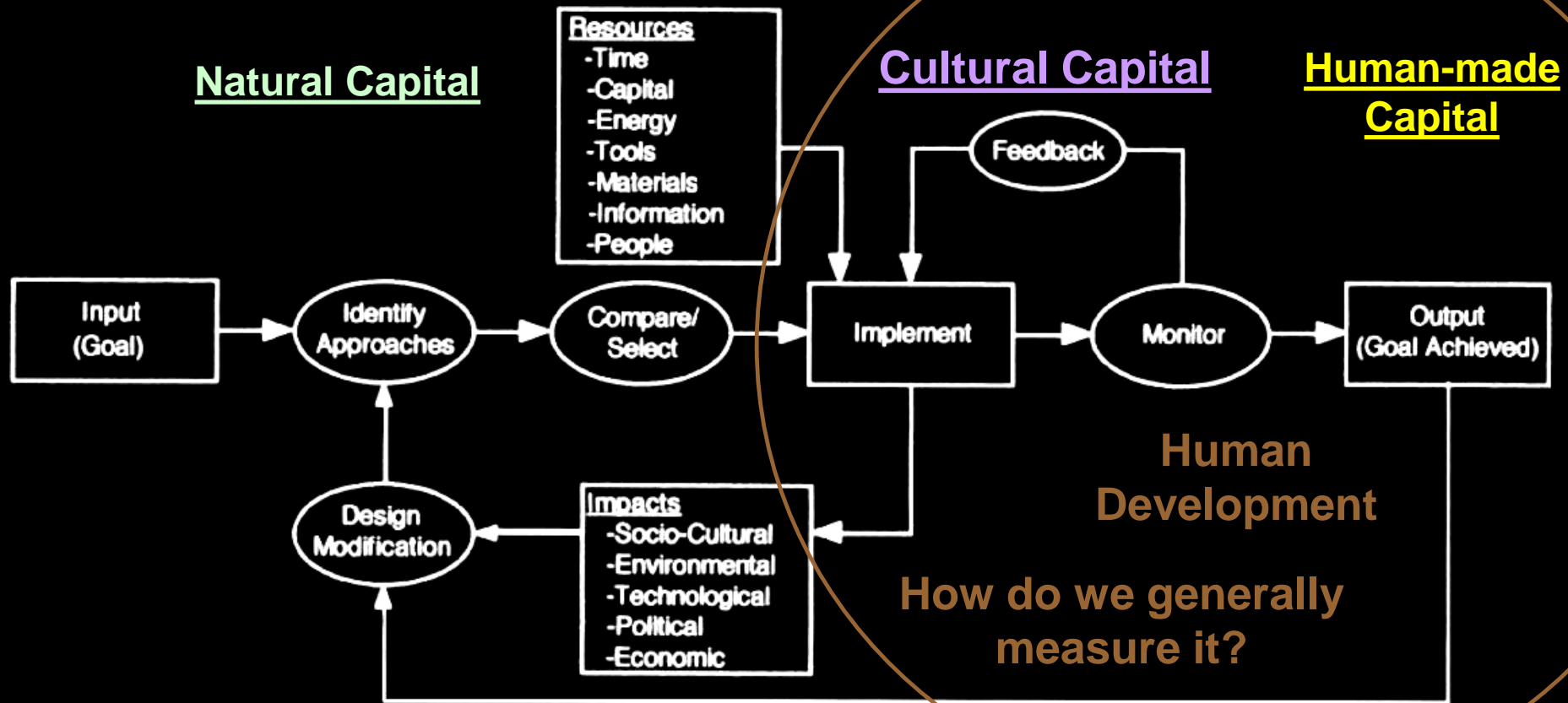
deposited in rivers,
empty lots
& streets



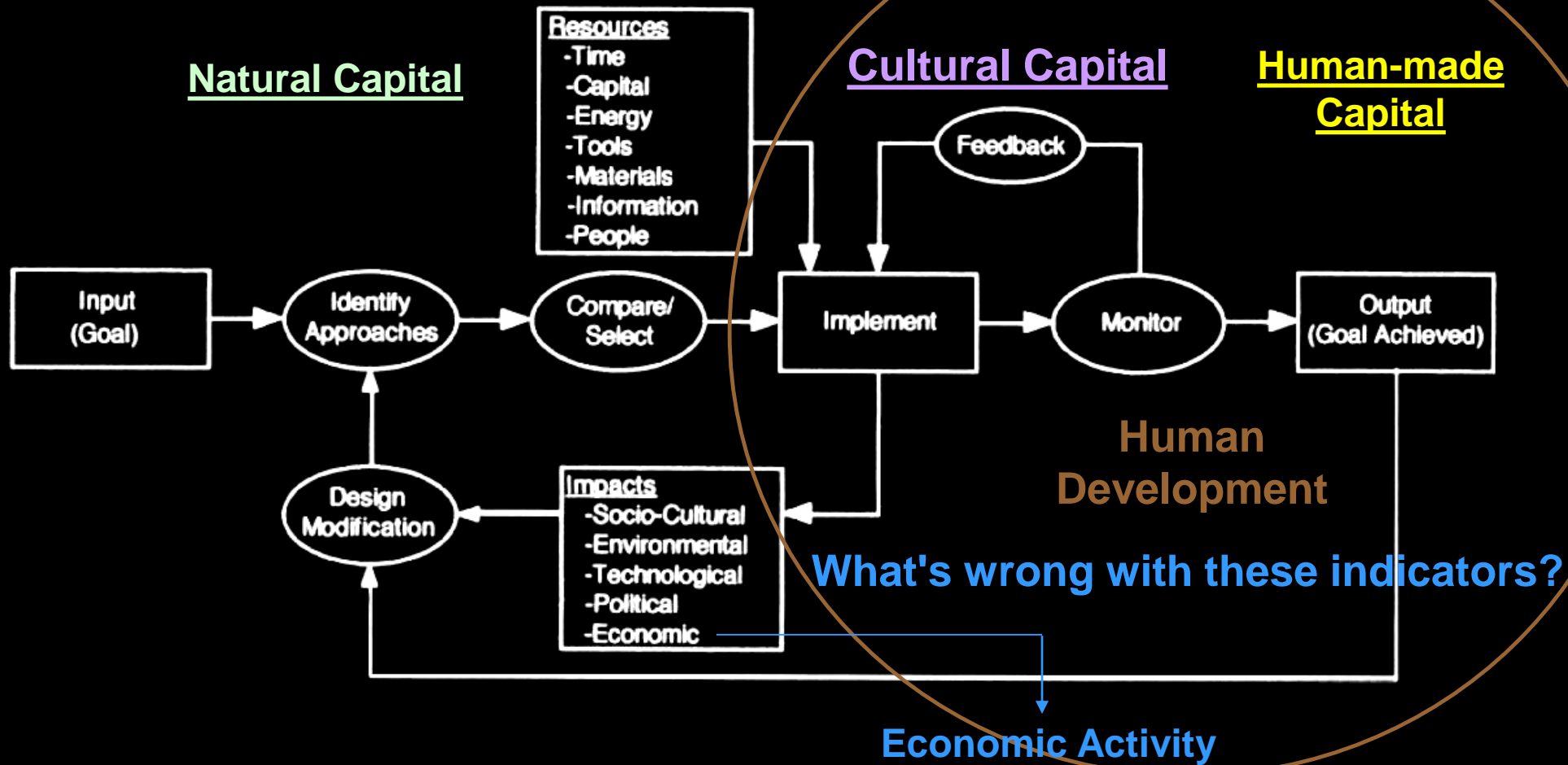
Development Review: Types of Capital



Development Review: Types of Capital

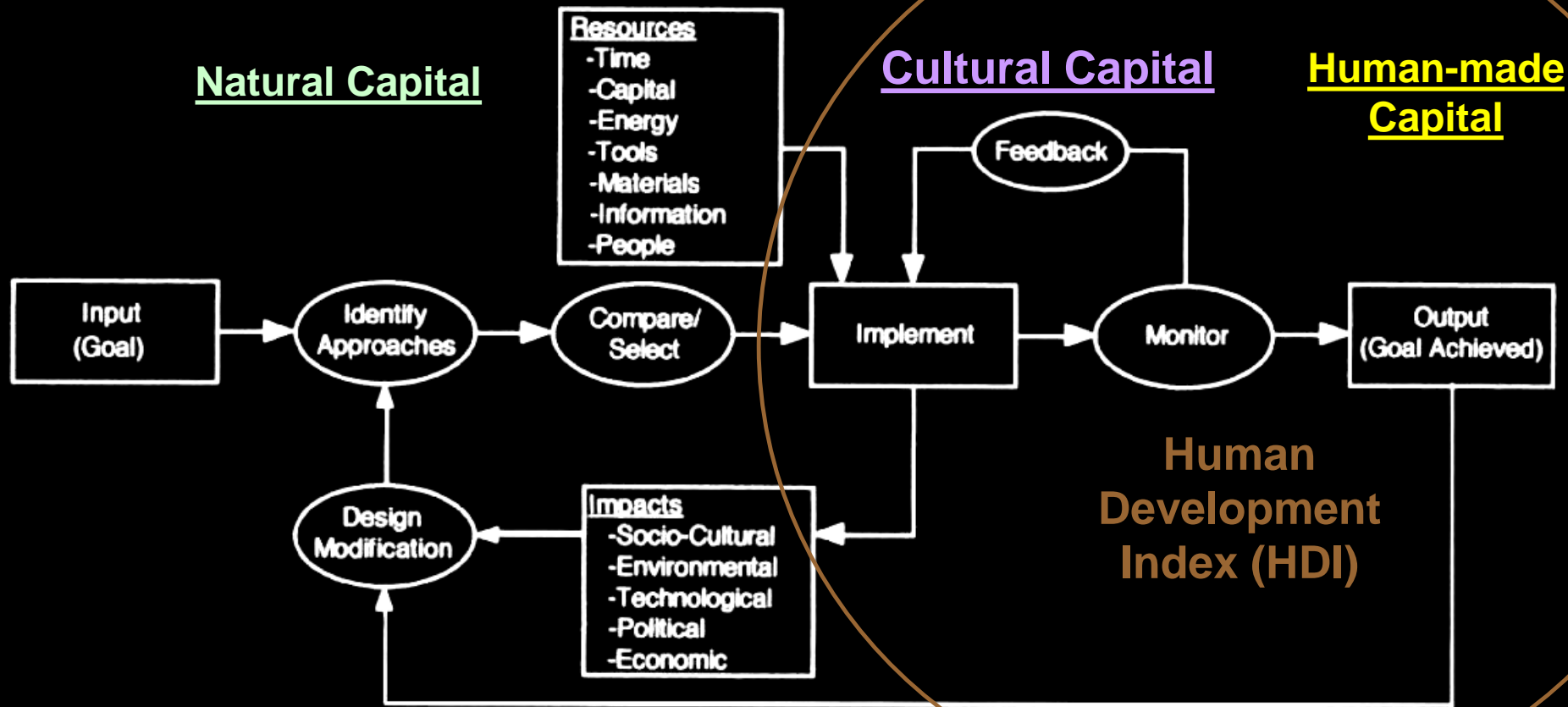


Development Review: Types of Capital



GDP, retail sales, new housing starts, industrial production...

Development Review: Types of Capital



Human Development Index (HDI)

United Nations Development Program (UNDP)

Includes economic activity and other values that do not reflect in growth or income (0-1)

Three Dimensions

1. HEALTH: Living a long and healthy life
2. EDUCATION: Acquisition of knowledge
3. LIVING STANDARDS: Availability of income

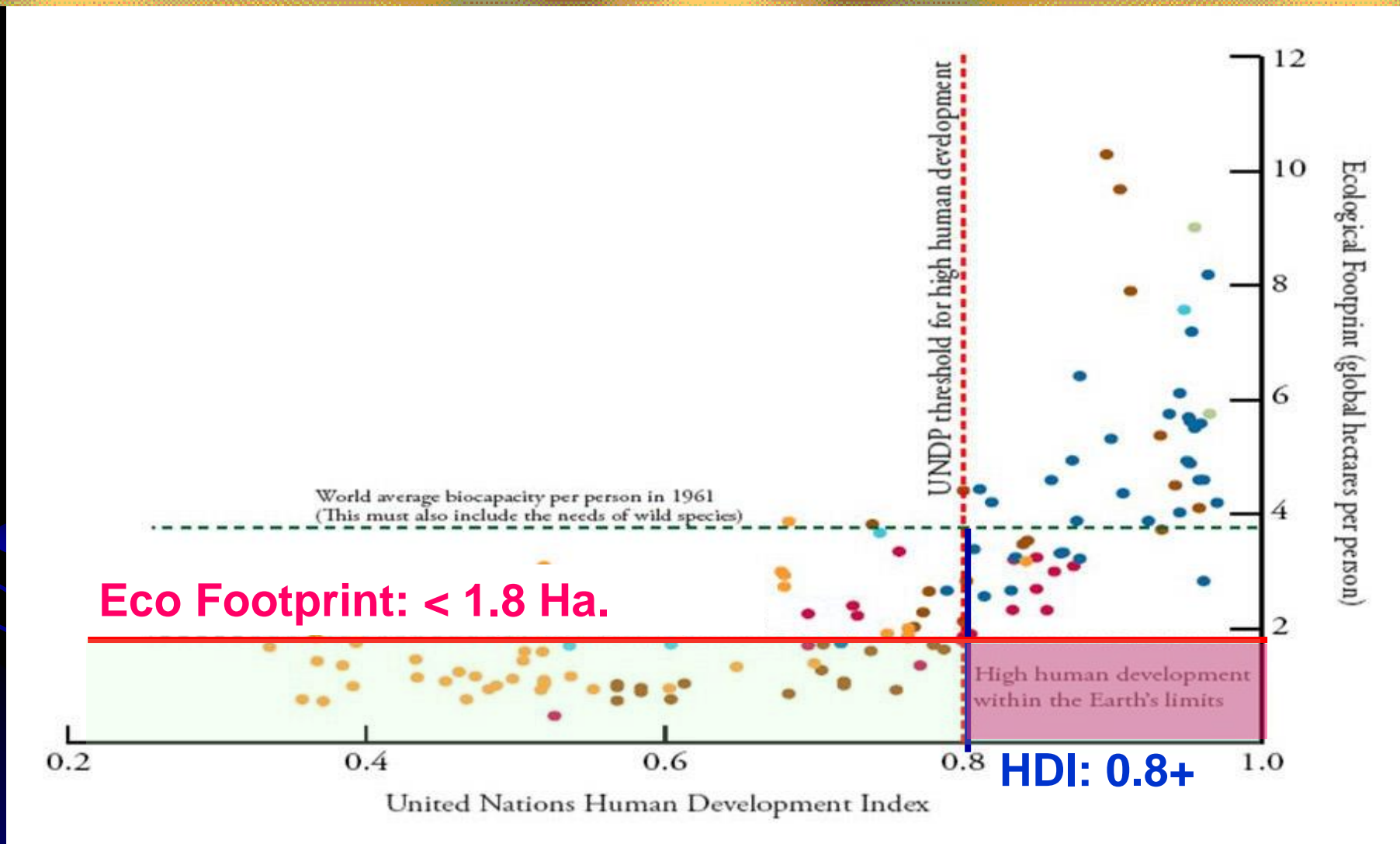


Human Development Index: Global

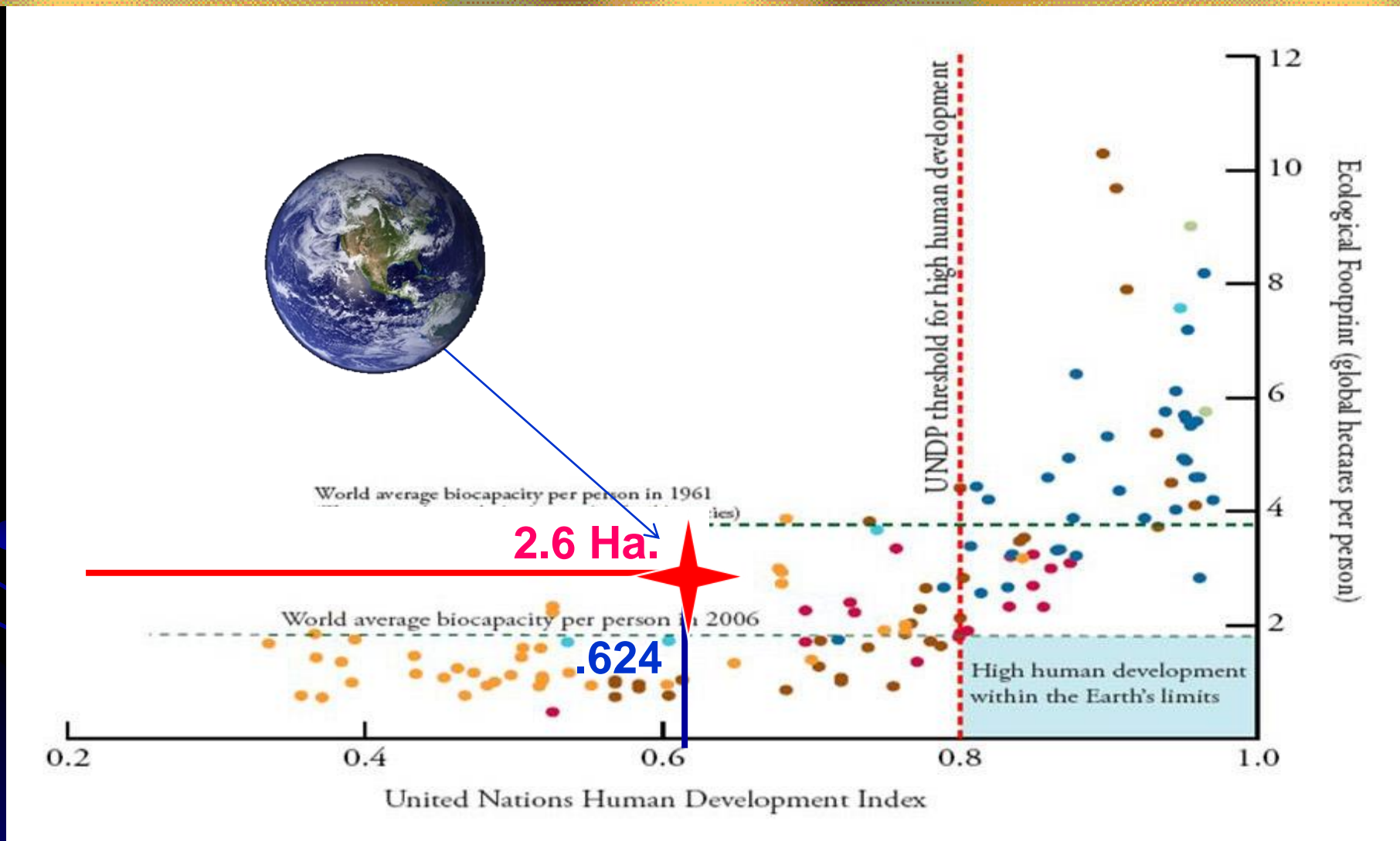
Country	HDI
Norway	.938
Australia	.937
New Zealand	.907
United States	.902
Costa Rica	.725
Global Average	.624
Niger	.261
Congo	.239
Zimbabwe	.140



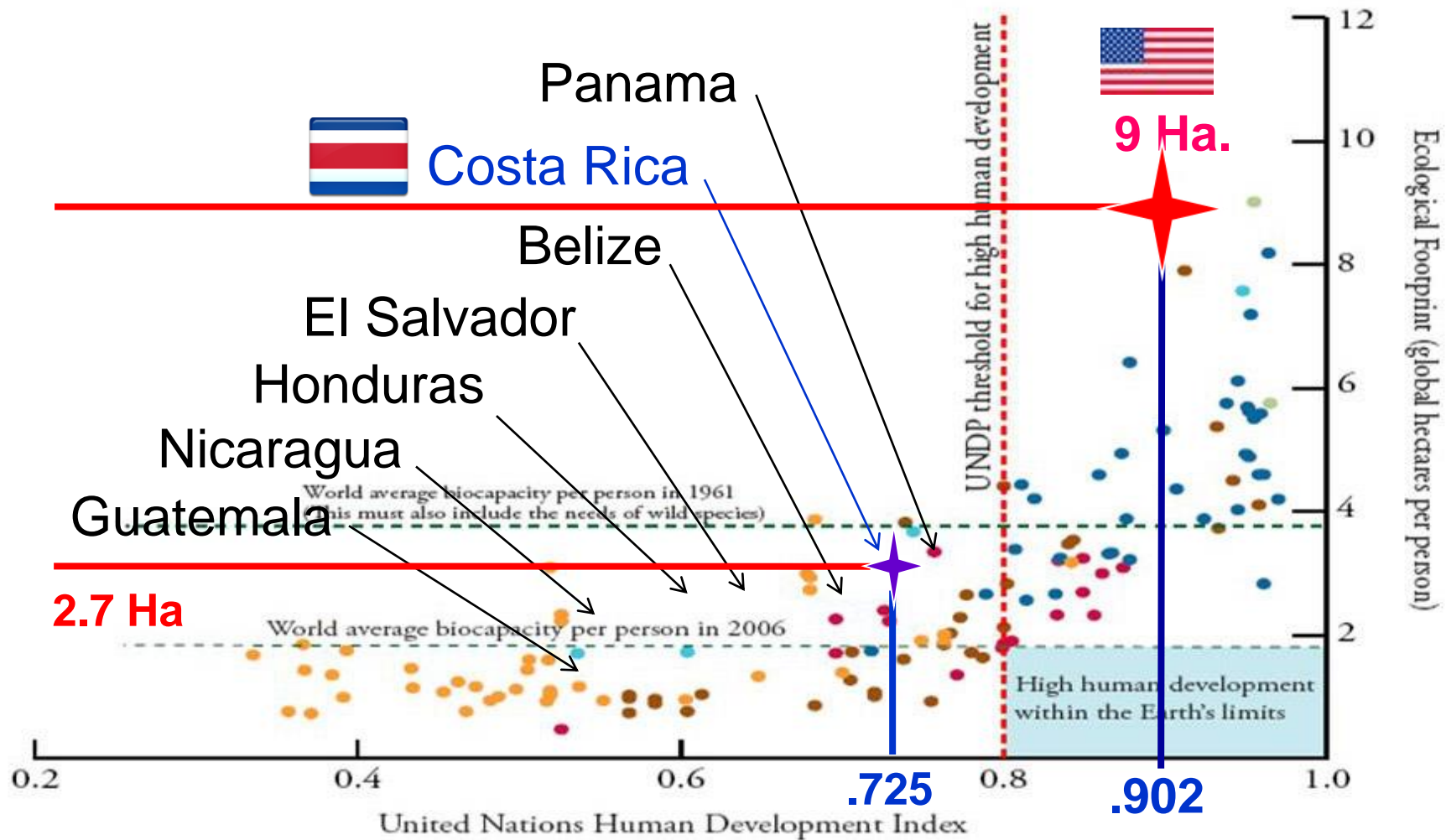
HDI vs. Ecological Footprint



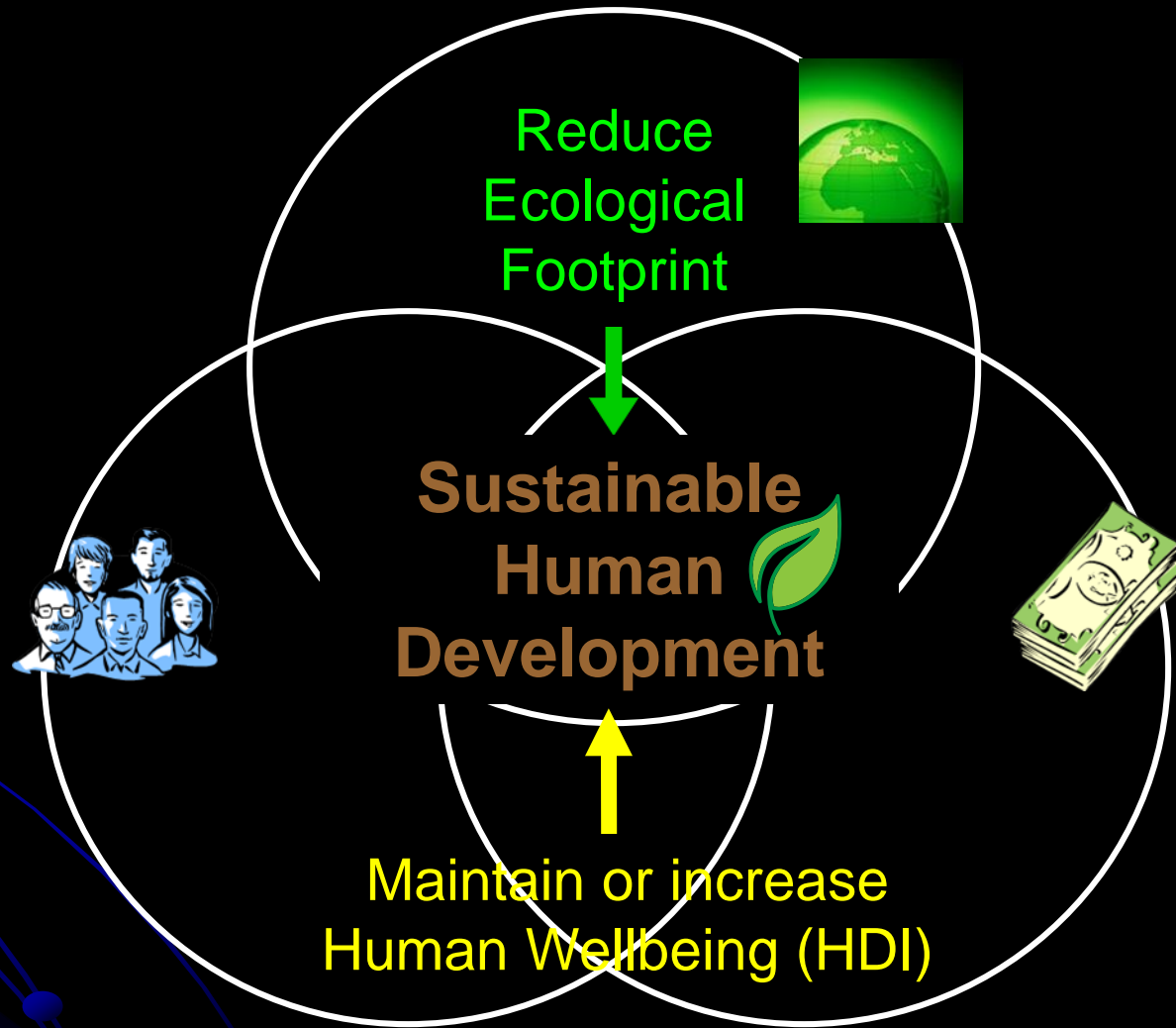
HDI vs. Footprints: Global



HDI vs. Footprints: Central America



Sustainable Human Development



Up Next:



Uneven Development

Decorative blue lines and dots in the bottom left corner of the slide.